

ORAL SESSIONS

ORAL SESSION 7A

ORGAN DAMAGE

7A.01 CAROTID ULTRASONOGRAPHY PREDICTS CARDIOVASCULAR EVENTS BETTER THAN ECHOCARDIOGRAPHY IN UNCOMPLICATED HYPERTENSION

S. Denti, P.S. Saba, S. Cambule, A.M. Sini, L. Usai, A. Ganau. *Cardiology, Department of Internal Medicine, University of Sassari, Sassari, Italy*

Left ventricular hypertrophy (LVH), carotid intima-media thickening (IMT) and plaques are independent predictors of cardiovascular events. Accordingly, echocardiography and carotid ultrasonography are both used for risk stratification in hypertension. However, it is not clear which marker better predicts cardiovascular events and which ultrasonographic investigation should be preferred in this setting.

Objectives: To compare the prognostic value of LVH, carotid IMT and plaques in uncomplicated hypertensives.

Methods: 278 patients (42% males, aged 60 ± 12 years) underwent baseline carotid and cardiac ultrasonography and were subsequently followed for 8.0 ± 3.0 years. LVH and IMT were defined as LV mass $>125 \text{ g/m}^2$ and IMT ≥ 0.9 , respectively. Atherosclerotic burden was assessed as any plaque, plaque score (0 to 6) or stenosing ($>50\%$) plaques. Primary end point included fatal and non fatal cardiovascular events. Hazard ratios (HRs) were estimated by Cox models. Predictive accuracy of cardiac and carotid ultrasonography was assessed using ROC curves.

Results: Diabetes was present in 22% of subjects, hypercholesterolemia in 46%, smoking history in 46%. The mean 10-years cardiovascular risk was $12 \pm 8\%$, according to Italian risk charts. LVH (HR = 2.77, CI 1.44–5.30), IMT (HR = 3.82, CI 1.86–7.82), plaque score >5 (HR = 3.82, CI 1.21–12.09) and stenosing plaques (HR = 2.69, CI 1.23–5.91), but not any plaque, individually predicted cardiovascular events. Among all markers, IMT was the strongest independent predictor (HR = 3.38, CI 1.55–7.37), superior to LVH (HR = 2.15, CI 1.08–4.26) and the other markers. Compared to Italian risk charts, carotid ultrasonography significantly increased cardiovascular events prediction (AUC = 0.74 versus 0.62, $p = 0.01$) and performed better than echocardiography (AUC = 0.71 versus 0.63, $p = 0.04$). This finding was more pronounced in the low-moderate risk subgroup (78%) (AUC = 0.75 versus 0.60, $p < 0.001$ and AUC = 0.72 versus 0.60, $p = 0.02$; carotid and cardiac ultrasonography respectively).

Conclusion: IMT is the strongest predictor of cardiovascular events in uncomplicated hypertension. Carotid ultrasonography improves risk prediction better than echocardiography. Therefore, it should be firstly considered for cardiovascular risk assessment in these subjects, especially in those at apparently low-moderate risk.

7A.02 AMALGAMATION OF MICRO AND MACROVASCULAR DAMAGE IN ESSENTIAL HYPERTENSION: THE COEXISTENCE OF RETINAL DAMAGE AND ARTERIAL STIFFNESS

V. Katsi, G. Soubretis, I. Skiadas, D. Tsartsalis, P. Theodoropoulos, G. Trantalis, C. Vlachopoulos, C. Stefanadis, I. Kallikazaros. *Hippokratia Hospital - Department of Cardiology, Athens, Greece*

Objective: The clinical and prognostic significance of hypertensive retinal changes, an established hypertension-related target organ damage (TOD), remains controversial. Therefore, we sought to investigate the relationship between retinal alterations and arterial stiffness, an index strongly correlated to increased cardiovascular morbidity and mortality.

Design and Method: Our population consisted of 268 consecutive newly diagnosed, untreated, essential hypertensives (aged $= 60 \pm 13$ years, 151 female, office blood pressure = $152/90 \text{ mmHg}$), without any history of cardiovascular disease or any other evident comorbidity. Venous blood

samples were drawn for determination of metabolic profile and all participants underwent ambulatory blood pressure monitoring (ABPM). All subjects underwent funduscopy examination and were distributed to five groups according to Scheie's grading system. (Groups A, B, C, D and E, for Scheie's scale 0, I, II, III and IV, respectively). Arterial stiffness was evaluated on the basis of carotid to femoral pulse wave velocity (c-f PWV) by means of a computerized method (Complior SP).

Results: The five groups (including 39, 87, 99, 35 and 8 subjects respectively) did not differ with regard to age, gender, ABPM parameters and their metabolic profile (fasting glucose, serum lipids, uric acid) as well. However, hypertensives of higher Scheie's category exhibited significantly greater values of c-f PWV (8 ± 1.3 , 9.1 ± 1.8 , 9.4 ± 2.1 , 9.8 ± 2 and $9.9 \pm 2.4 \text{ m/sec}$ respectively, $p = 0.005$). Notably, there was a statistically significant difference on pulse pressure among groups (53 mmHg, 60 mmHg, 63 mmHg, 65 mmHg and 67, respectively) ($p = 0.04$), another surrogate marker of arterial stiffness. Multivariable regression analysis showed that age, fundus classification and systolic arterial pressure were independent determinants of c-f PWV.

Conclusions: In hypertensive subjects there is a progressive stiffening of the aorta in parallel with the evolution of the fundus lesions according to Scheie's scale. A possible explanation derives from the fact that same pathophysiological processes, like wall remodeling or endothelium impairment occur in small and in large vessels in hypertension.

7A.03 INCREASED PULSE PRESSURE IS ASSOCIATED WITH LEFT ATRIAL ENLARGEMENT IN RESISTANT HYPERTENSIVE PATIENTS

P. Armario¹, A. Oliveras², R. Hernández Del Rey¹, C. Calvo³, C. Suárez⁴, J. Sobrino⁵, C. Fernández⁶, I. Lekuona⁷, A. Felip⁸, P. Aranda⁹, A. de la Sierra¹⁰. ¹Hospital General de L'Hospitalet, L'Hospitalet de Llobregat, Barcelona, Spain, ²Hospital del Mar, Barcelona, Spain, ³Hospital Clínico, Santiago de Compostela, Spain, ⁴Hospital de la Princesa, Madrid, Spain, ⁵Hospital Espíritu Santo, Santa Coloma de Gramanet, Barcelona, Spain, ⁶Hospital Virgen de las Nieves, Granada, Spain, ⁷Hospital de Galdakao, Galdakao, Spain, ⁸Hospital de Mataró, Mataró, Barcelona, Spain, ⁹Hospital General Carlos Haya, Málaga, Spain, ¹⁰Hospital Mutua de Terrassa, Terrassa, Barcelona, Spain

Background: There is strong evidence that left atrial enlargement (LAE), as determined by echocardiography, is a robust predictor of cardiovascular outcomes. A modest correlation between pulse pressure (PP) and left atrium diameter has been previously observed in essential hypertension, but its prevalence and associated factors are unknown known in resistant hypertensive patients (RH).

Objective: To determine the associated factors with LAE in resistant hypertensive patients.

Design and Method: Patients with clinical RH were consecutively recruited from Hypertension Units all around Spain. Inclusion criteria: patients aged >18 years, office RH diagnosis (BP greater or equal 140 and/or 90 mmHg despite a therapeutic plan with at least three drugs, including a diuretic), secondary hypertension ruled-out, with estimated glomerular filtration rate $>30 \text{ mL/min/1.73m}^2$. Demographic and anthropometric characteristics, cardiovascular risk factors and clinical associated conditions were recorded. Left ventricular hypertrophy was defined as a left ventricular mass index (LVMI) $>125 \text{ g/m}^2$ in men or $>110 \text{ g/m}^2$ in women. LAE was defined as a left atrium diameter indexed to body surface area diameter $>26 \text{ mm/m}^2$.

Results: 529 subjects with resistant hypertension, aged 64 ± 11 years, 47% women, were included. A 38.2% of them had diabetes mellitus, 53.1% had a body mass index $>30 \text{ kg/m}^2$, and 11.6% were active smokers. LAE was observed in 11.6% of the patients. When the patients with or without LAE were compared, we observed significant differences in the following factors: Older age (72.1 ± 9 vs 62.8 ± 11 years; $p < 0.0001$), female gender (18.8% vs 5.4%; $p = 0.0005$), prevalence of left ventricular hypertrophy (78.5% vs 21%; $p = 0.0462$), higher clinical PP (80 ± 26 vs 63 ± 11 ; $p = 0.012$) and a higher 24h-PP (74 ± 28 vs 60 ± 15 ; $p < 0.0001$). In the logistic regression analysis the independent associated factors with LAE were age (OR 1.07; CI 95% 1.02 to 1.14; $p = 0.013$) and 24h-PP (OR for 5 mm Hg increase: 1.21, CI 95% 1.18 to 1.25; $p = 0.010$).

Conclusions: Elevated pulse pressure was an independent associated factor with left atrial enlargement in patients with resistant hypertension.

7A.04 THE PROGNOSTIC DIFFERENTIAL OF GEOMETRIC PATTERNS OF LEFT VENTRICULAR HYPERTROPHY

A. Ryabikov^{1,2}, S. Malyutina¹, S. Shakhmatov¹, G. Simonova¹, V. Gafarov¹.
¹Institute of Internal Medicine SB RAMS, Novosibirsk, RUSSIA, ²Novosibirsk State Medical University, Novosibirsk, Russia

The left ventricular hypertrophy (LVH) is an established predictor of fatal and non-fatal cardiovascular outcomes. Concentric hypertrophy was shown to have the highest impact on CVD risk among geometric patterns of LVH, much less is known about septal hypertrophy pattern.

Purpose: To assess the impact of four geometric patterns of LVH on CVD incidence and mortality in a general population.

Methods: Random population sample (n=2006, men and women aged 25–64 at baseline) was examined echocardiographically in Novosibirsk (Russia). The cohort was followed-up during on the average 12.2 year. We distinguished four types of LVH: eccentric-nondilated (END), eccentric-dilated (ED), concentric (C), and disproportionate septal (DS) hypertrophy. For end points we registered acute myocardial infarction (MI), fatal coronary heart disease (CHD), cardiovascular deaths (CVD) and deaths from all causes.

Results: The LVH was defined according to population-specific reference value for myocardium mass (MM) index (MMI): 124 g/sq m for men and 100 g/sq m for women (90% cut-off point of MMI distribution in apparently healthy group). Totally 220 outcomes occurred during follow-up in studied cohort. The multivariate adjusted relative risk (RR) of incident MI, fatal MI, CVD death, and all-cause death in subjects with LVH was elevated approximately 1.6–2 times compared to those with normal MMI. The relative risk for fatal CVD in concentric LVH comprised RR=3.4 (95%CI 1.48–7.99, p=0.004), and was attenuated to borderline when adjusted for MM. Septal hypertrophy increased the risk of fatal CVD much strongly: RR=6.0 (95%CI 2.55–14.18, p<0.001), and this association remained significant after further controlling for MM. ED hypertrophy increased only the risk of all-cause death among men (RR=1.6, p=0.05).

Conclusion: Among LVH geometric types, concentric and septal hypertrophy are the powerful predictors of CVD risk in general population. The excess risk of fatal CVD in concentric LVH is largely explained by myocardium mass. Septal hypertrophy strongly increased the risk of fatal CVD independently of myocardium mass.

7A.05 RENAL DAMAGE. WHAT FORMULA DO WE USE?

P.J. Labrador, P.M. Gonzalez-Castillo. *Nephrology Unit, Virgen del Puerto Hospital, Plasencia, Spain*

Renal markers of organ damage include serum creatinine levels (sCr), estimates of creatinine clearance by the Cockcroft-Gault (CG) formula or of glomerular filtration rate by the MDRD formula. These estimated values are a more precise index of the cardiovascular risk accompanying renal dysfunction. A new equation, the CKD-EPI equation, has been validated.

The aim of our study was to show the impact of the difference methods used to identify renal damage (RD).

Methods: We analysed data from 1.847 patients in Nephrology care. 1.766 (95.6%) have the complete data to calculate the different estimation formulae. RD was study using sCr levels, estimated glomerular filtration rate using MDRD and CKD-EPI formulae, and estimated creatinine clearance using CG and body surface corrected CG formulae.

We considered RD when 4 or 5 methods were positive, while we considered no RD when one or none method shows RD.

Results: RD prevalence according to the different methods was: a) sCr levels 53.3%, b) MDRD 63.1%, c)CKD-EPI 61.3%, d) CG 57.9%, and e) body-surface corrected CG 60%.

Distribution of patients according to the number of RD methods resulting in RD was: none 34%, one 2.2%, two 3.6%, three 2.8%, four 8.8%, and five 48.5%.

So, for our analysis we consider without RD 36.2% of patients and with RD 57.3%, 6.4% of patients were excluded because they have 2 or 3 RD positive methods.

Sensitivity and specificity of the difference methods used was: a) to sCr levels 88.4% and 99.7%, b) to MDRD 100% and 97%, c) to CKD-EPI 100% and 100%, d) to CG 96.4% and 98%, and to body-surface corrected CG 99.4% and 99.1%.

Conclusions: RD prevalence depends on the method used, existing a variability near to 10% between methods. Use of sCr levels to determinate the presence of RD have a high specificity but the lower sensibility. The best formula according to our study was CKD-EPI, followed by body-surface corrected CG. MDRD and CG equations showed intermediate specificity and sensibility.

7A.06 DECREASED CORONARY MICROCIRCULATION ACCOMPANIED BY INCREASED ARTERIAL STIFFNESS LEADS TO IMPAIRED CARDIOPULMONARY EXERCISE PARAMETERS IN RECENTLY DIAGNOSED HYPERTENSIVE PATIENTS

H. Triantafyllidi, K. Kontsas, P. Trivilou, I. Ikonomidis, S. Tzortzis, J. Lekakis, M. Anastasiou-Nana, D. Kremastinos. *University of Athens, 2nd Department of Cardiology, Attikon Hospital, Athens, Greece*

Background: Impaired coronary microcirculation and increased arterial stiffness represent independent cardiovascular risk factors in essential hypertension. Purpose of the study was to evaluate the influence of both decreased coronary flow reserve and increased arterial stiffness in exercise parameters in patients with recently diagnosed essential hypertension.

Methods: Thirty-four non-diabetics, recently diagnosed hypertensive patients underwent a ramp maximal cardiopulmonary exercise test (CPET) on a bicycle ergometry. Carotid to femoral artery pulse wave velocity (PWV) was measured before exercise test as an estimate of arterial stiffness using the Complior apparatus. The ratio of VTI-Vd (time integral of peak diastolic coronary blood flow velocity) after adenosine infusion (140 g/kg/min) to VTI-Vd at baseline during color-guided Doppler echocardiography was used to access coronary flow reserve (CFR). In group A, patients had PWV>10 m/sec and CFR<2.5 (n=20, 51±10 years, 13 men) while in group B, patients had PWV<10 m/sec and CFR>2.5 (n=14, 51±10 years, 10 men). We evaluated the metabolic parameters (oxygen consumption at peak exercise [VO₂ PEAK] and at anaerobic threshold [VO₂ AT] and the 1st degree slope of VO₂ at early recovery [O₂ REC slope]). Blood pressure (BP) response was evaluated as the inotropic response during exercise (BP_{EXERCISE}=BP_{PEAK}-BP_{PRE}) while as hypertensive response was estimated every BP_{PEAK}>200 mmHg.

Results: All patients successfully completed the exercise test without ECG signs or symptoms of myocardial ischemia. Patients in group A compared with patients in group B had worse exercise outcome (p<0.05) regarding VO₂ PEAK=21.7±5 vs. 24.9±5 ml/kg/min, VO₂ AT=11.6±2 vs. 14.8±5 ml/kg/min, O₂ REC SLOPE=651±272 vs. 892±302 and inotropic response=51±17 vs. 66±12 mmHg. In Group A, PWV was positively related with the hypertensive response (r=0.48, p<0.05).

Conclusions: The co-existence of increased arterial stiffness and decreased coronary microcirculation result in impaired exercise parameters in recently diagnosed hypertensive patients during cardiopulmonary exercise test. Whether long-term successful hypertensive treatment leads to a better cardiopulmonary exercise outcome, has not been studied.

7A.07 PREVALENCE AND SIMULTANEOUS OCCURENCE OF MRI ASSESSED CARDIAC AND CEREBRAL TARGET ORGAN DAMAGE AND MICROALBUMINURIA

N. Tjeerdema¹, A. Brandts², J.J.M. Westenberg², M.A. van Buchem², L.J.M. Kroft², M.V. Huisman¹, A. de Roos², J.T. Tamsma¹. ¹Leiden University Medical Centre, Section of Vascular Medicine, Department of General Internal Medicine & Endocrinology, Leiden, The Netherlands, ²Leiden University Medical Centre, Department of Radiology, Leiden, The Netherlands

Objective: Target organ damage (TOD) contributes importantly to treatment decisions in patients with arterial hypertension. However, available evidence on the prevalence of multiple TOD is limited. We examined the prevalence and simultaneous occurrence of microalbuminuria (MA) and MRI assessed subclinical TOD of the heart and brain in patients with hypertension.

Methods: Seventy-three patients with treated hypertension without known overt cardiovascular disease (41 women; 32 men; mean age±sd, 44.5years±13.3; mean systolic blood pressure, 149.1 mmHg±23.9; mean diastolic blood pressure, 89.6 mmHg±13.1) were enrolled for the evaluation of subclinical TOD at our hypertension referral center. Patients underwent cardiac and cerebral MRI assessment in addition to standard evaluation

including 24-h urine collection for MA. MA was used as a marker of renal TOD, increased left ventricular mass index (left ventricular hypertrophy - LVH- male $>85.1 \text{ g/m}^2$, female $>66.9 \text{ g/m}^2$) as marker for cardiac TOD, lacunar brain infarcts, periventricular and deep white matter hyperintensities (PWMH and DWMH) and brain-micro-bleeds (BMB) as markers for cerebral TOD.

Results: In 49.3% of the patients TOD was observed. The prevalence of involvement of one, two or three organs was 38.8%, 9.0% and 1.5%, respectively. Microalbuminuria was present in 21.9% and LVH in 9.7% of the patients. Cerebral TOD was present in 30.1% of the patients defined as positive for at least one of following cerebral changes: PWMH (20.5%),

SWMH (17.8%), lacunar brain infarcts (9.6%) and BMB (5.5%). The most frequent combinations were MA and cerebral TOD: 5.5% and LVH and cerebral TOD: 4.1%.

Conclusions: This is the first time that clustering of MRI assessed TOD and MA are reported. Our results show that: (i) subclinical cerebral TOD is a frequently present phenotypic expression of hypertensive TOD; (ii) multiple target organ abnormalities were observed in approximately 10% of the patients, cerebral/renal and cerebral/cardiac being the most frequent combinations. Early recognition of patients developing organ damage with MRI should be further studied regarding treatment outcome since this may select a target population needing more intensive treatment.

ORAL SESSIONS

ORAL SESSION 7B

EPIDEMIOLOGY OF HYPERTENSION AND METABOLIC DISORDERS 1

7B.01 INTERACTION BETWEEN LEPTIN, LEISURE TIME PHYSICAL ACTIVITY, AND HYPERTENSION IN THE COPENHAGEN CITY HEART STUDY

C. Asferg¹, R. Møgelvang², A. Flyvbjerg^{3,7}, A. Frystyk^{3,7}, J.S. Jensen^{2,8}, J.L. Marott⁴, M. Appleyard⁴, P. Schnohr⁴, G.B. Jensen^{5,8}, J. Jeppesen^{6,8}.
¹Copenhagen University Hospital Glostrup, Department of Clinical Physiology and Nuclear Medicine, Glostrup, Denmark, ²Copenhagen University Hospital Gentofte, Department of Cardiology, Gentofte, Denmark, ³Aarhus University Hospital Aarhus, Medical Research Laboratories, Clinical Institute and Medical Department M, Aarhus, Denmark, ⁴Copenhagen University Hospital Bispebjerg, The Copenhagen City Heart Study, Bispebjerg, Denmark, ⁵Copenhagen University Hospital Hvidovre, Department of Cardiology, Hvidovre, Denmark, ⁶Copenhagen University Hospital Glostrup, Department of Medicine, Glostrup, Denmark, ⁷Faculty of Health Sciences, University of Aarhus, Aarhus, Denmark, ⁸Faculty of Health Sciences, University of Copenhagen, Copenhagen, Denmark

Objectives: The mechanisms by which overweight and physical inactivity lead to hypertension are complex. Leptin, an adipocyte-derived hormone, has been linked with hypertension. We studied the relationship between leptin, physical activity, and new-onset hypertension.

Methods: A prospective study design based on data from the 3. and 4. Copenhagen City Heart Study (CCHS). From the 3. CCHS, which was performed in 1991 to 1994, we identified 1111 subjects (744 women and 367) who were normotensive. Based on questionnaire items, the participants were divided into two groups with low (n = 674) and high (n = 437) level of leisure time physical activity, respectively. Between the 3. and the 4. CCHS examination, which was performed in 2001 to 2003, 304 had developed hypertension, defined as systolic blood pressure (SBP) ≥ 140 mm Hg or diastolic blood pressure (DBP) ≥ 90 mm Hg or use of antihypertensive medication.

Results: In a logistic regression model, including age, sex, body mass index, SBP, DBP, level of physical activity, and leptin, we found a significant interaction between leptin and level of physical activity with new-onset hypertension as outcome variable ($P = 0.012$). When we entered the interaction variables: effect of leptin with low level of physical activity and with high level of physical activity, respectively, in the original model, leptin only predicted new-onset hypertension in participants with low level of physical activity (odds ratio (95% confidence interval): 1.16 (1.01–1.33) for one unit increase in log-transformed leptin levels, $P = 0.038$), but not in participants with high level of physical activity (0.88 (0.74–1.05), $P = 0.15$). If we included other risk factors of hypertension and possible mediators of overweight-related hypertension, such as the triglyceride to HDL cholesterol concentration ratio, fibrinogen, glucose, diagnosis of diabetes, adiponectin, and heart rate, in the model, leptin still predicted new-onset hypertension in participants with a low level of leisure time physical activity ($P = 0.040$).

Conclusion: This study is the first prospective study to report that the hypertensive effect of leptin is modified by leisure time physical activity.

7B.02 EXERCISE SYSTOLIC BLOOD PRESSURE AT 100 WATT PREDICTS CARDIOVASCULAR MORTALITY IN APPARENTLY HEALTHY MEN; A 35-YEAR FOLLOW-UP STUDY

P. Skretteberg¹, I. Grundvold¹, S.E. Kjeldsen¹, G. Erikssen², J. Erikssen³, K. Liestøl³, J. Bodegard¹. ¹Oslo University Hospital, Ullevål, Oslo, Norway, ²Oslo University Hospital, Rikshospitalet, Oslo, Norway, ³University of Oslo, Oslo, Norway

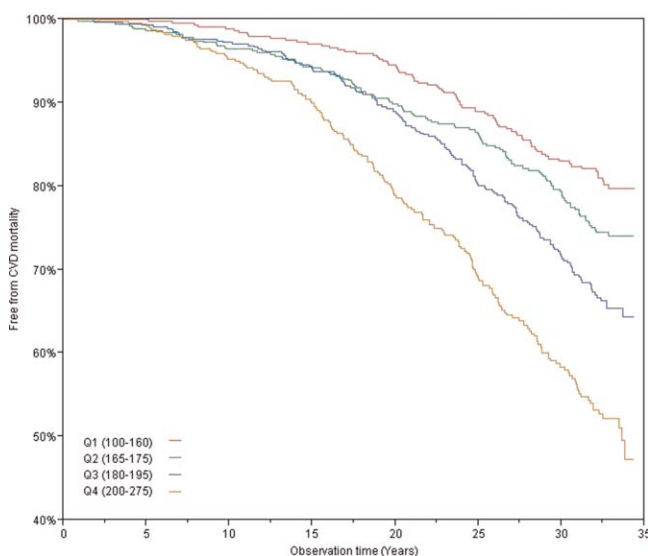
Objective: Systolic blood pressure (SBP) at rest is strongly associated with cardiovascular (CV) mortality, while data on exercise BP have been conflicting. We have previously found peak systolic BP at a workload of 100 Watt

(SBP100) to predict CV mortality after a follow-up of up to 21 years. We now aimed to investigate this association after 35 years.

Design and Methods: 2014 apparently healthy men aged 40 to 59 were included after an extensive examination program including a bicycle exercise test in the years 1972 to 1975. 1999 men achieved a workload of more than 100 W. The association between SBP 100, SBP and CV mortality was analyzed among these men, first in separate models and then in the same model using Cox proportional hazard and adjusted for age, smoking and total cholesterol.

Results: Kaplan-Meier plots illustrate CV mortality in different quartiles of SBP100. Cox models were performed using 1 standard deviation (SD). An increase of 1 SD (24.2 mmHg) in SBP100 was associated with a 1.29 (CI 1.19–1.40, $p < 0.001$) fold increased risk of CV mortality; corresponding for SBP was 1.27 (CI 1.17–1.38, $p < 0.001$) fold increased risk of CV mortality was found per 1 SD (17.9 mmHg). Both SBP and SBP100 were independently associated with CV mortality when tested in the same model.

Conclusion: Our data suggest that exercise systolic blood pressure at the moderate ergometer load of 100 Watt is an independent predictor of long term cardiovascular mortality in healthy middle aged men and that the strength of this association is of the same magnitude as for resting systolic blood pressure.



7B.03 HAEMATOCRIT INDEPENDENTLY PREDICTS MORTALITY IN HYPERTENSIVE PATIENTS

L. Paul, M. Walters, S. Muir, A.F. Dominiczak, G. Lowe, G.T. McInnes, S. Padmanabhan. University of Glasgow, BHF Glasgow Cardiovascular Research Centre, Glasgow, United Kingdom

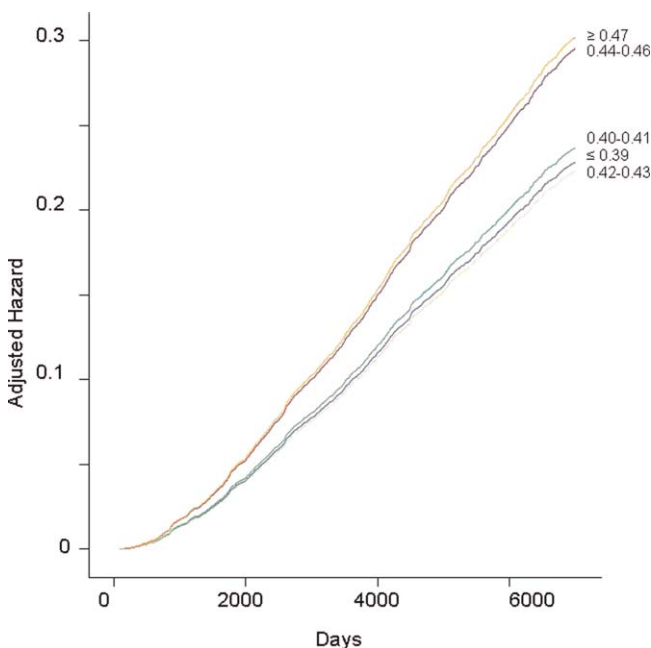
Elevated haematocrit correlates strongly with many independent cardiovascular risk factors including high blood pressure. The association of haematocrit with mortality is variable and suggests a U shaped pattern of risk. We investigated whether the risk associated with haematocrit persisted in treated hypertensive patients attending the Glasgow Blood Pressure Clinic (GBPC).

Methods: We examined the association between haematocrit and mortality in 4835 hypertensive patients attending the GBPC. Covariates in Cox proportional hazards model included age, sex, smoking, BMI, systolic blood pressure, cholesterol, urea and epoch defined by publication of major UK

hypertension treatment guidelines. Haematocrit was treated as a continuous variable in a multivariate analysis.

Results: During 20 years of follow-up, there were 1,202 deaths overall with 719 deaths from cardiovascular causes, and 483 from non-cardiovascular causes. Of the cardiovascular deaths, 455 and 204 were from ischaemic heart disease and stroke respectively. The median haematocrit was 42 (IQR 40–45). For each one percent increase in haematocrit, we observed an increased risk of all-cause (Hazard ratio [HR] 16.4 [95% CI 3.7 – 73.6]; $p = < 0.001$), cardiovascular (17.3 [2.5–119.2]; 0.004), ischaemic heart disease (30.7 [2.7–350.5]; 0.006), non-cardiovascular (13.8 [1.3–150.5]; 0.31) mortalities respectively. There was a borderline significant trend towards increased stroke mortality with increasing haematocrit (36.4 [0.9–1424.7]; 0.055). The results were similar after adjusting for achieved blood pressure during clinic follow-up, and when haematocrit was analysed as quintiles (figure).

Conclusion: Haematocrit in treated hypertensive patients is an independent predictor of increased cardiovascular mortality.



7B.04 DECREASING SYSTOLIC BLOOD PRESSURE RESULT IN DECLINING MORTALITY RATES IN AN UNTREATED POPULATION. RESULTS FROM THE COPENHAGEN CITY HEART STUDY

U. Andersen, G.B. Jensen. *Copenhagen City Heart Study, Copenhagen, Denmark*

Objective: The aim of the present study was to evaluate mortality risk and its association to developments in population systolic BP and to evaluate secular trends in BP associated mortality risk in the untreated population.

Design: The Copenhagen City Heart Study is a prospective longitudinal epidemiological study. The present analysis comprised subjects from survey 1 and 3.

Methods: BP measurements and other methods were fully standardised and unchanged throughout the observation period. Questionnaires were completed by the participants who were followed by public registers.

Results: 18 077 persons participated. Age, systolic BP, diabetes, gender and habitual physical activity were significant predictors of all-cause death in all age groups. Risk-factor adjusted risk for all-cause death was significantly lower in survey 3 compared to survey 1. Among the elderly, there were no development in mortality risk, but in the age groups 40–49 years and 50–59 years there were survey differences indicating a significant trend towards longer life expectancy compared to their age-matched counterparts in survey 1. No secular trend in risk-factor adjusted mortality risk could be identified.

Conclusion: A declining risk-factor adjusted risk of all-cause death was observed in the younger and middle-aged cohorts of the population. The

association of decreasing systolic BP and declining mortality risk in the same age-groups points to a role of systolic BP in age-cohort differentiated improvements of life expectancy. The mortality risk associated with any given level of systolic BP was stationary throughout the observation period.

7B.05 CHANGES IN LEVELS OF SERUM CHOLESTEROL AND DEVELOPMENT OF HYPERTENSION IN THE BRISIGHELLA HEART STUDY

C. Borghi, A.F.G. Cicero, G. Cardella, E. Cosentino, S. D'Addato, L. Laghi, A. Dormi. *Dept. of Medicine, Aging & Clinical Nephrology-University of Bologna, Bologna, Italy*

Rationale and Objectives: Serum cholesterol (S-Chol) levels have been reported to affect blood pressure at young age and hypercholesterolemia might promote the development of hypertension (HBP) probably by activating tissue renin-angiotensin system (RAS). The aim of the present study was to assess the rate of development of stable HBP over a period of 8 years in a population of patients with normal/high-normal blood pressure with a different control of S-Chol levels.

Methods: 932 subjects enrolled in the Brisighella Heart Study with baseline BP values $< 140/90$ mmHg and S-Chol levels from normal to elevated, treated or not with lipid lowering drugs were subdivided in 4 different subgroups according to S-Chol changes over a period of 8 years (1996–2004). Group 1 and 2 included subjects whose S-Chol levels respectively remained or decreased within the normal range, while group 3 and 4 included subjects showing S-Chol levels persistently elevated or increased above the normal range. The main measure of outcome was the incidence of stable HBP (BP $> 140/90$ mmHg and/or treatment for HBP) over the period of follow-up.

Results: No major differences have been observed in the demographic and pressure profile between subjects in group 1–2 vs. group 3–4. The 8-year incidence of HBP was 7.1% in group 1–2 and 13.8% in group 3–4 ($2p = 0.002$) and was significant after adjustment for the main confounding risk factors. The difference between groups 1–2 and 3–4 was confirmed in male (8.2 vs. 13.1%; $2p = 0.04$) and female (6.1 vs. 14.5%; $2p = 0.006$) subjects while disappeared in the older population (< 65 vs. 5.7 vs. 10.9%; $2p = 0.11$ and > 65 vs. 21.9 vs. 25.9%; $2p = 0.081$). Within each subpopulation of subjects (1/2 and 3/4) HBP rate was higher in subjects older and with higher baseline BP values but this does not affect the impact of the different control of S-Chol.

Conclusions: S-Chol levels are related to the new onset of HBP and a more aggressive strategy of lipid control could reduce the burden of CV risk beyond control of lipid profile.

7B.06 BLOOD PRESSURE IN 2½-YEAR-OLD CHILDREN BORN EXTREMELY PRETERM

M. Norman¹, S. Johansson², M. Vanpee², AK Edstedt-Bonamy². ¹Karolinska Institute, Dept of Clinical Science, Intervention & Technology, Stockholm, Sweden, ²Karolinska Institute, Dept of Woman and Child Health, Stockholm, Sweden

Objective: Adolescents and young adults born preterm have elevated blood pressure (BP). Little is known about the emergence of high BP in young children surviving extremely preterm birth (EXPT).

Methods: Population-based cohort study of 76 EXPT (gestational age 23–26 weeks, mean birth weight 814 [161] g) surviving to a corrected postnatal age of 32 [1.3] months, and 76 matched controls born at term (BW 3603[482] g). After 15 min acclimatization in the room and 5 min rest in sitting position, systolic (SBP) and diastolic (DBP) BP were measured in the up-right sitting position using a validated oscillometric BP-device (Omron HEM-907). Data are mean [SD] or proportions (%). Appropriate institutional ethics committee clearance and parents' informed consent were obtained.

Results: Blood pressures were successfully measured in 119 of 152 children (78%). There were no differences in postnatal age, gender distribution or resting heart rate (mean 104 and 105 min⁻¹, respectively) between EXPT and controls. In addition, SBP (mean 99 [11] vs 98 [8] mmHg, $p = 0.47$) did not differ significantly between EXPT and controls. However, DBP was higher in EXPT (mean 67 [11] compared to controls 63 [9] mmHg, $p = 0.01$) despite that EXPT were on average 1.9 kg lighter ($p < 0.001$) and 3.3 cm shorter ($p < 0.001$) than controls. The proportion of boys with an age, gender and height adjusted SBP > 90 th percentile₃ was 20/46 (44%) in EXPT and 9/44 (20%) in controls ($p = 0.013$). The corresponding proportions for girls were 6/31 (19%) and 8/31 (26%) ($p = 0.54$).

Conclusions: Children born extremely preterm, in particular boys, have elevated blood pressure already at 2½ years of age.

References

1. Edstedt Bonamy A.K. et al. *Pediatr Res* 2005; 58, 845-849.
2. Johansson S. et al. *Circulation* 2005; 112: 3430-3436.
3. The Fourth Report on the Diagnoses, Evaluation and Treatment of High Blood Pressure in Children and Adolescents, National High Blood Pressure Education Program Working group on High pressure in Children and Adolescents. *Pediatrics* (2004), 114 (2nd Suppl 4th Report): 555-576.

7B.07 TOTAL/HDL-CHOLESTEROL RATIO IMPROVES PREDICTION OF CARDIOVASCULAR DEATH BY SCORE IN MEN, BUT NOT IN WOMEN - IMPROVES PREDICTION OF ISCHEMIC HEART DISEASE, BUT NOT OF STROKE

J. Vishram¹, T. Sehestedt¹, T.S.G. Sehested¹, S. Lyngbaek¹, J. Jeppesen¹, T.W. Hansen², C. Torp-Pedersen³, M.H. Olsen¹. ¹*Department of Internal Medicine, Glostrup University Hospital, Glostrup, Denmark*, ²*Department of Clinical Physiology and Nuclear Medicine, Copenhagen University Hospital, Copenhagen, Denmark*, ³*Department of Cardiology, Gentofte University Hospital, Gentofte, Denmark*

Background: The SCORE table is increasingly used for cardiovascular (CV) risk prediction in Europe. In the HeartScore program it is possible to use the ratio between total and high density lipoprotein (HDL) cholesterol instead of total cholesterol. Whether it is possible to do the same in the SCORE table is uncertain. We investigated the impact of using the total/HDL cholesterol ratio instead of total cholesterol in the SCORE table.

Methods: In a population based sample of 2,109 subjects without CV disease or diabetes, not receiving any CV, anti-diabetic, or lipid-lowering treatment, aged 41, 51, 61, or 71 years we measured traditional CV risk factors in 1993-94. The SCORE and SCORE-HDL estimate were calculated using either TC or TC/HDL-C. CV death, fatal and non-fatal stroke, fatal and non-fatal ischemic heart disease (IHD) (fatal and non-fatal myocardial infarction or hospitalization for angina), as well as a composite CV endpoint (CEP) were assessed in 2006.

Results: Over a median follow-up of 13 years, the incidence of CV deaths, fatal and non-fatal stroke and IHD, as well as CEP amounted to 98, 55, 142 and 235 cases, respectively. Including SCORE-HDL and SCORE in the same multiple Cox-regression analyses, their predictive values were compared. In these mutually adjusted models, SCORE-HDL predicted IHD better than SCORE (hazard ratio per 1 unit increase [HR = 1.11 [1.03-1.18], $P < 0.01$ vs. HR = 1.02 [0.96-1.08], NS), whereas SCORE predicted stroke better than SCORE-HDL (HR = 1.11 [1.02-1.21], $P < 0.05$ vs. HR = 1.00 [0.90-1.11], NS). Both SCORE and SCORE-HDL predicted CV death (HR = 1.06 [1.01-1.12], $P < 0.05$ and HR = 1.07 [1.01-1.12], $P < 0.05$, respectively). However, SCORE-HDL predicted CV death better than SCORE (HR = 1.10 [1.02-1.12], $P < 0.05$ vs. HR = 1.05 [0.99-1.11], NS) in men, whereas SCORE predicted CV death better than SCORE-HDL (HR = 1.50 [1.10-2.05], $P < 0.05$ vs. HR = 0.89 [0.54-1.47], NS) in women.

Conclusion: Using SCORE-HDL instead of SCORE, prediction of CV death was improved in men, but reduced in women. SCORE-HDL predicted IHD better, whereas SCORE predicted stroke better.

ORAL SESSIONS

ORAL SESSION 7C

CLINICAL ASPECTS 2

7C.01 LACK OF REGRESSION OF LEFT VENTRICULAR HYPERTROPHY IS ASSOCIATED WITH CARDIOVASCULAR MORTALITY AFTER REVASCULARIZATION IN HYPERTENSIVES. THE LIFE STUDY

C. Sørås¹, K. Wachtell², P.M. Okin³, B. Dahlöf⁴, S.E. Kjeldsen¹, R.B. Devereux⁵, M.H. Olsen⁵. ¹*Oslo University Hospital, Ullevål - Department of Cardiology, Oslo, Norway*, ²*Rigshospitalet - The Heart Center, Copenhagen, Denmark*, ³*Weill Medical College of Cornell University - Greenberg Division of Cardiology, New York, USA*, ⁴*Sahlgrenska University Hospital/Östra - Department of Medicine, Gothenburg, Sweden*, ⁵*Glostrup University Hospital - The Cardiovascular Research Unit, Cardiology Section, Department of Internal Medicine, Glostrup, Denmark*

Objective: Regression of left ventricular hypertrophy (LVH) is associated with decreased cardiovascular (CV) risk. We have previously shown that lack of regression of Sokolow-Lyon voltage is associated with higher incidence of coronary and peripheral revascularization in hypertensive patients. We aimed to investigate whether lack of regression of LVH also is associated with CV mortality after revascularization.

Design and Method: In 9193 hypertensive patients included in the LIFE study, we measured LVH by electrocardiography, serum high-density lipoprotein (HDL) cholesterol and blood pressure after two weeks of placebo treatment and yearly during five years of anti-hypertensive treatment with either an atenolol- or a losartan-based regimen. 568 patients underwent revascularization (337 coronary, 231 peripheral) and 46 of these later died of CV disease within the study period.

Results: Using Sokolow-Lyon voltage criteria, there was no significant association between LVH status and CV mortality after revascularization. LVH defined by Cornell voltage-duration product was associated with higher CV mortality after coronary or peripheral revascularization ($p=0.04$). In Cox regression analyses adjusting for treatment allocation and continent, LVH by Cornell voltage-duration product, but not LVH by Sokolow-Lyon voltage, predicted CV mortality after revascularization, together with Framingham risk score and prevalent cerebral vascular disease (Table).

Variable	HR	95% CI	P-value
Cornell voltage- duration product (100 mm*ms)	1.02	1.01-1.03	<0.001
Treatment, losartan vs. atenolol	0.88	0.73-1.06	0.19
Framingham risk score	1.05	1.04-1.06	<0.001
Cerebral vascular disease	2.48	1.95-3.15	<0.001
Continent, USA vs. Europe	1.47	1.18-1.83	<0.001

Conclusion: After coronary or peripheral revascularization, LVH by Cornell voltage-duration product, but not LVH by Sokolow-Lyon voltage, predicted CV mortality independently of prior CV disease and traditional CV risk factors.

7C.02 CONTRIBUTION OF DIETARY SODIUM TO THE UNFAVOURABLE INFLUENCE OF ALDOSTERONE DURING CHRONIC BLOCKADE OF THE RENIN-ANGIOTENSIN SYSTEM

G. du Cailar, J. Ribstein, P. Fesler, A. Mimran. *University Montpellier, Montpellier, France*

Left ventricular hypertrophy (LVH) is a well known determinant of cardiovascular (CV) risk in essential hypertension (EH), and its correction is a very important goal of treatment. In recent years, dietary salt has emerged as a non-pressure dependent enhancer of the interaction between BP and LVM as well as albuminuria. The contribution of aldosterone in changes in

LV mass associated with long term control of hypertension is not well clarified.

In the present study, 182 patients with never-treated EH were studied at baseline and after 2 years of treatment by converting enzyme inhibitors (ACEI) or angiotensin II receptor blockers (ARA) associated with other antihypertensive agents. In all patients sodium intake was estimated by 2 consecutive 24-h collections. Plasma aldosterone (PAC) and renin (PRA) were measured in samples obtained in the morning and after at least 1 hour in the supine position.

Treatment was associated with satisfactory control of BP (less than 140/90 in 64% of patients and LVH prevalence decreased from 56 to 39%, whereas that of normal LVM increased from 21 to 34%.

24-h urinary sodium was positively related to baseline as well as final LVMI and after adjustment to age, gender and systolic pressure. PAC was correlated with LVMI only at baseline and did not remain in multivariate analysis. In response to treatment, the % change in LVMI was positively correlated with the change in SBP, and the absolute changes in natriuresis and PAC; this relationship was maintained independently of baseline LVMI.

When the population was divided into 3 tertiles according to final values of gender-specific 24-h urinary sodium, the positive trend for LVMI was maintained. When within each sodium tertile, patients were divided into those with PAC below (less than 11.6 ng/dL) and above median, it was found that LVMI was sensitive to aldosterone only in people on high sodium intake.

In conclusion, aldosterone requires the presence of high sodium intake for the expression of its unfavourable effect on the heart.

7C.03 REGIONAL DIFFERENCES IN HYPERTENSIVE CARDIOVASCULAR REMODELING BETWEEN FISHING AND FARMING COMMUNITIES IN JAPAN

Y. Yano¹, S. Hoshida², N. Tamaki³, T. Inokuchi⁴, M. Nagata⁵, N. Yokota⁶, T. Hidaka⁷, Y. Kanemaru¹, S. Matsuda⁸, M. Kuwabara⁹, K. Shimada², K. Kario². ¹*Saigo National Health Insurance Hospital, Miyazaki, Japan*, ²*Jichi Medical University School of Medicine, Tochigi, Japan*, ³*Tamaki Clinic, Miyazaki, Japan*, ⁴*Miyazaki Prefectural Miyazaki Hospital, Miyazaki, Japan*, ⁵*Kijo Clinic, Miyazaki, Japan*, ⁶*Yokota Naika, Miyazaki, Japan*, ⁷*Kitaura National Health Insurance Hospital, Miyazaki, Japan*, ⁸*University of Miyazaki, Miyazaki, Japan*, ⁹*Kuwabara Clinic, Miyazaki, Japan*

Objectives: Effects of dietary n-3 polyunsaturated fatty acids intake on cardiovascular system have been reported. Our aim was to examine differences in hypertensive cardiovascular remodeling between fishing and farming communities in Japan, and to find any strategies to minimize these differences.

Design: Cross-sectional study.

Methods: We recruited 263 essential hypertensive patients from a fishing village and 333 from a farming village; all subjects were >40 years (mean age, 73 years; 42% men). They were cross-sectionally examined for serum eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) levels, left ventricular mass index (LVMI), and common-carotid and internal-carotid artery (CCA, ICA) intima-media thickness (IMT).

Results: Patients in the fishing village had higher serum EPA level (70.9 vs. 63.2 µg/ml) and DHA level (157.8 vs. 137.2 µg/ml) than those in the farming village, while patients in the fishing village were more centrally obese and had unfavorable glucose and lipid metabolic profiles.

Both LVMI and the extent of CCA-IMT and ICA-IMT levels were significantly lower in the fishing village than the farming village (113.2 vs. 121.6 g/m², 0.88 vs. 0.94 mm, 1.10 vs. 1.17 mm, respectively; all $P < 0.01$) even after adjustment for significant covariates. The differences, however, were observed only in patients with poor-controlled 24-hour blood pressure (BP) levels (>130/80 mmHg, $n=367$: 117.7 vs. 129.2 g/m², 0.90 vs. 0.96 mm, 1.11 vs. 1.20 mm, respectively; all $P < 0.05$), but not in those with well-controlled 24-hour BP levels (<130/80 mmHg: 107.0 vs. 109.3 g/m², 0.85 vs. 0.90 mm, 1.10 vs. 1.13 mm, respectively; all $P = \text{NS}$). Although such regional differences remained significant even after adjustment for serum

EPA and DHA levels, serum DHA level was an independent determinant of LVMI, especially in patients with poor-controlled 24-hour BP levels ($\beta = -0.137$, $P = 0.003$).

Conclusion: Cardiovascular remodeling was significantly lower in fishing than farming communities in Japanese hypertensive patients; the difference, however, was nonsignificant in patients with well-controlled 24-hour BP levels. Serum DHA level was an independent negative determinant of cardiac hypertrophy, especially under high BP condition.

7C.04 INSULIN RESISTANCE AS A RISK FACTOR FOR HYPERTENSIVE PATIENTS WITH NON-ALCOHOLIC FATTY LIVER DISEASE

L. Latea, S. Negrea. *University of Medicine and Pharmacy, Cluj-Napoca, Romania*

Background: Non-alcoholic fatty liver disease is present in 15–25% of the general population. The aim of this study was to investigate the relationship between insulin resistance and non alcoholic fatty liver disease (NAFLD) in essential hypertensive patients, according to the circadian blood pressure rhythm.

Methods: A prospective pilot study was conducted at the regional outpatient Diagnosis and Treatment Center Cluj-Napoca, Romania. The study included mild to moderate hypertensive patients that have never been previously treated. Patients were divided into two groups according to the circadian (blood pressure) rhythm. Group I included dipper and Group II included hypertensive non-dipper patients. All patients underwent 24 hour ambulatory blood pressure (ABPM) monitoring and abdominal ultrasound, for the diagnosis of fatty liver disease. Plasma insulin and HOMA index (homeostatic model assessment) and the prevalence of NAFLD were measured. Thirty three patients were enrolled in the study, 14 of them in the dipper group and 19 of them in the nondipper group.

Results: The nondipper hypertensive patients, showed a statistically higher plasma insulin and HOMA index ($p < 0.001$) and also a higher prevalence of the NAFLD when compared to the non-dippers.

Conclusion: The nondipping BP status of hypertension associated both a higher prevalence of NAFLD and a higher insulin resistance. Although further expansive testing is necessary this study has found that insulin resistance is a pathogenetic link between the liver steatosis and nondipping BP status.

7C.05 PREVALENCE OF THE CLINICAL FEATURES OF HYPERTENSION FOLLOWS THE EUROPEAN CARDIOVASCULAR DISEASE GRADIENT

X. Girerd¹, P. Laroche², D. Miljkovic³. ¹Hôpital de la Pitié, Endocrinology, Paris, France, ²Stactis, Paris, France, ³Boehringer Ingelheim France, Paris, France

Objective: To estimate the regional prevalence of 3 clinical features (familial, metabolic, vascular) of essential hypertension, either alone or in combination, in French hypertensive patients followed-up by cardiologists.

Methods: A cross-sectional survey included subjects with essential hypertension and office BP $\geq 140/90$ mmHg (or $\geq 130/80$ mmHg if diabetes or renal insufficiency). They were stratified according to the presence/absence of ≥ 1 antihypertensive drug. At analysis, each hypertension was classified in clinical features: familial (antihypertensive treatment initiated < 50 years); metabolic (abdominal obesity and/or diabetes); vascular (pulse pressure ≥ 65 mmHg).

Results: 356 cardiologists recruited 1706 hypertensive patients (834 untreated and 872 treated but uncontrolled). Prevalence of each clinical feature, alone or in combination, did not depend on treatment. $\geq 63\%$ of the patients had vascular hypertension at least; 53 to 61%, metabolic one at least; 23%, familial one at least. 11% of the patients had no classifying characteristic. Vascular hypertension was independent of geography. Familial hypertension was predominant in the North of the country (OR = 1.7, $p < 10^{-4}$) and metabolic hypertension, in the East (OR = 1.5, $p < 10^{-3}$). Unclassified patients were more frequent in the South (OR = 1.6, $p < 10^{-2}$).

Conclusion: Essential hypertension is divided in clinical features, which follows differently the European CV gradients. Prevalence of familial hypertension in the North suggests a genetic pattern in the CV diseases and prevalence of metabolic hypertension in the East, a behaviour pattern.

7C.06 COMPARISON OF RISK ASSESSMENTS MADE USING THE ESH RISK CHARTS, FRAMINGHAM AND SCORE EQUATIONS IN PATIENTS WITH HYPERTENSION AND ADDITIONAL RISK FACTORS IN THE CRUCIAL TRIAL

S. Erdine¹, J.H. Kim², J. Zamorano³, A. Pavia Lopez⁴, A. Al Khadra⁵, M. Westergaard⁶, S. Sutradhar⁶, C. Yunis⁶. ¹Cerrahpasa School of Medicine, Istanbul, Turkey, ²Catholic University St. Paul's Hospital, Seoul, South Korea, ³Hospital Clinico San Carlos, Madrid, Spain, ⁴Hospital General de Mexico, Mexico City, Mexico, ⁵Prince Sultan Cardiac Center, Riyadh, Saudi Arabia, ⁶Pfizer Inc, New York, USA

Objective: Several organizations including the ESH, ESC, and NCEP ATP III have risk based guidance for the treatment of cardiovascular risk factors and target organ damage. Each guideline recommends treatment decisions based on patients estimated risk of cardiovascular disease. However, each guideline recommends a different risk assessment tool and sometimes different thresholds for initiating treatments. We compared the proportion of hypertensive patients with additional risk factors participating in the CRUCIAL trial in each cardiovascular risk category according to the ESH charts, the Framingham 10-year total cardiovascular disease risk equation and the SCORE 10-year risk of cardiovascular mortality.

Design and Method: CRUCIAL was a prospective, multinational, open-label, cluster-randomized trial to compare a multi-factorial risk factor management strategy based on single-pill amlodipine/atorvastatin with a Usual Care control arm. Eligible patients were aged between 35 and 79 years with hypertension, 3+ additional cardiovascular risk factors, but no history of CHD and baseline total cholesterol 6.5 mmol/L or less and not receiving a statin. The baseline risk of 1461 patients in the CRUCIAL trial were calculated using the ESH charts, the Framingham 10-year CVD risk equation and the SCORE 10-year cardiovascular mortality chart.

Results: At baseline the patients' mean age was 59 years and 52% were male. Using the ESH charts 99.7% of patients were in the high/very high added risk groups compared with 66.7% of patients using the Framingham equation and 34.9% using the SCORE charts (Table).

Table: Baseline estimated cardiovascular risk among 1461 participants of the CRUCIAL trial

ESH* Risk Chart N = 1461	N (%)	Framingham CVD† 10 Year Risk N = 1446	N (%)	SCORE†† Low Risk Chart N = 1446	N (%)
Low added risk	0 (0)	<15% ~ Low added risk	293 (20.3)	<4% ~ Low added risk	803 (55.5)
Moderate added risk	4 (0.3)	$\geq 15\%$ to <20% ~ Moderate added risk	189 (13.1)	$\geq 4\%$ to <5% ~ Moderate added risk	139 (9.6)
High or Very High added risk	1457 (99.7)	$\geq 20\%$ ~ High or Very High added risk	964 (66.7)	$\geq 5\%$ ~ High or Very High added risk	504 (34.9)

*ESH recommends lipid-lowering therapy for those in the high/very high added risk groups.

†NCEP ATP III recommends lipid-lowering therapy for those at high risk defined as Framingham 10-year CHD risk $\geq 20\%$ or $\geq 10\%$ and LDL-C ≥ 130 mg/dL or $< 10\%$ and LDL-C ≥ 160 mg/dL.

††ESC recommends lipid-lowering therapy for those at $\geq 5\%$ SCORE risk.

At baseline 15 subjects had missing values for SCORE and Framingham risk.

ESH, European Society of Hypertension; CVD, cardiovascular disease; SCORE, Systematic CORonary Risk Evaluation; NCEP ATP, National Cholesterol Education Program Adult Treatment Panel III; ESC, European Society of Cardiology

Conclusion: More patients are classified in the high/very high added risk category using the ESH charts compared with the high/very high risk group using the Framingham 10-year CVD risk equation and the SCORE charts. Therefore, the treatment a patient with hypertension and 3+ additional cardiovascular risk factors may receive may differ according to the treatment guidelines and risk assessment tool used.

7C.07 CLINICAL ASPECTS OF BAROREFLEX SENSITIVITY IN HYPERTENSIVE PATIENTS

D. Celovská¹, J. Stasko², J. Gonsorcik³, A. Dukar¹. ¹Comenius Faculty of Medicine, 2nd Department of Internal Medicine, Bratislava, Slovak Republic,

²Reimans Hospital, Department of Cardiology, Presov, Slovak Republic, ³East-slovakia Cardiology Institute, Kosice, Slovak Republic

Objective: The aim of the present study was to evaluate the clinical significance of baroreflex sensitivity in risk stratification of hypertensives.

Design: A total of 114 patients (58 M/56 F, 65 ± 13 years of age, BMI 30 ± 3.4 kg/m²), of whom 26 patients (15 M/11 F, 69 ± 10 years of age) had a history of the first ever ischemic stroke, which was neuroradiologically confirmed and 37 patients (24 M/13 F, 67 ± 8 years of age) who had a history of myocardial infarction, were studied. A total of 105 patients had treated essential hypertension and 9 subjects had high blood pressure. The relationship between baroreflex sensitivity (BRS) and blood pressure, and the influence of major cardiovascular events in hypertensives on baroreflex function was assessed.

Method: BRS was determined by the sequence and spectral method: a five-minute non-invasive beat-to-beat recording of blood pressure and R-R

interval with use of Collin CBM-7000 monitor, controlled breathing at a frequency of 0.1 Hz.

Results: Essential hypertension was associated with decreased BRS ($r = -0.52$, $p < 0.001$), and grade of hypertension was inversely related to BRS values (the higher the grade of hypertension, the lower BRS value). Spontaneous BRS values in hypertensives with major cardiovascular event (stroke, myocardial infarction) were significantly lower even 6 months and more after myocardial infarction and stroke onset compared to remaining patients. We found out that there was no significant difference between BRS values in mild hypertension and those in subjects with high normal blood pressure. The greatest decline in BRS values was in hypertensive patients with metabolic syndrome and target organ damage, who had BRS values < 3 ms/mmHg.

Conclusions: Essential hypertension is associated with decreased BRS, and that grade of hypertension is inversely related to BRS values. BRS is a clinically applicable, noninvasive method for assessing early dysfunction of autonomic nervous system, which seems to be an additive emerging marker of cardiovascular risk stratification in hypertensive patients.

ORAL SESSIONS

ORAL SESSION 7D

EXPERIMENTAL HYPERTENSION

7D.01 A SYNTHETIC PEPTIDE FROM TRANSFORMING GROWTH FACTOR-BETA1 TYPE III RECEPTOR INHIBITS NADPH OXIDASE ACTIVITY AND PREVENTS FIBROSIS IN KIDNEYS FROM SPONTANEOUSLY HYPERTENSIVE RATS.

A. Baltanás, C. Cebrián, J. Dotor, F. Borrás, B. López, J. Díez, G. Zalba, A. Fortuño. *Center of Applied Medical Research. University of Navarra, Pamplona, Spain*

Objective: NADPH oxidases constitute a major source of reactive oxygen species in experimental and human hypertension. Recent studies suggest that NADPH oxidases play a key role in the TGF-beta1 mediated profibrotic effects. We investigated whether p144, a synthetic peptide from TGFbeta1 type III receptor, exhibits renal antifibrotic effects, and whether these effects may be mediated through the inhibition of NADPH oxidases.

Design and Method: The study was carried out in one group of 10-week-old normotensive Wistar-Kyoto rats treated with vehicle (WKYV), one group of 10-week-old spontaneously hypertensive rats treated with vehicle (SHRV), one group of 10-week-old WKY treated with P144 (WKYP144) for 12 weeks, and one group of 10-week-old SHR treated with P144 (SHRP144) for 12 weeks. Two more groups of 10-week-old untreated WKY and SHR were used to assess baseline values of the parameters tested. In addition, the effects of P144 on rat fibroblasts stimulated with TGF-beta1 were also studied.

Results: Compared with WKYV, SHRV exhibited significant increases in the renal cortex NADPH oxidase activity and in the expression of Nox2, Nox4, p47phox proteins, as well as in the levels of nitrotyrosine and connective tissue growth factor. Histological analysis also showed a significant increase of these proteins in renal tissues from SHRV, compared with WKYV. In addition, SHRV showed a significant renal fibrosis, as assessed by collagen volume fraction. P144 administration was associated with significant reduction in all these parameters in SHRP144. No differences were observed in these parameters between WKYV and WKYP144. TGF-beta1-stimulated fibroblasts exhibited significant increases in NADPH oxidase activity compared with control fibroblasts. No significant differences were found between fibroblasts incubated with TGF-beta1 and P144 and control fibroblasts.

Conclusions: These data suggest that P144 might inhibit the NADPH oxidase dependent-oxidative stress in renal tissues. These effects may be involved in the ability of this peptide to prevent myocardial fibrosis in SHR.

7D.02 HYPERTENSIVE RENAL DAMAGE IS NOT AGEING: EVIDENCE FROM GLOBAL GENE EXPRESSION IN RAT RENAL CORTX

M. Hultström^{1,2}, T. Skogstrand^{1,2}, S. Leh^{1,3}, B.M. Iversen^{1,2}. ¹University of Bergen, Institute of Medicine, Bergen, Norway, ²Haukeland University Hospital, Department of Medicine, Bergen, Norway, ³Haukeland University Hospital, Gades Institute, Department of Pathology, Bergen, Norway

Objectives: Separating the effects of chronic hypertension on renal structure and function from those of ageing is difficult. The present investigation addresses this question by comparing three microarray studies of mRNA expression in the kidney cortex.

Design: 60 week old spontaneously hypertensive rats (SHR) were compared with normotensive Wistar Kyoto rats; rats with renal hypertension for 24 weeks with age matched controls and 4 weeks hypertension (2K1C); and 90 week old normotensive rats with 10 week old rats (old rats).

Methods: Global gene expression was assayed using Illumina Bead-array cDNA microarrays. The experiments were analysed using R, Bioconductor

and Beadarray. Each experiment was analysed separately and the resultant gene-lists compared. Interstitial fibrosis was investigated using sirius red in histological sections.

Results: Using the gene ontology enrichment analysis software toolkit (GOEAST) the enrichment of up and down-regulated genes were investigated. In both SHR and 2K1C showed an enrichment of up-regulated genes relating to the extracellular matrix (ECM). This corresponds to the well known hallmarks of chronic renal damage; tubular atrophy and interstitial fibrosis. Interestingly, the ECM was enriched with down-regulated genes in old rats.

In SHR the up-regulated ECM genes included fibronectin and decorin, as well as several types of fibrillar collagen: Col1a1, Col1a2 and Col3a1. In addition, the matrix metalloproteases MMP14 and MMP9, the tissue inhibitor of metalloproteases, TIMP1 and TIMP2, and the procollagen peptidase ADAMTS1 were up-regulated.

In 2K1C, ADAMTS1 was up-regulated, together with matrix Gla protein, decorin, Lgals1, Lgals3, MMP12, and TIMP1 all proteins involved in collagen deposition and turnover.

In contrast, old rats showed downregulation of several forms of collagen: Col1a1, Col4a1, Col1a2, Col3a1 and Col6a3. In addition, the expressions of MMP9 and Sparc were decreased.

Histologically SHR and 2K1C showed focal lesions with tubular damage and interstitial fibrosis, while old rats showed diffuse increase of interstitial collagen.

Conclusion: The genetic regulation of ECM differs radically between normal ageing and chronic hypertensive renal damage.

7D.03 MATERNAL SALT INTAKE- BLOOD PRESSURE AND TARGET ORGAN MORPHOLOGY IN THE OFFSPRING

N. Koleganova¹, G. Piecha², M.L. Gross-Weissmann¹, J.R. Nyengaard³, E. Ritz⁴. ¹Department of Pathology, University of Heidelberg, Heidelberg, Germany, ²Department of Nephrology, Endocrinology and Metabolic Diseases, Medical University of Silesia, Katowice, Poland, ³Stereology and Electron Microscopy Research Laboratory, University of Aarhus, Aarhus, Denmark, ⁴Department of Internal Medicine, Nierenzentrum, Heidelberg, Germany

An adverse environment during fetal development has life-long consequences: hypertension, increased cardiovascular risk, renal malfunction. We studied using stereology whether high salt intake in pregnancy modifies structure of the kidney as well as structure of vasculature and blood pressure in the offspring.

Sprague-Dawley rats were fed low (0.15%), medium (1.3%), or high (8.0%) salt diets during pregnancy and weaning. The offspring were weaned at 4 weeks of age and subsequently received a standard rodent diet. Blood pressure was measured by telemetry and albuminuria by rat specific ELISA up to 52 weeks of age. Nephron number was determined by design-based stereology at 12 weeks of age.

The nephron number was significantly lower in offspring of dams on low (males: 19100 ± 3700, females: 19000 ± 2500) and high (m: 12100 ± 600, f: 12800 ± 2800) compared to medium salt intake (m: 32400 ± 2500, f: 28500 ± 6000). In male offspring of dams on both low and high salt intake albumin excretion increased at 6 months of age and was higher than in offspring of dams on medium salt intake.

Systolic, diastolic, and mean arterial pressures were not significantly different between the offspring until 12 weeks of age. After 7 months of age systolic blood pressure was higher in offspring of dams on low (123 ± 8 mmHg) and high (124 ± 7) compared to medium (116 ± 5) salt intake.

There was no significant difference in vascular geometry at 7 weeks post-natally. At 12 weeks, however, wall thickness of central (aorta, carotid, iliac) and muscular (mesenteric and even intrapulmonary) arteries was significantly higher in offspring of mother rats on high salt diet irrespective of the post-weaning diet compared with other groups.

Both too high and too low salt intake in pregnant rats predisposes their offspring to increased renal risk due to reduced nephron number, increased albuminuria, hypertension and thickening of the wall of vessels even those not exposed to high blood pressure.

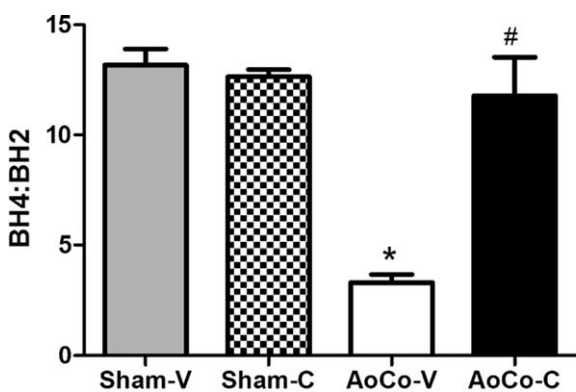
7D.04 ROLE OF PEROXISOME PROLIFERATOR ACTIVATED RECEPTOR ALPHA ON UNCOUPLING OF ENDOTHELIAL NITRIC SYNTHASE AND TETRAHYDROBIOTERIN PRODUCTION IN HYPERTENSION INDUCED BY AORTIC COARCTATI

L. Cervantes Pérez¹, M.L. Ibarra-Lara¹, M.A. Sánchez-Mendoza¹, L. Del Valle-Mondragón¹, M. Sánchez-Aguilar¹, G.S. Pastelín-Hernández¹, H. Vargas-Robles², B.A. Escalante-Acosta². ¹Instituto Nacional de Cardiología Ignacio Chávez - Department of Pharmacology, Mexico City, Mexico, ²Centro de Investigación y de Estudios Avanzados del IPN - Department of Molecular Biomedicine, Mexico City, Mexico

Objective: The aim of this study is to determine which is the participation of PPAR alpha activation in BH4 and BH2 metabolism and its implications on eNOS coupling.

Design and Methods: We used male Wistar rats 250–300 g and they were divided into four groups: false ligated-(sham-V), aortic coarctation-treated with vehicle (AoCo-V), false ligated-(sham-C) and aortic coarctation-treated with clofibrate (100 mg/kg/day, i.p.)(AoCo-C). The complete recuperation was allowed and they were maintained under 12 hrs light-dark and with free access to food and water. After 7 days, intracarotid blood pressure, aortic eNOS coupling expression, serum BH4 and BH2 production and aortic and renal reactive species of oxygen were measured, and BH4:BH2 ratio was determined. Results. After 7 days of treatment, AoCo-V rats raised blood pressure versus sham-V and sham-C groups. Administration of clofibrate to sham group did not affect blood pressure. AoCo-C group prevented rise of blood pressure versus AoCo-V group. Clofibrate administration increased eNOS coupling in AoCo-C group versus AoCo-V and it was comparable with sham-V and sham-C coupling. The mechanism involved could be through BH4:BH2 balance-recuperation. The BH4:BH2 balance is affected by oxidative stress and we observed that clofibrate administration diminished anion superoxide production in AoCo-C versus AoCo-V.

Conclusion: PPAR alpha stimulation reestablished eNOS coupling, apparently through recovering BH4:BH2 balance and diminishing oxidative stress. Both can contribute to high blood pressure attenuation in hypertension secondary to AoCo.



n=6 * p<0.05 ANOVA-Tukey Sham-V, Sham-C versus AoCo-V
n=6 # p<0.05 ANOVA-Tukey AoCo-V versus AoCo-C

7D.05 CILIARY NEUROTROPHIC FACTOR DEFICIENCY PROTECTS AGAINST ANGIOTENSIN II INDUCED HYPERTENSION

S. Potthoff, Y. Mori, J. Stegbauer, E. Koenigshausen, M. Woznowski, L.C. Rump, L. Sellin, O. Vonend, I. Quack. Department of Nephrology, Heinrich-Heine University, Duesseldorf, Germany

Ciliary Neurotrophic factor (CNTF) is an interleukin-6-like (IL-6) cytokine which plays a distinct role in survival and differentiation of neuronal cells.

Through binding to its own receptor and activation of the JAK2-STAT3-signaling cascade, CNTF mediates anti-inflammatory effects and reduces apoptosis. CNTF deficient mice show a detrimental progression of autoimmune encephalomyelitis. Despite the well examined role of CNTF in the central nervous system, its role in other tissues is poorly understood.

AngiotensinII (angII) induces the expression of IL-6 by increased production of reactive oxygen species. Activation of the renin angiotensin system is a typical finding in chronic kidney disease. Due to the nature of CNTF and its receptor as an IL-6-like ligand and receptor, this study focuses on the role of CNTF in angII induced hypertension in uninephrectomized mice.

One week after uninephrectomy, angII osmotic minipumps (1000ng/min/kgBW) were implanted in CNTF-KO (C57/Bl6J background) and matched C57/Bl6J male mice (WT) (n=19). Blood pressure was measured via tail cuff for 2 weeks. In addition, kidneys from WT- and CNTF-KO-mice were isolated perfused and a dose-response relationship to angII was measured.

WT- and CNTF-KO-mice developed hypertension within the first two days after surgery. Both groups showed an increase in systolic blood pressure (BP) over time. Comparison between the WT and CNTF-KO-group revealed that at any time point BP was significantly lower in the CNTF-KO-group compared to the WT-group (WT vs. CNTF-KO week1: 153 ± 3 vs. 139 ± 3 mmHg; week 2: 168 ± 4 mmHg vs. 151 ± 5 mmHg). Heart hypertrophy was significantly less in CNTF-KO (6.5 ± 0.4 mg/gBW) compared to the WT-mice (8.2 ± 0.6 mg/gBW). In the isolate perfused kidney, angII dependent pressure response was significantly lower in the CNTF-KO- compared to the WT-group.

This study shows that CNTF plays an important role in BP response to angII. However, at present, it cannot be distinguished whether intra- or extracellular actions of CNTF are responsible for the differences in blood pressure regulation. Future studies are needed to elucidate the underlying mechanisms.

7D.06 BENEFICIAL EFFECT OF NITRIC OXIDE ON LARGE ARTERIES IN HYPERTENSIVE RATS

C. Storini, J. Padron. Nicox Research Institute, Bresso, Italy

Nitric oxide (NO) is a biological messenger that is known to exert a wide range of patho/physiological functions. In particular it is responsible for vasodilation and is well established that the inhibitors of NO synthases (such as L-NAME) induce vascular contraction and hypertension. Vasoconstriction of compliance arteries leads to a potentially harmful increase in heart load. Recently, a new cardiovascular parameter, augmentation index (AIx), has been described to be a biological marker of vascular tree efficiency.

The aim of this study was to demonstrate a possible beneficial role of NO in large artery district. To this purpose, we measured AIx in the rat, using a recently developed technical tool enabling arterial pulse wave recording in small rodents (Samba Preclin, Samba Sensors AB, Goteborg, Sweden). To make analysis possible, we used the model of L-NAME-induced hypertension. Pulse wave was recorded in the carotid artery of anesthetized SD rats and drugs were given intravenously by jugular vein cannulation, except for L-NAME that was administered intraperitoneally.

L-NAME (50 mg/kg) induced an increase in AIx of 33.9 ± 1.8%, compared to basal value. The NO donor, diethylenetriamine/NO (DETA-NO), 3-morpholinodnonimine (SIN-1) and isonitride mononitrate (IIMN) (10 mg/kg, respectively) significantly decreased AIx (-15.5 ± 4.5%, -40.0 ± 4.93%, -22.7 ± 8.2%, respectively). Also the anti-hypertensive drugs, candesartan (3 mg/kg) and carvedilol (5 mg/kg), counteracted the L-NAME-induced increase in AIx (-16 ± 11% and 4 ± 2%, respectively), while atenolol (30 mg/kg) did not affect the L-NAME effect (data are expressed as delta from basal values).

These findings show that NO plays beneficial role in large arteries, suggesting a contribution to heart load reduction. Both NO donors and drugs inducing vasodilation by NO independent pathways (such as candesartan and carvedilol) are able to counteract the increase in large artery vasoconstriction, induced by NO depletion.

7D.07 LACK OF SUSTAINED ANTIHYPERTENSIVE EFFECT OF POLYETHYLENE GLYCOL CATALASE TREATMENT IN ANGIOTENSIN II-HYPERTENSIVE RATS

T. Sousa¹, S. Oliveira², J. Afonso², M. Morato¹, D. Patinha², C. Sousa³, F. Carvalho³, A. Albino-Teixeira¹. ¹Institute of Pharmacology and

Therapeutics, FMUP and IBMC; Pharmacology Department, FFUP, Porto, Portugal, ²Institute of Pharmacology and Therapeutics, FMUP and IBMC, Porto, Portugal, ³REQUIMTE- Toxicology Department, FFUP, Porto, Portugal

Activation of angiotensin II-(Ang II)-receptors is known to increase the generation of reactive oxygen species (ROS) in several cell types. Among ROS, H₂O₂ is increasingly being viewed as an important hypertensive factor. Increased H₂O₂ levels have been shown to affect renal mechanisms regulating sodium excretion. Furthermore, the direct infusion of H₂O₂ into the renal medulla results in sustained hypertension. Recent studies from our group also revealed that the H₂O₂-metabolizing enzyme, polyethyleneglycol (PEG)-catalase, prevents the blood pressure rise in a model of hypertension with activation of the renin-angiotensin system. This study aimed at evaluating the role of H₂O₂ in Ang II-induced hypertension, with special emphasis on its renal medullary effects. This study was conducted in two parts – part I: assessment of H₂O₂ bioavailability in sham (saline, s.c., from day 0 to day 14) and Ang II (200 ng/kg/min, s.c., from day 0 to day 14) – treated rats; part II: evaluation of antihypertensive efficacy of PEG-catalase (10,000 U/kg/day, i.p., from day 7 to day 14) in Ang II-hypertensive rats. SBP was evaluated by invasive (intrarterial) and non-invasive (tail-cuff) methods. Systemic and renal medullary H₂O₂ production, renal medullary antioxidant activity and nuclear factor (NF)-KB activation were assessed on day 14 in all experimental groups. H₂O₂ levels were evaluated by a fluorimetric assay, using an Amplex Red Hydrogen Peroxide kit. Antioxidant enzyme activity was evaluated by spectrophotometric assays. NF-KB activity was evaluated by a fluorescent electrophoretic mobility shift assay.

		Part I		Part II	
		Sham	Ang II	Ang II	Ang II +PEG-catalase
SBP (mmHg)	Day 3	122.0±1.4	139.1±2.4*	144.3±6.5	146.1±7.0
	Day 7	123.5±1.1	154.2±3.0*	171.6±9.2	155.0±3.3
	Day 9	122.0±1.2	153.6±4.7*	168.8±10.8	127.8±1.4*
	Day 14	123.0±1.6	156.5±2.4*	170.4±16.6	151.5±4.7
H ₂ O ₂	Plasma (nmol/ml)	0.38±0.09	0.80±0.14*	0.94±0.15	0.37±0.13*
	Urine (μmol/kg/day)	1.74±0.23	4.06±0.62*	4.63±0.91	1.76±0.29*
	Renal Medulla (nmol/mg protein)	1.16±0.05	1.53±0.08*	2.86±0.24	1.80±0.30*
Superoxide dismutase (U/mg protein)		10.7±1.2	26.1±3.3*	23.8±3.4	39.6±5.3*
Catalase (U/mg protein)		32.9±3.5	54.9±6.6*	95.5±11.4	98.6±13.3
Glutathione peroxidase (nmol oxid NADPH/min/mg protein)		65.0±6.5	59.1±4.2	69.7±3.4	53.3±2.3*
Renal medullary NF-KB (AUC)		21.0±8.7	87.5±17.5*	207.6±49.9	169.5±40.6

Table 1. SBP, H₂O₂ levels, antioxidant enzyme activity and NF-KB activation in experimental groups. Results are expressed as mean±S.E.M. *p<0.05 vs sham; *p<0.05 vs Ang II.

In summary, Ang II infusion induces hypertension, increases systemic and renal medullary H₂O₂ production and enhances NF-KB activation. PEG-catalase treatment has a short-term antihypertensive effectiveness, despite a sustained reduction in plasma and urinary H₂O₂ levels. Furthermore, the PEG-catalase-induced decrease of renal medullary H₂O₂ production is not sufficient to reduce NF-KB activation in Ang II-hypertensive rats.

ORAL SESSIONS

ORAL SESSION 8A

LARGE ARTERIES 2

8A.01 REGIONAL AGE-RELATED CHANGES IN AORTIC PULSE WAVE VELOCITY MEASURED USING MAGNETIC RESONANCE IMAGING

S. Hickson¹, M. Butlin², M. Graves¹, IB Wilkinson¹, CM McEniery¹.
¹University of Cambridge, Cambridge, United Kingdom, ²Macquarie University, Sydney, Australia

Objective: Aortic pulse wave velocity (PWV) is an independent predictor of cardiovascular risk. However, PWV is usually determined between the carotid and femoral sites, and ignoring the proximal ascending aorta which may stiffen most with age. We tested this hypothesis by assessing regional PWV along the length of the entire aorta using MRI.

Design and Method: 147 healthy subjects aged 18 to 79 years, all free of cardiovascular disease and medication were recruited from the ACCT study. Seated and supine blood pressure was measured and carotid-femoral pulse wave velocity (PWV_{Sphyg}) was assessed by applanation tonometry (SphygmoCor, Australia). Phase contrast MRI (PCMRI) (1.5T scanner, GE) was then performed in all patients to determine PWV (PWVMRI) in 4 aortic regions, the arch (R1), descending-thoracic (R2), mid-thoracic (R3) and abdominal aorta (R4). Repeatability of PWVMRI was assessed across 2 visits, in a subset of 10 subjects. PWVMRI over the length of the whole aorta (aPWVMRI) was compared with PWV_{Sphyg} as validation.

Results: The average PWVMRI for R1 to R4 were 4.6 ± 1.5 m/s, 5.5 ± 2.0 , 5.7 ± 2.3 , and 6.1 ± 2.9 m/s respectively. There was no difference between genders. The greatest age-related increase in PWVMRI occurred in R4 (0.9 m/s per decade, $P < 0.001$) followed by R2 (0.7 m/s, $P < 0.001$), R3 (0.6 m/s, $P < 0.001$) and R1 (0.4 m/s, $P < 0.001$). PWVMRI showed good repeatability (mean difference = -0.4 ± 2.1 m/s). aPWVMRI and PWV_{Sphyg} were strongly correlated ($r = 0.71$, $P < 0.001$), although overall aPWVMRI was significantly lower than PWV_{Sphyg} (5.7 ± 1.8 vs. 7.3 ± 1.8 m/s, $P < 0.001$).

Conclusions: Age-related increases in arterial stiffness are greatest in the descending and abdominal aorta. Measurements of PWV using PCMRI are reproducible and correlate with surface measurements of PWV.

8A.02 RENAL DISEASE IS ASSOCIATED WITH ACCELERATED VASCULAR AGEING: INITIAL RESULTS OF THE UK RESEARCH ALLIANCE INTO KIDNEY DISEASE AND ARTERIAL STIFFNESS (UREKA) COLLABORATION

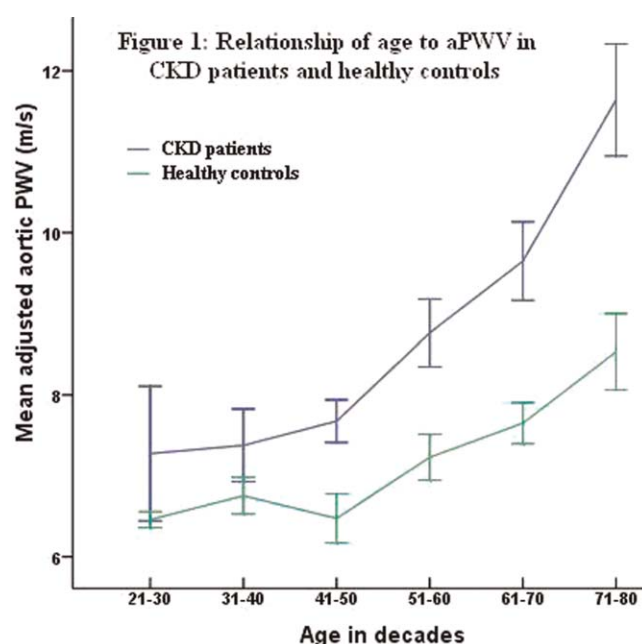
L. Tomlinson¹, Y. Ben-Shlomo², B. Caplin³, C. Delles⁴, C.J. Ferro⁵, J. Goddard⁶, R. Hoefield⁷, S.G. Holt⁸, P.A. Kalra⁷, C.M. Mceniery¹, C.W. McIntyre⁹, E.P. McQuarrie⁴, C. Rajkumar⁸, T. Savage², M.W. Taal¹, C.R. Tomson², J.N. Townsend⁵, D.J. Webb⁶, D.C. Wheeler³, I.B. Wilkinson¹.
¹University of Cambridge, Cambridge, United Kingdom, ²University of Bristol, Bristol, United Kingdom, ³UCL Medical School, London, United Kingdom, ⁴University of Glasgow, Glasgow, United Kingdom, ⁵University of Birmingham NHS Foundation Trust, Birmingham, United Kingdom, ⁶University of Edinburgh, Edinburgh, United Kingdom, ⁷University of Manchester, Manchester, United Kingdom, ⁸Brighton and Sussex Medical School, Brighton, United Kingdom, ⁹University of Nottingham Medical School, Derby, United Kingdom

Background: Chronic kidney disease (CKD) patients may have higher aortic pulse wave velocity (aPWV) than non-CKD patients of similar age but it is not known if increased aPWV is a consequence of renal disease or reflects vascular disease, diabetes and hypertension. We examined whether aPWV is increased in CKD patients with no other co-morbidities compared to a healthy control population.

Methods: Data regarding conventional and novel risk factors and aPWV was obtained on 2155 individuals with CKD from studies at 9 UK renal centres. aPWV was measured in the majority of centres using the SphygmoCor system. Results were compared between CKD patients (stages 1–5, not yet on dialysis, with a defined non-vascular renal disease, not-diabetic, no

previous CVD, exclusions = 1688) and healthy controls (no diabetes, CVD or hypertension, $\text{eGFR} > 60$ mL/min, BP $< 140/90$, drawn from ACCT, a community-based study of the healthy general population).

Results: After adjusting for age, mean BP, gender, smoking and cholesterol, aPWV was significantly higher in CKD patients than controls (9.1 ± 2.6 m/s compared to 7.0 ± 1.25 , $P < 0.001$). In both groups aPWV (adjusted for mean BP, gender, cholesterol and smoking) significantly increased with age but at all ages aPWV was increased compared to healthy controls (figure 1). For CKD patients for every decade of age there was an increase in aPWV of 1.1 m/sec (95% CI: 0.9–1.2) compared to 0.3 m/s (0.29–0.39) for controls. There was a significant interaction ($P < 0.001$) between age, aPWV (adjusted for mean BP, gender, cholesterol and smoking) and the presence of renal disease. Using multivariable analysis, amongst CKD patients, independent associations of aPWV were age (standardised β -coefficient = 0.49, $P < 0.001$) mean BP ($\beta = 0.17$, $P < 0.001$), and eGFR ($\beta = -0.11$, $P = 0.004$), (R^2 total = 0.33, $P < 0.001$).



Conclusions: The presence of renal disease in the absence of other co-morbidities is associated with increased aPWV compared to controls, and degree of aortic stiffening is independently related to renal function. Future plans include examining the prognostic utility of aPWV in predicting renal and cardiovascular outcomes among CKD patients.

8A.03 ASSOCIATION BETWEEN RENAL FUNCTION AND PULSE WAVE VELOCITY IN NEVER-TREATED HYPERTENSIVES

D. Terentes-Printzios, C. Vlachopoulos, N. Ioakeimidis, K. Aznaouridis, N. Alexopoulos, P. Xaplanteris, A. Samentzas, A. Siana, K. Baou, C. Stefanadis. Athens Medical School, Peripheral Vessels Unit, 1st Cardiology Department, Hippokraton Hospital, Athens, Greece

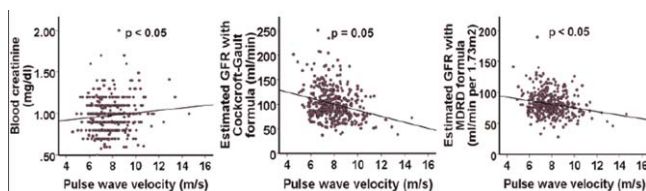
Objective: Hypertension and renal dysfunction are associated with increased arterial stiffness. Arterial stiffness is a marker of cardiovascular disease and predictor of cardiovascular risk. We assessed the relationship between renal function and arterial stiffness in never-treated hypertensives.

Design and Method: We enrolled 388 consecutive essential hypertensives (mean age 52 ± 12 years), who had no established cardiovascular disease. Arterial elastic properties were evaluated with carotid-femoral pulse wave

velocity (PWV). Renal function was evaluated with blood creatinine and estimated glomerular filtration rate, measured by the simplified Modification of Diet in Renal Disease (MDRD) formula and the Cockcroft-Gault formula.

Results: In multivariable regression analysis PWV significantly correlated with blood creatinine levels ($p < 0.05$, adjusted R^2 of model = 0.224) and estimated GFR by the Cockcroft-Gault formula ($p = 0.05$, adjusted R^2 of model = 0.222), as well as by the MDRD formula ($p < 0.05$, adjusted R^2 of model = 0.223). (Figure) The abovementioned correlations were independent of age, sex, body-mass index and mean blood pressure.

Conclusions: This is the first study in never-treated hypertensives that shows a weak but significant relationship between the degree of GFR loss and arterial stiffness, even in individuals with GFR values within the normal renal function range.



8A.04 AORTIC DILATATION IN NORMOTENSIVE OR HYPERTENSIVE ADOLESCENTS AND YOUNG ADULTS: THE STRONG HEART STUDY

M. De Marco¹, M.J. Roman², G. de Simone¹, M. Chinali¹, L.G. Best³, E.T. Lee⁴, D. Dixon⁵, B.V. Howard⁵, R.B. Devereux². ¹Federico II University Hospital, Naples, Italy, ²Weill Cornell Medical College, New York City, USA, ³Missouri Breaks Industries Research, Timber Lake, USA, ⁴University of Oklahoma, Oklahoma City, USA, ⁵Medstar Research Institute, Washington, USA

Background: Aortic root diameter (Ao) is related to body size, gender and age and may be influenced by arterial hypertension (HTN). Few data on clinical correlates of Ao dilatation (AoD) are available in adolescents and young adults in population-based samples.

Methods: We analyzed clinical and echocardiographic characteristics of 327 hypertensive and 1595 normotensive, 15 to 39 year-old participants in the 4th Strong Heart Study exam (58% female, 56% obese). AoD was defined as measured sinuses of Valsalva diameter exceeding the 97.5th percentile of the confidence interval of predicted diameter for age, gender and height (ht) or body surface area (BSA).

Results: Using ht-based definition, 239 (12%) of total population had AoD and 81 (4.2%) of population had AoD based on BSA-definition. Using both definitions criteria, prevalence of -AoD was higher in men and in participants with HTN and aortic regurgitation (AR) was more common in participants with (all $p < 0.05$) Independently of gender and measure of body size, AoD was associated with older age, higher BMI and blood pressure (BP) (all $p < 0.05$). After adjusting for age, gender, BP and BMI, participants with AoD had greater left ventricular mass (LVM), stroke volume and stroke index/pulse pressure ratio (all $p < 0.05$). AoD independently related to older age, male gender height, weight, diastolic BP, LVM, stroke volume and AR (all $p < 0.05$). In multivariate analysis, odds of AR increased significantly with female gender (OR = 4.36, 95% CI: 1.42–13), higher systolic BP (OR = 1.07/mmHg, 1.04–1.11), larger Ao (OR = 13/cm, 3.2–50), lower BMI (OR = 0.93/kg/m², 0.87–0.98), and lower diastolic BP (OR = 0.95/mmHg, 0.91–0.99, all $p < 0.05$), independently of age.

Conclusion: In a population-based sample of adolescents and young adults, AoD is more common in participants with HTN and is associated with higher LVM, stroke volume and total arterial compliance, and higher prevalence of AR, independently of major confounders.

8A.05 ENDOTHELIAL DYSFUNCTION AND DEFECTIVE SMOOTH MUSCLE CONTRACTILITY IN ANEURYSMAL FIBULIN-4 DEFICIENT MICE

E. Moltzer^{1,2}, P.M. van Heijningen³, M. Vermeij⁴, J.H.M. van Esch¹, M.C. de Waard³, S.M.A. Swagemakers^{3,5}, D.J. Duncker⁶, A.H.J. Danser¹, J. Essers^{3,7,8}. ¹Division of Pharmacology, Vascular and Metabolic Diseases, Department of Internal Medicine, Erasmus MC, Rotterdam, The Netherlands, ²Department of Cardiology, Erasmus MC, Rotterdam, The Netherlands, ³Department of Cell Biology & Genetics, Erasmus MC, Rotterdam, The

Netherlands, ⁴Department of Pathology, Erasmus MC, Rotterdam, The Netherlands, ⁵Department of Bioinformatics, Cancer Genomics Center, Erasmus MC, Rotterdam, The Netherlands, ⁶Department of Experimental Cardiology, Erasmus MC, Rotterdam, The Netherlands, ⁷Department of Radiation Oncology, Erasmus MC, Rotterdam, The Netherlands, ⁸Department of Vascular Surgery, Erasmus MC, Rotterdam, The Netherlands

Objective: Using Fibulin-4 knockdown mice (Fibulin-4R/R), we previously showed that the dosage of Fibulin-4 can determine the severity of aneurysm formation. Strikingly, even a modest reduction in expression of Fibulin-4 in the heterozygous Fibulin-4+/R mice occasionally resulted in small aneurysm formation. Aortic pulse pressure was 2 to 3-fold higher in Fibulin-4R/R mice, resulting from increased aortic stiffness. Here, we analyzed the altered biological pathways in aneurysmal disease at the molecular, cellular and functional level.

Methods: Aorta transcriptome changes of Fibulin-4+/R and Fibulin-4R/R aortas were performed using ANOVA and Ingenuity Pathway Analysis. Histology was applied to verify cellular abnormalities. Functional analysis occurred by measuring isometric forces of thoracic aortas in vitro and aortic pressures with a pressure transducer catheter in vivo.

Results: Ingenuity Pathway Analysis identified three major dysregulated pathways, including TGF β signaling, immune response and specifically Ca²⁺ signaling genes involved in the maintenance of contractile function. Histological analysis and α -smooth muscle actin immunostaining showed loss of smooth muscle cells (SMCs), which coincided with cartilage bone formation, already in Fibulin-4+/R animals. Severe loss of SMCs and increase of extracellular matrix depositions resulted in overall thickening of the aortic wall in Fibulin-4R/R mice. In addition, Fibulin-4R/R mice showed increased endothelial damage, endothelial cellular proliferation, as evidenced by BrdU labeling and thrombus formation, indicative for endothelial dysfunction. In vitro, maximum contractility was determined for phenylephrine and compared to KCl (100 mM). KCl responses showed a reduced contractile capacity of ascending aortas in Fibulin-4R/R mice correlating with a reduction of SMCs in this area. In descending aortas, phenylephrine-induced contractility decreased from $54 \pm 7\%$ in wildtypes to $13 \pm 2\%$ in Fibulin-4R/R mice. Endothelium-dependent vasorelaxation by acetylcholine, following preconstruction with U46619, was strongly reduced in Fibulin-4R/R mice. Finally, with reducing expression of fibulin-4, diastolic blood pressure decreased from 63 ± 3 in Fibulin-4+/+ to 60 ± 5 in Fibulin-4+/R and 41 ± 7 in Fibulin-4R/R mice.

Conclusion: Our results uncover a role for Fibulin-4 in the maintenance of SMC contractile function and endothelial responsiveness.

8A.06 AGE-DEPENDENT DIFFERENCES BETWEEN AORTIC AND CAROTID-FEMORAL PULSE WAVE VELOCITY

T. Weber¹, M. Ammer², M. Rammer¹, M. O'Rourke², B. Eber¹. ¹Cardiology Department Klinikum Wels-Grieskirchen, Wels, Austria, ²St. Vincent's Clinic and UNSW, Sydney, Australia

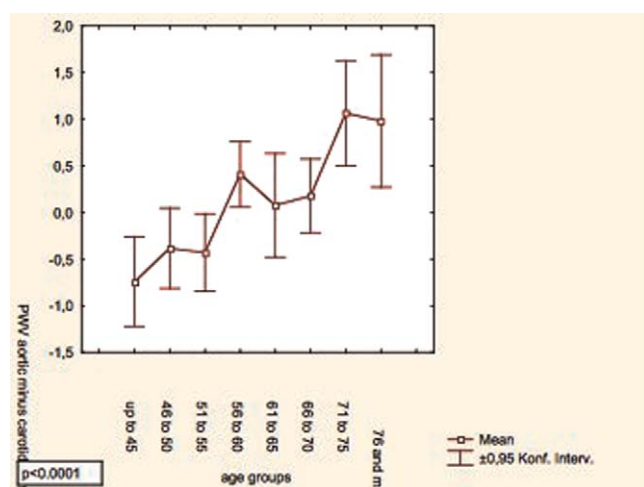
Background: Although carotid-femoral pulse wave velocity (cfPWV) is commonly equated with aortic stiffness and, thus, aortic PWV, this may not be completely accurate.

Methods, patients: We measured strictly aortic PWV (from ascending aorta to bifurcation) invasively in 378 patients undergoing coronary angiography as well as cfPWV non-invasively, using the SphygmoCor system. Patients were divided into age groups (from < 45 years to > 75 years), and age-dependent changes in aortic PWV, cfPWV, their determinants (travel distance - TD, travel time - TT) and differences between them were assessed.

Results: Body height significantly decreased with increasing age, and this was paralleled by a decrease in TD, as assessed non-invasively. In contrast, TD, as assessed invasively (catheter length), tended to increase with age, probably due to an increase in ascending aortic length or increased aortic kinking. As a result, the difference (TD aortic minus cf) showed a significant increase with age ($p = 0.001$). TT (aortic as well as cf) shortened significantly with increasing age, but the shortening was more pronounced for aortic TT, resulting in a significant decrease of the difference (TT aortic minus cf) from roughly 10 msec in younger patients to -4 msec in elderly patients ($p < 0.0001$). This may be due to an increase in stiffening of the ascending aorta. Finally, aortic as well as cfPWV significantly increased with increasing age. The increase was more pronounced for aortic PWV, resulting in a net difference (PWV aortic minus cf) of -0.7 m/sec in the youngest patients, increasing up to 1 m/sec in the oldest patients ($p < 0.0001$) – Figure.

Conclusion: Aortic and cf PWV cannot be easily equated. With age > 70 years, the effect of the more pronounced decrease of aortic TT on PWV is combined with a more pronounced increase of aortic TD, leading to a

higher aortic PWV as compared with cfPWV. In younger age (< 56 years), the opposite is true.



8A.07 PRECLINICAL STRUCTURAL AND FUNCTIONAL VASCULAR INVOLVEMENT IN YOUNG SUBJECTS WITH TYPE 1 DIABETES WITHOUT OVERT COMPLICATIONS

C. Palombo, M. Kozàková, C. Morizzo, L. Gnesi, E. Malshi, F. Massart, G. Saggese, G. Federico. ¹Department of Internal Medicine, University of Pisa, Pisa, Italy, ²Section of Pediatric Endocrinology and Diabetes, University of Pisa, Pisa, Italy

Background: Increased carotid intima-media thickness (IMT), endothelial dysfunction and arterial stiffness (AS) have been reported in young subjects with type 1 diabetes (DM1). However, the relations between these vascular abnormalities remain unknown.

Aim of the Study: To assess by a multiparametric approach the preclinical vascular involvement in young patients with early onset DM1 and adequate glycaemic control.

Methods: 31 DM1 patients, free of macro- and microvascular complications (20 males, age 19.3 ± 3.1 , BMI 22.1 ± 2.7 kg/m², disease duration: 11 ± 5 years, average HbA1c: $7.7 \pm 1.0\%$), and 31 controls (NL: 16 males, age 20.1 ± 1.6 ; BMI 21.6 ± 2.1 kg/m²) were studied. IMT was measured by radiofrequency-based ultrasound (Q-IMT, Esaote MyLab70). AS was estimated by carotid-femoral pulse wave velocity (PWV, Complior), and endothelial function by forearm reactive hyperemia index (RHI, EndoPAT). Carotid augmentation index (AIx) was measured by applanation tonometry (Pulsepen, Diatecne).

Results: Compared to controls, DM1 patients, although normotensive, had significantly higher ($p < 0.05$) SBP (119 ± 15 vs 110 ± 9 mmHg), Q-IMT (440 ± 64 vs 401 ± 55 μ m), PWV (7.4 ± 1.3 vs 6.5 ± 1.1 m/s) and AIx (12 ± 7 vs $1.8 \pm 7\%$). RHI was lower ($p < 0.05$) in patients with HbA1c $> 7.5\%$ than in those with HbA1c $< 7.5\%$ and NL (1.5 ± 0.35 ; 2.1 ± 0.69 and 2.1 ± 0.53). Lipid profile was comparable in DM1 vs NL. Within vascular parameters, in the entire population, Q-IMT was directly related with AIx ($r = 0.53$, $p < 0.005$) and inversely with RHI ($r = -0.33$, $p < 0.05$).

In multivariate models, DM1 was independent predictor ($p < 0.001$) of SBP (together with sex and BMI, $R^2 = 0.62$), Q-IMT (together with sex and RHI, $R^2 = 0.39$), PWV (together with age and SBP, $R^2 = 0.28$) and AIx (together with Q-IMT, $R^2 = 0.45$).

Conclusions: In young subjects with adequately controlled DM1 free of overt complications, a mildly increased IMT is associated with augmented wave reflection and reduced RHI. Higher HbA1c levels are associated with endothelial dysfunction, suggesting that an aggressive glycaemic control may be a critical factor for preventing preclinical vascular involvement.

ORAL SESSIONS

ORAL SESSION 8B

OBESITY AND METABOLIC SYNDROME 1

8B.01 DIFFERENT EFFECTS OF ALISKIREN AND LOSARTAN ON FIBRINOLYSIS AND INSULIN SENSITIVITY IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME

R. Fogari, A. Mugellini, P. Preti, A. Zoppi, P. Lazzari, G. Derosa. *Department of Internal Medicine, University of Pavia, Pavia, Italy*

Aim of the study was to compare the effect of aliskiren (A) and losartan (L) on insulin sensitivity (IS), and on fibrinolysis in mild to moderate hypertensive patients with metabolic syndrome.

Sixty-two outpatients aged 18–65 years with mild to moderate hypertension (DBP >90 <105 mmHg and SBP >140 <180 mmHg) and metabolic syndrome were screened for this parallel arm study. After 2 weeks placebo period 58 patients were randomized to A 300 mg od or to L 100 mg od for 12 weeks. Clinical BP as well as plasma PAI-1 antigen and t-PA activity have been evaluated after 2, 4, 8, and 12 weeks of treatment. At the end of the placebo period and of each treatment period, patients performed an euglycemic hyperinsulinemic clamp (IS has been evaluated by glucose infusion rate [GIR] during the last 30 minutes of the clamp).

Both A and L induced a significant and similar SBP/DBP reduction (-16.2/12.7 mmHg and -15.8/12.1 mmHg, $p < 0.001$, respectively). A significantly increased GIR (+0.98 $\mu\text{mol}/\text{min}/\text{Kg}$, $p < 0.01$ vs baseline), while L did not change it (+0.26 $\mu\text{mol}/\text{min}/\text{Kg}$, ns vs baseline, $p < 0.05$ vs A). PAI-1 showed a progressive decrease with A from 22.6 ± 10.5 ng/ml to 14.8 ± 6.1 ng/ml at week 12 ($p < 0.001$ vs baseline), while with L at week 12 it increased from 21.5 ± 9.8 ng/ml to 25.7 ± 10.1 ng/ml ($p < 0.05$ vs baseline, $p < 0.001$ vs A). t-PA activity showed no significant change with A and a decrease with L (from 0.49 ± 0.1 IU/ml to 0.42 ± 0.1 IU/ml, $p < 0.01$ vs baseline, $p < 0.01$ vs A).

These results indicate that in this type of patients, A significantly improved IS as well as fibrinolytic balance, while L did not affect IS and worsened fibrinolytic balance, despite similar BP reduction. It suggests that rennin-inhibition and AT1R-blockade action on IS and fibrinolysis is mediated by mechanisms partially independent of their antihypertensive effect.

8B.02 URIC ACID INTERRELATIONS WITH ADIPONECTIN, LOW-GRADE INFLAMMATION AND ARTERIAL STIFFNESS IN ESSENTIAL NEVER-TREATED HYPERTENSIVE PATIENTS

S. Kyvelou, C. Tsioufis, K. Dimitriadis, D. Tsiachris, D. Syrseloudis, A. Mazaraki, I. Andrikou, E. Anrikou, V. Tzamou, E. Tsiamis, C. Stefanadis. *First Cardiology Clinic, University of Athens, Hippokration Hospital, Athens, Greece*

Objective: Serum uric acid (SUA) is a relevant marker for cardiovascular disease in patients with hypertension and it has been implicated in target organ damage (TOD). However, the causative role has not been confirmed. Inflammation plays a pivotal role in TOD seen in essential hypertensive patients, while numerous studies confirm its interrelation with arterial stiffening. Thus, the purpose of the present study was to assess any possible links between SUA, inflammatory markers and arterial stiffness indices in never-treated essential hypertensive patients.

Design and Methods: The study included 450 newly diagnosed patients, with stage I-II essential hypertension who referred to our outpatient clinic within a period of 24 months. All patients underwent full clinical and laboratory evaluation, while BP levels were assessed by 24-h ambulatory blood pressure monitoring (ABPM). Levels of hsCRP were measured using a validated high-sensitivity assay, while adiponectin was evaluated by a sandwich ELISA system. Finally, arterial stiffness assessment was made by carotid-femoral pulse wave velocity (PWVc-f), using the Complior device.

Results: On the basis of the median uric acid levels (5.3 mg/dl) the study population was divided into subjects with low ($n = 149$) and with high

($n = 143$) SUA values. In the entire study population, SUA was positively associated with 24-h BP ($r = 0.297$, $p < 0.0001$), hsCRP ($r = 0.204$, $p = 0.001$) and PWVc-f ($r = 0.165$, $p = 0.009$), while it was negatively related to adiponectin ($r = -0.218$, $p < 0.0001$). In multiple regression analysis SUA was independently associated with hsCRP [beta (SE) = 0.142(0.116), $p = 0.02$], adiponectin [beta(SE) = -0.154(0.005), $p = 0.03$] and 24-h BP [beta(SE) = 0.246(0.008), $p = 0.001$], while PWVc-f failed to present such an association ($p = \text{NS}$).

Conclusions: There is a strong independent interrelation between SUA, CRP, 24h-BP and adiponectin levels in essential hypertensive patients, while no such association was confirmed for arterial stiffness. Further studies should be conducted so as to clarify the possible causative background of these interrelations.

8B.03 METABOLIC SYNDROME STRONGLY REDUCES THE EFFECTIVENESS OF ANTI-HYPERTENSIVE TREATMENT IN PORTUGAL

N. Cortez-Dias¹, S. Robalo Martins¹, A. Belo², M. Fiuza¹. ¹*Santa Maria University Hospital, Lisbon, Portugal*, ²*Portuguese Society of Cardiology, Lisbon, Portugal*

Aim: To evaluate the influence of metabolic risk factors, demographic variables and patterns of antihypertensive (aHT) treatment on the effectiveness of aHT therapy.

Methods: Cross-sectional study performed in a primary care setting, involving 719 general practitioners pursuant to stratified distribution proportional to the population density. The first 2 adult patients scheduled for an appointment on a given day were invited to participate, irrespective of the reason for the consultation. A questionnaire for social-demographic, clinical and laboratory data was applied. Blood pressure (BP) was measured in a seated position after a five-minute rest period, the mean of two consecutive measurements being recorded. Effectiveness of aHT treatment was assessed by the occurrence of uncontrolled hypertension (HT), defined as BP $\geq 140/90$ mmHg. Metabolic syndrome (MS) was defined by NCEP-ATP III criteria. Logistic regression multivariate analysis was performed to determine the association between uncontrolled HT and metabolic risk factors, demographic variables and patterns of aHT treatment. The effect of each variable on the mean BP was assessed by multiple linear regression analysis.

Results: Among the studied population (16,856 individuals), 8,925 hypertensive patients taking aHT drugs were identified (61.6% females, 58.1 ± 15.1 years). Among them, 35.8% had controlled BP (H: 34.6%, M: 35.9%, $p = 0.046$), 24.2% had BP $\geq 160/100$ mmHg and 5.3% had BP $\geq 180/110$ mmHg. The risk factor most strongly associated with poor BP control was MS (OR: 5.23) and its presence independently increased mean BP by 7 mmHg. BP control rate decreased with age, body mass index and waist circumference, and it was worse in patients with triglycerides ≥ 150 mg/dL. However, none of these variables was independently associated with uncontrolled HT. Furthermore, the effectiveness of aHT therapy was not dependent on the aHT drug class.

Conclusions: In the clinical setting, aHT treatment has a low effectiveness. So, it is urgent to implement national strategies for HT prevention and treatment. Furthermore, MS is clinically relevant, being the risk factor that most strongly reduces the effectiveness of aHT therapy.

8B.04 ACARBOSE TREATMENT ENHANCES LEVELS OF MIDREGIONAL-PRO-ATRIAL-NATRIURETIC PEPTIDE: EVIDENCES FOR GUT-HEART-AXIS?

N. Rudovich¹, A. Ernst³, M. Moehlig^{1,2}, M.O. Weickert^{1,2,4}, A.M. Arafat^{1,2}, O. Pivovarov^{1,2}, A. Bergmann³, A.F.H. Pfeiffer^{1,2}. ¹*Department of Endocrinology, Diabetes and Nutrition, Campus B, Franklin, Charite Medical University, Berlin, Germany*, ²*Department of Clinical Nutrition, German Institute of Human Nutrition Potsdam, Nuthetal, Germany*, ³*B.R.A.H.M.S AG, Biotechnology Centre Hennigsdorf, Berlin, Germany*, ⁴*Clinical Sciences Research Institute, Warwick Medical School, University of Warwick, Coventry, United Kingdom*

Objective: Acarbose unexpectedly reduced blood pressure and especially new cases of hypertension in the STOP-NIDDM study. Atrial natriuretic peptide (ANP) is a potent natriuretic and vasorelaxant hormone that is secreted mainly by cardiomyocytes and plays contributory roles in cardiovascular homeostasis. Recent studies have described that N-terminal natriuretic peptide levels are suppressed in obesity and subjects with Metabolic Syndrome (MS). Midregional-pro-atrial-natriuretic peptide (MR-proANP) is a stable fragment of the ANP precursor proANP, that is co-secreted with mature ANP from cardiomyocytes. We hypothesized that acarbose may modulate MR-proANP levels via regulation of postprandial insulin and/or glucose response.

Design and Method: Subjects with MS (n = 28) were studied in the double blind, placebo controlled, crossover intervention study. Interventions with acarbose (3x100 mg/d) or placebo for 12 weeks (with a respective 12-week washout period) were performed. Changes in MR-proANP, postprandial glucose/insulin responses in the liquid meal challenge test, body weight, and insulin sensitivity in the euglycemic clamp experiments were assessed. Furthermore, in a cohort of normotensive non-diabetic subjects (n = 46), the effect of insulin application on MR-proANP was analyzed during a hyperinsulinemic-euglycemic clamp.

Results: Fasting MR-proANP increased after 12 weeks of acarbose treatment (p = 0.001). Acarbose decreased postprandial insulin and glucose concentrations (p = 0.0001 and p = 0.024, respectively). Changes in MR-proANP levels correlated negatively with changes in postprandial insulin (r = -0.53, p < 0.0001). No effects on body weight and insulin sensitivity were observed. Exogenous insulin suppresses plasma levels of MR-proANP (p < 0.001).

Conclusions: Acarbose increases MR-proANP levels in subjects with metabolic syndrome. We propose that acarbose increases MR-proANP by reducing of the postprandial insulin. We therefore propose that the acarbose-induced increase of MR-proANP exerts a protective effect on the cardiovascular system. These observations provide a novel link between postprandial metabolism and hormonal heart action.

8B.05 NORMAL BLOOD PRESSURE IN OBESITY IS ASSOCIATED WITH REDUCED PERIPHERAL VASCULAR RESISTANCE

C. Mceniery¹, B. McDonnell², K. Miles¹, Y. Yasmin¹, J. Cockcroft², I. Wilkinson¹. ¹University of Cambridge, Cambridge, United Kingdom, ²Wales Heart Research Institute, Cardiff, United Kingdom

Objective: The link between obesity and elevated blood pressure is firmly established. However, not all obese individuals are hypertensive, suggesting that adaptive mechanisms are present in at least some obese individuals which allow them to maintain normal levels of blood pressure (BP). The aim of the current study was to examine the mechanisms underlying different levels of BP in obese individuals.

Design and Method: Data from 2511 individuals (1262 males) were available from The Enigma Study for the current analyses. All individuals were aged between 18–40 years, and were free of cardiovascular disease and medication. Detailed demographic, biochemical and haemodynamic data, including BP, cardiac output (CO) and peripheral resistance (PVR) were obtained in all individuals. They were then stratified according to BMI (normal weight, overweight and obese) using WHO criteria, and seated brachial BP (optimal, normal, high-normal and hypertensive) using JNC 6 criteria. For the current analyses, comparisons were made between 3 groups: normal-weight normotensives (controls, optimal and normal BP, n = 1360), obese normotensives (optimal and normal BP, n = 61) and obese hypertensives (n = 79).

Results: Compared with controls, obese individuals were older, had an increased family history of hypertension and an adverse biochemical profile (P < 0.01 for all). In addition, heart rate, CO and stroke volume were all significantly elevated in obese individuals (P < 0.001 for all). However, the elevation in CO was more marked in obese individuals who were hypertensive (P < 0.05 versus obese normotensives). In contrast, PVR was significantly lower in obese individuals with normal BP (P < 0.05 versus controls and obese hypertensives).

Conclusions: These data suggest that a reduction in peripheral resistance is an important mechanism by which some obese individuals maintain normal blood pressure despite having a significantly elevated cardiac output. Although the factors underlying the reduction in PVR in these individuals remain to be elucidated, they are likely to provide an intriguing insight into the pathophysiology of obesity-related hypertension.

8B.06 PRESENCE OF SYMPATHETIC HYPERACTIVITY IN PATIENTS AT HIGH RISK FOR DEVELOPING A METABOLIC SYNDROME

S. Habib¹, P. van de Borne², E. Sauleau³, F. Zannad⁴, A. Simon¹, C. Brandt¹, P. Bousquet¹. ¹Hôpitaux Universitaires de Strasbourg, Clinical Investigation Centre, Strasbourg, France, ²Hôpital Universitaire Erasme, Dpt of Cardiology, Brussels, Belgium, ³Hôpitaux Universitaires de Strasbourg, Dpt of Epidemiology and Public Health, Strasbourg, France, ⁴Hôpitaux Universitaires de Nancy, Clinical Investigation Centre, Nancy, France

Sympathetic hyperactivity is associated with several components of the metabolic syndrome (MetS). However, the contribution of such a hyperactivity to the pathogenesis of the MetS has never been assessed.

The aim of this study was to assess the presence of sympathetic hyperactivity in patients with early symptoms or incomplete forms of MetS.

40 healthy volunteers and 23 patients with one or 2 components of MetS among 3, as defined by the International Diabetes Federation (moderate obesity, moderate hypertension, dyslipemia, glucose intolerance), were enrolled.

Sympathetic activity was measured by the muscular sympathetic nerve activity (MNSA) technique as the reference method. Plasma and urinary catecholamines, blood pressure and heart rate variabilities have also been measured (Holter ECG, Portapres).

Compared with healthy volunteers, sympathetic activity was significantly increased in patients (MSNA: 32.95 ± 0.5 bursts/min vs 28.69 ± 0.39 bursts/min, P < 0.001). A significant correlation was observed between MNSA and cardiovascular risk factors, such as abdominal obesity (r = 0.55; P < 0.001), heart rate (r = 0.54; P < 0.001), diastolic blood pressure (r = 0.49; P < 0.001), systolic blood pressure (r = 0.34; P = 0.006), insulinemia (r = 0.32; P = 0.01) and HDLc (r = -0.26; P = 0.04). Neither catecholamines nor heart rate and blood pressure variabilities were significantly changed.

In conclusion, a sympathetic hyperactivity can be assessed in patients who are at risk for developing MetS, i.e., at a stage when the MetS is not yet completed. Plasma and urinary catecholamines do not constitute markers sensitive enough to detect sympathetic hyperactivity in such patients. The same holds true for blood pressure and heart rate variabilities. Therefore, the MNSA technique remains the only method accurate enough to be used in this kind of studies for the measurement of sympathetic activity. The present results support the hypothesis according to which a relation between cause and effect may exist between sympathetic hyperactivity and some forms of MetS.

8B.07 INCREASED INTERLEUKIN-18 PLASMA LEVELS IN HYPERTENSIVE PATIENTS AFTER ORAL GLUCOSE TOLERANCE TEST

E. Porteri, C. De Ciuceis, G.E.M. Boari, C. Platto, A. Pilu, G. Bulgari, D. Avanzi, M. Mazza, L. Giacomelli, C. Agabiti Rosei, D. Rizzoni. *Internal Medicine, University of Brescia, Brescia, Italy*

Type 2 diabetes mellitus is associated with an increased oxidative stress and/or inflammation, which might play a relevant role in the development of clinical complications. The aim of the present study was to investigate circulating indices of inflammation/oxidative stress during an oral glucose tolerance test (OGTT) in hypertensive patients.

We have enrolled 14 essential hypertensive patients with at least two components of the metabolic syndrome, but without overt diabetes mellitus. All patients underwent a standard OGTT (75 mg glucose). Interleukin 6, interleukin 18, lipoperoxides, antioxidant capacity (PAO) and macrophages chemotactic factor 1 (MCP-1) plasma circulating levels were evaluated before and 120' after OGTT by ELISA.

Results: OGTT demonstrated an impaired glucose tolerance in all cases (basal: 102 ± 11 mg/dl, 120' 221 ± 24 mg/dl). Plasma interleukin 18 was significantly increased after OGTT (2069 ± 1010 vs. 1305 ± 546 pg/ml, p = 0.02). No increase was observed in plasma interleukin 6 (6.6 ± 5.38 vs. 8.02 ± 7.91 pg/ml p = NS), plasma lipoperoxides 5.39 ± 6.89 vs. 4.87 ± 4.97 μM/L, p = NS), PAO (630 ± 137 vs. 688 ± 180 μM/L, p = NS) and plasma MCP-1 (527 ± 450 vs. 376 ± 290 pg/ml, p = NS). Blood pressure values were 145 ± 91 ± 11/9 mm Hg; body mass index 27 ± 3 Kg/m².

In conclusion, our data suggest that an increase in serum glucose during OGTT is associated with systemic inflammation, as documented by the observation of an increase in plasma interleukin 18, but not with an increased oxidative stress.

ORAL SESSIONS

ORAL SESSION 8C

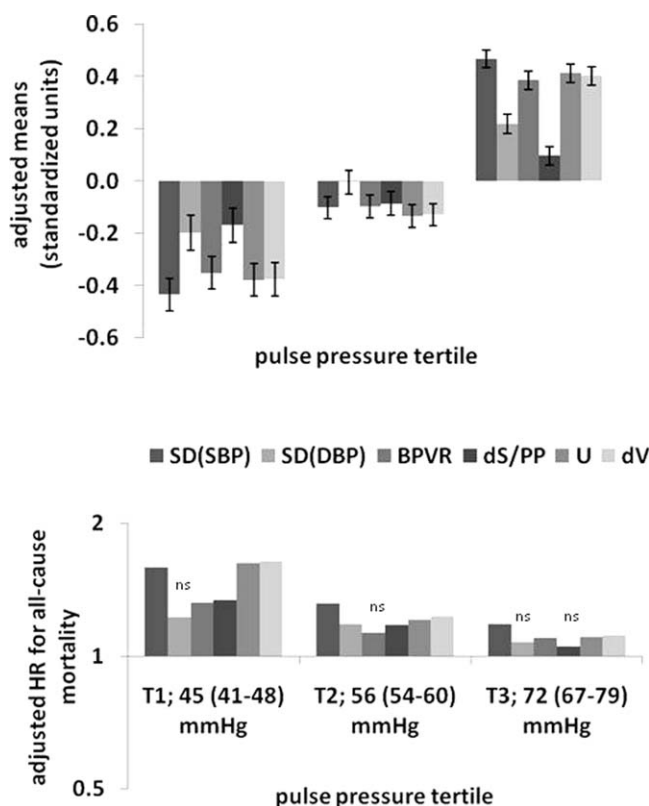
BLOOD PRESSURE MEASUREMENT 3

8C.01 AMBULATORY BLOOD PRESSURE VARIABILITY INDICES AS INDEPENDENT PREDICTORS OF ALL CAUSE MORTALITY

I. Ben-Dov¹, M. Bursztyn², B. Gavish³. ¹The Rockefeller University, New York, USA, ²Hadassah - Hebrew University Medical Center, Jerusalem, Israel, ³InterCure Ltd., Lod, Israel

Objective: To evaluate new indices, derived from ambulatory BP variability, for associations with clinical characteristics and survival.

Design and Methods: Correlation and outcome analyses of an ABPM database. BP variability (BPV), was defined as the weighted average of awake and sleep SD of BP. The following were defined using systolic (SDs) and diastolic (SDd) BPV: BP Variability Ratio (BPVR), defined as SDs/SDd, estimates the slope of the systolic-vs-diastolic pressure relationship using symmetric regression (the corresponding symmetric Ambulatory Arterial Stiffness Index is $1-1/(BPVR)$); $dV = SDs2-SDd2$; $U = (SDs-SDd)/SDs$; and $dS/PP = (SDs-SDd)/PP$, where PP is the pulse pressure.



Results: Between 1991 and 2009, 4690 patients (age 55 ± 16 years; 52% women) underwent ABPM. 58% were treated for hypertension and 9% for diabetes. Ambulatory BP was $137 \pm 16/79 \pm 10$ mmHg, and BPV was $13 \pm 4/9 \pm 2$ mmHg. The median values (and IQR) of the variability-derived indices were: BPVR 1.36 (1.15–1.61); dS/PP 0.057 (0.027–0.090); U 37 mmHg² (14–79); and dV 64 mmHg² (26–128). BPVR and dS/PP were more dependent on age and hypertension treatment status compared to U , dV and BPV, but less dependent on gender and systolic BP. BPVR and dS/PP were entirely

independent of mean arterial pressure, while U and dV had mild positive correlations with it. The figure (top) shows standardized values of BPV and its derivatives according to PP tertiles, adjusted for covariates. During median follow-up of 9.0 years (IQR 5.1–13.4 years) 524 patients died. BPV and its derivatives predicted all-cause mortality. The figure (bottom) shows decreasing multivariable-adjusted HR associated with BPV indices as PP increases.

Conclusions: BPV and derived indices have meaningful associations with clinical characteristics, but are nonetheless independently linked with outcome. Prognosis might be directly affected by BPV, or indirectly through associated deranged arterial properties. Indeed, arterial rigidity as assessed by PP appears to markedly modulate the prognostic significance of ambulatory BPV. This suggests a specific role for prediction of outcome in subjects with low PP hypertension (isolated diastolic hypertension) or prehypertension.

8C.02 DOES THE PREDICTIVE VALUE OF 24-H AMBULATORY BLOOD PRESSURE (ABP) IS GENDER DEPENDENT? AN ANALYSIS OF A HYPERTENSIVE POPULATION FOLLOWED BY 15.2 YEARS FOLLOW-UP

J. Bastos¹, S. Bertoquini², J. Polonia³. ¹Escola Superior de Saúde da Universidade de Aveiro, Sob Financiamento do Ministério da Saúde, Hospital Infante D Pedro E, Aveiro, Portugal, ²Faculdade Psicologia e Ciências da Educação, Porto, Bolseira FCT, Porto, Portugal, ³Faculdade de Medicina, Porto, Portugal

It is uncertain if the predictive value of 24-h ambulatory blood pressure (ABP) for cardiovascular (CV) events differs between men and women. In a hypertensive population $n = 1200$ (645 women), ageing 51 ± 12 years, BMI 27 ± 5 Kg/m², 53% under antihypertensive medication and without previous CV events we assessed and compared the CV prognostic value of ABP. Occurrence of CV events was analyzed by Cox hazard model with adjustment for age, smoking, BMI, CV therapy, diabetes, lipids and office BP (OBP). There were 152 CV fatal/non-fatal events (79 strokes, 51 coronary, 22 others) during 15.2 years follow-up. Men vs women showed higher prevalence of total CV events (16.2% vs 9.6%) and of coronary (CE) (6.5% vs 2.3%) both $p < 0.001$ not of stroke (STK), (7.2% vs 6.0%, n.s.). The adjusted relative risk (RR) of female vs male was 0.62 (95%CI 0.42–0.91, $p < 0.01$) for total CV events and 0.43 (95%CI 0.21–0.88, $p < 0.01$) for CE, not for STK. In women, the adjusted RR of total CV events and of STK associated to 1-SD increments in 24h, daytime and nighttime systolic BP were respectively (1.41, 1.78, 1.72, all $p < 0.01$) and (1.81, 2.05, 1.77, all $p < 0.01$). Significance of these RR was maintained after adjustment for correspondent ABP diastolic pressures. Significant RR of total CV events 2.98 (95%CI 1.48–5.97) of STK 2.48 (95%CI 1.04–5.93) and of CE 4.13 (95%CI 1.48–5.97) were associated with 24h-pulse pressure >56 mm Hg vs ≤ 56 mm Hg. In men the adjusted predictive value of ABP was less consistent. Significance was found in adjusted RR of total CE 1.33 (95%CI 1.01–1.75) and of STK 1.69 (95%CI 1.14–2.52) associated with 1-SD increment of nighttime SBP (not with 24h, daytime and PP). We conclude that in patients with hypertension, prevalence of total CV events is greater in men than women, but after adjustment for OBP and other risk factors the predictive value for CV events and for STK of ABP is greater in women comparing to men.

8C.03 AGE-DEPENDENT DIFFERENCES IN OFFICE (OBP) VS AMBULATORY BLOOD PRESSURE MONITORING (ABPM) IN HYPERTENSIVE CHILDREN AND ADOLESCENTS

P. Salice¹, G. Ardissino², A. Zanchetti³, S. Ghiglia¹, A.M. Colli¹, M.A. Galli¹, S. Testa², G. Marra², L. Baca⁴, D. Li Vecchi¹, A. Edefonti², F. Magrini¹, G.B. Danzi¹. ¹Cardiologia Pediatrica UO di Cardiologia Fondazione IRCCS Ca Granda Ospedale Maggiore Policlinico, Milan, Italy, ²UO di Nefrologia e Dialisi Pediatrica Fondazione IRCCS Ca Granda Ospedale Maggiore Policlinico, Milan, Italy, ³Istituto Auxologico Italiano IRCCS e Centro di Fisiologia Clinica ed Ipertensione Università di Milan, Milan, Italy, ⁴Dipartimento toraco polmonare e cardiocircolatorio, Università di Milano e UO. Medicina Cardiovascolare Fondazione IRCCS, Milan, Italy

Background: ABPM is a well established tool for investigating BP in adults, but information on ABPM in young children is scarce. The limited number

of available data suggests, however, that in children, at variance with adults, day time ABP is no lower and sometimes slightly higher than OBP (J Hypertens 2009;27:1719–42). The aim of the present study was to compare OBP with ABP in children of different age, based on the working hypothesis that the relation between OBP and ABP may differ within age.

Method: We retrospectively compared OBP (S and D) and mean 24 hrs, day and night ABP in 440 individuals aged 4–18 yrs (11.8 ± 3.8 ; 253 M) divided in 7 age groups 2 years apart. All individuals diagnosed as hypertensive, 180 (41%) on antihypertensive treatment. Data were statistically analyzed by ANOVA. Results: We found a specific, and statistically significant ($p < 0.0002$ for SBP and < 0.0001 for DBP), pattern among groups with ABP being higher than OBP in children < 10 years old and equal or lower in older. Tables hereafter show the distribution of 24h ABP differences for S and D in respect to office value. No gender difference was observed and the same results were found both during the day and night. Conclusions: In younger children ABPM measures higher BP values than the office measurements, while the pattern in older children is more similar to that of adults (office higher than ABP). It can be speculated that younger children either are more sensitive to the discomfort caused by ABPM or their higher level of activity is responsible for the reported pattern. Whatever the interpretation, it is of paramount importance to keep this age specific pattern into consideration when using ABPM to diagnose hypertension and to control the efficacy of the treatment in this age group.

8C.04 INTER ARM DIFFERENCES CAN ONLY BE DETERMINED ACCURATELY WHEN MULTIPLE MEASUREMENTS ARE PERFORMED ON BOTH ARMS SIMULTANEOUSLY WITH AN AUTOMATIC OSCILLOMETRIC DEVICE

F.W. Lohmann¹, S. Eckert², W.J. Verberk³. ¹Department of Internal Medicine, Neukölln Hospital, Berlin, Germany, ²Heart and Diabetes Center Northrhine-Westphalia, Department of Cardiology, University Hospital Bochum, Bad Oeynhausen, Germany, ³Department of Research and Development Microlife Corporation, Taipei, Taiwan

Background: Screening for inter arm differences (IADs) of blood pressure (BP) at each first visit is recommended by many guidelines. However, the method of how this should be performed is much less clearly described.

Objective: The present study aimed at comparing two methods for double arm measurements: 1) conventional measurement (CM) and 2) simultaneous automatic measurement (SAM).

Methods: 118 patients with two or more cardiovascular risk factors and a mean age of 59 $\pm$ 17 years were referred to two internal clinics.

CM was performed with a validated aneroid manometer in sitting position on the right and left arm subsequently and v.v. SAM was performed three times in sitting and standing position using a validated automatic oscillometric device (WatchBP Office, Microlife, Taipei, Taiwan) equipped with two cuffs for double-arm measurements.

Results: Systolic BP values were significantly higher at the first measurement than at the second for all three BP measurement methods. The average absolute IADs were significantly higher ($p < 0.01$) for CM (4.9/3.7 mmHg) than for SAM in sitting (3.7/3.1 mmHg) and standing (4.4/3.4 mmHg) position for systolic and diastolic pressure, respectively. The standard deviations of IADs were significantly higher ($p < 0.01$) for CM (4.1/3.1 mmHg) than for SAM in sitting (3.2/2.5 mmHg) and standing (3.9/2.9 mmHg) position for systolic and diastolic pressure, respectively.

Conclusions: SAM provides smaller and more reproducible IADs than CM. As BP is constantly fluctuating and manual measurements are more liable to observer bias SAM is most likely to provide a better estimation of a patient's true IAD than CM.

8C.05 RELATIONSHIP BETWEEN NOCTURNAL BLOOD PRESSURE PATTERNS AND DAYTIME BLOOD PRESSURE VARIABILITY IN THE SPANISH AMBULATORY BLOOD PRESSURE MONITORING REGISTRY

G. Bilo^{1,2}, S. Hoshida^{1,3}, A. de la Sierra⁴, J.R. Banegas⁵, M. Gorostidi⁶, J. Segura⁷, L.M. Ruilope⁷, G. Mancía², G. Parati^{1,2}. ¹Dept. of Cardiology, Istituto Auxologico Italiano, Milan, Italy, ²Dept. of Clinical Medicine and Prevention, University of Milano-Bicocca, Milan, Italy, ³Dept. of Cardiology, Jichi Medical University School of Medicine, Tochigi, Japan, ⁴Department of Internal Medicine, Hospital Mutua Terrassa, University of Barcelona, Barcelona, Spain, ⁵Department of Epidemiology and Public Health, Autonomous University,

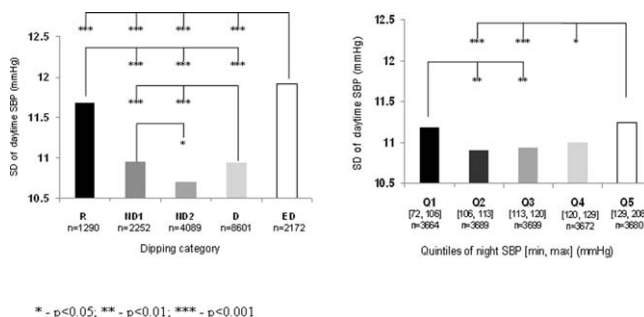
Madrid, Spain, ⁶Department of Nephrology, Hospital San Agustín, Avilés, Spain, ⁷Hypertension Unit, 12 de Octubre Hospital, Madrid, Spain

Objective: Different abnormal patterns of nocturnal blood pressure (BP) including nocturnal hypertension, absent or excessive night-time BP fall, as well as increased short-term BP variability have been reported to be associated with an increased risk of cardiovascular events. However, it is not clear whether any relationship exists between different nocturnal BP patterns and daytime BP variability. The aim of the present study was to address this issue taking advantage of the large number of subjects included in the Spanish Ambulatory Blood Pressure Monitoring Registry.

Methods: We studied 18405 subjects (mean age: 52.7 ± 14.3 years, male 54%) not on antihypertensive medication for at least 2 weeks. Ambulatory BP monitoring was performed with Spacelabs 90207 devices. BP variability was quantified as standard deviation (SD) of daytime (10 a.m.-10 p.m.) values. Data were analyzed by different models, subdividing subjects into: 1) categories of day/night systolic(S) BP pattern [risers (R): $< 0\%$ nocturnal SBP fall, nondippers: 0–5% (ND1) and 5–10% (ND2), dippers (D): 10–20%, extreme dippers (ED): $> 20\%$] and 2) quintiles of mean night-time (mid-night-6 a.m.) SBP. The differences between categories were assessed by means of an ANCOVA model adjusted for age, BMI, gender, smoking, diabetes, dyslipidemia, previous cardiovascular disease, renal insufficiency and mean 24h SBP (Model 1) or mean awake SBP (Model 2). Post hoc analysis with Bonferroni correction was used for multiple comparisons.

Results: Significant differences in daytime SBP SD were found between day/night SBP fall categories ($p < 0.0001$) and between night-time SBP quintiles ($p < 0.0001$) (see Figure).

Conclusions: Untreated subjects with very high or very low nocturnal BP, as well as with “riser” and “extreme-dipper” SBP profile show increased short-term BP variability during the awake period even after adjustment for major confounders. This relationship may reflect an increased sympathetic activity in these subjects. Studies on the clinical relevance of these ambulatory BP patterns should thus not disregard such an association.



8C.06 IMPACT OF IMPROPER CUFF SIZE FOR HOME BP DEVICES ON THE PREVALENCE OF WHITE COAT AND MASKED HYPERTENSION

J. Mourad, M. Lopez-Sublet, S. Aoun-Bahous, F. Villeneuve, O. Jaboureck, C. Dourmap, C. Mourad, T. Denolle, J. Fourcade, E. Tison, J.P. Baguet. Club des Jeunes Hypertensiologues, Paris, France

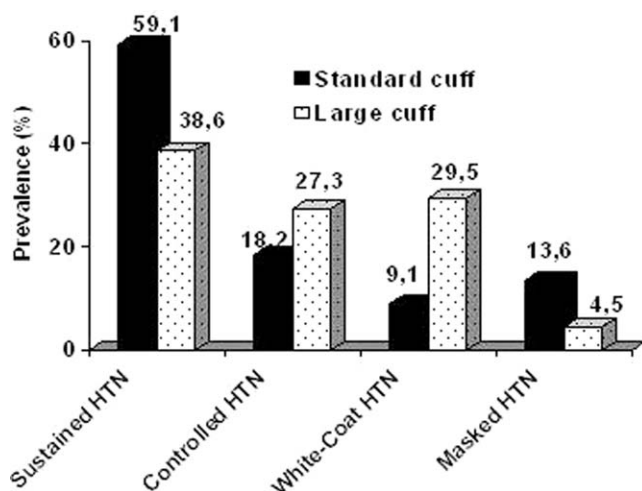
Background: Masked hypertension has been associated with obese and overweight individuals; however, most studies do not mention the use of large cuffs for home BP measurements in patients with oversized arms. Our goal was to test the impact of cuff size on hypertension status in patients with oversized arms.

Patients and Methods: 53 treated hypertensive patients (mean age 60 ± 13 y; mean BMI 36 ± 5 kg/m² (range 25–48)) with an arm circumference > 33 cm (range 33–45 cm) have been included. After the office visit, they performed two cycles of home blood pressure measurements according to the French Society of Hypertension protocol with a standard cuff, and a large cuff, using the Microlife® BP A100 PLUS validated device. Home BP $< 135/85$ mmHg was the cut-off used to classify the patients in terms of BP control.

Results: Mean office BP was $143 \pm 17/85 \pm 11$ mmHg. Home BP measurements were $141 \pm 14/84 \pm 11$ mmHg and $134 \pm 13/80 \pm 10$ mmHg with the standard and the large cuff respectively (mean difference 6.9/4.0 mmHg for SBP/DBP $p < 0.0001$). The prevalence of white-coat and masked hypertension with the 2 different cuffs is summarized in the figure.

The use of an appropriate large cuff for home BP evaluation led to a 3-fold decrease in masked hypertension and a 3-fold increase in white-coat hypertension.

Conclusion: The use of inappropriate cuffs for home BP measurements has a significant and epidemiological impact by modifying substantially the prevalence of white-coat and masked hypertension. Large adult cuffs for home BP devices, commonly needed by hypertensive patients, are not always easily available for purchase, and charging extra for large adult cuffs is a potential hindrance to consumers purchasing the correct cuff size for accurate blood pressure measurement and should be eliminated. Future studies in the field of masked hypertension should specify the use of appropriate cuffs for home BP measurements in order to avoid any technical bias.



8C.07 THE IMPORTANCE OF BLOOD PRESSURE VARIABILITY FOR SUBCLINICAL ORGAN DAMAGE AND CARDIOVASCULAR EVENTS. A LIFE SUBSTUDY

J. Vishram¹, K. Wachtell², H. Ibsen³, L. Lindholm⁴, S.E. Kjeldsen⁵, B. Dahlöf⁶, P.M. Okin⁷, R.B. Devereux⁷, M.H. Olsen¹. ¹Department of Internal Medicine, Glostrup University Hospital, Glostrup, Denmark, ²Department of

Cardiology, Rigshospitalet, Copenhagen University Hospital, Copenhagen, Denmark, ³Department of Cardiology, Holbæk Hospital, Holbæk, Denmark, ⁴Department of Public Health and Clinical Medicine, Umeå University, Umeå, Sweden, ⁵Department of Cardiology, Ullevaal University Hospital, Oslo, Norway, ⁶Sahlgrenska University Hospital-Östra, Göteborg, Sweden, ⁷The Weill Medical College of Cornell University, New York, USA

Background: In daily practice, antihypertensive treatment is based on the mean value of several blood pressure (BP) measurements due to high day-to-day variation of BP. However, it is unknown whether high BP variability may be harmful in treated hypertensive patients.

Methods: Therefore, we tested in the LIFE study whether BP variability assessed as standard deviation (SD) and range for BP(6–24months) measured at 6, 12, 18 and 24 months of treatment 1) was associated with subclinical organ damage (SOD) defined by left ventricular hypertrophy on ECG and urine albumin/creatinine ratio, and 2) predicted the composite cardiovascular endpoint (CEP) of cardiovascular death, myocardial infarction and stroke occurring after 24 months. We excluded patients with CEP before two years of treatment and patients with < two BP(6–24 months) leaving 8505 patients with 630 CEPs.

Results: Patients randomized to losartan- vs. atenolol-based treatment had slightly lower systolic BP(6–24 months) (149 vs. 150mmHg), lower SD (10.2 ± 6.0 vs. 10.9 ± 6.3mmHg), lower range (22.1 ± 13.2 vs. 23.7 ± 14.0mmHg) and higher diastolic BP(6–24 months) (85 vs. 84mmHg, all $P < 0.001$), but not different diastolic BP(6–24months) SD (5.5 ± 3.2 vs. 5.5 ± 3.1mmHg) nor range (11.8 ± 7.1 vs. 11.9 ± 6.8mmHg). Diastolic as well as systolic BP(6–24months) SD ($\beta_{diastolic} = 0.07$ and $\beta_{systolic} = 0.33$) and range ($\beta_{diastolic} = 0.06$ and $\beta_{systolic} = 0.31$) increased with increasing mean BP(6–24months) (all $P < 0.001$). After adjusting for mean BP(6–24months), neither high BP(6–24months) SD nor wide range were related to SOD. Independently of treatment allocation, mean BP(6–24months), Framingham risk score and SOD at baseline, CEP was predicted by diastolic BP(6–24months) SD (hazard ratio [HR] = 1.04[1.02–1.07], $P < 0.01$), range (HR = 1.02[1.01–1.03], $P < 0.01$), systolic BP(6–24months) SD (HR = 1.01[0.99–1.03], $P = 0.07$) and range (HR = 1.007[1.001–1.01] per mmHg, $P = 0.02$). Adjusted for the same factors, stroke was predicted by diastolic BP(6–24months) SD (HR = 1.06[1.03–1.10], $P < 0.01$), range (HR = 1.03[1.01–1.04], $P < 0.01$), systolic BP(6–24months) SD (HR = 1.02[1.002–1.04], $P = 0.03$) and range (HR = 1.009[1.001–1.02] per mmHg, $P = 0.04$), but not myocardial infarction was not.

Conclusions: In treated LIFE patients, BP(6–24months) variability predicted CEP and stroke but not myocardial infarction independent of mean BP(6–24months), treatment allocation, Framingham risk score and SOD at baseline.

ORAL SESSIONS

ORAL SESSION 8D

KIDNEY 2

8D.01 DYSFUNCTIONAL HDL FROM PATIENTS WITH END-STAGE RENAL DISEASE (ESRD) RECOVER AFTER SUCCESSFUL RENAL TRANSPLANTATION

T. Huang, M. Tölle, M. Schuchardt, A. Wiedon, W. Zidek, M. van der Giet. *Charité - Department of Nephrology and Transplantation, Berlin, Germany*

Objective: The monocyte chemoattractant protein-1 (MCP-1) plays an important role in the recruitment of monocytes to sites of injury and infection. High density lipoproteins (HDL) have strong anti-inflammatory protective properties. It is known that HDL from patients with end-stage renal disease (ESRD) does not correlate with the cardiovascular outcome suggesting a dysfunctionality of HDL. Here, we show that HDL from ESRD is dysfunctional but can recover to functional HDL after successful renal transplantation.

Methods: HDL was using gradient salt density ultracentrifugation procedure. MCP-1 protein concentration was quantified using Luminex technology.

Results: Thrombin (8 IE/ml) led to a significant increase of MCP-1 secretion from VSMCs compared with basal conditions ([MCP-1]: 1464 ± 95 pg/mg vs. 253 ± 19 pg/mg, $p < 0.001$; $n = 6$). HDL from healthy controls significantly decreased this MCP-1 secretion in a dose-dependent manner (EC50 [μ g/ml]: HDL 31 ± 4 , [MCP-1]: 545 ± 35 pg/ml; $n = 6$). HDL from patients with ESRD also significantly decreased this MCP-1 secretion in a dose-dependent manner (EC50 [μ g/ml]: HDL 321 ± 153 , 734 ± 35 pg/ml; $n = 6$), but there was a significant right shift of the dose-response curve and a lower maximum decrease of MCP-1 secretion compared to HDL from healthy controls. MCP-1 inhibiting capacity in HDL from patients after successful renal transplantation was measured ($n = 7$). Patients before renal transplantation showed a reduced MCP-1 inhibitory capacity (EC50 [μ g/ml]: HDL 341 ± 143 ; 716 ± 37 pg/ml; $n = 7$). Four weeks after renal transplantation functionality of HDL in these patients was tested with good functioning graft (eGFR 54 ± 12 ml/min/1.72 m²) (EC50 [μ g/ml]: HDL 58 ± 7 , 590 ± 37 pg/ml; $n = 7$). Functionality of HDL significantly induced.

Conclusions: This study demonstrated for the first time that there is a significant functional difference between HDL from healthy controls and patients with ESRD, which seems to be dysfunctional under uremic conditions. After renal transplantation HDL functionality recovers. This might be again a relevant factor to inhibit the progression of vascular disease.

8D.02 EFFECTS OF BODY FAT ON THE NEUROADRENERGIC ABNORMALITIES OF RENAL FAILURE PATIENTS

F. Quarti-Trevano¹, G. Seravalle², F. Arenare¹, S. Furiani³, V. Vella¹, L. Magni¹, G. Mancini¹, G. Grassi¹. *¹Clinica Medica, Ospedale San Gerardo, Università Milano-Bicocca, Milan, Italy, ²Istituto Auxologico Italiano, Milan, Italy, ³Divisione di Nefrologia, Ospedale Bassini, Cinisello Balsamo, Milan, Italy*

Objective: Previous studies have shown that body fat is a major determinant of sympathetic activity both in healthy subjects and in patients with hypertension or other cardiometabolic diseases. Whether this is the case also for renal failure (RF) is unknown, however.

Design and Methods: In 30 male patients with a moderate RF belonging to stage 3 NKF (age 61.3 ± 2.2 yrs, creatinine clearance 41.6 ± 2.2 ml/min/1.73m², MDRD formulae, mean $\pm$ SEM) we measured anthropometric parameters [body mass index (BMI) and waist circumference (WC)], beat-to-beat blood pressure (BP, Finapres), heart rate (HR, EKG) and muscle sympathetic nerve traffic (MSNA, microneurography, peroneal

nerve) during a 30 min resting period. The same measurements were also performed in 32 age-matched male controls (C), characterized by a preserved renal function and with a BMI and WC range ($21.7\text{--}48.4$ Kg/m² and $78\text{--}150$ cm) similar to the RF ones.

Results: In the population as a whole MSNA was significantly related to creatinine clearance ($r = 0.31$, $P < 0.05$) but not to BMI or WC. RF patients were characterized by MSNA values significantly greater than lean C (58.6 ± 2.1 bs/100hb vs. 45.2 ± 3.7 bs/100hb, $P < 0.05$). While in C MSNA was significantly related to BMI and WC ($r = 0.32$ and $r = 0.56$, $P < 0.001$ for both, respectively), in RF no such correlations were found ($r = 0.26$ and $r = 0.25$, $P = \text{NS}$ for both). Furthermore while in C MSNA was significantly increased in the subgroup of subjects ($n = 18$) with a BMI > 25 Kg/m² and WC > 102 cm (63.1 ± 3.0 bs/100hb vs. 45.2 ± 3.7 bs/100hb, $P < 0.001$), no significant difference was observed in the RF subgroups with BMI and WC greater or lower than 25 kg/m² or 102 cm (60.1 ± 2.5 bs/100hb vs. 54.9 ± 3.5 bs/100hb, $P = \text{NS}$).

Conclusions: These data show that renal dysfunction alters the relationships between BMI, WC and sympathetic activity seen in lean and in obese subjects. They also show that the adrenergic overdrive seen in RF 1) is specifically dependent on RF "per se" rather than on coexisting metabolic factors and 2) is not potentiated by the concomitant presence of an overweight or an obese state.

8D.03 EFFICACY OF REVASCULARIZATION FOR RENAL ARTERY STENOSIS CAUSED BY FIBROMUSCULAR DYSPLASIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

L. Trinquart¹, C. Mounier-Vehier², M. Sapoval³, N. Gagnon⁴, P.F. Plouin⁴. *¹INSERM CIC-EC 4, Paris, France, ²CHRU, Hôpital Cardiologique, Service de Médecine Vasculaire et Hypertension, Lille, France, ³Assistance Publique-Hôpitaux de Paris, Hôpital Européen Georges Pompidou, Service de Radiologie Cardiovasculaire, Paris, France, ⁴Assistance Publique-Hôpitaux de Paris, Hôpital Européen Georges Pompidou, Service de Médecine Vasculaire et Hypertension, Paris, France*

Objective: Fibromuscular dysplasia (FMD) is the second most frequent cause of renal artery stenosis (RAS) after atherosclerosis. It is also a potentially curable cause of renovascular hypertension. Renal artery revascularization has been used to control or cure hypertension, or to stabilize or improve renal function in patients with high-grade RAS due to FMD. We performed an up-to-date and reliable assessment of the benefits and risks associated with revascularization in this population.

Design: Systematic review and meta-analyses of observational studies that enrolled hypertensive patients with FMD RAS who underwent renal artery revascularization, using surgical reconstruction or percutaneous transluminal renal angioplasty (PTRA). We assessed how often postoperative complications, and hypertension cure and improvement occurred. The variation in cure rates was assessed according to the patient and study characteristics.

Data Sources: Eligible studies were identified from Medline and Embase electronic databases, and from conference proceedings, textbooks and reference lists.

Results: We selected 70 series of patients with RAS caused by FMD who underwent revascularization using PTRA or surgery (47 and 23 series totalling 1616 and 1014 patients, respectively). Combined rates of hypertension cure, defined according to the criteria in each study, following PTRA or surgery were estimated to be 46%, 95%CI, 40% to 52%, and 58%, 95%CI, 53% to 62%, respectively, with large variations across studies. The probability of being cured was negatively associated with patient age and time of publication. Cure rates using current definitions of hypertension cure (BP $< 140/90$ mmHg without treatment) were only 36% and 54% following PTRA and surgery, respectively. The combined risk of periprocedural complications was 12% and 17% following PTRA and surgery, respectively, with less major complications following PTRA than surgery (6% versus 15%).

Conclusions: Surgical or PTRA revascularization yielded moderate BP benefits in patients with FMD RAS, with substantial variation across studies. The BP outcome was strongly influenced by patient age.

8D.04 ALBUMINURIA IS ACCOMPANIED BY INCREASED CIRCULATING SOLUBLE RECEPTOR FOR ADVANCED GLYCATION END PRODUCTS IN HYPERTENSIVE SUBJECTS

K. Dimitriadis, C. Tsioufis, D. Syrseloudis, C. Thomopoulos, A. Mazaraki, A. Miliou, D. Flessas, G. Latsios, D. Tousoulis, E. Tsiamis, C. Stefanadis *First Cardiology Clinic, University of Athens, Hippokration Hospital, Athens, Greece*

Objectives: The soluble receptor for advanced glycation end-products (sRAGE) participates in the development and acceleration of atherosclerosis, while albuminuria is an established marker of target organ damage. Our aim was to investigate plausible relationships of urinary albumin excretion, expressed as the albumin to creatinine ratio (ACR), with sRAGE in essential hypertensives.

Design and Methods: Our population consisted of 80 newly diagnosed untreated non-diabetics with stage I to II essential hypertension [48 men, mean age = 52 years, office blood pressure (BP) = 145/93 mmHg]. According to the ACR values determined as the mean of two non-consecutive morning spot urine samples, the study population was divided into microalbuminurics (n = 27) (mean ACR = 30–300 mg/g) and normoalbuminurics (n = 53) (mean ACR < 30 mg/g). Moreover, in all patients venous blood sampling was performed for estimation sRAGE concentrations.

Results: Microalbuminurics compared to normoalbuminurics were older (53 ± 6 vs 49 ± 5 years, $p < 0.05$), had higher 24-h systolic BP (140 ± 13 vs 132 ± 12 mmHg, $p = 0.001$), while did not differ regarding sex and metabolic profile ($p = \text{NS}$). Moreover, microalbuminurics compared to normoalbuminurics exhibited lower levels of sRAGE (1011 ± 458 vs 1503 ± 931 pg/ml, $p = 0.003$). In the total population, ACR was positively related to age ($r = 0.345$, $p = 0.004$), body mass index ($r = 0.217$, $p < 0.003$) and 24-h systolic BP ($r = 0.514$, $p < 0.0001$), whereas it was negatively correlated with sRAGE ($r = -0.275$, $p = 0.018$). Regarding sRAGE, it was associated with body mass index ($r = -0.241$, $p = 0.003$), waist to hip ratio ($r = -0.463$, $p < 0.0001$) and 24-h pulse pressure ($r = -0.372$, $p = 0.001$). Multiple regression analysis revealed that age, 24-h systolic BP and sRAGE were the independent predictors of ACR ($R^2 = 0.47$, $p < 0.0001$). Furthermore, analysis of covariance showed that sRAGE values were significantly different between groups even after adjustment for confounding factors ($p < 0.05$).

Conclusion: In essential hypertension, microalbuminuria is accompanied by attenuated levels of sRAGE, reflecting pronounced vascular dysfunction. Moreover, the close association of sRAGE with ACR, suggests active involvement of sRAGE in atherosclerotic target organ damage progression in non-diabetic essential hypertensives.

8D.05 GLOMERULAR FILTRATION RATE FORMULA FOR CLASSIFICATION OF CHRONIC KIDNEY DISEASE IN PATIENTS WITH ARTERIAL HYPERTENSION AND GLUCOSE INTOLERANCE

V. Tolkacheva, S. Villevalde, E. Tyukhmenov, Z. Kobalava. *Russian Peoples' Friendship University, Moscow, Russia*

Objective: To compare 2 widely available in clinical practice formulas for estimating glomerular filtration rate (GFR) in patients with arterial hypertension and glucose intolerance.

Design and Method: 547 patients 35–83 years old with arterial hypertension were enrolled into the study. BMI, BP, lipid profile and GFR using Cockcroft-Gault (C-G) and Modification of Diet in Renal Disease.

Equations (MDRD) formulas were assessed in all patients. Glycemia status was defined by standard oral glucose tolerance test in all non-diabetic patients. Patients were divided into groups with normal glucose tolerance (NGT) (n = 88), impaired fasting glucose (IFG) (n = 132), impaired glucose tolerance (IGT) (n = 90), newly diagnosed diabetes mellitus (n = 123), known diabetes mellitus (n = 114) (IDF 2005).

Results: Moderate decrease in GFR using C-G formula were observed in 15% of patients with NGT, 9% - with IFG, 7% - with IGT, 11% of newly diagnosed diabetes mellitus, 11% in known diabetes mellitus versus 28%, 18%, 14%, 27% and 29% respectively (K/DOQI, 2002). Mild decrease in GFR using C-G formula were observed in 38% of patients with NGT, 41% - with IFG, 33% - with IGT, 45% of newly diagnosed diabetes mellitus, 43% in known diabetes mellitus versus 54%, 64%, 66%, 55% and 53% respectively. No severe decrease in GFR was observed in all groups.

Conclusion: The frequency of mild and moderate decrease in GFR in patients with arterial hypertension was twice high using the MDRD formula versus C-G formula irrespective of the stage of glucose intolerance.

8D.06 IS QT INTERVAL A MARKER OF AORTIC CALCIFICATION IN CKD PATIENTS?

K. Claes¹, S. Heye², B. Bammens¹, P. Evenepoel¹, D. Kuypers¹, Y. Vanrenterghem¹. ¹University Hospital Gasthuisberg, Dpt of Nephrology, Leuven, Belgium, ²University Hospital Gasthuisberg, Dpt of Radiology, Leuven, Belgium

Objective: Approximately 60% of all cardiac deaths in patients on dialysis are due to sudden cardiac death. Prolonged QT interval and vascular calcifications have been associated with morbidity and mortality in different patient populations including patients with renal failure. There are also limited data on the association of arterial calcification and QT duration. The aim of this study was to evaluate the association of vascular calcification with distinct electrocardiographic variables (QRS, QTc and JTc interval duration) in renal transplant candidates.

Method: Single-center cross-sectional study including 193 patients (118 men, 52 years old). Patients taking QT-prolonging agents and with a bundle branch block were excluded. Aortic calcifications (AC) were evaluated on lumbar X-ray (maximum score 24). Prolonged QTc intervals were defined as > 450 ms for men and > 460 ms for women. Several clinical parameters (age, cardiovascular history, diabetes, gender, dialysis duration, dialysis type, haematocrit) and parameters of mineral metabolism (calcium, phosphorous, PTH, calcidiol and calcitriol) were included in the final analysis. Linear regression and Chi² analyses were used to test the hypotheses.

Results: 26% had a prolonged QT-interval. The presence of a prolonged QT-interval had a positive predictive value of 75.5% for the occurrence of calcifications. In linear regression analysis QRS, QTc, and JTc interval duration significantly correlated with the extent of AC in univariate analysis ($p = 0.027$; $p = 0.0017$; $p = 0.02$; respectively). QRS and QTc interval duration remained significantly correlated with the calcifications score in the multivariate model ($p = 0.012$, $p < 0.0001$). In contrast, in the multivariate model the association with the JTc interval was lost. After restricting the analyses to patients without cardiovascular history the same results were found.

Conclusions: The presence of a prolonged QT duration has a high positive predictive value for the occurrence of calcification irrespective of gender, age, cardiovascular history and parameters of mineral metabolism. Further research is warranted to unravel the pathophysiological mechanism of this association.

8D.07 ANGIOTENSINOGEN GENE PROMOTER VARIANTS AND KIDNEY CANCER

R. Sarzani¹, M. Bordicchia¹, M. D'Anzeo¹, G. Salvetti², F. Santini², A. Barbato³, P. Strazzullo³, P. Dessì-Fulgheri¹, A. Rappelli¹. ¹Dept. of Internal Medicine, University of Ancona - Politecnica Marche, Ancona, Italy, ²Endocrinology and Kidney Unit, University Hospital, Pisa, Italy, ³Dept. of Clinical and Experimental Medicine - University Naples, Naples, Italy

Objective: Angiotensinogen (AGT)-derived peptides, as angiotensin II, regulate renal biology and physiology. Two novel AGT gene promoter variants (G-175A and G-163A) influence AGT gene expression in adipocytes as recently published. Moreover, obesity has been consistently linked to renal cell cancer. In a small population of kidney cancer patients studied mainly to obtain visceral adipose tissue samples, we have found a very high prevalence of -175A and -163A AGT gene variants. The aim of the present study was to compare the frequencies of these alleles in populations with or without kidney cancer.

Design and Method: Three populations differing in size and gender were studied: 1075 healthy men of the Olivetti Heart Study (OHS) from southern Italy, 91 obese females, and 35 consecutive patients (both males and females) with kidney cancer from center Italy. The allele frequencies of G-175A and G-163A were evaluated. The known -20A/C SNP was used as control AGT promoter SNP.

Results: AGT -163A and -175A variants were significantly more common with a striking 8-fold (for the -163A) to 26-fold (for the -175A) difference in kidney cancer patients than in OHS males ($P = 0.001$) or obese female subjects ($P = 0.001$). Indeed, comparing allele frequencies we found that the -163A allele was 2.9% in OHS, 3.3% in obese females and 24.3% in kidney cancer patients ($P = 0.001$). The frequency of -175A allele was 1.8% in OHS, 1.1% in obese female but a striking 37.1% in kidney cancer patients ($P = 0.001$). No differences were found comparing -163A and -175A frequencies of OHS and obese females despite the differences in gender and size of populations. In kidney cancer patients no allele frequency differences were found comparing males (n = 26) and females (n = 9). No differences in A-20C allele frequencies were found among the three different populations.

Conclusions: Two novel AGT gene promoter functional variants are dramatically more frequent among kidney cancer patients suggesting a link between these genetic markers and renal cancer maybe through altered AGT expression in adipose tissue.

ORAL SESSIONS

ORAL SESSION 9A

CLINICAL TRIALS 2

9A.01 RESULTS OF A NOVEL ANGIOTENSIN RECEPTOR BLOCKER, AZILSARTAN MEDOXOMIL, IN PATIENTS WITH PRIMARY HYPERTENSION

G. Bakris¹, D. Sica², M. Weber³, W.B. White⁴, A. Perez⁵, C. Cao⁵, S. Kupfer⁵.
¹University of Chicago, Pritzker School of Medicine, Chicago, USA, ²Virginia Commonwealth University Health System, Richmond, USA, ³SUNY Downstate College of Medicine, New York, USA, ⁴University of Connecticut School of Medicine, Farmington, USA, ⁵Takeda Global Research & Development, Deerfield, USA

Objective: We compared blood pressure (BP) lowering of a novel angiotensin II receptor blocker (ARB), azilsartan medoxomil (AZL-M), with placebo and another ARB, olmesartan medoxomil (OLM-M), in patients with primary hypertension using ambulatory BP monitoring (ABPM) and clinic measurement.

Design and Method: In this 6-week, multicenter, double-blind, randomized controlled study, the primary endpoint was change in 24-hour mean systolic BP (SBP) by ABPM. Other outcomes were clinic BP, trough SBP at 22–24 hours by ABPM, and safety. We treated 1272 patients. Sample size was calculated for 90% power to detect a 5.5-mm Hg difference from placebo and 4 mm Hg between treatments.

Results: Final ABPM data were available for 86% of patients (age 58 ± 11 yrs [mean $\pm$ SD]; 73% Caucasian, 11% African-American, 12% Hispanic; body mass index 30.2 ± 6 kg/m²). AZL-M 80 mg reduced 24-hour mean SBP most, followed by AZL-M 40 mg and OLM-M 40 mg (Table). AZL-M 80 mg lowered clinic BP more than OLM-M 40 mg (placebo-corrected difference -15.5/-8.6 vs -12.8/-7.1 mm Hg; treatment differences were -2.7 mm Hg SBP (95% CI -5.34, -0.09; $P = 0.043$) and -1.5 mm Hg DBP (95% CI -2.98, -0.04; $P = 0.044$). AZL-M tended to reduce 22- to 24-hour SBP by ABPM more than OLM-M (treatment difference -2.3 mm Hg; 95% CI -4.70, 0.04; $P = 0.054$). Adverse effects were similar. Headache was most common with placebo.

Conclusions: AZL-M lowered 24-hour mean SBP in a dose-related fashion, and AZL-M at its maximum 80-mg dose was more efficacious than OLM-M 40 mg. Similar results for AZL-M were observed for clinic BP measurements.

ABPM Results: 24-Hour Mean SBP (mm Hg)

	Placebo n=120/142	20 mg n=241/283	AZL-M 40 mg n=244/281	80 mg n=243/284	OLM-M 40 mg n=250/282
Baseline	146.3 $\pm$ 0.93	145.4 $\pm$ 0.65	146.0 $\pm$ 0.65	146.2 $\pm$ 0.65	146.5 $\pm$ 0.64
Week 6					
Difference vs placebo		-10.8 ^a (-13.2, -8.3)	-12.1 ^a (-14.5, -9.7)	-13.2 ^a (-15.6, -10.8)	-11.2 ^a (-13.6, -8.8)
Difference vs OLM-M		0.4 ^b (-1.6, 2.4)	-0.9 ^c (-2.9, 1.0)	-2.1 ^d (-4.0, -0.1)	

Data are mean $\pm$ SE or mean (95% CI).

^aSignificant difference, $P < 0.001$. ^b $P = 0.687$. ^c $P = 0.352$. ^dSignificant difference, $P = 0.038$.

9A.02 DOES INCIDENCE OF CARDIOVASCULAR OUTCOMES REALLY INCREASE WHEN LOW SYSTOLIC AND DIASTOLIC BLOOD PRESSURES ARE ACHIEVED BY DRUG TREATMENT? FACTS IN THE FEVER TRIAL

X. Zhang¹, Y. Zhang², L. Liu³, A. Zanchetti⁴. ¹Clinical Trials Center, Chinese Hypertension League, Beijing, China, ²Fu Wai Hospital, Beijing, China, ³Clinical Trials Center, Chinese Hypertension League, Beijing, China, ⁴Istituto Auxologico Italiano IRCCS, Milan, Italy

Background: The optimal level to which BP should be reduced by treatment is difficult to establish. Apart from the limitations inherent in post-hoc analyses, the major problem is a small number of subjects and an even smaller number of outcomes.

Methods: FEVER was a trial involving 9711 hypertensives from China, randomized to BP lowering treatments. The major outcomes were related to achieved BP values according to two methods: 1) Usual approach. FEVER patients independent of treatment allocation were grouped on the basis of their mean on-treatment BP into predetermined 7 or 6 ranges of SBP or DBP; 2) Moving Events Per 1000 Patient Observations (MEPPO) approach. With this method each patient enters not with a single BP observation but with as many observations as the number of visits in which BP is measured and event information is collected, and event occurrence or absence are referred to BP measured at the previous visits. The 10 mmHg BP range to which events are referred is moved forward by 1 mmHg steps.

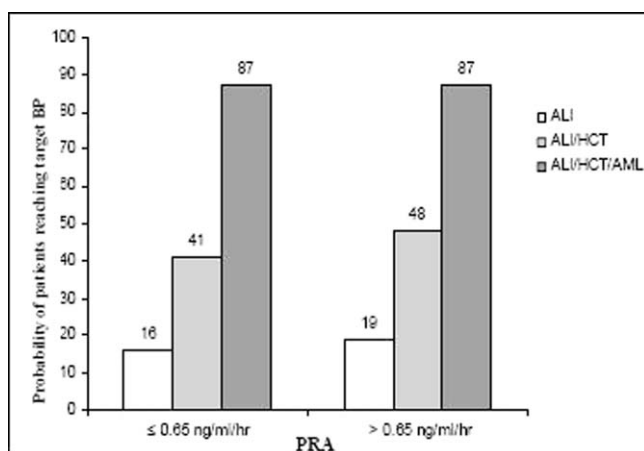
Results: Usual approach. Outcome incidence steadily declines for SBP from >160 to 120–130 (CV events/1000 patient years: 54.5, 30.3, 18.7, 14.7, 7.7), does not further decline at SBP 111–120 (7.6), and rises at SBP <110 (with only 6 patients in this group). Similar relations are seen with DBP. MEPPO approach. With this approach there is a steep decrease in incidence of all outcomes (all CV events, strokes, cardiac events, CV and all deaths) to reach a rather flat nadir at SBP 129–139 mmHg and DBP 79–86 mmHg. Calculation of the curves after adjustment for baseline risk is under way.

Conclusion: Both approaches indicate benefits of lowering SBP/DBP below 140/85 mmHg, but MEPPO suggests further benefits below these cutoffs may be rather small. The larger number of data analyzed by MEPPO also suggests the J-curve may be a real phenomenon.

9A.03 ALISKIREN-BASED TREATMENT CONTROLS BLOOD PRESSURE INDEPENDENT OF BASELINE PLASMA RENIN ACTIVITY

D. Richter¹, C. Mickel², S. Acharya³, M. Prescott², P. Brunel⁴, C. Militaru⁵, J. Amar⁶. ¹Rue du Point du Jour, Jarny, France, ²Novartis Pharmaceuticals Corporation, East Hanover, USA, ³Novartis Healthcare Pvt. Ltd, Hyderabad, India, ⁴Novartis Pharma AG, Basel, Switzerland, ⁵Craiova Cardiology Center, Craiova, Romania, ⁶Hospital of Rangueil, Toulouse, France

Objective: The direct renin inhibitor aliskiren (ALI) has demonstrated excellent antihypertensive efficacy as monotherapy and in combination with other antihypertensives. We explored whether blood pressure (BP) control with ALI alone or in combination with hydrochlorothiazide (HCT) and amlodipine (AML) differed depending on baseline levels of PRA. Design and Method: This analysis was performed as part of a 24-week, open-label, non-comparator study in mild-to-moderate hypertensive patients. After a 0- to 2-week optional washout and 3-week placebo period, eligible patients (mean sitting systolic BP [msSBP] 140 to <180 mmHg and/or mean sitting diastolic BP [msDBP] 90 to <110 mmHg) entered ALI-based stepped-care treatment. All patients were initiated with ALI 150 mg qd. At subsequent visits, patients not meeting target BP ($<140/90$ mmHg; $<130/80$ mmHg for diabetic patients) were up-titrated to ALI 300 mg qd and HCT (12.5 mg qd $\rightarrow$ 25 mg QD), and AML (5 mg qd $\rightarrow$ 10 mg qd) were added as needed to achieve target BP. 206/256 patients entering active treatment had baseline PRA measured (geometric mean PRA 0.78 ng/ml/h). BP control was assessed by baseline PRA subgroup (low defined as ≤ 0.65 , moderate/high defined as > 0.65 ng/ml/h). Results: BP target was achieved in 70 patients with baseline PRA ≤ 0.65 and 97 patients with baseline PRA > 0.65 ng/ml/h. The proportion of patients reaching BP target at each treatment step was similar in patients with low and moderate/high PRA (figure) and ALI, either as monotherapy or in combination, significantly reduced PRA versus baseline as determined by 95% confidence intervals. Conclusion: Aliskiren alone or in combination with HCT and amlodipine reduced PRA and provided similar, effective BP control regardless of baseline PRA levels.



9A.04 CAN MOUNTAIN SICKNESS SYMPTOMS BE PREDICTED ON THE BASIS OF BLOOD COAGULATION PARAMETERS?

P. Modesti¹, S. Rapi¹, G.E. Cambi¹, G. Bilo^{2,3}, M. Revera^{2,3}, V. Mainini³, P.G. Agostoni⁴, A. Piperno³, G.F. Gensini¹, R. Abbate¹, G. Mancina³, G. Parati^{2,3}. ¹Dept. Critical Care Medicine, University of Florence, Florence, Italy, ²Dept. Cardiology, S. Luca Hospital, Ist. Auxologico Ital., Milan, Italy, ³Dept. Clinical Medicine and Prevention, University of Milan-Bicocca, Milan, Italy, ⁴Centro Cardiologico Monzino IRCCS, Department of Cardiology, University of Milan, Milan, Italy

Objective: The present study was performed to investigate the possible occurrence of global changes of blood coagulation (thromboelastometry) during exposure to high altitude hypoxia, and their relation with the occurrence of mountain sickness symptoms (quantified by the Lake Louise Score, LLS), in the frame of the HIGH altitude Cardiovascular Research (HIGHCARE) project at Everest base camp (BC, 5400 m).

Design and Method: All participants (n = 47; 40 ± 9 yrs) to HIGHCARE expedition underwent baseline clinical and instrumental evaluation at sea level (baseline), the day after reaching 3400 m by helicopter (Namche), after acute (BC1) and prolonged (2 weeks, BC2) exposure at 5400 m. Thromboelastometry (ROTEM Pentapharm, Munich, Germany), was performed on simple recalcified citrated plasma (spontaneous contact activation, NATEM) and upon addition of ellagic acid (intrinsic pathway, INTEM). All clinical and instrumental parameters were then entered in stepwise multivariate regression analysis to select independent predictors of LLS, which was determined in each study conditions.

Results: At Namche 23 out of 47 subjects had no symptoms of high altitude sickness (LLS = 0) with LLS > 3 in 2 subjects. At BC1 40 subjects had symptoms, 14 reporting a LLS > 3 (0 in only 7 subjects). After chronic adaptation (BC2), only 17 had symptoms (LLS > 3 in 1 subject). Oxygen saturation (beta = -0.859; p < 0.0001), haematocrit (beta = 0.228; p < 0.004), expedition day (-0.263; p < 0.006) and maximum velocity of clot formation at INTEM assay (beta = 0.176; p < 0.013) were identified as independent predictor of LLS at stepwise regression analysis. A score index, calculated on the basis of the four predictors corrected for regression coefficients, was then retrospectively used to stratify subjects in three classes of mountain sickness risk, according to data measured at Namche (acute hypoxia exposure). One out of 12 subjects in the first tertile versus 12 out of the remaining 35 subjects had LLS > 3 at BC1 (p < 0.001).

Conclusions: INTEM assay revealed a reduced activity of coagulation intrinsic pathway at altitude. However the maximum velocity of clot formation at INTEM assay was selected as a positive independent predictor of LLS, indicating a link between rheological changes and adaptation to altitude.

9A.05 PROGNOSTIC VALUE OF BLOOD PRESSURE IN PATIENTS WITH CORONARY ARTERY DISEASE: EVIDENCE FROM THE ACTION TRIAL DATABASE

P. Meredith¹, S. Lloyd¹, I. Ford¹, H.L. Elliott². ¹Medical Faculty, University of Glasgow, Glasgow, United Kingdom, ²University of Strathclyde, Glasgow, United Kingdom

The placebo-controlled ACTION trial examined the effects of added treatment with Nifedipine GITS on clinical outcomes in patients with stable symptomatic coronary artery disease (CAD). A retrospective further analysis of the database from ACTION has now evaluated the inter-relationships between a number of blood pressure (BP) parameters and subsequent cardiovascular outcomes.

Analyses were performed using multivariate Cox proportional hazard models to test the relationships between quintiles/quartiles of baseline BP and achieved BP after 6 weeks of the trial (by which time titration of both placebo and nifedipine GITS was complete).

A statistically significant (p < 0.001) and consistent trend between baseline systolic BP and risk was shown for all the major endpoints pre-specified in the trial design (with the exception of coronary angiography). Thus, the lowest risk for myocardial infarction (MI) was apparent in those patients with baseline systolic BP < 120 mmHg. A similar (more pronounced) trend was shown for stroke: the respective hazard ratios in the lowest quintile of systolic BP compared to the referent highest quintile (SBP > 150 mmHg) were 0.45 (0.28, 0.72) for stroke and 0.79 (0.60, 1.02) for MI. Adjusting the model for treatment and for the use of antihypertensive therapy at baseline did not modify the outcomes in any statistical or meaningful fashion. Comparable results were obtained for the analysis of the data using the on-treatment BP levels at 6 weeks.

Similar results were obtained for pulse pressure (PP) with consistent trends for all major endpoints across the quintiles of PP. The hazard ratios in the lowest quintile of PP (< 45 mmHg) were 0.58 (0.35, 0.94) and 0.70 (0.53, 0.94) for stroke and MI respectively.

For diastolic BP the results were less clear with a significant and consistent trend only observed for debilitating stroke.

Because of the retrospective nature of these analyses, the findings must be interpreted cautiously. However, there was no evidence to suggest that treatment in patients with baseline systolic BP < 120 mmHg was associated with a significant increase in cardiovascular risk.

9A.06 FIRST-LINE TREATMENT WITH ALISKIREN/AMLODIPINE COMBINATION PROVIDES ROBUST BLOOD PRESSURE REDUCTIONS IN PATIENTS WITH SEVERE HYPERTENSION

R. Braun-Dullaeus¹, S.B. Shustov², C. Alvarez³, G.G. Rogelio⁴, J. Zhang⁵, S. Hristoskova⁶, D.A. Häring⁶, W. Liao⁵. ¹Otto-von-Guericke-University, Magdeburg, Germany, ²State Educational Institution of High Professional Education, St Petersburg, Russia, ³ABS Centelles, Barcelona, Spain, ⁴St. Luke's Medical Center, E. Rodriguez Blvd, Quezon, Philippines, ⁵Novartis Pharmaceuticals Corporation, East Hanover, USA, ⁶Novartis Pharma AG, Basel, Switzerland

Objective: To assess the effectiveness of initiating therapy with aliskiren/amlodipine (ALI/AML) compared to AML alone in reducing blood pressure (BP) in the subgroups of patients with severe (baseline msSBP: ≥ 180 to < 200) and moderate BP (baseline msSBP ≥ 160 to < 180 mmHg). **Methods:** This was an 8-wk, multicenter, randomized, double-blind study. After a 1 - 4-wk washout period, all eligible patients (msSBP ≥ 160 to < 200 mmHg) were randomized (1:1) to receive a once-daily dose of ALI/AML 150/5 mg or AML 5 mg for 1 wk followed by double the initial dose (ALI/AML 300/10 mg or AML 10 mg) for 7 wks. Summary statistics for blood pressure reductions were produced and treatment comparisons were made using ANCOVA with treatment and region as factors, and corresponding baseline BP as a covariate. **Results:** Mean baseline BP was 187.1/97.1 and 167.7/94.2 mmHg for patients in the severe and moderate subgroups. Baseline BP levels were similar for both treatment groups. At Wk 8 endpoint, mean BP reductions from baseline were -49.2/-18.1 and -35.6/-15.4 mmHg with ALI/AML combination and -39.7/-13.6 and -29.5/-12.3 mmHg with AML alone in patients for the severe and moderate subgroups, respectively. Differences in least-square mean reductions in BP for ALI/AML vs. AML were significant for both subgroups (Table; p < 0.01 from ANCOVA). The percentage of patients achieving BP control at Wk 8 was also significantly greater with ALI/AML vs. AML alone for both subgroups (Table; p < 0.05). The overall incidence of AEs was similar between ALI/AML and AML groups. Peripheral edema was the most commonly reported AE, with lower incidence in ALI/AML (14.4%) than AML (18.3%). **Conclusion:** In patients with severe or moderate BP, first-line use of ALI/AML provided greater BP reductions and higher rates of BP control compared to AML alone. ALI/AML combination represents an important potential first-line treatment option for patients with moderate to severe hypertension.

	Severe hypertension (baseline SBP ≥ 180 to <200 to mmHg) n=92		Moderate hypertension (baseline SBP ≥ 160 to <180 mmHg) n=371	
	ALI/AML n=45	AML n=47	ALI/AML n=188	AML n=183
LSM change in msSBP, mmHg $\pm$ SE	-47.45 $\pm$ 2.264**	-37.36 $\pm$ 2.103	-35.30 $\pm$ 1.043***	-28.83 $\pm$ 1.062
LSM change in msDBP, mmHg $\pm$ SE	-18.57 $\pm$ 1.390**	-14.02 $\pm$ 1.291	-15.66 $\pm$ 0.616***	-11.95 $\pm$ 0.626
BP control, n (%)	25 (55.6)*	16 (34.0)	131 (69.7)**	97 (53.0)

SE, standard error; LSM, least squares mean.
 * $p < 0.05$ vs. AML; ** $p < 0.01$ vs. AML; *** $p < 0.0001$ vs. AML.
 BP changes were analyzed by an ANCOVA model with treatment and region as factors, and the respective baseline BP as a covariate. BP control was analyzed using a logistic regression model with treatment and region as factors and baseline msSBP as a covariate.

9A.07 THE USE OF COMBINATION THERAPY BENEFITS ALL HYPERTENSIVE PATIENTS (POOR AND EXCELLENT RESPONDERS TO MONOTHERAPY) WHOSE BP WAS UNCONTROLLED

D. Sica¹, N.A. Crikelair, S. Li, D.H. Zappe². ¹Virginia Commonwealth University, Richmond, USA, ²Novartis Pharmaceuticals, East Hanover, USA

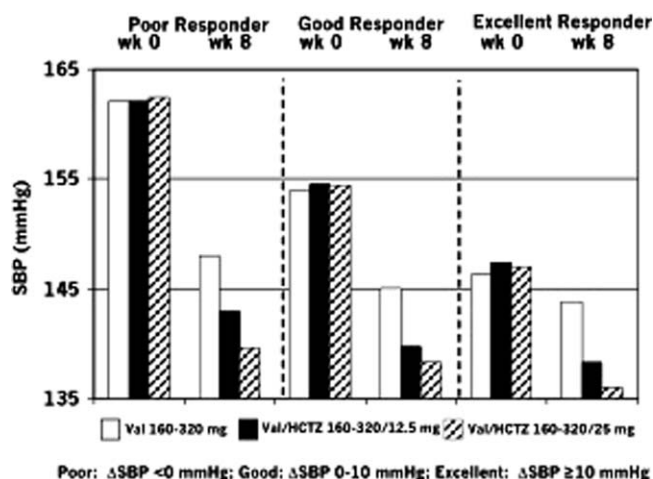
Objective: Patients with a poor antihypertensive response to a given drug therapy are either switched to another agent or have a second agent added. We evaluated the response to continued mono- or add-on therapy in poor, good or excellent responders to valsartan (VAL) monotherapy (mono).

Design and Method: The data from two large hypertensive studies in patients whose blood pressure (BP) was uncontrolled (diastolic (DBP) > 90 mmHg) after 4 weeks on VAL mono (160–320 mg) was evaluated as to whether adding hydrochlorothiazide (HCTZ) to VAL (160–320 mg) results in greater reductions in BP than simply maintaining the patient on mono. A total of 4,567 (age = 54.8 ± 11 yrs; BP = $160.1 \pm 12/100.9 \pm 4$ mmHg; BMI = 29.4 ± 5 kg/m²) patients qualified after the single-blind run-in period and were subsequently randomized (double-blind) to continued VAL mono (160–320 mg), VAL (160–320 mg)/HCTZ (12.5 mg) low or VAL (160–

320 mg)/HCTZ (25 mg) high dose combination therapy for 8 additional weeks. At the end of the single blind run-in period patients were classified as either poor (systolic BP > 0 mmHg from baseline, n = 25%), good (SBP < 0 to -10 mmHg from baseline, n = 34%) or excellent initial responders (SBP > -10 mmHg from baseline, n = 41%) to VAL monotherapy.

Results: Initial poor-responders had the largest reductions in SBP on VAL mono (-13.7 mmHg); Val/HCTZ low (-19.3 mmHg) and Val/HCTZ high (-22.7 mmHg) doses with absolute BP levels at study end being similar to the initial good and excellent responder patients (Figure). Initial excellent responders to VAL monotherapy had only small additional reductions in SBP to continued VAL mono (-2.3 mmHg), patients randomized to Val/HCTZ low (-9.2 mmHg) and Val/HCTZ high (-10.8 mmHg) demonstrated additional reductions in BP. All 3 BP responder categories benefited from add-on HCTZ in a dose-related manner.

Conclusions: Classifying hypertensive patients as either poor, good or excellent responders to VAL monotherapy had little predictive value in determining which patients benefited from adding HCTZ to VAL mono.



ORAL SESSIONS

ORAL SESSION 9B

OBESITY AND METABOLIC SYNDROME 2

9B.01 HIGH SALT CONSUMPTION AND INCREASED BLOOD PRESSURE REACTIVITY TO DIETARY SALT INTAKE IN PATIENTS WITH METABOLIC SYNDROME

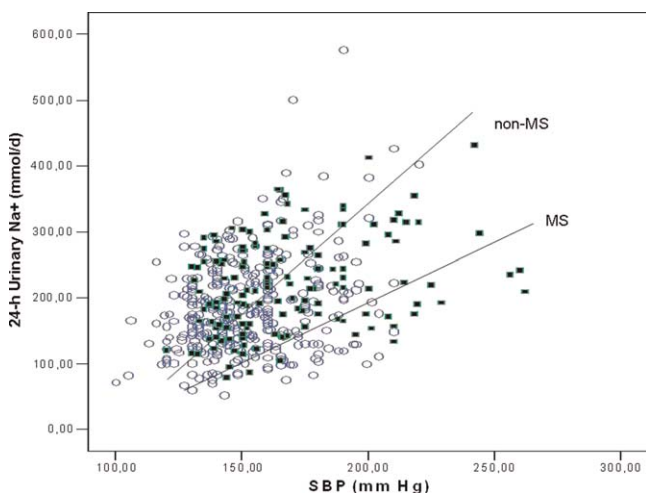
J. Faria, S. Bertoquini, J.A. Silva, J. Polonia. *Unidade Hipertensão, Hospital Pedro Hispano, Matosinhos, Portugal*

Background: Metabolic syndrome (MS) predicts diabetes type 2 and cardiovascular disease. Recent studies suggest MS might be a high salt-sensitivity situation.

Methods: In a total of 496 non-diabetic adults (272 female), 143 with MS by ATP III (ageing 52 ± 13 yrs, BMI 30 ± 5 Kg/m², Office BP 169/95 ± 26/14 24 h BP 137/83 ± 17/11) and 353 without (nonMS) (ageing 47 ± 15 yrs, BMI 27 ± 5 Kg/m², Office BP 152/89 ± 21/13, 24 h BP 132/82 ± 13/10), all $p < 0.01$, we compared dietary salt consumption (24-h urinary sodium controlled for creatinuria, UNa+) within their usual dietary habits and examined the relationship of salt consumption and blood pressure.

Results: UNa+ was 223 ± 70 in MS and 187 ± 70 mmol/d in nonMS ($p < 0.001$). Also magnitude of UNa+ was directly related to the number of traits (0–5), 0–1 traits 178 ± 60 2 traits 193 ± 79, 3 traits 210 ± 61 and 4–5 traits 241 ± 76 mmol/d (Anova 0.001). UNa+ correlated with SBP $r = 0.331$, $p < 0.001$, but for similar UNa+ plotted vs office BP, pts with MS show higher SBP values. Such an increased BP responsiveness to salt intake in patients with MS was lost if corrected for BMI.

Conclusions: In conclusion, patients with MS show a significant increase of dietary salt consumption vs subjects without MS. Also for similar daily salt consumption MS (and overweight) associates with higher BP levels than subjects without MS, suggesting an increased BP reactivity to salt intake i.e. an increased salt-sensitivity.



9B.02 CATECHOL-O-METHYLTRANSFERASE GENOTYPE MODULATION OF INSULIN RESISTANCE IN OBESITY, IS INDEPENDENT OF BLOOD PRESSURE LEVEL

A. Pereira Da Silva¹, C. Marinho¹, A. Matos¹, M. Carvalho¹, V. Lança¹, J.L. Themudo Barata², L. Sardinha², M.P. Bicho¹. ¹Genetic Laboratory and

Cardiology Centre of the Faculty of Medicine, Lisbon University, Portugal, ²Exercise and Health Centre, Human Physical Exercise Sciences Faculty, Lisbon Technical University, Portugal

Objective: Catechol O-methyltransferase (COMT) is a polymorphic enzyme (val158-met: HH, HL and LL), which degrades catecholamines differentially (HH, increased activity), related to the control of food intake and the regulation of insulin secretion. The aim of the present study was to determine the influence of COMT genotypes in obesity, hypertension and insulin resistance.

Design and Method: We studied 149 women, with 54.05 ± 12.65 years, 63% normotensive (NT) and 27% with hypertension (HTA), 81.5% overweight and obese (BMI > 25) and 18.5% normal weight. COMT genotypes were determined by PCR-RFLP, insulin (microUI/ml), blood glucose (mmol/L) and serum lipids (total cholesterol, HDL-c, LDL-c and triglycerides) (mmol/L), by standard methods, the blood pressure and HOMA by conventional methods.

Results: The BMI was higher in hypertensive patients, $p = 0.023$, and also the glucose $p = 0.007$, despite the absence of diabetes mellitus observed. The COMT genotype was not associated significantly with the values of systolic and diastolic, or to serum lipids, but the insulin and insulin resistance in obesity (insulin: LL (7.68 ± 2.9) vs. HL (11.24 ± 5.61) vs. HH (13.14 ± 7.27) $p = 0.01$; HOMA: LL (1.65 ± 0.649) vs. HL (2.77 ± 2.27) vs. HH (3.33 ± 2.33) $p = 0.04$). Normal weight women had higher BMI associated with the HH genotype, compared with LL ($p = 0.005$). There were no significant differences in the distribution of COMT genotype between hypertensive and normotensive or between normal weight and obese women.

Conclusions: In women with overweight and obesity, the genotype of COMT positively modulates metabolic parameters of insulin resistance independent of serum lipids and blood pressure, possibly associated with anorexigenic effects of dopamine and anti-lipolytic noradrenaline.

9B.03 ADIPOSITY, BLOOD PRESSURE AND CAROTID INTIMA-MEDIA THICKNESS IN GREEK CHILDREN AND ADOLESCENTS

A. Kollias¹, I. Psilopatis², E. Karagiaouri², M. Glarakis², E. Grammatikos², A. Destounis¹, E.E. Grammatikos², G. Stergiou¹. ¹Hypertension Center, Third University Dept. of Medicine, Sotiria Hospital, Athens, Greece, ²Health Center of Karlovasi, Hospital of Samos, Karlovasi, Samos, Greece

Objective: To investigate the association between adiposity, blood pressure (BP) and carotid intima-media thickness (cIMT) in healthy children and adolescents.

Method: The study included 307 high school students (mean age 14.4 ± 2.1 years, 132 boys) in Samos island, Greece. Participants underwent high resolution B-mode carotid ultrasonography and measurements of body mass index (BMI), waist circumference (WC), waist-to-hip ratio (WHR), lipid profile, glucose and office BP (3 readings).

Results: The prevalence of overweight was 27% and of obesity 12.4%. Office BP was in the high-normal range (systolic and/or diastolic >=90th to <95th percentile) in 25.7% of the participants and in the hypertension range (>=95th percentile) in 16.9%. BMI, WC and WHR were correlated with systolic ($r = 0.41/0.17/0.19$ respectively) and diastolic BP (0.37/0.19/0.14) (all $p < 0.05$). Left cIMT was correlated with WC ($r = 0.20$), WHR (0.18), systolic BP (0.17), diastolic BP (0.14) and low density lipoprotein cholesterol (LDL-C) (0.13) (all $p < 0.05$). Right cIMT was correlated with WHR ($r = 0.14$, $p = 0.01$). Mean left-right cIMT was correlated with WC ($r = 0.16$), WHR (0.18) and systolic BP (0.11) (all $p < 0.05$). In stepwise regression analysis (dependent predictors age, gender, WC, WHR, LDL-C, systolic, diastolic BP) only WC was an independent predictor of left cIMT, whereas WHR was predictive of right and average cIMT. Children with large WC (>=90th percentile, age-gender-specific; $n = 84$) compared to those <90th percentile had higher BP (120.3 ± 11.4/75.5 ± 7.7 mmHg systolic/diastolic vs. 113.5 ± 11.8/70.5 ± 8.3 mmHg, $p < 0.001$), LDL-C (102.2 ± 30.9 vs. 88.3 ± 21.5 mg/dl, $p < 0.001$) and left cIMT (0.65 ± 0.1 vs. 0.63 ± 0.09 mm, $p = 0.04$). In subjects with WC <90th percentile, regression analysis with the same variables identified WHR and systolic BP as independent predictors of left cIMT.

Conclusions: In apparently healthy children and adolescents central adiposity appears to be the most important predictor of early carotid atherosclerosis, whereas elevated BP and LDL-C also contribute. In children without central adiposity, WHR and systolic BP predict carotid atherosclerosis.

9B.04 CLINICAL PROFILE AND MANAGEMENT OF HYPERTENSIVE PATIENTS WITH CHRONIC ISCHEMIC HEART DISEASE ACCORDING TO BODY MASS INDEX

V. Barrios¹, C. Escobar², A. Calderon³. ¹Department of Cardiology, Ramon y Cajal Hospital, Madrid, Spain, ²Department of Cardiology, Infanta Sofia Hospital, Madrid, Spain, ³Primary Care Center Rosa Luxemburgo, Madrid, Spain

Aim/Background: Obesity is associated with numerous risk factors and comorbidities such as hypertension, metabolic syndrome, type 2 diabetes and cardiovascular diseases. However, numerous studies have reported an obesity paradox; the overweight and obese patients with established cardiovascular disease have better prognosis than those with a body mass index (BMI) <25 kg/m². The CINHTIA study was designed to assess the clinical management of hypertensive outpatients with chronic ischemic heart disease attended by cardiologists.

Patients and Methods: CINHTIA was designed as an epidemiological transversal multicenter study in Spain. The epidemiological and clinical differences according to BMI were examined. Overweight and obesity were defined as a BMI 25–29.9 kg/m² and ≥30 kg/m², respectively. Cardiovascular risk factors goals were considered according to ESH-ESC 2003, NCEP-ATP III and ADA 2005 guidelines.

Results: A sample of 2,024 patients (66.8±10.1 years; 31.7% women) was included. Of these, 0.1% had a BMI <20 kg/m²; 17.1% BMI 20–24.9 kg/m²; 53.7% BMI 25–29.9 kg/m²; 23.7% BMI 30–34.9 kg/m²; 4.3% BMI 35–39.9 kg/m²; and 1.1% BMI ≥40 kg/m². The subgroup of patients with BMI ≥30 kg/m² had a higher proportion of women, diastolic dysfunction, diabetes, dyslipidemia, left ventricular hypertrophy and heart failure. There was an inverse relationship between risk factors control rates and BMI (all comparisons BMI 20–24.9 vs 25–29.9 vs ≥30 kg/m²): BP control (51.7% vs 42.4% vs 29.2%, $p < 0.001$); LDL-cholesterol control (35.2% vs 30.5% vs 27.9%, $p = 0.03$) and diabetes control (38.6% vs 27.6% vs 22.2%, $p = 0.023$).

Conclusion: In patients with hypertension and chronic ischemic heart disease, as BMI increases, the clinical profile worsens as well as risk factors control rates.

9B.05 EFFECTS OF A SYMPATHO-INHIBITORY DRUG IN A MODEL OF METABOLIC SYNDROME

L. Fellmann¹, V. Gasparik¹, C. De Tapia¹, E. Tibiriça², P. Bousquet¹. ¹Faculté de Médecine, Université de Strasbourg, Dpt of Pharmacology, Strasbourg, France, ²Instituto Oswaldo Cruz, Dpt of Pharmacology, Rio de Janeiro, Brazil

Background: A large body of experimental and clinical evidence indicates that sympathetic hyperactivity is associated with all the symptoms of the metabolic syndrome.

Objectives: In this study, we investigated the effects of a sympatho-inhibitory drug selective for the I1 imidazoline receptors (LNP599), on metabolic parameters and hormones implicated in lipid and glucid metabolism in a model of metabolic syndrome (SHHF rats).

Methods: LNP599 was conceived and synthesized in our laboratory. This drug was delivered in the drinking water (20 mg/kg/j during 12 weeks) to twelve-week old male SHHF rats. Cardiovascular, metabolic and hormonal (insulin, adiponectin) parameters were measured at the end of the treatment and compared to those of control untreated SHHF rats. Mean values±SEM are presented. Unpaired Student's *t* tests were used for intergroup comparisons. *P* values < 0.05 were considered significant.

Results: LNP599 reduced mean arterial blood pressure (153±7 vs 176±6 mmHg, $p < 0.05$). It also reduced body weight (472±11 vs 587±9 g, $p < 0.001$). In parallel, we observed a decrease in plasma cholesterol (2.66±0.09 vs 3.84±0.18 mmol/l, $p < 0.001$) and triglycerides (3.8±0.25 vs 4.59±0.23 mmol/l, $p < 0.05$) concentrations. LNP599 had no effects on fasted glycaemia, but improved glucose tolerance (AUC glucose tolerance test: 556±20 vs 710±37 mmol/l/min, $p < 0.001$). Plasma insulin was lowered by the treatment (15.2±2 vs 46.8±3.7 ng/ml, $p < 0.001$), but plasma

concentrations of adiponectin and leptin were increased (10.64±0.52 vs 5.54±0.14 µg/l, $p < 0.001$ and 20.8±1.4 vs 14.4±1.3 ng/ml, $p < 0.01$ respectively).

Conclusion: In this study we demonstrated that, at a dose which normalizes blood pressure, a centrally-active sympatho-inhibitory drug had beneficial effects on metabolic parameters. LNP599 induced a decrease in insulin concentration and an increase in adiponectin concentration contributing to improve the metabolic profile of SHHF rats. In a recent study, we showed that high fat feeding induced a sympathetic over-activity in SHR rats, associated with a strong decrease in adiponectin concentration. Taken together, these results indicate that variations in adiponectin plasma concentration reflect variations of sympathetic activity.

9B.06 CONTRIBUTION OF BODY BUILD TO THE DEVELOPMENT OF NEW ONSET DIABETES MELLITUS, HYPERTENSION AND LEFT VENTRICULAR HYPERTROPHY

M. Bombelli¹, E. Toso¹, I. Ronchi¹, M. Rondinelli¹, R. Facchetti¹, D. Invernizzi², L. Primitz², F. Quarti Trevano¹, G. Grassi¹, R. Sega², G. Mancia¹. ¹Internal Medicine, University Milan Bicocca, S. Gerardo Hospital, Monza, Italy, ²Internal Medicine, Hospital of Vimercate, Vimercate (MB), Italy

Objective: Cross sectional evidence suggests that an increase in body mass index (BMI) and waist circumference (WC) is associated with an increased prevalence of diabetes mellitus (DM), hypertension (HT) and HT-related left ventricular hypertrophy (LVH). The longitudinal evidence confirming such relationships are scanty, however.

Design and Methods: In 1412 subjects (25–74 yrs), randomly selected from the general population of Monza (Italy), we assessed in 1990–1991 and repeated in 2000–2001 measurements of BMI, WC, office, home and 24 hour ambulatory (24 h) blood pressure (BP), fasting glycemia and left ventricular mass (LVM, echocardiography). New onset high risk conditions were identified at the 2nd examination (if absent at the 1st) as follows: 1) DM: glycemia ≥ 126 mg/dl; 2) office HT: office systolic (S)BP ≥ 140 mmHg and/or diastolic (D) ≥ 90 mmHg; home HT: home SBP ≥ 132 mmHg and/or DBP ≥ 83 mmHg; 24 h HT: 24 h SBP ≥ 125 mmHg and/or DBP ≥ 79 mmHg and 3) LVH: LVM index ≥ 111 g/m² (males), ≥ 106 g/m² (females).

Results: New cases of DM, LVH, office, home and 24 h HT were 53, 230, 336, 202 and 324, respectively. A unit increase in BMI and WC was associated with a significant increase in the risk of new onset DM (respectively OR 1.18, CI 1.11–1.25, and 1.07, CI 1.05–1.1, $p < 0.0001$), LVH (respectively OR 1.18, CI 1.13–1.22, and 1.07, CI 1.05–1.08, $p < 0.0001$), office HT (respectively OR 1.15, CI 1.11–1.2, and 1.05, CI 1.04–1.06, $p < 0.0001$), home HT (OR 1.12, CI 1.07–1.16, and 1.05, CI 1.03–1.06, $p < 0.0001$) and 24 h HT (OR 1.06, CI 1.02–1.1, and 1.04, CI 1.02–1.05, $p < 0.0001$). Statistical significance was maintained after data adjustment for confounders [age, gender, antihypertensive drugs, and baseline glycemia (for DM), baseline LVMI (for LVH), baseline office, home and 24 h (respectively for office, home and 24 h HT)], except for risk of new onset home and 24 h HT.

Conclusions: In an unselected population BMI and WC are important predictors for the future development of DM, HT and HT-related LVH, i.e. conditions characterized by a high cardiovascular risk.

9B.07 CONTRIBUTION OF SYMPATHETIC NERVOUS SYSTEM ACTIVITY TO OBESITY-INDUCED SUBCLINICAL ORGAN DAMAGE IN YOUNG ADULTS

M. Schlaich, C. Sari, T. Dawood, J. Nguyen, M. Grima, N. Eikelis, C. Wong, K. Chatzivlastou, G. Head, N. Straznicky, M. Esler, G. Lambert, E. Lambert. Baker IDI Heart and Diabetes Institute, Melbourne, Australia

Introduction: Excess weight is established as a major risk factor for cardiovascular diseases (CVD) particularly in young individuals. To get a better understanding of the pathophysiology underlying increased CVD risk, we evaluated early signs of organ damage and their possible relationship to the sympathetic nervous activity (SNA).

Methods: 18 lean [body mass index (BMI) <25 kg/m²] and 25 overweight or obese (BMI >25 kg/m²) healthy university students were recruited. We assessed subclinical target organ damage including 1) assessment of renal function (creatinine clearance) 2) left ventricular structure and systolic and diastolic function (by two-dimensional echocardiography)

3) endothelial function (using a fingertip peripheral arterial tonometry device during reactive hyperemia). Muscle SNA (MSNA) was assessed by microneurography.

Results: Participants with excess weight had decreased endothelial function ($P < 0.01$), elevated creatinine clearance ($P < 0.05$), increased left ventricular mass index ($P < 0.05$) and left ventricular wall thickness ($P < 0.01$), lower systolic and diastolic function ($P < 0.01$) and elevated MSNA ($P < 0.001$) compared to lean individuals. Endothelial function was inversely related to MSNA ($R^2 = 0.244$, $P < 0.05$), while creatinine

clearance and left ventricular mass index were positively related to MSNA, after adjustment for BMI, sex and blood pressure ($R^2 = 0.318$, $P < 0.01$ and $R^2 = 0.312$, $P < 0.05$ respectively).

Conclusion: Excess weight in young individuals is associated with subclinical alterations in renal, endothelial function as well as in the structure of the heart. Elevated sympathetic activity appears to be a major driver of cardiovascular and renal alterations observed in these subjects. The consequences of elevated SNA may, in part, explain the increased CVD risk in young individuals with excess weight.

ORAL SESSIONS

ORAL SESSION 9C

NEURAL MECHANISMS

9C.01 RENALASE PLASMA LEVELS ARE ASSOCIATED WITH SYSTOLIC BLOOD PRESSURE IN PATIENTS WITH RESISTANT HYPERTENSION

M. Schlaich, F. Socratous, N. Eikelis, R. Chopra, G. Lambert, S. Hennebry. *Baker IDI Heart and Diabetes Institute, Melbourne, Australia*

Evidence from experimental studies suggest that renalase, a soluble FAD-dependent protein, is involved in blood pressure regulation, possibly via degradation of catecholamines including noradrenaline. To investigate whether renalase is associated with blood pressure levels and/or indices of noradrenaline disposition in humans we studied a cohort of 22 patients with resistant hypertension (at least 3 antihypertensive drugs including a diuretic) and 4 healthy, normotensive control subjects. Radiotracer dilution methodology and arterial blood sampling was applied to measure whole body noradrenaline (NA) spillover. Arterial plasma levels of renalase were measured by Western blot analysis using a monoclonal anti-renalase antibody and quantified using a gel documentation system (Bio-Rad Quantity One Software). Split half analysis of the hypertensive cohort according to systolic blood pressure levels (mean: 186 ± 22 vs 156 ± 9 mmHg; $p < 0.001$) revealed that mean arterial renalase levels were substantially lower in the group with higher systolic blood pressure (62 ± 31 vs 125 ± 82 arbitrary units; $p < 0.05$), whereas whole body NA spillover tended to be higher in the group with higher systolic blood pressure without reaching statistical significance (645 ± 445 vs 407 ± 195 ng/min; $p = 0.12$). Arterial renalase levels were higher (238 ± 174 arbitrary units) and whole body NA spillover was lower (168 ± 78 ng/min) in the normotensive control subjects (mean systolic blood pressure: 123 ± 7 mmHg) (all $p < 0.05$). Correlation analysis revealed an inverse relationship between arterial renalase plasma levels and systolic blood pressure for the entire cohort ($r = -0.52$; $p < 0.05$). These data suggest that arterial plasma levels of renalase are inversely associated with systolic blood pressure in a cohort of patients with resistant hypertension. Whether this relation can in part be explained by alleviated degradation of noradrenaline or whether alternative pathways are involved requires further investigation.

9C.02 SYMPATHETIC, BAROREFLEX AND METABOLIC ABNORMALITIES IN THE OPTIMAL, NORMAL AND HIGH-NORMAL BLOOD PRESSURE STATE

G. Seravalle¹, F. Quarti-Trevano², R. Dell'Oro², F. Arenare², G. Brambilla², M. Bombelli², G. Mancia², G. Grassi². ¹Istituto Auxologico Italiano, Milan, Italy, ²Clinica Medica, Ospedale San Gerardo, Università Milano-Bicocca, Monza, Milan, Italy

Objective: Essential hypertension is characterized by a marked sympathetic activation, which is coupled with an impairment of baroreceptor-heart rate control. Whether the behaviour of sympathetic and baroreceptor function is peculiar of the established hypertensive state or it does also characterize the so-called high-normal blood pressure (BP) state is unknown, however.

Design and Methods: In 12 subjects with optimal BP (O, age: 38.1 ± 2.1 years, mean $\pm$ SEM), 10 with normal BP (N) and 9 with high-normal BP (HN, ESH guidelines classification), all age-matched with O, we measured beat-to-beat arterial BP (Finapres), heart rate (HR, EKG), plasma norepinephrine (NE, venous sample, HPLC) and muscle sympathetic nerve traffic (MSNA, microneurography peroneal nerve) at rest and during baroreceptor stimulation and deactivation (vasoactive drug infusion technique). Measurements also included anthropometric as well as metabolic parameters, such as HOMA index.

Results: Body mass index, waist circumference and HOMA index were slightly, although not significantly, greater in HN than in the other 2 groups. The progressive and significant increase in BP values seen from O to N and HN was paralleled by an elevation in MSNA values,

which achieved statistical significance in HN (47.4 ± 2.2 vs 37.1 ± 1.9 and 40.9 ± 2.1 bursts/100 heart beats in O and N respectively, $P < 0.05$). NE values were also significantly increased in HN (324.4 ± 31 vs 182.4 ± 22 and 195.6 ± 30 pg/ml, $P < 0.05$). In HN, baroreceptor-HR control was displaced toward elevated BP values and impaired compared with N and O (average reduction, 21.5%). In contrast, the sympathoinhibitory and sympathoexcitatory responses to baroreceptor stimulation and deactivation were displaced toward elevated BP values but similar in all the 3 groups.

Conclusions: These data provide the first evidence that high-normal BP is already characterized by a sympathetic activation coupled with a baroreflex-HR impairment. The sympathetic overdrive, which is dependent on central and/or metabolic factors (i.e. insulin resistance) but not on baroreflex mechanisms, is likely to contribute to the increased cardiovascular risk seen in HN.

9C.03 VASODILATATION INDUCED BY BETA 2 ADRENERGIC RECEPTOR ACTIVATION IS IMPAIRED IN OBESE HYPERTENSIVES BEFORE AND AFTER WEIGHT LOSS

M. Correia¹, A. Agapitov², C. Sinkey², W. Haynes². ¹State University of Rio de Janeiro, Rio de Janeiro, Brazil, ²University of Iowa, Iowa City, USA

Activation of vascular beta 2 adrenergic receptors causes vasodilatation through endothelium-dependent and -independent mechanisms. We tested the hypothesis that beta 2-dependent vasodilatation is impaired in obese hypertensives. Forearm resistance vessel dilatation in response to brachial artery infusion of isoproterenol (ISO; beta 2 agonist) and nitroprusside (NTP; endothelium-independent nitric oxide donor) was assessed using plethysmography in obese hypertensives before and after weight loss (hypocaloric diet and orlistat for 12 weeks) and in age and sex-matched lean hypertensives (repeated after a 12 week control period). Weight loss reduced adiposity (by DEXA), ambulatory systolic pressure and sympathetic nerve activity to skeletal muscles (mSNA) in obese hypertensives (Table). Global vascular function was impaired in obese hypertensives, because dilatation to both ISO and NTP was lower in obese vs. lean hypertensives, both before and after weight loss (Table). Importantly, weight loss augmented dilatation to NTP in obese hypertensives, indicating improved vascular smooth muscle function, whereas dilatation to ISO did not change after weight loss. In conclusion, weight loss improves vascular smooth muscle function without changes in beta 2 adrenergic receptor-dependent vasodilatation, despite decreased sympathoactivation (which would be expected to upregulate beta 2-adrenergic receptors). Impaired dilatation to ISO suggests abnormal adrenergic receptor signaling and/or endothelial-dysfunction that persist after modest weight loss. Both of these may contribute to obesity-related vascular dysfunction and hypertension.

	Obese (n=23)			Lean (n=19)		
	Before	After	P-value	Before	After	P-value
Weight (kg)	110 $\pm$ 3	102 $\pm$ 4	<0.0001	72 $\pm$ 3	70 $\pm$ 3	0.4
BMI (kg/m ²)	38 $\pm$ 1	35 $\pm$ 1	<0.0001	24 $\pm$ 1	24 $\pm$ 1	0.3
Body fat (DEXA, %)	39 $\pm$ 2	37 $\pm$ 2	<0.001	27 $\pm$ 2	28 $\pm$ 2	0.6
Systolic pressure (mmHg)	143 $\pm$ 2	139 $\pm$ 3	0.02	137 $\pm$ 2	138 $\pm$ 2	0.3
mSNA (burst/min)	38 $\pm$ 4	28 $\pm$ 4	0.01	34 $\pm$ 3	33 $\pm$ 3	0.7
Resting FVR (mmHg*min*dl/ml)	35 $\pm$ 4	36 $\pm$ 3	0.4	36 $\pm$ 4	32 $\pm$ 2	0.2
NTP 1 μ g/min (Δ FVR%)	-35 $\pm$ 4*	-43 $\pm$ 3†	0.08	-53 $\pm$ 2	-51 $\pm$ 3	0.6
NTP 10 μ g/min (Δ FVR%)	-56 $\pm$ 4*	-66 $\pm$ 2†	0.02	-73 $\pm$ 3	-76 $\pm$ 2	0.4
ISO 25 ng/min (Δ FVR%)	-42 $\pm$ 4*	-46 $\pm$ 4†	0.3	-54 $\pm$ 3	-56 $\pm$ 2	0.5
ISO 250 ng/min (Δ FVR%)	-57 $\pm$ 3*	-60 $\pm$ 3†	0.5	-70 $\pm$ 2	-73 $\pm$ 2	0.3

* $p < 0.05$ obese vs. lean before; † $p < 0.05$ obese vs. lean after; FVR, forearm vascular resistance

9C.04 MORNING BLOOD PRESSURE SURGE IS NOT RELATED TO MUSCLE SYMPATHETIC NERVE ACTIVITY IN HYPERTENSION

D. Hering¹, W. Kucharska¹, T. Kara², V.K. Somers², K. Narkiewicz¹. ¹Department of Hypertension and Diabetology, Medical University of Gdansk,

Gdansk, Poland, ²Divisions of Hypertension and Cardiovascular Disease, Mayo Clinic, Rochester, USA

Objective: Blood pressure rise on awakening (the morning surge) might be a predictor of hypertension-related cardiovascular complications. Previous studies indicated that the autonomic nervous system may contribute to the diurnal blood pressure rhythm. We tested the hypothesis that direct measures of intraneural sympathetic nerve activity taken at rest may be related to blood pressure morning surge in hypertension.

Design and Methods: We measured muscle sympathetic nerve activity (MSNA), heart rate (HR) and blood pressure (BP) during undisturbed supine rest in 68 hypertensive patients (53 males, age 40 ± 3 years, BMI 27 ± 1 kg/m², mean $\pm$ SEM). Patients were newly diagnosed, never treated for hypertension and were free of any other known diseases. All hypertensives underwent 24-hour ambulatory blood pressure monitoring. Morning surge was defined as the difference between the morning BP (the average BP during the 2 h after waking up) and the pre-awake BP (the average BP during the 2 h before waking up).

Results: SBP averaged 143 ± 3 mmHg for daytime and 126 ± 2 mmHg for night time. Mean HR was 81 ± 2 bpm for daytime and 69 ± 2 bpm for night time. Average MSNA was 32 ± 2 bursts/min., SBP morning surge 19 ± 2 mmHg, and HR morning surge 14 ± 2 bpm. In univariate analysis, MSNA was related to daytime SBP ($r=0.28$; $P=0.02$), nighttime SBP ($r=0.26$; $P=0.03$), daytime HR ($r=0.28$; $P=0.02$), night time HR ($r=0.26$; $P=0.03$). Multivariate analysis, taking into consideration age, BMI and gender, revealed that MSNA was independently related to both daytime ($P=0.006$) and nighttime HR ($P=0.02$), but to ambulatory SBP. MSNA was not linked to morning surge of SBP ($r=0.01$) or HR ($r=0.07$).

Conclusions: In patients with essential hypertension, muscle sympathetic nerve activity is related to both daytime and night time heart rate, but not to morning blood pressure surge.

9C.05 SMOKING IS ASSOCIATED WITH CHRONIC SYMPATHETIC ACTIVATION IN HYPERTENSION

D. Hering¹, W. Kucharska¹, T. Kara², V.K. Somers², K. Narkiewicz¹. ¹Department of Hypertension and Diabetology, Medical University of Gdansk, Gdansk, Poland, ²Divisions of Hypertension and Cardiovascular Disease, Mayo Clinic, Rochester, USA

Objective: Previous studies have shown that smoking contributes importantly to short-term modulation of sympathetic nerve traffic. However, effect of smoking status on resting muscle sympathetic nerve activity (MSNA) in hypertension is unknown. Therefore, we tested the hypothesis that smoking is associated with chronic sympathetic activation in patients with essential hypertension.

Design and Methods: We measured MSNA, heart rate (HR) and blood pressure during undisturbed supine rest in 30 hypertensive smokers (22 males, age 38 ± 4 years, BMI 27 ± 1 kg/m², mean $\pm$ SEM). These measurements were compared with those obtained in 38 non-smoking hypertensive patients matched for gender, age and BMI. All hypertensives underwent 24-hour ambulatory blood pressure monitoring. Patients were newly diagnosed, never treated for hypertension and were free of any other known diseases.

Results: In comparison to non-smokers, smokers had smaller office-daytime SBP difference (6 ± 2 vs. 15 ± 3 mmHg, respectively; $P < 0.01$). Despite similar resting values, HR in smokers was greater than in non-smokers during both daytime (86 ± 3 vs. 77 ± 2 bpm, respectively; $P < 0.001$) and nighttime (73 ± 3 vs. 66 ± 2 bpm, respectively; $P < 0.01$). MSNA was elevated in smokers (36 ± 3 bursts/min) as compared to non-smokers (28 ± 3 bursts/min; $P < 0.01$). Multiple linear regression analysis revealed that only age and smoking status were linked independently to MSNA ($R^2=0.42$, $P < 0.001$). Similar results were obtained when MSNA was expressed as bursts/100 heart beats.

Conclusions: In patients with essential hypertension, smoking is independently associated with chronic increase in muscle sympathetic nerve activity. These findings may have implications for our understanding of the mechanisms linking smoking to cardiovascular events.

9C.06 IMPACT OF SALT BEYOND ARTERIAL PRESSURE

S. González, P. Forcada, D. Olano, E. Cavanagh, F. Inserra, S. Obregón, C. Castellaro, C. Kotliar. Hospital Universitario Austral, Presidente Derqui, Argentina

Although experimental data describes the relation between sodium intake and parasympathetic tone, its interaction still remains controversial. A recent clinical report from Coruzzi et al.¹ identified an impaired parasympathetic cardiac control in hypertensives submitted to a high salt diet by describing a fall in their baroreflex sensitivity. The metabolic impact of these autonomic abnormalities has not been explored.

Objective: To evaluate the effect of a high salt loading on parasympathetic tone and metabolic status in essential hypertension (EH). **METHODS:** We evaluated 1671 consecutive patients with mild EH (50.8 ± 12.9 years, 31.3 % female) without or after a 7 days wash out from any antihypertensive drugs. A final group of 490 patients (49.5 ± 13.9 years, 33.2% women) were included after application of exclusion criteria (treatment with hypoglycemics and/or hypolipemics; renal damage, congestive heart failure, rheumatic disease). The following determinations were done: BMI, SBP/DBP (OMRON HEM-781), urinary sodium excretion (UNa), lipid profile, glucose (colorimetric), insulin (radioimmunoanalysis), usCRP (immunoturbidimetry). To evaluate parasympathetic tone we determined heart rate-recovery in the first minute after the end of stress-test (HRR). UNa was stratified by using tertiles (table). **RESULTS (table):** Patients with high levels of UNa presented lower levels of HRR and HDL, and higher levels of Tg, insulin, HOMA_{1c} and usCRP (univariate analysis) while HRR ($p < 0.03$) and HDL ($p < 0.02$) were the significant variables in multivariate analysis.

	UNa < 50 meq/l (n=155) (35.09 $\pm$ 20 meq/l)	UNa 50 - 99 meq/l (n=199) (73.08 $\pm$ 13.84 meq/l)	UNa > 100 meq/l (n=136) (134.44 $\pm$ 27.49 meq/l)	P
Systolic pressure (mmHg)	133.2 $\pm$ 12.6	135.7 $\pm$ 14.8	136.8 $\pm$ 16.1	ns
Diastolic pressure (mmHg)	89.4 $\pm$ 9.9	90.1 $\pm$ 10.1	90.2 $\pm$ 11.6	ns
BMI (kg/m ²)	27.0 $\pm$ 6.1	26.9 $\pm$ 5.9	28.3 $\pm$ 7.2	ns
cholesterol (mg/dl)	201.3 $\pm$ 36.6	201.9 $\pm$ 33.9	193.4 $\pm$ 40.5	ns
HDL (mg/dl)	56.7 $\pm$ 11.5	51.0 $\pm$ 11.3	44.4 $\pm$ 9.2	1vs2: $p=0.02$, 1vs3: $p<0.0001$ 2vs3: $p<0.007$
LDL (mg/dl)	122.0 $\pm$ 32.9	129.2 $\pm$ 29.8	124.3 $\pm$ 36.1	ns
Triglycerides (mg/dl)	108.1 (36-314)	120.6 (45-306)	132.0 (44-312)	1vs3: $p=0.03$
Glucose (mg/dl)	97.4 $\pm$ 15.3	100.7 $\pm$ 20.3	102.4 $\pm$ 30.8	ns
Insulin (mU/ml)	6.42 $\pm$ 3.21	7.36 $\pm$ 4.42	9.23 $\pm$ 4.91	1vs3: $p<0.03$, 2vs3: $p<0.049$
HOMA _{1c}	1.84 $\pm$ 1.31	2.46 $\pm$ 1.40	3.18 $\pm$ 1.52	1vs3: $p<0.01$
us CRP (mg/dl)	2.07 $\pm$ 1.82	2.16 $\pm$ 2.03	2.46 $\pm$ 2.31	1vs3: $p<0.007$
HRR (beats/min)	20.9 $\pm$ 7.9	17.1 $\pm$ 7.7	15.5 $\pm$ 7.6	1vs3: $p<0.026$

Conclusion: Higher levels of salt intake were associated with a reduction in parasympathetic tone and metabolic abnormalities (lower levels of HDL; and higher levels of triglycerides, insulin and HOMA_{1c}). Sympathetic activation secondary to a loss of parasympathetic modulation in the brain-stem maybe the cause of metabolic and inflammatory abnormalities observed.

A reduction in sodium intake would have a potential impact in the restoration of the autonomic balance and in the regression of these alterations beyond its benefits on blood pressure.

9C.07 HYPERTENSIVE PREGNANCIES - A 35 YEAR FOLLOW-UP ON CARDIOVASCULAR REGULATION - IS THE SYMPATHETIC ACTIVATION STILL PERSISTENT?

A. Collén¹, K. Manhem¹, Y. Bergmann Sverrisdóttir². ¹Inst. of Medicine, Dept. of Emergency and Cardiovascular Med., Sahlgrenska University Hospital/Östra, Sahlgrenska Academy, Gothenburg, Sweden, ²Institute of Neuroscience and Physiology, Sahlgrenska Academy, Gothenburg University, Gothenburg, Sweden

Objective: Gestational hypertension is associated with an increased risk of developing primary hypertension later in life and preeclampsia has been shown to increase the risk of coronary artery disease. Preeclampsia is a condition associated with sympathetic over activity, which in turn, is thought to constitute a precursor of preeclampsia and hence cause hypertension. Whether the increased sympathetic drive in hypertensive pregnancies persists following delivery is however not known. The aim of the present study was to investigate sympathetic nerve activity and blood pressure level in women with hypertensive pregnancies (HP), 35 years following delivery.

Design and Methods: Sympathetic nerve activity was recorded in 25 women with prior a) HP and present diagnosis of hypertension, b) HP without present diagnosis of hypertension and c) normotensive pregnancies, without present diagnosis of hypertension, serving as controls. Sympathetic nerve activity (MSNA) was expressed as burst frequency (BF), burst incidence (BI), relative median burst amplitude (MA%). Baroreflex slopes were determined by the relation between MSNA burst amplitude and corresponding diastolic blood pressure value. All subjects were investigated without withdrawal of ongoing medication.

Results: The study groups were equal in terms of age, body mass index, heart rate and blood pressure level. MSNA BF, BI were however, significantly higher in the patient group with present hypertension as compared to the control ($p = 0.02$ for both) and patient group without hypertension ($p = 0.04$ and 0.01 , respectively), whereas MSNA MA% did not differ. Baroreflex slopes were positively related to MSNA BF and BI ($r = 0.5$, $p = 0.1$, for both) for the whole study group.

Conclusions: Our results show, that women with hypertensive pregnancies 35 years ago, still suffering from hypertension, have a persistent sympathetic activation despite ongoing antihypertensive medication. The difference in sympathetic outflow in this study can not be explained by differences in blood pressure level, since they did not deviate between the study groups.

ORAL SESSIONS

ORAL SESSION 9D

NEW THERAPEUTIC DEVELOPMENT

9D.01 SUSTAINED BLOOD PRESSURE REDUCTION BY BAROREFLEX ACTIVATION THERAPY WITH A CHRONICALLY IMPLANTED SYSTEM: 4-YEAR DATA OF RHEOS DEBUT-HT STUDY IN PATIENTS WITH RESISTANT HYPERTENSION

A. Kroon¹, J. Schmidli², I. Scheffers¹, J. Tordoir¹, M. Mohaupt², Y. Allemann², J. Jordan³, S. Engeli³, U. Liebeskind⁴, F. Luft⁵, S. Eckert⁶, B. Hansky⁶, M. Elletson⁷, P. de Leeuw¹. ¹University Hospital Maastricht (MUMC+) and Cardiovascular Research Institute Maastricht (CARIM), Maastricht, The Netherlands, ²University Hospital Inselspital Bern, Bern, Switzerland, ³Institute for Clinical Pharmacology, Medical School of Hannover, Hannover, Germany, ⁴Hospital Siloah, Hannover, Germany, ⁵Experimental & Clinical Research Center, Charité Campus Buch & Max Delbrück Center for Molecular Medicine, Berlin, Germany, ⁶Heart and Diabetes Center North Rhine Westphalia, Bad Oeynhausen, Germany, ⁷CVRx Inc., Minneapolis, Minnesota, USA

Objective: The Device Based Therapy of Hypertension (DEBuT-HT) study uses an implantable device and electrodes implanted around the carotid sinus to electrically activate the carotid baroreflex chronically. An external programmer is used to optimize and individualize efficacy. (Rheos® System). The long-term (more than 4 years) blood pressure (BP) data in a cohort of patients who underwent chronic Rheos therapy were assessed to determine if magnitude of response was sustained at 4 years.

Design and Method: Of 45 patients enrolled in DEBuT-HT, a cohort of 18 patients (9f / 9m, age: 53 ± 8 yrs, BMI: 31 ± 6 kg/m²) from 4 European centers have completed more than 4 years of Rheos chronic therapy. The mean duration of Rheos therapy in this cohort is currently 58 ± 6 months.

Results: We observed clinically meaningful and statistically significant reductions in blood pressure at each follow-up interval through 4 years.

Paired Changes in Blood Pressure, Heart Rate and Medications Over Time

N=18	Pre-Implant (Mean ± SD)	Changes in Blood Pressure, Heart & Medication (Mean ± SE)			
		1 Year	2 Years	3 Years	4 Years
Systolic BP (mmHg)	193 ± 36	-38 ± 7 (p<0.001)	-36 ± 7 (p<0.001)	-40 ± 9 (p<0.001)	-53 ± 9 (p<0.001)
Diastolic BP (mmHg)	111 ± 20	-22 ± 4 (p<0.001)	-18 ± 5 (p=0.002)	-21 ± 6 (p=0.002)	-30 ± 6 (p<0.001)
Heart Rate (bpm)	74 ± 13	-4 ± 2 (p=0.10)	-5 ± 3 (p=0.15)	-1 ± 3 (p=0.76)	-5 ± 2 (p=0.02)
Antihypertensive Medications (#)	5.0 ± 1.3	-0.2 ± 0.3 (p=0.51)	-0.7 ± 0.4 (p=0.14)	-0.8 ± 0.4 (p=0.06)	-1.6 ± 0.5 (p=0.02)

At 4 years and 12 of 18 (67%) achieved a systolic BP of less than 140 mmHg and a drop in systolic BP of at least 30 mmHg was achieved in 13 of 18 (72%) patients at 4 years. Heart rate was also reduced over time. These reductions were sustained while the average number of antihypertensive medications decreased. During the total observation period (1042 patient months), there were no unexpected system- or procedure- related serious adverse events.

Conclusions: The Rheos system is a unique therapeutic advance that permits individualized treatment of resistant hypertension. These 4-year results demonstrate that the response to the Rheos therapy is clinically significant and sustainable long-term.

9D.02 THE NITRIC OXIDE DONATOR NAPROXINOD HAS BLOOD PRESSURE EFFECTS SIMILAR TO PLACEBO IN PATIENTS ON RENIN-ANGIOTENSIN SYSTEM BLOCKERS

W. White¹, T. Schnitzer², J. Dijian³, H. Frayssiner³, B. Duquesnois³, M. Weber⁴. ¹University of Connecticut School of Medicine, Farmington, USA, ²North-

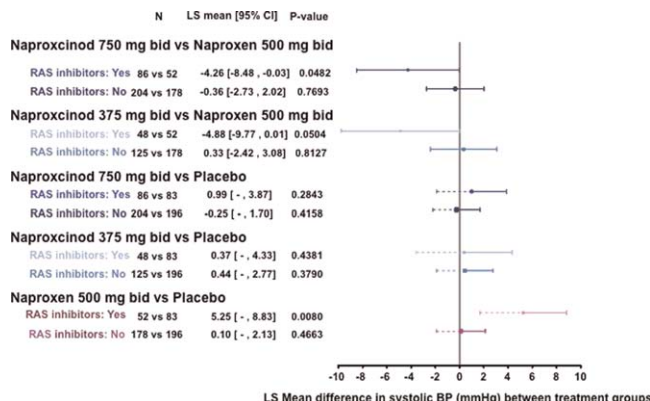
western Fineberg School of Medicine, Chicago, USA, ³Nicox, S.A., Sophia-Antipolis, France, ⁴Downstate Medical Center, Brooklyn, USA

Background: NSAIDs are associated with destabilization of systolic blood pressure (SBP), particularly in patients taking renin-angiotensin system (RAS) blockers. Naproxinod is a new nitric oxide (NO) donating cyclooxygenase inhibitor (CINOD) being developed for osteoarthritis (OA). To characterize the effects of this CINOD on BP in the subgroup of patients taking renin-angiotensin system (RAS) blockers, a pooled analysis of the three large Phase 3 trials in patients with OA according to antihypertensive drug use was performed.

Methods: Changes from baseline in SBP were evaluated using a mixed linear model with study and treatment as categorical fixed effects and baseline BP as continuous fixed effects. Heterogeneity testing showed no treatment-by-study interaction.

Results: There were 332 patients on RAS blocker monotherapy who received naproxinod (375 and 750 mg), naproxen 500 mg or placebo twice daily for 13 weeks. The mean age of the RAS blocker monotherapy subgroup was 63 years, 65% were women and baseline SBPs were similar (129–132 mmHg in each group). Both doses of naproxinod had SBP changes from baseline at week 13 similar to placebo (1.0 ± 1.74 mmHg, p=0.284 for 750 mg and 0.4 ± 2.39 mmHg, p=0.438 for 375 mg) but naproxen did not (5.3 ± 2.17 mmHg, p=0.008) (FIGURE). Changes in SBP between equimolar doses of naproxinod 750 mg and naproxen 500 mg twice daily were also significant (-4.3 ± 2.15 mmHg, p=0.048).

Conclusions: These data demonstrate that naproxinod would be less likely than a conventional NSAID to alter systolic BP control in OA patients on RAS blockers. This finding may be due in part to the potential reduction in angiotensin II production and action mediated through NO delivery.



9D.03 BLOOD PRESSURE AND POTASSIUM EFFECTS OF THE NEW DIRECT ALDOSTERONE SYNTHASE INHIBITOR, LCI699, IN PATIENTS WITH PRIMARY ALDOSTERONISM

M. Azizi¹, L. Amar¹, J. Menard¹, S. Peyrard¹, C. Watson², P.F. Plouin³. ¹APHP, Georges Pompidou Hospital, Clinical Investigation Center, Paris, France, ²Novartis Pharma, Cambridge, USA, ³APHP, Georges Pompidou Hospital, Hypertension Unit, Paris, France

Objective: Aldosterone synthase inhibition with LCI699 is a new therapeutic option aimed at decreasing hormone concentrations in both plasma and tissues. We report the first administration of LCI699 to patients with primary aldosteronism (PA).

Design and Methods: After a two-week placebo run-in, 14 patients with PA received oral LCI699 (0.5 mg bid) for two weeks, LCI699 (1 mg bid) for two weeks, and placebo for one week. We assessed the effects of a 70 to 90% inhibition of aldosterone synthase on 24 h ambulatory SBP/DBP, office SBP/DBP and plasma potassium (K) levels and safety. From the screening visit onwards, all patients received oral KCl (3 to 6 g/day) to ensure that plasma K

remained ≥ 3.0 mmol/L and 10/14 patients received a calcium channel blocker alone or in combination with prazosin to ensure that home BP remained $\leq 170/105$ mmHg.

Results: At baseline, patients (13/14 men, age: 50.3 ± 6.7 yrs) had high office SBP/DBP ($151 \pm 17/91 \pm 12$ mmHg) and 24h ambulatory SBP/DBP ($145 \pm 9/89 \pm 7$ mmHg) and low plasma K (3.0 mmol/L [min:2.5;max:3.5]). They also had high plasma aldosterone (630 pmol/L [359;997]), low plasma renin (4.5 mU/L [1.0;9.5]) concentrations, and high aldosterone/renin ratio (123 pmol/pg [84;553]).

LCI699 over four weeks reduced the 24h ambulatory SBP/DBP by -3.8 (95%CI: $-7.5; -0.1$)/ -1.9 (95%CI: $-4.1; +0.3$) mmHg ($P = 0.046/P = 0.08$). Office SBP/DBP decreased by -7.0 (95%CI: $-14.2; +0.2$)/ -1.9 (95%CI: $-6.7; +3.0$) mmHg on Day 15 and by -9.5 (95%CI: $-16.7; -2.4$)/ -4.9 (95%CI: $-11.0; +1.3$) mmHg on Day 29 ($P = 0.044/P = 0.284$). Office BP returned to baseline one week after LCI699 interruption.

On Day 8, 0.5 mg LCI699 significantly increased plasma K by 0.76 mmol/L ([95%CI: $0.58; 0.94$]; $P < 0.0001$) and corrected hypokalemia (4.03 ± 0.33 mmol/L). This allowed oral KCl to be interrupted in 13 patients on Day 15. The plasma K on 1 mg LCI699 remained stable until Day 29 (3.89 ± 0.35 mmol/L; $P < 0.0001$ vs. Day 1). Hypokalemia reoccurred one week after LCI699 interruption (3.38 ± 0.35 mmol/L, $P < 0.00001$ vs. Day 29).

Conclusion: The four-week administration of LCI699, up to 1 mg bid, effectively and safely corrected the hypokalemia and decreased BP in patients with PA.

9D.04 THE NON-PEPTIDE AT₂-RECEPTOR AGONIST COMPOUND 21 AMELIORATES HYPERTROPHY AND FIBROSIS IN UREMIA-ASSOCIATED CARDIOMYOPATHY

S. Krämer², H. Peters², A. Mika², T. Looft², N. Althoff², H.-H. Neumayer², T. Unger¹, U.M. Steckelings¹. ¹Center for Cardiovascular Research, Institute of Pharmacology, Charité-Universitätsmedizin Berlin, Berlin, Germany, ²Dept. of Nephrology, Center for Cardiovascular Research, Charité-Universitätsmedizin Berlin, Berlin, Germany

During recent years the so-called "kidney-heart-connection" has been increasingly recognised meaning that chronic kidney disease (CKD) is not only consequence but also cause of cardiac disease. The AT₂R has been described to act anti-inflammatory and anti-fibrotic. However, up to now a therapeutic use of these features could not be considered due to the lack of a suitable, orally active AT₂R-agonist. Such an selective, non-peptide AT₂R-agonist termed Compound 21 (C21) was recently synthesised and tested in this study as a treatment to prevent myocardial changes in a rat model of CKD.

CKD was induced by subtotal nephrectomy (SNX) in male Wistar rats. The following groups were formed and treated for 12 weeks: Sham ($n = 4$); SNX ($n = 10$) and SNX+C21 (0.15 mg/kg BW/day, $n = 10$).

After 12 weeks, SNX animals showed significantly increased systolic blood pressure (155 ± 5 mmHg) and blood creatinine levels (0.7 ± 0.06 mg/dL). C21 administration moderately and not significantly lowered blood pressure (144 ± 3 mmHg, $p = \text{NS}$) and creatinine (0.6 ± 0.03 mg/dL). Regarding the heart, chronic uremia caused a significant increase in heart weight (0.4 ± 0.03 vs. 0.3 ± 0.01 g/100 g BW in sham), cardiomyocyte diameter (21 ± 0.4 vs. 17 ± 0.7 μm), connective tissue fibre content (40 ± 3.6 vs. $13 \pm 2.0\%$ /section), collagen I content (148 ± 10 vs. $125 \pm 10\%$ vs. GAPDH), IL-6 protein expression (3.2 ± 0.6 vs. $0.2 \pm 0.1\%$ vs. GAPDH) and infiltration with macrophages (4.7 ± 0.5 vs. 0.6 ± 0.1 cells/section) and lymphocytes (5.5 ± 0.3 vs. 0.7 ± 0.2 cells/section). C21 treatment significantly improved all these markers and lowered heart weight by 15%, cardiomyocyte diameter by 16%, connective tissue fibre content by 50%, collagen I by 25%, IL-6 protein expression by 71% and infiltration with macrophages by 78% and lymphocytes by 71%, respectively. Remarkably, C21 was effective in a blood-pressure independent way.

Selective AT₂ receptor stimulation significantly ameliorated uremic cardiomyopathy in experimental CKD. The AT₂ agonist acted through antihypertrophic, anti-fibrotic and anti-inflammatory pathways. The study provides direct insights into the role of the AT₂ receptor and introduces a novel approach of pharmacological interference with the RAS in uremic cardiomyopathy.

9D.05 THE NEW ANGIOTENSIN RECEPTOR BLOCKER AZLSARTAN MEDOXOMIL HAS SIGNIFICANTLY GREATER 24-HOUR BLOOD PRESSURE LOWERING EFFICACY TO BOTH OLMESARTAN AND VALSARTAN

W. White¹, M. Weber², D. Sica³, G. Bakris⁴, A. Perez⁵, C. Cao⁵, S. Kupfer⁵. ¹University of Connecticut School of Medicine, Farmington, USA, ²SUNY Downstate Medical Center, Brooklyn, USA, ³Virginia Commonwealth University,

Richmond, USA, ⁴University of Chicago Pritzker School of Medicine, Chicago, USA, ⁵Takeda Global Research and Development, Deerfield, USA

Background: Azilsartan medoxomil (AZL-M) is a novel angiotensin receptor blocker (ARB) being developed for the treatment of hypertension. To compare this ARB to others in the class, we studied the effects of AZL-M, valsartan (VAL) and olmesartan (OLM-M) in a randomized, placebo-controlled up-titration trial using ambulatory (ABPM) and clinic BP monitoring.

Methods: There were 1291 patients randomized to AZL-M (2 doses), VAL, OLM-M or placebo daily for 6 weeks. The primary efficacy endpoint was change in 24-hour systolic BP (SBP) by ABPM. Titration from the intermediate to maximal doses of the drugs also occurred at 2 weeks. Hierarchical analysis testing for superiority over placebo was followed by non-inferiority, and then superiority, testing of AZL-M (80 mg, then 40 mg) vs. the comparator ARBs.

Results: For 1088 patients with both baseline and 6 week ABPM data, the patients' mean age was 56 years, 54% were men, and baseline 24-hour BPs were similar in each group (Table). AZL-M at 80 mg lowered 24-hour SBP greater than VAL 320 mg and OLM-M 40 mg while AZL-M 40 mg was non-inferior to OLM-M 40 mg. Clinic BPs also showed superiority of both doses of AZL-M compared to VAL 320 mg and OLM-M 40 mg (data not shown). Safety and tolerability parameters were similar among the 5 groups.

Conclusions: These data demonstrate that AZL-M at its maximal dose has superior efficacy to both OLM-M and VAL at their maximal doses without increasing adverse events. This implies AZL-M could provide higher rates of hypertension control within the ARB class.

Table. Changes from Baseline in 24-hour Ambulatory Systolic BP (mm Hg)

N at week 6	Placebo 134	AZL-M 40 237	AZL-M 80 229	VAL 320 234	OLM-M 40 254
Baseline 24-hour SBP (SE)	144.3 (0.9)	144.4 (0.6)	144.6 (0.7)	146.3 (0.6)	144.4 (0.6)
Δ 24-hour SBP ($\pm$ SE)	-0.3 ± 0.9	-13.4 ± 0.7	-14.5 ± 0.7	-10.2 ± 0.7	-12.0 ± 0.7
Differences for AZL-M vs VAL LS mean (95% CI) p-value		-3.2 [-5.1, -1.3] 0.001	-4.3 [-6.3, -2.4] < 0.001		
Differences for AZL-M vs OLM-M LS mean (95% CI) p-value		-1.4 [-3.3, 0.5] 0.14	-2.5 [-4.4, -0.6] 0.009		

SE = standard error; CI = confidence interval

9D.06 HYPOKALEMIA BLUNTS LEFT VENTRICULAR MASS REGRESSION IN HYPERTENSIVE PATIENTS DURING LOSARTAN- OR ATENOLOL-BASED TREATMENT: THE LIFE ECHO-SUBSTUDY

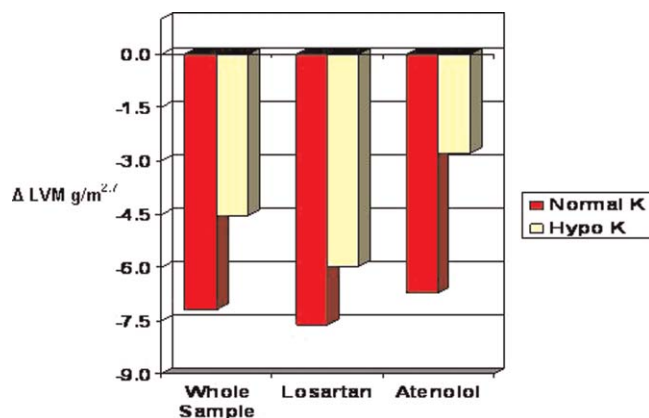
M. Chinali¹, G.P. Aurigemma¹, P.M. Okin², E. Gerds³, K. Wachtell⁴, S.E. Kjeldsen⁵, S. Julius⁶, B. Dahlöf⁷, G. de Simone⁸, R.B. Devereux². ¹University of Massachusetts Medical School, Worcester, USA, ²Weill-Cornell Medical College, New York, USA, ³Haukeland University Hospital, Bergen, Norway, ⁴Rigshospitalet, Copenhagen, Denmark, ⁵University of Oslo, Oslo, Norway, ⁶University of Michigan, Ann Arbor, USA, ⁷Sahlgrenska University Hospital/Ostra, Gothenburg, Sweden, ⁸Federico II University Hospital, Naples, Italy

Background: It has been recently reported in hypertensive patients that hypokalemia (HypoK) is associated with persistent ECG left ventricular (LV) hypertrophy. The aim of the present study was to assess the impact of HypoK on echocardiographic LV mass regression in treated hypertensive patients.

Methods: We analyzed data from 863 patients from the LIFE echo substudy (age 66 ± 7 years, 41% women) with available serum K⁺ levels. Patients were dichotomized according to presence of HypoK (i.e. < 3.90 mmol/L, lowest quartile). LV mass regression after one year of treatment was compared among groups.

Results: Patients with HypoK had similar mean age and gender distribution as compared to patients with normal K⁺ (all $p = \text{ns}$), but higher systolic and diastolic blood pressure (BP) and heart rate (all $p < 0.05$). There was a similar reduction among groups in both systolic and diastolic BP ($p = \text{ns}$). As shown in figure, in multivariate analysis controlling for differences in age, gender, baseline LV mass index, hydrochlorothiazide use before or during the study, baseline BP, and BP change, patients with HypoK showed a significant lower reduction in LV mass as compared to the normal K⁺ group ($p < 0.001$).

Furthermore, while in patients randomized to Losartan there was a similar significant reduction in LV mass both in the absence and presence of HypoK ($p = \text{ns}$), in the Atenolol group HypoK was associated with a nearly 60% lower LV mass reduction ($p < 0.001$).



Conclusions: Despite similar blood pressure reduction with treatment, patients with HypoK have a significant lower LV mass regression. While Losartan is able to offset the negative impact of HypoK, its presence markedly affects the efficacy of Atenolol.

9D.07 **CALCIUM CHANNEL BLOCKERS USE IS ASSOCIATED WITH A BETTER COGNITIVE PERFORMANCE IN OLDER HYPERTENSIVE PATIENTS WITH SUBJECTIVE MEMORY COMPLAINTS**

G. Watfa¹, P. Rossignol¹, A. Kearney-Schwartz¹, R. Fay¹, S. Bracad³, J. Felblinger⁴, J.M. Boivin¹, P. Lacomblez⁵, F. Zannad¹, A. Benetos². ¹Inserm

Clinical Investigation Centre, CIC9501, Nancy University Hospital, Dommartin lès Toul, France, ²Geriatric Service, Nancy University Hospital, Brabois Hospital, Vandœuvre lès Nancy, France, ³Neuroradiology service, Central Hospital, Nancy University Hospital, Nancy, France, ⁴Inserm ERI 13, Adaptive, Diagnostic and Interventional Imagery, and CIC-Innovative Technologies, Brabois Hospital, Vandœuvre lès Nancy, France, ⁵Inserm, U961, Faculty of Medicine, Nancy, France

Background and Purpose: Hypertension is strongly associated with cognitive decline and a promising candidate for dementia prevention. Our aim was to investigate the association between different antihypertensive treatments and cognitive performance in elderly hypertensive patients presenting with subjective memory complaints (SMC).

Methods: 378 elderly hypertensive patients > 65 years (mean age 70.4 ± 6.3 years) treated with at least one antihypertensive agent and presenting with SMC but without dementia were prospectively recruited and underwent a combination of neuropsychological tests, a brain MRI with semi-quantification of White Matter Hyperintensities (WMH), carotid echotraccking, brachial endothelial function and ambulatory blood pressure (BP) assessments.

Results: None of the 3 composite scores (memory score, verbal fluency, visual memory capacity) was found associated with BP levels. Age and gender-adjusted analyses showed a significant and positive association between the memory score and calcium channel blockers (CCBs) use (users: $+0.14 \pm 0.09$ versus non-users: -0.12 ± 0.06 , $p = 0.016$). Multivariate analyses showed that CCBs use was significantly associated with a better memory score, independently from age, male gender, WMH, and carotid wall cross-sectional area, which were associated with worse memory scores.

Conclusions: In elderly hypertensive treated patients with SMC, CCBs use was associated with better memory performances independently of BP level and macro and microvascular alterations, suggesting a specific neuroprotective effect of this pharmacological class. Interventional controlled trials are required to confirm the specific protective effect of CCBs on cognitive decline.

ORAL SESSION

HOT LINE SESSION 3

EPIDEMIOLOGY AND PATHOPHYSIOLOGY

HT.3.01 RELATIONSHIP BETWEEN SICK LEAVE, RISK FACTORS AND GLOBAL CARDIOVASCULAR RISK AND ITS ECONOMIC IMPACT. STUDY ICARIA 2004-2007

A. Zanchetti¹, L.M. Ruilope², E. Calvo Bonacho³, M.A. Sánchez Chaparro³, M. Cabrera Sierra³, A. González Quintela⁴, J. Román García², J.R. Banegas⁵.
¹Istituto Auxologico Italiano, Milan, Italy, ²Hospital 12 Octubre, Madrid, Spain, ³Sanitary Projects, Ibermutuamur, Madrid, Spain, ⁴University of Santiago de Compostela, Santiago de Compostela, Spain, ⁵Autonomous University, Madrid, Spain

Background: Few studies evaluating the relationship between sick leave (SL) and cardiovascular risk among working population and its economic impact.

Objective: To investigate the relationship between SL and the level of global cardiovascular risk (CVR) in a broad working population who came to medical check ups (MCH) and assess its economic impact.

Methods: Prospective observational study including 1,110,313 workers (72.7% male (M); mean age 37.2 years for M and 35.3 years for female (F)) who underwent four successive routine MCH between 2004 and 2007. SL prevalence was considered by the percentage of workers who had SL during the year following the MCH, either by accident (A) or common disease (CD). SL average length and its cost were calculated multiplying days of sick leave for employee contribution basis. CVR was stratified (according to the cardiovascular SCORE for low-risk European countries) as low (<4) and moderate/high (>4).

Results: Table 1 and 2 show prevalences of SL-A and SL-CD in the year following the MCH with their average length and the average cost per worker respectively. Tables 3 and 4 show the difference of days on SL length in presence or absence of CVR and its associated cost.

Patients with high/moderate CVR, accounting for 4% of the study population, produced an increase of CD-SL and A-SL expenditures around 9,385,230 and 1,390,840 Euros higher than the reference category, respectively.

Conclusions: Controlling CVR among the working population during the studied period would affect important economic savings of the cost of this social benefit; further studies are still needed to extend these findings.

Table 1

	CD-SL prevalence (% (IC95%))		CD-SL average length Mean (days) (CI 95%)		CD-cost Euros (IC 95%)	
	Male	Female	Male	Female	Male	Female
High/moderate CVR	18.72% (18.22 - 19.23)	20.61% (18.44 - 22.8)	61.32 (77.64 - 85.13)	55.57 (44.51 - 77.70)	4231.92 (4032.05 - 4444.77)	2410.95 (1849.21 - 2976.38)
Low CVR	18.85% (18.74 - 18.97)	21.96% (21.77 - 22.14)	40.02 (39.48 - 40.60)	43.72 (42.97 - 44.48)	1962.41 (1905.59 - 1995.21)	1896.01 (1861.21 - 1933.54)

Table 2

	A-SL prevalence (% (IC95%))		A-SL average length Mean (days) (CI 95%)		A-cost Euros (IC 95%)	
	Male	Female	Male	Female	Male	Female
High/moderate CVR	10.34% (10.03 - 10.70)	4.71% (3.46 - 5.97)	44.14 (40.63 - 47.13)	34.91 (23.21 - 47.13)	2139.81 (1960.12 - 2313.49)	1338.13 (780.78 - 1905.14)
Low CVR	12.07% (11.98 - 12.18)	4.58% (4.48 - 4.69)	30.24 (29.73 - 30.79)	30.39 (29.21 - 31.51)	1414.8 (1388.64 - 1443.58)	1165.39 (1116.28 - 1215.33)

Table 3

	CD-Contribution basis		CD-Difference of days		n		CD-Final costs	
	Male	Female	Male	Female	Male	Female	Male	Female
High/moderate CVR	52.25	44.82	41.3	11.85	4282	273	9,240,235	144,995
Low CVR	45.69	43.28			80181	41373	Reference	Reference

Table 4

	A-Contribution basis		A-Difference of days		n		A-Final costs	
	Male	Female	Male	Female	Male	Female	Male	Female
High/moderate CVR	46.38	36.93	13.9	4.5	2144	52	1,382,198	8,642
Low CVR	43.53	36.87			47412	7073	Reference	Reference

HT.3.02 CHRONIC KIDNEY DYSFUNCTION BY OCCUPATIONS. RESULTS OF THE ICARIA STUDY

A. Zanchetti¹, M.A. Sánchez-Chaparro², E. Calvo-Bonacho², A. González-Quintela², M. Cabrera², J.C. Sainz², C. Fernández-Labandera², L. Quevedo Aguado², A. Fernández-Meseguer², J.R. Banegas³, L.M. Ruilope⁴, J. Román-García². ¹Istituto Auxologico Italiano, Milan, Italy, ²Sanitary Projects, Ibermutuamur, Madrid, Spain, ³Autonomous University, Madrid, Spain, ⁴Hospital 12 Octubre, Madrid, Spain

Objective: To investigate the prevalence of chronic kidney dysfunction (CKd), its potential association with cardiovascular risk factors and type of occupations in the Spanish working population.

Methods: Cross-sectional study of 194,623 workers (74.2% men, mean age 38.6 years, range 16 to 75) who underwent two routine medical checkups. The estimated glomerular filtration rate (eGFR) was assessed by the Abbreviated Modification of Diet in Renal Disease Study equation. CKd was defined by the mean of two separate eGFR, <73.4 ml/min/1.73m² in males and <69.7 ml/min/1.73m² in females. Silent CKd was defined by the presence of CKd with normal serum creatinine level (<1.2 mg/dL in females and <1.3 mg/dL in males).

Results: As consequence of definition used, a total of 10.0% (CI 95% 9.9–10.1%) of workers displayed CKd. The prevalence of CKd was equal in both sexes and increased with age. Silent CKd was observed in 8.15% of men and 9.75% of women. White collar occupation was associated with CKd after adjusting for confounders (OR 1.70, 95% CI 1.64–1.76). Overweight, obesity, hypertriglyceridemia, high LDL-cholesterol, and hypertension, were also positively and independently associated with CKd. Table 1 shows the comparison of demographic, anthropometric, and biological variables between workers with chronic kidney dysfunction and workers without it.

Table 1.

Variable	Chronic kidney dysfunction		P-value
	Absent (n=175,168)	Present (n=19,455)	
Age (years)	37.7 (37.7-37.8)	46.1 (46.0-46.3)	<0.0001
Gender (male)	74.2 (74.0-74.4)	74.1 (73.4-74.8)	0.725
Smoking habit (yes)	44.5 (44.2-44.8)	33.2 (32.0-34.4)	<0.0001
Body mass index (kg/m ²)	26.1 (26.0-26.1)	27.0 (26.9-27.0)	<0.0001
Waist circumference (cm)	89.0 (88.9-89.1)	91.8 (91.5-92.1)	<0.0001
Systolic blood pressure (mmHg)	126.2 (126.2-126.3)	130.1 (129.8-130.3)	<0.0001
Diastolic blood pressure (mmHg)	76.2 (76.2-76.3)	79.3 (79.1-79.5)	<0.0001
Serum glucose (mg/dL)	88.2 (88.1-88.3)	91.0 (90.7-91.3)	<0.0001
Total serum cholesterol (mg/dL)	198.3 (198.1-198.5)	210.9 (210.3-211.4)	<0.0001
Serum HDL-cholesterol (mg/dL)	57.8 (57.8-57.9)	57.7 (57.5-57.9)	0.2038
Serum triglycerides (mg/dL)	109.7 (109.2-110.1)	124.1 (122.8-125.4)	<0.0001
Serum LDL-cholesterol (mg/dL)	119.6 (119.4-119.7)	129.6 (128.1-130.1)	<0.0001
Serum creatinine (mg/dL)	0.95 (0.95-0.95)	1.16 (1.16-1.16)	<0.0001
Serum uric acid (mg/dL)	5.0 (5.0-5.0)	5.6 (5.5-5.6)	<0.0001
Haematocrit (%)	44.8 (44.7-44.8)	44.2 (44.0-44.5)	<0.0001

Figures are means or percentages with 95% confidence intervals (within parentheses).

Kidney dysfunction was defined by a mean of two separate estimated glomerular filtration rates <73.4 ml/min/1.73m² in men and <69.7 ml/min/1.73m² in women.

Data available for 194,267 workers.

Conclusions: CKd is independently associated with white collar occupation and cardiovascular risk factors in this young and "healthy worker" population, which displays a high prevalence of silent CKd. The eGFR estimation during routine checkups in workers may facilitate early detection of CKd.

HT.3.03 PREDICTIVE VALUE OF PULSE WAVE VELOCITY FOR CARDIOVASCULAR EVENTS IN 15220 SUBJECTS: AN INDIVIDUAL PARTICIPANT META-ANALYSIS ON BEHALF OF THE PWV COLLABORATIVE GROUP

Y. Ben-Shlomo¹, C. McEniery², P. Boutouyrie³, J. Cameron⁴, C.H. Chen⁵, K. Cruickshank⁶, E. Lakatta⁷, S. Laurent³, J. Maldonado⁸, A. Newman⁹, M. Ohishi¹⁰, B. Pannier¹¹, T. Pereira¹², T. Shokawa¹³, K. Sutton-Tyrell⁹, D. Webb¹⁴, I. Wilkinson², T. Willum Hansen¹⁵, S. Zoungas⁴, J. Cockcroft¹⁶.
¹Dept. of Social Medicine, University of Bristol, Bristol, United Kingdom, ²Clinical Pharmacology Unit, Cambridge, United Kingdom, ³INSERM, Paris, France, ⁴Dept. of Vascular Science, Monash University, Victoria, Australia, ⁵Department of Medicine, Yang-Ming University, Taipei, Taiwan, ⁶Manchester Medical School, Manchester, United Kingdom, ⁷Laboratory of Cardiovascular Science, NIH, Baltimore, Maryland, USA, ⁸Instituto de Investigação e Formação Cardiovascular, Penacova, Portugal, ⁹Center for Aging and Population Health, Pittsburgh, USA, ¹⁰Department of Geriatric Medicine, Osaka, Japan, ¹¹Centre d'Investigations Préventives et Cliniques, Paris, France, ¹²Escola Superior de Tecnologia da Saude de Coimbra, Coimbra, Portugal, ¹³Department of Cardiovascular Medicine, Hiroshima University Graduate School of Biomedical Science, Hiroshima, Japan, ¹⁴Clinical Pharmacology Unit, Edinburgh, United Kingdom, ¹⁵Research Centre for prevention and health, Copenhagen, Denmark, ¹⁶Wales Heart Research Institute, Cardiff, United Kingdom

A recent meta-analysis, using published data, showed a 47% increase in cardiovascular (CVD) events for a one standard deviation (SD) increase in carotid-femoral pulse wave velocity (cf-PWV). We have analysed individual participant data, rather than using published data, from existing cohorts so we could: (1) compare the standardised risk for PWV with and without adjustment for other cardiovascular risk factors on CHD, stroke, CVD events; (2) examine whether the risk associated with an increase in PWV interacts with other covariates such as age, gender, diabetic and hypertensive status.

We obtained data from 12 studies (including three unpublished) on 15,220 subjects with 1779 combined CVD events. We derived within study z-scores after log transformation. Our preliminary results show the following. The age and sex adjusted hazard ratio for a 1 SD change in log cf-PWV from the random effects model was a hazard ratio (HR) of 1.32 (95% CI 1.18, 1.48, $p < 0.001$) for coronary heart disease, 1.51 (95% CI 1.30, 1.74, $p < 0.001$) for stroke events and 1.41 (95% CI 1.26, 1.59) for CV events. There was evidence of heterogeneity of effect across studies. The associations with gender, diabetes and high blood pressure were similar. The risk associated with cf-PWV decreased with age group (CVD HRs 1.98 < 50 years, 1.70 for 51–60 years, 1.34 for 61–70 years, 1.19 > 70 years, p -value for trend = 0.001). After adjusting for conventional CVD risk factors (age, sex, systolic blood pressure, cholesterol, HDL-cholesterol, smoking and blood pressure medication), cf-PWV remained an independent predictor (CHD risk 1.19, 95% CI 1.06, 1.33 $p = 0.01$; stroke 1.25, 95% CI 1.15, 1.37 $p < 0.001$; CVD risk 1.27, 95% CI 1.14, 1.42, $p < 0.001$). These findings highlight the added value of PWV as an independent predictor, over and above existing risk factors, for future cardiovascular events, though this effect varied with age. These results should better identify high risk populations that may benefit from more aggressive management.

HT.3.04 TWO-YEAR DURABILITY OF BLOOD PRESSURE REDUCTION WITH CATHETER-BASED RENAL SYMPATHETIC DENERVATION

M. Schlaich¹, H. Krum², T. Walton³, R. Whitbourn⁴, P. Sobotka⁵, M. Esler¹.
¹Baker IDI Heart & Diabetes Institute, Melbourne, Australia, ²Centre for CV Research and Education in Therapeutics, Dept. of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia, ³Heart Centre, Alfred Hospital, Melbourne, Australia, ⁴Department of Cardiology, St. Vincent's Hospital, Melbourne, Australia, ⁵ARDIAN Inc, Palo Alto, CA, USA, ⁶Baker IDI Heart & Diabetes Institute, Melbourne, Australia

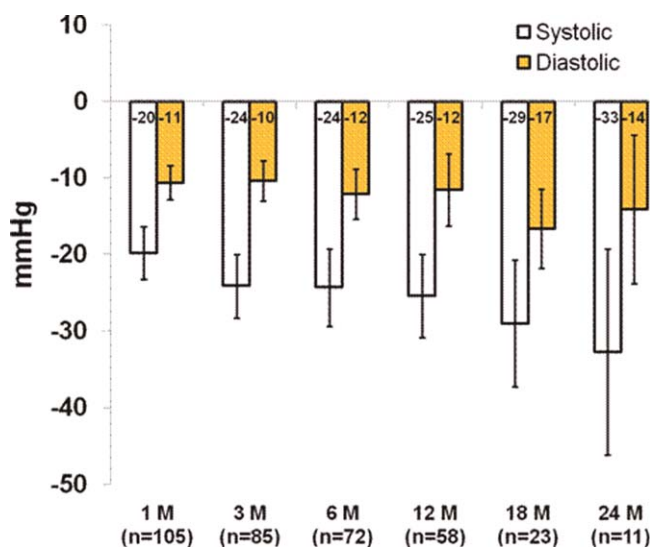
Background: Renal sympathetic hyperactivity is seminal in the progression of hypertension (HTN). Catheter-based renal sympathetic denervation (RDN) has been shown to significantly reduce blood pressure in patients with hypertension (HTN). Durability of effect at 2-years using this novel technique has never been reported.

Methods: A cohort of 45 patients with resistant HTN (SBP ≥ 160 mmHg on ≥ 3 anti-HTN drugs, including a diuretic) was originally reported in the Lancet. We report longer term data on these patients and similar patients subsequently treated with the catheter-based renal denervation in non-randomized studies. Office blood pressure (BP) data and safety data were available at 1, 3, 6, 12, 18 and 24 months post-procedure. eGFR at 3 and 12 months were available.

Results: 117 pts were treated with catheter-based RDN at 17 centers in Australia, Europe, and the US. Mean age was 57 $\pm$ 11 yrs, 40% were female,

33% diabetic, 22% with CAD. Baseline values include mean office BP 176/98 $\pm$ 17/14 mmHg, mean of 5.0 anti-HTN medications, and eGFR 82 $\pm$ 19 mL/min. The procedure lasted a median of 38 minutes. Four acute procedural complications occurred: three groin pseudoaneurysms and one renal artery dissection, all managed without further sequelae. Post-procedure office BPs were reduced by 20/11, 24/10, 24/12, 25/12, 29/17, and 33/14 mmHg at 1, 3, 6, 12, 18, and 24 months respectively. At 3-months the eGFR had changed by -1.4 mL/min (95% CI: -4.6 to 1.7), and at 12-months the eGFR had changed by -2.8 mL/min (95% CI: -6.4 to 0.8). One patient required stenting of a renal artery ostial stenosis that was present at baseline but grew by 6 months; no radiofrequency energy had been delivered in this location. Otherwise, there were no late adverse events associated with the therapy.

Conclusions: Catheter-based RDN results in a substantial reduction in BP sustained to at least 2 years, without significant adverse events, in patients with resistant HTN. The changes in eGFR are better than the natural history reported in similar patients.



HT.3.05 TRENDS IN ALBUMINURIA UNDER RENIN-ANGIOTENSIN SYSTEM SUPPRESSION

C. Cerezo¹, J. Segura¹, J.R. Banegas², J.J. de la Cruz², J.A. Garcia-Donaire¹, T.J. Rabelink³, L.M. Ruilope¹.
¹Hypertension Unit, Hospital 12 de Octubre, Madrid, Spain, ²Department of Preventive Medicine & Public Health, Universidad Autónoma, Madrid, Spain, ³Department of Nephrology and Hypertension, Leiden University Medical Center, Leiden, The Netherlands

Introduction: RAS suppression is considered as the therapy of choice, together with a strict BP control, to prevent the development and to impede the progression of albuminuria.

Objective: We have reviewed the evolution of albuminuria in a group of 1433 patients (mean age 60.5 yr; 50.3% male), arriving in our unit as a consequence of arterial hypertension with varying degrees of associated cardiovascular risk factors. All had in common the existence of previous therapy with an ACEi or an ARB for a minimum of two years before arrival in the Unit.

Results: When first seen 67.7% were normoalbuminuric (albumin-to-creatinine ratio [ACR] <10 mg/g for male, <15 mg/g for female), 11.9% exhibited high-normal values of albuminuria (ACR 10–20 mg/g for male, 15–30 mg/g for female), 16.4% were microalbuminuric (ACR 20–200 mg/g for male, 30–300 mg/g for female) and 4% had macroalbuminuria (ACR >200 mg/g for male, >300 mg/g for female). At that time measured creatinine clearance was 96.8 $\pm$ 49.6 and 54.1% had BP values below 140/90 mmHg. All of them were followed for three years during which RAS suppression was maintained, while BP control improved. At the end of follow-up, only 54.9% were normoalbuminuric, 16.1% presented high-normal albuminuria, 21.6% were microalbuminuric and 7.4% macroalbuminuric ($p < 0.004$). The changes were seen in non-diabetic ($p < 0.005$) but were more marked in diabetics with only 37.5% of patients being normoalbuminuric.

Conclusions: These results indicate that albuminuria develops in the presence of chronic RAS suppression at adequate doses and progresses

continuously. Long-term RAS suppression needs to be revisited in order to control this alteration.

HT.3.06 FLASH PULMONARY EDEMA (FPE) AND BILATERAL RENAL ARTERY STENOSIS (RAS) - THE PICKERING SYNDROME - A HYPERTENSIVE EMERGENCY

F.H. Messerli¹, S. Bangalore², H. Makani¹, S. Rimoldi³, Y. Allemann³, C.J. White⁴, P. Sleight⁵. ¹*Division of Cardiology, St. Luke's and Roosevelt Hospitals, Columbia University, College of Physician & Surgeons, New York, USA*, ²*Division of Cardiology, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School*, ³*Division of Cardiology, Swiss Cardiovascular Center Bern, University Hospital Bern, Bern, Switzerland*, ⁴*Department of Cardiovascular Diseases, Ochsner Clinic Foundation, New Orleans, USA*, ⁵*Department of Cardiovascular Medicine, John Radcliffe Hospital, University of Oxford, Oxford, USA*

Background: In 1988 Thomas Pickering* et al reported in the Lancet 11 hypertensive patients with renovascular disease who presented with episodes of pulmonary edema. Seven (64%) of these patients had bilateral RAS and in a subsequent series of 90 patients FPE was significantly more common in patients with bilateral than in those with unilateral RAS. Since the initial observation of this clinical entity numerous case reports and clinical studies have described the sporadic occurrence of FPE in patients with bilateral RAS and the underlying pathophysiologic mechanisms have been delineated. Because FPE and bilateral RAS are a unique clinical entity with distinct pathophysiologic, clinical and therapeutic features, we propose to name it Pickering Syndrome.

Incidence: Incidence of RAS at cardiac catheterization in 11 studies in a patient population of 11243 varied between 9 and 33%. Of all patients with RAS, the disease was bilateral in 4 to 40%. FPE occurred in 41% of patients in a series of 56 patients with bilateral RAS and in 62% of patients in another series of 16 patients.

Pathophysiology: Bilateral RAS, predisposes patients to develop FPE by 3 main pathophysiologic mechanism:

1. increased hemodynamic burden and exacerbation of diastolic dysfunction (NEJM 2001, 344, 17–22)
2. increased vascular permeability secondary to excessive circulating angiotensin levels
3. Defective natriuresis. Similar to the animal model of 1 kidney 1 clip hypertension, the acute increase in blood pressure caused by a renovascular mechanism leads to a decreased tubular sodium reabsorption and natriuresis

which would normally antagonize the development of FPE. However, in patients with the Pickering Syndrome this compensatory mechanism is defective because the kidneys are protected from the elevated pressure by bilateral RAS. As a consequence and in contrast to unilateral RAS, sodium retention and fluid volume retention ensue.

Distinct pathophysiologic and clinical differences between unilateral and bilateral RAS have been identified. (Figure 1)

	Renal Artery Stenosis	
	Unilateral	Bilateral
RAS activation	??	?
Na/Fluid volume state	Pressure natriuresis	Sodium retention
Cardiac output	Normal	?
Total peripheral resistance	??	?
BP response to RASblockade	Yes	Yes
Diuresis post angioplasty	No	Yes
Flash pulmonary edema	Rare	Common

Clinical Findings: The Pickering syndrome can present a diagnostic conundrum. In the series described by Pickering, the mean number of attacks of FPE before a diagnosis of RAS was made was 2.3. Patients present with sudden onset of severe, unprovoked dyspnea ('flash' pulmonary edema) but the LV systolic function is usually normal. Occasionally significant coronary artery disease is present resulting in misinterpretation of FPE as resulting from coronary ischemia. However, in many patients, coronary angiography reveals no flow limiting stenosis. This finding coupled with normal LV systolic function can lead to a false sense of security or give rise to evaluation for non-cardiac causes for dyspnea. The not uncommon nocturnal appearance of FPE may be due to the nocturnal dip in arterial pressure which further compromises renal perfusion in patients with bilateral RAS.

Therapy and Prognosis: The occurrence of FPE in patients with bilateral RAS - the Pickering syndrome- must be considered a hypertensive emergency requiring immediate therapeutic intervention with a titratable short acting intravenous antihypertensive agent. Subsequent revascularization of 1 or both renal arteries has been shown to virtually abolish the occurrence of FPE. Long term prognosis of patients with bilateral RAS is guarded with a 5 year survival rate of less than 50%.

Thomas G. Pickering passed away on May 14, 2009 after a short battle with a brain tumour.

POSTER SESSIONS

POSTER SESSION 25

BLOOD PRESSURE MEASUREMENT 3

PP.25.01 HOME BLOOD PRESSURE EDUCATIVE PROGRAMS: IMPACT ON ADULT KNOWLEDGE AND PRACTICE

M. Leblanc, L. Cloutier. *Nursing Department, Université Du Québec A Trois-Rivières, Trois-Rivières, Canada*

Home blood pressure measurement (HBPM) can improve screening and treatment of hypertension. Other benefits linked with HBPM are better therapeutic adherence, faster reach of blood pressure target value and self-care enhancement. HBPM is included in the vast majority of hypertension guidelines around the world. Patients are becoming more interested in the technique and are buying devices in large numbers. Despite clear benefits demonstrated and attraction provide by HBPM, literature is scarce when it comes to validated educational programs. Few authors have yet to demonstrate the efficacy and validity of a HBPM educational strategy.

Objective: Determine the impact on adult knowledge and practice for HBPM following three different educational strategies.

Design and Method: A pre test post test design was chosen. Adult workers from a French Canadian University having never received formal teaching on HBPM were included. Participants were randomly assigned to three different educational strategies following Canadian hypertension educational program; individual session, group session or self-learning with a booklet. Knowledge was assessed with a questionnaire while skills were evaluated with an observational grid.

Results: Sixty participants were included. Analysis shows that individual, group sessions and self learning strategy improve knowledge significantly with greater post test scores (38%, 54% and 45% vs up 97%, 99% and 90% respectively, $p < 0,001$). Individual and group sessions were more effective than a self-learning strategy ($p = 0,01$). As for skills development, individual and group sessions are clearly more effective than self-learning module as shown with post test scores: 74%, 79% and 53% respectively ($p = 0,01$).

Conclusions: This study has demonstrated that different strategies can be used effectively to teach adults how to measure their blood pressure. Notwithstanding this, the interaction with an educator has proven beneficial, especially regarding skills acquisition.

PP.25.02 CHRONOPHARMACOLOGY OF VERAPAMIL IN HYPERTENSION

V. Gorbunov¹, V. Belolipetskaya², D. Guranda³, E. Fedorova¹, A. Deev¹, E. Zhabina². ¹National Research Center for Preventive Medicine - Department of Epidemiology of Non-Infectious Diseases, Moscow, Russia, ²National Research Center for Preventive Medicine - Department of Clinical Pharmacology, Moscow, Russia, ³A.N. Belozersky Research Institute of Physical & Chemical Biology, M.V. Lomonosov Moscow State University, Moscow, Russia

Objective: The aim of the trial was to study the pharmacokinetics of morning and evening intake of verapamil retard and to compare these data with 24-hour antihypertensive effect of the drug.

Design and Method: 14 volunteers (5 males, mean age 62 ± 2 years) with stable hypertension (mean day-time blood pressure (BP) $>135/85$ mm Hg) were enrolled into the open, randomized, cross-over trial. Before the trial started, all antihypertensive medications were withdrawn, with an exception of short-acting agents. The duration of the initial wash-out period was 2 weeks; the duration of both "morning" and "evening" treatment courses – 3 weeks; the interval between courses – 1 week. The dose of verapamil (isoptin-SR) was 240 mg o.d. The plasma concentration of non-modified verapamil was measured by high-performance liquid chromatography with fluorescent detection. BP monitoring (SpaceLabs 90207) was performed prior to treatment and at the end of each course of treatment, simultaneously with

the verapamil concentration measurement. The Spearman partial coefficient with z-transformation was used in correlation analysis.

Results: The maximal plasma concentration of verapamil after its morning intake was 239.7 ± 152.3 ng/ml ($M \pm SD$), after the evening intake – 148.6 ± 107.4 ng/ml ($p < 0,01$). The half-elimination time was 12.5 ± 3.5 h and 22.6 ± 15.2 h ($p < .05$), respectively. We found no significant differences in other pharmacokinetic parameters. The correlation coefficients between 24 hour systolic BP changes and drug concentrations were -0.134 ± 0.050 for morning intake and -0.242 ± 0.081 for evening intake ($p < 0,05$).

Conclusions: Morning intake of verapamil in hypertensive patients resulted in rapid increase of drug plasma concentration. At the same time, evening administration of verapamil was associated with higher half-elimination time and "concentration-effect" correlation. According to our data, the evening verapamil intake should be more effective and cause less adverse events. We propose that our analytical model may be used for the identification of the most rational time regimen of different antihypertensive drugs administration.

PP.25.03 EARLY MORNING AND ISOLATED SYSTOLIC HYPERTENSION IN ELDERLY

M. Zain Elabdin, M. Snincak, P. Hrabcakova. *UPJS and Saint Lukas Highly Specialized Geriatric Institute, Kosice, Slovak Republic*

Objective: Elderly pts commonly have Isolated Systolic Hypertension, it has also proved to be an important factor in overall hypertensive complications. Morning hypertension is currently the blind spot in the clinical practice of hypertension, Home 24-hour Blood Pressure measurement has been recommended in patients with high clinic Blood Pressure and patients with Target Organ Damage.

Aim: To assess whether an increased early morning blood pressure surge, established on the basis of a single 24-hour blood pressure monitoring is related to more prominent target organ damage.

Material and Methods: 310 treated hypertensive patients were divided into Systolic/Diastolic hypertension and Isolated Systolic Hypertension (76 ± 10 yrs). Early Morning Blood Pressure Surge, was defined as peak Blood Pressure during morning period (4-6am, average of 5 values, mean = 124.08 mmHg, SD 21.91 mmHg) minus average BP during the sleep period (average of lowest 3 sleep values, mean = 145.45 mmHg, SD 22.14 mmHg) with a sleep to trough (mean 22.74 mmHg, SD 11.92 mmHg, $P < 0, 01$). Pulse Pressure was also used in this study as a direct predictor of hypertensive target organ damage (dippers- 64 mmHg SD 6.84 mmHg, non-dippers- 73.22 mmHg SD 13.94 mmHg).

Results: More females experienced early morning surge. Hyperlipidemia arises equally in Dippers and Nondippers, 45% of Nondippers had Diabetes Mellitus; 30 % suffered previous renal insufficiency and about 29 % of patients suffered from an endocrine disorder, mostly thyroid. Metabolic syndrome was only found to be associated with a nondipping pattern. Pulse pressure mean was higher in Nondippers than Dippers by 10mmHg. Dippers suffered fewer cases of stroke and Myocardial Infarction than Nondippers. Higher cases of stroke were reported in the Early Morning Surge group.

Conclusion: Early Morning Surge is a predictor of hypertensive target organ damage, being a Dipper or Nondipper patient with Isolated Systolic Hypertension, might not make a difference depending on one own degree of target organ damage and diurnal variation.

PP.25.04 RELATIONSHIP BETWEEN AMBULATORY PULSE PRESSURE AND CENTRAL OBESITY IN HEALTHY SUBJECTS AND IN PATIENTS WITH ESSENTIAL HYPERTENSION

M.C. Bravi, M. Compagnucci, L. Gasbarrone. *Medicina Interna 1, Internal Medicine Department, Az. Osp. San Camillo Forlanini, Rome, Italy*

Introduction: Progressive stiffening of large arteries predicts cardiovascular mortality as indicated by the relationship between estimated pulse pressure (PP) with ambulatory blood pressure monitoring (ABPM) and cardiac and

vascular damage. Central obesity (CO) is related to cardiovascular risk but, at present, it is unknown if abdominal fat accumulation is associated with increased PP in healthy and hypertensive patients.

Objective: Analyse the relationship between PP derived from ABPM and CO by anthropometric parameters in healthy and hypertensive patients.

Methods: We studied 220 outpatients (115 male; 105 female) attending to our Department of Internal Medicine, antihypertensive therapy free, with a mean age of 54.60 ± 12.89 years, BMI (kg/m^2) 26.16 ± 3.72 , waist circumference (WC) (cm) 94.81 ± 10.83 cm and waist to height ratio (WHtR) (cm/cm) 0.563 ± 0.06 . The occurrence of CO was evaluated according to NCEP-ATP III criteria (WC > 102 cm in men and > 88 cm in women).

Results: In patients with CO ($n=87$) we found elevated 24-hour PP (58.23 ± 11.36 vs 50.96 ± 9.20 mmHg, $p < 0.0001$), 24-hour systolic blood pressure mean (142 ± 12.93 vs 130.56 ± 12.0 mmHg, $p < 0.0001$), and 24-hour diastolic blood pressure mean (83.76 ± 8.71 vs 79.56 ± 7.57 mmHg, $p < 0.001$). Interestingly, we also found a progressive increase in WHtR value from the first to the third tertile of the distribution of ambulatory PP (chi-square 242.30 $p < 0.0001$). Furthermore, we found a direct correlation between WC and PP in all subjects ($p < 0.0001$).

Conclusions: Our data show an association between PP evaluated by ABPM and obesity overall present in patients with CO. Furthermore, the direct correlation between WC and 24-hour PP mean suggest that these measures can be used as additional tools in assisting risk stratification in hypertensive patients.

PP.25.05 EARLY AUTONOMIC CHANGES IN PATIENTS WITH NEWLY DIAGNOSED ARTERIAL HYPERTENSION

P. Frana¹, M. Plachy¹, P. Jurak², J. Halamek², I. Rihacek¹, L. Pinkova¹, M. Soucek¹, L. Bartosikova³, J. Franova⁴. ¹St. Anne's University Hospital and Masaryk University, 2nd Department of Internal Medicine, Brno, Czech Republic, ²The Academy of Science, Institute of Scientific Instruments, Brno, Czech Republic, ³Palacky University, Faculty of Medicine and Dentistry, Department of Physiology, Olomouc, Czech Republic, ⁴Faculty Hospital Brno and Masaryk University, Department of Paediatrics, Brno, Czech Republic

Objective: The autonomic nervous system plays a key role in the regulation of blood circulation and its abnormal function is a major factor involved in the early phases of essential arterial hypertension. The objective of the study was to assess the differences between short-term variation in heart rate and blood pressure in healthy individuals and in a group of patients with newly diagnosed mild essential arterial hypertension.

Design and Method: Three continuous 5-minute measurements of the ECG and blood pressure in supine position with different breathing patterns (spontaneous breathing, paced breathing 0.1 Hz and 0.33 Hz), were applied at 2 groups of subjects: young healthy (YH, 31 subjects, 13 female) and patients with newly diagnosed mild arterial hypertension (HT, 29 subjects, 12 female). Analyzed parameters: heart rate (HR), heart rate variability spectral power in low frequency (HRVlf) and high frequency (HRVhf) power bands, systolic pressure (SBP), diastolic pressure (DBP) and baroreflex sensitivity (BRS).

Results: Mean HR [beat/min] over groups YH/HT at 0.1 Hz breathing is $69.9/73.2$ ($p = \text{NS}$), during spontaneous breathing $66.1/72.9$ ($p = \text{NS}$), and 0.33 Hz breathing $67.1/72.8$ ($p = \text{NS}$); mean HRVlf [ms²/1000] at 0.1 Hz is $17.9/8.5$ ($p < 0.01$), during spontaneous breathing $3.8/2.0$ ($p = \text{NS}$) and at 0.33 Hz $2.2/0.8$ ($p < 0.05$); mean HRVhf [ms²/1000] at 0.1 Hz is $2.4/1.3$ ($p = \text{NS}$), during spontaneous breathing $2.6/1.3$ ($p = \text{NS}$) and at 0.33 Hz $2.1/0.7$ ($p = \text{NS}$); mean BRS [ms/mmHg] at 0.1 Hz is $17.3/11.2$ ($p < 0.01$), during spontaneous breathing $10.6/8.3$ ($p = \text{NS}$) and at 0.33 Hz $9.9/5.9$ ($p < 0.05$).

Conclusions: Increased risk of cardiac mortality is closely connected to decreased HRV and BRS as the markers of the short-term circulation control dysfunction. There are no significant differences between both groups in HRVlf, HRVhf and BRS during spontaneous breathing. Group differences in HRVlf and BRS are more significant ($p < 0.01$) at 0.1 Hz breathing than during 0.33 Hz breathing ($p < 0.05$). The 0.1 Hz paced breathing is simple and convenient approach to amplify inter-groups differences of the cardiovascular control detected by the HRVlf and BRS in early stages of hypertension.

PP.25.06 AMBULATORY ARTERIAL STIFFNESS INDEX AS A MARKER OF ARTERIAL STIFFNESS

T. Zeljkovic Vrkic¹, M. Laganovic¹, I. Pecin², D. Kuzmanic¹, S. Karanovic¹, I. Vukovic Lela¹, V. Premuzic¹, T. Roncovic¹, L.J. Fodor¹, M. Fistrek¹,

B. Jelakovic¹. ¹University Hospital Centre, Department of Nephrology and Arterial Hypertension, Zagreb, Croatia, ²University Hospital Centre, Department of Metabolic Diseases, Zagreb, Croatia

Objective: Increased arterial stiffness (AS) has been shown to predict cardiovascular mortality in patients with essential hypertension (EH). Ambulatory arterial stiffness index (AASI) was proposed as a surrogate measurement method for determination of AS. Although, some authors showed prognostic value of AASI, this is still a controversial issue. Our aim was to analyze AASI in 66 normotensive subjects (NT) and 114 patients with EH (divided in stage 1 (47), stage 2 (41) and stage 3 (26)).

Design and Methods: Detailed clinical exam was performed in all patients. Blood pressure (BP) was measured using mercury sphygmomanometer (RR) and ambulatory blood pressure monitor (ABPM) Spacelabs 90207 following the ESH/ESC guidelines. AASI was defined as 1 minus the regression slope of diastolic over systolic BP values obtained from ABPM.

Results: NT were the youngest and had the lowest values of BMI ($p < 0.01$). There were no differences in age, gender and BMI between hypertensive patients divided into the different stages ($p > 0.05$). The highest values of AASI were determined in stage 1 (0.392 ± 0.054) and NT (0.386 ± 0.036) being significantly different from results obtained in stage 2 and 3 (0.369 ± 0.042 ; 0.362 ± 0.048 , respectively; $p = 0.01$). Significant differences were observed between NT, stage 1, 2 and 3 in pulse pressure values (PP) obtained using either RR (41.6 ± 7.9 vs. 46.2 ± 8.5 vs. 51.6 ± 12.3 vs. 55.1 ± 13.8 , respectively; $p < 0.0001$) or ABPM (44.5 ± 6.0 vs. 49.1 ± 8.9 vs. 48.5 ± 6.5 vs. 54.0 ± 9.8 , respectively; $p = 0.0002$).

Conclusion: The highest AASI values were obtained in the youngest and in subjects with lowest values of BP (NT and stage 1). On contrary, PP values gradually and significantly increased from the NT to the stage 3 group. Obtained AASI values in all groups were below the proposed cut-off values of 0.5 and 0.7 for younger and older, respectively. Our results did not confirm important clinical value of AASI, and PP provide more useful data. Definitive validation of AASI should await further studies with direct measurements of AS.

PP.25.07 CARDIOVASCULAR OUTCOMES IN PATIENTS WITH NORMAL AND ABNORMAL 24 H AMBULATORY BLOOD PRESSURE MONITORING

P. Iqbal, L. Stevenson. Chesterfield Royal Hospital FT, Chesterfield, United Kingdom

24-Hour Ambulatory Blood Pressure Monitoring (ABPM) plays an important role in assessing cardiovascular prognosis, through presence or absence of ABPM related prognostic features.

Objectives: To study relationship between 24 H ABPM and cardiovascular outcomes in patients from Chesterfield Royal Hospital.

Material and Methods: Over 12 months from 1st of August 2002, 1187 individuals had 24-hour ABPM performed. These individuals were referred either from local general practices, hypertension or general medical clinics. These individuals had at least one of the recognized indications for 24-hour ABPM. Cardiovascular outcomes were studied in a subset (297) of the original cohort, made up by every 4th consecutive patient. Prognostic information was not available from 52 patients and they were excluded leaving 245 patients.

The following ABPM related prognostic features were studied: High day time Systolic and diastolic BP (≥ 135 , ≥ 85 mmHg) high Night time Systolic and diastolic BP (≥ 120 mmHg, ≥ 75 mmHg) absence of nocturnal dip ($< 10\%$ fall in night time SBP) high early morning SBP (≥ 140 mmHg) and morning surge (≥ 20 mmHg). The cardiovascular outcomes studied included Fatal and Non-fatal MI, new diagnosis of angina, Acute coronary syndrome, sudden cardiac death, cardiac arrhythmias, Acute LVF, Cerebrovascular events, Peripheral vascular disease, abdominal aortic aneurysm and CKD stage 3 or above.

Results: There were no differences between the original cohort of 1187 and subset of 245 studied in terms of age, gender, clinic blood pressure and ABPM related features. Over a follow up period of 2015 ± 116 days (1720 - 2305 days) 83 cardiovascular events occurred in 61 subjects. Cardiac arrhythmias were the most common CV outcome (34 events) followed by cerebrovascular events (15). Statistically significant associations found were between cerebrovascular events and absent nocturnal dip 10% ($p = 0.05$) and peripheral vascular disease and morning surge $20/15$ mmHg ($p = 0.014$).

Conclusion: Two significant associations were found between cerebrovascular events and absent nocturnal dip $< 10\%$ and peripheral vascular disease and high pulse pressure ≥ 50 mmHg.

PP.25.08 THE ASSOCIATIONS BETWEEN METABOLIC ABNORMALITIES, 24-H AMBULATORY BLOOD PRESSURE MONITORING PARAMETERS AND MORNING CORTISOL LEVELS IN PATIENTS WITH NON-DIPPING HYPERTENSION

A. Brzeska, J. Porzezinska - Furtak, J. Ziemak, J. Dziwura, T. Miazgowski, K. Widecka. *Department of Hypertension and General Medicine, Szczecin, Poland*

Aims: To assess an impact of morning cortisol level on metabolic abnormalities and 24-h ambulatory blood pressure profile in patients with dipping and non-dipping hypertension.

Material and Methods: The study was performed on 96 subjects with hypertension (47 females, 49 males). All patients had 24-h ambulatory blood pressure monitoring (ABPM). The following parameters were calculated: 24-h mean (MAP), systolic (SBP) and diastolic (DBP) blood pressure, daytime systolic (DSBP) and diastolic (DDBP) as well as night-time systolic (NSBP) and diastolic (NDBP) blood pressure. The non-dipping hypertension was diagnosed if the nocturnal declines in systolic blood pressure were below 10%. Therefore, we identified 49 dippers (23 females, 26 males; mean age 44.0 $\pm$ 13.7) and 47 non-dippers (20 females, 27 males; mean age 45.9 $\pm$ 14.5). The morning blood samples for serum cortisol, glucose, uric acid, cholesterol, and triglycerides levels were drawn. All patients had also a 75 g oral glucose tolerance test (OGTT) and a 1 mg dexamethasone suppression test. The anthropometric assessments included height, weight, waist circumference and body mass index (BMI).

Results: Waist circumference, BMI, MAP, serum uric acid, total cholesterol and its LDL and HDL fractions, triglycerides, glucose and results of the OGTT were similar in both groups. All patients had normal dexamethasone suppression test. However, the morning cortisol level was significantly higher in non-dippers group as compared to dippers (20.7 $\pm$ 6.7 vs. 18.3 $\pm$ 5.6 ug/dl; $P < 0.05$) and in non-dippers was positively correlated with BMI ($R = 0.60$; $P < 0.005$), fasting glucose ($R = 0.39$; $P < 0.05$), 2-h post load glucose ($R = 0.95$; $P < 0.0005$) and inversely with HDL cholesterol ($R = -0.38$; $P < 0.05$). Similarly, in non-dippers, but not in dippers, the morning cortisol level correlated with the following ABPM values: 24MAP ($R = 0.61$; $P < 0.005$), 24SBP ($R = 0.58$; $P < 0.005$), 24DBP ($R = 0.54$; $P < 0.005$), DSBP ($R = 0.52$; $P < 0.05$), DDBP ($R = 0.51$; $P < 0.05$), NSBP ($R = 0.62$; $P < 0.005$), NDBP ($R = 0.56$; $P < 0.005$).

Conclusions: In patients with hypertension, an increased morning cortisol level is associated with metabolic abnormalities, circadian blood pressure profile and non-dipping pattern of blood pressure.

PP.25.09 RELATION BETWEEN HEART RATE VARIABILITY AND NOCTURNAL BLOOD PRESSURE PATTERN IN HYPERTENSIVE PATIENTS

T. Ovdienko. *NSC The M.D. Strazhesko Institute of Cardiology, AMS, Kiev, Ukraine*

Objectives: The aim of this study was to investigate the relation between heart rate variability (HRV) and blood pressure (BP) in patients (pts) with dipping (DP)/non-dipping (NDP) patterns with essential hypertension (EH).

Methods: Ambulatory BP monitoring and 24-hour Holter ECG monitoring has been recorded in 92 untreated pts using Meditech CardioTens System. The analysis of HRV included time parameters: SDNN, SDANN, pNN50%, rMSSD, SDSD and HRV triangular index, spectral parameters: TP, LF and HF, LFn, HFn, ratio LF/HF and their circadian fluctuation. Echocardiography of all patients has been carried out.

Results: 41pts had dipping pattern, 51pts had non-dipping pattern. They did not differ in age (DP 45 $\pm$ 1.8 vs NDP 47.8 $\pm$ 1.3 yrs, $p = 0.29$). We found no significant difference between time parameters of HRV, spectral parameters HRV and their circadian fluctuation in DPpts and NDPpts. In comparison, NDP patients showed more level of left ventricular (LV) mass index (LVMI) (in NDPpts LVMI 138.0 $\pm$ 3.3 vs 120.6 $\pm$ 6.4 g/m² DPpts, $p = 0.02$). In these pts there was also found significant and linear relation between level of SBP every 24 hours, in daytime, nighttime and time parameters of HRV (rMSSD, SDSD), for daytime SBP with spectral HRV parameters (with HF $r = 0.354$, $p < 0.01$, HFn $r = 0.369$, $p = 0.01$) and, at the same time, the significant inverse relationship was found for daytime SBP with LFn ($r = -0.364$, $p < 0.01$) and LF/HF ($r = -0.361$, $p < 0.01$). In comparison, in DP patients there were revealed not numerous inverse relations between SBP level and time parameters of HRV (with SDNN for 24-hour $r = -0.374$, $p < 0.05$, for night $r = -0.484$, $p < 0.01$ and with SDANN for night $r = -0.397$, $p < 0.05$). It was also noticed that there was significant linear relation between the SBP and DBP level for nighttime and LVMI (with SBP $r = 0.42$, with DBP $r = 0.31$, $p < 0.01$).

Conclusion: These findings demonstrated that the level of BP and progression of LV hypertrophy has a more essential impact on HRV in patients with non-dipping pattern than on HRV in patients with dipping pattern.

PP.25.10 AMBULATORY ARTERIAL STIFFNESS INDEX AS PREDICTOR SUBCLINICAL TARGET ORGAN DAMAGE IN HYPERTENSIVE PATIENTS

L. Garcia-Ortiz¹, A. Garcia-Garcia¹, M.A. Gomez-Marcos¹, J.I. Recio-Rodriguez¹, L.J. Gonzalez-Elena¹, J. Parra-Sanchez¹, F. Gude², M.F. Muñoz-Moreno¹, M. Alonso-Gonzalez¹, A.I. Hernandez Dominguez¹, J.A. Iglesias Valiente¹, R. Abow-Assali¹. ¹La Alamedilla, Primary care Research Unit, Salamanca, Spain, ²Clinical Epidemiology Unit, Hospital Clinico Universitario, Santiago de Compostela, Spain

Background: Increased arterial stiffness has been shown to predict cardiovascular risk in hypertensive patients. The objective is to evaluate the relationship between the ambulatory arterial stiffness index (AASI) and subclinical organ damage (SOD).

Methods: Design: Cross sectional study.

Subjects: 554 hypertensive patients with and without drug treatment (mean age 57 $\pm$ 12 years, 60.6% males).

Measurement: Ambulatory arterial stiffness index was defined as 1 minus the regression slope of diastolic over systolic BP readings obtained from 24-hour recordings. Renal damage was evaluated on the basis of glomerular filtration rate (GFR) and microalbuminuria; vascular damage according to carotid intima-media thickness (IMT) and ankle/arm index; and cardiac damage on the basis of the Cornell voltage-duration product (Cornell VDP) and left ventricular mass index.

Results: The mean AASI was 0.38 $\pm$ 0.07 (0.39 $\pm$ 0.07 in treated patients and 0.37 $\pm$ 0.06 in non-treated subjects). The index showed a positive correlation to IMT ($r = 0.417$, $p < 0.001$) and Cornell VDP ($r = 0.188$, $p < 0.001$), and a negative correlation to the Cockcroft-Gault formula ($r = -0.205$, $p = 0.001$) and ankle/arm index. The variables associated to the presence of SOD were AASI (OR = 3.89) and smoking (OR = 1.55). The variables associated to IMT were smoking and waist circumference, while those associated to GFR were AASI, body mass index and waist circumference. In turn, smoking, total cholesterol and HbA1c were the variables associated to the ankle/arm index.

Conclusion: The increased AASI implies a greater presence of SOD in primary hypertensive patients with or without blood pressure-lowering drug treatment.

PP.25.11 DO WE KNOW TO MEASURE BLOOD PRESSURE CORRECTLY?

M. Macedo¹, C. Oliveira², L. Oliveira², L. Santos³, N. Lima⁴, S. Cardoso⁵. ¹IBMC, University Oporto, Porto, Portugal, ²C.S. Rio Tinto, Porto, Portugal, ³C.S.Gondomar, Porto, Portugal, ⁴C.S.Paranhos, Porto, Portugal, ⁵C.S.Santo Tirso, Santo Tirso, Portugal

Measuring blood pressure (BP) in the medical office is the recommended technique for the diagnosis and management of the hypertensives patients, but many times physicians have limited knowledge about it.

To determine the level of knowledge on this technique among primary care professionals (PC), physicians (P) and nurses (N) in the Porto health care centers.

A descriptive cross sectional study was realized. A 15-question multiple answer survey to fill anonymously was given to 131 primary care professionals (54.2% of physicians and 45.8% of nurses) in 4 Health Centers. The independent Student's t test was used for quantitative variables. All recorded data were analysed using the SPSS 14.0.

A total of 131 surveys were analysed. Median correct answers for the P = 10 N = 9. The number of corrected answered was similar for P and N. Less than 8 questions were responded correctly by only 14.5% of the professionals. Nobody of the professional responded correctly to all the questions. There are a very few difference between physicians and nurses in relation to the degree of knowledge. The older physicians have more wrong responses.

In conclusions: the knowledge on adequate BP measurement technique among primary care professionals have some limitations. Training should be improved and remembered along the professional life, mainly for older professionals.

PP.25.12 THE MASKED HYPERTENSION EVALUATED BY AMBULATORY BLOOD PRESSURE MONITORING MODIFIES THE VASCULAR RISK IN HYPERTENSIVE PATIENTS WITH CONTROLLED BLOOD PRESSURE IN THE OFFICE

S. Suárez Ortega, J. Artiles Vizcaino, M. Serrano Fuentes, J.M. Sanchez Hernandez, D. Godoy Diaz, J. Delgado Martinez, J.C. Rodriguez Perez, P. Betancor Leon. *Hospital Dr Negrin, Las Palmas de G.C., Spain*

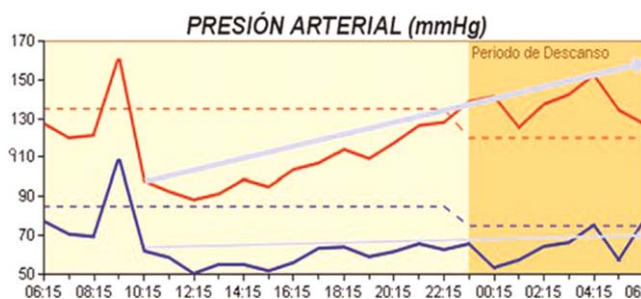
Objective: The masked hypertension (MH) is a clinical situation in which the blood pressure (BP) is normal in the office but elevated by ambulatory blood pressure monitoring (ABPM). The ABPM is the suitable method to corroborate the MH diagnosis in hypertensive patients (HP). We analyzed the prevalence and the vascular risk in the MH.

Design and Methods: According to Cardiorisc project 680 HP fulfil validity criteria. We analyze the prevalence and vascular risk of MH in the HP controlled in office BP. The controlled BP in office was considered <140/90 mmHg and by ABPM <130/80. The sample concentrates in HP evaluated for the first time or because a difficult control. Collected data were processed using SPSS 16.

Results: Of 680 HP, 295(43.4%) were controlled in office BP. In this subgroup 87(29.5%) HP had MH. The average age was of 50.5 ± 15.4 (range: 14-84 years); MH represents the 12.8% of all HP. The distribution of ABPM patterns in the HP controlled in office BP has been: dipper (84; 40%), nondipper (89; 43%), riser (22; 10%) and dipper extreme (13; 6.2%). The vascular risk in the subgroup without MH (non-MH) was distributed in: low in 159(76.5%) and elevated in 49(23.5%). In the MH subgroup the vascular risk was low in 20(23%) and elevated in 67(77%). The riser pattern existed in 22 (14%) HP in the subgroup of nonMH and in 14(16%) HP in the MH. The vascular risk and the riser pattern were higher in the MH subgroup (Figure 1).

Conclusions: 1. - The prevalence of MH is elevated (29.5%). 2. - The vascular risk and the riser pattern is more elevated in the MH subgroup. 3. - The ABPM is the suitable method for the diagnosis of MH in HP controlled in office BP. 4. - The increase of the vascular risk in the MH is correlated with an increase of nocturnal BP

Figure 1: Ascendent riser patten coexists with masked hypertension.



PP.25.13 BLOOD PRESSURE VARIABILITY IN EXTREME DIPPERS

G. Simonyi, M. Medvegy, J.R. Bedros. *Flor Ferenc Hospital of County Pest-Cardiometabolic Center, Kistarcsa, Hungary*

Introduction: Hypertension is one of the most frequent diseases of the world. It is risk factor for several vascular diseases. The relationship between nocturnal blood pressure (BP) decline and various vascular incidences and target organ damage is well known. The increasing BP variability associated with a greater degree of end-organ damage and with a higher rate of cardiovascular events.

Patients and Methods: Ambulatory BP monitoring were performed 2452 patients in our clinic. We assessed the circadian pattern of BP, PP, MAP, heart rate (HR), blood pressure variability, heart rate variability. The criteria of extreme dipping were nocturnal blood pressure fall >20%. BP variability we can estimate as a standard deviation of ambulatory BP monitoring obtained by every 15 to 20 minutes measurement. We investigated the difference of BP variability between extreme dippers, non-dippers, and normal dippers, by Student-t (SPSS 15).

Results: 87 patients had extreme dipping pattern (6.35%). Age 47.91 years (SD:12.56), BMI was 29.14 kg/m² (SD:5.64). The 24-hour systolic BP was 126.17 mmHg (SD:14.43) the diastolic was 74.26 mmHg (SD:10.26), the HR was 70.32 beat/min (SD: 8.19). The systolic diurnal index (DI) was 23.68% (SD:2.61) and diastolic DI was 27.19% (SD:5.24). The 24-hour PP were 56.53 mmHg (SD:10.67), MAP was 89.48 mmHg (SD:10.69). We found significant difference between dipper, non-dipper and extreme dipper group between 24-hour systolic and diastolic blood 24-hour BP variability ($p < 0.0001$) but not in heart rate variability (N.S.).

Conclusions: The extreme dipping pattern is a non-favourable condition. In extreme dippers we have found greater blood pressure variability than in other groups. These are associated with higher degree of vascular complications.

PP.25.14 ABSTRACT WITHDRAWN

PP.25.15 RELIABILITY OF THE WRIST TYPE 24-HOUR AMBULATORY BLOOD PRESSURE MONITORING DEVICE

J. Yee¹, S. Lee², S.S. Min¹, S.H. Han¹, S.K. Shin². ¹Dept. of Physiology and Biophysics, School of Medicine, Eulji University, Daejeon, South Korea, ²Div. of Cardiology, Dept. of Internal Medicine, Eulji University Hospital, Daejeon, South Korea

Objective: Monitoring one's blood pressure for 24 hour period may give more information than just the variation of it. Widely used device tends to adopt the oscillometric method that detects the vibration of the pressure inside an air-filled cuff wrapped around the upper arm. Pressure control and measuring box is connected to the cuff by a tube. Usual 30 minute operating interval forces the whole device set to be worn by a person throughout the monitoring period, which may be so stressful that the real everyday blood pressure pattern might actually change. Wrist wearable watch type device looks promising because of its simpler no-tube structure and its smaller size. Resemblance to the normal wrist watch is expected to have a certain amount of the emotional effect. Therefore once the reliability of the device of this type is verified, the bulkier cuff type device may well be replaced by the wrist type one.

Design and Method: An oscillometric along with a wrist type ABPM devices are used to monitor the 24 hour blood pressure changes of healthy young adults. A standard Riva-Rocci sphygmomanometer has been used for the initial calibration of the wrist type device.

Results and Conclusions: Two devices show consistent results when measuring the heart rate while the blood pressure values don't match for both systolic and diastolic cases ($p < 0.05$). The variance distribution inconsistency for the two cases ($p = 0.1480$ and $p < 0.0000$ respectively) may call for more complicated requirement of the nonlinear calibration, which is not provided in the wrist type devices studied.

	p-value		meaning	
	F-test	t-test	Variance	Value
Heart Rate	0.4178	0.7378	Equal	Equal
Systolic Pressure	0.1480	0.0000	Equal	Unequal
Diastolic Pressure	0.0000	0.0168	Unequal	Unequal
Pulse Pressure	0.0460	0.0000	Unequal	Unequal

PP.25.16 ECHOCARDIOGRAPHIC LEFT VENTRICULAR HYPERTROPHY IN HYPERTENSIVE PATIENTS IN RELATION TO CLINIC, HOME AND AMBULATORY BLOOD PRESSURE MEASUREMENTS

A. Konstantopoulou¹, P. Konstantopoulou¹, I. Papargyriou¹, S. Liatis¹, G. Stergiou², D. Papadogiannis¹. ¹1st Department of Propaedeutic Medicine,

Athens University Medical School, Laiko General Hospital, Athens, Greece, ²Hypertension Center, 3rd Department of Medicine, Athens University Medical School, Sotiria Hospital, Athens, Greece

Objective: This study compared the left ventricular mass index (LVMI) of hypertensive patients in relation to blood pressure (BP) measurements in the clinic (CBP), at home (HBP) and by 24h ambulatory (ABP) monitoring.

Design and Method: Three hundred hypertensive individuals, mean age (60 ± 11) years, 170 males, 213 under drug treatment, were included. CBP was measured in 3 visits at least 1 week apart, HBP for 4 consecutive workdays with duplicate morning and evening measurements and ABP for 24 hours. Left ventricular hypertrophy (LVH) was assessed by echocardiographic estimation of LVMI.

Results: The correlation coefficients of LVMI with CBP were $0.14^{**}/0.02$, with HBP $0.38^{***}/0.20^{***}$ and with ABP mean $0.26^{***}/0.14^{*}$, daytime $0.23^{***}/0.10$, nighttime $0.27^{***}/0.17^{**}$, early morning first BP $0.24^{***}/0.06$. Comparison of the relationship of HBP versus other BP measurements with LVMI was significant for CBP (both systolic and diastolic) and daytime ABP (only systolic).

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Conclusions: In hypertensive patients, HBP monitoring seems to be the optimal method of revealing the association between BP and echocardiographic assessment of left ventricular hypertrophy.

PP.25.17 TARGET ORGAN DAMAGE IN HYPERTENSIVE PATIENTS IN RELATION TO CLINIC, HOME AND AMBULATORY BLOOD PRESSURE MEASUREMENTS

A. Konstantopoulou¹, P. Konstantopoulou¹, I. Papargyriou¹, S. Liatis¹, G. Stergiou², D. Papadogiannis¹. ¹1st Department of Propaedeutic Medicine, Athens University Medical School, Laiko General Hospital, Athens, Greece, ²Hypertension Center, 3rd Department of Medicine, Athens University Medical School, Sotiria Hospital, Athens, Greece

Objective: This study compared the cardiovascular status of hypertensive patients in relation to blood pressure (BP) measurements in the clinic (CBP), at home (HBP) and with ambulatory (ABP) monitoring.

Design and Method: Three hundred hypertensive individuals, mean age (60 ± 11) years, 170 males, 213 under drug treatment, were included. CBP was measured in 3 visits at least 1 week apart, HBP for 4 consequent workdays with duplicate morning and evening measurements and ABP for 24 hours. Cardiovascular target organ damage (TOD) was assessed by Sokolow-Lyons electrocardiographic voltage criteria and prediction of 10-year risk for fatal cardiovascular disease was calculated using SCORE tables for low risk European region.

Results: The correlation coefficients of Sokolow-Lyons criteria with CBP were $0.10/-0.06$ (systolic/diastolic), with HBP $0.31^{***}/0.17^{**}$, and with ABP mean $0.19^{***}/0.10$, daytime $0.19^{***}/0.07$, nighttime $0.17^{**}/0.10$, early morning first BP $0.13^{*}/-0.02$. Comparison of the relationship of HBP versus other BP measurements with Sokolow-Lyons criteria was significant for CBP and first morning BP only.

The correlation coefficients of SCORE risk with CBP were $0.09/-0.02$, with HBP $0.17^{**}/0.10$, and with ABP mean $0.13^{*}/0.08$, daytime $0.11/0.04$, nighttime $0.18^{**}/0.15^{**}$, early morning first BP $0.16^{**}/0.09$. There was no significant statistical difference between the correlation coefficients of HBP versus other BP measurements in relation to SCORE risk.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Conclusions: In hypertensive patients, CBP was not correlated significantly with LVH electrocardiographic Sokolow-Lyons voltage criteria and SCORE risk, in comparison to the other BP measurement methods, HBP and ABP.

PP.25.18 CHANGES IN QUALITY OF LIFE IN HYPERTENSIVE PATIENTS DURING HOME BLOOD PRESSURE TELEMONITORING

M. Kloczek, M. Brzozowska-Kiszcza, M. Rajzer, K. Kawecka-Jaszcz. ¹Department of Cardiology and Hypertension, Jagiellonian University Medical College, Krakow, Poland

Aim: To assess changes in quality of life (QoL) during self-measurement of BP at home and combination of self home BP monitoring with teletransmission during antihypertensive treatment.

Material and Methods: Eighty hypertensive patients never treated (age: 18-65 yrs.). We randomized 40 pts for telemonitoring (TELE - by Tensio-Care® system) and 40 patients for self home BP monitoring (SDOM - by OMROM M5-I device). The study lasted 10 months. In both groups the antihypertensive treatment was the same and was intensified during follow-up visits, if BP was $> 130/85$ mmHg. At baseline and after 9 months assessment of QoL by the Psychological General Well-being index (PGWB) was performed.

Results: At baseline, the TELE and the SDO M groups did not differ in relation to age, gender, BMI, prevalence of diabetes, dyslipidemia, smoking, cholesterol, as well as to office BP and ABPM values. During treatment a decrease in BP was observed in both groups: at office ($p < 0.01$), at home ($p < 0.05$) and at ABPM ($p < 0.05$). The ANOVA analysis did not show any BP differences between groups during consecutive follow-up visits. At baseline total index of the PGWB was the same in both groups (TELE: 91.9 vs SDO M: 85.6 points, $p > 0.05$). At 9 month no differences in quality of life between two groups were found (TELE: 95.6 vs SDO M: 90.7 points, $p > 0.05$). However in all patients analyzed together (80 subjects), despite of the method of home BP monitoring, a significant improvement in QoL was observed, from 88.8 ± 15.5 points at baseline to 93.1 ± 14.2 points at 9 month, respectively ($p < 0.01$). Only 2 factors were associated with improvement of QoL at the end of observation, i.e. lower SBP and DBP values ($p < 0.05$).

Conclusions: Method of home BP monitoring does not influence the QoL of patients undergoing pharmacotherapy due to hypertension. The improvement in QoL observed in all patients was an effect of better BP control obtained during treatment.

PP.25.19 STRESS-INDUCED ARTERIAL HYPERTENSION AT A WORKING PLACE: PARTICULARITIES OF CARDIOVASCULAR FITNESS

T. Horbat, T. Nechesova, M. Liventseva, I. Korobko, V. Paulova, V. Apanasevich, N. Kuzniatsova. *RSPC Cardiology, Minsk, Belarus*

Materials and Methods: 115 subjects were included in this study. The main group ($n = 46$) were the ones whose differences in daily average systolic (SBP) and diastolic blood pressure (DBP) obtained on working day and on weekend during the BP daily monitoring were 6 and/or 3 and more mm of mercury. The control set ($n = 69$) were the normotensives according to BP daily monitoring. Groups were comparable on a sex, age and the work experience. Ambulatory blood pressure monitoring, echocardiography, pulse wave velocity, morning cortisol level, magnesium level and microalbuminuria were measured in all patients included in study.

Results: Persons with stress-induced hypertension at a working place (SIH) showed significantly higher 24-hour SBP load (46 ± 2.73) % and DBP (49.8 ± 2.38) % in a working day as compared with (28.9 ± 2.21) % for SBP load and (30.2 ± 2.53) % for DBP load in rest day ($p < 0.05$). The rate of person with increased pulse pressure among the patient with SIH (24%) was significantly higher than among the normotensives (4 %) ($\chi^2 = 5.73$, $\delta = 0.017$) as well as the rate of persons with nocturnal hypertension («night-peaker») in a working day in comparison with a day off. Patients with SIH had elevated cortisol (959.4 ± 54.5 nmol/l) and lowered magnesium (0.79 ± 0.016 mmol/l) level. SIH leads to the subclinical end organ damage: left ventricular mass (233.6 ± 8.83) and relative wall thickness (0.40 ± 0.008) increase, all these indices were significantly higher in patient with SIH than in normotensives. Increase of left atrium diameter was revealed in 30% of patient with SIH, grade I of diastolic dysfunction – in 26%, microalbuminuria – in 12%, pulse wave velocity augmentation – in 31%.

Conclusions: Persons with SIH are characterised by an adverse daily profile the BP, presence of subclinical end-organs damage and changes of biochemical markers of stress.

PP.25.20 REFERRALS FOR AMBULATORY BLOOD PRESSURE MEASUREMENTS

A. Høieggen, A.E. Stenchjem, C. Foss, I. Os. *Department of Nephrology, Oslo University Hospital, Oslo, Norway*

Introduction: Ambulatory blood pressure (ABP) measurement has become an important tool in clinical practice, both for diagnosis and control of treatment effect, although it is still limited in use in primary care. The aim of this study was to assess reasons for referral to the hypertension clinic for ABP measurements from primary care physicians in an urban area.

Material and Methods: During the last 20 years, monitoring of ABP has been available on request at the outpatient hypertension clinic. Information was gathered from 498 randomly selected measurements undertaken during a 3-year period from 1998-2000. All ABPs were measured with Spacelab 90207. For 439 of the measurements, the reason for referral was given.

Results: The patients (52% women, age 55.8 ± 14.8 years, mean $\pm$ SD) had referral blood pressure $166.3 \pm 22.4/98.8 \pm 10.9$ mmHg, with less than 3% with systolic (S)BP < 140 mmHg, while 24-h ABP was $138.6 \pm 16.1/83.1 \pm 11.0$ mmHg. The diagnosis of hypertension was questioned in 42.2%, while in another 10.8% white coat hypertension was suspected. Whether patients had adequate blood pressure control was asked in 19.3%, while suspicion of resistant hypertension was given as a reason in 9.0%. In 6.0% hypotensive episodes were assumed, while in 12.7% no reason for referral was stated.

Conclusion: In primary practice ABP measurements were mainly requested to confirm the diagnosis of hypertension rather than to ascertain adequate blood pressure control. ABP measurements should be encouraged not only to ensure proper diagnosis, but also to make certain that hypertension is adequately treated.

PP.25.21 EFFECTIVENESS OF A BLOOD PRESSURE EDUCATIONAL AND EVALUATION PROGRAM FOR THE IMPROVEMENT OF MEASUREMENT ACCURACY AMONG NURSES

E. Testa, C. Bertello, F. Rabbia, S. Rabbia, S. Praticò, C. Colasanto, F. Montersino, S. Totaro, E. Berra, V. Milazzo, A. Vairo, A. Iannaccone, V. Crudo, P. Mulatero, F. Veglio. *Hypertension Unit University Of Turin, Turin, Italy*

Aim: To assess the procedure for measuring blood pressure among hospital nurses and to assess if a measurement training program would improve measurement technique and accuracy.

Methods: 160 Molinette hospital nurses (10% of all hospital nurses) participated to the study. Italian society of hypertension (SIIA) guidelines were used to develop the blood pressure educational program. The program was based upon theoretical and practical lessons and was one day long, and was conducted by trained nurses and physicians afferring to the Hypertension Unit. An evaluation of nurses measuring technique and accuracy was done before and after the program, by using a 10 items check. Moreover we calculated the differences between measured and effective BP values before and after the training program.

Results: We showed, at baseline evaluation, an inadequate performance on some points of clinical blood pressure measurement technique, in particular: only 10% of nurses control the arm diameter before placing the cuff, 4% measure BP in both arms, 80% placed the stethoscope under the cuff, 43% did not remove all clothing that covered the location of cuff placement, did not comfortably seated the patient with the legs uncrossed and the back and arm supported. After the training we found a significant improvement of the technique for all items. About the accuracy of measurement we found that the difference between measure and effective measurement was significantly reduced after training, particularly for SBP. We didn't observe significant difference of measurement knowledge between nurses working in different realities such as Medical or surgical departments.

Conclusions: Periodical education in BP measurement may be required, and this could significantly improve the technique and consequently the accuracy.

PP.25.22 MICROLIFE WATCHBP FOR HOME BLOOD PRESSURE MEASUREMENT MORE ACCURATE IN 'DIAGNOSTIC' MODE COMPARED TO USUAL MODE

S. Wessel, N.V. van der Hoeven, B.J. H. van den Born, M. Cammenga, G.A. van Montfrans. *Academic Medical Centre - Department of Internal Medicine, Amsterdam, The Netherlands*

Background: Patients often fail to follow advised schedules for home blood pressure measurement (HBPM). Microlife recently developed the Watch BP Home device with a 'diagnostic' mode, allowing only two readings at fixed time slots in the morning and evening for 7 days, according to the European Society of Hypertension recommendations. In 'usual' mode measurements at all times are accepted. A formal assessment of the added value of the 'diagnostic' mode on accuracy has not yet been performed.

Methods: We instructed and randomized 99 hypertensive patients to measure their BP at home in either the usual or diagnostic mode according

to ESH HBPM recommendations. Patients were asked to report their BP values in a logbook. They were not informed that we were to compare their logbook entries with the device memory.

Results: The mean BP retrieved from the memory was $148.5 \pm 22.8/87.6 \pm 10.3$ for diagnostic mode and $146.8 \pm 17.3/88.9 \pm 10.7$ for usual mode. In the diagnostic mode 43.2 % had full adherence to the schedule, in the usual mode only 20.0 % had full adherence (p 0.01). Unscheduled measurements were performed by 23.6% in the usual mode. Missing readings were found in 45.5% of patients in the diagnostic mode and 47.3 % of patients in the usual mode (p 0.86). Fictional data were found in 13.6% of patients in the diagnostic mode and 10.9% of patients in the usual mode (p 0.68). Omitted readings were found in 2.3% of patients in the diagnostic mode and in 36.4% of patients in the usual mode (p 0.00).

Conclusion: Patients performing HBPM in the Microlife Watch Home BP 'diagnostic' mode had a greater adherence to the ESH measurement schedule. The 'diagnostic' mode is a useful feature, and improves accuracy of home blood pressure measurement.

PP.25.23 CEREBROPROTECTIVE PROPERTIES OF NEBIVALOL IN PATIENTS WITH ARTERIAL HYPERTENSION ASSOCIATED WITH TYPE 2 DIABETES MELLITUS

K. Zahidova¹, F. Guliyev². ¹The Azerbaijan State Advance Training Institute, Department of Cardiology, Baku, Azerbaijan, ²The Azerbaijan State Advanced Training Institute, Department of Cardiology, Baku, Azerbaijan

Objectives: Aim of the study was elucidate peculiarities of influence of nebivalol on 24- hours blood pressure (BP) profiles and changes of parameters of cerebral perfusion in patients with arterial hypertension (AH) associated with type 2 diabetes mellitus.

Methods: 56 patients with ²⁻²²² degree AH associated with type 2 diabetes mellitus was examined. At baseline and after 4 months of treatment with nebivalol in a 24- hour dose 5 mg we carried out BP monitoring, single photon emission computer tomography of the brain, and assessed the state of carbohydrate and lipid metabolism.

Results: According to data of 24-hour BP monitoring marked lowering of BP parameters occurred under the influence of treatment. This was accompanied with 31% decrease of the number of hyperperfused sectors of the brain ($\chi^2 = 5.84, p = 0.012$). During adenosine test number of hypoperfused sectors of the brain decreased to 23 % ($\chi^2 = 1.89, p = 0.162$) what performed for a tendency to improvement of reactivity of cerebral vessels in response to vasodilating influences.

Conclusion: Nebivalol exerted favorable effect on metabolic parameters and lowering of level postprandial glycemia in dynamics of treatment was significant. The results of the study demonstrate positive effect of treatment of patients with arterial hypertension associated with type 2 diabetes mellitus with nebivalol (5 mg/day).

PP.25.24 PREVALENCE OF MASKED HYPERTENSION IN DIFFERENT GROUPS OF MEDICATED PATIENTS

M. Smirnova, V. Gorbunov, A. Deev, G. Andreeva. *National Research Center For Preventive Medicine - Department of Epidemiology of Non-Infectious Diseases, Moscow, Russia*

Objective: The problem of masked hypertension (MH) in medicated patients is very important due to their high cardiovascular risk. The aim of our study was to determine the prevalence of MH in various patients' groups.

Design and Method: Two groups of patients with the stable hypertension grade 1-2 were compared. Group I included 219 patients with the single measurement of clinical (CBP) and 24h ambulatory blood pressure (ABP) after 4-8 weeks of monotherapy by 9 antihypertensive drugs. Group II included 39 patients from cross-over randomized trial of amlodipine and spirapril. These participants underwent at least 7 visits to the clinic for CBP control. ABP monitoring was performed at the end of each treatment course (4 weeks). The additional diagnostic methods were: ECG (in group II), General Well-Being Questionnaire (GWBQ). MH was determined as CBP $< 140/90$ mm Hg and daytime ABP $\geq 135/85$ mm Hg. To summarize the data the analysis of 2x2 contingency tables was done. The multivariate logistic procedure in stepwise mode and Spearman correlation analysis were used for assessment of MH predictors in groups I and II respectively. The analysis models were sex and age adjusted.

Results: The prevalence of MH in group I was 11.5%, in group II - 37.5-41.9%. We found initial differences between groups: age (57.7 ± 0.6 and

53.7 ± 1.6 years, $p < 0.05$), body mass index (BMI; 29.0 ± 0.3 and 30.3 ± 0.8, $p < 0.05$), GWBQ scale III (7.7 ± 0.3 and 9.1 ± 0.5, $p < 0.01$) and VI (7.9 ± 0.3 and 9.0 ± 0.5, $p < 0.05$). MH in group I was associated with: GWBQ scales II, V, VI; intake of metoprolol and amlodipine (positive correlation [+]). MH in group II correlated with: increased orthostatic BP, ECG criteria of left ventricular hypertrophy, GWBQ scales I, IV, VI (+); age, BMI, previous antihypertensive medication, alcohol intake (negative correlation).

Conclusions: The prevalence of MH in medicated hypertensive patients may depend on initial patients' characteristics, prescribed drugs and the factor of repeated visits to the clinic (due to CBP regression to the mean).

PP.25.25 CARDIOVASCULAR DAMAGES IN PATIENTS WITH ARTERIAL HYPERTENSION CHRONICALLY EXPOSED TO LEAD AND RELATIONS TO BLOOD PRESSURE VARIABILITY

R. Poreba¹, M. Poreba², P. Gac¹, A. Derkacz¹, A. Beck¹, B. Beck¹, R. Andrzejak¹. ¹Department of Internal Medicine and Hypertension, Wrocław, Poland, ²Department of Pathophysiology, Wrocław, Poland

Relations between blood pressure variability and organ damages has not been fully evaluated in patients with occupational exposition to lead. The aim of the study was to determine relations between occupational exposition to lead and cardiovascular damages in patients with diagnosed arterial hypertension. A group of 35 patients with pharmacologically treated arterial hypertension (mean age 49.18 ± 9.35) was included into the study. A subgroup I consisted of patients with occupational chronic exposition to lead ($n = 17$), and a subgroup II of patients without exposition to lead ($n = 18$). In all patients 24-hour ambulatory blood pressure monitoring (ABPM), echocardiography, and duplex Doppler ultrasound of carotid arteries were carried out. Based on echocardiography left ventricle mass (LVM), left ventricle mass index (LVMI), relative wall thickness (RWT) were determined. Patients were classified into types of left ventricle geometry: normal geometry, concentric remodeling, concentric hypertrophy and eccentric hypertrophy. In hypertensive copper-smelters significant higher values of ABPM were observed in comparison with non-exposed hypertensives [MSBP (mean systolic blood pressure) - I: 135.72 ± 16.57 mmHg; II: 125.59 ± 13.25 mmHg; $p < 0.05$; MBP (mean blood pressure) - I: 94.56 ± 11.64 mmHg; II: 90.31 ± 9.95 mmHg; $p < 0.05$; PP (pulse pressure) - I: 59.96 ± 10.56 mmHg; II: 51.07 ± 9.57 mmHg; $p < 0.05$; VSBP (variability systolic blood pressure) - I: 16.63 ± 4.89 mmHg; II: 10.11 ± 3.14 mmHg; $p < 0.05$]. Higher values of LVMI and RWT were present in subgroup I (LVMI - I: 122.24 ± 24.59 g/m²; II: 109.42 ± 19.72 g/m²; $p < 0.05$; RWT - I: 0.43 ± 0.06; II: 0.38 ± 0.05; $p < 0.05$; IMT - I: 1.08 ± 0.18 mm; II: 0.98 ± 0.14 mm; $p < 0.05$). In hypertensive copper-smelters concentric hypertrophy was more often diagnosed than in hypertensives without exposition to lead (subgroup I: 17.6%; II: 5.5%; $p < 0.05$). In copper-smelters there were linear positive correlations between MSBP and IMT ($r = 0.49$; $p < 0.05$), PP and LVMI ($r = 0.46$; $p < 0.05$), lead blood level and PP ($r = 0.58$; $p < 0.05$), and between lead level and LVMI ($r = 0.45$; $p < 0.05$). Conclusions. In patients with arterial hypertension occupationally exposed to lead cardiovascular damages are more severe and more often than in non-exposed subjects.

PP.25.26 DIFFERENCES IN CAROTID INTIMA-MEDIA THICKNESS AND LEFT VENTRICULAR MASS INDEX IN MILD HYPERTENSIVES WITH ELEVATED AWAKENING BLOOD PRESSURE

C. Majul, O. Paez, P. Pulcio, M. De Maria, M. Gorosito. Hospital Santojanni, Buenos Aires, Argentina

Elevated awakening blood pressure (EABP) appears to be a risk factor for cardiovascular events. The increase of left ventricular mass index (LVMI) and carotid intima-media thickness (CIMT) have been described regarding hypertensives with EABP. However, the reproducibility of EABP is important, and most works diagnosed EABP with only one measurement of ambulatory blood pressure monitoring (ABPM).

Objective: To evaluate if there are differences in LVMI and CIMT between no elevated awakening blood pressure (NEABP) and EABP in mild hypertensives, diagnosed with good reproducibility.

Method: 95 male and 79 female recently diagnosed mild hypertensives by way of ABPM systolic diurnal blood pressure (BP): 135-149 and or diastolic diurnal BP: 85-94 mmHg were included, EABP was present if the division of the average of ABPM of the first 2 awake hours by the average BP of the remaining awake hours was > 1.10 . This result was confirmed by 2 different measurements of ABPM in two visits separated by one week. They were

split into two groups, A) 58 with EABP and B) 57 without EABP. LVMI was measured by echocardiogram; CIMT by carotid doppler. No patient was receiving medication. Statistics: Student's t-Tests or Man Whitney

	EABP	NEABP	p
age	53 ± 7	55 ± 6	NS
Systolic ABPM	148 ± 10	147 ± 11	0.1
Diastolic ABPM	85 ± 6	84 ± 7	0.1
LVMI g/m ²	124 ± 41	114 ± 38	0.02
CIMT mm	Median 1 Range 0.8-1.3	Median 0.7 Range 0.6-1	0.01

Conclusion: CIMT and LVMI are greater in mild hypertensives with EABP and are therefore more at risk of subclinical damage than in hypertensives without EABP.

PP.25.27 THE INFLUENCE OF ANTIHYPERTENSIVE THERAPY ON 24-HOUR PARAMETERS OF ARTERIAL STIFFNESS MEASURED BY OSCILLOMETRIC DEVICE

E. Abirova, N. Egorkina, A. Deev, V. Gorbunov. National Research Centre For Preventive Medicine, Moscow, Russia

Objective: According to the recent data, the effect of ACE inhibitors on arterial stiffness is preferable in comparison with beta-blockers. The aim of our study was to investigate the effect of metoprolol (M) and enalapril (E) on different 24h parameters of arterial stiffness, using the oscillometric ambulatory blood pressure measurement (osABPM) device, with the function of QKD (Korotkoff Diastolic pressure delay) measurement and analysis of native oscillometric curves.

Methods: 32 patients (mean age 55.1 ± 8.9 years; mean 24h systolic blood pressure (SBP)/diastolic BP (DBP) > 135/85 mmHg) were enrolled into the randomized cross-over study. The doses of E were 5-10 mg, the doses of M - 100 mg o.d. The 24 h measurements were performed by the BPLab-3 (Nizhny Novgorod, Russia) device at the end of both control periods and courses of therapy.

We analyzed 24h pulse transmission time (PTT), maximum rate of increase of arterial pressure (dP/dt max), oscillometric arterial stiffness index (ASI), and augmentation index (Aix). We used t-test for assessment of the value of the variables (no treatment vs. treatment).

Results: During the follow-up period, mean 24h SBP levels (150.4 ± 1.7 for E and 149.4 ± 1.6 for M) were decreased to 130.6 ± 1.6 and 128.5 ± 1.6, respectively; $p > 0.05$. Baseline mean 24h pulse pressure (58.9 ± 1.4 and 56.7 ± 1.4) was decreased to 50.9 ± 1.4 and 48.1 ± 1.4, respectively ($p > 0.05$). The dynamics of the arterial stiffness variables is shown in Table 1.

Conclusions: According to our preliminary data, there is no significant difference in the effect of E and M on 24h parameters of arterial stiffness. The value of the specific oscillometric parameters (dP/dt) seems to be higher than the PTT value.

Table 1. Comparative dynamics of the arterial stiffness variables, according to osABPM.

index	baseline	E	p	baseline	M	p
(dP/dt) max	654,4 ± 27,1	626,1 ± 25,2	0,440	664,8 ± 25,7	565,8 ± 26,6	0,008*
ASI	41,7 ± 1,4	34,5 ± 1,2	0,0001*	39,5 ± 1,3	32,5 ± 1,3	0,0002*
Aix	-5,6 ± 2,9	-15,0 ± 2,7	0,016*	-7,6 ± 2,7	-13,9 ± 2,8	0,103
PTT	135,7 ± 2,3	137,9 ± 2,1	0,477	138,1 ± 2,1	141,0 ± 2,2	0,333

* $p < 0,05$

PP.25.28 RELATIONSHIP BETWEEN HYPERTENSION AND BODY MASS INDEX IN THE WORKERS

M. Nooritajer¹, A. Ravandi². ¹Islamic Azad University Branch of Eslamshahr, Tehran, Iran, ²Semelvis Medical University, Budapest, Hungary

Objective: This research was performed to determine the relation between hypertension and body mass index (BMI) in the workers of vitana factory that is under consideration of the University of Iran.

Methods: This research is a cross sectional study. The data collection tool was questionnaire that had 2 parts. The first part complained individual

information on dietary habits and the second part complained BMI measures, systolic and diastolic blood pressure and the amounts of cholesterol, triglyceride and fasting blood sugar. The samples were 175 number of the workers of vitana factory who had been selected by the manner of census.

Results: The results were as follows: The average and standard deviation of weight, height, systolic blood pressure and diastolic blood pressure of workers were respectively 76.9 ± 11.27 kg, 170.81 ± 7.3 cm, 130 ± 17.66 mmHg and 82.390 ± 12.22 mmHg. The average and standard deviation of blood cholesterol was 17.5 ± 6.8 . In 17.2% of samples fasting blood sugar was > 120 mg/dl. BMI in 46.3% of workers was between 25 and 29.9 and in 21.7% was between 30 and 39.91.

Conclusion: The results of the research showed that 15% of samples in the research society were affected by medium and severe degree of hypertension and two third (68%) were obese in the grade of 1 and 2, also a statistical meaningful relation between BMI and systolic blood pressure ($P < 0.002$) and between BMI and diastolic blood pressure ($P < 0.01$) were founded. On the basis of this research it is necessary that periodical examination be done about workers of this factory for health planning in 3 fields: Screening, education and prevention.

PP.25.29 IS ABNORMAL CIRCADIAN BLOOD PRESSURE PATTERN REVERSED DURING IMPROVED CONTROL OF BLOOD PRESSURE IN LOW RENIN HYPERTENSION?

I. Os, A. Høieggen, C.B. Lindstad, I.K. Eide. *Oslo University Hospital Ullevål-Department of Nephrology, Oslo, Norway*

Objective: Low renin status is frequent in treatment-resistant hypertension and often associated with primary hyperaldosteronism. The diurnal blood pressure (BP) is reported to be abnormal with reduced nocturnal reduction in BP in these patients. The aims of this investigation were to assess the circadian BP pattern in patients with low-renin treatment-resistant hypertension, and whether improved BP control would normalize the circadian BP rhythm.

Design and Methods: A total of 90 patients were referred from private practitioners to the hypertension outpatients clinic due to treatment-resistant hypertension, and of these 38 were characterized by low renin hypertension, including 20 patients with hyperaldosteronism. They entered a randomized placebo-controlled, double-blind, cross-over study with fixed combination of hydrochlorothiazide/amiloride (HTC/A). The patients remained on their pre-study regimen except for diuretics which was discontinued in the placebo/HTC/A periods. After completion of the cross-over periods, patients received unblinded HTC/A. Ambulatory BP (Spacelab 90207) was measured before and 6-12 months and complete data set was obtained in 29 patients.

Result: Office BP readings was significantly reduced with an average of $31/15$ mmHg, while daytime ABP was reduced from $163.6 \pm 17.1/101.4 \pm 11.4$ to $146.7 \pm 18.9/90.0 \pm 11.9$ mmHg ($p < 0.001/p < 0.001$). A similar reduction was observed for nighttime BP with reduction of $13.9 \pm 24.6/9.6 \pm 14.8$ mmHg from $151.5 \pm 20.5/91.8 \pm 10.6$ mmHg ($p = 0.005/p = 0.002$). Night-time reduction of BP $> 10\%$ was observed in 8/29 patients, and the proportion did not change 9/29 during follow-up. Nocturnal BP reduction was $7.3 \pm 7.6\%$ and $5.9 \pm 6.1\%$ for systolic and diastolic BP respectively before the study, and did not change significantly during the follow-up. Only 14% of the patients had normotension based on ABP.

Conclusion: Abnormal diurnal BP pattern was present in the majority of patients with low-renin treatment-resistant hypertension, close to 75% and substantial reduction, albeit still not adequately controlled, did not affect the diurnal pattern. If normotension would normalize the diurnal pattern is not known.

PP.25.30 WHITE COAT EFFECT AND WHITE COAT HYPERTENSION IN PATIENTS REFERRED TO AMBULATORY BLOOD PRESSURE MEASUREMENTS

C. Foss, A. Høieggen, A.E. Stenchjem, I. Os. *Department of Nephrology, Oslo University Hospital, Oslo, Norway*

Introduction: The transient blood pressure (BP) rise during clinical visits is referred to as white-coat effect (WCE), and can be identified using ambulatory blood pressure (ABP) measurement. The aims of this study were to assess the magnitude of WCE and the prevalence of white coat hypertension (WCH) in patients referred to the hypertension clinic for ABP from primary care physicians.

Material and Methods: Information was gathered from 498 randomly selected patients who underwent ABP measurements using Spacelab 90207 during a 3-year period from 1998-2000. WCE was calculated as the difference between referral BP and daytime ABP, and between 1st h ABP (average of the 3 first readings) in the outpatient clinic and daytime ABP. WCH was defined as office SBP reading ≥ 140 and/or DBP ≥ 90 mmHg, but normal 24h ABP $< 125/80$ mmHg.

Results: The patients (52% women, 55.8 ± 14.8 years, mean $\pm$ SD) had referral blood pressure $166.3 \pm 22.4/98.8 \pm 10.9$ mmHg and daytime ABP $142.6 \pm 16.4 / 86.6 \pm 11.4$ mmHg. The WCE using referral BP was 23.5 ± 22.0 , and 11.6 ± 12.4 mmHg using 1st h ABP. The difference between referral BP and 1st h ABP was $9.4 \pm 22.1/1.7 \pm 13.0$ mmHg. No gender difference appeared in WCE (24.0 ± 22.5 vs 23.1 ± 21.5 mmHg). WCE was related to age ($r = 0.21$, $p < 0.001$). Clinical significant WCE defined as a difference > 15 mmHg between office BP and ABP was present in 42% of all patients. WCH was present in 19.1%.

Conclusion: In this patient population, WCE was pronounced and WCH was present in approx 1/5th of the patients. ABP measurement should be undertaken routinely in patients with hypertension to ensure proper diagnosis and avoid overtreatment, especially in the elderly patients.

PP.25.31 THE APPLICATION OF APPROXIMATE ENTROPY FOR THE ANALYSIS OF IRREGULARITY IN AMBULATORY BLOOD PRESSURE VALUES

J. Shin¹, Y.S. Park², Y.H. Lim³, M.I. Park¹. ¹Hanyang University College of Medicine, Seoul, South Korea, ²Hanyang University College of Natural Science, Seoul, South Korea, ³Hanyang University Hospital, Seoul, South Korea

Background: Approximate entropy is known to be an indicator of irregularity previously applied to the research of numerous successive measurements such as heart rate. Broadening the application to the relatively small number down to 30 measurements, we applied approximate entropy concept to the blood pressure variability in hypertensive patients.

Methods: The ambulatory blood pressure monitoring data of 160 uncomplicated hypertension patients and 300 complicated patients. Approximate entropies were computerized and compared to 60 normotensive control patients. The measurement number of the inclusion criteria was 70.

Results: The ages were 48.2 ± 18.7 , 53.4 ± 16.0 and 61.5 ± 13.5 for control, uncomplicated and complicated hypertensive patients, respectively ($p < 0.0001$). Daytime blood pressure were 122.7 ± 7.4 , 147.9 ± 14.3 , 151.2 ± 13.1 ($p = 0.0001$) and daytime standard deviation were 18.9 ± 5.8 , 20.3 ± 6.6 , 19.1 ± 4.8 ($p = 0.0001$). Approximate entropy were 0.47 ± 0.16 , 0.40 ± 0.14 , and 0.41 ± 0.14 ($p = 0.0028$) for control, hypertension, and complicated hypertension, respectively. Approximate entropy was not different between gender (0.41 ± 0.15 vs 0.42 ± 0.14).

Conclusion: Approximate entropy in essential hypertension with or without clinical complication patients is lower than normal patients.

PP.25.32 IMPACT OF WAIST CIRCUMFERENCE AND AGE ON 24 HOUR AMBULATORY BP PROFILE IN NEVER TREATED ESSENTIAL HYPERTENSIVE PATIENTS

M. Crippa¹, S. Camanini², F. Zani¹, R. Costa¹, F. Del Magro², S. Ettori³, F. Lazzari¹. ¹Spedali Civili di Brescia P.O. Gardone Val Trompia- Department of Internal Medicine, Gardone Val Trompia, Italy, ²Università degli Studi di Brescia, Brescia, Italy, ³Azienda Mellino Mellini- Department of Internal Medicine, Chiari, Italy

Background: Age and Waist Circumference are two parameters considered by ESH/ESC Hypertension Guidelines for Cardiovascular risk stratification.

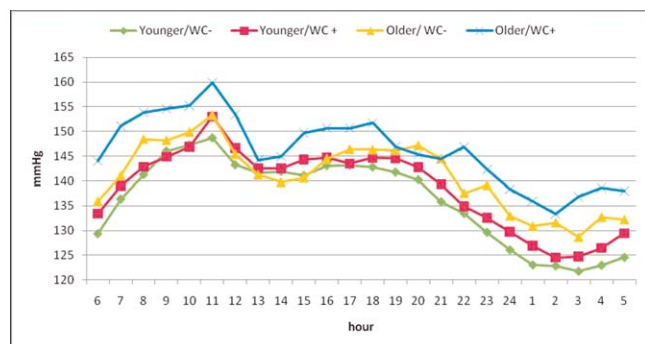
Objective: Determine modification obtained by the association of waist circumference and age (ESH/ESC 2007 Hypertension Guidelines criteria) to ABPM profile in uncomplicated essential hypertensive patients.

Methods: We performed an analysis based on 208 patients (43% women) affected from grade 1 and 2 essential hypertension (mean office blood pressure PAS 151 ± 16.92 mmHg; PAD 96 ± 9.44 mmHg) not in treatment and with no other cardiovascular risk factors consecutively came to our outpatient department.

Measurement of Office Blood Pressure, Waist Circumference and ABPM (Spacelabs 90207) were performed on all subjects.

Patients were divided in 4 groups according to WC ($M < 102$ cm and $W < 88$ cm vs $M > 102$ cm and $W > 88$ cm) associated to age ($M < 55$

ys, $F < 65$ yrs vs $M > 55$ yrs, $F > 65$ yrs) and then was compared the ABPM profile.



Results and Conclusions: ABPM confirmed the diagnosis of Hypertension obtained by Office Blood Pressure (24 hours ABPM mean values: PAS 138.88 ± 11.32 mmHg and/or PAD 87.45 ± 8.91 mmHg).

Age as risk factor determines a higher SBP profile compared to abdominal obesity. Within the same age group abdominal obesity is associated with higher SBP values (figure).

DBP was almost comparable in the 4 groups considered, even if we observed a higher BP reduction in the post-prandium hours in older patients irrespectively of waist circumference.

Dipping pattern was present only in younger patient groups irrespectively of waist circumference (12 mmHg vs 8 mmHg).

PP.25.33 THE NORMALIZED SMOOTHNESS INDEX AND POPULATION RDH INDEX OF LOSARTANE AND TELMISARTANE IN PATIENTS WITH NEWLY DIAGNOSED HYPERTENSION AND METABOLIC SYNDROME

I. Rihacek¹, P. Frana¹, D. Schwarz², M. Plachy¹, M. Soucek¹. ¹University hospital St. Anna and Masaryk university, Brno, Czech Republic, ²Institute of Biostatistics and Analyses at the Faculty of Medicine and the Faculty of Science of the Masaryk University, Brno, Czech Republic

Objective: To determine the normalized smoothness index and the population RDH index of two once daily dosed sartans (losartane, telmisartane) in patients with newly diagnosed hypertension and metabolic syndrome.

Design and Methods: BP measurement using mercury sphygmomanometer and 24-hour ambulatory blood pressure monitoring (SpaceLabs 90207) according to the ESH criteria. Metabolic syndrome and hypertension was defined by ATP III criteria. We evaluated 57 patients in two groups before and after 1 year of treatment with losartane or telmisartane once daily.

The programmer Excel for Windows was used for the statistic evaluation.

Results: Systolic blood pressure (SBP) normalized smoothness index (nSI) of losartane $\pm$ standard error of mean (SEM) was 1.10 ± 0.13 , diastolic blood pressure (DBP) nSI of losartane $\pm$ SEM was 0.81 ± 0.11 .

SBP nSI of telmisartane $\pm$ SEM was 0.96 ± 0.12 , DBP nSI of telmisartane $\pm$ SEM was 0.80 ± 0.12 .

SBP population RDH (RDHp) index of losartane was (24.24.0) and DBP RDHp index of losartane was (24.24.0).

SBP RDHp index of telmisartane was (22.17.2) and DBP RDHp index of telmisartane was (21.15.2).

Conclusions: In our groups of patients once daily administration of losartane have reasonably better homogenous effect on blood pressure throughout 24-hour than telmisartane in patients with metabolic syndrome and newly diagnosed hypertension.

PP.25.34 PREECLAMPSIA AND CHRONIC HYPERTENSION INDUCED CORD UMBILICAL VASCULAR LESIONS

M. Vazquez Blanco¹, H. Ruda Vega², R. Giuliano², D.R. Grana³, M.L. Aon Bertolino³, F. Azzato³, J. Milei³. ¹Dept. Internal Medicine. Hospital de Clinicas Jose de San Martin - Universidad de Buenos Aires, Buenos Aires, Argentina, ²Dept. Obstetrics. Hospital de Clinicas Jose de San Martin - Universidad de Buenos Aires, Buenos Aires, Argentina, ³Instituto de Investigaciones Cardiológicas (ININCA) UBA - CONICET, Buenos Aires, Argentina

Aim: To assess the histological lesions of umbilical cord vessels in patients with preeclampsia and chronic hypertension compared to normal pregnancies

Material and Methods: Samples of umbilical cords 2 cm close to the placental attachment were obtained from 19 normal pregnancies, 9 patients with preeclampsia and 14 with chronic hypertension. Specimens were fixed in buffered formaldehyde, embedded in paraffin, sectioned and stained with hematoxylin and eosin, Masson Tricrhome, acetic orceine for elastic fibers, PAS, Alcian Blue and Mallory phosphotungstic acid hematoxylin.

Results: The prevalence of histological cord alterations (perivascular hemorrhage, vessel thrombosis, Wharton's jelly edema and venous dilatation) was significantly higher in patients with chronic hypertension (85%).

	With alterations 4/9	Perivascular hemorrhage 2/9	Arterial/venous thrombus 0/9	Wharton's jelly edema 1/9	Venous dilation 1/9
Preeclampsia					
Chronic hypertension	11/14*	2/14	5/14	4/14	1/14
Normal pregnancies	4/19	1/19	1/19	1/19	2/19

* $p=0.0016$ vs. normal (Two-sided Fisher's exact test)

Conclusion: According to our results, chronic hypertension patients showed significant vascular lesions (78.5%) in arteries and veins of the umbilical cord, suggesting that these alterations may be considered due to concurrent causes in the wide spectrum of hypertensive alterations in pregnancy.

POSTER SESSIONS

POSTER SESSION 26

CLINICAL ASPECTS 2

PP.26.35 PATHOGENETIC AND CLINICAL PECULIARITIES OF MASKING ARTERIAL HYPERTENSION AT WORKING PLACE

I. Osipova¹, O. Antropova¹, A. Zalzman², E. Vorobyeva¹, K. Golovina¹, T. Belousova². ¹Altai State Medical University, Department of Internal Medicine, Barnaul, Russia, ²Non-State Railroad Hospital, Barnaul, Russia

It is important to measure blood pressure (BP) not only on the doctor's office to estimate severity of arterial hypertension and identification of higher risk in some subjects with normal BP. The term of "ambulatory" or "masking" arterial hypertension (mAH) was inserted. 197 subjects with arterial hypertension at working place (AHwp) and 132 subjects with essential hypertension (EH) were examined. In subject with firstly detected not-treated AHwp office BP and average BP during monitoring at rest was within normal ranks, at working hours average systolic BP (SBP) and diastolic BP (DBP) increased over 6.9% ($p < 0.001$) and 9.6% ($p < 0.001$). Masking AH was revealed, that could be done only by measuring BP at working place. One of the mechanisms of developing AHwp is activating of sympathetic nervous system during stress. According to our data subjects with masking AHwp in comparison with subjects with not-treated EH had higher reactivity to stress-test "Mathematical count" in the form of increasing SBP over 7.9 mmHg ($\delta < 0.001$) and heart rate (HR) over 4.3 bpm ($\delta < 0.001$). Higher stress-reactivity had subjects with family history of early cardiovascular diseases (more SBP increase over 35.0%, $\delta = 0.001$) and with abdominal obesity (more increase of SBP and HR over 33.8% ($\delta = 0.001$) and 25.4% ($\delta = 0.001$). Vasoconstriction is another mechanism of mAH developing. In subjects with AHwp average SBP was comparable with SBP in subjects with not-treated EH, but average DBP was over 4.1% higher in subjects with AHwp. During a month we controlled office BP and revealed that DBP increasing met twice more frequent than SBP ($p = 0.001$). Subjects with AHwp had lower early pick E over 22.4% ($\delta = 0.001$), higher pick A over 37.1% ($\delta = 0.001$), less A/A over 50% ($\delta = 0.001$). Endothelial dysfunction meet more often over 26.1% ($\chi^2 = 8.0$, $\delta = 0.005$), vasoconstriction of brachial artery at temporary occlusion – often over 30.3% ($\chi^2 = 15.8$, $\delta = 0.001$) in subjects with AHwp. This data may be considered as united pathogenetic mechanism of developing masking AH.

PP.26.36 EFFECTS OF TIME OF ANTIHYPERTENSIVE TREATMENT ON THE AMBULATORY BLOOD PRESSURE PATTERN OF SUBJECTS WITH RESISTANT HYPERTENSION: THE HYGIA PROJECT

M. Dominguez¹, M.T. Rios¹, J.L. Salgado¹, P.A. Callejas¹, P. Eiroa¹, A. Otero², A. Mojon³, J.R. Fernandez³, R.C. Hermida³, Hygia Project Invest.³. ¹Gerencia de Atención Primaria, Vigo, Spain, ²Complejo Hospitalario Universitario, Orense, Spain, ³University of Vigo, Vigo, Spain

Objectives: Subjects with resistant hypertension are at a greater risk for stroke, renal insufficiency, and cardiovascular events than individuals for whom blood pressure (BP) is well controlled by medical therapy. It has been reported that as much as 89% of hypertensive subjects ingest all their antihypertensive medication in the morning. Recent results also indicate that non-dipping is partly related to the absence of homogeneous 24h therapeutic coverage in subjects treated with single morning doses. We investigated the impact of treatment-time on the BP pattern in subjects with resistant hypertension participating in the Hygia Project, designed to evaluate prospectively cardiovascular risk by ambulatory BP monitoring (ABPM) in primary care centers of Northwest Spain.

Methods: We studied 909 subjects with resistant hypertension (547 men), 66.4 ± 11.6 years of age. Among them, 232 subjects were receiving, at the time of evaluation, all their medication on awakening, and 677 were taken at least one antihypertensive drug at bedtime. BP was measured every 20-min from 07:00 to 23:00 h and every 30-min at night for 48 h.

Results: Among subjects receiving all antihypertensive medication on awakening, the prevalence of extreme-dipper, dipper, non-dipper and riser BP patterns were 2.6, 22.4, 50.0 and 25.0%, respectively. The prevalence of patients with sleep-time relative systolic BP decline $< 10\%$ (non-dipping, including rising) was significantly lower among subjects receiving medication at bedtime (66.9; $P = 0.021$), and it was further reduced to 56% when subjects were ingesting all BP-lowering medication at bedtime ($P < 0.001$). The prevalence of a riser pattern was lowest (12%) when subjects were ingesting all drugs at bedtime. No subjects in this later group presented an extreme-dipper pattern.

Conclusions: In subjects with resistant hypertension, pharmacological therapy should take into account when to treat with respect to the rest-activity cycle of each individual patient. Treatment at bedtime is characterized by increased nighttime BP control and a significantly lower prevalence of a non-dipper and mainly riser BP pattern, associated with increased cardiovascular morbidity and mortality.

PP.26.37 COMPLIANCE TO TREATMENT AND QUALITY OF LIFE DURING A LONG-TERM MONOTHERAPY WITH DIURETICS

F. Kasumova, F. Kasumova, R. Mamedova. *The Azerbaijan State Institute of Postgraduate Education of Physicians Named After A.Aliyev, Baku, Azerbaijan*

Purpose: To study influence of thiazid diuretics on compliance to treatment and quality of life (QL) in patients with essential hypertension (EH).

Materials and Methods: Antihypertensive therapy (AT) with diuretics was carried out in 34 men with essential hypertension in the age of 30-59 out of whom 18 received monotherapy with hypothiazid in the dose 12.5–25 mg, and 16 – indapamid (Arifon-retard) in the dose 1.5 mg per day. The treatment lasted for 10 years. Compliance to the treatment was studied by Moriski-Green test, and QL by questionnaire "General Well Being Questionnaire".

Results: Antihypertensive effect (AE) of diuretics during the monotherapy was approximately identical, as with hypothiazid and indapamid. However, during the monotherapy with hypothiazid the level of diastolic arterial tension exceeded the target level of arterial tension (90 mm.hg). Heart reductions frequency was not changed during the treatment. The unequal compliance was observed in the group of hypothiazid and indapamid in favor of the last ($\delta < 0.01$). So, during the monotherapy with hypothiazid, only 27.8% of patients had a satisfactory compliance (3 + 4 points), the other 72.2% had unsatisfactory compliance (< 3 points). When receiving indapamid, 62.5% had positive, 37.5% had negative compliance. As a whole, the compliance to the treatment was unsatisfactory in both groups, so not reached 80%. One of the factors of the unsatisfactory compliance in the receipt of diuretics was a psychological barrier due to possible side effects, fear of dehydration and loss of potassium, as well as the sexual dysfunction noticed in both treatment groups. Changes of QL during the monotherapy with diuretics were reducing of complaints, increase of working capacities, especially when receiving indapamid.

Conclusions: Long-term AT with diuretics provides satisfactory AE. Thus, the QL is a little improved, in most cases during a monotherapy with indapamid, however compliance to the treatment remains unsatisfactory, especially in patients taking hypothiazid.

PP.26.38 HIGH BLOOD PRESSURE SECONDARY OF PLUMB' POISONING

S. Karma, L. Karma, N. Ben Salah. *Department of Emergency, Tunis, Tunisia*

The aim of our study is to do the toxic- investigations if there is heavy metal's professional exposure.

Design and Methods: We reported 16 workers: 13 soldering and 3 mechanics who were regularly followed by a worker's doctor. The clinical symptoms that urge to consult are guidiness, cerebral troubles, singing, polyneuropathy, apathy, hemorrhagic urinate, and general edema. The clinical exam showed that the systolic blood pressure increased in all the cases but the diastolic high blood pressure just in 80% of the cases. The endocrin exam is normal.

The poisoning analysis were perturbed; the plumbism and the plumbury were increased in all cases, the hard sounds, the tomodensitometry exams and the kidney's biopsy said that there were some « sels d'or » on the proximal tube- cells. The hospitalisation was necessary in all cases and the eradication from the professional environment.

Discussion: Kidney's damages after a professional exposition can be complicated by high blood pressure, general edema, kidney's pains, high urinary's calciury, high urecemia, hematuria and stains. The heavy metals' exposed workers as the plumb or the cadmium can have a kidney's damage as the defect of the proximal go-rounded- tubular which is explained by the affinity of these heavy metals on the epithelial cells and specially the affinity with SH- groups of the proteins.

The entry- door of the plumb is lung or digestive, the plumb accumulate on the blood, on the soft materials and on the bone, realizing the plumb's- triphosphates- groups , the elimination is by kidney or hepatic, the clinical symptoms are the chronic kidney damage and high blood pressure, the poisoning analysis are perturbed, the treatment basing on the: EDTA calcique and the evacuation from the professional environment is necessary.

Conclusion: The Professional exposure to the plumb can go on the kidney's toxicity and as occurrence high blood pressure.

PP.26.39 COMPARISON OF GENERAL CARDIOVASCULAR DISEASE RISK PROFILE WITH FRAMINGHAM CORONARY HEART DISEASE FORMULA IN A DEVELOPING COUNTRY

Y. Chia¹, P. Srinivas². ¹University of Malaya, Kuala Lumpur, Malaysia, ²Gleneagles Hospital, Penang, Malaysia

Background and Aim: Cardiovascular disease (CVD) is the leading cause of death even in developing countries. The Framingham Coronary Heart Disease (CHD) formula only estimates CHD and this may underestimate the total risk due to other CV causes. This paper exams and compares the general CVD risk profile against the Framingham CHD risk score of individuals in a developing country.

Methods: An epidemiological survey of a semi-rural community was conducted. Subjects aged 55 years and above were selected by attendance at a free health screening service in the community.

A standardized questionnaire was applied by interview. History of diabetes, smoking, hypertension were captured. Blood pressure was measured using a standardised mercury sphygmomanometer. Serum lipids were also measured. The Framingham CHD Risk Score based on total cholesterol was used as a measure of CHD risk and the general CV Risk formula from the Framingham Heart Study was used for total CVD risk. Separate charts were used for men and women.

Results: 1417 subjects participated. The response rate was 56%. A follow-up survey of the non-responders did not show any differences from the initial responders in any systematic way.

The mean age of the subjects was 65.4 years, 53% were men. 34.9% were current smokers, 10.7% reported diabetes, 52.3% had BP>140/90mmHg, 69.1% had total cholesterol >5.2 mmol/l,

The mean 10 year CHD risk was 20–25% and 11–13% for men and women respectively. The mean general 10 year CVD risk was >30% and 14–16% for men and women respectively. The distribution of the different risk categories changed from 14.9% to 11.8% for low, 48.5 to 24.5% for medium and 36.6 to 63.7% for high risk based on the CHD and CVD scores respectively.

Conclusion: The general CVD risk score is able to identify more people at higher risk for other CV events rather than for just CHD alone. As such the general CVD profile risk estimation may be a better tool for identifying those at CVD risk.

PP.26.40 THE QTd INTERVAL ALTERATIONS AND THEIR CLINICAL SIGNIFICANCE IN PATIENTS WITH ESSENTIAL HYPERTENSION

A. Anastassopoulou, M. Papavasileiou, M. Seferou, G. Papadimitriou, K. Giannakopoulos, D. Mytas, S. Karas. *Sismanogleion G.H.A., Athens, Greece*

Aim of the Study: The evaluation of the QT dispersion interval (QTd) alterations, in pts with essential hypertension, and furthermore, the investigation of their possible clinical significance.

Methods: We included 48 outpts (23 men, 25 women), mean age 52 ± 7.5 yrs, with first diagnosed essential hypertension. All pts underwent: a) a surface 12-lead ECG (paper speed 50 mm/sec), for the calculation of QT corrected interval (QTc) according to Bazet's formula, followed by the calculation of QTd (QTcmax-QTcmin), by two independent investigators, and b) a M-Mode echocardiogram, for the definition of the presence (LVH+) or not (LVH-) of Left Ventricular Hypertrophy (LVH), defined by the Left Ventricular Mass Index, and by the relative Left Ventricular Wall Thickness.

Results: According to gender, and to the presence or not of LVH, our results are presented in table 1.

	LVH(+)	LVH(-)
QTd Men	78.125 ± 28.77	28.88 ± 9.41
QTd Women	83.295 ± 33.4	38.81 ± 15.36
		$p < 0.01, r = 0.6$
		$p < 0.01, r = 0.7$

Conclusion: In pts with first diagnosed essential hypertension, there is a clear, direct positive relationship between QTd alterations and the presence or not of LVH. For this reason, this marker could be proved useful for the quick first estimation of the presence of LVH, in this group of pts.

PP.26.41 ELDEST AND HIGH BLOOD PRESSURE

S. Karma, L. Karma. *Department of emergency, Tunis, Tunisia*

The aim of our study is to precise the correlation between the age of the patients and the high blood pressure to clear about the predictif factors.

Design and Methods: We report 26 elderly who are declared high blood pressure in the advanced age.

Results: We had 20 men and 16 women with average age about 72 years. These patients were followed for ten years, the blood pressure numbers were raising after 5 or 6 years, the clinical symptoms were giddiness, cerebral troubles, singing and visual blurred the following of patients permit to see that there are psychological and physical factors incriminated on the high blood pressure.

Discussion: The high blood pressure numbers specified of the eldest are characterised by a raising of the systolic number. Many factors are incriminated. The heart's muscle il flooded by the fibrous material that create many troubles concerning the heart's links that become calcareous and create blasts. The lipofuscine is a metabolic which producing the eldest stains that accumulate so that decrease the mitochondries numbers, this reduce of the heart's demand and the effort tolerance. There are many other psychological factors that contribute to increasing blood pressure: as the taking of blood pressure without waiting the repose, strong and calcaleread arteries at the eldest, food diets that increasing artificially the blood pressure, finally the anxiety can contribute to increase blood pressure. If there is doubt, we can do the complementary biological and radiological exams. The treatment of high blood pressure must begin early in any age to reduce the complications, it is based on one medicine and the control of the other factors as the smoking, the obesity, the exces of salt, the treatment must be also regularly followed.

Conclusion: The eldest of heart's muscle, the defect of the artery's elasticity, the psychological factors are the predictif factors of hypertension

PP.26.42 DEPRESSED...HEART AND ARTERIAL HYPERTENSION IN EMERGENCY

A. Ilardi², U. Valentino², M. D'Avino¹, G. Caruso¹, F. Capasso¹, M. Sacco², E. Anastasio¹, R. Muscherà¹, D. Caruso¹. ¹Unit of Arterial Hypertension, Cardarelli Hospital, Naples, Italy, ²Emergency Department, Cardarelli Hospital, Naples, Italy

Objective: In 17–27% of the patients with cardiovascular disease is present a grave depression and just depression is a well-known risk factor for coronaric aduers events.

Materials and Methods: We have examined, indipendently by the motives, the admissions to Urgency Medicine in a narrow time interval (24h). The hypertensive disease has been referred by 33 patients on 57. In 6 cases an hypertensive emergency was diagnosed; in others 27 patients, during the observation time, elevated blood pressure was recorded repeatedly; and in 10 an unstable pressure control was referred in the preceding weeks too. By pharmacological anamnesis transpired that 1/5 among the patients with hypertension assumed antidepressants.

Results: The wide spread of depressive syndromes pushes often the physicians to the prescription of antidepressants, which can interfere with anti-hypertensive treatment. The drugs concerned in this survey, were mainly re-uptake inhibitors of Serotonin (sertraline, paroxetine, escitalopram, citalopram: in order of frequency) and less so (6 cases) one re-uptake inhibitor of Serotonin and Noradrenalin (venlafaxine). In two patients who have been taking the drug for a long period (3 months and 1 year respectively), alteration of homeostasis pressure was presumably increased by the assumption of over-the-counter antitussives drugs, containing desmethylmetoprolol.

Conclusions: The frequent prescription of anti-depressive drugs, especially in patients over 75-year-olds, creates major issues related to the management of home pharmacological therapy, the risk of possible interactions still less accidental overdose. In hypertensive patients these effects could negatively influence the blood pressure test. Thus the necessity to aim for coordinated management of therapeutic interventions to allow, together with the implementation of activity of institutes aimed to study and cure hypertension, to survey the weak points of the prescription process, on which to act in terms of in-depth research and collaboration.

PP.26.43 DYNAMICS OF CATECHOLAMINE METABOLITES IN MILD SALINE LOADING IN PATIENTS WITH RESISTANT HYPERTENSION

I. Emelyanov, N.K. Merkulova, A.O. Konrad. *Almazov Federal Centre of Heart, Blood and Endocrinology - Department of Arterial Hypertension, Saint-Petersburg, Russia*

Objective: Assess changes in metabolites of catecholamines in blood plasma during the test with saline load in patients with resistant hypertension (HT).

Design and Methods: We examined 22 patients (11 males and 11 females) from 44 to 64 yrs (mean age 56.3 ± 6.2 yrs) with resistant (HT) during triple combined antihypertensive therapy. The patients received lisinopril 20 mg/day, amlodipine 10 mg/day and hydrochlorothiazide 25 mg/day, but goal BP was not achieved. The salt loading was performed according to the modified protocol (i.v. infusion of 1000 mL 0.9% saline solution for 1 hour). The Finometer Pro device (Amsterdam, Netherlands) was used for beat-to-beat continuous BP registration. Hourly BP values were analyzed. Plasma metanephrines (MN) and normetanephrines (NMN) concentrations were calculated by chromatographic assay (cation-exchange and TLC) at baseline and immediately after saline infusion. Patients did not take any antihypertensive drugs in the day of testing.

Results: We found the significant BP increase during salt loading from $161.1 \pm 20.0/89.4 \pm 9.2$ to $187.9 \pm 29.1/103.5 \pm 9.3$ mm Hg ($P < 0.0001$). These BP changes accompanied by a marked increase in the plasma concentration of MN (from 0.34 ± 0.05 to 0.55 ± 0.07 nM/L, $P < 0.001$) and NMN (from 0.51 ± 0.12 to 0.92 ± 0.32 nM/L, $P < 0.001$). The reverse dynamics of hemodynamic parameters were explored in 1 hour after the end of saline infusion.

Also, we have identified the close correlation between the amplitude systolic BP during test and the concentration of NMN after saline loading ($R = 0.94$, $P < 0.001$). The similar relationships were found between the degree of growth diastolic BP and NMN at baseline ($R = 0.86$, $P < 0.001$) and NMN at final ($R = 0.79$, $P < 0.001$).

Conclusion: The marked pressor response accompanied the increase level of catecholamine metabolites during saline loading in patients with resistant HT, which may indicate activation of the sympathetic nervous system in this condition.

PP.26.44 PERICARDIAL FAT FOUND BY ECHOCARDIOGRAPHY AS MARKER OF INCREASED CARDIOVASCULAR RISK

A. Frigy, J. Buzogany, O. Szakacs, S.Z. Szoke, E. Carasca. *4th Medical Clinic, Cardiology, Targu-Mures, Romania*

Recent data from the literature indicate a possible role of pericardial fat in the genesis of an increased cardiovascular risk. We evaluated the significance of the presence of anterior pericardial fat found on standard echocardiographic examination in an unselected cardiac patient population.

Methods: The data of 61 patients (39 men, 22 women, mean age 65.5 years) - from 970 consecutive echocardiographic examinations - were reviewed retrospectively. The prevalence of classic cardiovascular risk factors, associated cardiac conditions and relevant laboratory data were collected at each case.

Results: Arterial hypertension and obesity had the higher prevalence, being found each in 77% of the patients. Elevated cholesterol levels were observed

in 52.4% of patients, 49% of them having also hypertriglyceridemia. 16 patients (26%) had diabetes, while 6 patients had impaired fasting glucose. We found an accumulation of three or more major cardiac risk factor in 53% of the patients. Almost half (42.6%) of the cases were diagnosed with left ventricular failure, while ischemic heart disease and valvular pathology were present in 18% and 27% respectively. Systolic function of left ventricle was preserved ($EF > 40\%$) in the majority of the patients (82%), while impaired diastolic function was found in 54% of the cases.

Conclusions: Our data indicate that patients with pericardial fat found by standard echocardiography present an accumulation of cardio-metabolic risk factors and have an increased incidence of structural heart disease with impaired left ventricular function. The presence of pericardial fat could be translated as a marker of increased cardiovascular risk, thus, its mentioning in the echocardiographic report is important.

PP.26.45 COGNITIVE IMPAIRMENT IN TREATED PATIENTS WITH HOME MEASURED BLOOD PRESSURE NOT IN THE RECOMMENDED RANGE

T. Yaneva, R. Tarnovska. *Medical University Sofia, Alexander's Hospital, Cardiology Clinic, Sofia, Bulgaria*

Objective: The process of understanding and early diagnosis of the entire group of disorders under the umbrella term vascular cognitive impairment (CI) (cerebrovascular disease (CVD); multiple cortico-subcortical, silent or strategic infarcts, small vessel disease, as well as Alzheimer's disease pathology with co-existing CVD lesions) is important, because the number of demented people is progressively rising and there is a tendency to progress towards vascular dementia.

The data in this abstract is based on the preliminary results of an ongoing research, which aims to analyze if there is any correlation between home measured blood pressure (HMBP) values and the results from several screening neuropsychological tests (NPTs). The target group is a population of treated Bulgarian hypertensive people on frequently changed therapy, whose BP control was suboptimal.

Design and Methods: During a 3 months' period we selected 152 patients, whose HMBP was not in the recommended range: 44 female (29.1%) and 108 (70.9%) male, mean age 66.88 ± 9.724 years, 24.2% with paroxysmal or chronic atrial fibrillation on anticoagulation therapy. Mean hypertension history was 13.74 ± 11.53 years. The maximal values of HMBP were: systolic (SBP) 194.38 ± 26.00 mmHg and diastolic (DBP) 109.29 ± 16.61 mmHg. The usually registered HMBP values were: SBP 140.8 ± 18.51 mmHg and DBP 86.38 ± 11.59 mmHg. The mean BP was 104.50 ± 12.79 mmHg and mean pulse pressure 54.48 ± 13.52 mmHg. We used a battery of screening NPTs: a standardized Mini Mental State Examination (MMSE) test (26.82 ± 3.132), the more specific for early CI Montreal Cognitive assessment (MoCA), translated and validated in Bulgarian for the first time (23.51 ± 3.839) and Hachinski Ischemic Score, used to differ cases with vascular from those with non-vascular CI.

Results: Correlation analysis indicates that there is a correlation between the values of HMBP and the results from sensitive screening NPTs (namely MoCA).

Conclusion: These results suggest that the use of highly sensitive NPTs in clinical practice might be useful in early diagnosis of CI in hypertensive patients with suboptimal HMBP control.

PP.26.46 CORRELATION BETWEEN FILLING PATTERN AND COMPLICATIONS DURING THE FIRST WEEK AFTER ACUTE MYOCARDIAL INFARCTION IN HYPERTENSIVE PATIENTS

R. Musetescu¹, D. Toader¹, A. Musetescu², D.D. Ionescu¹. ¹Craiova Cardiology Center, Craiova, Romania, ²University of Medicine and Pharmacy Craiova, Craiova, Romania

Background: An increased filling pressure is revealed by a severe diastolic dysfunction, associated with a large acute myocardial infarction (AMI) and the risk of acute complications. Aim of the study was to find a correlation between the pattern of diastolic mitral inflow and the complications during the first week after AMI in hypertensive patients.

Methods: A number of 98 hypertensive patients (56 males and 43 females) aged 36 - 82 years, admitted with acute myocardial infarction with ST-segment elevation were evaluated in the first week of hospitalization by: clinical examination: angina, heart failure symptoms, 12 lead standard ECG, Holter: the presence of arrhythmias, echocardiographic measurement of diastolic mitral inflow using Doppler method, the presence of complications:

left ventricular aneurysm, left ventricular thrombus, rupture of interventricular septum, using transthoracic echocardiography. Patients were divided in 4 groups: 1. LVH+ and reperfusion 2. LVH+ without reperfusion 3. LVH- and reperfusion 4. LVH- without reperfusion.

Results: 1. LVH was found in 67 patients (68,36%). 2. Failed reperfusion was present in 16,33% patients with LVH and 36,73% in patients with LVH which matched not criterias for thrombolitic therapy administration. 3. In hypertensive patients with LVH and without successful reperfusion pseudonormal pattern was found in 10,20% and restrictive pattern in 10,20% percentage. 4. Complications during the first week were more frequent in patients with pseudonormal pattern: angina: 55%, pericarditis: 20%, heart failure classes NYHA III and IV: 80%, aneurysm: 25%, thrombus: 5%, atrial fibrillation: 25% and restrictive pattern: angina: 57,14%, pericarditis: 50%, heart failure classes NYHA III and IV: 100%, aneurysm: 42,85%, thrombus: 35,71%, rupture of interventricular septum: 7,14%, atrial fibrillation: 71,42%. Conclusions 1. The most severe patterns of diastolic dysfunction such as pseudonormal and restrictive were present in hypertensive patients with LVH and without successful reperfusion. 2. In these patients complications during the first week of hospitalization were more frequent. 3. We can conclude that an increased filling pressure revealed by a severe diastolic disfunction were associated with short term complications after AMI.

PP.26.47 INFLUENCING FACTORS FOR CHOOSING A SINGLE OR A TWO-DRUG THERAPY IN HYPERTENSIVE PATIENTS UNCONTROLLED AND UNTREATED: REFLEXE STUDY

B. Fiquet¹, S. Quere¹, A. Francillon¹, M. Galinier². ¹Novartis Pharma SAS, Clinical Research and Development, Rueil-Malmaison, France, ²CHU Rangueil, Cardiology department, Toulouse, France

To assess influencing factors for choosing a single or a two-drug therapy in uncontrolled and untreated hypertensive patients (pts) (BP $\geq 140/90$ for non diabetic (DB) and BP $\geq 130/80$ mmHg for DB pts).

French cross sectional study conducted with 1048 GPs and 155 cardiologists in 2008. Each physician included the first 5 consecutive hypertensive pts according to above inclusion criteria. Three treatment approaches were assessed: lifestyle and diet recommendations without treatment (LD), implementation of a single drug antihypertensive treatment (SD) or prescription of two antihypertensive agents (TD).

Univariate and multivariate analysis (logistic model) were performed to determine factors which could influence the choice between the SD and TD therapeutic options.

5965 pts were included. Mean age was 58 ± 12 years (y) and 59% were men. Mean duration of hypertension (HTN) was 1.9 ± 3 y. Mean BP was $160 \pm 12/93 \pm 8$ mmHg. 17% of pts were diabetic. The following therapeutic approaches were chosen: LD 491 pts (8.2%), SD 4031 pts (67.6%) and TD 1443 pts (24.2%).

In the univariate analysis, age, male gender, duration and severity of HTN, most of the associated cardiovascular risk factors (CVRF) (DB, dyslipidemia, obesity, alcohol abuse and sedentarity) and diseases (coronary heart disease [CHD], lower limb arteriopathy [LLA], history of stroke or transient ischaemic attack [TIA], renal failure and proteinuria), and ABPM were predictive for deciding to treat a pt immediately with a two-drug therapy. In the multivariate analysis, the Odds-Ratio for the TD decision compared to SD decision was 1.24 [1.08–1.43] for male gender, 2.12 [1.79–2.51] for DB, 1.31 [1.14–1.51] for dyslipidemia, 1.46 [1.24–1.71] for obesity, 3.29 [2.65–4.08] for HTN severity, 5.99 [4.98–7.25] for HTN ≥ 5 y versus < 1 y, 1.75 [1.33–2.29] for CHD, 1.71 [1.32–2.21] for LLA, 1.85 [1.21–2.84] for proteinuria, 1.86 [1.34–2.56] for history of stroke or TIA and 1.41 [1.18–1.67] for ABPM.

Physicians tend to initiate a two-drug antihypertensive therapy immediately in the more severe hypertensive pts with other cardiovascular risk factors and diseases.

PP.26.48 PARADOXICAL POSITIVE RELATION BETWEEN VITAMIN D3 AND BLOOD PRESSURE MAY DEPEND ON PATIENTS' FUNCTIONAL STATUS

J. Gasowski, A. Skalska, T. Grodzicki. Jagiellonian University, Department of Internal Medicine and Gerontology, Krakow, Poland

Background: Low levels of vitamin D have been associated with higher blood pressures.

Objective: In a cross-sectional setting to check the associations between blood pressure and measures of calcium homeostasis such as: intact PTH, log vitamin D, serum calcium; in the context of patients' ability to cope.

Methods: We analysed consecutive elderly patients who were hospitalised, or were living in an institution, in whom we assessed calcium homeostasis, measured blood pressures conventionally and assessed their ability to cope. As measure of dependence we used self-reported perception of being dependent on help from third parties.

Results: The mean (SD) age of 140 subjects (32.9% male) included was 79.6 (7.0) years. The systolic (SBP), diastolic (DBP) pulse (PP) and mean (MBP) blood pressure averaged as follows: SBP 138.2 (27.6) mm Hg, DBP 78.3 (14.5) mm Hg, PP 59.9 (18.8) mm Hg, and MBP 98.2 (17.8) mm Hg. Dependence was declared by 37.8% of participants. We found that both serum calcium (2.18 ± 0.13 vs. 2.26 ± 0.11 mmol/L, $p=0.002$) and logVitD ($3.17 \pm SE=0.13$ vs. $3.61 \pm SE=0.10$ nmol/L, $p=0.01$) were greater in individuals free from dependence. In the multiple regression models with blood pressure components modeled as function of age, sex, serum calcium, dependence, log vitamin D, PTH, BMI and the interaction term between log vitamin D and dependence, we found that level of log vitamin D was associated with higher values of all studied blood pressure components (all $p < 0.04$, partial $R^2=2.6-9\%$), and except for PP (p for interaction = 0.07) the effect of vitamin D tended to differ among those individuals who were dependent and those who were independent (all p for negative interaction < 0.01).

Conclusion: Contrary to earlier reports we found that in elderly individuals level of vitamin D is positively associated with levels of blood pressure. This relationship, seems to be less pronounced in patients dependent on others, who tend to have lower values of both vitamin D and serum calcium.

PP.26.49 MEASURES OF FRAILTY AND BLOOD PRESSURE LEVEL IN ELDERLY PATIENTS FOLLOWED IN GERIATRIC TERTIARY CARE CENTRE

A. Skalska, J. Gasowski, T. Grodzicki. Department of Internal Medicine and Gerontology Jagiellonian University Medical College, Kraków, Poland

Background: Although high blood pressure is an established cardiovascular risk factor, there are some data indicating that low blood pressure in the elderly is associated not only with increased risk of stroke, and cardiovascular events but also of cognitive and functional decline.

Objective: To check the association between measures of functional status in the elderly and the level of blood pressure.

Methods: We recorded patients gender, age, and measured body weight and height. In a cross-sectional setting we checked the associations between blood pressure (measured conventionally) and measures of patient's functional status assessed as: mini nutritional assessment (MNA), abbreviated mental test score (AMTS), activities of daily living (ADL) and instrumental activities of daily living (iADL).

Results: The mean (SD) age of 140 subjects (32.9% male) included was 79.6 (7.0) years. The blood pressure averaged as follows: SBP 138.2 (27.6) mm Hg, DBP 78.3 (14.5) mm Hg, PP 59.9 (18.8) mm Hg, and MBP 98.2 (17.8) mm Hg. The average values of respective measures of functional capacity were as follows: MNA 23,16 (3,41), AMTS 7,61 (2,80), ADL 4,65 (1,64) and iADL 18,63 (6,91).

In multiple regression models (see table), after adjustment for sex, age and BMI respective measures of functional capacity were positively, significantly associated with all blood pressure components, with an exception of nutritional assessment which was not significantly associated with blood pressure level when adjusted for BMI.

	MNA (beta±SE)	p	AMTS (beta±SE)	p	ADL (beta±SE)	p	iADL (beta±SE)	p
SBP	1.33±0.68	0.053	3.94±0.76	<0.0001	2.25±1.34	<0.0001	1.98±0.31	<0.0001
DBP	0.41±0.36	0.26	1.40±0.42	0.001	2.62±0.73	0.0004	0.83±0.17	<0.0001
PP	0.92±0.48	0.06	2.54±0.55	<0.0001	3.63±0.98	0.0003	1.15±0.23	<0.0001
MBP	0.71±0.44	0.10	2.43±0.49	<0.0001	3.83±0.86	<0.0001	1.22±0.20	<0.0001

Conclusion: In this cross sectional study of elderly patients, lower blood pressure values were related to poorer functional capacity affecting ability to cope (ADL, iADL), and mental function (AMTS). The relation was borderline insignificant for nutritional status (MNA). This stressed the importance of careful blood pressure lowering which, when extreme, may harm rather than benefit older individuals.

PP.26.50 P-HIRES AHD ECHOCARDIOGRAPHIC PARAMETERS OF DIASTOLIC DYSFUNCTION IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

D. Toader, R. Musetescu, D.D. Ionescu. *Craiova Cardiology Center, Craiova, Romania*

Background: An increased filling pressure in acute phase of myocardial infarction can be identified echocardiography. P-HiRes reveals late atrial potentials (LAP), associated with the risk of reentry arrhythmias. Aim of the study was to find a correlation between echocardiographic parameters of increased filling pressure and the presence of LAP.

Methods: A number of 98 hypertensive patients (56 males and 43 females), admitted with acute myocardial infarction (AMI) with ST-segment elevation were evaluated in the first week by: clinical examination, 12 lead standard ECG, echocardiographic measurements of: left atrium volume index (LAVi) and left ventricle mass index (LVMI), pulmonary artery systolic pressure (PAPs) (transthoracic and Doppler echocardiography), E/E' (tissue Doppler echocardiography), E/vp (colour Mmode) and ar-A (pulmonary venous flow): cut off levels: LAVi>32 ml/m², LVMI>131 g/m² in males and >125 g/m² in females (left ventricular hypertrophy, LVH), PAPs>35mmHg, E/E'>14, E/vp>1,5, ar-A>25ms. Criteria for the presence of LAP were evaluated using P-HiRes were: SAPWD>140ms, RMS(LP20)>3,5 μV, integral of p wave >800 μVs, number of beats 250, filters 25–40 MHz, noise level<0,1 μV (target).

Results: 1. The higher incidence of LAP was found in patients with LVH without reperfusion: 25,51%. 2. Percentages of patients with LVH and without reperfusion which presented filling pressure parameters values higher than cut off levels were: VASi: 26,53%, PAPs: 26,53%, E/E': 15,31%, E/vp:22,45%, ar-A: 16,33%. 3. Using chi squared (cs), odd ratio(or) and relative risk (rr) we found significant correlation between the presence of LAP and these parameters: VASi>32 ml/m²: cs = 36,64729, or = 19,28205, rr = 4,96111, E/E'>14: cs = 11,26657, or = 5,677419, rr = 1,866189, E/vp>1,5: cs = 35,39615, or = 0, rr = 0, ar-A>25ms: cs = 14,72762, or = 6,08, rr = 2,016.

Conclusions: 1. The incidence of LAP was higher and echocardiographic parameters of filling pressure were higher than cut off levels in hypertensive patients with LVH without reperfusion. 2. Because of this good correlation between these parameters and the presence of LAP we can conclude that may be a link between increased filling pressure and damage of atrial myocardium which may lead to reentry arrhythmias in hypertensive patients with AMI.

PP.26.51 ECHOCARDIOGRAPHIC PARAMETERS OF FILLING PRESSURE IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

D. Toader, R. Musetescu, D.D. Ionescu. *Craiova Cardiology Center, Craiova, Romania*

Background: Before acute myocardial infarction (AMI), hypertensive patients has high filling pressure in left ventricle which is supplementary rised during the infarction by the areas of necrosis and ischemia. Aims of the study: was to evaluate echocardiographic parameters of diastolic dysfunction in hypertensive patients during the first week after AMI.

Methods: A number of 98 hypertensive patients (56 males and 43 females), admitted with acute myocardial infarction with ST-segment elevation were evaluated in the first week by: clinical examination, 12 lead standard ECG, echocardiographic measurements of: left atrium volume index (LAVi) and left ventricle mass index (LVMI) using transthoracic echocardiography, pulmonary artery systolic pressure (PAPs) using Doppler echocardiography for tricuspid inflow, E/E', E/vp and ar-A, using Doppler echocardiography for mitral inflow (E wave velocity, A wave duration), tissue Doppler echocardiography at lateral and medial corner of mitral annulus (E' wave velocity), colour Mmode (flow propagation velocity vp) and pulmonary venous flow (ar wave duration): cut off levels: LAVi>32 ml/m², LVMI>131 g/m² in males and >125 g/m² in females (left ventricular hypertrophy, LVH), PAPs>35mmHg, E/E'>14, E/vp>1,5, ar-A>25ms. Patients were divided in 4 groups: 1. LVH+ and reperfusion 2. LVH+ without reperfusion 3. LVH- and reperfusion 4. LVH- without reperfusion.

Results: 1. LVH was found in 67 patients (68,36%). 2. Mean values of parameters of filling pressure in hypertensive patients with LVH and without reperfusion were: VASi: 35,04, p = 0,00007, PAPs: 45,57, p = 0,00122, E/E': 14,81, p = 0,03992, E/vp: 1,99, p = 0,00197, ar-A: 28,79, p = 0,00726. 3. Percentages of patients with LVH and without reperfusion which presented filling pressure parameters values higher than cut off level were: VASi: 26,53%, PAPs: 26,53%, E/E': 15,31%, E/vp:22,45%, ar-A: 16,33%.

Conclusions: 1. In hypertensive patients without or failed thrombolytic therapy all echocardiographic parameters of filling pressure mean values were higher than cut off levels and than in hypertensive patients without LVH and with successful medical reperfusion. 2. The highest mean values were found in hypertensive patients with LVH and without reperfusion, which theoretical had the highest values of left ventricle filling pressure.

PP.26.52 LEFT VENTRICULAR REMODELING AND ARRHYTHMOGENIC POTENTIAL IN ARTERIAL HYPERTENSION

E. Rebeko, A. Mrochek. *Republic Scientific and Practical Center Cardiology, Minsk, Belarus*

Objective: To determine the rate of cardiac arrhythmias in hypertensive patients subject to left ventricular remodeling pattern (LVRP) in the absence of coronary artery disease.

Design and Methods: The study cohort consisted of 79 patients with proved essential hypertension. The average age of patients was 50,2 ± 10,6 years. All patients were studied using mono- and two-dimensional echocardiography, 24-h dynamic Holter monitoring and exercise ECG testing in order to exclude coronary artery disease. Subject to LVRP the patients were divided into four groups. The first group (n = 5) consisted of the patients with normal geometry; the second group (n = 9) included the patients with concentric remodeling; the third group (n = 45) involved the patients with concentric left ventricular hypertrophy (LVH); the fourth group (n = 20) embraced the patients with eccentric LVH. Ventricular arrhythmias were categorized according to Lown-Wolf classification.

Results: The average number (median) of premature atrial contractions (PAC) per hour was 0,4 ± 0,44 (0,29) in the first group; 2,15 ± 5,0 (0,25) in the second group; 13 ± 61,9 (2,2) in the third group and 12,4 ± 27,3 (3,1) in the fourth group. The frequency of PAC was different in the groups (p = 0,0038). The third group patient PAC occurred more frequently than the same in the first (δ = 0,01) and in the second group (δ = 0,02). The frequency of complex atrial arrhythmias (atrial couplets and runs of supraventricular tachycardia) was not different (p = 0,46; δ = 0,39).

Average number (median) of ventricular premature complexes (VPC) per hour was 0,04 ± 0,05 (0,04) in the first group; 0,02 ± 0,03 (0) in the second group; 8 ± 21,8 (0,1) in the third group and 12,4 ± 27,3 (3,1) in the fourth group. The obtained data indicated intergroup differences in VPC frequency (p = 0,004). The third group patient VPC occurred more frequently than the same in the second group (p = 0,0007) and the fourth group patients as compared to the second group (δ = 0,01). There were no intergroup differences in high gradation ventricular arrhythmias frequency (p = 0,08).

Conclusions: The highest arrhythmogenic potential is detected in hypertensive patients with concentric and eccentric LVH.

PP.26.53 RELATIONSHIP BETWEEN PARAMETERS OF 24-HOURS BLOOD PRESSURE MONITORING AND ECHOCARDIOGRAPHY PARAMETERS AT BASELINE AND UNDER INDAPAMIDE OR ENALAPRIL THERAPY IN HYPERTENSIVE PATIENTS

M. Kolodina¹, V. Mordovin², S. Pekarski², E. Kosmacheva¹, I. Shelestova¹.
¹*Ochapoysky Regional Clinical Hospital 1, Krasnodar, Russia*, ²*Research Institute of Cardiology, Tomsk, Russia*

The aim of the present study was to investigate the relationship between parameters of 24-hours BP (24-h ABPM) and parameters of echocardiography at baseline and in course of the treatment with indapamid or enalapril.

Design and Method: 64 patients: 33 male, 31 female, mean age - 48 ± 6,6 years, mean duration of hypertension 10,4 ± 8,6 years were randomized to treatment with either indapamid (32 patients, arifon-retard, Servier, France; 1,5 mg per day) or enalapril (32 patients, ednyt, Gedeon Richter, Hungary; 5–20 mg per day) during 24 weeks. Echocardiography ("Ultramark-9 HDI CV", USA), and 24-hours ABPM ("SpaceLabs Medical" 90207 (USA)) were performed at baseline and in course of the treatment.

Results: Left ventricular hypertrophy was observed in 33 (51,5%) patients with arterial hypertension. The 24-hour systolic blood pressure (24-h SBP) was positively related to the left ventricular mass (LVM, g) (r = 0,326; p = 0,009) and left ventricular mass index (LVMI, g/m²) (r = 0,313; p = 0,01); 24-hour diastolic blood pressure (24-h DBP) and LVMI (r = 0,267; p = 0,03). Variability of 24-h DBP (r = 0,247; p = 0,050) and variability of day DBP (r = 0,255; p = 0,04) was positively related to the LVMI.

Indapamid reduced significantly 24-h SBP (147.1 to 132.6; $p < 0.001$), 24-h DBP (93.3 to 84.6; $p < 0.001$); time-index 24-h SBP (79.7 to 41.9; $p < 0.001$) and time-index 24-h DBP (71.3 to 38.3; $p < 0.001$). Enalapril reduced significantly 24-h SBP (149.3 to 135.3; $p < 0.001$), 24-h DBP (93.6 to 85.2; $p < 0.001$), time-index 24-h SBP (82.1 to 49.1; $p < 0.001$) and time-index 24-h DBP (66.6 to 41.6; $p < 0.001$).

Indapamid reduced significantly LVM (137.2 to 129.8 g; $p = 0.041$) and LVMI (121.3 to 115.0 g/m²; $p = 0.039$). Monotherapy of enalapril was no significant dynamic of LVM (149.9 to 146.7 g; $p = 0.570$) and LVMI (131.9 to 129.3 g/m²; $p = 0.614$). The degree of decrease the SBP and DBP was identical in both groups.

Conclusions: Left ventricular hypertrophy was related with parameters of 24-h. Therapy of indapamide was more effective than enalapril to decrease of LVMI in hypertensive patients.

PP.26.54 IMPACT OF HYPERTENSION, AGE AND GENDER ON ATHEROSCLEROSIS OF THE DESCENDING AORTA

H. Jaagus, S. Sildmäe, A. Hedman, M. Kadarik, H. Kaljusaar, S. Masik, S. Pilv, T. Uettoa. *East Tallinn Central Hospital, Tallinn, Estonia*

Previous studies have shown that the presence of atherosclerotic aortic plaques (AP) is a common independent predictor of coronary artery disease (CAD). Some authors have reported that the majority of AP is located in the descending aorta (DA). Hypertension (HTN) is a known risk factor for atherosclerosis.

The aim of this retrospective study was to determine the relationship between HTN, age, sex and AP prevalence using transoesophageal echocardiography (TEE).

502 in-hospital and ambulatory patients (263 men, 236 women, mean age 61 ± 14 years (range 30–91) underwent routine multiplane TEE for different clinical indications (exclusion of intracardial thrombus in patients with atrial fibrillation (AF, 43 %), septal defects, to assess structure and function of heart valves etc.) Depending on intima-media burden patients were divided into 2 groups:

Group 1: normal intima or minor thickening; Group 2: DA intimal thickening < 2 –5 mm with lumen irregularities, intima thickening > 5 mm, simple AP or multiple AP protruding into the lumen, with ulceration or mobile parts.

Results: HTN was present in 60% of patients. AP in DA was present in 59% of patients. HTN was 4 times more prevalent in Group 2. Prevalence of CAD in HTN may be underestimated; because nearly half of the patients had not undergone coronary angiography due to the lack of indication for that procedure. AF was more closely related to HTN than to AP. AF was very prevalent condition in HTN (73%). Details are shown in Table

	Group 1 men (n=106)	Group 2 men (n=160)	p-value*	Group 1 women (n=100)	Group 2 women (n=136)	p-value*
Mean age $\pm$ SD	52.9 $\pm$ 13	66.5 $\pm$ 11	ns	50.8 $\pm$ 14	69.5 $\pm$ 10	ns
HTN (%)	21	90	< 0.01	16	88	< 0.01
CAD (%)	9	50	< 0.01	6	38	< 0.01
AF (%)	44	59	ns	24	51	< 0.05

*Comparison between Group 1 and 2

Conclusion: AP in DA was seen in over a half of patients. Prevalence of AP increased with age and was independent of gender. HTN was associated with increased aortic atherosclerosis. Our data show the importance of the assessment of structural changes on DA during TEE in order to detect subclinical atherosclerosis in HTN.

PP.26.55 INVESTIGATING THE CRITICAL SITUATION IN HYPERTENSION MANAGEMENT: DISPARITIES BETWEEN THE PERCEPTION AND REALITY OF THE BURDEN OF 'CHALLENGING PATIENTS' (SHARE SURVEY)

R. Kreutz¹, C. Ferri², M. Boehm³, H. Brunner⁴, S. Erdine⁵, R. Kolloch⁶, S. Laurent⁷, A. Persu⁸, J. Redon⁹, R. Schmieder¹⁰, W. Koch¹¹. ¹Charité Universitätsmedizin, Berlin Institut für Klinische Pharmakologie, Berlin, Germany, ²Università di L'Aquila, Facoltà di Medicina e Chirurgia, Dipartimento di Medicina Interna e Sanità Pubblica, L'Aquila, Italy, ³Universitätsklinikum des Saarlandes, Klinik für Innere Medizin III, Homburg/Saarland, Germany, ⁴Université Vaudoise, Centre

Hospitalier, Lausanne, Switzerland, ⁵Cerrahpaşa Medical School, University of Istanbul, Department of Cardiology, Istanbul, Turkey, ⁶Evangelisches Krankenhaus Bielefeld, Klinik für Innere Medizin, Kardiologie, Nephrologie und Pneumologie, Bielefeld, Germany, ⁷European Hospital Georges Pompidou, Paris Descartes University, Department of Pharmacology and INSERM U970, Paris, France, ⁸Cliniques Universitaires Saint Luc (UCL), Department of Cardiology, Brussels, Belgium, ⁹University of Valencia, Hospital Clínico, Internal Medicine, Hypertension Clinic, Valencia, Spain, ¹⁰Friedrich Alexander Universität, Department of Nephrology and Hypertension, Erlangen, Germany, ¹¹HaaPACS GmbH, Schriesheim, Germany

Objectives: A 'Challenging Patient' is defined as any patient not reaching goal blood pressure (BP) with a minimum target of $< 140/90$ mmHg. The aims of this analysis were to i) compare physicians' perceptions about the proportion of their patients who are not attaining ESH–ESC recommended BP goals with their perception about the proportion of patients who are 'Challenging Patients', and ii) to assess the real resource burden of 'Challenging Patients' in terms of the time between examinations.

Design and Methods: 2629 physicians from across Europe and from a wide range of specialties (including primary and secondary care) completed the interactive Supporting Hypertension Awareness and Research Europe-wide (SHARE) survey. This survey aimed to investigate the current situation in hypertension management. T-tests and Chi-Square tests were used to compare responses from office- versus hospital-based physicians.

Results: On average, European physicians thought that 47% of their patients were not attaining recommended ESH–ESC BP targets, however when asked their opinion on what percentage of their patients were 'Challenging Patients' they estimated a much lower value of 34% ($p < 0.0001$). A higher proportion of office- compared with hospital-based physicians aimed to get their 'Challenging Patients' to recommended BP goals (65% versus 38%, respectively). Interestingly, however, a lower proportion of office-based physicians would immediately adjust medication in their 'Challenging Patients' in order to get them to BP goal compared with hospital-based physicians (16% versus 39%, respectively; $p < 0.001$). The majority of physicians (94%) wanted their 'Challenging Patients' to return within 1 month for an examination, while only 41% wanted patients with controlled BP to return within this time-frame (Figure)

Conclusions: The number of 'Challenging Patients' is often underestimated by physicians. 'Challenging Patients' are a greater resource burden and are at increased cardiovascular risk than patients whose BP is controlled, therefore by underestimating the number of 'Challenging Patients', physicians are also underestimating the true extent of the economic and health burden associated with these patients.

PP.26.56 HYPERTENSIVE EMERGENCIES MAY CAUSE NONFATAL CARDIOVASCULAR EVENTS?

C. Andrei¹, D. Mincu¹, O. Dina², I. Gabor², C.J. Sinescu¹. ¹UMF Carol Davila, Bagdasar Emergency Hospital, Bucharest, Romania, ²Sf. Ioan Hospital, Bucearest, Romania

Objectives: The purpose of this study was to determine if there is a relationship between frequency of hypertensive emergencies and the occurrence of nonfatal cardiovascular events in patients with arterial hypertension.

Method: Were included in the study 451 patients hospitalized in the cardiology department between December 2008 and December 2009. Patients were divided into two groups: I - patients with hypertensive emergencies frequently (minimum 2/month) and II - hypertensive patients with seldom emergencies (maximum 1/month). Hypertensive emergencies were represented by: jumps symptomatic blood pressure and hypertensive encephalopathy. Nonfatal cardiovascular events were followed: acute myocardial infarction, stroke, heart failure and arrhythmia. Monitoring of patients was done by means of: hospitalization, outpatient consultations at the cabinet or telephonic. Statistical processing of data was performed with SPSS statistical methods.

Results: In group I, 251 patients were registered, while in group II were 180 patients, 20 patients were excluded due to inability of maintaining coherent links. The average age was 57 ± 12 years. Patients in group I vs. group II were older (59 ± 8 years vs. 54 ± 12 years), more often diabetics (27.5% vs. 18.2%), with the longest history of hypertension (11.7 ± 3.2 years vs. 8.5 ± 2.7 years), with elevated blood pressure less controlled (dietary and therapeutic) ($153 \pm 80/110 \pm 23$ mm Hg vs. $139 \pm 46/97 \pm 32$ mm Hg). There were no statistically significant differences between the two groups in terms of: dyslipidemia, smoking history, BMI, gender distribution. In patients of group I were more frequently recorded arrhythmias (32.1% vs. 27.2%) and the phenomenon of chronic heart failure and acute (36.6% vs. 31.4%). There were no statistically significant differences between the two groups for acute myocardial infarction (7.2% vs. 6.8%) and stroke (9.3% vs. 8.7%).

Conclusion: Hypertensive emergencies occurred more frequently were not a trigger factor in producing nonfatal acute myocardial infarction and stroke.

PP.26.57 INFLUENCE OF NADROPARIN DECREASING ON BLOOD PRESSURE IN HAEMODIALYSED PATIENTS

M. Sain, D. Ljutic, V. Kovacic, J. Radic, I. Jelcic. *Department of Nephrology and Dialysis, Clinical Hospital Center Split, Split, Croatia*

Introduction: Patients receiving chronic haemodialysis (HD), especially diabetics, have an increased risk of arterial hypertension and cardiovascular morbidity. Previous studies were described hypotensive effect of systemic heparin administration. The aim of this study was to assess the impact of decreasing single bolus dose of low molecular weight heparin (LMWH) nadroparin on blood pressure among patients on HD.

Design and Method: Forty patients (18 females), 20 diabetics, mean age 64.95 ± 12.34 years (range 36–84) undergoing intermittent HD for 62.63 ± 53.97 months (range 5–196) were included in this 12-weeks long prospective study. The recommended nadroparin bolus dose was decreased by 25% after 4 weeks, again by 25% after 8 weeks, and maintained 50% lower doses for 4 weeks. The blood pressure was measured at the beginning of each HD. The efficacy and safety of LMWH were assessed by dialysis system clotting and the dose of LMWH was respectively changed.

Results: Overall, there was difference between the first and the last LMWH dose but not between the first and the last predialysis blood pressure parameters (Table 1.). In the subgroup of diabetics the differences in the first and the last predialysis systolic and PP were found (Table 2.).

Conclusion: This trial demonstrated the influence of lowering nadroparin doses on blood pressure in HD patients. The significant decreasing of LMWH level led to paradoxically decreasing in systolic and pulse pressure only in diabetics on chronic haemodialysis.

Table 1. Differences among total number of subjects (Student's t test for dependent data).

	first HD arithmetic mean±standard deviation	last HD arithmetic mean±standard deviation	significance
nadroparin (IU/kg/HD)	52.47±15.04	33.84±12.64	<0.001
preHD systolic blood pressure (mmHg)	131.05±25.58	125.92±25.49	0.133
preHD diastolic blood pressure (mmHg)	73.82±11.82	72.89±9.13	0.653
preHD mean arterial pressure (mmHg)	92.89±14.79	90.57±13.12	0.301
preHD pulse pressure (mmHg)	57.24±20.39	53.03±21.20	0.121

Table 2. Differences among diabetic subjects (Student's t test for dependent data).

	first HD arithmetic mean±standard deviation	last HD arithmetic mean±standard deviation	significance
nadroparin (IU/kg/HD)	50.08±13.21	31.12±13.59	<0.001
preHD systolic blood pressure (mmHg)	134.00±28.13	126.00±26.54	0.020
preHD diastolic blood pressure (mmHg)	74.25±9.90	73.00±7.50	0.278
preHD mean arterial pressure (mmHg)	94.17±14.97	90.87±12.12	0.060
preHD pulse pressure (mmHg)	59.75±21.73	53.00±23.75	0.081

PP.26.58 P WAVE DISPERSION AND DIASTOLIC DYSFUNCTION IN HYPERTENSIVE PATIENTS

I. Donoiu¹, O.D. Dracea², R.I. Radu², A. Giuca², D.D. Ionescu¹. ¹*Craiova University of Medicine and Pharmacy - Department of Cardiology, Craiova, Romania*, ²*Craiova Cardiology Center, Craiova, Romania*

Purpose: We investigated the relationship between P wave dispersion, as measured on the surface electrocardiogram, and left ventricular diastolic function, in a group of hypertensive patients.

Methods: We included 86 patients (52 males, aged between 35–67 years). We excluded patients with previous acute myocardial infarction, thyroid dysfunction, valvular heart disease, cardiomyopathy, electrolyte imbalance, drug use that affects atrial conduction, or alcohol use. P wave dispersions were calculated by measuring minimum and maximum P wave duration values on the surface electrocardiogram. By standard transthoracic echocardiography we investigated the presence and degree of diastolic dysfunction, classified as: stage 1 - prolonged relaxation pattern, stage 2 - pseudonormalization pattern, and stage 3 - restrictive pattern.

There were 47 patients with diastolic dysfunction and 39 without. The relationships between P wave dispersion and echocardiographic measurements of diastolic dysfunction were analyzed.

Results: P wave dispersion was 62 ± 12 ms in patients with diastolic dysfunction and 49 ± 10 ms in those without ($p < 0.01$). The maximum P wave duration was 118 ± 9 ms in patients with diastolic dysfunction vs 107 ± 8 ms in the control group ($p < 0.05$). The minimum P wave duration was 64 ± 11 ms vs 63 ± 10 ms (not significant). When patients were grouped according to the stage of diastolic dysfunction, P wave dispersion was 52 ± 8 ms in stage 1, 58 ± 9 ms in stage 2, and 64 ± 13 ms in stage 3. As the severity of diastolic dysfunction increased, P wave dispersion increased, the difference was statistically significant ($p < 0.05$).

Conclusion: P wave dispersion is increased in hypertensive patients with diastolic dysfunction, and this increase is related to the severity of diastolic dysfunction.

PP.26.59 MAGNESIUM AND POTASSIUM STATUS AND RENAL FUNCTION UNDER ALISKIREN THERAPY

K. Kisters¹, B. Gremmler², M.Q. Nguyen³, F. Tokmak³, M. Hausberg⁴. ¹*Med. Klinik I, Herne, Germany*, ²*Cardiology, Bottrop, Germany*, ³*Nephrology, Herne, Germany*, ⁴*Nephrology, Karlsruhe, Germany*

Lowered Mg++ stores in humans seem to be involved in the pathogenesis of essential hypertension. However, some antihypertensive drugs (e.g. in particular diuretics) can additionally decrease plasma or intracellular Mg++ + stores. In this context the role of the new antihypertensive renin inhibitor aliskiren has not been studied in detail. In our study, presented here, 8 essential hypertensive patients were treated with the renin inhibitor aliskiren (Rasilez or Rasilez/HCT). In each patient plasma Mg++ concentrations were studied before and under therapy (4.2 +/-1.5 months).

The results showed no significant difference in plasma Mg++ and K+ concentrations in essential hypertensives before and under treatment with aliskiren. The plasma Mg++ concentrations of 8 essential hypertensive patients before and under therapy with aliskiren was not found significantly different (0.92 ± 0.04 versus 0.91 ± 0.05 mmol/l). There was a significant effect on lowering blood pressure in all patients (systolic blood pressure decreased from 149.3 ± 4.4 to 138.3 ± 3.2 mmHg, $p < 0.05$ / diastolic blood pressure decreased from 89.4 ± 3.0 to 85.5 ± 2.4 mmHg, $p < 0.05$).

There was no correlation between plasma Mg++ and K+ concentrations and blood pressure values before and under aliskiren therapy. In addition serum creatinine levels were not found significant different before and under therapy with aliskiren in our study (0.9 ± 0.1 versus 0.91 ± 0.2 mg/dl, n. s.).

In conclusion a therapy with aliskiren concerning Mg++ and K+ handling is safe and reduces blood pressure significantly, in addition renal function was stable in each patient in longterm therapy.

PP.26.60 BLOOD PRESSURE VARIABILITY IN PENELOPE'S SYNDROME

R. Natoli, P. Crescenti, F. D'amico. ¹*Department of Geriatrics, Hospital of Patti, Messina, Italy*, ²*School of Medicine, University of Messina, Messina, Italy*

Objective: This study assessed the prevalence of blood pressure variability in Penelope's Syndrome among hospitalised elderly people. We studied ageing subjects who refused to leave the hospital at dismissal because of social and familiar problems, which provoked an increase in hospitalization's length and costs. Evidence of both physical and emotional symptoms defines the Penelope's Syndrome (F. D'Amico 2006).

Design and Method: 16 elderly people (5 men, 11 women, mean age 78 ± 9) hospitalised in the Geriatric ward for Long-term treatment and with a mean length of hospitalization of 21 days, with blood pressure variability resulting in hypertensive crisis at discharge were studied. The study included: 1) Clinical measurement of blood pressure (BP); 2) Geriatric Depression Scale (GDS); 3) Brief Pain Inventory (BPI). The clinic measurement of blood pressure resulted from the average of 3 measurement taken at 5 minutes intervals. The Geriatric Depression Scale (GDS) was used to assess the anxiety-depression symptoms, so that a score between 0 and 5 is normal, while a score ≥ 6 is significant of depression. To evaluate the quantitative features of pain we used the Brief Pain Inventory multi-dimensional scale (BPI) made of 4 items describing the pain intensity and 7 describing the pain interference.

Results: Depression was found in 48.3% of subjects with a prevalence in women (67.5%; $p < 0.05$), anxiety in 69% with a prevalence in women (82.3%; $p < 0.01$); pain in 57.3% with a prevalence in women (73.7 %; $p < 0.01$). Blood pressure values were: SBP 145 ± 10 mmHG DBP 85 ± 15 mmHg in men ($p < 0.05$), SBP 160 ± 15 mmHG DBP 90 ± 15 women ($p < 0.05$).

Conclusions: In such this group of elderly subjects discharged from the long-term geriatric ward showing evidence of the Penelope's Syndrome we detected a very significant relation between hypertensive crisis and anxiety, pain and feminine gender.

PP.26.61 CLINICAL AND CARDIOVASCULAR RISK PROFILE IN HYPERTENSIVE PATIENTS WITH AORTIC SCLEROSIS

C. Tirziu, E. Duculescu, E. Badila, F. Mehic, D. Bartos. *The Clinical Emergency Hospital, Bucharest, Romania*

Background: Aortic valve sclerosis (AS) without aortic stenosis has been associated with an increase risk of cardiovascular mortality and morbidity. Although some data relates arterial hypertension (AH) being more frequent associated with AS, not all authors agree with this. The aim of our study was to characterise the hypertensive patients who associate AS.

Method: We performed a retrospective study in 92 patients with AS consecutively admitted to The Emergency Hospital from Bucharest during a period of 6 month. The diagnosis of AS and AH was made in accordance with the recommendations of the ESC. For each patient were noted: blood pressure, heart rate, functional (NYHA) class for those with heart failure; echocardiography, ECG and biochemistry was done (glycaemia, creatinine and lipid profile).

Results: Distribution by sex was 55% man, aged between 47 and 90 years old (mean age 72).

We found not statistical correlation between AS and the presence of AH (Pearson coefficient $r=0.22$), diabetes mellitus ($r=0.02$), dyslipidemia ($r=0.22$), renal failure ($r=0.1$) or the presence of heart failure. We separately tested the subgroup of patients with AH and AS. We found a good correlation between AS and the grade of AH ($r=0.42$ for AS and AH at least grade 2), the presence of heart failure by class NYHA at least grade 2 ($r=0.42$) – with or without systolic dysfunction – and also with echocardiographic diagnosed left ventricular hypertrophy ($r=0.45$).

Conclusions: The presence of AS hasn't been statistical associated with higher prevalence of AH or other traditional cardiovascular risk factors. However, the subgroup of patients who present AS and AH is characterised by a peculiar clinical and functional profile consisting in higher values of blood pressure, more frequent presence of left ventricular hypertrophy and of heart failure. We appreciate that patients with AH and AS represent a subgroup of patient with a high cardiovascular risk which should promote a tighter control of blood pressure and risk factors than in patients with AH and without AS.

PP.26.62 HIGH PREVALENCE OF TARGET ORGAN DAMAGE IN HYPERTENSIVE AND PREHYPERTENSIVE PATIENTS WITH ASSOCIATED CARDIOVASCULAR RISK FACTORS

J. Segura¹, A. De La Sierra², S. Fernandez³, L.M. Ruilope¹, On Behalf of the Idencare Study Investigators. ¹Hypertension Unit, Nephrology Department, Hospital Universitario 12 de Octubre, Madrid, Spain, ²Internal Medicine Department, Hospital Universitario Mutua de Terrassa, Barcelona, Spain, ³Medical Department, Boehringer Ingelheim España, S.A., Barcelona, Spain

The presence of silent target organ damage (TOD) in patients with hypertension is an indicator of cardiovascular disease progression. Hypertension management guidelines therefore recommend the detection of silent TOD in both hypertensive and prehypertensive patients with aggregated cardiovascular risk factors, in order to establish the global risk and apply appropriate therapeutic measures.

This cross-sectional study was designed to estimate the percentage of hypertensive and prehypertensive patients with cardiovascular risk factors who present silent TOD.

The study included 5551 patients (60.2% male, mean age 63.9 ± 12.1 years), with a mean body mass index of $29.6 \pm 5.1 \text{ kg/m}^2$ and a mean waist circumference of $100.9 \pm 13.5 \text{ cm}$. A total of 5243 (94.5%) were hypertensive and 308 (5.5%) were prehypertensive. The mean systolic/diastolic BP values were $146.6 \pm 16.7/85.6 \pm 11.3 \text{ mmHg}$. In total, 47.0% were diabetic, 24.5% presented coronary artery disease, 16.2% heart failure, 8.8% cerebrovascular disease, 13.1% peripheral vascular disease and 20.3% renal impairment.

The prevalence of silent TOD in hypertensive and prehypertensive patients is shown in the table.

	Prehypertensive		Hypertensive	
	N	%	N	%
LVH	31	10.1	2007	38.3
Microalbuminuria	28	30.1	908	39.8
↓GFR	46	16.9	1727	35.4
↑Serum creatinine	17	6.3	526	10.8
IMT>0.9	6	1.9	300	5.7
AAI<0.9	5	1.6	111	2.1
Any TOD	95	30.8	3215	61.3

When classifying the patients according to the number of co-existing TODs, it was found that 50.3% of the hypertensive patients with TOD presented a single TOD, while 31.0% presented two TODs and 18.7% presented three or more. Among the prehypertensive patients with TODs, these percentages were 67.4%, 26.3% and 6.3%, respectively.

Silent TOD in patients with aggregate cardiovascular risk factors shows a high prevalence, particularly as blood pressure levels increase. TOD identification in these patients enabled to identify those with greater cardiovascular risk, potential beneficiaries of a more active therapeutic attitude.

PP.26.63 COMPARATIVE STUDY OF ENALAPRIL, MOEXIPRIL AND FOZINOPRIL INFLUENCE ON BLOOD PRESSURE, BONE MINERAL DENSITY AND MANIFESTATIONS OF MENOPAUSAL SYNDROME IN POSTMENOPAUSAL WOMEN

I. Golovach¹, Z. Mytnyk¹, D.V. Golovach², O.O. Lazorenko¹, S.V. Vershynin². ¹Clinical Hospital Feofania, Department of Rheumatology & Internal Diseases, Kyiv, Ukraine, ²National Medical University, Therapeutic Department, Ivano-Frankivsk, Ukraine

Objective: To study the comparative effect of enalapril, moexipril and fozinopril on the level of blood pressure, course of the menopausal syndrome and characteristics of bone tissue density in women with arterial hypertension in postmenopause.

Design and Methods: 106 women participated in the study; they were divided into 3 comparable groups based on the antihypertensive therapy. The average age of the women was 53.7 ± 1.23 years. Postmenopausal period duration was 3.93 ± 0.67 years. To examine the impact on the course of hypertension, osteoporosis, pathological menopausal syndrome before treatment and after 1, 3, 6 and 12 months of therapy, the dynamics of blood pressure was evaluated with the help of traditional sphygmomanometer during monitoring visits. Before the start of the study and after 12 months, the bone mineral density was determined by DEXA (lumbar spine). Intensity of the menopausal syndrome was assessed with the help of a questionnaire.

Results: Against the background of treatment by enalapril, moexipril and fozinopril, significant reduction in systolic blood pressure was identified within 18–24 days and in diastolic blood pressure closer to the end of the 3rd month. Antihypertensive effect was comparable in all the groups and remained stable throughout the period of observation. Only the group of patients using moexipril demonstrated significant improvement of bone mineral density compared with the group of patients using enalapril ($p < 0.05$) and fozinopril ($p > 0.05$), as well as in comparison with the control group ($p < 0.01$). Moexipril treatment led to a significant decrease of the severity of climacteric disorders in 84.7% and to an improvement of the mental condition. 67.2% of women using fozinopril therapy showed reduction of climacteric symptoms without any influence on their mental status. Enalapril had no effect on the psycho-emotional and vegetative disorders. Conclusion. Moexipril is the drug of choice in the treatment of arterial hypertension in postmenopausal women, as it has a positive effect on bone mass and menopausal disorders.

PP.26.64 BLOOD PRESSURE AND RELATED RISK FACTORS CONTROL IN PATIENTS AFTER CORONARY REVASCULARIZATION - WE CAN DO IT BETTER

N. Roseva-Nielsen, K. Kristensen, T.L. Svendsen. *Holbaek Hospital - department of Cardiology, Holbaek, Denmark*

Objective: To study blood pressure (BP) values and treatment and related risk factors control in patients with coronary heart disease after revascularization with PCI and/or CABG.

Design: An observation study on 190 patients treated with PCI and/or CABG for unstable angina or/and non elevation myocardial infarction aged 18 years and older in the period 1999-2001 with two examinations, that took place in 2002-2003 and 2007.

Methods: Blood pressure was measured with a Mercury sphygmomanometer and by automated electronic device 24-hours at home and clinical history was recorded during the ambulatory visit. Fasting blood tests for lipids and plasma glucose were examined and morning urine was tested for albumin. Uncontrolled BP was defined as BP $\geq 140/90$ mmHg at the office ($\geq 135/85$ mmHg mean daytime at home) in patients with normal value of plasma glucose and as BP $\geq 130/80$ mmHg (resp. $\geq 125/75$ mmHg) in patients with elevated levels of fasting plasma glucose.

Results: Well controlled BP by the first examination was found in 109 patients (N = 190, 57.4%) and in 67 patients (N = 134, 50%) by the second examination respectively according to office BP measurements and according to ambulatory BP measurements respectively in 92 patients (N = 190, 48.4%) and in 79 patients (N = 134, 59%). Blood pressure lowering medication was registered in 160 patients (84.2%, N = 190) and in 116 patients (86.6%, N = 134) by the first and by the second examination respectively. Hypertensives did not achieve better BP regulation despite more medicines. Elder patients were more insufficiently treated.

Conclusion: Very high risk patients with established IHD and treated with OCI or/and CABG are not controlled sufficiently and not medically target treated regarding modifiable risk factors. They should be followed by cardiologists in out patient specialized clinics. Ambulatory BP monitoring should be routinely used to achieve normal BP levels.

PP.26.65 THE RELATIONSHIP BETWEEN THE LEFT ATRIAL VOLUME AND P WAVE DISPERSION IN HYPERTENSIVE PATIENTS

I. Donoiu¹, O.D. Dracea², R.I. Radu², A. Giuca², D.D. Ionescu¹. ¹Craiova University of Medicine and Pharmacy - Department of Cardiology, Craiova, Romania, ²Craiova Cardiology Center, Craiova, Romania

Purpose: A maximum P wave duration (Pmax) of > 110 msec and a P wave dispersion (PWD) > 40 msec are accepted indicators of a disturbance in interatrial conduction and an inhomogeneous propagation of the sinus impulse, respectively. The left atrial (LA) volume is considered to be a marker of atrial remodeling. We aimed to investigate the relationship between LA volume and Pmax or PWD in patients with hypertension.

Methods: We included 52 hypertensive patients in sinus rhythm. We recorded for each patient a 12-lead electrocardiogram with a paper speed of 50 mm/s and an amplification of 20 mm/mV. P wave dispersion (PWD) was defined as the difference between the duration of the widest (Pmax) and the narrowest (Pmin) P wave, measured on all leads of the 12-lead electrocardiogram. Measurements were made by a single investigator, in a blinded fashion, using a computerized program; the onset and offset points of the P wave were marked manually. The study population was classified into four groups, according to the Pmax (≥ 110 ms or < 110 ms), and the PWD (≥ 40 ms or < 40 ms). The left atrial volume (LAV) was measured by transthoracic echocardiography.

Results: There were significant differences in the ejection fraction, diastolic function, and LAV between patients with a Pmax ≥ 110 ms or a PWD ≥ 40 ms and those with a Pmax < 110 ms or a PWD < 40 ms. The LAV was independently associated with a disturbance in interatrial conduction and an inhomogeneous propagation of the sinus impulse. The LAV can be used to identify patients with a disturbance in the propagation of the sinus impulse, which are at risk for atrial fibrillation.

Conclusion: The maximum duration of the P wave and the P wave dispersion on standard 12-lead electrocardiograms are associated with the LAV volume in hypertensive patients.

PP.26.66 EFFECTS OF ALLOPURINOL ON ARTERIAL BLOOD PRESSURE AND PULSE WAVE VELOCITY DEPENDING ON HYPOURICEMIC EFFECT IN TREATED HYPERTENSION

K. Kostka-Jeziorny, P. Uruski, A. Tykarski. Department of Hypertension, Angiology and Internal Diseases, Poznan University of Medical Sciences, Poznan, Poland

Some studies show that allopurinol reduces blood pressure in adolescents with newly diagnosed hypertension, decreases aortic pulse wave velocity (PWV) and improves endothelial function in hypertensives. It was not the case with uricosuric agents. It is possible that there may be an alternative vasoprotective mechanism of allopurinol to its hypouricemic effect.

Objective: To determine effects of allopurinol on arterial blood pressure and pulse wave velocity depending on hypouricemic effect in treated hypertension.

Methods: 66 patients with treated arterial hypertension aged 30 to 70 (mean age 46.17 ± 10.89) have been studied. After 8 weeks of antihypertensive therapy, allopurinol 150mg daily was added for 2 months. Patients are divided in two groups depending on hypouricemic effect. Group A represents stronger hypouricemic effect (median over > 0.84), group B presents poor hypouricemic effect (median ≤ 0.84)

Results: The results are shown in the table.

Conclusion: 1. There were no significant changes in blood pressure after allopurinol treatment regardless of amount of lowering of uric acid. 2. Aortic PWV decreased after allopurinol treatment. It correlated with baseline PWV but did not correlate with hypouricemic effect. However, the tendency to greater PWV improvement in patients with bigger decrease in plasma urate levels was observed.

	Changes (delta) after allopurinol treatment		p (between A B)
	A	B	
SBP	+0,01	+0,78	NS
DBP	+0,43	+0,83	NS
PP	-0,43	-0,04	NS
PWV	-1,06*	-0,77*	NS

PP.26.67 HEART RATE VARIABILITY IN PALLIATIVE PATIENTS - A PILOT STUDY

G. Ernst¹, M. Rostrup². ¹Vestre Viken Hospital, Anesthesiology, Kongsberg, Norway, ²Ullevål University Hospital, Internal Medicine, Oslo, Norway

Objective: Assessing long-term prognosis is still a challenge in palliative patients. Use of scores (eg. PAP) has been proposed, but additional assessment methods are needed. Linear and non-linear measures of heart rate variability (HRV) have been used in cardiology and diabetic patients to assess risk factors for sudden cardiac death. Short-term HRV measurement is a simple bedside technique which can be used on palliative patients without causing stress

Design and Method: A total of 24 cancer patients with a survival prognosis less than 6 months, receiving palliative care, are included in this prospective study. A short-term HRV measurement was performed several times on each patient, depending on survival time. Time domain and frequency domain indices were calculated (SDNN, RMS-SD, HF, LF, VLF, and LF/HF). In addition, approximate entropy (Pincus 1991) was computed as non-linear measurement.

Results: All heart rate variability indices declined nonlinearly during the course of the disease. Approximate entropy also declined. Some patients however had a temporary increase in HRV.

Conclusion: As far as we are aware, this is the first study which has assessed HRV changes in palliative patients. The preliminary results are encouraging. HRV is potentially an interesting bedside tool for the assessment of palliative patients prognosis, but larger studies are needed.

PP.26.68 STROKE, ARTERIAL THROMBOSIS AND HYPERTENSION REVEALING MYELOPROLIFERATIVE DISEASE

D. Hakem, S. Lassouaoui, D. Zemmour, M. Ibrir, A. Boudjelida, M. Boucelma, D. Mesloub, N. Ouadahi, A. Berrah. *Dr Mohammed-Lamine Debaghine, Bab El Oued University Hospital, Algiers, Algeria*

Introduction: Hypertension, Stroke and Arterial Thrombosis can reveal or complicate myeloproliferative diseases. Thrombosis implied multiple mechanisms often intricate (stasis, thrombotic state; compression and/or vascular invasion...). The association myeloproliferative disease and thromboembolism is a well established binomial.

Objectives: To review one case report to illustrate this subject.

Case Report: TNE, 46 years old, tabacoscsmoker (30 packages / year), treated for recent hypertension which is complicated by recurrent transient ischemic events justifying an anti-coagulation is investigated for one occlusion of the primitive left carotid (extended up to the carotid fork). A thrombocytopenia (platelets estimated at 1000 giga) is noted. Biological investigations (glycemia, lipid profile, homocysteinemia, liver tests, thrombophilia tests...) and morphological investigations (ECG, echodoppler heart patients, echodoppler of the lower limb...) are normal. The diagnosis of essential thrombocytopenia is established after exclusion from the other causes of thrombocytopenia and others myeloproliferative diseases. Hydroxyurea stabilizes the rate of platelets. A surgical vascularization is recused.

Discussion: This case report illustrates the difficulty establishing an imputability of the hemopathy in the thrombotic events because of the association to cardiovascular risks factors (smoking, Hypertension...). The age (young) and the hemogram directs to a myeloproliferative disease. The arterial thrombosis is considered in this context 6 times more numerous than the venous thrombosis. The topography, the extensive and the multifocal character of these thrombosis make all the gravity thought the hemopathy. Its imperative to detect them and to treat them prematurely and effectively by an etiologic and specific treatment (medical, surgical, vascular) to improve the prognosis.

PP.26.69 CLINICAL AND ECHOCARDIOGRAPHIC FEATURES IN ALGERIAN AGEING PATIENTS

N. Ali-Tatar Chentir, A. Derradji, M.T. Chentir. *Cardiology Department A1, University Hospital, Algiers, Algeria*

Objective: This study determined the management of Algerian ageing patients enrolled in our out patient clinic (a monocenter, observational and prospective study) to optimise heart failure treatment or to manage a preoperative non cardiac surgery check up.

Design and Method: The population was composed of all subjects older than 75 years presenting in our out-patient clinic from June 2005 to July 2009 and data about clinical history, medications at admission, hypertension, diabetes, tobacco, atrial fibrillation, left ventricular wall thickness, co-morbidities, standard biology and echocardiographic data were collected. An assessment of preserved left ventricular systolic function was given by echocardiographic left ventricular ejection fraction (EF) > 45%.

Results: 198 patients (100 women) mean age 80.3 ± 14 years were enrolled. Hypertension and obesity are more often seen in women than in men (respectively 89% vs. 77% $p < 0.001$ and 35% vs 29% $p < 0.001$) although tobacco is exclusively masculine. Pulse pressure > 50mmHg is more frequent in men (67% vs 55% $p < 0.0001$). Heart Failure is seen in 41% of patients.

Atrial fibrillation is more frequent in women than in men (29% vs 18% $p < 0.01$) probably in relation with the high prevalence of hypertension and obesity in women.

The prevalence of underlying diseases is decreasingly as follow: ischemic (22%); valvular (8%); cardiomyopathies (4.5%).

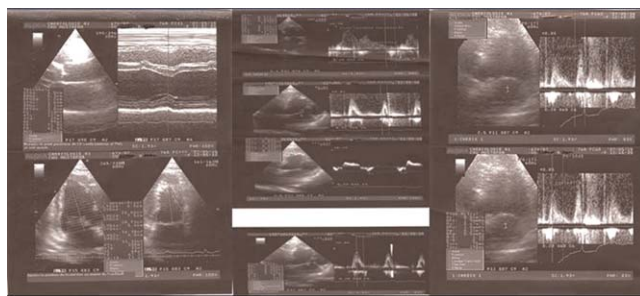
The most frequent co morbidity is chronic pulmonary disease.

Echocardiographic features show more frequent heart failure cases with preserved ejection fraction, left atrium enlargement and pulmonary hypertension in women than in men.

Relaxation pattern with increasing left ventricular filling are more frequent in women (37% vs 21% $p < 0/0001$).

We noted that the patients are undertreated at admission with only one third of them on ACE-Inhibitors or Angiotensin- II- antagonists ; 22% on diuretics; 15% on calcium antagonists and 11% on beta-blockers.

Conclusion: Hypertension and atrial fibrillation appear to be the more frequent disease in seniors after 75 years. Ambulatory medical treatment, particularly ARBs and ICE I should be prescribed more frequently in this population.



PP.26.70 AETIOLOGIES OF YOUNG 'S HYPERTENSION: REVIEW OF 5 CASES REPORTS

S. Lassouaoui¹, D. Hakem¹, A. Boudjelida¹, D. Zemmour¹, S. Fedala-Haddam², L. Stof³, N. Ouadahi¹, B. Mansouri³, A. Berrah¹. ¹Internal Medicine, Dr Mohammed-Lamine Debaghine, University Hospital Of Bab El Oued, Algiers, Algeria, ²Endocrinology, Dr Mohammed-Lamine Debaghine, University Hospital Of Bab El Oued, Algiers, Algeria, ³Imaging, Dr Mohammed-Lamine Debaghine, University Hospital Of Bab El Oued, Algiers, Algeria

Introduction: Young's Hypertension 'YH' reveals numerous diseases as vascular ones (aorta's coarctation, renal artery stenosis), endocrines diseases (hypercorticism, hyperaldosteronism), systemic diseases (Takayashu disease 'TD') etc.. Some ones are considered rare (hyperparathyroidism) and are discovered fortuitly or in dramatic complications (stroke, kidney failure, congestive heart failure, retinal bleedings).

Objectives: To review 5 observations of YH observed in Internal Medicine to illustrate this topic.

Observations:

1. 33 years old men is allowed for suspicion of TD according to association YH and abolition of the femoral pulses. Cardiovascular explorations established diagnosis of a coarctation of the downward aorta.
2. 41 years old woman is investigated for a YH associated with asthenia, paresthesias, hypokaliemia... Biological exploration directs to Conn disease which will be confirmed by morphological data.
3. 45 years old woman is explored for polymyositis. In history she reports insulin-dependent diabetes recently diagnosed and a YH badly balanced under ARA2 treatment. The examination shows clinical signs of hypercorticism. Biological data with dynamic tests will confirm the diagnosis of pituitary basophilism.
4. 40 years old woman is investigated for a YH complicated with an ischemic stroke. Clinical examination discovers a left cervical mass identified with the ultrasound as an adenoma of the parathyroid. Biological and morphological investigations (scintigraphy, MRI) will allow to confirm this diagnosis.
5. 47 years, old man consults for headaches, palpitations and unstable YH. Biological tests shows the rise of VMA and individualize a pheochromocytoma (TDM, scintigraphy MIBG).

The course is favorable after surgical cure for all patients and normalized YH and biological tests (4/5 cases).

Discussion: Endocrines, vascular and systemic's diseases can be of late diagnosis of YH (cases 1 and 3). A good clinical examination (heart, vessels, thyroid, parathyroid, kidney) confronted with biological parameters and morphological simple first-line investigations allow a fast etiologic approach.

Conclusion: YH justify exploration adapted in the clinical and biological context. Its be quickly recognized to propose adequate treatment before the occurrence of fatal visceral complications.

POSTER SESSIONS

POSTER SESSION 27

CLINICAL TRIALS 2

PP.27.71 CAROTID - FEMORAL PULSE WAVE VELOCITY (PWV) AND 48-HOUR AMBULATORY BLOOD PRESSURE IN HEMODIALYSIS PATIENTS

R. Ekart¹, R. Hojs², M. Bernhardt³, S. Bevc¹. ¹University Medical Centre Maribor, Clinic for Internal Medicine, Department of Dialysis, Maribor, Slovenia, ²University Medical Centre Maribor, Clinic for Internal Medicine, Department of Nephrology, Maribor, Slovenia, ³University Medical Centre Maribor, Clinic for Internal Medicine, Department of Cardiology, Maribor, Slovenia

Objectives: Carotid-femoral pulse wave velocity (PWV), a measure of large artery stiffness, is an important predictor of cardiovascular (CV) events in general population and also in hemodialysis (HD) patients. In general population PWV is strongly associated with age and blood pressure (BP), findings with regard to its relation with other risk factors have been inconsistent. The best timing and method of BP measurement in HD patients is still uncertain. Ambulatory blood pressure measurements (ABPM) have been used to better define the relationship between BP, target organ damage, and outcomes in HD patients. The aim of this study was to find out possible association between PWV and 48-hour ABPM in chronic HD patients.

Methods: Thirty three HD patients (22 men, 11 women) were included. Ten (30.3%) patients were habitual smokers and 6 (18.2%) patients were diabetics. Arterial stiffness was estimated on the interdialytic day by PWV, using Complior SP device (Artech Medical, Pantin, France). BP was measured before PWV measurement, 48-hour ABPM were performed after the end of HD session using a non-invasive ABPM monitor (Spacelabs 90207, USA).

Results: Data of included patients are summarized in the table.

RESULTS

VARIABLE	MEAN $\pm$ SD
Age (years)	59.76 $\pm$ 12.69
Time on HD (months)	38.94 $\pm$ 42.9
Systolic BP before PWV measurement (mmHg)	135.61 $\pm$ 14.51
Diastolic BP before PWV measurement (mmHg)	79.09 $\pm$ 9.39
48-hour systolic BP (mmHg)	131 $\pm$ 19.93
48-hour diastolic BP (mmHg)	75.76 $\pm$ 9.54
PWV (m/sec)	8.31 $\pm$ 2.35
Total cholesterol (mmol/L)	4.38 $\pm$ 0.87
LDL Cholesterol (mmol/L)	2.44 $\pm$ 0.76
HDL Cholesterol (mmol/L)	1.18 $\pm$ 0.3
Triglycerides (mmol/L)	1.78 $\pm$ 0.84
Body mass index (kg/m ²)	24.53 $\pm$ 5.0

Using regression analysis no association between PWV and BP before PWV measurements was found. Statistically significant correlation between PWV and 48-hour systolic ($P < 0.002$) and also 48-hour diastolic ABPM ($P < 0.016$) were found. Using multiple regression analysis (including age, sex, smoking, diabetes, body mass index, total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol and triglycerides) 48-hour systolic ($P < 0.001$) and diastolic ABPM ($P < 0.005$) still remain statistically significant associated with PWV.

Conclusion: Only 48-hour ABPM were associated with PWV in HD patients in our study. We found no relation between PWV and other risk factors for CV disease.

PP.27.72 PERINDOPRIL IS EFFECTIVE TO SIGNIFICANTLY LOWER BLOOD PRESSURE IN HYPERTENSIVE PATIENTS UNTREATED OR UNCONTROLLED ON PREVIOUS TREATMENTS: FINDINGS OF THE CONFIDENCE TRIAL

G. Tsoukas¹, S. Anand², K. Yang³. ¹Montreal General Hospital, Montreal, Canada, ²Dr Georges-L. Dumont Regional Hospital, Moncton, Canada, ³University British Columbia, British Columbia, Canada

Aims: To assess the blood pressure (BP) lowering efficacy of perindopril 4 to 8 mg/day (equivalent to perindopril arginine 5 to 10 mg/day) in patients whose hypertension was untreated or uncontrolled despite treatment with other antihypertensive drugs.

Patients and Methods: This is an open-label, multicenter, observational trial conducted in Canadian general practice clinics. Patients ($n = 8208$; age: 59 ± 13.1 years) with uncontrolled hypertension (i.e. seated BP above 140/90 mm Hg or 130/80 mm Hg in the presence of diabetes, renal disease, or proteinuria) were prescribed perindopril 4 mg/day. Patients who were previously receiving other ACE inhibitors (ACEIs) or angiotensin-receptor blockers (ARBs) were switched to perindopril 4 mg/day. At visit 2 (after 14 to 28 days), dosage of perindopril could be increased to 8 mg/day in cases of failure to achieve BP control. Follow-up was over 12 weeks.

Results: Perindopril significantly reduces BP among the overall population and the different subgroups as summarized in the table below. One third of patients required up titration to the high dosage for higher normalization rate. Up titration to 8 mg provided an additional mean 10.1/5.3 mm Hg BP reduction, which was even greater among severely hypertensive patients (15.1/5.7 mm Hg). Switching previous ACE inhibitor or ARB to perindopril resulted in reduced BP by a further 15.5/7.7 and 15.9/8.2 mm Hg, respectively. Perindopril was well tolerated, including when it replaced treatment with other ACEIs or ARBs.

Conclusions: This trial demonstrates that a perindopril-based strategy up titrated to the maximal dose as required for BP control, significantly reduces SBP and DBP in untreated or uncontrolled hypertensive patients irrespective of their previous treatment. These findings, combined with its proven risk reduction in myocardial infarction, stroke, and death, make perindopril an optimal treatment for a wide range of hypertensive patients.

Table: Reduction in BP from baseline to week 12. * $P < 0.001$

	Baseline		12 weeks	
	SBP (mm Hg)	DBP (mm Hg)	SBP (mm Hg)	DBP (mm Hg)
			Reduction from baseline	Reduction from baseline
Overall hypertensive population (n=8298)	152.5 $\pm$ 10.8	89.5 $\pm$ 9.0	134.2 $\pm$ 12.6	79.8 $\pm$ 8.4
			18.5*	9.7*
Diabetic subpopulation (n=2064)	148.9 $\pm$ 11.2	86.1 $\pm$ 8.9	132.4 $\pm$ 12.1	78.1 $\pm$ 8.1
			16.5*	8*
Asian subpopulation (n=1320)	150.0 $\pm$ 11.1	89.4 $\pm$ 8.6	131.8 $\pm$ 12.9	79.7 $\pm$ 8.0
			18.2*	9.7*
Severely hypertensive population (n=666) BP $\geq$ 170/109 mm Hg	178.1 $\pm$ 11.2	97.6 $\pm$ 12.1	141.9 $\pm$ 15.8	82.3 $\pm$ 10.0
			36.2*	15.3*
Switched from ACEIs (n=1340)	149.3 $\pm$ 11.1	86.3 $\pm$ 8.8	133.5 $\pm$ 12.3	78.5 $\pm$ 8.5
			15.5*	7.7*
Switched from ARBs (n=434)	151.9 $\pm$ 11.2	87.5 $\pm$ 9.0	135.5 $\pm$ 12.3	79.3 $\pm$ 8.2
			15.9*	8.2*
Added to beta-blockers (n=639)	153.3 $\pm$ 10.9	87.0 $\pm$ 9.9	135.5 $\pm$ 13.4	78.4 $\pm$ 8.7
			17.7 $\pm$ 14.8*	8.7 $\pm$ 9.8*
Added to calcium channel blocker (n=881)	152.6 $\pm$ 10.5	86.2 $\pm$ 9.8	135.5 $\pm$ 12.8	78.1 $\pm$ 9.2
			17.0 $\pm$ 14.7*	8.2 $\pm$ 10.0*
Added to diuretics (n=1256)	152.2 $\pm$ 10.5	87.5 $\pm$ 9.6	134.7 $\pm$ 12.2	79.0 $\pm$ 8.4
			17.6 $\pm$ 13.7*	8.5 $\pm$ 9.6*

PP.27.73 THE EFFECTS OF SPIRAPRIL ON AMBULATORY PULSE PRESSURE IN ESSENTIAL HYPERTENSION ARE DEPENDENT ON THE CIRCADIAN TIME OF TREATMENT

D.E. Ayala¹, R.C. Hermida¹, L. Chayan², M.J. Fontao¹, A. Mojon¹, J.R. Fernandez¹. ¹University of Vigo, Vigo, Spain, ²Urgencias Sanitarias 061 Galicia, Santiago, Spain

Objectives: Increased pulse pressure (PP) has been identified as an independent marker of cardiovascular risk, mainly for myocardial infarction,

congestive heart failure, and cardiovascular deaths. Moreover, the asleep PP mean obtained from ambulatory blood pressure (BP) monitoring has also been correlated, to a larger degree than the awake PP mean, with markers of cardiovascular risk. So far, scarce attention has been paid to the effects of antihypertensive treatment of PP. Accordingly, we have investigated the administration-time-dependent effects of spirapril on ambulatory PP in hypertensive subjects.

Methods: We studied 165 untreated hypertensive subjects (65 men), 42.5 ± 13.9 years of age, assigned to receive spirapril (6 mg/day) as a monotherapy either upon awakening or at bedtime. BP was measured every 20-min from 07:00 to 23:00 h and every 30-min at night for 48 h before and after 12 weeks of therapy. Physical activity was simultaneously monitored every minute by wrist actigraphy.

Results: The significant reduction in ambulatory PP after treatment was significantly larger with bedtime dosing (1.6 mmHg reduction in the 24 h PP mean after spirapril on awakening; 3.0 mmHg after bedtime dosing; $P=0.018$ between groups). Efficacy in reducing awake PP mean was comparable among treatment-time groups (1.8 and 2.7 mmHg reduction after awakening and bedtime dosing, respectively; $P=0.199$). The effects of spirapril on asleep PP mean were, however, markedly larger after bedtime dosing (1.1 and 3.9 mmHg reduction after awakening and bedtime dosing, respectively; $P<0.001$ between groups). The sleep-time relative PP decline was significantly increased only after bedtime dosing (2.7; $P=0.018$).

Conclusions: Spirapril significantly reduces PP during the 24 h when the medication is administered at bedtime. Bedtime dosing is particularly effective in controlling asleep PP, a more relevant marker of risk compared with clinic, awake or 24 h PP mean values. Accordingly, bedtime dosing with spirapril should be chosen, for potentially added cardiovascular risk reduction, in the treatment of the elderly and hypertensive subjects with type 2 diabetes, both groups characterized by elevated PP.

PP.27.74 TOLERABILITY OF LERCANIDIPINE COMPARED TO AMLODIPINE IN MILD TO MODERATE HYPERTENSION TREATMENT

A. Goda, M. Tase, A. Banushi, T. Goda, E. Pavli, E. Dado, A. Dibra, B. Horjeti. *Dept. of Cardiology, University Hospital Center Mother Theresa, Tirana, Albania*

Blood pressure (BP) control is close related to compliance and tolerability of treatment. The aim of this study was to assess the tolerability of lercanidipine (L) compared to amlodipine (A) in the treatment of hypertension.

Methods: Open-label, 28 weeks, cross-over study included 202 pts with mild to moderate hypertension. Following a washout phase of two weeks pts were randomized to treatment with 10 mg L (101 pts) or 5 mg A (101 pts) daily. In patients not responding adequately to treatment (DBP decrease < 10 mmHg or DBP > 90 mmHg) the dose was doubled after two weeks and treatment was maintained for other ten weeks. Following a second washout phase, treatments were crossed over for another 12 weeks period. Adverse events were compared and evaluated by investigators and patients during both treatments.

Results: Both drugs were comparable for BP reduction and the rate of patients responding to treatment with some superiority of L vs A. The percentage of patients with adverse events was greater during A-treatment compared to L-treatment (23.8% vs 9.4%, $p<0.0001$ in 4 weeks and 29.2% vs 12.4%, $p<0.001$ in 12 weeks). Edema formation (6.4% vs 1.0%, $p=0.006$ in 2 weeks and 23.3% vs 5.9%, $p<0.001$ in 12 weeks) and cefalea (8.4% vs 3.5%, $p=0.04$) were significantly higher in A than in L group. Patients dropped-out because of adverse events more during A-treatment than L-treatment (9.9% vs 2.5%, $p<0.001$). Ankle edema was the reason of dropping out respectively in 8.4% of A group and 0.5% of L group ($p<0.001$). No difference resulted concerning the change of heart rate during both treatments (NS). The evaluation of safety was "good or very good" by investigator in 96% of L-group and 84% of A-group ($p<0.001$) and by the patient in 86% of L-group vs 69% of A-group ($p<0.001$).

Conclusions: L was better tolerated than A in patients treated for hypertension. Markedly less patients dropped-out due to side effects under L than A treatments.

PP.27.75 THE HABITS AND CUSTOMS OF THE NATIVE AMERICANS OF CHUBUT (PATAGONIA ARGENTINA) INFLUENCE THE PREVALENCE AND CHARACTERISTICS OF HYPERTENSION?

R. Ingarano, D. Williams, M. Del Popolo, A. Daroca, F. Suárez, G. Guevara, S. Zambianchi, M. Carletti, L. Carrizo. *Hypertension Center and Cardiovascular Disease (CEHTA Cardiovascular), Trelew, Argentina*

The native south americans of Chubut (NA), Patagonia Argentina, Mapuches and Tehuelches races, retain certain customs. It is unknown the prevalence and characteristics of hypertension (HBP) among them and if their lifestyle has some influence on it. 285 subjects, 181 NA, and 106 zonal residents (ZR), answered to a questionnaire on their habits and socio-economic condition. Fasting blood samples were obtained, in order to measure cholesterol (CHOL), triglycerides (TGL) and glucose (GL). Their body mass index (BMI), abdominal circumference (ABD), systolic (SBP) and diastolic blood pressure (DBP), were obtained. The subjects underwent an echocardiographic (ECHO) to assess the left ventricular mass index (LVMI), a carotid echogram to assess the intima-media thickness (IMT) and presence of plaques (CP) and to an ophthalmoscopic examination (OF). Student's t-test, chi-square test and a multivariate model of logistic regression were used for the statistical analysis. A p value $< 0,05$ was considered statistically significant. Results: Mean age: $46,2 (\pm 18,8)$ years, 180 women. The prevalence of HBP was 25% for NA and 17% in ZR ($p=0,152$). The average value of SBP and DBP were $158,2 \pm 16,2$ and $87,3 \pm 12,6$ in the NA and $152,3 \pm 21,5$ and $83,1 \pm 11,9$ in the ZR, $p=0,067$. In both groups HBP was more frequent in those with a diet based on meat, $p=0,037$. The presence of diabetes, $p=0,001$, increased BMI, $p<0,001$ and ABD, $p<0,001$, abnormal OF, $p<0,001$, the presence of CP, $p=0,015$, increased IMT, $p<0,001$ and LVMI, $p<0,001$ were associated with HBP in both groups, while obesity, $p=0,001$, levels of CHOL and TGL, $p=0,05$ did so only in the NA. The prevalence of HBP and TOD shows no significant differences between NA and ZR. The major metabolic abnormalities related to the HBP found in the NA, might suggest a racial or cultural component specific to them.

PP.27.76 ABSTRACT WITHDRAWN

PP.27.77 FATAL OUTCOMES IN PATIENTS WITH ESSENTIAL HYPERTENSION, RECEIVED LONG-TERM ANTIHYPERTENSIVE THERAPY FOLLOWING THE RESULTS OF A 20-YEAR-OLD CONTROL WORK

F. Kasumova. *The Azerbaijan State Institute of Postgraduate Education of Physicians Named After A.Aliyev, Baku, Azerbaijan*

Introduction: The arterial hypertension (AH) takes one of the leading positions in cardiology, and often ends with heart attack or stroke. Despite the carried out long-term antihypertensive therapy (AHT), death rate from cardiocerebrovascular complications of AH still remains high enough.

Aims: To study death rate from cardiocerebrovascular complications in patients with AH, receiving continuous AHT following the results of a 20-year-old supervision from 1986 to 2006.

Material and Methods: Under the supervision there were 138 men with AH in the age of 30–59 years (on average $46,5 \pm 3,28$ years), receiving AHT with α -blockers, calcium antagonists, diuretics, angiotensin converting enzyme-inhibitors in the form of mono- and the combined therapy.

Results: The general death rate from all reasons during the control period has made 13,8 %, 11,8 % out of which is directly from complications of AH, and 2,2 % from the reasons not related with it. Complications of AH in the form of myocardium heart attacks made 7,2 %, and strokes - 4,3 %. The average age of the dead was $52,6 \pm 2,0$ years, duration of the disease before treatment - more than 10 years ($11,5 \pm 0,5$ years), level of the systolic arterial tension - $158,0 \pm 20,5$ mm hg, and diastolic - $108,0 \pm 8,5$ mm hg, duration of the treatment - $6,2 \pm 2,7$ years. The monotherapy has been received by 5 persons, the combined treatment by 11 persons, from them 6 have received combination of 2 preparations, and 5 have received 3 preparations from different pharmacological groups. It is necessary to notice that among the dead in 75% cases there was marked the lowest compliance to treatment.

Conclusions: In patients with AH receiving long-term AHT, the low compliance to treatment, durability of the disease and the age of patients influenced the death frequency. The factors like the initial level of arterial tension, mono- or the combined treatment did not affect the outcome of disease considerably. It testifies the necessity of the early beginning of a long-term AHT, even at young age providing high compliance to treatment.

PP.27.78 CORRELATIONS BETWEEN URIC ACID SERUM LEVEL AND LEFT VENTRICULAR HYPERTROPHY IN PATIENTS WITH HYPERTENSION AND CHRONIC KIDNEY DISEASE

M. Gjata, E. Nelaj, L. Collaku, E. Sadiku, E. Collaku, J. Klosi, M. Tase. *Service of Internal Medicine and Hypertension. UHC Mother Teresa, Tirana, Albania*

Background: Several studies on the general population have suggested an association between uric acid level and cardiovascular outcomes. Other studies also have shown an association of uric acid level with established cardiovascular risk factors as hypertension and diabetes. Hyperuricemia is highly prevalent in patients with chronic kidney disease (CKD).

Objective: The evaluation of correlation between serum uric acid level and left ventricular hypertrophy in patients with essential hypertension and chronic kidney disease

Material and Methods: 57 patients with stage III of essential hypertension and chronic kidney disease were studied. All patients were examined for serum uric acid concentration. Patients were divided in 2 groups based on the presence of hyperuricemia, defined as serum uric acid level greater than 9 mg/dL or lower than 8 mg/dL.

Left ventricular abnormalities have been determined by bidimensional echocardiography. The left ventricular mass index (LVMI) has been evaluated according to the method of Devereux and Reichek

Results: A positive correlation was observed between uric acid level (UA) and LVMI. ($r = 0.412$, $p < 0.05$). The study evidenced that patients, which presented uric acid levels > 9 mg/dl show significant differences in left ventricular hypertrophy degree and systolic left ventricular functions compared with patients which presented uric acid levels < 8 mg/dl

Conclusions: The results show that elevated UA serum levels are associated with left ventricular hypertrophy and worsening of systolic left ventricular function in patients presenting chronic hypertensive disease and CKD.

PP.27.79 EFFECTS OF DILTIAZEM AND ACEI ON MYOCARDIAL ISCHEMIA IN PRIMARY HYPERTENSIVES

Y. Shen. Fujian Hypertension Research Institute, Fuzhou City, China

Objective: To investigate the effects of diltiazem on myocardial ischemia in essential hypertensives.

Methods: Fifty patients with grade I-II, in roman numbers essential hypertension were divided into two groups. 27 hypertensives received benazepril 10 mg or irbesartan 150 mg a day (mask-control group, $n = 27$); 23 hypertensives received diltiazem 90 mg a day. Total ischemia overload, defined as accumulation of depression of ST segment depression plus time in Ambulatory electrocardiogram (Holter ECG) recording. Patients were followed up for an average of 14.80 months. The index of TBI were converted by log10 because TBI was not in normal distribution. Pairs T-test was used in comparison of parameters between pre and post-treatment. (Two-related-samples wicoxon was used in nonnormal distribution data). ANOVA was used to determine the difference between groups.

Results: 1. BP in ACEI or ARB treated group was decreased ($148.7/84.41 \pm 5.98/8.36$ VS $131.67/78.11 \pm 6.23/7.48$ mmHg) to a similar extend of that in diltiazem treated group ($147.26/85.78 \pm 7.51/9.38$ VS $129.17/79.00 \pm 8.11/8.28$ mmHg, $P < 0.05$).

2. The total ischemia burden of post-treatment was significantly decreased in both groups when compared with that of pre-treatment (TBI in ACEI or ARB treated group was $1694.76(2781.89)$ min^{*}mv VS $1531.20(2022.24)$ min^{*}mv; TBI in diltiazem treated group was $1308.58(2994.35)$ min^{*}mv VS $140.82(2241.84)$ min^{*}mv, $P < 0.05$, median(inter-quartile range) was used in TBI.). When the parameter of TBI was converted into log10, it was found that TBI was significantly decreased after ACEI or ARB treatment: 3.09 ± 0.76 VS 2.69 ± 1.07 , ($P > 0.05$); However there was no difference of TBI between pre and post treatment in diltiazem treatment group: 2.37 ± 1.51 VS 1.88 ± 1.43 ($P > 0.05$).

Conclusion: Diltiazem is as effective as ACEI or ARB in blood pressure reduction, however, not as effective as ACEI or ARB in anti-ischemia in hypertensives.

PP.27.80 RELATION BETWEEN ACHIEVED BLOOD PRESSURE LEVEL AND THE REDUCTION OF CARDIOVASCULAR RISK IN HIGH-RISK HYPERTENSIVE PATIENTS: A SUBANALYSIS OF THE CASE-J TRIAL

S. Yasuno¹, K. Ueshima¹, K. Oba¹, A. Fujimoto¹, T. Ogihara², T. Saruta⁴, K. Nakao^{1,4}. ¹EBM Research Center, Kyoto University Graduate School of Medicine, Kyoto, Japan, ²Osaka General Medical Center, Osaka, Japan, ³Keio University Graduate School of Medicine, Tokyo, Japan, ⁴Department of Medicine and Clinical Science, Kyoto University Graduate School of Medicine, Kyoto, Japan

Objective: The benefits of lowering blood pressure (BP) on the risk of cardiovascular (CV) events are well established. Recent studies have raised

the issue of the residual risk under the strict BP control in high-risk hypertensive patients. In the present study, we examined the relationship between achieved BP level and the reduction of cardiovascular risk in high-risk hypertensive patients.

Methods: The CASE-J trial had been conducted to examine the effects of candesartan and amlodipine on the incidence of CV events. Subjects were all of 4,703 patients (mean age: 63.8 years) to be analyzed in the trial. Achieved BP were defined as the last values of BP in patients who did not experience CV events and the value of BP prior to CV events in those who experienced CV events during the follow-up. We used the multivariate Cox regression analysis to estimate the hazard ratio (HR) and 95% confidential interval (CI) of achieved systolic BP (SBP) and diastolic BP (DBP) level for cardiac and cerebrovascular events with adjustment for possible baseline confounders.

Results: BP was strictly controlled to the level as low as less than 140/80 mmHg. During 3.2 ± 0.9 years of follow-up, 102 (2.2%) patients experienced cerebrovascular events and 89 (1.9%) patients experienced cardiac events. For cerebrovascular events, lower achieved SBP and DBP were associated with the reduced risk (HR per 10 mmHg decrease of SBP: 0.66; 95%CI: 0.59–0.74, HR per 5 mmHg decrease of DBP: 0.81; 95%CI: 0.73–0.89). On the contrary, for cardiac events, only lower achieved SBP was associated with the reduced risk (HR per 10 mmHg decrease of SBP: 0.86; 95%CI: 0.76–0.98, HR per 5 mmHg decrease of DBP: 0.92; 95%CI=0.82–1.02). In addition, its risk reduction of lowering BP was small compared to that in cerebrovascular events.

Conclusion: Reduction of BP confers benefit in high-risk hypertensive patients. However, the benefit from lowering BP is attenuated in cardiac events.

PP.27.81 NEW ONSET ATRIAL FIBRILLATION IN RANDOMISED CLINICAL TRIALS PERFORMED WITH ANGIOTENSIN-CONVERTING ENZYME INHIBITORS OR ANGIOTENSIN II RECEPTOR BLOCKERS: AN UPDATED META-ANALYSIS.

G. Tocci¹, F. Paneni¹, F. Palano¹, B. Ponziani¹, S. Sciarretta¹, A. Ferrucci¹, M. Volpe^{1,2}. ¹Division of Cardiology, II Faculty of Medicine, University Sapienza, Sant' Andrea Hospital, Rome, Italy, ²IRCCS Neuromed, Pozzilli (Is), Italy

Introduction: Atrial fibrillation significantly increases risk of developing major cardiovascular (CV) events, mostly stroke, in hypertensive patients and worsens prognosis in patients with cardiac diseases or heart failure. Thus, new onset atrial fibrillation (NOAF) represents an adverse complication during long-term treatment of CV diseases. Randomised trials and meta-analyses suggested that Renin-Angiotensin System (RAS) blockers may significantly reduce NOAF.

Objective: To evaluate the efficacy of Angiotensin-Converting Enzyme (ACE) Inhibitors and Angiotensin II Receptor Blockers (ARBs) in term of incidence of NOAF in international, randomised, controlled clinical trials.

Design and Method: We performed a comprehensive meta-analysis of all available clinical trials performed with ACE Inhibitors (SOLVD, TRACE, CAPPP, STOP2, GISSI-3) or ARBs (Val-HeFT, LIFE, VALUE, OPTIMAAL, CHARM, ONTARGET, TRANSCEND, PROFESS, GISSI-AF), published within December 31 2009 (14 trials, $n = 108,722$ patients, mean age 66.1 ± 5.3 years), which reported absolute incidence of NOAF, either as predefined CV endpoint or as drug-related adverse event, as compared to placebo or other active treatment strategies in different clinical conditions.

Results: During a mean follow-up of 3.8 ± 1.5 years, we recorded 1014/8520 cases in the ACE Inhibitor group, 1966/29945 cases in the ARB group and 3278/38385 cases in the placebo group. In the presence of heterogeneity among selected clinical trials, antihypertensive therapy based on ACE Inhibitors (OR 0.8998; 95% CI 0.7439–1.0884) or ARBs (OR 0.8820; 95% CI 0.7695–1.0109) significantly reduced NOAF incidence. In particular, this beneficial effect of RAS blocking agents has been observed in patients with coronary artery disease (OR 0.8906; 95% CI 0.8056–0.9845) or congestive heart failure (OR 0.7352; 95% CI 0.6299–0.8580), and seems to be independent by the comparator strategy (placebo, conventional or active treatment). Overall, Renin-Angiotensin System (RAS) blocking agents significantly reduced NOAF incidence (OR 0.8861; 95% CI 0.7980–0.9840) as compared to any other treatment strategy, including placebo.

Conclusions: The clinical use of RAS blocking agents significantly reduced NOAF incidence in clinical trials performed in high risk patients in different clinical settings.

PP.27.82 A 12-WEEK, RANDOMIZED, DOUBLE-BLIND STUDY COMPARING THE EFFICACY AND SAFETY OF VALSARTAN AND ENALAPRIL IN HYPERTENSIVE CHILDREN AGED 6–17 YEARS

F. Schaefer¹, M. Litwin², J. Zachwieja³, M. Boolell⁴, A. Grosso⁵, N. Pezous⁴. ¹University Hospital of Heidelberg, Division of Pediatric Nephrology, Centre for Pediatric and Adolescent Medicine, Im Neuenheimer Feld, Germany, ²The Children's Memorial Health Institute, Department of Nephrology and Kidney Transplantation, Aleja Dzieci Polskich, Poland, ³Poznan University of Medical Sciences, Department of Pediatric Nephrology and Dialysis, Poznan, Poland, ⁴Novartis Pharma AG, Basel, Switzerland, ⁵Novartis Pharmaceuticals Corporation, East Hanover, USA

Objective: To compare the efficacy and safety of valsartan (Val) with that of enalapril (Enl) in hypertensive children aged 6–17 years.

Method: This was a 12-week, randomized, double-blind, parallel-group, active-controlled study. After a placebo run-in of 4–28 days, eligible patients (mean sitting systolic blood pressure [msSBP] $\geq$ 95th percentile for age, gender and height) were randomized equally to either Val or Enl treatment groups ($\geq$ 18 to $<$ 35 kg: Val 80 mg or Enl 10 mg; $\geq$ 35 to $<$ 80 kg: Val 160 mg or Enl 20 mg; $\geq$ 80 to $\leq$ 160 kg: Val 320 mg or Enl 40 mg). For the first week, patients received half the randomization dose of Val or Enl and were up-titrated to the final dose for the remaining 11 weeks. Efficacy variables included the change from baseline in msBP and SBP control rate (msSBP $<$ 95th percentile for age, gender and height). Safety was assessed by monitoring and recording of adverse events (AEs).

Results: Of 300 patients randomized (male: 63.7%, Caucasian: 82.7%, age: 12.9 years, baseline BP: 134.2/79.1 mmHg), 281 (93.7%) completed the study. At the week 12 endpoint, patients on Val had greater least square mean BP reductions from baseline compared to those on Enl (Table). Val was statistically non-inferior in reducing msSBP ($p < 0.0001$) compared with Enl (Table). The proportion of patients achieving SBP control was similar for both groups (Val: 66.9%; Enl: 70.3%). The incidence of AEs was similar in Val (60.3%) and Enl (58.1%) groups, with most frequent AEs were headache, cough and nasopharyngitis. Discontinuations due to AEs were seen in 7 patients (4.6%) in the Val group and none in the Enl group. Serious AEs were low and comparable between the treatments (Val: 2.0%; Enl: 1.4%).

Conclusions: Val and Enl provided comparable BP reductions and effective BP control with good tolerability in hypertensive children aged 6 to 17 years.

Treatment groups	N	LSM change from baseline (SE) in msSBP	LSM change from baseline (SE) in msDBP
Valsartan	148	-15.4 (1.29)*	-9.4 (0.94)
Enalapril	148	-14.1 (1.28)	-8.5 (0.95)

* $p < 0.0001$ for non-inferiority, LSM: Least square mean, SE: Standard error

PP.27.83 AGE-RELATED DIFFERENCES IN THE EFFECTS OF CANDESARTAN AND AMLODIPINE ON LEFT VENTRICULAR HYPERTROPHY IN HIGH RISK HYPERTENSIVE PATIENTS - CASE-J SUB-ANALYSIS

T. Ogiwara¹, K. Nakao^{2,3}, K. Ueshima³, A. Fujimoto³, T. Saruta⁴. ¹Osaka General Medical Center, Osaka, Japan, ²Department of Medicine and Clinical Science, Kyoto University Graduate School of Medicine, Kyoto, Japan, ³EBM Research Center, Kyoto University Graduate School of Medicine, Kyoto, Japan, ⁴Keio University Graduate School of Medicine, Tokyo, Japan

Objective: Left ventricular hypertrophy (LVH) is now appreciated as an important risk factor for cardiovascular events. Recent studies have suggested that regression of LVH during antihypertensive treatment lead to a reduction in the incidence of cardiovascular events. However, there is little evidence for the relation between aging and the effect of antihypertensive drugs on regression of LVH. In the present study, we examined whether there exist age-related differences in the effects of candesartan and amlodipine on the regression of LVH as a sub-analysis of the CASE-J trial.

Design and Method: Subjects were 404 high-risk hypertensive patients with LVH at baseline who underwent echocardiography at both baseline and three years after treatment. Left ventricular mass was calculated with Devereux's formula by echocardiography, normalized by body surface area and expressed as left ventricular mass index (LVMI). Effects of the two drugs on LVH were investigated stratified according to age (cut-off point: 65 years old).

Results: The numbers of subjects were 205 in the candesartan group and 199 in the amlodipine group. There were no significant differences between the two groups with regard to background factors and blood pressure levels during the follow-up period. Reduction of LVMI after three years was 22.9 g/m² in the candesartan group and 13.4 g/m² in the amlodipine group ($p = 0.023$). Subgroup analysis by age revealed that reduction of LVMI in patients aged 65 years or more was 24.7 g/m² in the candesartan group, significantly effective compared to the value 8.4 g/m² in the amlodipine group ($N = 95$ v.s. $N = 90$; $p = 0.009$). However, no statistically significant difference was observed between the two groups in patients aged less than 65 years (-20.8 g/m² v.s. -19.6 g/m²).

Conclusions: Candesartan was more effective than amlodipine on regression of LVH. The effect of candesartan on regression of LVH was observed over wide age range, but the effect of amlodipine was attenuated in the elderly patients.

PP.27.84 COMPREHENSIVE EVALUATION OF EFFICACY OF ANTIHYPERTENSIVE DRUGS IN REDUCING INCIDENCE OF "HOPE" ENDPOINT: A META-ANALYSIS

G. Tocci¹, F. Paneni¹, F. Palano¹, B. Ponziani¹, S. Sciarretta¹, A. Ferrucci¹, M. Volpe^{1,2}. ¹Division of Cardiology, II Faculty of Medicine, University Sapienza, Sant' Andrea Hospital, Rome, Italy, ²IRCCS Neuromed, Pozzilli (IS), Italy

Introduction: Cumulative incidence of myocardial infarction, stroke and cardiovascular (CV) mortality, which represented the primary composite endpoint in the landmark Heart Outcomes Prevention Evaluation (HOPE) trial, i.e. the so-called "HOPE endpoint", has recently emerged as useful and powerful tool for assessing cardiovascular protection of different antihypertensive strategies.

Objective: To evaluate cumulative incidence of myocardial infarction, stroke and CV mortality, in international, randomised, controlled clinical trials.

Design and Method: We performed a comprehensive meta-analysis of all available clinical trials performed with Angiotensin-Converting Enzyme (ACE) Inhibitors, Angiotensin II Receptor Blockers (ARBs), calcium-analogues, anti-aldosterone agents, conventional treatment, including beta-blockers and diuretics, alpha-blockers and combination therapies based on ACE Inhibitors plus calcium-antagonists or ARBs published within December 31 2009 (48 trials, $n = 426,481$ patients, mean age 65.7 ± 5.6 years), which reported absolute incidence of myocardial infarction, stroke and CV death, either as predefined CV endpoints or as cumulative HOPE endpoint, as compared to placebo or other active treatment strategies in different clinical conditions (hypertension, high risk, diabetes, coronary disease, stroke, renal disease, heart failure).

Results: During a mean follow-up of 3.9 ± 0.9 years, we recorded 12,339/114,712 HOPE endpoints in the ACE-Inhibitor, 8,893/57,818 in the ARB group, 998/4,141 in the anti-aldosterone group, 7,613/71,986 in the calcium-antagonist group, 2,915/20,407 in the combination group (288/5,744 in the ACE Inhibitors plus calcium-antagonists and 2,627/14,633 in the ACE Inhibitors plus ARBs), 739/9,067 in the alpha-blocker group, 12,007/190,772 in the conventional group and 10,914/72,595 in the placebo group. In the presence of omogeneity, antihypertensive therapy based on ACE Inhibitors (OR 0.901; 95% CI 0.868–0.934) or ARBs (OR 0.955; 95% CI 0.925–0.986) significantly reduced incidence of HOPE endpoint, while calcium-antagonists did not significantly affect this endpoint (OR 0.977; 95% CI 0.9435–1.031). In particular, this beneficial effect has been observed among pre-defined subgroups, independently by the comparator strategy (placebo, conventional or active treatment).

Conclusions: Overall, RAS blocking agents significantly reduced HOPE endpoint incidence as compared to any other treatment strategy, including placebo.

PP.27.85 HOME AND CLINIC BP RESPONSES IN ELDERLY INDIVIDUALS WITH SYSTOLIC HYPERTENSION DURING INITIAL TREATMENT WITH COMBINED ANGIOTENSIN RECEPTOR BLOCKER+DIURETIC COMPARED TO MONOTHERAPY

W. Cushman¹, D. Duprez², H. Weintraub³, R. Samuel⁴, D. Purkayastha⁴, D. Zappe⁴, J.L. Izzo⁵. ¹University of Tennessee, Knoxville, USA, ²University of Minnesota, Minneapolis, USA, ³NYU School of Medicine, New York, USA, ⁴Novartis Pharmaceuticals Corporation, East Hanover, USA, ⁵State University of New York at Buffalo, Erie County Medical Center, Buffalo, USA

Objective: To evaluate whether home blood pressure monitoring (HBPM) may enhance assessment of blood pressure (BP) control.

Methods: In the 16-week Valsartan in the Very Elderly Trial (VALVET) in individuals over age 70, male and female subjects with systolic BP 150–200 mmHg were randomly assigned to receive valsartan/hydrochlorothiazide (V/HCTZ) 160/12.5 mg (n=128), HCTZ 12.5 mg (n=128), or V 160 mg (n=128) for 4 weeks. At Week 4, subjects not achieving BP goal (<140/90 mmHg) in all 3 groups received optional titration with V/HCTZ (160/12.5 mg in HCTZ and V groups and 320/12.5 mg in V/HCTZ group) up to maximum dose of 320/25 mg by Week 12. Subjects in each group were evaluated by HBPM using an automated device each week prior to taking daily study medication (n=301).

Results: At Week 4, differences between V/HCTZ and HCTZ or V were similar for both HBPM and clinic recordings, and results obtained by either technique correlated significantly ($p < 0.0001$; see table). Adverse events were similar between groups.

Conclusion: In conclusion, (1) HBPM measurements confirm that treatment initiated with V/HCTZ resulted in a greater BP reduction from baseline than treatment initiated with either monotherapy and (2) HBPM provides a reliable indicator of BP control in elderly patients and may help guide drug dosing and titration.

Home vs office SBP and DBP measurements (mmHg±SD)

	V/HCTZ 160/12.5 mg	HCTZ 12.5 mg	V 160 mg
Baseline office SBP/DBP	164.5±11.9/ 84.8±9.4	164.5±11.8/ 85.5±9.1	166.2±11.1/ 84.9±9.8
Baseline home SBP/DBP	161.3±15.1/ 83.6±9.5	162.7±15.5/ 86.1±10.2	163.6±16.8/ 83.2±10.7
Office SBP/DBP Week 4 change	-17.3±17.6 [†] / -7.1±8.8 [†]	-13.6±16.8/ -3.9±10.2	-8.6±19.5/ -3.9±9.1
Home SBP/DBP Week 4 change	-15.1±18.3 [†] / -6.1±8.3 [†]	-9.9±16.3/ -2.9±9.5	-5.9±18.7/ -1.8±10.9
Office SBP/DBP Week 16 change	-20.9±18.5/ -8.3±8.6	-19.7±19.7/ -7.5±10.8	-17.5±19.6/ -7.1±10.8
Home SBP/DBP Week 16 change	-19.0±19.3/ -7.6±8.4	-17.9±19.9/ -7.6±9.9	-18.1±20.5/ -6.8±10.0

* $p < 0.05$ for V/HCTZ vs HCTZ (ANCOVA)

[†] $p < 0.05$ for V/HCTZ vs V (ANCOVA)

PP.27.86 EFFICACY AND SAFETY OF VALSARTAN IN HYPERTENSIVE CHILDREN 6 MONTHS TO 5 YEARS OF AGE: A RANDOMIZED, DOUBLE-BLIND, DOSE-RESPONSE STUDY

F. Schaefer¹, R. Coppo², M.Y. Kadwa³, R. Schlosshauer³, Y. Zhang⁴. ¹University Hospital of Heidelberg, Division of Pediatric Nephrology, Center for Pediatric and Adolescent Medicine, Im Neuenheimer Feld, Germany, ²Ospedale Regina Margherita, Struttura Complessa Nefrologia, Dialisi e Trapianto, Turin, Italy, ³Novartis Pharma AG, Basel, Switzerland, ⁴Novartis Pharmaceuticals Corporation, East Hanover, USA

Objective: To evaluate a dose-dependent reduction in blood pressure (BP) and overall safety and tolerability of valsartan (Val) in hypertensive children aged 6 months to 5 years.

Method: This was a multicenter, randomized, double-blind, parallel-group study that included a 6-week dose-ranging period followed by a 2-week placebo-withdrawal period. Following a placebo run-in of 4–28 days, patients (both naïve and treated) with mean sitting systolic BP (msSBP) ≥ 95 th percentile for age, gender, and height were randomized (2:1:2) to receive one of the three doses of Val (low: 0.25 mg/kg; medium: 1 mg/kg; high: 4 mg/kg of body weight) for 6 weeks. After 6 weeks, patients were re-randomized (1:1) to receive placebo or continue on the respective dose of Val for 2 weeks. The efficacy variables included changes in msBP from baseline to week 6 and from week 6 to week 8. Safety was assessed by monitoring and recording of adverse events (AEs).

Results: Of 75 patients randomized (male: 64%, Caucasian: 56%, mean age: 3.3 years, BP: 114.6/70.4 mmHg), 73 (97.3%) completed the study. At week 6, statistically significant reductions in msBP ($p < 0.05$) from baseline were observed with all doses of Val (Table). The slope estimate trend of $-1.05/-0.33$ mmHg per unit increase in dose ratio for the dose-response curve did not achieve significance. During the placebo-withdrawal period, a greater increase in msBP was observed in patients who switched to placebo from Val, however, the difference between treatments was not significant. Overall, AEs occurred in 52.7% (low-dose: 56.7%; medium-dose: 42.9%; high-dose: 53.3%) of patients in the dose-ranging period and 20.3% (placebo: 21.1%; Val: 19.4%) in placebo-withdrawal period. Four patients (5.4%) experienced serious AEs, none of which was considered to be related to study medication.

Conclusion: Val (at all doses) demonstrated statistically significant reductions in BP compared to baseline with good tolerability, although a dose-response relationship and superiority versus placebo during the withdrawal period did not reach statistical significance.

	Valsartan		
	0.25 mg/kg N=30	1.0 mg/kg N=14	4.0 mg/kg N=30
Change from baseline in BP at week 6, mean (SD) mmHg	-8.3(10.44)*/ -4.7(9.53)*	-10.3(9.83)*/ -8.6(12.43)*	-14.4(10.93)*/ -6.7(10.61)*
	Valsartan N=35		Placebo N=38
Change from week 6 in BP at week 8 by pooled treatment, mean (SD) mmHg	2.6(8.38)/1.8(8.99)		4.1(9.66)*/3.4(8.74)*

* $p < 0.05$ within treatment group; SD, standard deviation

PP.27.87 INITIAL COMBINED VALSARTAN/HCTZ THERAPY VS EITHER COMPONENT AS MONOTHERAPY IN ELDERLY INDIVIDUALS WITH SYSTOLIC HYPERTENSION: AGE-STRATIFIED ANALYSIS OF THE VALVET STUDY

J.L. Izzo¹, D. Duprez², H. Weintraub³, R. Samuel⁴, D. Purkayastha⁴, D. Zappe⁴, W. Cushman⁵. ¹State University of New York at Buffalo, Erie County Medical Center, Buffalo, USA, ²University of Minnesota, Minneapolis, USA, ³NYU School of Medicine, New York, USA, ⁴Novartis Pharmaceuticals Corporation, East Hanover, USA, ⁵University of Tennessee, Knoxville, USA

Objective: The presence of isolated systolic hypertension and the perception of increased adverse events (AEs) are major barriers to effective blood pressure (BP) control in the elderly. Age-stratified analyses are reported from the VALVET study.

Methods: The 16-week study compared efficacy and tolerability of initial combination therapy with valsartan/hydrochlorothiazide (V/HCTZ) vs HCTZ or V monotherapy. Subjects ≥ 70 years old with systolic (S) BP between 150 and < 200 mmHg were randomized to V/HCTZ 160/12.5 mg (n=128); HCTZ 12.5 mg (n=128); or V 160 mg (n=128). At Week 4, subjects not achieving BP goal $< 140/90$ mmHg in any of the 3 arms could receive optional titration up to a maximum of V/HCTZ 320/25 mg for an additional 12 weeks.

Results: The mean baseline SBP $\pm$ standard deviation (SD) were 164.5 $\pm$ 11.9, 164.5 $\pm$ 11.8, and 166.2 $\pm$ 11.1 mmHg for the V/HCTZ, HCTZ, and V groups, respectively. At Week 4, mean reductions in SBP $\pm$ SD were greatest with V/HCTZ (17.3 $\pm$ 17.6 mmHg) compared to HCTZ (13.6 $\pm$ 16.8 mmHg; $p = ns$) or V (8.6 $\pm$ 19.5 mmHg; $p < 0.0001$); with differences less pronounced at Week 16 (V/HCTZ [20.9 $\pm$ 18.5 mmHg] vs HCTZ [19.7 $\pm$ 19.7 mmHg; $p = ns$] and V [-17.5 $\pm$ 19.6 mmHg; $p = ns$]). Similar BP patterns persisted for each age stratum (70–75 y [n=126]; 76–80 y [n=181]; > 80 y [n=77]); however, within these strata, baseline BP influenced treatment responses. Overall BP control rates at Week 4 were 41.7%, 29.3%, and 14.4% and at Week 16 were 52.0%, 49.5%, and 36.6% for subjects in the V/HCTZ, HCTZ, and V groups, respectively, with similar patterns persisting for each age stratum. Dizziness, fatigue, and headache occurred relatively frequently in all 3 treatment groups but serious AEs were rare; 96 subjects (25.0%) discontinued the study prematurely (3/4 of the total discontinuations occurred within first 4 weeks). Age group did not predict discontinuation rates (70–75 y: 23.8%, 76–80 y: 28.7%, and > 80 y: 18.2%, respectively).

Conclusion: Initial therapy with combination V/HCTZ was more effective and equally well tolerated vs monotherapy in hypertensive individuals ≥ 70 years of age.

PP.27.88 NEW ONSET DIABETES MELLITUS IN RANDOMISED CLINICAL TRIALS PERFORMED WITH ACE INHIBITORS OR ANGIOTENSIN II RECEPTOR BLOCKERS: AN UPDATED META-ANALYSIS VERSUS PLACEBO

G. Tocci¹, F. Paneni¹, F. Palano¹, B. Ponziani¹, S. Sciarretta¹, A. Ferrucci¹, G. Mancini², M. Volpe^{1,3}. ¹Division of Cardiology, II Faculty of Medicine, University Sapienza, Sant Andrea Hospital, Rome, Italy, ²University of Milano-Bicocca, San Gerardo Hospital, Monza, Italy, ³IRCCS Neuromed, Pozzilli (IS), Italy

Introduction: New onset diabetes mellitus (NOD) represents an adverse complication during long-term treatment of cardiovascular (CV) disease, mostly hypertension, being related to a significant increase in CV morbidity and mortality. Retrospective analyses suggested that the use of drugs that counteract Renin-Angiotensin System (RAS) may significantly reduce NOD incidence, while use of beta-blockers and thiazide diuretics have been associated to an increased risk of NOD. The recent results of ONTARGET/TRANSCEND and PROFESS trials, however, have questioned this issue.

Objective: To evaluate the efficacy of ACE Inhibitors and Angiotensin II Receptor Blockers (ARBs) in term of incidence of NOD in international, randomised, placebo-controlled clinical trials.

Design and Method: We performed a comprehensive meta-analysis of all available clinic trials performed with ACE Inhibitors (SOLVD, HOPE, PEACE e DREAM) or ARBs (CHARM, SCOPE, TRANSCEND, PROFESS), published within December 31 2009 (8 trials, n=63.715 patients, mean age 65.7 ± 6.3 years), which reported NOD incidence, either as predefined CV endpoint or as drug-related adverse event, as compared to placebo in different clinical conditions.

Results: During a mean follow-up of 3.7 ± 0.9 years, we recorded 886/10540 cases in the ACE Inhibitor group, 740/17552 cases in the ARB group and 1875/22880 cases in the placebo group. Antihypertensive therapy based on ACE Inhibitors reduced NOD incidence (OR 0.7288; 95% IC 0.5438–0.9768), although this reduction did not achieve statistically significance; at the same time, antihypertensive strategy based on ARBs significantly reduced NOD incidence as compared to placebo (OR 0.8395; 95% IC 0.7573–0.9306) in clinical trials performed in high risk patients, with or without heart failure. Overall, RAS blocking agents significantly reduced NOD incidence as compared to placebo (OR 0.8498; 95% IC 0.7917–0.9122).

Conclusions: The clinical use of RAS blocking agents significantly reduced NOD incidence in placebo-controlled clinical trials in high risk patients, with or without heart failure.

PP.27.89 EFFICACY OF THE SINGLE-PILL COMBINATION OF ALISKIREN 300/HCTZ 25 (+/- AMLODIPINE 5) IN HYPERTENSIVE PATIENTS NOT CONTROLLED BY THE COMBINATION OF CANDESARTAN 32/HCTZ 25

J. Schweizer¹, S. Klebs². ¹Dept. of Internal Medicine, Chemnitz Hospital, Chemnitz, Germany, ²Clinical and Regulatory Affairs, Novartis Pharma GmbH, Nuernberg, Germany

Most hypertensive patients require combination therapy for sufficient blood pressure (BP) reductions but in single-pill combination (SPC) the dose range often is limited. The study investigated whether the SPC of aliskiren 300 mg and hydrochlorothiazide (HCTZ) 25 mg (A 300/H 25) is able to significantly improve the BP reduction in hypertensive patients not adequately controlled by the free combination of candesartan 32 mg and HCTZ 25 mg (C 32+H 25) which was not available as SPC when the study was conducted.

After up to 2 weeks of wash-out, 186 patients with mean sitting diastolic blood pressure at trough (MSDBP) ≥ 100 and < 110 mmHg entered a 4-week treatment phase with C 32+H 25. 123 patients whose BP was still uncontrolled at week 4 (MSDBP ≥ 90 mmHg), entered a second 4-week treatment phase with A 300/H 25. If BP was not controlled after that time (MSDBP ≥ 90 mmHg or MSSBP ≥ 140 mmHg), amlodipine 5 mg (Aml) was added in an optional study extension.

At day 1, MSDBP in the intention-to-treat population was 103.5 ± 2.3 mmHg. At week 4, MSDBP decreased to 95.4 ± 4.7 mmHg with C 32+H 25. Subsequent treatment of patients not adequately controlled by C 32+H 25 with A 300/H 25 for 4 weeks reduced MSDBP to 92.2 ± 7.5 mmHg (p-value < 0.0001).

Mean sitting systolic BP (MSSBP) was 161.1 ± 9.8 mmHg at day 1. At week 4, MSSBP decreased to 146.3 ± 11.4 mmHg with C 32+H 25. Subsequent treatment with A 300/HCTZ 25 for 4 weeks reduced MSSBP to 143.5 ± 12.6 mmHg (p = 0.0064).

61 patients were included in the optional study extension and received additional treatment with Aml 5 mg. At start of triple therapy, MSDBP/MSSBP were $96.5 \pm 5.8/149.4 \pm 9.6$ mmHg. After 4 weeks, MSDBP/MSSBP decreased to $90.6 \pm 8.0/140.2 \pm 13.4$ mmHg. This represents MSDBP/MSSBP reductions of $5.9/9.2$ mmHg (p-value < 0.0001 for both). Triple combination with A/H plus Aml was generally well tolerated.

Hypertensive patients not controlled by C 32+H 25 achieve a significant additional BP reduction from treatment with A 300/HCTZ 25. Further

significant and clinically relevant BP reductions can be achieved by the addition of Aml 5 mg to A 300/H25.

PP.27.90 LONG-TERM EFFICACY AND SAFETY PROFILE OF SINGLE-PILL COMBINATIONS OF TELMISARTAN/ AMLODIPINE IN PATIENTS NOT CONTROLLED ON AMLODIPINE 10 MG: OPEN-LABEL FOLLOW-UP OF TEAMSTA-10

S. Neldam¹, C. Edwards², R. Jones³, C. Edwards². ¹Rødovre Centrum, Rødovre, Denmark, ²Boehringer Ingelheim Ireland Ltd, Dublin, Ireland, ³Boehringer Ingelheim Ltd, Bracknell, United Kingdom

Objective: TEAMSTA-10 was an 8-week, randomized, double-blind comparison of telmisartan 40 or 80 mg/amlodipine 10 mg (T40/A10 and T80/A10) single-pill combinations (SPCs) versus amlodipine 10 mg (A10) monotherapy in patients who failed to respond to treatment with A10 (DBP ≥ 90 mmHg after 6 weeks of A10). This open-label follow-up trial investigated the long-term (≥ 6 months) efficacy and safety of T40/A10 and T80/A10 SPCs alone or in combination with other antihypertensive therapies in 838 patients who completed TEAMSTA-10.

Design and Method: All patients started with T40/A10 and at Week 4 were randomized to T40/A10 or T80/A10 (2:3 ratio) for 26–30 weeks. T40/A10 patients with inadequate DBP control (≥ 90 mmHg) 4 weeks after randomization were up-titrated to T80/A10. At later visits, additional antihypertensive medications were added if DBP ≥ 90 mmHg in either treatment group. Primary endpoint was the proportion of patients achieving DBP control (mean seated trough DBP < 90 mmHg).

Results: Long-term open-label treatment with T/A SPCs further improved DBP control rate to 89.2% (745/835 patients) compared with 59.5% (497/835 patients) at trial start. Long-term open-label treatment with T/A SPCs resulted in clinically relevant additional BP reductions ($-5.7/-4.9$ mmHg; from $138.2/87.7$ mmHg [n=826] to $132.5/82.8$ mmHg [n=826]). During open-label treatment, 71.4% (598/838) of patients on T40/A10 were up-titrated to T80/A10: 58.1% (487/838) due to randomization and 13.2% (111/838) due to inadequate DBP control. Of patients up-titrated due to poor DBP control, 67.6% (75/111) achieved DBP control post up-titration. The proportion of patients who received additional antihypertensive medication(s) was low (14.5%; 121/835). Overall, 1.9% (16/835) of patients discontinued trial treatment because of adverse events. The T/A SPCs were well tolerated with 95.7% of patients completing the trial.

Conclusions: Long-term open-label treatment with T/A SPCs was well tolerated and effective in achieving DBP control in 89.2% of patients who were not controlled on A10 monotherapy, and resulted in clinically meaningful additional reductions in SBP/DBP.

PP.27.91 EFFICACY AND SAFETY OF THE SINGLE PILL COMBINATION OF AMLODIPINE AND VALSARTAN IN HYPERTENSIVE PATIENTS WITH OVERWEIGHT OR OBESITY

A. Wirth¹, S. Klebs². ¹Klinik Teutoburger Wald, Bad Rothenfelde, Germany, ²Clinical and Regulatory Affairs, Novartis Pharma GmbH, Nuernberg, Germany

Objectives: Elevated body weight and hypertension are often associated. Blockers of the renin angiotensin system and calcium channel blockers offer advantages (e.g. metabolic ones) in the treatment of such patients and should be preferred in single pill combination for the treatment of hypertension according to the actual ESH/ESC guidelines. This study investigated the efficacy and safety of the single pill combination of amlodipine and valsartan in daily practice.

Methods: This prospective, open-label, non-interventional, observational study was conducted in patients with overweight (body mass index ≥ 25 and < 30 kg/m²) or obesity (body mass index ≥ 30 kg/m²) where the physicians had decided to treat hypertension with the single pill combination of amlodipine and valsartan prior to start of the observation. Dosages included were amlodipine/valsartan 5/80, 5/160, and 10/160 mg alone or on top of other antihypertensive drugs. The duration of the observation period was about 4 months. Data of 2906 patients was analyzed.

Results: Mean age in the population was 62.3 ± 11.8 years and 54.9% were men. Mean body mass index (BMI) was 30.8 ± 4.8 kg/m². 46% had a BMI ≥ 25 and < 30 , 34% a BMI ≥ 30 and < 35 , and 14% higher BMIs. Hypertension has been known for 7.6 ± 6.5 years.

Treatment with the single pill combination of amlodipine and valsartan resulted in SBP reductions in patients with SBP ≥ 140 and < 160 mmHg,

≥ 160 and < 180 mmHg and ≥ 180 mmHg of 18.6 ± 9.6 ($n=936$), 30.9 ± 10.8 ($n=1357$), and 48.3 ± 15.7 mmHg ($n=491$). Diastolic blood pressure (DBP) reductions in these groups were 11.4 ± 8.9 , 14.2 ± 9.1 , and 17.7 ± 11.5 mmHg, respectively. In elderly patient (65 years and older; $n=1232$), SBP/DBP were reduced by $29.3 \pm 16.4/12.9 \pm 10.3$ mmHg. In very elderly patients (80 years and older; $n=164$), SBP/DBP were reduced by $30.7 \pm 19.2/12.0 \pm 10.8$ mmHg. Treatment was well tolerated. 63 patients (2.2%) experienced adverse events - most commonly peripheral oedema, flushing and dizziness.

Conclusions: Treatment with the single pill combination of amlodipine and valsartan in patients with overweight/obesity and hypertension led to pronounced blood pressure reductions in daily practice and was well tolerated.

PP.27.92 STATE OF HEMODYNAMIC OF PENILE ARTERIES, PITUITARY-HONADAL SYSTEM AND SEXUAL FUNCTION IN MEN WITH ESSENTIAL HYPERTENSION IN SHORT-TERM MONOTHERAPY WITH MODERN BETA-BLOCKERS

G. Nur-Mammadova, I. Mustafayev. *Azerbaijan State Advanced Training Institut for Doctors, Baku, Azerbaijan*

Objective: The purpose of this investigation was the study of influence of bisoprolol (B), nebivolol (N) and carvedilol (C) on the sexual function in men with essential hypertension (ESH) in complex with changes of levels of hormones of pituitary-honadal system and state of hemodynamic of penile arteries.

Method: 75 males with ESH on degree I and II (ESC, ESH 2007) in age $35-55 (47.7 \pm 0.58)$ years were examined, duration of ESH was 10.1 ± 0.44 year. Patients were randomized after four weeks of placebo period into three identical groups with 25 men in each. The content of testosterone (T), prolactin (PRL), estradiol (E2), luteinizing hormone (LH) and follicle-stimulating hormone (FSH) was identified by radioimmunoassay, penile hemodynamics was determined using the Doppler ultrasound method, sexual status - by Vasilchenko questionnaire.

Results: Monotherapy of B, N, and C significantly decreased of arterial blood pressure and heart rate resulted in increase of the systolic blood flow in cavernosus right (32,6%; 46,3%, $p < 0,001$; 36,6%, $p < 0,01$); in a cavernosus left (35,6%; 36,8%; 48,4%, $p < 0,01$); in a dorsalis penis (44,5%; 34,9%; 35,8%, $p < 0,05$). During the treatment of B and N statistically high significantly increased the levels of T (75,7% and 56,8%) and PRL (54,8% and 69,7%) in plasma of blood, and decreased the levels of LH (26,9%; 25,7%, $p < 0,05$), FSH (36%; 46,5%; $p < 0,001$), E2 (13,7%; 17,2%, $p < 0,001$). Monotherapy of C characterized by the decreasing the concentration of T (19,2%, $p < 0,05$), PRL (40,7%; $p < 0,001$), LH (29,3%, $p < 0,001$), and the increasing of the content of FSH (33,6%, $p < 0,001$) and E2 (16,5%, $p < 0,01$). Data obtained from the questionnaires showed that patient didn't notice any considerable changes of neurohumoral, ejaculation and other characteristics of the sexual function.

Conclusion: In monotherapy of B and N increased the level of T and PRL, decreased the concentration of E2. The monotherapy of C resulted in decreasing of the content of PRL and T, the level of E2 increased. Two months monotherapy of B, N, C results in improvement of the penile blood flow, which are not accompanied by the changes in the sexual function in men with ESH.

PP.27.93 EFFICACY AND TOLERABILITY OF COMBINED ANGIOTENSIN RECEPTOR BLOCKER+DIURETIC THERAPY VS COMPONENT MONOTHERAPIES IN ELDERLY INDIVIDUALS WITH SYSTOLIC HYPERTENSION: RESULTS FROM VALVET

J.L. Izzo¹, H. Weintraub², D. Duprez³, R. Samuel⁴, D. Purkayastha⁴, D. Zappe⁴, W. Cushman⁵. ¹State University of New York at Buffalo, Erie County Medical Center, Buffalo, USA, ²NYU School of Medicine, New York, USA, ³University of Minnesota, Minneapolis, USA, ⁴Novartis Pharmaceuticals Corporation, East Hanover, USA, ⁵University of Tennessee, Knoxville, USA

Objective: Low rates of blood pressure (BP) control in the elderly are partly attributable to clinicians' reluctance to initiate combination therapy. The 16-week Valsartan in the Very Elderly Trial (VALVET) investigated the efficacy and tolerability of initial single-pill combination therapy with valsartan (V) and hydrochlorothiazide (HCTZ) vs the individual components at similar doses.

Methods: After a 3–14 day washout, subjects ≥ 70 years of age (mean age: 77.5 years, sitting systolic BP [SBP]: $150-200$ mmHg) were randomized to V/

HCTZ 160/12.5 mg ($n=128$), HCTZ 12.5 mg ($n=128$), or V 160 mg ($n=128$). Subjects not achieving BP goal $< 140/90$ mmHg in any of the 3 groups could receive an optional titration up to a maximum dose of V/HCTZ 320/25 mg from Week 4 until Week 12: subjects in the V and HCTZ arms electively received V/HCTZ 160/12.5 mg at Week 4, 320/12.5 mg at Week 8, and the maximum dose 320/25 mg at Week 12.

Results: Mean baseline clinic BP was 165/85 mmHg. At Week 2, there were greater SBP reductions from baseline in subjects assigned initially to the combination V/HCTZ (-18.6 mmHg) compared with those assigned to HCTZ (-13.0 mmHg, $p < 0.005$), or V (-10.8 mmHg, $p < 0.001$). Similar BP differences were maintained until the end of study, by which time 65% of subjects initiated on HCTZ and 78% initiated on V required combination therapy. Median time to BP control was lower with V/HCTZ (4 weeks) than with HCTZ (8 weeks, $p < 0.05$) or V (12 weeks, $p < 0.0001$). At Week 16, 52.0%, 49.5%, and 36.6% of subjects in the V/HCTZ, HCTZ, and V arms, respectively, achieved goal BP. Adverse events were similar across the 3 treatment groups; the most common events being dizziness, fatigue, and headache.

Conclusion: Initiation of treatment with V/HCTZ lowered BP more effectively, controlled a higher proportion of individuals, reduced the time necessary to reach BP target, and was equally well tolerated compared with monotherapy with either component.

PP.27.94 INFLUENCE OF MODERN BETA-BLOCKERS ON THE STATE OF AUTONOMIC NERVOUS SYSTEM, PENILE HEMODYNAMIC AND SEXUAL FUNCTION IN MEN WITH ARTERIAL HYPERTENSION

G. Nur-Mammadova, I. Mustafayev. *Azerbaijan State Advanced Training Institut for Doctors, Baku, Azerbaijan*

Objective: The aim was to study the effect of bisoprolol (B), nebivolol (N) and carvedilol (C) on the sexual function, penile hemodynamic (PH), heart rate variability (HRV) in men with essential hypertension (EH).

Method: 75 males with EH on degree I and II (ESC, ESH, 2007) aged $35-55 (47.7 \pm 0.58)$ years were examined. After four weeks of placebo period patients were randomized into three identical groups with 25 men in each. There was held the monotherapy of one of the researching drugs. The dosage of B was 6.1 ± 0.39 mg daily, N - 6.6 ± 0.4 mg daily, C - 22.5 ± 1.02 mg daily. HRV spectral parameters included low (LF) and high (HF) frequencies waves carried out by computer cardiography, PH was determined using the Doppler ultrasound method, sexual status was studied by Vasilchenko questionnaire.

Results: Monotherapy of B, N, and C resulted in increase of the systolic blood flow (S), acc: in a cavernosus right - 32,6%; 46,3%, $p < 0,001$; 36,6%, $p < 0,01$; in a cavernosus left - 35,6%; 36,8%; 48,4%, $p < 0,01$; in a dorsalis - 44,5%; 34,9%; 35,8%, $p < 0,05$. In placebo period the patients have the increasing power of LF waves and the decreasing power of HF waves. During of the monotherapy of study BB was established normalization of disbalance of vegetative nervous system (VNS), which shows the improve the tone of parasympathetic part of VNS. The single-drug therapy with B and N results in increasing of amplitude of LF waves, acc.: 241.4 ± 59.4 to 423.8 ± 53.6 ; $p < 0.05$; 165.2 ± 32.9 to 400.4 ± 56.8 ; $p < 0.001$ and HF waves (acc. 165.1 ± 32.4 to 423.8 ± 53.6 ; 117 ± 12.5 to 279.7 ± 35.8 ; $p < 0.001$); in the therapy of C increased the power of HF waves (159.6 ± 28.02 to 247.6 ± 32 ; $p < 0.05$) and reduced the power of LF waves (229 ± 37.6 to 130.8 ± 19.9 ; $p < 0.05$) in limited normative data. Patients didn't notice any considerable changes in neurohumoral, ejaculation and other characteristics of the sexual function during two months of monotherapy.

Conclusion: Our results indicated that C carry out significant reduction of sympathetic hyperactivity and increase parasympathetic parameters of VNS, B and N exerted correct influence on HRV by improving the parasympathetic activity. The monotherapy all of study BB results in statistically improvement of the PH and don't worse the sexual function.

PP.27.95 LONG-TERM EFFICACY AND SAFETY PROFILE OF SINGLE-PILL COMBINATIONS OF TELMISARTAN/AMLODIPINE IN PATIENTS NOT CONTROLLED ON AMLODIPINE 5 MG: OPEN-LABEL FOLLOW-UP OF TEAMSTA-5

S. Neldam¹, M. Lang², R. Jones³. ¹Rødovre Centrum, Rødovre, Denmark, ²Boehringer Ingelheim bv, Alkmaar, The Netherlands, ³Boehringer Ingelheim Ltd, Bracknell, United Kingdom

Objective: TEAMSTA-5 was an 8-week, randomized, double-blind comparison of single-pill combinations (SPCs) of telmisartan/amlodipine (T40/A5 and T80/A5) versus A5 and A10 monotherapy in patients who failed to

respond to treatment with A5 (DBP ≥ 90 mmHg after 6 weeks of A5). This open-label follow-up trial investigated the long-term (≥ 6 months) efficacy and safety of T40/A5 and T80/A5 SPCs alone or in combination with other antihypertensive therapies in 976 patients who completed TEAMSTA-5.

Design and Method: All patients started with T40/A5; patients with inadequate DBP control (≥ 90 mmHg) after Week 4 or 8 were up-titrated to T80/A5. After up-titration, or beyond Week 8, additional antihypertensive medications were added if DBP was inadequately controlled. Primary endpoint was the proportion of patients achieving DBP control (mean seated trough DBP < 90 mmHg).

Results: At TEAMSTA-5 baseline, 0.2% (2/952) of patients had DBP control. Following 8 weeks' treatment with T40–80/A5 SPCs in TEAMSTA-5, 59.7% (295/494) of patients achieved DBP control; long-term, open-label treatment with T40–80/A5 SPCs further improved DBP control rates to 79.5% (767/965). During the open-label treatment, 39.2% (378/965) of patients were up-titrated to T80/A5; 37.4% (361/965) did not have DBP control prior to up-titration; 52.6% (190/361) achieved DBP control post up-titration. The proportion of patients who received additional antihypertensive medication(s) was low (22.6%; 218/965). In TEAMSTA-5, the overall BP reduction seen after 8 weeks' double-blind treatment was $-11.6/-8.6$ mmHg (from $149.5/96.7$ mmHg [$n=962$] to $137.9/88.1$ mmHg [$n=960$]). Long-term, open-label treatment with T/A SPCs resulted in clinically relevant additional BP reductions ($-5.0/-4.4$ mmHg; from $137.9/88.1$ mmHg [$n=952$] to $132.9/83.7$ mmHg [$n=965$]), and 63.0% (608/965) of patients reached the recommended target BP ($< 140/90$ mmHg). The T40–80/A5 SPCs were well tolerated.

Conclusions: Long-term open-label treatment with T40/A5 and T80/A5 SPCs was well tolerated and effective in achieving DBP control for the vast majority of patients who were not controlled on A5 monotherapy, and resulted in clinically meaningful additional reductions in SBP/DBP.

PP.27.96 EFFECT OF VALSARTAN, HYDROCHLOROTHIAZIDE, AND ITS COMBINATION ON 24-HOUR AMBULATORY BLOOD PRESSURE RESPONSE IN ELDERLY INDIVIDUALS WITH SYSTOLIC HYPERTENSION: A VALVET SUBSTUDY

D. Duprez¹, H. Weintraub², R. Samuel³, D. Purkayastha³, D. Zappe³, W. Cushman⁴, J.L. Izzo⁵. ¹University of Minnesota, Minneapolis, USA, ²NYU School of Medicine, New York, USA, ³Novartis Pharmaceuticals Corporation, East Hanover, USA, ⁴University of Tennessee, Knoxville, USA, ⁵State University of New York at Buffalo, Erie County Medical Center, Buffalo, USA

Objective: Hypertension is very common and inadequately controlled among the elderly. Ambulatory blood pressure (ABP) measurement has a better predictive value than office blood pressure (BP) measurement. In a substudy of the VALVET trial, we examined the effect of combined valsartan/hydrochlorothiazide (V/HCTZ), or V or HCTZ alone on 24-h mean ABP in elderly subjects with systolic hypertension.

Methods: Three hundred eighty-four subjects ≥ 70 years old with mean sitting systolic BP > 150 and ≤ 200 mmHg were randomized to receive V/HCTZ 160/12.5 mg ($n=24$), HCTZ 12.5 mg ($n=26$), or V 160 mg ($n=31$) for 4 weeks. At Week 4, subjects not achieving $< 140/90$ mmHg received optional titration with V/HCTZ (160/12.5 mg in HCTZ and V groups; 320/12.5 mg in V/HCTZ group) up to a maximum dose of V/HCTZ 320/25 mg by Week 12.

Changes in ASBP and ADBP (mmHg) from baseline at Week 4 and Week 16

Parameter	Week 4			Week 16		
	V/HCTZ (n=24)	HCTZ (n=26)	V (n=31)	V/HCTZ	HCTZ	V
Change in 24-h mean ASBP and ADBP	-14.6 $\pm$ 9.7** -7.3 $\pm$ 6.3**	-3.0 $\pm$ 9.1 -1.2 $\pm$ 5.6	-6.0 $\pm$ 10.8 -3.2 $\pm$ 6.2	-16.7 $\pm$ 9.5* -8.6 $\pm$ 5.6*	-9.0 $\pm$ 10.8 -3.9 $\pm$ 7.7	-14.2 $\pm$ 9.9 -7.9 $\pm$ 6.2
Change in 6AM–10PM mean ASBP and ADBP	-16.2 $\pm$ 11.2** -8.2 $\pm$ 7.7**	-2.6 $\pm$ 9.7 -1.2 $\pm$ 6.6	-6.5 $\pm$ 10.4 -3.8 $\pm$ 6.5	-17.4 $\pm$ 10.3* -9.1 $\pm$ 6.9*	-8.9 $\pm$ 12.0 -3.8 $\pm$ 8.3	-15.4 $\pm$ 11.1 -9.0 $\pm$ 6.6
Change in 10PM–6AM mean ASBP and ADBP	-11.9 $\pm$ 7.8** -5.8 $\pm$ 6.2**	-2.8 $\pm$ 10.2 -1.0 $\pm$ 5.2	-5.1 $\pm$ 12.4 -2.6 $\pm$ 6.7	-15.3 $\pm$ 9.3* -7.9 $\pm$ 6.3*	-8.4 $\pm$ 10.4 -3.9 $\pm$ 7.3	-12.8 $\pm$ 9.6 -6.3 $\pm$ 6.8

* $p < 0.05$ for V/HCTZ vs HCTZ (ANCOVA)
† $p < 0.05$ for V/HCTZ vs V (ANCOVA)

Results: Baseline ASBP/ADBP values $\pm$ SD were $141.1 \pm 10.7/76.5 \pm 9.3$, $142.2 \pm 9.3/78.7 \pm 7.5$, and $142.2 \pm 10.6/78.3 \pm 8.2$ mmHg in the V/HCTZ, HCTZ, and V groups, respectively. At Week 4, reductions from baseline in 24-h mean ASBP and ADBP were greater in subjects initiating V/HCTZ than HCTZ or V alone (Table). At Week 16, differences were observed between V/HCTZ and HCTZ groups only. These results were largely consistent for nighttime vs daytime, and last-4-hours dosing analyses.

Adverse events were similar across all groups; the most common being dizziness, fatigue, and headache.

Conclusions: In conclusion, 4 weeks of initial combination therapy resulted in a greater BP reduction from baseline vs monotherapy, demonstrating enhanced efficacy of V/HCTZ in elderly patients.

PP.27.97 EFFICACY AND SAFETY OF THE SINGLE PILL COMBINATION OF AMLODIPINE AND VALSARTAN IN HYPERTENSIVE PATIENTS WITH TYPE 2 DIABETES MELLITUS

S. Eckert¹, S. Klebs². ¹Heart and Diabetes Center NRW, Clinic for Cardiology, Bad Oeynhausen, Germany, ²Novartis Pharma GmbH, Clinical and Regulatory Affairs, Nuernberg, Germany

Objectives: Patients with type 2 diabetes mellitus often suffer from concomitant hypertension increasing the cardiovascular risk profile. Blockers of the renin angiotensin system and calcium channel blockers offer advantages (e.g. metabolic ones) and therefore should be preferred in single pill combination for the treatment of hypertension according to the actual ESH/ESC guidelines. This study investigated the efficacy and safety of the single pill combination of amlodipine and valsartan in daily practice.

Methods: This prospective, open-label, non-interventional, observational study was conducted in 2678 patients with type 2 diabetes mellitus where the physicians had decided to treat hypertension with the single pill combination of amlodipine and valsartan prior to start of the observation. Dosages included were amlodipine/valsartan 5/80, 5/160, and 10/160 mg alone or on top of other antihypertensive drugs. The duration of the observation period was about 4 months.

Mean age in the population was 63.6 ± 11.2 years and 54.7% were men. Mean body mass index was 29.4 ± 4.6 kg/m², and mean HbA1c was $7.0 \pm 1.0\%$. Hypertension was known for 8.4 ± 6.6 years. Mean systolic blood pressure (SBP) at start of observation was 161.8 ± 15.6 mmHg and mean diastolic blood pressure (DBP) was 93.5 ± 9.6 mmHg.

Treatment with the single pill combination of amlodipine and valsartan resulted in SBP reductions in patients with SBP ≥ 140 and < 160 mmHg, ≥ 160 and < 180 mmHg, and ≥ 180 mmHg of 19.3 ± 8.9 ($n=795$), 30.6 ± 10.9 ($n=996$), and 48.0 ± 14.5 mmHg ($n=329$). DBP reductions in these groups were 11.8 ± 8.1 , 14.0 ± 9.3 , and 18.9 ± 11.7 mmHg, respectively. In elderly patient (65 years and older; $n=1031$), SBP/DBP were reduced by $27.5 \pm 15.3/12.7 \pm 10.3$ mmHg. In very elderly patients (80 years and older; $n=163$), SBP/DBP were reduced by $27.9 \pm 14.9/13.1 \pm 9.7$ mmHg. Treatment was well tolerated. 64 patients (2.4%) experienced adverse events – most commonly peripheral oedema, headache and flushing.

Conclusions: Treatment with the single pill combination of amlodipine and valsartan in patients with type 2 diabetes mellitus and hypertension led to pronounced blood pressure reductions in daily practice and was well tolerated.

PP.27.98 NEW APPROACHES TO TREATMENT OF ISOLATED SYSTOLIC

T. Zubiashvili, N. Kipshidze. Institute of Therapy, Tbilisi, Georgia

The aim of the work is to estimate the effectiveness of the combined hypotensive and hypolipidemic therapy with calcium antagonist “Norvasc” (“Pfizer”, Germany, daily 5–10 mg) and “Zocor” (“Merck”, Netherlands, daily 20 mg) in comparison to effectiveness of the isolated therapy with “Norvasc” in geriatric patients with ISAH.

The results of the research and the treatment of 107 patients was used as the material for the given work. All patients had undergone the clinical, biochemical, and echocardiographic examination before the treatment and 3 and 6 months after it. Biochemical examination included T-C, LDL-C, VLDL-C, HDL-C, TG.

The combined use of “Norvasc” and “Zocor” gives the stable clinical effect and normalization of the lipid spectrum in 97.3% patients and provides the regression of the left ventricular hypertrophy (LVH) in 54% cases with improvement of the parameters systolic and diastolic function after 3 and 6 month. The isolated hypotensive therapy after 3 months of the treatment gives clinical effect in 67.8% patients and provides the regression of LVH in 36.3% cases without normalization of the lipid spectrum and the stable hypotensive effect after 6 months of the treatment.

The investigation showed, that combined use of “Norvasc” and “Zocor” gives the stable hypotensive effect and regression of LVH with improvement of

LV systolic and diastolic function, which is especially important for geriatric patients.

PP.27.99 **CARDIOVASCULAR EFFECT OF IRBESARTAN IN NEWLY STARTED HEMODIALYSIS PATIENTS: A SUBSTUDY WITHIN THE SAFIR-STUDY**

C. Peters¹, K. D. Kjærgaard¹, J. D. Jensen¹, T. T. Nielsen², B. Jespersen¹.

¹Department of Nephrology, Aarhus University Hospital, Skejby, Aarhus, Denmark, ²Department of Cardiology, Aarhus University Hospital, Skejby, Aarhus, Denmark

Background: Patients with chronic renal failure suffer from a high risk of cardiovascular disease (CVD) and CVD mortality is markedly above what is seen in the general population. Several studies suggest that angiotensin II receptor blockers (ARBs) have a favourable effect on CVD that can not be explained solely by the blood pressure lowering effect of these drugs, but seems to originate from the ability of ARB to reduce arterial stiffening probably via inhibition of fibrosis and inflammation. SAFIR is a multicenter study begun in April 2009 primarily designed to investigate whether an ARB (irbesartan) can preserve residual renal function among newly started hemodialysis patients (HD-pt.). Presently, fear of elevated potassium and hypotension during dialysis results in the abandoning of ARB-treatment, when patients begin dialysis.

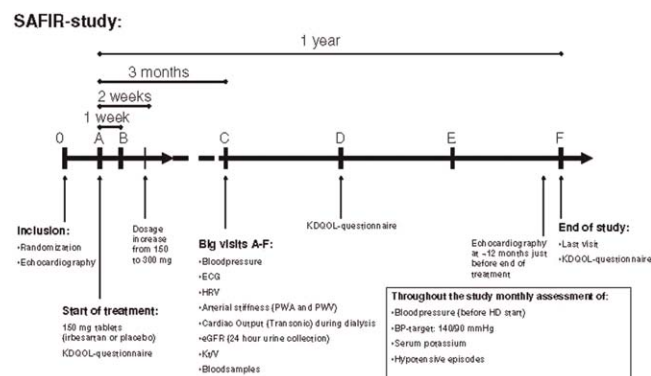
The purpose of this substudy is to investigate if ARB-treatment has a beneficial effect on the cardiovascular system among newly started HD-patients.

Hypotheses: Irbesartan has a beneficial effect on the cardiovascular system in newly started HD-pt. causing:

- Stable or less cardiac hypertrophy
- Less arterial stiffening
- Improvement of intradialysis hemodynamics

Methods: 80 HD-pt. are recruited from 6 different dialysis centres in Denmark: Skejby, Randers, Horsens, Viborg, Aalborg and Fredericia. Patients are randomized double-blind for treatment with either irbesartan or placebo and followed for 1 year (see graphic). Blood pressure is closely monitored and a systolic blood pressure of 140 mmHg predialysis is the target among all patients. Blood- and urine samples are collected throughout the whole study period. A panel of biomarkers (TNF-alfa, IL-1beta, IL-6, IL-8, IL-10, IL-18, TGF-beta, hsCRP, C3c) involved in inflammation, fibrosis and vascular calcification are studied in order to determine the effect of ARB-treatment. Cardiac status is evaluated by echocardiography at entry and at the end of the study. The degree of arterial stiffness is measured noninvasively by applanation tonometry using SphygmoCor equipment. Hemodynamic parameters during dialysis are obtained using Transonic ultrasound flow devices connected to the HD-machines.

Perspectives: Reduction of CVD-burden in HD-pt.



POSTER SESSIONS

POSTER SESSION 28

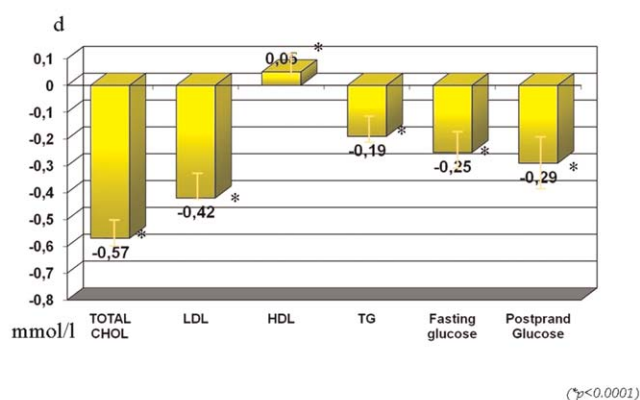
EPIDEMIOLOGY OF HYPERTENSION AND METABOLIC DISORDERS 3

PP.28.100 ADVANCED FORM OF PERINDOPRIL ARGININE IN TREATMENT OF PATIENTS WITH HYPERTENSION IN DIFFERENT CLINICAL CASES IN NATIONAL PROGRAM PREMIA

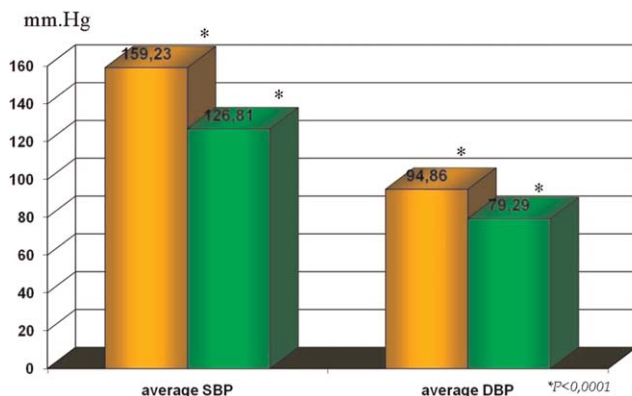
I. Chazova, V. Mychka, M. Kirillova, U. Prokhorova. *Russian Research Cardiology Complex, Moscow, Russia*

Aim: To estimate antihypertensive efficacy of the new form of perindopril in patients with hypertension, 1–2 stages, high risk.

Dynamic of biochemical data (d)



Control rates of blood pressure decrease



Materials and Methods: The randomized study included 2200 patients from 73 towns with hypertension, stages 1–2: average age 56.2 ± 0.22 years, 42,6% men and 57,4% women, weight was 82.94 ± 0.30 kg, body mass index was 29.26 ± 0.09 kg/m², waist circumference was 95.14 ± 0.27 cm, tobacco consumption was 15,50%, family history of cardio-vascular diseases was 18,3%. 29,60% were patients with increased blood pressure (BP) stage 1, 70,40% with stage 2, of which 83,20% previously treated and 16,80% previously untreated, 36,70% took therapy regularly, 63,30% took therapy irregularly. Patients were prescribed 5 mg of perindopril. In patients previously treated

by another ACE inhibitor the last was changed to perindopril 5 or 10 mg. If the effect was not enough the therapy included indapamid retard 1,5 mg. The study lasted 16 weeks. BP was estimated.

Results: The adjusted doses by the end of the study were: 37,2% received 5 mg of perindopril, 27,7% - 10 mg, 0,5% - 2,5 mg. On the basis of perindopril therapy the rate of systolic BP (SBP) and diastolic BP (DBP) control (< 130/80 mm Hg.) was achieved in 70% of patients, the rate of only SBP control was in 9,3%, only DBP control was in 10,5%. The SBP level was decreased d - 32.44 ± 0.17 mmHg ($\delta < 0.0001$), DBP level was d - 15.58 ± 0.17 mmHg ($\delta < 0.0001$), heart rate level was d - 6.14 ± 0.17 per minute ($\delta < 0.0001$). In 34,6% cases indapamid retard 1,5 mg was added to 10 mg perindopril. When estimating efficacy of treatment by doctors in 68,20% it was "very good", 29,50% - "good" and 2,3% - "satisfactory" and by patients in 65,70%, 32,30%, 2,1% respectively. 99,10% patients and 99,70% doctors were willing to continue the treatment. Compliance was 97,3%. Adverse events were 2,5%.

Conclusion: The results of perindopril therapy of patients with hypertension showed significant antihypertensive effect.

PP.28.101 EARLY VASCULAR ALTERATIONS OF METABOLIC SYNDROME

E. Chatzistamatiou¹, G. Moustakas¹, N. Kalovidouris¹, I. Babatseva Vagena¹, E. Androulakis¹, N. Rodolakis¹, C. Bakogiannis², D. Tousoulis², C. Tsioufis², C. Stefanadis², I. Kallikazaros¹. ¹Cardiology Department, Hippokration Hospital, Athens, Greece, ²1st University Department of Cardiology, Athens Medical School, Hippokration Hospital, Athens, Greece

Aim: Patients with essential hypertension (EH) and metabolic syndrome (MS) are characterized by an increased incidence of target organ damage. The vascular tree is damaged in the primary stages of this syndrome. The aim of our study was to investigate common carotid (CCA) and lower extremity arterial function in patients with newly diagnosed EH in the context of MS.

Methods: We studied 193 consecutive newly diagnosed EH patients stage I–II (age 51 ± 12 years, 49% females). Compliance and distensibility of the CCA were assessed by ultrasonography and ankle brachial index (ABI) was measured using a 8MHz continuous wave Doppler device. According to ATP III criteria, the study cohort was divided in two groups: group A (n = 115 patients without MS) and group B (n = 78 patients with MS).

Results: The two groups did not differ regarding age, sex, office blood pressure and smoking status. Group B exhibited significantly higher loghs-CRP values ($.31 \pm .47$ vs. $.04 \pm .49$ mg/L, $p = .02$) and fibrinogen plasma levels (400 ± 108 vs. 360 ± 80 mg/dl, $p = .018$). Moreover, group B compared to group A exhibited statistically significant lower right (8.0 ± 2.4 vs. 9.6 ± 2.4 mm²/mmHg, $p = .049$) and left (7.4 ± 2.4 vs. 9.7 ± 2.4 mm²/mmHg, $p = .010$) CCA compliance and distensibility ($.23 \pm .12$ vs. $.28 \pm .11$ mmHg-1/10-2, $p = .022$ and $.23 \pm .15$ vs. $.32 \pm .16$ mmHg-1/10-2, $p = .010$, respectively). In addition, group B compared to group A had statistically significant higher ABI ($1.18 \pm .11$ vs. $1.15 \pm .08$, $p = .028$). In the whole population, metabolic syndrome was negatively correlated with CCA compliance ($r = -.249$, $p = .008$) and distensibility ($r = -.265$, $p = .005$) and positively with loghs-CRP ($r = .217$, $p = .009$) and ABI ($r = .163$, $p = .028$). Multivariable regression analysis revealed waist circumference ($b = .039$, $p < .001$), CCA compliance ($b = -215.3$, $p = .001$) and BMI as independent predictors of MS ($r = .099$, $p < .001$).

Conclusions: Patients with EH and MS are characterized by early impairment of the CCA compliance and distensibility without impairment of lower extremity arterial function. These findings are in accordance with recent evidence, which link increased abdominal adiposity with subclinical inflammation and higher values of ABI.

PP.28.102 ANTHROPOMETRIC MEASURES AS PREDICTORS OF PREHYPERTENSION IN ADOLESCENTS

M. Bracho, C. Esis, E. Silva, J. Villasmil, A. Gonzalez, G. Bermudez, S. Briceño, G. Calmon, M. Labarca. *Instituto Regional de Investigacion y*

Estudio de Enfermedades Cardiovasculares de la Universidad del Zulia, Maracaibo, Venezuela

Objective: To evaluate the role of anthropometric measures as predictors of Prehypertension in adolescents.

Design and Method: A prospective randomized study was carried out in 3167 patients (1389 males and 1778 females), aged 12–19 years, mean 15 $\pm$ 1.73 years. In all patients, anthropometrical data and blood pressure were measured and a questionnaire was applied to adolescents recruited from public and private schools, in Maracaibo city, Zulia state, Venezuela, from 2007 to 2009. Prehypertension was diagnosed when blood pressure levels were $\geq$ 120/80 mm Hg. Data are presented as mean $\pm$ SD. Correlation analysis and the multiple regression analysis were applied to determine the predictor factors of Prehypertension in adolescents. The following factors were included in these analyses: age, gender, weight, height, body mass index, hip circumference, waist circumference, hip waist index and height waist index.

Results: In this study 22.3% (95% Confidence Interval 19.2%–25.4%) of the population had Prehypertension. The prehypertensive group had higher levels of weight, body mass index, hip circumference, waist circumference, hip waist index, and height waist index than did the normotensive group ($P < 0.001$). Multivariate logistic regression analysis showed that body mass index was the strongest predictor of prehypertension among both males and females (odds ratio, 1.084; 95% CI, 1.053 to 1.117 and odds ratio, 1.108; 95% CI, 1.077 to 1.141, respectively, for every 1 kg/m² increase); but when evaluating general population waist circumference was the best predictor (odds ratio, 1.042; 95% CI, 1.032 to 1.051).

Conclusion: The index that best predicts prehypertension in both men and women is body mass index. Our results indicate the importance of prevention and control of overweight in order to reduce Prehypertension.

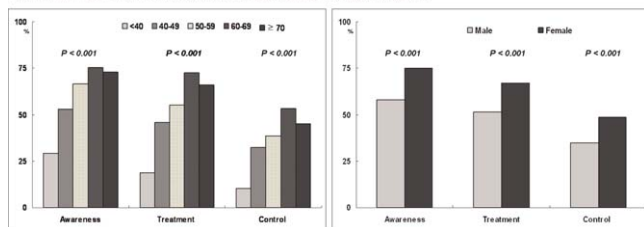
PP.28.103 PREVALENCE, AWARENESS, TREATMENT, AND CONTROL OF HYPERTENSION IN KOREA; KOREAN NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2007

K. Kim, Y. Cho, T. Youn, G. Cho, I. Chae, D. Choi, C Kim. *Seoul National University Bundang Hospital, Department of Internal Medicine, Seongnam, South Korea*

Objective: We analyzed the Korean National Health and Nutrition Examination Survey (KNHNES) database to determine the prevalence, awareness, treatment, and control of hypertension in a Korean population.

Design and Methods: The KNHNES, which was conducted by the Korean Ministry of Health and Welfare, was a cross-sectional, nationally representative survey in which a stratified multistage sampling design was used. The most recent KNHNES survey, conducted in 2007, was analyzed. Hypertension was defined as systolic BP $\geq$ 140 mm Hg or diastolic BP $\geq$ 90 mm Hg, or current treatment with antihypertensive drugs.

Fig. 1 Awareness, treatment, and control of hypertension by age and gender



Results: A total of 2,888 adults ($\geq$ 20 years) were included in the analysis. Mean age was 49.9 ± 16.3 years and male subjects were 41.8%. The prevalence of hypertension increased with aging (5.1%, 15.0%, 31.9%, 44.0% and 55.0% in the < 40, 40–49, 50–59, 60–69 and $\geq$ 70 age groups, respectively) and overall prevalence was 25.3%. However, the prevalence of prehypertension was not different according to the age group (overall prevalence was 26.4%). Overall, 67.2% of those with hypertension were aware of their diagnosis, 59.5% were receiving pharmacologic treatment and only 42.3% had their blood pressure under control. The awareness, treatment, and control rate of hypertension were significantly lower in the younger age group and male subjects. (Fig 1) However, no significant difference in the

control rate of hypertension among the treated subjects was identified according to the age and gender.

Conclusions: For the improvement of blood pressure control in Korea, we should enhance the awareness and treatment of hypertension in the younger age group and male subject through education and target screening.

PP.28.104 INFLUENCE OF METABOLIC SYNDROME AND HYPERTENSION ON PULSE PRESSURE IN ADOLESCENTS

C. Esis, M. Bracho, A. Gonzalez, E. Silva, J. Villasmil, S. Briceño. *Instituto Regional de Investigación y Estudios de Enfermedades Cardiovasculares de la Universidad del Zulia, Maracaibo, Venezuela*

Background: The Pulse Pressure (PP) is a marker of central artery stiffness. In adults, PP is impaired in patients with Metabolic Syndrome (MS) and Hypertension (HT), but in adolescents has been poorly studied. We assessed the influence of MS and HT on PP in a population of adolescents.

Design and Method: This was a cross-sectional study conducted with 363 high school students (175 males and 188 females), aged between 10 to 19 years (mean = 14.79 ± 1.85 years). In all patients, anthropometric data and blood pressure were measured, and blood samples were taken. Recruited adolescents were classified according to presence of MS (criteria of Cook et al) and HT (IV Report NHBPEP): Group I: without MS+ without HT ($n = 309$); Group II: without MS + with HT ($n = 25$); Group III: with MS + without HT ($n = 18$) and Group IV: with MS+ with HT ($n = 11$). Impaired Student t-test was used to compare the means PP between the groups. The Multivariate Analysis of Variance was used to evaluate the effect of gender; MS and HT on PP. $P < 0.05$ were considered statistically significant.

Results: In this study, 29 (8.0%; IC 95%: 5.2–10.8) patients had MS and 36 (9.9%; IC 95%: 6.8–13.0) had HT. The overall mean of PP was 52.66 ± 11.50 mmHg, in male was 57.08 ± 11.83 mmHg and female 48.55 ± 9.51 mmHg ($P < 0.001$). The PP was higher in subjects with MS than those without MS (60.39 ± 10.89 vs. 51.99 ± 11.32 mmHg, $P < 0.001$) and hypertensive than in normotensive subjects (69.44 ± 11.06 vs. 50.82 ± 9.96 mmHg, $P < 0.001$). The mean PP in Group I was 50.49 ± 9.91 , Group II: 70.62 ± 11.27 , Group III: 56.49 ± 9.33 and Group IV: 66.77 ± 10.58 ($P < 0.001$). In the Multivariate Analysis of Variance, both groups categorized according MS and HT as gender independently have an effect on PP ($P < 0.001$).

Conclusion: The MS, HT and gender independently influence on PP, which is a marker of arterial stiffness. The evaluation of PP should be performed in all adolescents with risk factors.

PP.28.105 EVALUATION OF APPROPRIATENESS OF HYPERTENSIVE PATIENT'S REFERRAL TO AN ESH EXCELLENCE CENTRE

E. Testa¹, S. Totaro¹, F. Rabbia¹, L. Angelici², E. Berra¹, A. Iannaccone¹, V. Crudo¹, V. Milazzo¹, A. Vairo¹, D. Leone¹, P. Mulatero¹, A. Milan¹, F. Veglio¹. ¹Hypertension Unit, University of Turin, Turin, Italy, ²Work Health Department, Milan, Italy

Aim: To investigate appropriateness of referral of the hypertensive patient to hypertension Specialist according to guidelines.

Methods: We have examined data of 9874 hypertensive Caucasian patients consecutively referred to an hypertension clinic between 1989 and 2008. For each patient we have considered the first visit data as indicators of the patient's management by practitioners. Appropriateness was identified by almost one of these indicators: blood pressure values and its control, suspected or confirmed secondary and pediatric hypertension, blood pressure $> 180/110$ mmHg, resistant hypertension (blood pressure $> 140/90$ mmHg with three drugs) and co-morbidities or severe target organ damage at the time of first visit.

Analysis was divided in three periods (1985–1994, 1995–2001, 2002–2008) to study the variability in the patient's data and to analyse the practitioner's conduct according to different guidelines.

Results: Only 59.3% of patients were correctly referred to Hypertension Unit, considering secondary forms of hypertension (6.3%) pediatric hypertension (1%), blood pressure $> 180/110$ mmHg (22.5%), resistant hypertension (15%), and hypertension with target organ damage or co-morbidities (40%).

The value of corrected reference to our Unit changes from 65,5% in the first period, to 70,5% in the second and 47,4% in the third.

Mean blood pressure values at entry were 155/94 mmHg, with a tendency, into three periods, to blood pressure reduction (from 161/99 mmHg in the first period, to 150/90 mmHg in the third one). The 16% of patient at entry have blood pressure values less than 140/90 mmHg, with a significant increased percentage in the three periods (5,8% and 23,4% respectively in the first and last period).

Conclusion: Since more than a third of referrals to Hypertension Unit can be defined as inappropriate, thus further investigation is needed to identify all underlying factors responsible or methods available (such as medical education, feedback from consultants or guidelines for referral) to reduce this inefficient process.

PP.28.106 RISK FACTOR PROFILE IN PATIENTS WITH ASYMPTOMATIC PERIPHERAL ARTERIAL DISEASE IN AN INTERNAL MEDICINE SERVICE

B. Roig-Espert¹, J.J. Tamarit-García², C. Sala-Sainz², A. Sáez-Segura², J. Giner-Morales¹, I. Carbonell-Casán², L. Sánchez-Segura², F. García-Tolosa², V. Navarro-Ibáñez¹, A. Artero-Mora². ¹Manises University Hospital, Valencia, Spain, ²Dr. Peset University Hospital, Valencia, Spain

Objective: To identify the clinical-biological profile of the patient with ankle brachial index (ABI) <0.9 hospitalized in a Service of Internal Medicine.

Method: A transversal, descriptive and observational trial was carried out among hospitalized patients with an acute or deteriorated non vascular disease in the Internal Medicine Service of the University Hospital Dr. Peset (Valencia, Spain) during a 3-month period. Patients were selected taking into account the age, sex and cardiovascular risk factors, such as smoking, high blood pressure, diabetes mellitus (DM), lipid disorders, personal and familiar past history of cardiovascular disease. Previous evidence of symptomatic arteriosclerosis, uncontrolled cancer or cognitive deterioration were exclusion criteria. An Ankle-Brachial Index (ABI) test was performed in all patients and we used the most recent analytical data before the present process within the 6 previous months.

Results: Of 189 clinical checked files, we observed a mean age of 76.20 years (standard deviation of 12.93), of which were 66% males and 43% females. To determine the ABI test in our patients the following results were obtained: 34% had an ABI of <0.9, 48.8% had a normal ABI (0.9–1.2) and in 17.2% an ABI of > 1.2% was detected. On combining both pathological results we found a total of 51.2% of an abnormal ABI test.

Prevalence of an ABI<0.9 in the different subgroups was:

SUBGROUPS	PREVALENCE
HIGH BLOOD PRESSURE	36.7%
DIABETES MELLITUS	40.9%
ABDOMINAL OBESITY	28.6%
LIPID DISORDERS	50%
SMOKING	66.7%

Conclusions: There is a high prevalence of asymptomatic peripheral arterial disease that can be detected performing an ABI, simple and low cost test. A third of the patients without past family history of arteriosclerosis disease presented a pathological ABI test. In the group of patients with a pathological ABI test, active smoking was found to have the highest risk factor, followed by lipid disorders, diabetes mellitus and high blood pressure, in this order.

PP.28.107 GENDER DIFFERENCES AND CLINICAL PROFILE OF HYPERTENSIVE PATIENTS WITH ESTABLISHED CARDIOVASCULAR DISEASE

T. Gijón¹, I. Morón², J. Palau³, I. Egocheaga⁴, O. Gómez⁵, A. Díaz⁵, I. Pitillas¹, T. Rua¹, B. Valero¹. ¹Primary Health Care Centre Cerro Aire, Majadahonda, Spain, ²Primary Health Care Centre Pozuelo Estacion, Pozuelo, Spain, ³Primary Health Care Centre El Escorial, El Escorial, Spain, ⁴Primary Health Care Centre Isla de Osa, Madrid, Spain, ⁵Medical Management 6Th Health District, Majadahonda, Spain

Objectives: Evaluate gender differences and clinical profile of hypertensive patients with established cardiovascular disease(CVD) in 6th Health District of Madrid.

Methods: Cross-sectional study of computerised medical records of hypertensive patients with established CVD and undergoing antihypertensive

therapy who visited one of the 24 Primary Health Care Centres in Madrid during 2008. The variables were age, sex, smoking habits,obesity, history of dyslipidaemia or diabetes, blood pressure(BP)levels and goals (<140/90 and <130/80 mmHg), laboratory test and therapy.

Results: From a database of 92.069 patients, 16.158 were selected (17.5%). 51,5% were males and their age was lower (70.91 / 78.31) (p<0.05). Females smoked less(2,1 / 7%), were more obese (44,7/38,8%), 26% were diabetics vs 28,5%, 37,5% had dyslipidaemia vs 39.6% . BP control was inferior in females:40 vs 44% if <140/90 and 20% vs 22% if <130/80 mmHg, the LDL-cholesterol was <100 mg/dl in 15% of females vs 21%. (p<0.05).

The most frequent diagnosis and the ratio female/male, first coronary heart disease(CHD)(33.6/49.2%) followed by stroke (32/25.7%),heart failure(HF) (25.2/12.2%), renal disease(RD)(16/21.3%), atrial fibrillation (AF)(17/12.4%), peripheral artery disease (PAD)(8/10%) (p<0.05).

Proportion of drugs consumption was: 43% diuretics, 31% betablockers ,calcium antagonist 29%. The 64% were taking a blocker of the renin-angiotensin system (60.4% ACE inhibitors, 22.3% angiotensin receptor antagonist). 46% of females and 51% of males were taking statins (p<0.05) and 65% anti-platelet therapy with no differences by sex.

Conclusions: Gender differences exist in identified CVD and control of risk factors. Females have more HF, stroke and AF and males more CHD, RD and PAD. BP and cholesterol controls are very deficient but even worse in females. There is a higher consumption of beta-blockers and statins by males, although in both is insufficient. These differences should be held in consideration,perhaps more attention is being given to the CVD in males.

PP.28.108 PREDICTING FACTORS OF UNCONTROLLED HYPERTENSION IN A TREATED COHORT: PHARMACO-EPIDEMIOLOGIC STUDY PROTECT PLUS STUDY

C. Mounier-Vehier¹, A. Sanchez-Ponton², P. Delsart¹, D. Miljkovic³. ¹Hopital Cardiologique, Medecine Vasculaire et Hypertension, Lille, France, ²Biostatem, Castris, France, ³ Groupe Therapeutique Cardiovasculaire/Thrombose, Unité Affaires Medicales Boehringer-Ingelheim, Reims, France

Objectives: The purpose of this study was to identify the independent predicting factors of uncontrolled hypertension (PAS/PAD> 140/90 mm Hg).

Method: Demographic variables (age and sex), characteristics of the patient during the change of treatment (heart rate and duration of hypertension), cardiovascular risk factors (tobacco, diabetes, dyslipidemia, microalbuminuria, impaired renal function, obesity, alcohol,) as well as the therapeutic observance and the duration of treatment were tested in univariate model. All the variables related to uncontrolled hypertension with a p ≤ 0.20 were included into the multivariate model.

Results: 4255 patients were included in the study. Duration of treatment longer than 2 weeks was significantly related to control rate. The patients of more than 70 years old are more at the risk of "non control" (OR = 1.83 [1.32–2.54]). The presence of diabetes, microalbuminuria or impaired renal function were also risk factors of "non control" (OR = 7.59 [5.63–10.23], OR = 2.83 [1.55–5.20] and OR = 5.71 [2.62–12.41], respectively). In the same way, abdominal obesity increased of almost 50% (OR = 1.47 [1.22–1.77]) the risk of non control as well as the consumption of more than 3 glasses of alcohol per day (OR = 1.48 [1.17–1.86]).

Conclusion: These results confirmed the risk factors of uncontrolled factors reported in the literature. The duration of treatment is an independent predicting factor of uncontrolled hypertension whereas the observance, which is a predicting factor in the univariate model, disappeared in the multivariate model after adjustment. It is also interesting to note that the excessive alcohol consumption was an independent predictive factor of uncontrolled hypertension.

PP.28.109 CARDIOVASCULAR RISK BY APPLYING THE SCORE CARDIOVASCULAR RISK CHART CALIBRATED FOR USE IN SPAIN IN PATIENTS WITH A FIRST DIAGNOSIS OF ARTERIAL HYPERTENSION IN SPAIN: RISCOR-E STUDY

J.L. Llisterri¹, J. García², J. Alcázar³, I. Álvarez³. ¹Centro de Salud Ingeniero Joaquín Benlloch, Valencia, Spain, ²Unidad Riesgo Cardiovascular - Hospital La Paz, Madrid, Spain, ³Cmc & Me - Merck S.L., Madrid, Spain

Objective: To assess the cardiovascular risk (CVR) on arterial hypertensive patients at the moment of diagnosis, by the SCORE chart calibrated for Spain.

Design and Method: Transversal, multicenter study (patients aged 40–74), first diagnosed with hypertension, enrolled by consecutive sampling in either primary health care or specialists' consultations. Arterial hypertension was diagnosed when mean blood pressure (BP) figures after three consecutive visits (time-frame within visits of, at least, one week) were ≥ 140 and/or 90 mmHg. Patients with a previous diagnosis of hypertension, cardiovascular disease, type 2 diabetes, type 1 diabetes with microalbuminuria, chronic kidney disease, or very high levels of one or more CVR factors (cholesterol > 320 mg/dl, LDL > 240 mg/dl) were excluded. CVR was classified in four different categories: $< 1\%$; 1–4%; 5–9%; 10–14% and $\geq 15\%$. Other collected data was: socio-demographics, clinical and analytical, and CVR factors data. This study was approved by an IRB (Hospital La Paz, Madrid).

Results: 324 physicians (76.5% from Primary Health Care) enrolled 1500 patients (57.8% male; mean age ($\pm$ SD) 57.1 ± 7.7). 35.7% were smokers (46.1% male; 21.5% female; $p < 0.001$). Mean systolic and diastolic BP were $156.3 (\pm 12.0)/92.5 (\pm 8.1)$ mmHg, and mean total cholesterol was $217.7 (\pm 40.3)$ mg/dl, with no significant gender differences in both endpoints. At diagnosis, 53.9% of the sample presented a CVR of 1–4%; 25.9% of 5–9%; 13.5% of 10–14%; and 7.3% of $\geq 15\%$. Mean CVR was 4.8%, median 3%. Statistically significant differences were found in CVR figures referred to patient's gender, with a mean of 6.5% (5.4) in males and 2.5% (2.3) in females ($p < 0.001$). An increase of CVR with increasing patient's age ($p < 0.001$) was also found.

Conclusions: Above 4 out of every 10 patients diagnosed with arterial hypertension for the first time presented a high-very high CVR, according to SCORE chart for Spain. Diagnosis of arterial hypertension and earlier medical intervention on CVR factors, in these patients, will reduce the chance of suffering CV events over the next 10 years.

PP.28.110 PREVALENCE OF ARTERIAL HYPERTENSION OF FEMALE POPULATION—FORCED MIGRANTS OF SUMGAIT

A. Musayeva, A. Zeynalov, A. Humbatova. *Azerbaijan State Advanced Institut for Doctors, Baku, Azerbaijan*

Objective: To study the prevalence the structure of arterial hypertension (AH) in population of the forced migrants of female of Sumgait.

Methods: It has investigated 952 females who were divided into 4 age groups: aged 20–29 (187), aged 30–39 (287), aged 40–49 (229), aged 50–59 (253). Arterial hypertension was measured twice in the position – sitting after 10 minutes rest. It was defined general cholesterol (GH), glucerols (G), cholesterol lipoproteids of high density (CLHD), cholesterol lipoproteids of low density (CLLD) in blood plasma. It was conducted ECHO cardiographic investigation (ECHO-CG) with the object of left ventricle hypertrophy.

Results: Prevalence of AH formed 30.5 ± 1.0 per cent. The age dynamics was positive from minimal aged 20–29 (7.0 ± 1.9 per cent) to maximum aged 50–59 (64.4 ± 12.6 per cent, $p < 0.001$). The structural analysis showed in the group aged 20–59 women that AH of the 1-st degree (14.2 ± 1.1 per cent) had been registered more often, AH of the 2-nd degree (9.6 ± 1.0 per cent) less and AH of 3-rd degree (6.7 ± 0.8 per cent) still less. The concentration of general cholesterol (GC) in blood plasma formed - 9.80 per cent, G – 5.20 per cent, CLHD – 5.80 per cent, CLLD – 4 per cent. Mass of left ventricle myocardium (MLVM) was the highest in the persons with concentric hypertrophy (CH) of left ventricle (329 ± 17.8). With eccentric hypertrophy (EH) of left ventricle (275.9 ± 13.9). Index of mass of left ventricle myocardium (IMLVM) was the highest in CG (211.2 ± 11.98 g/m) and EG (180.1 ± 8.9 g/m) in comparison with the criteria of LVH, FDV was marked (119.1 ± 3.6 ml and 51.6 ± 5.1 ml) in the persons with CG and EG.

Conclusion: Thus high prevalence of AH was marked in the female population, prevailed AH of the 1-st degree that showed unfavourable epidemiological situation. The obtained results should take into consideration during working out of measures in the primary and secondary prophylaxis of AH.

PP.28.111 MANAGEMENT OF HYPERTENSIVE CRISIS IN THE EMERGENCY DEPARTMENT, AN ITALIAN EPIDEMIOLOGICAL STUDY. PRELIMINARY DATA

L. Magrini, S. Vitali, S. Santarelli, B. De Berardinis, C. Bongiovanni, F. Tega, E. Ferri, S. Di Somma. *A.O. S.Andrea-Emergency Dept.-University of Rome La Sapienza, Rome, Italy*

Introduction: Aim of our experimental epidemiological study was to improve the understanding of the clinical condition of acute, severe hypertension

managed in the Emergency Department (ED). We evaluated epidemiological data of the in-hospital mortality, end-organ damage, time to achieve controlled blood pressure. We show preliminary data collected in the period October-December 2009.

Patients and Methods: 48 patients were studied until now (28F,20M, mean age 68.6yrs) arriving in ED with elevated blood pressure (BP). We recorded anamnestic data, physical examination, blood tests, levels of BP leading to initiation of treatment, antihypertensive medications used, time required to achieve blood pressure control, in-hospital outcomes.

Results: mean Systolic BP/Diastolic BP(SBP/DBP) at admission was $212.3/105.8$ mmHg(mean BP 141.3 mmHg), and at pressure control (after mean 5.5 hours) was $143.7/76.5$ mmHg(mean BP 98.9 mmHg). Medications used for BP control were in 93.7% of cases intravenous drugs (iv), and in a short percentage of cases oral drugs (6.3%). Patients presented history of hypertension 70.8%, diabetes 20.8%, cardiac ischemic disease 25%, chronic cerebro-vascular disease 6.2%, chronic kidney failure 2%.

The in-hospital outcomes consist mainly in hospitalization (66.7%) for complications, or for those cases of poor pressure control after more than 24 hours of stay in ED (8 patients). No patients died in ED. 29/48 patients completed a 30-days follow-up, and no events have been recorded until now.

Conclusions: Preliminary data, show that hypertensive crisis is 1% of the total visits in our ED in a period of 3 months. In ED it is treated mainly with iv drugs, but also oral drugs are used. This indicates that ED physician's decision making for hypertension therapy is not standardized yet. The time required in pressure control is 5.5 hours, and this mirrors the different behaviours of ED physicians based on individual skill and experience. We are continuing the study to achieve a larger number of data useful to build a sort of "standardized protocol" for the diagnosis and treatment of hypertensive crisis in ED.

PP.28.112 CONTROL RATE ACCORDING TO THERAPEUTIC OBSERVANCE IN A COHORT OF HYPERTENSIVE PATIENTS TREATED WITH A COMBINATION OF TELMISARTAN AND HYDROCHLOROTHIAZIDE: PROTECT PLUS STUDY

C. Mounier-Vehier¹, A. Sanchez-Ponton², P. Delsart¹, D. Miljkovic³. ¹Hopital Cardiologique, Service Médecine vasculaire et Hypertension, Lille, France, ²Biostatem, Castries, France, ³Groupe Thérapeutique Cardiovasculaire/Thrombose, Unité Affaires Médicales Boehringer-Ingelheim, Reims, France

Objectives: The purpose of this study was to compare the control rate according to the observance assessed by the questionnaire of the French Committee of Fight Against Hypertension (CFLHTA) including 6 questions.

Method: PROTECT PLUS is an pharmaco-epidemiologic study with assessment of the observance. An observance was rated as good if the patient answered "NOT" all the questions, average if he answered "YES" one or two questions and poor if there were more than two answers "YES".

Results: 3443 patients out of 4255 were included in the analysis. Observance was good for 34.2% of the patients, average for 56.1% and poor for 9.7%. We observed a significant difference on control rate (SBP/DBP $< 140/90$ mm Hg) with 38.2%, 44.8% and 48.0% of control rate for poor, average and good observance respectively ($p = 0.0004$). The patients having a poor observance were more sedentary compared to the patients having a good observance. In the same way, they were more often and significantly diabetics and dyslipidemic, had more abdominal obesity and consumed more alcohol than the patients with a good observance. "Poor observing" had more often left ventricular hypertrophy and microalbuminuria than "good observing"; furthermore, they had significantly more history of Stroke/TIA and peripheral artery disease.

Conclusion: More than half of the patients was not correctly observing. One found a significant correlation between observance and control rate of blood pressure. Unfortunately the population of "poor observing", which had weakest control rate, was also which had the most comorbidities and more at high-risk of developing cardiovascular events. An increased sensibilization of this high-risk population to the therapeutic observance by educational programs and specific follow up appear to be essential.

PP.28.113 TWENTY-YEAR TRENDS IN CARDIOVASCULAR RISK FACTORS AMONG SWEDISH MEN: IMPACT OF OVERWEIGHT AND OBESITY

T. Cars¹, L. Lind¹, M. Neovius², J. Sundström¹. ¹Uppsala University - Dept. Medical Sciences, Uppsala, Sweden, ²Karolinska Institutet - Clinical Epidemiology Unit, Stockholm, Sweden

Objective: To assess prevalences of diabetes mellitus type 2 (T2DM), hypertension and hypercholesterolemia across BMI categories during 20 years of aging among Swedish men.

Design and Method: The longitudinal population-based cohort Uppsala Longitudinal Study of Adult Men (initially 2322 50-year-old men) was used. Weight, height, blood pressure, total cholesterol and plasma glucose were measured at ages 50, 60 and 70.

Results: The prevalences of overweight (BMI 25–29.9 kg/m²) were 47%, 52% and 63% at 50, 60, and 70 years of age. At the same ages the prevalences of obesity (BMI ≥30) were 7%, 9% and 13% respectively. The corresponding prevalences of T2DM were 5%, 6% and 11%; hypertension 42%, 68% and 72%; and hypercholesterolemia 95%, 91% and 81%. The prevalence of T2DM was higher with higher BMI categories at each age: 4/5/5% of normal weight, 4/5/12% of overweight and 13/16/23% of obese men, at 50, 60 and 70 years of age, respectively. Hypertension followed a similar pattern with 33/62/67% (normal weight), 49/75/77% (overweight) and 75/85/86% (obese). Prevalence of hypercholesterolemia was not related to BMI group at any age.

Conclusions: An approximate doubling of the prevalences of obesity, diabetes and hypertension was observed over 20 years of aging among Swedish men. The significance of overweight and obesity for the prevalence of diabetes and hypertension appears to persist with increasing age.

PP.28.114 THE IMPACT OF UNCONTROLLED HYPERTENSION ON CARDIOVASCULAR RISK IN PATIENTS WITH METABOLIC SYNDROME

D. Tsounis, N. Brellas, G. Stamos, V. Laschos, D. Voutsela, D. Platoyiannis. *General Hospital of Trikala - Department of Cardiology, Trikala, Greece*

Metabolic syndrome, according to its definition, is recognized as an additional risk factor for atherosclerosis, which is responsible for cardiovascular events.

Objective: To evaluate the correlation between uncontrolled hypertension and inflammation markers in patients with metabolic syndrome and also the incidence of cardiovascular events in these patients.

Methods: During 2004–2006 we studied 63 patients with metabolic syndrome, 39 women (29–56 years old) and 24 men (31–62 years old). Patients reported high blood pressure (BP) values (BP >130/80 mmHg) and normal inflammation markers at screening. Every 6 months and when a cardiovascular event occurred, inflammation markers such as fibrinogen, homocysteine, CRP and BP were reported. No one received medication, apart from lifestyle recommendations concerning diet salt restriction, body weight loss and physical exercise (brisk walking at least 3–5 Km/day).

Results: In the first 6 month follow up visit 26 patients (41%) showed low compliance with our lifestyle recommendations and reported high BP values (lowest 173/98 mmHg, highest 205/103 mmHg), increase in inflammation markers (CRP 0.2 → 1.8, homocysteine 6.7 → 21.3, fibrinogen 158 → 306 - mean values) and so medication was prescribed. From those, during their 12 month follow up period, 10 patients (6 females, 4 males) had heart attack, 9 patients (7 females, 2 males) an acute coronary syndrome and one male patient had a stroke. During the next 2 years, 4 out of 16 (25%) had an acute coronary syndrome, during which inflammation markers were increased (CRP = 2.1, Fibrinogen = 263, homocysteine = 17.2, mean values). From the rest 37 patients, who followed are guidelines, only one male patient had a stroke during the follow up period, with inflammation markers CRP = 2.3, fibrinogen = 186 and homocysteine = 16.7.

Conclusions: Taking into account that every one criterion that defines metabolic syndrome has positive effect on the development of atherosclerosis, uncontrolled hypertension, as shown from our study, increases the risk of cardiovascular events.

PP.28.115 HEART RATE AS A RISK FACTOR OF ARTERIAL HYPERTENSION DEVELOPMENT IN BELARUS URBAN POPULATION

V. Podpalov, A. Stehastlivenko. *Vitebsk State Medical University, Vitebsk, Belarus*

Objectives: To examine what heart rate quartile was connected with arterial hypertension development in Belarus urban population.

Methods: 342 people were examined during our research work. They were divided into 4 quartiles according to their heart rate: the first (control) – 86 people with 52–56 beat/min, second – 98 people with 63–65 beat/min, third – 49 people with 66–69 beat/min, and fourth – 109 people with 70–100 beat/min.

The survey included standard questionnaire for detection of cardiovascular risk factors, measurements of blood pressure, electrocardiography. The influence of heart rate quartiles on the hypertension development was determined in the logistic regression analysis.

Results: All men groups of quartile distribution of heart rate were the similar mean age. Higher prevalence of hypertension in the second quartile of heart rate ($P < 0.1$), third quartile of heart rate ($P < 0.05$) and the fourth quartile of heart rate ($P < 0.01$) than in the first quartile of heart rate were found. The hypertension prevalence in men is revealed the first (control) group – 13.9%; second group – 37.3%; third group – 42.9% and fourth group – 56.9%. All women groups of quartile distribution of heart rate were the similar mean age. Higher prevalence of hypertension in the second quartile of heart rate ($P < 0.1$), third quartile of heart rate ($P < 0.05$) and the fourth quartile of heart rate ($P < 0.01$) than in the first quartile of heart rate were found. The hypertension prevalence in men is revealed the first (control) group – 18%; second group – 40.4%; third group – 52.4% and fourth group – 54%. Data of third quartile of heart rate ($df=1$; $\chi^2_{Wald}=6.3$; $P < 0.05$) and fourth quartile of heart rate ($df=1$; $\chi^2_{Wald}=6.3$; $P < 0.01$) was positively related to hypertension prevalence after adjusting to the effects of age and sex.

Conclusions: Our findings show that the heart rate more than second quartile of heart rate (65 beat/min) with adjustment for the effects of age and sex is a risk factor for arterial hypertension.

PP.28.116 NONPHARMACOLOGICAL APPROACH TO WEIGHT REDUCTION IN ADULTS WITH HIGH NORMAL BLOOD PRESSURE AND OVERWEIGHT OR OBESITY

O. Molchanova, A. Britov. *National Research Centre for Preventive Medicine, Moscow, Russia*

Increased body mass is a strong risk factor for hypertension.

The aim was to evaluate the effects of dietary weight loss intervention in adults with high normal BP and overweight/obesity.

Methods and Results: Working population of men and women aged 25–54 was observed within the frames of longitudinal epidemiological study. In subjects with BMI >25 kg/sq and BP 130–139/85–89 mmHg a strong correlation of systolic BP (SBP) and BMI was revealed: $p=0.0001$ in women and $p=0.0045$ in men. The same was true for diastolic BP (DBP): $p=0.0001$ in women and $p=0.0001$ in men. It was revealed that increase of BMI by 1 kg/sq was associated with increase of SBP by 1.3 in women and by 0.7 mmHg in men ($p < 0.05$), of DBP increase by 0.7 in men and by 0.9 mmHg in women ($p < 0.05$). In stepwise regression analysis BM explains 27% of SBP variability and 11% of DBP variability in men. In women - 19% and 17% respectively.

Two groups were formed and followed for 3 years. Intervention group consisted of 203 subjects, control group - 252. A low-calories diet (1200–1500) and dietician's consultations were used in intervention group. At baseline BM in intervention group was 77.45 ± 1.24 in women and 72.19 ± 1.11 (kg) in men; in controls 78.05 ± 1.01 and 69.17 ± 1.90 (kg) respectively. Last follow up visit attended 76.6% of the participants. After 3 years a significant weight reduction was observed in the intervention group: 75.02 ± 1.17 in women and 69.56 ± 0.63 (kg) in men ($p < 0.05$). In controls BM increased: 82.07 ± 3.08 in women ($p < 0.05$) and 75.33 ± 2.89 (kg) in men ($p < 0.05$). BP decreased in the intervention group: - 3.27 for SBP and - 2.09 mmHg for DBP in women; - 1.92 and - 1.91 mmHg in men respectively. In control group BP increased: 2.97 mmHg SBP and 1.29 mmHg for DBP in women and 2.56 mmHg and 2.39 mmHg in men respectively (all $p < 0.05$).

Conclusion: Dietary approach to weight loss is effective tool in adults with high normal BP and overweight/obesity.

PP.28.117 EVALUATION OF CARDIOMETABOLIC RISKS FACTORS IN HYPERTENSION

D. Hakem, A. Boudjelida, H. Lafer, D. Zemmour, M. Ibrir, A. Berrah. *Internal Medicine, Dr Mohammed-Lamine Debaghine's Hospital, Bab El Oued, Algiers, Algeria*

Introduction: It is clearly established that hypertension 'HT' is associated to an accelerated atherosclerosis and to a rise of the cardiovascular events. The screening and the correction of the cardiovascular and metabolic risk factors 'CVMRF' reduce the morbi-mortality

Objectives: To estimate our practices in the evaluation of the CVMRF at the course of HT

Methods: A questionnaire is put back to the internist working in university hospital with following ITEMS: At what frequency do you estimate the CVMRF of yours patients followed for HT? What are the circumstances which lead you to estimate them? What are the biological examinations for which you ask for this evaluation? What are the clinical situations justifying this evaluation? On what therapeutic based your first and secondary prevention? Think you that systemic lupus 'SLE', rheumatoid arthritis constitutes an independent CVMRF and that they should prove this fact of the same therapeutic targets for HT, cholesterol, glycemia?.

Results: 50 cards analyzed. Only 1/3 of the practitioners practise annual screening risk. Evaluation of CVMRF is made in a overweight, dyslipidemia, metabolic syndrome (30%), pregnancy (80%), diabetes or stroke (100%), family history of fatal cardiovascular event (50%), congestive heart failure (70%). Renal function alteration, proteinuria, liver steatosis, cervical murmur are considered as alert signs only in 10% of the practitioners. The waist measurement, the abdominal perimeter, the index of systolic pressure 'IPS', the scores of evaluation of the CVMRF are not elements of monitoring in common consultation and only 20% of the practitioners realize them in a regular way. The relevance of the biological tests is found (70%).

Conclusion: The correction of the CVMRF is a part of the global care of management of HT to contribute to reduce its morbi-mortality. This investigation reveals that our practices remain failing particularly in primary prevention of HT to should allow to homogenize our practices before the occurrence of morbid events.

PP.28.118 PREVALENCE OF CARDIOVASCULAR RISK FACTORS IN HYPERTENSIVE PATIENTS IN BELARUS

V. Paulava¹, T. Nechesova¹, M. Liventseva¹, I. Korobko¹, T. Pavlovich², M. Belskaya¹. ¹Republican Scientific and Clinical Centre Cardiology, Minsk, Belarus, ²Belorussian State Medical University, Minsk, Belarus

Objective: To determine the prevalence of cardiovascular (CV) risk factors in hypertensive patients (pts) in Republic of Belarus.

Design and Methods: 1035 hypertensive pts, 421 men (40.7%) and 614 women (59.3%) from all regions of Belarus were included in this study. On ambulatory visit blood pressure (BP) measurements were performed in pts. Data regarding others CV risk factors were obtained using a special questionnaire. Hypertensive pts answered questions about their age, gender, residence area, an education level, duration of hypertension, CV risk factors (smoking, serum cholesterol, weight and growth, family history of CV diseases, diabetes and level of physical activity), regularity of antihypertensive drug intake.

Results: Mean age of hypertensive pts was 54.5 ± 0.3 years with BP average level $146.6 \pm 0.6/90.3 \pm 0.3$ mmHg. According to BP level 269 pts (26%) had adequate systolic BP control (<140 mmHg) and 321 pts (31%) had adequate diastolic control (<90 mmHg). However 64% of hypertensive pts indicated that they had accepted antihypertensive treatment daily. Among the hypertensive pts the prevalence of heredity tainted family history of CV diseases was 36%, hypercholesterolemia – 34%, increased body mass index (BMI) – 32%, the low level of physical activity – 31%, smoking – 17%, hyperglycemia – 12%. There were more smokers in hypertensive men than in hypertensive women (34% vs. 5%, $p < 0.05$). Increased BMI was observed more often in women than in men (33% vs. 26%; $p < 0.05$). By using statistical one-factorial dispersion analysis we determined two significant factors influencing on increase of serum cholesterol and glucose levels as well as BMI in hypertension pts: low level of education ($F = 2.9$, $F = 4.7$, $F = 4.9$) and greater duration of hypertension ($F = 22.6$, $F = 4.7$, $F = 2.4$).

Conclusions: BP control in Belarusian hypertensive pts is clearly insufficient. Hypertensive pts have high prevalence of hypercholesterolemia, increased BMI, the low level of physical activity indicating that more active role of general physicians and cardiologists is needed for the correction CV risk factors and adequate treatment of hypertension in Republic of Belarus.

PP.28.119 IMPACT OF THE HYPERTENSION ON GENERAL MORTALITY IN VENEZUELA

M. Luzardo, S. Briceño, E. Silva, J. Villasmil. Instituto de Enfermedades Cardiovasculares. Facultad de Medicina. Universidad del Zulia, Maracaibo, Venezuela

Objective: To determine the impact of the Hypertension (H) on general mortality in Venezuela during the period: 2003–2007.

Methods: The data was obtained of the Health Ministry, surged of the individual death certificates, selecting the codes associated with H mortality

(F01, I10-I13.9, I15.0-I15.9, I66.9, I67.2, I67.4, I70.1, O10-O16, P00.0, P29.2). Also, we obtained the mortality by heart diseases (HD) (codes: I05-I09, I11-I13, I121, I151). It was used the 10th Review of International Classification of Diseases Codes. The mortality rates were calculated using the population of Venezuela estimated for the National Statistical Institute. The HD and H mortality rates were calculated for each studied year and were expressed as the mean of the period. The impact of the H mortality on the HD mortality and general mortality was estimated using the proportionate rates.

Results: The general mean H mortality rates was 32.15 per 100 000 population, 31.91 per 100 000 population in males and 32.93 per 100 000 population in females. The age-adjusted H mortality rates for each studied year were: for males 673.66, 612.76, 694.10, 609.3 and 448.89 per 100 000 population, respectively; and for females, 842.82, 927.25, 836.29, 794.79 and 1090.61 per 100 000 population, respectively. The mean proportionate rate of the H mortality (I11-I13) on HD mortality was 24.92% and H was 7.05% on the general mortality.

Conclusions: In Venezuela, the H is responsible for the 7.05% of the general mortality. The H (I11-I13) explains the 24.92% of the HD mortality. The females show a higher tendency to dye for H. Non-sistematic observations permits to think in the presence of underestimate values for the H, besides the procedures used for the selection and codification of the basic cause of death, and the following selection rules and their sequences, lead to the exclusion of pathologies with H etiology, being probable that the true impact of H on general mortality be higher than the national mortality data permits to know.

PP.28.120 EPIDEMIOLOGY OF HYPERTENSION IN 061 EMERGENCY SYSTEM OF GALICIA

M. Chayán Zas, A. Chayan Zas, V. Faraldo Balado, A. Iglesias Vazquez, F. Contreras Martinon, M.V. Barreiro Diaz. Fundacion Publica Urgencias Sanitarias 061 Galicia, Santiago De Compostela, Spain

Objectives: Galicia is an autonomous region situated in the northwest of Spain. Most of the emergencies treated outside hospitals are attended trough the 061 phone system, consisting of a Coordination Station situated in Santiago de Compostela, where all the emergency calls are answered. The objective of this study is to describe the situation of emergencies due to high blood pressure evaluated through this centralized 061 emergency system along 2008.

Methods: Descriptive and longitudinal retrospective study (January 1 to December 31, 2008). The population under investigation consisted on patients from Galicia who demanded medical assistance or advice by phone due to high blood pressure. The study variables were age, gender, time of day of the consultation, monthly distribution and resolution of the consultation.

Results: 1912 consultations by phone associated to high blood pressure emergencies. Women did more consultations (1323, 69%). The age that more attendances required was that of those over 80 years (670 patients). The most calls were received was from 20:00 to 21:59 hours (357 patients). March was the month with the highest number of calls (212 calls). Among the total consultations performed through the centralized 061 system, 53% (1058) were solved by a physician over the phone without mobilization of resources, 41% (802) were derived to a clinical center in ambulance, 3% were solved by a domiciliary visit of the physician and nurse, and the remaining 3% required the mobilization of a doctor and an ambulance equipped with life support system.

Conclusions: The assistance given by phone through the 061 system in Galicia to the patients who suffer from high blood pressure is very important, since the number of consultations for a hypertensive problem is elevated. A high percentage of these emergency calls are solved over the phone with the advice and indications provided by the attending physician. The high number of consultations might indicate that hypertensive patients are neither properly controlled nor well informed about their condition and treatment.

PP.28.121 RELATION OF ABDOMINAL OBESITY, METABOLIC RISK FACTORS, AND LEFT VENTRICULAR HYPERTROPHY IN HEALTHY MIDDLE-AGED AND OLDER MEN

C.J. Kim¹, I.S. Sohn¹, J.H. Park¹, E.S. Jin¹, J.M. Cho¹, J.H. Bae². ¹Kyung Hee East-West Neo Medical Center - Department of Cardiology, Seoul, South Korea, ²Kyung Hee Medical Center- Department of Cardiology, Seoul, South Korea

Background: Obese individuals are likely to have a high burden of sub-clinical disease and at increased risk of development of overt cardiovascular disease (CVD). We were to determine the relationships between abdominal obesity, other metabolic risk factors, and electrocardiographic left ventricular hypertrophy (ECG-LVH) in healthy Asian middle aged and older men who have different anthropometric habitus from westerners.

Methods: Healthy 251 men who visited for a general health examination and free from overt medical illness were enrolled. Sixty-five men (25.9%) with waist circumference (WC) ≥ 90 cm were compared with 186 men with WC < 90 cm.

Results: Men with increased WC had increased prevalence of traditional risk factors and higher prevalence of increased fasting plasma insulin, insulin resistance, and metabolic syndrome and decreased insulin sensitivity. WC increased substantially as the numbers of elements of metabolic syndrome. Men with increased WC had higher Cornell voltage, and Cornell voltage product.

Conclusion: The metabolic risk factors and ECG-LVH are prevalent in healthy Asian middle-aged and older men with abdominal obesity. Thus routine measurement of WC and simple ECG may reflect subclinical CVD and predict obesity-related health risk.

Table. Prevalence of metabolic criteria and index of insulin resistance and sensitivity

Metabolic criteria	WC		P value
	Normal (WC < 90 cm) (n=186)	Increased (WC ≥ 90 cm) (n=65)	
Triglycerides ≥ 150 mg/dL, n(%)	59(31.7)	38(58.5)	0.0001
HDL cholesterol < 40 mg/dL, n(%)	54(29.0)	27(41.5)	NS
Systolic BP ≥ 130 mmHg, n(%)	56(30.1)	32(49.2)	0.005
Diastolic BP ≥ 85 mmHg, n(%)	28(15.1)	17(26.2)	0.04
Fasting blood glucose ≥ 110 mg/dL, n(%)	20(10.8)	8(12.3)	NS
Insulin (μ U/mL)	5.7 $\pm$ 2.7	8.9 $\pm$ 4.7	< 0.0001
HOMA-IR	1.37 $\pm$ 0.69	2.21 $\pm$ 1.23	< 0.0001
QUICKI	0.73 $\pm$ 0.16	0.62 $\pm$ 0.09	< 0.0001
Metabolic syndrome, n(%) ^a	20(10.8)	33(50.8)	< 0.0001
Metabolic syndrome by ATP III, n(%) ^b	20(10.8)	16(24.6)	0.006

PP.28.122 EFFICIENCY OF TREATMENT OF PATIENTS WITH ESSENTIAL HYPERTENSION IN PRIMARY HEALTH CARE FACILITIES OF RUSSIA (THE DATA FROM THE REGISTRY FOR ESSENTIAL HYPERTENSION)

S. Evstifeeva¹, E. Oschepkova¹, V. Gridnev², P. Dovgalevsky². ¹Russian Cardiology Research Complex, Moscow, Russia, ²Saratov Research Institute of Cardiology, Saratov, Russia

Objective: Russian Registry for essential hypertension (Register EH) work with automatic information-analytical system (the computer program) with real time Internet-technologies. The Register EH works during from 2005 to 2009 years in 18 establishments primary health care ambulatories from different cities in Russia.

The aim of our study was to evaluate efficiency of treatment EH patients (pts) and total cardiovascular (CV) risk EH pts from 2005 to 2009 years (y).

Design and Method: During 2005 to 2009 years 10184 EH patients were observed in dynamics (38,5% M., av. age 58,2 $\pm$ 6,9 y and 61,5% F., av. age 61,1 $\pm$ 11,5y.). 50% observable patients had average levels of blood pressure (BP) about 131–144/91–90 mmHg, 25% pts $< 130/80$ mmHg and 160/99 mmHg. All pts were treated according Russian Recommendations by management of arterial hypertension.

Results: Show by Table

Conclusion: In Russia from 2005 to 2009 y-s EH patients have high and very high additional CV risk due to presence OD and/or established cardiovascular or renal disease. Great part of pts didn't save goal BP during from 2005 to 2009 y., and due to poor adherence to treatment. In last years we observed increase tendency more effective treatment at EH pts for some primary health care ambulatories.

Parameters	2005 y	2006 y	2007 y	2008 y	2009 y
CV risk (SCORE model) [Me(25%,75%)	5,1 (1,5;11,3)	4,7 (1,5;10,3)	4,1 (1,4;8,7)	4,4 (1,6;9,8)	4,9 (2,0;9,6)
Subclinical organ damage (OD) and/or established cardiovascular or renal disease (%)	65,0	84,0	86,0	78,0	90,0
Goal BP at the treatment (low BP<140/90 mm Hg) (%)	50,0	59,0	56,0	38,0	55,0
Save goal BP at the treatment (low BP<140/90 mm Hg) (%)	9,0	20,0	26,0	17,0	15,0

PP.28.123 COULD EARLY DIAGNOSIS OF METABOLIC SYNDROME LOWER THE INCIDENCE OF ATRIAL FIBRILLATION IN HYPERTENSIVE PATIENTS?

E. Belu¹, R. Musetescu¹, D.D. Ionescu¹, A.E. Musetescu², V. Belu³, M. Cosulschi², S. Gusti², D. Toader¹. ¹Cardiology Center, Craiova, Romania, ²University Of Medicine, Craiova, Romania, ³County Hospital, Campulung, Romania

Objective: Metabolic syndrome consists of several interrelated risk factors that have been shown to increase the risk of heart disease and also the risk of atrial fibrillation.

Method: We have included in the study group patients admitted in Cardiology Center in 2006 and we have divided them in 2 subgroups: individuals with hypertension and metabolic syndrome according to NCEP criteria and the second subgroup of hypertensives without metabolic syndrome. The follow-up period lasted for 3 years. We performed multivariate logistic regression analyses in order to assess the relationships between hypertension, metabolic syndrome, atrial fibrillation, dyslipidemia and diabetes mellitus.

Results: We have evaluated 542 patients with metabolic syndrome and hypertension mean age of 55,12 years. There were 48,72% men and 51,28% women. The profile of our MS patients was depicted by older age, higher systolic pressure, higher body mass indexes and higher incidence of atrial fibrillation. The percent of patients with diabetes mellitus was 34,19%, but 27,35% from them had impaired fasting glucose. This population had more left ventricular hypertrophy, renal and cardiac diseases were more prevalent ($p < 0.01$), and they received more antihypertensive drugs ($p < 0.05$).

Conclusions: The study shows the poor adherence to treatment of hypertensive patients with metabolic syndrome. The hypertensive patients with atrial fibrillation are achieving the target values for blood pressure in a very small percent ($p < 0.05$). The number of important cardiovascular events is increased in the case of these young patients with a very high risk profile.

PP.28.124 EPIDEMIOLOGY OF ARTERIAL HYPERTENSION IN UKRAINE: RESULTS OF THE 25-YEAR OBSERVATION

I. Gorbas, I. Smyrnova. Research Institute of Cardiology, Kiev, Ukraine

Objective: of the investigation is to study the 25-year epidemiological situation dynamics relative to arterial hypertension (AH) in Ukraine.

Two separate standard examinations of urban residents aged 18–64 years (respectively 2456 and 1975 persons) were conducted at an interval of 25 years, using conventional epidemiological methods and evaluation criteria.

Within the observational period the AH prevalence changed from 30.6 to 35.3% ($\delta > 0.05$) at the expense of an increase in the average systolic arterial pressure levels.

The results of study have revealed the high prevalence of risk factors among patients with AH. Only 5.6% persons have none of risk factors. In 25.4% inspected AH is reported with one, in 33.2% - with two and in 35.8% - with three or more by risk factors.

In this group 46.6% of males and 35.9% of females had an overweight, while 25.9 and 48.2% suffered from the obesity. Every third male or female with AH displayed the hypercholesterolemia and every fifth - hypertriglyceridemia; 40.1% of males and 5.6% of females with AH were smokers, 42.6% and 50.8% respectively had low physical activity.

The dynamics of division of inspected with AH depending on the amount of risk factors during 25 years testifies to the substantial increase from 21.5 to 35.8% ($p < 0.05$) amounts of patients with three and more by risk factors.

The prevalence of overweight, obesity and smoking was practically unchanged, whereas the hypercholesterolemia prevalence increased from 22.2 to 35.6% ($p < 0.05$) and hypertriglyceridemia frequency – from 14.5 to 20.0% ($\delta > 0.05$).

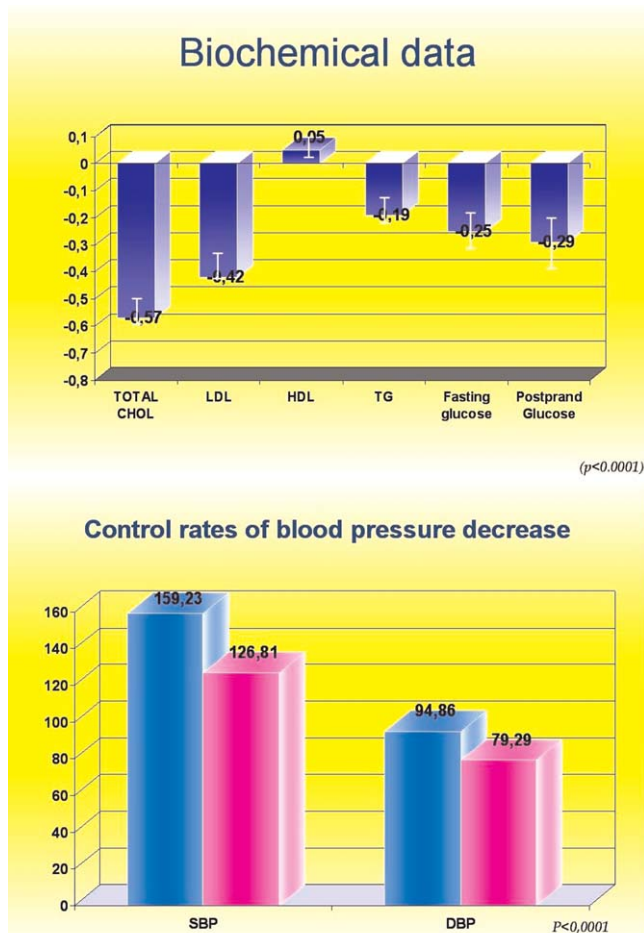
During 25 years knowledge of patients about the presence of AH grew from 39.7 to 80.2%, amount of persons which use antihypertensive medications increased from 28.7 to 57.4%. Efficiency of treatment did not almost change, hesitating from 9.1 to 12.2%.

An epidemiology situation in relation to AH remains unfavorable. At presence of certain of risk profile it is heavy to hope in the near time on the noticeable decline of death rate of population.

PP.28.125 METABOLIC EFFECTS OF THE THERAPY, BASED ON PERINDOPRIL ARGININE, IN NATIONAL PROGRAM PREMIA

V. Mychka, M. Kirillova, U. Prokhorova, I. Chazova. *Russian Research Cardiology Complex, Moscow, Russia*

Aim: To estimate antihypertensive efficacy and cardiometabolic effects of a new form of perindopril in hypertensive patients, stages 1–2, with high risk.



Material and Methods: The randomized study included 2200 patients from 73 towns with hypertension stages 1–2: average age 56.2 ± 0.22 years, 42.6% men and 57.4% women, weight 82.94 ± 0.30 kg, body mass index 29.26 ± 0.09 kg/m², waist circumference 95.14 ± 0.27 cm, tobacco consumption 15.50%, family history of cardio-vascular diseases 18.3%. Among them patients with metabolic syndrome were 44.30%, with diabetes mellitus were 13.20%. Patients with increased blood pressure (BP) of 1 stage were 29.60%, 2 stage – 70.40%, of which 83.20% were previously treated, 16.80% – previously untreated, 36.70% – regularly treated, 63.30% – treated irregularly.

All patients underwent assessment of office BP measurement, glucose during oral glucose tolerance test, total cholesterol (TC), low density lipoproteins (LDL), high density lipoproteins (HDL), triglycerides (TG).

Results: The adjusted doses by the end of the study 16 weeks later were: 37.2% received 5 mg perindopril, 27.7% – 10 mg, 0.5% – 2.5 mg. In 34.6% indapamid retard in dose of 1.5 mg was added to 10 mg perindopril monotherapy. As a result the systolic BP significantly decreased from 159.23 ± 0.26 mmHg to 126.81 ± 0.19 mmHg ($\delta < 0.0001$), diastolic BP decreased from 94.86 ± 0.16 mmHg to 79.29 ± 0.13 mmHg ($\delta < 0.0001$). The initial TC level decreased from 5.74 ± 0.02 mmol/L to 5.18 ± 0.09 mmol/L, $\delta -0.57 \pm 0.02$ ($\delta < 0.0001$) ($n = 2086$), LDL level from 3.45 ± 0.04 mmol/L to 3.05 ± 0.04 mmol/L, $\delta -0.42 \pm 0.03$ ($\delta < 0.0001$) ($n = 735$), TG level from 1.82 ± 0.03 mmol/L to 1.65 ± 0.03 mmol/L, $\delta -0.19 \pm 0.02$ ($\delta < 0.0001$) ($n = 821$), HDL increased from 1.28 ± 0.02 mmol/L to 1.32 ± 0.02 mmol/L, $\delta 0.05 \pm 0.01$ ($\delta < 0.0001$), fasting glucose level decreased from 5.36 ± 0.03 mmol/L to 5.10 ± 0.02 mmol/L, $\delta -0.25 \pm 0.03$ ($\delta < 0.0001$) ($n = 2052$), postprandial glucose level decreased from 6.92 ± 0.10 mmol/L to 6.59 ± 0.08 mmol/L, $\delta -0.29 \pm 0.06$ ($\delta < 0.0001$) ($n = 370$).

Conclusion: The results of perindopril therapy in hypertensive patients showed antihypertensive effect with significantly improved rates of lipid and glucose metabolism.

PP.28.126 MID TERM CLINICAL CONSEQUENCES OF HYPERTENSION AND DIFFERENT CARDIOVASCULAR RISK FACTORS IN A SUBGROUP OF ROMANIAN PATIENTS

E. Belu¹, V. Belu², R. Musetescu¹, D.D. Ionescu¹, M. Cosulsi³, A.M. Musetescu⁴, S. Gusti⁴. ¹Cardiology Center, Craiova, Romania, ²County Hospital, Campulung, Romania ³University, Craiova, Romania, ⁴University Of Medicine, Craiova, Romania

Purpose: The goal of this study was to assess the proportion of hypertensive patients who had 1 or more of the following major modifiable cardiovascular risk factors: dyslipidemia, metabolic syndrome, diabetes, current smoking and overweight.

Material and Methods: A total of 650 individuals, aged between 20–80 years with a positive diagnosis of arterial hypertension were enrolled in our prospective epidemiological study in 2006. The follow up period lasted for 3 years. Data collection was conducted in local county hospital in the participant's residential area. During the study visit, we administered a standardized questionnaire which assessed: age, sex, education, cigarette smoking, myocardial infarction, congestive heart failure and the previous diagnosis and treatment of hypertension, high cholesterol, and diabetes. Descriptive statistics (SPSS 17) for categorical variables were used for the study cohort.

Results: 328 women and 322 men were available for analysis. 50.37% of patients had been diagnosed with high blood pressure for more than 10 years, 21.84% had HT between 5 to 10 years and 19.53% had a positive diagnosis of HT between 2 to 5 years. The prevalence of the risk factors in study population was: 14.30%, 14.30%, and 13.53% of men and 13.38%, 14%, and 16.46% of women had 1, 2, and 3 of these risk factors, respectively. We also assessed the prevalence of individual metabolic syndrome (MS) components and number of fulfilled components. MS was present in 268 subjects (41.23%) according to the NCEP-ATP III definition. The prevalence of the metabolic syndrome was higher in women (21.23%) compared with men (20%).

Conclusions: Arterial hypertension is a major cause of cardiovascular morbidity and mortality in our area. Overall, 72.31% of hypertensive patients have at least 1 cardiovascular risk factor from the 7 cardiovascular risk factors assessed in the current study. Effective population-based interventions such as smoking cessation, improved diet, and increased physical activity can safely and effectively lower the risk of cardiovascular morbidity and mortality.

PP.28.127 EPIDEMIOLOGY OF HYPERTENSION IN SLOVENIA

B. Salobir, R. Accetto, J. Brguljan, P. Dolenc. *University Medical Centre Ljubljana, Dpt of Hypertension, Ljubljana, Slovenia*

Hypertension is a major cardiovascular risk factor and at the same time one of the most prevalent chronic condition worldwide. With effective early treatment the development of consequences of hypertension: coronary artery disease, heart failure, stroke and chronic kidney disease can be prevented or reduced. In past years every effort has been made to improve awareness of importance of screening for hypertension and lowering blood pressure (BP) below 140/90 mmHg.

The aim of the epidemiological study of hypertension in Slovenia was to assess the prevalence of high BP in adult population and the extent to which high BP is being detected, treated and controlled.

9903 subjects aged ≥ 20 years, randomly selected from state resident register were invited to first visit where BP was measured and questionnaire was filled in. Office BP was calculated as the mean of 2 measurements using a validated automatic BP device (Omron 705IT). Subjects with systolic BP ≥ 140 and/or diastolic BP ≥ 90 mmHg were invited to repeated BP measurement in the next 3 to 6 weeks. Data about history and treatment of hypertension were acquired by questionnaire.

Solely 3067 subjects (1309 men and 1758 women) participated in the study which indicates 30.9% responsiveness. The prevalence of hypertension, defined as office BP $\geq 140/90$ mmHg or being on antihypertensive treatment was 66%, of which 61% were treated. In 39% of subjects with BP $\geq 140/90$ mmHg elevated BP values were not previously known. 33.5% of treated subject attained goal BP of $<140/90$ mmHg. Majority of treated hypertensive patients were managed with antihypertensive drugs (94.5%), the rest with nonpharmacological treatment only (5.5%).

The obtained high prevalence of hypertension in adult population in Slovenia is probably overestimated due to influence of white coat effect – attendance to repeated BP measurements was low. Although the percentage of patients with controlled BP ($<140/90$ mmHg) ranks Slovenia among countries with better BP control more effort is needed to improve the treatment.

PP.28.128 STUDY OF THE CARDIOVASCULAR RISKS FACTORS IN A POPULATION IN THE BASQUE COUNTRY (SPAIN)

G. Mediavilla¹, J. Iturralde¹, A.A. Rodríguez¹, J. Martínez-Gorostia¹, N. Miskovic¹, M.L. Alarcia¹, C. Castellano-Hurtado¹, B. Barrios¹, I. De Torre¹, A. Ruiz De Loizaga¹, J. Larrañaga¹, C. Parra¹, M.T. Hernandez-Sortes², M. Alonso-Vallejo², J. Ocharan². ¹Comarca Araba-Osakidetza, Vitoria, Spain, ²H. Txagorritxu-Osakidetza, Vitoria, Spain

Objective: Cardiovascular diseases constitute the first cause of death in the majority of the developed countries. In the Basque Country, they are the first cause of death among women and the second in men, after tumours, which represents almost the 32% of deaths in 2001. Hence, the intervention in this problem being one of the priority points of our health Plan. The aim of this study is to know the control of the Cardiovascular Risk Factors in our population.

Method: A descriptive transversal study was conducted in September 2009 to a population of 289,923 patients from C. Álava (Basque Country, Spain) using an analysis of the OSABIDE programme database.

Results: HTA was screened to 47.94% of the assigned population and to the 59.79% of the patients who have come to our clinics at least once in the last 2 years, obtaining a prevalence in our clinics of 14.95%.

Glucose and Cholesterol analysis to the 46.01% of the population and to the 81.23% of our patients, obtaining a prevalence of diabetes of 7.01% and of hypercholesterolemia of 14.62%.

Body Mass Index was calculated to the 51.14% of the population, finding a prevalence of obesity of 6.85%.

Tobacco: 57.68% of the population aged over 15 years old and 69.53% of the patients were screened. 18.08% of them smoke.

Cardiovascular risk was assessed to the 57.61% of our patients.

We obtained good control of TA (TA $<140/90$) in the 42.67% of the patients, cholesterol (CT <200) in the 38.88% and HbA1c ($<7\%$) in the 39.40%.

Conclusions: We have improved the level of the prevalences obtained and the control level, although the results should improved, we believe we need more time to register all our population. We consider important the use of the computerized clinic in order to show the real situation of our population and therefore being able to act with greater precision.

PP.28.129 THE MEDICAL AND ELUCIDATIVE ACTION ON BLOOD PRESSURE MEASUREMENT IN BELARUS

I. Lazareva, T. Netchessova. *Republican Scientific and Practice Centre Cardiology, Minsk, Belarus*

Objective: To study the response of the urban population of Belarus and the prevalence of arterial hypertension (AH) in different age groups in Belarus.

Design and Methods: On the 21 of September 2009 leading cardiologists of Belarus gave the interview to the 1 Channel of Belorussian Radio about the necessity of blood pressure (BP) measurement and regular BP control in hypertensive patients, risk factors of arterial hypertension. On the 23 of September the medical and elucidative action (Measure your blood pressure, say to myocardial infarction and stroke -No) took place in majorities of cities of Belarus in supermarkets, most of polyclinics, metro stations in Minsk.

Results: During one day 255855 persons measured their BP. High BP was revealed in 74920 persons (29,3%): in 28883 men (38,6%) and 46037 women (61,4%). Among 74920 persons with arterial hypertension 3556 were 20–30 years old, 7692 – 31–40 years old, 16041 – 41–50 years old, 23180 – 51–60 years old, 24435 – more than 60 years old. For the first time arterial hypertension was detected in 8892 persons (11,9%). 1468 persons needed the emergency aid.

Conclusions: This medical and elucidative action showed good response of Belorussian population and wide prevalence of arterial hypertension in Belarus.

PP.28.130 MODIFIABLE CARDIOVASCULAR RISK FACTORS- ARE THEY STILL PROBLEM FOR HYPERTENSIVE PATIENTS?

L. Woznicka-Leskiewicz¹, K. Malaczynska-Rajpold², A. Kuczmarska², I. Lipska². ¹Department of Hypertensiology, Angiology and Internal Medicine, University of Medical Science, Poznan, Poland, ²University of Medical Science, Poznan, Poland

Keywords: Modifiable cardiovascular risk factors, hypertension, coronary artery disease.

Objectives: Assessment of modifiable risk factors of cardiovascular diseases as a health problem of the population with arterial hypertension.

Design and Methods: We examined 58 hospitalized hypertensive patients (38 men and 20 women). They were divided in two groups: A- 28 patients without coronary artery disease (19 men and 9 women) and B- 30 patients with coronary artery disease (19 men and 11 women). The average age in groups was: A- 57,79 yrs, B- 65,67 yrs. Following measurements were taken on each patient: SBP, DBP, level of glycaemia, uric acid, HDL, LDL and total cholesterol, triglycerides, urea, creatinine, BMI. Family history and current treatment were also considered. The t-student test was used for the statistical analysis, ρ Spearman was taken to analyze the correlation of statistically significant values.

Results: We revealed statistically significant differences between the means: total cholesterol: A ($5,45 \pm 1,2$ [mmol/l]) and B ($4,55 \pm 0,94$ [mmol/l]) $p \leq 0,01$; LDL: A ($3,47 \pm 1,04$ [mmol/l]) and B ($2,63 \pm 0,77$ [mmol/l]) $p \leq 0,001$. The BMI >30 kg/m² was noticed: in the group A in 46,43% (women-17,86%, men- 28,57%) and in the group B in 30% (women-10,0%, men-20,0%). Hypercholesterolemia was noticed in the group A in 57,14% (women-17,86%, men-39,29%) and in the group B in 38,23% (women-10%, men-23,3%). Moreover, in the group A we revealed positive correlations between SBP and BMI ($p=0,0005$), also between diastolic blood pressure and BMI ($p=0,021$).

Conclusions: Obesity and hypercholesterolemia are still problem for hypertensive patients, especially for those without coronary artery disease. Better lipid profile and lower percentage of people with hypercholesterolemia and BMI >30 kg/m² in the group of hypertensive patients with coronary artery disease, are probably the result of intensified nonpharmacological and pharmacological treatment of cardiovascular diseases. There is a need to pay special attention to effective prevention of hypertension and other cardiovascular diseases.

PP.28.131 CARDIOVASCULAR MORBIDITY ASSOCIATED WITH ELECTROCARDIOGRAPHIC ALTERATIONS IN PEOPLE WITH HYPERTENSION IN ANDALUCIA. PREHVA STUDY

E. Martín-Riobo¹, J. Redondo Sánchez², E.I. García Criado¹, L.A. Perula Torres³, L. Cea Calvo⁴, M. Villalba Calvente¹, E. Camacho Navarro¹. ¹Centro De Salud Fuensanta, Cordoba, Spain, ²Centro De Salud Fuensanta, Cordoba, Spain, ³Unidad Docente De Medicina Familiar Y Comunitaria, Cordoba, Spain, ⁴Medical Department Msd, Madrid, Spain

Objective: Different studies have associated the presence of electrocardiographic alterations with cardiovascular disease in patients with hypertension. Because only scarce studies have been done with random sampling the results cannot be applied to everyone with hypertension. Therefore, we have evaluated the relationship between different electrocardiographic alterations, changes in the rhythm (tachycardia, auricle fibrillation) and waveform (changes of ST/T, left ventricular hypertrophy), with the presence of cardiovascular disease in patients attending a Primary Care Center. The main objective of PREHVA was to identify the presence of left ventricular hypertrophy (LVH) in patients with hypertension.

Methods: We used an epidemiologic, transverse and multicenter study, with stratified random sampling. The study included 681 hypertension patients

being 35, or more, years old, which were controlled by 125 general practitioner in a Primary Care Center from Andalucía (Spain). We evaluated the clinical antecedents, risk factors and the cardiovascular diseases. Each ECG was analysed by one investigator, and then all the ECGs were analysed by a cardiologist. Finally, a bi-multivariate analysis for controlling confusion factors ($p < 0,05$) was made.

Results: 578 patients have been included in the main analysis. 41.5% (CR 95%: 37.6–45.4%) of the patients had repolarization alterations, 5.7% atrial fibrillation, 13.7% left ventricular hypertrophy (Cornell 12.6%, Sokolow 1.6%) and 22.1% cardiovascular diseases. No relations between the frequency of pulse and cardiovascular disease was found. The Relationship between Left Ventricular Hypertrophy, atrial fibrillation, and repolarization's alterations with Cardiovascular Disease (Multivariate analysis) in the table 1.

Conclusions: In patients with hypertension, the electrocardiographic and rhythm alterations are more frequently associated with cardiovascular disease, especially the atrial fibrillation, left ventricular hypertrophy and myocardial infarction. No relationship was found between the cardiovascular disease and angina pectoris, cerebrovascular accident or intermittent claudication. The ST/T alterations are more frequently associated with cardiovascular diseases but this has not been proved with any statistical significance, except in individual cases. Tachycardia was not correlated with the presence of cardiovascular disease.

	Without LVH (%)	With LVH (%)	p	Without AF %	With AF %	p	Repolarization's alterations. Odds Ratio	p
Cardiov. disease	21,3	29,9	0,270	20,1	58,6	<0,001	1,43(25,4-19,2)	0,076
A. pectoris	9,8	12,8	0,406	8,7	37,9	<0,001	1,35(11,7-7,9)	0,271
Myocardial inf.	3,3	6,4	0,169	3,1	13,8	0,003	3,68(6,3-1,8)	0,005
Intermittent claudic.	7,3	5,1	0,482	5,9	27,6	<0,001	0,91(6,8-6,3)	0,791
Congestive Heart Failure	6,3	10,3	0,199	4,6	48,3	<0,001	2,39(10,0-4,4)	0,009
Cerebr. disease	5,5	6,4	0,742	5,0	17,2	0,005	1,18(6,3-5,3)	0,637
Left ventricular hypertrophy				13,5	17,2	<0,567	3,54(221-7,4)	<0,001
Atrial Fibrillation	4,9	6,4	0,567				8,09(10,8-1,5)	<0,001

PP.28.132 FEATURES OF REALIZATION OF POPULATIONAL STRATEGY OF PREVENTIVE PROPHYLAXIS OF THE ARTERIAL HYPERTENSION ON PLACES

T. Poponina¹, M. Komarova². ¹Siberian State Medical University of Higher Professional Medical Education, Tomsk, Russia, ²Research Institute of Cardiology, Tomsk, Russia

Aim: It has been spent screening research of the population attached to polyclinics to study of features of realisation of populational strategy of preventive prophylaxis of arterial hypertension (AH) in 2006–2009 years.

Design and Methods: Screening of 914 patients of Tomsk and 717 patients of the Tomsk region has been spent.

Results: The average level of systolic blood pressure in city population has made $129,8 \pm 20,7$ mm hg, in area population - $141,1 \pm 24,7$ mm hg ($\delta = 0,001$). Frequency of smoking was statistically significantly above among patients of a city (31,1%), than area (22,9%). Patients of area had hypercholesterolemia (level of total cholesterol > 5 mmol/l) in comparison with patients of a city (63,5% against 50,5%, $\delta = 0,003$) more often. The average index of body mass index according to a city has made $26,8 \pm 4,8$ kg/m², areas - $28,9 \pm 5,6$ kg/m² ($\delta = 0,001$). According to out-patient cards patients of area authentically more often received recommendations on control of high blood pressure (72,4%), and on refusal of smoking (63,4%), than patients of a city (36,1% and 40,1% accordingly). Among patients with overweight (BMI > 25 kg/m²) 45,6% citizens and 72,3% patients from an area ($\delta = 0,001$) have received consultations on nutrition.

Conclusion: Thus, in population of patients of area authentically big prevalence of major factors of risk (RF) developments of cardiovascular

diseases is observed. During screening local doctors independently specified frequency of spent preventive consultations. Probably, it can explain discrepancy between frequency of RF in population and quantity of recommendations about their correction, simultaneously reflecting features of realization of populational preventive maintenance strategy in level of an out-patient link of public health services of Tomsk and the Tomsk region.

PP.28.133 AS HAS BEEN THE CONTROL OF BLOOD PRESSURE IN THE LAST 5 YEARS IN A POPULATION OF THE BASQUE COUNTRY?

J. Iturralde-Iriso, G. Mediavilla-Tris, J. Martinez-Gorostiaga, A. Rodriguez-Fernandez, N. Miskovic-Karacsonyi, M.L. Alarcia-Ceballos, A. Ruiz De Loizaga-Arellano, M.E. Ortega-Horrillo, M. Pinel-Monge, M.J. Mendaza-De La Hoz, T. Esparza-Otero, M. Lasso De La Vega-Martinez, C. Noriega-Bosch, J. Cora-Bardeci, M.T. Amiano-Arregui. *Comarca Araba, Osakidetza, Vitoria-Gasteiz, Spain*

Objective: To examine the control of the population with hypertension en the last 5 years.

Methods: A descriptive cross-sectional study has been design, using the data base of OSABIDE PROGRAM. Data obtained in September and October each year. The study population over 13 years of Alava, in the basque country (Spain)

Results: See the table

YEAR	2005	2006	2007	2008	2009
POPULATION*	196350	194852	194395	195845	195327
SCREENING	24.20%	36.62%	42.48%	46.28%	47.94%
PREVALENCE	12.43%	13.51%	14.18%	14.51%	14.95%
BLOOD TEST	49.50%	66.93%	71.51%	75.73%	76.13%
ADVICE ON DIET AND PHYSICAL EXERCISE	51.06%	57.48%	55.28%	60.57%	58.90%
EKG	49.05%	63.46%	69.65%	77.09%	78.26%
GOOD CONTROL**	43.10%	43.56%	41.73%	42.38%	42.67%

* POPULATION OVER 13 YEARS

** GOOD BLOOD PRESSURE CONTROL IS CONSIDERED UNDER 140/90 IN YOUNGER THAN 65 YEARS AND UNDER 160/95 IN OVER 65 YEARS

Conclusions: Through OSABIDE PROGRAM know us as is the control of hypertensive population in recent years. We have increased screening of our population, even though we should increase it. We have a low prevalence, because we have enough people undetected hypertension. The good control of hypertension is low, although we are improving every year. Its possible in coming years we improve

PP.28.134 THE INFLUENCE OF ARTERIAL HYPERTENSION TO MAIN CORONARY CHARACTERISTICS IN PATIENTS WITH CORONARY HEART DISEASE

N. Sydor¹, O. Fedorchuk², I. Sichkaruk³. ¹Volyn Regional Hospital Department of Invasive Cardiology, Lutsk, Ukraine, ²Volyn Regional Hospital for disables in Second World War Department of Cardiology, Lutsk, Ukraine, ³Lutsk City Hospital Department of Cardiology, Lutsk, Ukraine

Background: In Ukraine cardiovascular morbidity and mortality is one of the highest in Europe. Arterial hypertension (AH) is one of the most important modifiable risk factors for coronary heart disease (CHD) and its active control is a basis of primary and secondary cardiovascular disease prevention.

Objective: Was to establish the influence of AH to coronary artery (CA) characteristics in patients with stable angina pectoris with (group ²) or without (group ²²) history of myocardial infarction (MI) according to coronary angiography results.

Design: We studied 176 subjects. They were discharged from Volyn Regional Hospital with stable angina pectoris in 2006–2007. To group ² were enrolled 111 patients (98 men, 13 women; mean age 57.97 ± 8.54); group ²²–65 patients (58 men, 7 women; mean age 61.0 ± 9.03). Patients in group were significantly older ($p=0.02$). Severity of coronary artery lesion was assessed according to the following indexes: quantity of affected vessels (three most important coronary arteries-LAD, Cx, RCA were taken into consideration), most affected artery and intensity of stenotic process (stenosis, subocclusion, occlusion).

Results: More subjects in group ² had AH, increased total cholesterol and DM in anamnesis but without significant difference -see table 1. Presence of AH did not influence to CA lesion in patients of two clinical groups in total. Nevertheless, ² group patients without AH more frequently had RCA lesions- see table 2. Next step of investigation was to indicate the influence of AH to quantity of affected vessels, maximum level of lesion and most affected coronary artery -table 3. Our data demonstrate that AH as an independent unit had small influence to findings mentioned above.

Conclusion: Patients in group ² more frequently had RCA lesion. We did not find the correlation between AH and coronary artery characteristics in two clinical groups of patients. The forming of coronary pathology is a complex process. It is influenced by a range of factors besides AH, the main of which are hypercholesterolemia and DM.

Table 1. Main risk factors of CAD in patients of two clinical groups

Risk factors	SAP+MI	SAP	p
AH	63.08%	48.65%	0.06
diabetes	9.91%	7.69%	0.62
†total cholesterol	62.50%	57.14%	0.53

Table 2. Influence of AH to coronary lesion location

artery	AH +			AH-			Total p
	SAP.%	SAP+MI.%	p	SAP.%	SAP+MI.%	p	
LAD	29.03	44.09	0.28	19.75	55.56	0.24	0.11
Cx	15.79	24.21	0.55	12.35	33.33	0.63	0.39
RCA	25.26	24.21	0.12	11.11	44.44	0.03	0.76

Table 3. Influence of AH to main coronary artery characteristics

	AH+, p	AH-, p
Quantity of affected vessels	0.75	0.17
Max. level of lesion (stenosis, subocclusion, occlusion)	0.08	0.15
Most affected CA	0.17	0.40

PP.28.135 PREHYPERTENSION IN ASTURIAS, A PROSPECTIVE STUDY. THE PREVASTURIAS STUDY

R. Marin Iranzo¹, M.A. Prieto Diaz², F. Fernandez Vega¹, J. Baños Marti-nez³, M.B. Gonzalez Lopez², A. De La Escosura Garcia⁴, C. Vidal Gonzalez⁵, C. Rubiera Alvarez⁶, C. Varela Suarez⁷, J. Crespo Garcia⁸. ¹Hospital Universitario Central of Asturias S Nephrology-HTA Unit, Oviedo, Spain, ²Primary Health Center Vallobin-La Florida, Oviedo, Spain, ³Primary Health Center Pola de Laviana, Laviana, Spain, ⁴Primary Health Center La Corredoria, Oviedo, Spain, ⁵Primary Health Center Raices, Aviles, Spain, ⁶Primary Health Center Severo Ochoa, Gijon, Spain, ⁷Primary Health Center Lugones, Lugones, Spain, ⁸Primary Health Center Laviana, Gijon, Spain

Objective: The aim is to know the proportion of subjects that progress from prehypertension (category blood pressure high normal) to hypertension in a 5 years prospective study, and the cardiovascular risk factors (CVRf) that determine this evolution.

Methods: A descriptive, cross sectional study of a 5 years prospective study. Population: 27 investigators had selected patients with blood pressure high normal (130–139/ 85–89 mmHg), in correlative order, attended in primary care, both sex and age between 40 and 65 years. Diabetics subjects, cardiovascular or kidney disease or need to treatment with cardiovascular agents with antihypertensive effects were excluded. Cardiovascular risk (CVR) was stratified according to ESC-ESH 2007 guidelines. The present work shows the basal data of the analyzed population.

Results: 646 subjects were selected, 48.5% men; mean age 53.8 ± 6.7 years; systolic blood pressure 134.3 ± 4.4 mmHg; diastolic blood pressure 84.9 ± 4.3 mmHg. The average of glucose was 94.1 ± 10.2 mg/dl, creatinine 0.83 ± 0.17 mg/dl, LDL cholesterol 141.1 ± 35.4 , glomerular filtration rate (GFR) by the MDRD formula 92.2 ± 20.1 ml/min/1.73m² and microalbuminuria 4.8 ± 10.8 mg/g. We had observed in this population the following alterations: Smoking: 22%, Obesity: 31%, Fasting plasma glucosa: 29%, LDL-Cholesterol ≥ 160 mg/dl: 29%, Triglycerides > 150 mg/dl: 30%. Metabolic syndrome by ATP III criteria: 37%. GFR < 60 ml/min/1.73m²: 2.8%. Microalbuminuria (>21 men, >30 mg/g en women): 2.6%. Hyperurycemia ≥ 7 mg/dl: 10.2%. According with the ESH 2007 guidelines, 31% of subjects had not any CVRF associated and 27% had two or more CVRF. The prevalence of high cardiovascular risk was 39%.

Conclusions: A third part of population in not elder and not diabetic subjects, with blood pressure high normal, had two or more cardiovascular risk factors and a high cardiovascular risk.

POSTER SESSIONS

POSTER SESSION 29

EXPERIMENTAL HYPERTENSION

PP.29.136 JUXTAMEDULLARY CORTEX HAS A HIGHER DEGREE OF RENAL DAMAGE THAN THE OUTER CORTEX IN THE NON-CLIPPED KIDNEY IN TWO KIDNEY ONE CLIP RATS AFTER LONG EXPOSURE TO HYPERTENSION

T. Skogstrand¹, M. Hultström^{1,2}, S. Leh^{1,3}, B.M. Iversen^{1,2}. ¹Institute of Medicine, University of Bergen, Bergen, Norway, ²Internal Medicine, Haukeland University Hospital, Bergen, Norway, ³Department of Pathology, Haukeland University Hospital, Bergen, Norway

Objective: The present study was designed to investigate the progression of hypertensive renal damage in the non-clipped kidney of the two kidney one clip model (2K1C), 24 weeks after clipping.

Design: Animals underwent clipping of the left renal artery at the age of 6 weeks (approximately 180 g) and were studied 24 weeks after clipping. One group of 12 animals was assigned to the 2K1C group, while another group of 8 animals underwent sham operation. The blood pressure was measured during the experiment in both groups.

Methods: The amount of renal damage was determined semi-quantitatively using a grading system and tissue from the outer (OC) and juxtamedullary cortex (JMC) of the non-clipped kidney was analysed for mRNA and protein expression using quantitative rt-PCR and western blotting.

Results: The mean arterial pressure increased after 2–4 weeks, and was 166 ± 9 mmHg in the 2K1C group and 116 ± 7 mmHg in the control group after 24 weeks. The amount of tubulointerstitial damage was higher in JMC of 2K1C group compared to OC and the controls. The mRNA expression of coll1a1, n-peptidase and TIMP-1 in the 2K1C was higher in the JMC than in the OC, and than the control group. We found no difference in the expression of c-peptidase. The amount of MMP-9 protein was lower in OC of 2K1C compared to the same compartment in sham animals. No difference was found for the protein expression of TIMP-2.

Conclusions: Progression of renal damage from JMC towards OC cortex has been shown earlier in genetic, low renin model of hypertension. A similar pattern of response seems to occur in 2K1C, which is a high renin model. The increased expression of n-peptidase and up-regulation of TIMP-1 may be an important mechanism in the increased collagen. The present findings indicate that blood pressure per se is the most active factor in the development of renal fibrosis.

PP.29.137 SALT SENSITIVE RENAL DYSFUNCTION IN THE SHRSP IS CHROMOSOME 2 DEPENDENT

A. Sampson, D. Graham, C. Koh-Tan, W. Miller, C. Hamilton, M. McBride, A. Dominiczak. *BHF Glasgow Cardiovascular Research Centre, Glasgow, United Kingdom*

Hypertension is the main risk factor for the development of CVD, accounting for over 30% of all cause mortality in the UK, with 30–50% of blood pressure variation attributable to genetic factors. We have previously identified a quantitative trait locus (QTL) in the rat on chromosome 2 which is associated with arterial pressure. In the long term, arterial pressure is regulated by renal mechanisms. Our study examined the functional consequences of this chromosome 2 QTL on arterial pressure regulation and renal function in the presence and absence of a high-salt (1%NaCl) challenge. WKY and SHRSP rats were investigated as well as the congenic strain (SP.WKYGla2k) containing the SHRSP background and the QTL region of chromosome 2 (D2Mit21-D2Rat157, 33,969,588 kb congenic interval) from the WKY. 12 week old rats were chronically implanted with a radiotelemetry probe for measurement of hemodynamic variables for 9 weeks. At 18 weeks of age, rats were treated with either water or high-salt for 3 weeks, after which rats were placed in metabolic cages for measurement of renal function. Baseline average daytime (D) and night-time (N) systolic

blood pressure (SBP) was WKY:D= 139 ± 3 mmHg, N= 142 ± 3 mmHg, SP.WKYGla2k:D= 179 ± 2 mmHg, N= 181 ± 4 mmHg and SHRSP:D= 195 ± 5 mmHg, N= 201 ± 4 mmHg. Following high-salt treatment we observed a chromosome 2 dependent increase in SBP: WKY increased by D: 5 ± 2 mmHg and N: 6 ± 3 mmHg, SP.WKYGla2k by D: 17 ± 2 mmHg and N: 28 ± 3 mmHg and SHRSP by D: 36 ± 5 mmHg and N: 47 ± 5 mmHg. Furthermore, there was no difference in glomerular filtration rate despite increased urine volume ($P < 0.005$, compared with all other groups) and decreased urinary sodium excretion/ml in SHRSP ($P < 0.05$, compared with all other groups), with no difference in excretion parameters between SP.WKYGla2k and WKY. The absence of alterations in renal excretion parameters in the SP.WKYGla2k as compared to WKY demonstrates that the genes influencing salt sensitivity in the SHRSP are indeed located within the implicated chromosome 2 region, suggesting that the presence of the WKY chromosome 2 QTL is sufficient to provide protection against alterations in renal function and decreases the sensitivity to the effects of a high salt challenge.

PP.29.138 EFFECTS OF ATORVASTATIN AND LOSARTAN ON MONOCROTALINE-INDUCED PULMONARY ARTERY REMODELING IN RATS

P.S. Lin, L.D. Xie, H. Xie, C.S. Xu. *Fujian Hypertension Research Institute, the First Affiliated Hospital of Fujian Medical University, Fuzhou, China*

Introduction: Structural remodeling of pulmonary artery plays an important role in the maintaining of sustained pulmonary arterial hypertension (PAH). The anti-remodeling effects of statins has been reported in systemic hypertension. In this study, we investigated the effects of atorvastatin (Ato) and losartan (Los) on monocrotaline-induced pulmonary artery remodeling in rats.

Methods: Forty SD rats were assigned into: normal control (Ctr), PAH, Los, Ato treated groups. The rats were given a dose of 40 mg/Kg monocrotaline intraperitoneally in PAH, Los and Ato treated groups and untreated rats were given 1 ml normal saline intraperitoneally as control. After 4 weeks, the rats were given 50 mg/Kg/d of Los and 5 mg/Kg/d of Ato by gavage respectively in Los and Ato treated groups for 4 weeks. 4 weeks after medication, mean of pulmonary arterial pressure (MPAP) and right ventricular hypertrophy index (RVHI) were measured, and WT% and WA% of pulmonary arterioles were evaluated. The protein analysis for 1C subunit of voltage-gated calcium channel (Cav1c), sarcoplasmic/endoplasmic reticulum calcium-ATPase (SERCA-2a), inositol 1,4,5 triphosphate receptor 1 (IP3R-1) and Ryanodine receptor 3 (RyR-3) in pulmonary artery was evaluated by RT-PCR and Western-Blot.

Results: The MPAP was reduced by Los and Ato treatment (mmHg: Los, 29.8 ± 4.8 , Ato, 27.6 ± 4.1 , PAH, 36.1 ± 4.2 , $P < 0.05$). There was a reduction in the RVHI in Los and Ato treated groups (Los, $38.5 \pm 6.4\%$, Ato, $37.7 \pm 6.0\%$, PAH, $45.6 \pm 3.8\%$, $P < 0.05$). The ratio of wall/lumen thickness (WT%) and wall/lumen area (WA%) was lower in Los and Ato treated group (WT%: Los: $44.9 \pm 5.7\%$, Ato: $42.8 \pm 2.9\%$ vs PAH: $58.5 \pm 4.6\%$; WA%: Los: $61.3 \pm 5.5\%$, Ato: $59.3 \pm 3.4\%$ vs PAH: $76.8 \pm 7.0\%$; $P < 0.05$) than that of PAH group. The expression of 1C subunit of voltage-gated calcium channel (Cav1c) was down-regulated, while sarcoplasmic/endoplasmic reticulum calcium-ATPase (SERCA-2a) and inositol 1,4,5 triphosphate receptor 1 (IP3R-1) up-regulated both in mRNA and protein levels in pulmonary arteries after Los and Ato treatment.

Conclusion: We concluded that atorvastatin and losartan may regress remodeling of pulmonary artery and calcium regulating channels in pulmonary hypertensive rats.

PP.29.139 THE ROLE OF NUCLEAR FACTOR KAPPA B IN L-NAME-INDUCED HYPERTENSION

O. Pechanova, A. Barta, S. Vrankova. *Institute of Normal and Pathological Physiology, Slovak Academy of Sciences, Bratislava, Slovak Republic*

Objective: Recently we have demonstrated involvement of NF- κ B in the upregulation of endothelial nitric oxide synthase (eNOS) in hypertension induced by NG-nitro-L-arginine methyl ester (L-NAME). Thus, the goal of

our study was to analyze an effect of NF- κ B inhibitor, lactacystin, in L-NAME-induced hypertension.

Methods and Design: Adult 12-week-old male Wistar rats were subjected to treatment with L-NAME (40 mg/kg/day) for seven weeks ($n = 14$). Half of the rats received lactacystin together with L-NAME for last three weeks. Next 16-week-old male Wistar rats received lactacystin only for 3 weeks ($n = 7$). Blood pressure was measured by tail-cuff plethysmography every week. Total NOS activity was determined by measuring the formation of L-[3H] citrulline from L-[3H] arginine. Endothelial NOS and NF- κ B (p65) protein expressions were determined immunohistochemically and by Western blot analysis.

Results: Lactacystin treatment did not affect the blood pressure (103 ± 6 mmHg), while 7-week-L-NAME treatment increased blood pressure (141 ± 3 mmHg) by 38% comparing the age-matched untreated animals (104 ± 5 mmHg). Addition of lactacystin to the L-NAME increased blood pressure significantly (159 ± 4 mmHg) by 54% comparing the untreated control group and by 12% comparing the L-NAME group. L-NAME treatment led to increased NF- κ B expression followed by elevation of both eNOS protein expression and total NOS activity in the aorta, heart and kidney. Addition of lactacystin blocked, however, elevated eNOS protein expression in all tissues investigated.

Conclusion: We hypothesized that NF- κ B is responsible for upregulation of eNOS protein expression which may represent one of the counterregulatory mechanisms activated to compensate decreased NO production and increased blood pressure after long-term L-NAME treatment.

PP.29.140 THE EFFECT OF REPEATED ANTISENSE THERAPY ON VARIOUS VASOACTIVE SYSTEMS IN YOUNG REN-2 TRANSGENIC RATS

I. Vaneckova, Z. Dobesova, J. Kunes, J. Zicha. *Institute of Physiology, Prague, Czech Republic*

Objective: We demonstrated that single injection of antisense oligodeoxynucleotides (AS) against AT1 receptor had transient antihypertensive effect in TGR. We were interested whether repeated AS therapy will have durable effect on blood pressure (BP) and on the contribution of principle vasoactive systems to BP regulation in this model of ANG II-dependent hypertension.

Methods: From the age of 30 days heterozygous Ren-2 rats were injected in 10-day intervals with AS until the age of 60 days. On days 40, 50 and 70 of age, basal BP and acute responses to consecutive blockade of renin-angiotensin (10 mg/kg captopril), sympathetic (5 mg/kg pentolinium) and nitric oxide (NO) (30 mg/kg L-NAME) systems were determined in conscious rats.

Results: AS therapy decreased BP and reduced cardiac hypertrophy. Both these effects disappeared after the third AS injection. Captopril-induced BP decrease was higher on day 70 in untreated than in AS-treated TGR, suggesting higher contribution of RAS in established hypertension. On the contrary, AS therapy decreased the contribution of sympathetic system on day 40 (during hypertension development). BP decrease was double after SNS than after RAS blockade. AS-treated animals had higher BP increase after NO blockade on day 40. The impact of NO on BP control increased with age, suggesting its role as a compensatory mechanism against augmented activity of pressor systems. The dependency of principle vasoactive systems on the number of renin gene copies was evaluated in three groups of animals: HanSD (-/-), TGR heterozygous for renin gene (+/-) and homozygous TGR (+/+). The contribution of angiotensin-dependent and nifedipine-sensitive vasoconstriction increased with the number of renin gene copies, while heterozygous and homozygous TGR had reduced NO vasodilatory component.

Conclusions: Repeated AS therapy of Ren-2 TGR has transient antihypertensive effect, which correlates with cardiac hypertrophy. Augmented sympathetic activity together with reduced NO activity contribute to hypertension in initial phases, while increased RAS influence prevails in established hypertension.

PP.29.141 EFFECT OF ANGIOTENSIN II ON INTERLEUKIN-1 β INDUCED COX-2 AND MPGES-1 EXPRESSION IN PERIVASCULAR FIBROBLASTS

M. Galan¹, M. Miguel², A. Beltrán³, C. Rodríguez⁴, M.J. Alonso⁵, J. Martínez-González⁶, M. Salas⁷. ¹Dpt. de Farmacología, Universidad Autónoma de Madrid, Madrid, Spain, ²Centro de Investigación Cardiovascular, Hospital de la Santa Creu i Sant Pau, Barcelona, Spain, ³Dpt. de Bioquímica, Fisiología y Genética Molecular, Universidad Rey Juan Carlos, Madrid, Spain

Objective: Adventitial layer plays a critical role in the regulation of vascular function and structure. Angiotensin II has been implicated in the pathophysiological processes that occur in hypertension through its significant proinflammatory actions in the vascular wall, including the production of inflammatory cytokines. Cyclooxygenase-2 (COX-2) and prostaglandin E synthase-1 (mPGES-1) are induced by several proinflammatory agents like cytokines. In this study we have evaluated if angiotensin II alter the effect of interleukin-1 β on COX-2 and mPGES-1 expression in cultures of rat aortic fibroblasts.

Results and Conclusion: Interleukin-1 β (10 ng/ml, 24 h) increased COX-2 and mPGES-1 expression and PG12 and PGE2 production. Incubation of cells with angiotensin II (0.1 μ M, 24 h) modified neither COX-2 and mPGES-1 expression nor prostanoid levels but enhanced COX-2 protein expression, mRNA levels and PG12 production induced by interleukin-1 β ; however angiotensin II did not change mPGES-1 protein expression, mRNA levels and PGE2 production induced by interleukin-1 β . The potentiator effect of angiotensin II on COX-2 expression was inhibited by the AT1 receptor antagonist losartan. After incubation with interleukin-1 β and angiotensin II, p38 and ERK 1/2 MAP kinases phosphorylation was higher and more sustained than in cells only treated with interleukin-1 β . The respective inhibitors of p38 and ERK 1/2, PD98059 and SB203580 diminished COX-2 and mPGES-1 protein expression induced by the combination of interleukin-1 β plus angiotensin II. Stability of COX-2 mRNA levels was measured in cells incubated with actinomycin D and it was significantly increased in cells stimulated with interleukin-1 β plus angiotensin II. These results suggest that angiotensin II participate in the vascular inflammatory response through the increase of cytokine effects on expression of some proinflammatory enzymes such as COX-2, but not mPGES-1. This effect of angiotensin II is thought to be caused by signalling pathways in which p38 and ERK 1/2 MAP kinases are involved.

PP.29.142 GENDER DIFFERENCE IN BLOOD PRESSURE OF SPONTANEOUSLY HYPERTENSIVE RATS IS NOT MEDIATED BY THE CHANGES IN CALCIUM ENTRY THROUGH VOLTAGE-DEPENDENT CALCIUM CHANNELS OF L TYPE

J. Zicha^{1,2}, I. Ostadalo^{1,2}, Z. Dobesova^{1,2}, M. Pinterova^{1,2}, J. Kunes^{1,2}. ¹Institute of Physiology, Academy of Sciences of the Czech Republic, Prague, Czech Republic, ²Cardiovascular Research Center, Prague, Czech Republic

Objective: It is well known that blood pressure (BP) is higher in male than female rats in most forms of genetic hypertension. This difference is usually ascribed to prohypertensive effects of androgens and/or antihypertensive action of estrogens because BP difference can be attenuated by castration. Several reports suggested that androgens increase the expression of alpha subunits of L type of voltage-dependent calcium channels (L-VDCC). These channels are involved in the control of vascular tone and agonist-induced vasoconstriction in both normotensive and hypertensive rats.

Design and Method: To investigate the role of L-VDCC in gender-dependent BP control in spontaneously hypertensive rats (SHR), we have compared BP response to acute nifedipine injections (0.05 – 0.4 mg/kg i.v.) in intact or neonatally castrated male and female SHR.

Results: Although BP was significantly elevated in male SHR compared to female SHR, there was no difference in the involvement of L-VDCC measured as BP reduction elicited by nifedipine administration. Neonatal castration abolished gender difference in BP of SHR, but again without significant alterations of nifedipine-sensitive BP component.

Conclusions: The gender difference in blood pressure of spontaneously hypertensive rats can not be ascribed to different calcium entry through voltage-dependent calcium channels of L type susceptible to the inhibition by nifedipine.

PP.29.143 MODULATION BY SODIUM INTAKE OF CARDIORENAL AND METABOLIC CHANGES INDUCED BY HIGH FRUCTOSE DIET IN RATS

C. Oudot¹, C. Reboul², B. Jover¹, C. Rugale¹. ¹Université Montpellier I, Montpellier, France, ²Université Avignon, Avignon, France

High fructose (HF) diet is a well known model of insulin resistance in rats, associated with slightly increase in blood pressure, cardiac hypertrophy and renal damages. The aim of this study was to evaluate the influence of sodium intake on cardiorenal and metabolic changes associated with HF diet in Sprague-Dawley rats. At the age of 6 weeks, rats fed 4 types of diet for 12 weeks: normal salt control (NSC, 0.64% NaCl), normal salt-60% fructose (NSF), low salt-60% fructose (DSF, <0.01% NaCl), or high salt-60% fructose (HSF, 8% NaCl) diet. At the end of the diet, tail-cuff pressure (TCP) was

measured. Glucose metabolism was assessed by intra-peritoneal glucose and insulin tolerance tests. Cardiac morphology and function were evaluated by echocardiography. Urinary albumin excretion (UAE) was measured by ELISA test. Heart weight index (HWI) was determined.

Fructose diet induced insulin resistance, cardiac hypertrophy and albuminuria, and these damages were amplified by high sodium intake independently of blood pressure. Low sodium intake prevented albuminuria without change of blood pressure but had no significant effect on cardiac hypertrophy. Sodium intake did not influence insulin resistance associated with high fructose diet.

Effects of sodium intake on cardiac and renal changes induced by high fructose diet were independent of blood pressure and glucose metabolism. The role of oxidative stress should be assessed.

Group N=8	TCP mmHg	HWI mg/gBW	RWT %	UAE mg/24h	CrEAT mg/dl	Insulin sensitivity index	K _{irr}
NSC	136±1	2.52±0.05	30±2	0.34±0.07	0.41±0.05	1.20±0.08	0.40±0.04
NSF	137±3	2.76±0.04*	35±1	1.25±0.38*	0.53±0.06	0.81±0.08*	0.30±0.02*
LSF	137±3	2.64±0.05	30±1	0.27±0.06§	0.50±0.04	0.97±0.14	0.29±0.02*
HSF	141±3	2.96±0.12*	46±3*	1.73±0.33*	0.73±0.16*	1.06±0.07	0.33±0.02

P<0.05 vs NSC group; § P<0.05 vs NSF group

PP.29.144 IMPACT OF INSULIN RESISTANCE ON CARDIAC AND RENAL CHANGES ASSOCIATED WITH HIGH SODIUM DIET IN RATS

C. Rugale¹, C. Oudot¹, S. Tanguy², B. Jover¹. ¹Université Montpellier I, Montpellier, France, ²Université Avignon, Avignon, France

The objective of this study was to evaluate the impact of fructose-induced insulin resistance on cardiac and renal changes induced by an early and chronic high sodium intake in Sprague-Dawley rats. Immediately after weaning, rats were fed with the normal salt diet (NS, 0.64% NaCl, or a high salt diet (HS, 8% NaCl) for 20 weeks (n = 16 for each diet). At 8 weeks, half of the rats received a diet enriched in fructose (HF, 60%) with the same contain of NaCl (NS or HS) for 12 weeks. At the end of diet, tail-cuff and arterial pressures were measured in conscious rats. Glucose metabolism was assessed by intra-peritoneal glucose tolerance test and glomerular filtration was estimated by creatinin clearance (Cr Cl). Urinary albumin excretion (UAE) was measured by ELISA test. Heart and kidney weight index (HWI and KWI respectively) were determined.

High sodium intake induced a slight increase in blood pressure, a marked increase in cardiac and renal mass, albuminuria and an alteration of renal function but had no influence on glucose metabolism. High fructose intake was associated with a rise in cardiac and renal mass, a decrease in renal function independently of blood pressure and an insulin resistance without glucose intolerance. In high salt fed rats, high fructose diet induced insulin resistance, slightly reduced blood pressure and cardiac mass but did not influence renal changes.

Subsequent high fructose intake did not worsen cardiac and renal alterations induced by high salt feeding despite the induction of insulin resistance.

Group N=8	MAP mmHg	HWI mg/gBW	KWI mg/gBW	Cr Cl μl.min ⁻¹ .g ⁻¹ KW	UAE μg/24h	Insulin sensitivity index
NSC	122±4	2.48±0.04	5.77±0.22	0.79±0.16	0.51±0.05	1.25±0.07
HSC	142±5*	2.90±0.10*	7.50±0.26*	0.27±0.08*	19.65±11.02*	1.13±0.23
NSHF	120±4	2.75±0.05§	7.05±0.26§	0.45±0.08§	1.41±0.41	0.80±0.09§
HSHF	125±4§	2.61±0.05§	7.27±0.23	0.25±0.09	6.72±3.37	0.69±0.15§

P<0.05 vs corresponding NS group; § P<0.05 vs corresponding control (C) group.

PP.29.145 THE ROLE OF NO AND OXIDATIVE LOAD IN THE ANTIREMODELING EFFECT OF MELATONIN IN TWO TYPES OF EXPERIMENTAL HYPERTENSION: SHR AND L-NAME-INDUCED HYPERTENSION

L. Paulis¹, O. Pechanova², P. Celec³, R. Gardlik⁴, A. Barta⁵, K. Bednarova⁴, M. Mullerova⁴, V. Pelouch⁵, M. Adamcova⁶, J. Kunes⁷, J. Zicha⁷, F. Simko⁴. ¹Charité-Universitätsmedizin - Center for Cardiovascular Research, Berlin, Germany, ²Slovak Acad Sci- Inst Normal Pathol Physiol and Centre Excell Cardiovasc Res, Bratislava, Slovak Republic, ³Fac Med, Comenius Univ- Inst Mol Biomed, Bratislava, Slovak Republic, ⁴Fac Med, Comenius Univ- Inst Pathol Physiol, Bratislava, Slovak Republic, ⁵2nd Fac Med, Charles Univ- Dep Med Chem Biochem and Center Cardiovasc Res, Prague, Czech Republic, ⁶Fac Med in Hradec Kralove, Charles Univ- Dep Physiol, Hradec Kralove, Czech Republic, ⁷Acad Sci CR- Inst Physiol and Center Cardiovasc Res, Prague, Czech Republic

The remodeling of the left ventricle (LV) represents an important independent risk factor in hypertension. Melatonin was shown to reduce blood pressure (BP), enhance NO availability and scavenge free radicals. Therefore it was supposed that it might have antiremodeling properties.

We investigated, whether 5-week melatonin treatment was able to reduce BP and revert/prevent LV hypertrophy and fibrosis in two experimental models of hypertension: spontaneously hypertensive rats (SHR) and L-NAME hypertensive rats. 5 groups (n = 10/group) of male adult rats were investigated: untreated SHR and Wistar, melatonin (10 mg/kg/day)-treated SHR and Wistar, and melatonin+L-NAME (50 mg/kg/day)-treated Wistar rats. BP was measured by tail-cuff plethysmography each week. NO-synthase (NOS) activity and expression (western blot and PCR), fibrosis (collagenous proteins and hydroxyproline) and oxidative load (conjugated dienes (CD)) were determined in the LV. Vascular function (NO-mediated relaxations and endothelium-derived-constricting factor-mediated constrictions) was evaluated in femoral and small mesenteric arteries.

We observed that both models of hypertension were associated with LV hypertrophy and fibrosis and increased oxidative load. While in the SHR the NOS activity was increased compared to control Wistar rats, L-NAME treatment attenuated the NOS activity. In the SHR melatonin treatment further enhanced the NOS activity and reduced BP (by 25%). However, in the L-NAME hypertension NOS remained inhibited by L-NAME administration and subsequently vascular function was unaltered and BP rise was only slightly attenuated (by 10%) by additional melatonin treatment. Although in both models LV hypertrophy remained unaffected, melatonin diminished/prevented LV fibrosis in SHR and in L-NAME hypertension. This effect was associated with reduction of oxidative load in both strains.

We conclude, that the BP lowering effect of melatonin was largely dependent on the possibility of melatonin to affect NOS activity. In the LV of both strains, melatonin showed a selective anti-fibrotic effect without affecting hypertrophy. The effect of melatonin on LV remodeling might be linked to its antioxidant properties and seems to be independent of its effects on NOS activity.

PP.29.146 EFFECTS OF DILTIAZEM AND BENAZEPRIL ON MONOCROTALINE-INDUCED PULMONARY ARTERIAL REMODELING IN RATS

P.S. Lin¹, L.D. Xie². ¹the People's Hospital of Fujian Province, No.602, 817 Road, Fuzhou, P. R. China, Fuzhou, China, ²Fujian Hypertension Research Institute, the First Affiliated Hospital of Fujian Medical University, Fuzhou, China

Introduction: To evaluate the effects of diltiazem and benazepril on monocrotaline-induced pulmonary arterial remodeling in rats.

Methods: Forty Sprague-Dawley rats were randomly assigned into four groups: normal control (Ctr), pulmonary arterial hypertension (PAH), diltiazem (Dil) and benazepril treated group (Ben). The rats were given a dose of 40 mg/kg monocrotaline intraperitoneally in PAH, diltiazem and benazepril treated groups and untreated rats were given 1 ml NS intraperitoneally as control. After 4 weeks, the rats were given 25 mg/Kg/d of diltiazem and 10 mg/Kg/d of benazepril by gavage respectively in diltiazem and benazepril treated groups for 4 weeks. 4 weeks after medication, mean of pulmonary arterial pressure (MPAP) and right ventricular hypertrophy index (RVHI) were measured, and WT% and WA% of pulmonary arterioles were evaluated. The protein analysis for Cav1c, SERCA-2a, IP3R-1 and RyR-3 in pulmonary artery was evaluated by Western-Blot.

Results: MPAP and RVHI were significantly increased in PAH. MPAP and RVHI were significantly decreased after diltiazem and benazepril treatment (P<0.05 respectively). Compared with Ctr group, WT% and WA% were significantly increased in PAH. Administration of diltiazem and benazepril, WT% and WA% were significantly reduced. [MPAP: Ctr(23.22±/-3.27), PAH(36.12±/-4.17), Dil(25.27±/-6.18) vs Ben(28.11±/-6.02)mmHg; RVHI: Ctr(25.58±/-2.94), PAH(45.60±/-3.81), Dil(39.96±/-2.61) vs Ben(39.50±/-4.90)%; WT: Ctr(37.63±/-3.63), PAH(58.48±/-4.59), Dil(43.04±/-4.96) vs Ben(37.41±/-4.35)%; WA: Ctr(51.37±/-6.40), PAH(76.84±/-7.04), Dil(61.74±/-4.90) vs Ben(53.86±/-5.53)%, P<0.05 respectively] Cav1c and RyR-3 expression was significantly down-regulated after diltiazem and benazepril treatment (P<0.05 respectively). And RyR-3 expression in benazepril treated group was less than that in diltiazem treated group (P<0.05). There were no significant differences in the expression of SERCA-2a between diltiazem and benazepril treated groups and PAH (P>0.05 respectively). As to IP3R-1, diltiazem and benazepril treated groups also showed downregulated expression compared with PAH (P<0.05 respectively).

Conclusion: Diltiazem, as effective as benazepril, could reduce pulmonary arterial pressure, attenuate right ventricular hypertrophy and pulmonary arterioles remodeling and regulate calcium channels expression in pulmonary artery in monocrotaline-induced pulmonary arterial hypertensive rats.

PP.29.147 SEASONAL CHANGES AND MORNING BLOOD PRESSURE SURGE. WHICH ROLE FOR OUTDOOR AND INDOOR AIR TEMPERATURE?

P. Modesti¹, M. Morabito^{2,3}, L. Massetti³, G.E. Cambi¹, G. Bilo^{4,5}, G. Caldarà⁵, S. Orlandini², G. Mancini⁴, G.F. Gensini^{1,2}, G. Parati^{4,5}. ¹Dept. Critical Care Medicine, University of Florence, Florence, Italy, ²Int. Cent. Bioclim, University of Florence, Florence, Italy, ³Inst. Biomet., NRC, Florence, Italy, ⁴Dept. Clin. Med. Prev., University of Milano-Bicocca, Milan, Italy, ⁵Dept. Cardiology, Istituto Auxologico Italiano, Milan, Italy

Objective: Important climate related variations of clinic and ambulatory blood pressure (BP) have been repeatedly reported. However, notwithstanding the wide use of indoor climate control systems, specially in winter, no information is available regarding the role of air temperature values measured proximally to the patient, in particular when focussing on specific components of the 24 h BP profile, such as the morning BP surge (MBPS).

Design and Methods: To investigate whether MBPS is affected by outdoor air temperature or by the air temperature measured proximally to the patient, 2120 hypertensives underwent 24 h ambulatory blood pressure (ABP) monitoring with a battery-powered "HOB0" temperature data logger fitted to the carrying pouch of the ABP monitor. Predictors of MBPS were investigated with a multivariate stepwise regression model including age, gender, body mass index, office systolic BP, 24 h average ABP, mean 24 h outdoor atmospheric pressure and mean 24 h air temperature measured both outdoor and by HOB0 as independent variables.

Results: Stepwise multiple regression analysis carried out in the 1728 subjects included in the final analysis selected outdoor air temperature ($\beta = -0.09$; $p < 0.0001$), 24 h ABP ($\beta = -0.72$; $p < 0.0001$), and age ($\beta = -0.06$; $p < 0.002$) as negative independent predictors of MBPS, with systolic office BP selected as a positive independent predictor ($\beta = 1.04$; $p < 0.0001$) ($r = 0.610$); no significant effect of HOB0 air temperature was observed. When subjects were stratified according to age, the effect on MBPS of outdoor air temperature was detectable in subjects > 65 yrs ($\beta = -0.086$; $p < 0.002$), whereas the only determinants of MBPS in subjects < 50 yrs were office SBP (positive) and 24 h average SBP (negative).

Conclusions: These results confirm and extend previous observation on the occurrence of seasonal changes in 24 h BP profiles, by providing new evidence that only air temperature measured outdoor affects BP morning surge in addition to office BP, 24 h ABP and age, whereas no role appears to be played by air temperature measured proximally to the patient. The clinical implications of these findings for BP control would need to be further tested by ad hoc studies.

PP.29.148 INVOLVEMENT OF LARGE CONDUCTANCE POTASSIUM CHANNELS IN THE VASODILATION INDUCED BY OVERPRODUCTION OF CYCLIC AMP: IN VIVO STUDY IN RATS WITH GENETIC HYPERTENSION

M. Pinterova^{1,2}, Z. Dobesova^{1,2}, J. Kunes^{1,2}, J. Zicha^{1,2}. ¹Institute of Physiology, Academy of Sciences of the Czech Republic, Prague, Czech Republic, ²Cardiovascular Research Center, Prague, Czech Republic

Objective: We have shown that cyclic nucleotides (cAMP and cGMP) are involved in the control of Ca^{2+} influx into the vascular smooth muscle cells by closing L-VDCC (L-type of voltage-dependent calcium channels). Overproduction of cAMP induced by in vivo inactivation of inhibitory G-proteins as well as by activation of beta-adrenoceptors with isoprenaline infusion diminished Ca^{2+} influx through L-VDCC elicited by the absence of cGMP occurring after acute nitric oxide (NO) synthase blockade (L-NAME). One of the possible pathway by which cAMP inhibits these channels could be the activation of Ca^{2+} -dependent potassium channels (BKCa) leading to the membrane hyperpolarization and thus closing of L-VDCC.

Design and Method: To confirm this hypothesis we investigated whether inhibition of BKCa channels can modify the ability of cAMP overproduction to prevent blood pressure (BP) rise induced by acute NO depletion using conscious normotensive (WKY) and hypertensive (SHR) rats. Enhanced production of cAMP was induced by beta-adrenoceptor stimulation using isoprenaline infusion (100 ng/kg/min i.v.), which was followed by inhibition of NO formation with L-NAME (30 mg/kg i.v.). To determine the role of BKCa continuous infusion of BKCa blocker (TEA, 100 mg/kg/h i.v.) was started before isoprenaline infusion.

Results: Isoprenaline-induced overproduction of cAMP caused significant BP fall in both rat strains (substantially more in SHR) and prevented BP rises induced by acute inhibition of NO formation. This prevention of L-NAME-induced BP rise was diminished by the blockade of BKCa with TEA. Interestingly, the completely restored BP response to L-NAME injection was observed only in SHR while in WKY the restoration was only partial.

Conclusions: Major part of the inhibitory effect of cyclic AMP on calcium entry through L-VDCC in genetically hypertensive rats is mediated by the activation of large conductance calcium-activated potassium channels. However, the involvement of these channels in cAMP-induced vasodilation in normotensive rats was largely attenuated.

PP.29.149 CORRELATION BETWEEN ECHOCARDIOGRAPHIC LEFT VENTRICULAR MASS INDEX AND ELECTROCARDIOGRAPHIC VARIABLES USED IN LEFT VENTRICULAR HYPERTROPHY CRITERIA IN CHINESE HYPERTENSIVE PATIENTS

L. Xie, Z. Wang. Fujian Hypertension Research Institute, VIP ward, The First Affiliated Hospital of Fujian Medical University, Fuzhou city, China

Introduction: We investigated the association between echocardiographic left ventricular mass (LVM) indexed to body surface area (LVM/BSA) or height^{2.7} (LVM/H2.7) and electrocardiographic (ECG) variables in 546 Chinese hypertensives.

Methods: Cornell voltage, Sokolow-Lyon voltage, maximum R amplitude in V1-V6, Gubner-Ungerleider voltage and the products with QRS duration of these amplitude variables were evaluated.

Results: In our study, LVM/H2.7 was significantly related to body mass index, but not gender. Correlation between ECG variables and LVM/H2.7 was similar to that of LVM/BSA. In obese and overweight subgroups, Cornell product was the best predictor for both LVM/BSA and LVM/H2.7; the correlation trended to be stronger as LVM/BSA or LVM/H2.7 increased. Correlation coefficient between LVM/BSA and Cornell product was 0.529 for male obesity, 0.597 for female obesity, 0.451 for male overweight and 0.345 for female overweight patients. When LVM was indexed to height^{2.7}, the r values were 0.559, 0.589, 0.427 and 0.360 respectively. Fewer ECG variables showed weak correlation with LVM/BSA in the hypertensives without left ventricular hypertrophy.

Conclusions: We concluded that LVM/H2.7 might well predict LVM in Chinese hypertensives, and that Cornell product was the best parameter for the prediction of both LVM/BSA and LVM/H2.7 in obese and overweight hypertensives, whereas estimation of LVM/BSA by ECG was inaccurate in Chinese hypertensives without left ventricular hypertrophy.

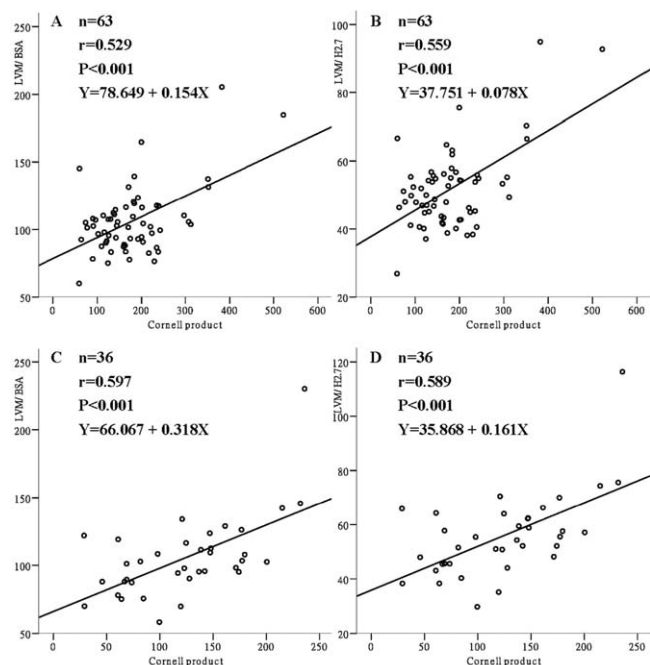


Figure 1. Scattergram showing the correlation between Cornell product (mv × ms) and left ventricular mass indexed to body surface area (LVM/BSA, g/m²) or height^{2.7} (LVM/H^{2.7}, g/m^{2.7}) in obese hypertensive patients stratified by gender and body mass index. A, B in male obese hypertensive patients. C, D in female obese hypertensive patients. The solid line is the regression trend line.

PP.29.150 COMPARISON SEMI-AUTOMATIC METHOD BASED ON SNAKE MODEL VS LINEAR MODEL TO STUDY OF HYPERTENSIVE RETINOPATHY

M. Pena Seijo¹, A. Pose Reino¹, S. Gonzalez Vazquez², J.L. Diaz Diaz³, M. Suarez Tembra⁴, C. Calvo Gomez¹, A. Hermida Ameijeiras¹, E. Lopez Paz¹, M. Gonzalez Penedo², J.A. Diaz Peromingo⁵, R. Monte Secades⁶, J. Estevez Nuñez⁷. ¹Internal Medicine Service, Chus, Santiago De Compostela, Spain, ²Varpa Group, Coruña, Spain, ³Hospital Abente Y Lago, Coruña, Spain, ⁴Hospital San Rafael, Coruña, Spain, ⁵Hospital Barbanza, Ribeira, Spain, ⁶Hospital Xeral Calde, Lugo, Spain, ⁷Economics Departament, Santiago University, Santiago, Spain

Objective: Hypertension produces disturbance and frequent changes in the caliber of retinal vessels. These changes in early stages are difficult to quantify. European guidelines consider only hemorrhage, exudates and papilledema as associate clinical disease but these are advanced lesions and difficult to see nowadays due to control of blood pressure.

For this reason is necessary an objective method to quantify initial modifications in retinal microcirculation, particularly because these alterations are very frequent in hypertensive patients but very subjective and difficult to quantify in early stages.

Material and Methods: Our group has described and validated years ago a semiautomatic method based on an image simple processing (linear model) for arteriovenous ratio (AVR) as a measure of arteriolar narrowing, with high sensitivity and specificity, but with limitations.

We describe a new method based on the model of snakes or elastic curves for measuring arteriovenous retinal ratio, with a similar sensitivity and greater specificity in the detection of vessels in the retina than the method previously described (linear model).

In order to validate this method, we analyzed 173 digital photographs obtained from 96 hypertensive patients, most of them were being treated previously. Photos were taken in two different centers and were analyzed by the same person at each center. AVR was calculated through linear and snake method.

Results: We note that AVR calculated through linear and snake methods are minimal and follow a normal distribution. The correlation coefficient between both methods (linear and snake) was 0.91 for all images ($p < 0.0001$). In images of Santiago Hospital, correlation coefficient between both methods is 0.949 ($p < 0.0001$). In Coruña Hospital, correlation coefficient is 0.86 ($p < 0.0001$).

Conclusions: We conclude that Snake model is an appropriate method for calculating arteriovenous ratio in retinal vessels with high sensitivity and greater specificity than linear model.

And there is an excellent correlation between snake and linear.

PP.29.151 STRESS-TESTS IN DIAGNOSTICS OF MASKING ARTERIAL HYPERTENSION IN SUBJECTS WITH PROFESSIONAL STRESS

I. Osipova¹, O. Antropova¹, N. Pyrikova², N. Lobanova², K. Golovina¹. ¹Altai State Medical University, Department of Internal Medicine, Barnaul, Russia, ²Non-State Railroad Hospital, Barnaul, Russia

The purpose was to estimate diagnostic capacity of psychoemotional tests for revealing masking arterial hypertension (AH) in subjects with professional stress. 76 subjects with masking AH and professional stress formed the 1st group, 42 subjects with firstly detected essential hypertension (EH) formed the 2nd group, and 20 healthy subjects comparable to age formed the 3rd group. All subjects performed test "Mathematical count" ("MC"). Also psychoemotional test was held. The highest blood pressure (BP) during the test and changing BP in comparable with initial BP were estimated. All subjects developed increasing systolic (SBP) and diastolic BP (DBP) and heart rate (HR) in response to the "MC". 1st group subjects had more increase of SBP than 2nd group and healthy subjects over 36.6 % ($\delta = 0.008$) and 49.7% ($\delta = 0.001$) correspondingly. Increasing of HR in 1st group subjects was more than in 2nd group and healthy subjects over 42.1 % ($\delta = 0.001$) and 42.9% ($\delta = 0.002$). During psychoemotional test BP and HR increased but there was no any difference between groups. In 1st group subjects the increase of SBP and HR was bigger during test "MC" than during reading over 35.9% ($\delta = 0.006$) and 30.9% ($\delta = 0.014$) correspondingly. Estimating of stress-induced hemodynamic shifts permits to prognose arterial hypertension at working place with sensitivity 100%, specificity 75% and efficiency 87.5%. Changes of SBP and DBP during test "MC" and working strain were comparable in healthy and 1st group subjects. Direct correlation dependence of increasing SBP with age ($r = 0.4$; $\delta = 0.01$) and atherogenic index ($r = 0.5$; $\delta = 0.001$) was detected. Consequently, using test

"MC" in subjects with professional stress helps to reveal patients with masking arterial hypertension. Hemodynamic response to psychoemotional strain during test is comparable with one during the working hours. Hemodynamic figures during test "MC" correlate with some risk factors of CVD.

PP.29.152 THE EFFECT OF WILD THYME POLYPHENOLS ON HAEMODYNAMIC PARAMETERS AND PLASMA LIPIDES IN SPONTANEOUSLY HYPERTENSIVE RATS

N. Mihailovic-Stanojevic¹, B. Bugarski², D. Komes³, J. Grujic Milanovic¹, M. Ivanov¹, Dj. Jovicic¹, D. Bugarski¹, Z. Miloradovic¹. ¹Institute for Medical Research, University of Belgrade, Belgrade, Serbia, ²Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia, ³Faculty of Food Technology and Biotechnology, University of Zagreb, Zagreb, Croatia

Objective: Growing epidemiological evidence suggests the existence of a negative correlation between consumption of polyphenol-rich foods or beverages and the incidence of cardiovascular disease. Present study was aimed to investigate possible antihypertensive and antilipidemic effects of extract isolated from wild thyme (*Thymus serpyllum* L.).

Design and Method: Adult male spontaneously hypertensive rats (SHRs), were selected in 2 groups: first group served as control (SHR-C, received vehicle), and the second group (SHR-TE) received bolus of thyme (TE, 100 mg/kg b.w. dissolved in 0.2 ml saline). Mean (MAP) arterial pressure and cardiac output were directly measured in anesthetized rats before and after bolus injection of TE or vehicle, while total peripheral vascular resistance (TPVR) was calculated. Animals were sacrificed and blood samples were collected for determination of total plasma cholesterol, high-density lipoprotein cholesterol (HDL-C), and triglyceride levels, while very low-density lipoprotein cholesterol (VLDL-C) and low-density lipoprotein cholesterol (LDL-C) were calculated.

Results: MAP dropped significantly after bolus of TE (SHR-TE: 103.14 ± 7.27 mmHg vs. baseline value: 196.86 ± 7.54 mmHg, and vs. SHR-C 198.33 ± 7.27 mmHg, $p < 0.001$). TPVR was also decreased significantly in this rat group, (SHR-TE: 0.41 ± 0.04 mmHg kg min/ml, vs. baseline value: 0.77 ± 0.05 mmHg kg min/ml, $p < 0.05$, and vs. SHR-C: 0.68 ± 0.05 mmHg kg min/ml, $p < 0.01$) without changes in cardiac output. Bolus of TE induced the reduction of plasma cholesterol and triglyceride levels (SHR-TE: 0.55 ± 0.03 mmol/l, and 0.23 ± 0.02 mmol/l vs. SHR-C: 0.98 ± 0.03 mmol/l, and 0.59 ± 0.06 mmol/l, $p < 0.001$) but the HDL-C remained unchanged. VLDL and LDL were also diminished after TE treatment (SHR-TE: 0.05 ± 0.01 mmol/l, and 0.00 ± 0.00 mmol/l vs. SHR-C: 0.12 ± 0.01 mmol/l, $p < 0.001$, and 0.17 ± 0.04 mmol/l, $p < 0.01$).

Conclusion: Wild thyme extract possess strong antihypertensive and antilipidemic effects in SHRs, therefore could be account for decrease of cardiovascular risk.

PP.29.153 CIRCADIAN VARIATIONS IN HEMODYNAMICS AND LOCOMOTOR ACTIVITY IN CONGENIC RATS

H. Kawamura¹, H. Mitsubayashi¹, N. Saito², T. Nabika³. ¹The Nippon Dental University, School of Life Dentistry, Department of Medicine, Tokyo, Japan, ²Miyazaki Medical Center, Miyazaki, Japan, ³Shimane University Faculty of Medicine, Department of Functional Pathology, Izumo, Japan

Objective: The congenic rats (SHRSPwch1.0) were derived from stroke-prone SHR/Izumo (SHRSP/Izm) and Wistar-Kyoto rat/Izumo (WKY/Izm). We studied the circadian variations of systolic arterial pressure (SAP), heart rate (HR) and locomotor activity (ACT) in SHRSPwch1.0. We also studied the effect of central selective noradrenergic neurotoxin, DSP-4 (N-2-chloroethyl-N-ethyl-2-bromobenzylamine HCl), on the circadian variations of SAP, HR and ACT.

Methods: We used ten male mature SHRSPwch1.0 and ten age-sex matched SHRSP/Izm for the control. SAP, HR and ACT were monitored using radiotelemetry, and circadian variations in SAP, HR and ACT were analyzed using the maximum entropy method.

Results: SHRSPwch1.0 were heavier than SHRSP/Izm (352 ± 15 vs. 279 ± 15 g, $P = 0.0001$). As expected, SAP in SHRSPwch1.0 was lower than in SHRSP/Izm (194 ± 9 vs. 229 ± 15 mmHg, $P = 0.0110$). HR in SHRSPwch1.0 was slower than in SHRSP/Izm (310 ± 9 vs. 381 ± 45 beats/min, $P = 0.0110$). Both light period and dark period SAP and HR in SHRSPwch1.0 were lower than those in SHRSP/Izm. The circadian variations of SAP, HR and ACT in SHRSPwch1.0 were clearly evident, compared to SHRSP/Izm. 24-hr periodicities were dominant in SAP, HR and ACT of SHRSPwch1.0, compared to those in SHRSP/Izm. DSP-4 did

not affect the 24-hr periodicities of SAP, HR and ACT in SHRSPwch1.0. However, it reduced the power of spectral density (PSD) of SAP in SHRSPwch1.0.

Conclusions: The circadian variations of SAP, HR and ACT appear better maintained in SHRSPwch1.0, compared to SHRSP/Izm. Further work is needed to confirm the effect of noradrenergic neurons on circadian variations of SAP, HR and ACT.

PP.29.154 INCREASED URIDINE ADENOSINE TETRAPHOSPHATE CONCENTRATIONS CAUSE INCREASED PROLIFERATION RATES OF IMT AND CORRELATE WITH BLOOD PRESSURE

V. Jankowski, M. Toelle, W. Zidek, J. Jankowski. *Med. Klinik IV, Berlin, Berlin, Germany*

Background: Uridine adenosine tetraphosphate (Up4A) has been recently characterized as a potent vasoconstrictor. Up4A occurs in plasma from healthy subjects at concentrations sufficient to cause strong vasoconstrictive effects. In this study, Up4A concentrations in plasma from juvenile hypertensives and normotensives were determined.

Methods: Up4A was purified to homogeneity by preparative reverse phase high performance liquid-chromatography (HPLC), affinity HPLC and analytic reverse phase HPLC from deproteinized plasma of juvenile hypertensives and normotensives.

Results and Discussion: Mean total plasma Up4A concentration was significantly increased in juvenile hypertensives compared to juvenile normotensives (33.0 ± 25.4 vs. 3.7 ± 0.9 nmol/L; mean $\pm$ SEM, $n = 40$ and 38 ; respectively, $p < 0.005$). Accordingly, Up4A showed a significant association with juvenile hypertension (OR for $\ln(\text{Up4A})$: 1.82; 95% CI 1.12, 2.95). Plasma Up4A concentrations correlated with left ventricular mass (Kendall-tau correlation coefficient 0.220, $n = 40$; $p < 0.05$) and intima media wall thickness (Kendall-tau correlation coefficient 0.296, $n = 40$; $p < 0.05$) in the hypertensives. Since the increased intima media thickness may be related to proliferative effects of Up4A, we studied the effects of Up4A on human vascular smooth muscle cell (VSMC) proliferation. The maximum proliferative effect of Up4A was $83.7 \pm 18.0\%$ above control ($p < 0.01$).

Conclusion: Circulating levels of Up4A are strongly associated with juvenile hypertension. The endothelium-derived vasoconstrictor Up4A may contribute to the early development of primary hypertension and is moreover an important risk factor of juvenile hypertension.

PP.29.155 CONTINUOUS LIGHT EXPOSURE- AND L-NAME-INDUCED LEFT VENTRICULAR REMODELLING: INTERACTIONS WITH MELATONIN AND CAPTOPRIL

F. Simko¹, O. Pechanova^{2,3}, V. Pelouch^{4,5}, K. Krajcirovicova¹, K. Bednarova¹, M. Mullerova¹, P. Celec¹, M. Adamcova⁶, L. Paulis⁷. ¹Department of Pathophysiology and 3rd Clinic of Medicine, School of Medicine, Comenius University, Bratislava, Slovak Republic, ²Institute of Normal and Pathological Physiology, Slovak Academy of Sciences, Bratislava, Slovak Republic, ³Institute of Physiology and Center of Cardiovascular Research, Academy of Sciences of the Czech Republic, Prague, Czech Republic, ⁴Department of Medical Chemistry and Biochemistry, 2nd School of Medicine, Charles University, Prague, Czech Republic, ⁵Center for Cardiovascular Research, Prague, Czech Republic, ⁶Department of Physiology, School of Medicine, Charles University, Hradec Kralove, Czech Republic, ⁷Charité-Universitätsmedizin, Center for Cardiovascular Research, Berlin, Germany

Objective: Blood pressure enhancement induced by continuous light exposure represents an attractive but rarely investigated model of experimental hypertension.

Design and Method: The aim of our study was to show whether the combination of continuous light (24 h/day) exposure and chronic L-NAME treatment induces remodelling of the left ventricle and whether captopril or melatonin are able to modify these potential alterations. Six groups ($n = 8$ /group) of 3-month old Wistar rats were treated for six weeks: control (untreated rats) (c), L-NAME-treated (40 mg/kg/day) (L), exposed to continuous light (24), L-NAME treated and exposed to continuous light (L24), light-exposed-L-NAME rats which were treated with either captopril 100 mg/kg/day (L24C), or melatonin (10 mg/kg/24 h) (L24CM). Systolic blood pressure (SBP) was measured by tail-cuff method. Relative weight of the LV, endothelial nitric oxide synthase (eNOS) and angiotensin converting enzyme (ACE) expression in tissues, malondialdehyde (MD) concentration in plasma, and the level of hydroxyproline in collagenous protein fractions were measured.

Results: SBP increase was prevented by both drugs investigated but more prominently by captopril in L24. Expression of eNOS was decreased in the aorta of L24 compared to controls and neither drug has improved it. Expression of ACE was increased in L24 and both drugs prevented this increase. Increased oxidative load, estimated by concentration of MD in plasma, was reduced by both drugs. Only captopril reduced LV hypertrophy in L24, while both captopril and melatonin reduced hydroxyproline concentration (captopril in soluble collagenous fraction and melatonin in insoluble collagenous fraction) of the LV.

Conclusion: It is concluded that although melatonin - in comparison to captopril - did not prevent the increase of LV weight, both captopril and melatonin prevented LV fibrosis development. This protective effect of both drugs may be due to their antioxidative effect and by reducing the ACE expression.

PP.29.156 THYME EXTRACT IMPROVES BLOOD PRESSURE AND OXIDATIVE STRESS IN SPONTANEOUSLY HYPERTENSIVE RATS

Z. Miloradovic¹, B. Bugarski², D. Komes³, J. Grujic Milanovic¹, M. Ivanov¹, DJ. Jovovic¹, N. Mihailovic-Stanojevic¹. ¹Institute for Medical Research, University of Belgrade, Belgrade, Serbia, ²Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia, ³Faculty of Food Technology and Biotechnology, University of Zagreb, Zagreb, Croatia

Objective: A relationship between elevated blood pressure and oxidative stress has been suggested in hypertensive animals as well in humans. Rosmarinic acid, the predominant phenolic compound of thyme extract (TE- *Thymus serpyllum* L.) possesses a broad spectrum of biological activities and is known as antiviral, antibacterial, antioxidant, antiinflammatory and immunostimulating agent. The objective of this study was to examine the effects of bolus injection of TE on systolic, diastolic, and pulse pressure and oxidative stress in the model of essential hypertension.

Design and Method: Adult male spontaneously hypertensive rats (SHR), and age/sex match normotensive Wistar rats (WR) were divided in 4 groups: SHR-TE and WR-TE received TE, 100 mg/kg b.w. dissolved in 0.2 ml saline. Control SHR-C and WR-C groups received vehicle. After pentobarbital anesthesia systolic (SAP), diastolic (DAP), and pulse pressure (PP) were measured directly. Blood samples were taken for oxidative stress (thiobarbituric acid reactive substances-TBARS).

Results: SAP and DAP decreased significantly in hypertensive rats after bolus of TE (SHR-TE: 147.43 ± 8.99 mmHg vs. SHR-C 243.67 ± 7.17 mmHg, $p < 0.001$, and SHR-TE: 79.43 ± 7.27 mmHg vs. SHR-C 161.50 ± 6.29 mmHg, $p < 0.001$) without effects on those parameters in normotensive rats (WR-TE: 105.67 ± 6.23 mmHg vs. WR-C 122.83 ± 7.20 mmHg, and WR-TE: 58.17 ± 5.64 mmHg vs. WR-C 76.33 ± 5.10 mmHg). There was no difference between PP in SHR and WR, however, bolus of TE induced the decline of PP by 17.24 % in hypertensive rats. Plasma TBARS level was significantly higher in SHR than in WR (6.47 ± 0.86 nmol/ml vs. 4.35 ± 0.66 nmol/ml, $p < 0.05$), and TE significantly reduces its value to a level of normotensive rats (SHR-TE: 4.04 ± 0.52 nmol/ml, $p < 0.05$).

Conclusions: Our results showed that in SHR, TE induces a normalization of arterial blood pressure and circulating level of TBARS, thus promoting rosmarinic acid, as an antihypertensive and antioxidant agent.

PP.29.157 EFFECTS OF THE β 1-ADRENERGIC RECEPTOR GENE OVER-EXPRESSION

H. Yuan, M.Z. Zhang, Z.J. Huang, X.W. Xing. *The 3rd Xiangya Hospital, Central South University, Changsha, China*

Objective: To discuss the role of β 1-adrenergic receptor (β 1-AR) in hypertension, H9c2 myocardial cell lines in which β 1-AR is overexpressed were constructed. The effects of overexpressing of β 1-AR on H9c2 cells were investigated.

Design and Method: PCR was used to amplify the cDNA sequences of β 1-AR from cDNA which was reverse transcribed by the mRNA extracted from the myocardial tissues. The product was subcloned into pcDNA3.1 mammalian expression vector to obtain recombinant pcDNA3.1/ β 1-AR which was transfected into H9c2 cells. RT-PCR, real-time quantitative PCR and Western blot were done to analyze the expression level of β 1-AR mRNA and protein. The effect of β 1-AR on H9c2 cell proliferation and apoptosis were measured by the MTT assay, AO/EB staining was applied to observe the cell morphology.

Results: 1) Overexpression of $\beta 1$ -AR was detected in cells transfected with pcDNA3.1/ $\beta 1$ -AR which was analyzed by semi-quantitative RT-PCR, real-time RT-PCR and Western blot;

2) The effects of overexpression on the $\beta 1$ -AR H9c2 cell line:

Overexpression of $\beta 1$ -AR did not alter proliferation of H9c2 cells in vitro;

Overexpression of $\beta 1$ -AR reduced the apoptosis;

Overexpression of $\beta 1$ -AR changed the cell biology features.

Conclusions:

1) H9c2 cell lines in which $\beta 1$ -AR is stably overexpressed has been obtained.

2) $\beta 1$ -AR overexpression inhibited H9c2 cell apoptosis and changed the biology features which indicated that $\beta 1$ -AR overexpression might be helpful to the myocardial cells.

PP.29.158 A DIETARY PHASE 2 ENZYME INDUCER IN ANIMAL MODEL OF ESSENTIAL HYPERTENSION

A. Banigesh, V. Senanyake, L. Wu, P. Lee, B. Juurlink. *University of Saskatchewan, Saskatoon, Canada*

Numerous studies have demonstrated the health benefits of fruits, vegetables, spices and herbs. For instance, consuming a clove of garlic (or equivalent) decreases cholesterol levels and attenuates hypertension. Previous studies in our laboratory have shown that broccoli sprouts rich in glucoraphanin, a precursor of a potent phase 2 protein inducing isothiocyanate sulforaphane, decreases oxidative stress and ameliorates hypertension. The question this study addressed was the importance of a food matrix in causing these beneficial effects, i.e., can one see the same effects by administration of sulforaphane alone? Sulforaphane (5, 10 and 20 μ Moles/Kg) was administered by daily gavage to 5-wk old Spontaneously Hypertensive Stroke Prone rats (SHRsp) for 4 months. Blood pressure was measured weekly by tail cuff and at the end of the experiment by an external catheter inserted into the carotid artery in anesthetized animals. For comparison, age-matched normotensive Sprague Dawley (SD) rats were treated in the same manner. SHRsp control rats had significantly higher Systolic Blood Pressure (SBP) (179.9 ± 4.3 mm Hg) than control SD rats (83.98 ± 1.69). Sulforaphane treatment significantly lowered SHRsp blood pressure to $157.7 \pm .21$. There was no effect of sulforaphane treatment on SD rat SBP (93.9 ± 4.26). We conclude that the health benefit previously demonstrated in our laboratory is due to sulforaphane.

PP.29.159 DETECTION THE EXPRESSION OF $\beta 1$ -ADRENERGIC RECEPTOR IN SPONTANEOUSLY HYPERTENSIVE RATS MYOCARDIAL TISSUE IN DIFFERENT INDIVIDUALS

H. Yuan¹, X. Du¹, Z. J. Huang², X.W. Xing². ¹The Department of Cardiology, The Third Xiangya Hospital of Central South University, Changsha, China, ²Hypertension Research Center of Hunan Province, Changsha, China

Objective: Detection of the expression of $\beta 1$ -adrenergic receptor ($\beta 1$ -AR) in different individuals of spontaneously hypertensive rats (SHRs) myocardial tissue. To identify the relationship between expression of $\beta 1$ -AR and blood pressure.

Design and Method: 10 SHRs, 24 weeks, male. Rat tail artery manometry to measure the systolic blood pressure three times of awake SHRs, the average value as the SBP. Collection the body weight, body length, heart weight and other data. SHRs were anesthetized by 10% chloral hydrate. Then they were fixed, open-chest and taken heart tissue quickly and placed in separate freezing tube and stored in liquid nitrogen. Total RNA was extracted for RT-PCR, fluorescence-quantitative RT-PCR analysis to determine the expression of $\beta 1$ -AR gene mRNA. Total protein was extracted for Western Blotting/Immunohistochemistry analysis to determine the expression of $\beta 1$ -AR gene.

Results: Tail artery pressure measurement showed that the average systolic blood pressure of 10 rats were higher than 170 mmHg. RT-PCR, and fluorescence-quantitative RT-PCR analysis show that the expression of $\beta 1$ -AR gene mRNA is distinct in different individuals. Western Blotting/Immunohistochemistry analysis show that the expression of $\beta 1$ -AR gene is distinct in different individuals. There is a correlation between systolic blood pressure and the expression of $\beta 1$ -AR gene ($p < 0.05$).

Conclusions: Confirmed that the expression of $\beta 1$ -adrenergic receptor differences in SHRs myocardial tissue of different individuals. It may

provide an experimental basis for clinical application of $\beta 1$ -AR blockers for Individualized treatment of hypertension.

PP.29.160 ROLE OF CYCLOOXYGENASE-2 PATHWAY IN ANTI-OXIDATIVE EFFECT OF ASPIRIN AND IN ANGIOTENSIN II-INDUCED OXIDATIVE STRESS

R. Wu, J. de Champlain, H. Girouard. *University of Montreal, Montreal, Canada*

Objective: Cyclo-oxygenase (COX)-2 overreaction is implicated in numerous human diseases and could elicit inflammation and free radicals generation. Angiotensin II (AngII) stimulates COX-2 expression and induces oxidative stress in cardiovascular tissues. Aspirin reduces superoxide (O_2^-) production and prevents AngII-induced oxidative stress and hypertension. The present study was designed to evaluate the role of the COX-2 pathway in the antioxidative effect of aspirin.

Methods: The COX-1 (COX-1 $^{-/-}$) or COX-2 (COX-2 $^{-/-}$) knock-out mice and the cultured aortic smooth muscle cells (SMCs) from these animals were treated either with aspirin or AngII for 14 days (in vivo) or for 48 hours (cell culture). The O_2^- production was measured with the lucigenin-enhanced chemiluminescence method.

Results: In vivo study. As observed on wild type mice, aspirin treatment reduced and AngII treatment increased the cardiovascular tissue O_2^- production in COX-1 $^{-/-}$ mice. AngII treatment also significantly increased the blood pressure in those mice. At variance from wild type or COX-1 $^{-/-}$ mice, AngII treatment increased only moderately the O_2^- production and blood pressure in COX-2 $^{-/-}$ mice. Histological analysis showed the presence of hypertrophy on renal arterioles in untreated COX-2 $^{-/-}$ mice and in AngII-treated wild type or COX-1 $^{-/-}$ mice.

Study on cultured SMC. Aspirin treatment reduced the AngII-enhanced O_2^- production on cultured aortic SMCs from wild type mice by 23% and COX-1 $^{-/-}$ mice by 30%. The basal O_2^- level produced by SMCs from COX-2 $^{-/-}$ mice was significantly lower than that from wild type or COX-1 $^{-/-}$ mice. AngII infusion brought the O_2^- production rate back to the basal level of WT mice. Aspirin treatment neither reduced the basal O_2^- level nor inhibited the AngII-enhanced O_2^- production on cultured SMCs from COX-2 $^{-/-}$ mice.

Conclusions: a) The COX-2 pathway plays an important role in the redox balance in cardiovascular tissue. b) The COX-2 pathway appears to be responsible in great part for the antioxidative and cardiovascular protective effect of aspirin against AngII.

PP.29.161 BLOCKADE OF TACHYKININ NK-3 RECEPTOR REVERSES HYPERTENSION THROUGH A DOPAMINERGIC MECHANISM IN THE VENTRAL TEGMENTAL AREA OF SPONTANEOUSLY HYPERTENSIVE RATS

H. De Brito Gariepy, R. Couture. *Universite de Montreal, Montreal, Canada*

Intracerebroventricularly (i.c.v.) injected tachykinin NK-3 receptor (R) antagonists normalized mean arterial blood pressure (MAP) in spontaneously hypertensive rats (SHR). This study was pursued to define the role played by NK-3R located on dopamine (DA) neurons of the ventral tegmental area (VTA) in the regulation of MAP in SHR.

SHR (16 weeks) were implanted permanently with i.c.v. and/or VTA guide cannula. Experiments were conducted 24 h after catheterization of the abdominal aorta to measure MAP and heart rate (HR) in freely behaving rats. Cardiovascular responses to i.c.v. or VTA injected NK-3R agonist (senktide) and antagonists (SB222200 and R-820) were measured before and after systemic administration of selective DA antagonists for D-1R (SCH23390), D-2R (raclopride) or non-selective D-2R (haloperidol) and after destruction of the VTA with ibotenic acid.

Senktide (10, 25, 65 and 100 pmol) elicited more prominent increases of MAP and HR when injected in the VTA than i.c.v. and this cardiovascular response was blocked by R-820, SCH23390 and haloperidol. I.c.v. or VTA injected SB222200 and R-820 (500 pmol) evoked anti-hypertension, which was blocked by raclopride. Destruction of the VTA prevented the pressor response to i.c.v. senktide and the anti-hypertension to i.c.v. R-820. VTA injected SB222200 prevented the pressor response to i.c.v. senktide, and vice versa, i.c.v. senktide prevented the anti-hypertension to VTA SB222200. Repeated i.c.v. injection of R-820, once a day for 5 days, caused a sustained anti-hypertensive effect in SHR.

Tachykinin NK-3R in the VTA is implicated in the maintenance of hypertension by increasing midbrain DA transmission in SHR. Hence, these

receptors may represent a therapeutic target in the treatment of arterial hypertension.

PP.29.162 UP-REGULATION OF MYOCARDIAL CONNEXIN-43 AND PKCE IS MOST LIKELY INVOLVED IN CARDIOPROTECTIVE-ANTIARRHYTHMIC EFFECTS OF OMEGA-3 FATTY ACIDS IN OLD HYPERTENSIVE RATS

J. Radosinska¹, B. Bacova¹, V. Knezl², M. Barancik¹, P. Weismann³, N. Tribulova¹. ¹*Institute for Heart Research SAS, Bratislava, Slovak Republic*, ²*Institute of Experimental Pharmacology SAS, Bratislava, Slovak Republic*, ³*Medical Faculty of Comenius University, Bratislava, Slovak Republic*

Background: Hypertension-induced myocardial remodelling contributes to both heart failure and occurrence of life-threatening arrhythmias. Clinical studies showed that omega-3 polyunsaturated fatty acids (omega-3) reduce the incidence of cardiovascular diseases and sudden cardiac death. However, mechanisms are not fully elucidated. Myocardial connexin (Cx) channels at the gap junctions ensure electrical coupling and cardiac synchronisation. The aim of this study was to investigate whether omega-3 affect distribution, expression and/or phosphorylation of Cx-43 in aged spontaneously hypertensive rats (SHR). Myocardial ultrastructure and susceptibility of the heart to ventricular fibrillation (VF) were examined as well.

Design and Methods: Male, 14-months-old SHR and non-hypertensive Lewis rats (NLR) were fed with omega-3 (Vesteralens, Norway, 40 mg/day/2mth) and compared with untreated. Blood pressure was registered and left ventricular tissues were processed for 'in situ' immunodetection of Cx43 and electron microscopy. Western blotting was used to assess total Cx43 expression, its phosphorylation status and expression of protein kinases C (which phosphorylate Cx43). Susceptibility to electrically-induced VF was tested using Langendorff isolated heart model. Results showed that omega-3 supplementation led to a significant decline of blood pressure in SHR and reduced incidence of VF despite myocardial fibrosis, hypertrophy and abnormal Cx43 distribution (remodelling) were not eliminated but integrity of the cardiomyocytes and their junctions were improved. Total myocardial Cx43 expression and its phosphorylated forms were markedly decreased in SHR, while significantly increased due to omega-3. It was accompanied by enhanced PKC ϵ expression different to its suppression in untreated SHR.

Conclusions: Findings indicate that up-regulation of myocardial connexin-43 and PKC- ϵ is most likely involved in the mechanisms of antiarrhythmic effects of omega-3 fatty acids in old hypertensive rats. Results challenge to know a possible beneficial effects of omega-3 fatty acids supplementation in patients suffering from hypertension.

PP.29.163 ANTIHYPERTENSIVE EFFECT OF SOLUBLE EPOXIDE HYDROLASE INHIBITION IN MICE WITH RENOVASCULAR HYPERTENSION

L. Kopkan¹, L. Cervena^{1,2}. ¹*Institute for Clinical and Experimental Medicine, Prague, Czech Republic*, ²*Center for Cardiovascular Research, Prague, Czech Republic*

Objective: Inhibition of soluble epoxide hydrolase (sEH) induces substantial antihypertensive responses in several model of hypertension. The present study was performed to determine antihypertensive effects of sEH inhibition in mice with renovascular hypertension.

Methods: Male C57Bl6 (wild type; WT) and mice lacking gene for endothelial nitric oxide (NO) synthase (knock out; KO) were implanted with transmitters (DSI) to monitor systolic blood pressure (SBP) continuously by radiotelemetry. Renovascular hypertension was induced by placing of silver clip on the right renal artery in these mice (two-kidney, one clip model). After clipping at day 25, animals were treated with the novel sEH inhibitor, cis-4-[4-(3-adamantan-1-yl-ureido)-cyclohexyloxy]-benzoic acid (c-AUCB; 26 mg/L in drinking water) or left untreated for two week. Animals were placed into the metabolic cages to determine 24-hrs sodium excretion trough the treatment period.

Results: Renal artery clipping caused significant SBP increases in both WT (121 ± 2 to 158 ± 4 mmHg; $n=6$) and KO mice (141 ± 3 to 169 ± 7 mmHg; $n=7$). However, c-AUCB treatment given from day 25 significantly reduced SBP in WT (147 ± 3 mmHg, $n=6$) and also in KO mice (154 ± 2 mmHg, $n=7$). During second day of the treatment, both WT and KO animals exhibited transiently higher sodium excretion (0.141 ± 0.008 and 0.127 ± 0.006 mmol/day, respectively) compared to untreated WT and KO mice (0.118 ± 0.007 and 0.092 ± 0.005 mmol/day, respectively) but not at the end of the treatment period.

Conclusion: These data indicate that inhibition of sEH displayed appreciable blood pressure reductions in mice model with established renovascular hypertension and this antihypertensive effect seemed to be NO independent as observed responses to c-AUCB were present also in KO mice lacking NO production.

PP.29.164 THE RELATIONSHIP BETWEEN CENTRAL AORTIC PRESSURE, BRACHIAL BLOOD PRESSURE AND LEFT VENTRICULAR MASS INDEX: IN FIRST DIAGNOSED HYPERTENSIVE PATIENTS

J. Na, E. Kim, S. Lim, C. Choi, H. Lim, S. Rha, C. Park, H. Seo, D. Oh. *Cardiovascular Center, Korea University Guro Hospital, Seoul, South Korea*

Background: Central (aortic) blood pressure (BP) has been reported as a more powerful indicator to predict cardiovascular risk than peripheral (brachial) BP. Also, increased left ventricular mass index (LVMI) and its change during treatment can predict cardiovascular complications in hypertensive subjects. However, the relationship between aortic or peripheral BP and LVMI is not clear especially in first diagnosed hypertensive subjects. We purposed to compare the relationship of LVMI with central and peripheral BP parameters.

Methods: We studied 111 patients who diagnosed hypertension for the first time without any medical history including diabetes (mean age: 47 ± 10 years, 72 males). Subjects with heart failure, any significant valvular disease or cardiomyopathy on echocardiogram were excluded. Peripheral BP was measured by automatic sphygmomanometer at brachial artery and central BP was measured by analysis of non-invasive radial artery pulse wave using automated applanation tonometry. The LVMI was calculated from M-mode echocardiographic data and body surface area. To avoid multiple co-linearity among BP parameters, multiple regressions predicting LVMI were done four times.

Results: Baseline central and peripheral systolic BP (SBP) were 136 ± 17 and 150 ± 18 mmHg ($p < 0.001$) and each mean pulse pressure (PP) was 41 ± 11 and 53 ± 13 mmHg respectively ($p < 0.001$). Mean PP difference was 11.7 ± 12.0 mmHg and mean LVMI was 109 ± 22 g. The LVMI was positively correlated with age, peripheral SBP & PP, central SBP & PP, and carotid intima-media thickness ($r=0.231, 0.276, 0.283, 0.248, 0.343, 0.259$ respectively, each $p < 0.05$). But, PP difference was not significantly correlated ($p=0.915$). Although central and peripheral systolic and pulse pressures were still significantly related to LVMI after adjustment for age in the four different analyses, central PP was stronger predictor than peripheral PP (β coefficient = $0.311, p=0.001$ vs. $0.281, p=0.003$).

Conclusion: Left ventricular mass index, which is one of useful indicators for predict cardiovascular risk and outcome of hypertension, is independently and positively associated with blood pressure parameters. Central pulse pressure is particularly more strongly related with LVMI than peripheral BP parameters.

PP.29.165 EFFECT OF CHRONIC LOW-DOSE L-NAME TREATMENT ON NITRIC OXIDE SYNTHESIS AND ENDOTHELIAL FUNCTION IN SPONTANEOUSLY HYPERTENSIVE RATS

P. Balis, A. Puzserova, P. Slezak, J. Kopincova, I. Bernatova. *Institute of Normal and Pathological Physiology, SAS, Centre of Excellence for Cardiovascular Research, Bratislava, Slovak Republic*

Objective: Chronic pharmacological reduction of nitric oxide (NO) synthesis with the non specific NO synthase (NOS) inhibitor NG-Nitro-L-arginine methyl ester (L-NAME) results in reduction of endothelium-dependent vasorelaxation and hypertension when it is administered in higher dose (more than 5 mg/kg/day) in normotensive rats. However, spontaneously hypertensive (SHR) rats are more sensitive to NO deficiency than normotensive rats. Thus, the aim of this study was examine the effect of chronic low-dose L-NAME treatment on blood pressure and endothelial function in SHR.

Design and Method: Adult male 12-week-old SHR rats were treated with L-NAME (0.3 mg/kg/day) in drinking water for 10 weeks. Blood pressure (BP) was determined by tail-cuff method. Samples of liver tissues were used for cholesterol determination (1). NOS activity was determined by conversion of [3H]-L-arginine in the aorta, left ventricle and liver. NO-dependent component of relaxation was investigated in rings of the femoral artery, using the wire myograph as a difference between acetylcholine (ACh)-induced relaxation before and after acute L-NAME pre-treatment. Since vasorelaxation, expressed as a percentage of pre-constriction, was inversely related to initial tension, relaxing responses were expressed as absolute values too.

Results: Chronic low-dose of L-NAME significantly elevated BP but failed to affect relative left ventricular weight and NOS activity in all organs investigated. Similarly, relative and absolute ACh-induced vasorelaxation as well as relative and absolute NO-dependent component of ACh-induced relaxation were not affected by chronic low dose L-NAME administration. Concentrations of cholesterol in the liver were similar in the groups (20.45 ± 0.86 and 20.62 ± 0.6 mmol/kg).

Conclusions: Chronic low-dose L-NAME treatment failed to affect NO-dependent vasorelaxation in SHR rats, however increased the severity of hypertension. Supposedly the increase of blood pressure by chronic low-dose L-NAME administration in SHR is a consequence of rather central than peripheral NO-insufficiency. Additionally, elevated BP did not alter cholesterol metabolism in the liver.

PP.29.166 INAPPROPRIATELY HIGH ANGIOTENSIN II LEVELS DURING DIETARY SALT LOADING EXACERBATE HYPERTENSION IN CYP1A1-REN-2 TRANSGENIC RATS

Z. Huskova, Z. Vanourkova, L. Cervenka. *Institute for Clinical and Experimental Medicine, Department of Experimental Medicine, Prague, Czech Republic*

Objective: This study evaluated the effects of increasing dietary salt loading and of salt restriction on blood pressure (BP) and the renin-angiotensin system (RAS) in Cyp1a1-Ren-2 transgenic rats with inducible hypertension.

Methods: Hypertension was induced through dietary administration of xenobiotic indole-3-carbinol (I3C; 0.3%). Rats were fed either a normal salt (NS; 0.6 % NaCl) or high salt (HS; 2, 4 and 8% NaCl) or a low salt (LS; <0.04% NaCl) diets. BP was monitored by radiotelemetry. ANG II and aldosterone levels, renin and ACE activity were measured by radioimmunoassay. Urinary protein concentration was measured by a biuret method, sodium concentration by a flame photometry.

Results: I3C administration resulted in NS fed rats in the development of severe hypertension and cardiac hypertrophy that were accompanied by marked increases in plasma and kidney ANG II and plasma aldosterone levels. Moreover, I3C induction caused a marked rise in PRA, a significant decrease in renal renin activity and elicited a significant increase in proteinuria. Feeding the 2% and 4% HS diets did not worsen the course of hypertension and did not alter ANG II and aldosterone levels in I3C-treated rats. 8% HS diet exacerbated the course of hypertension and caused further increases in ANG II and aldosterone levels, in proteinuria, in PRA and greater suppression of renal renin activity in I3C-treated rats. Feeding 8% HS diet did not alter plasma ACE activity but it resulted in a significant increase in kidney ACE activity. I3C administration in rats fed the NS as well as the 8% HS diet caused a significant transient decrease in urinary sodium excretion. LS diet substantially attenuated the increase in BP and the development of cardiac hypertrophy in I3C-treated rats.

Conclusions: After induction of the renin gene in Cyp1a1-Ren-2 transgenic rats inappropriate increases in plasma and kidney ANG II levels and transient sodium retention in response to very high dietary salt intake are responsible for the development of severe hypertension.

PP.29.167 ENDOTHELIAL FUNCTION IN ADULT BORDERLINE AND SPONTANEOUSLY HYPERTENSIVE RATS - EFFECT OF ASCORBIC ACID

A. Puzserova¹, J. Kopincova¹, H. Jombikova², I. Bernatova¹. ¹*Institute of Normal and Pathological Physiology, SAS, Centre of Excellence for Cardiovascular Research, Bratislava, Slovak Republic*, ²*Department of Animal Physiology and Ethology, Faculty of Natural Sciences, Comenius University, Bratislava, Slovak Republic*

Objective: Literary data indicate apparent discrepancies related to nitric oxide (NO) production in hypertension. Antioxidants were shown to modify the levels of vasoactive factors released by the endothelium. Previously we showed significantly better NO-dependent vasorelaxation of the femoral artery (FA), both in borderline (BHR) and spontaneously hypertensive (SHR) rats, however in presence of ascorbic acid (AsA) in working physiological solution (PSS, 1). The aim of this study was to examine acetylcholine (ACh)-induced and sodium nitroprusside (SNP)-induced relaxation in the FA of 22-week-old Wistar-Kyoto (WKY), BHR and SHR rats in absence of AsA in PSS.

Design and Method: Blood pressure (BP) was determined by tail-cuff method. NO synthase activity was determined by conversion of [3H]-L-arginine. Conjugated dienes (CD) and thiobarbituric acid-reactive substances (TBARS) were measured in the left ventricle. NO-dependent component of relaxation was investigated in rings of the FA, using the wire

myograph as a difference between ACh-induced relaxation before and after acute NO synthase inhibitor NG-Nitro-L-arginine methyl ester (L-NAME) pre-treatment.

Results: BP of WKY, BHR and SHR was 111 ± 3 , 140 ± 4 and 184 ± 6 mm Hg, respectively ($p < 0.05$ among all). NO synthase activity was significantly higher in the aorta of BHR and SHR vs. WKY. ACh-induced relaxation was reduced in both BHR and SHR vs. control when expressed as both relative values and absolute tension. Absolute and relative NO-dependent component of ACh-induced relaxation was similar in BHR, SHR and WKY. Reduced responses to ACh in BHR and SHR were associated with significant decrease of NO-independent relaxation. Cumulative addition of SNP produced similar relaxation responses in the FA of WKY, BHR and SHR. CD and TBARS were increased in BHR and SHR vs. WKY.

Conclusions: AsA, when present in PSS, might artificially reverse endothelial dysfunction in BHR and SHR supposedly by improvement of vascular NO bioavailability due to reduction of oxidative stress. Supported by the grants APVT-51-018004 and VEGA 2/0084/10.

PP.29.168 SEX PARTICULARITIES IN NITRIC OXIDE AVAILABILITY IN HEALTHY AND HYPERTENSIVE RATS UNDER NORMAL AND STRESS CONDITIONS

A. Kuznetsova, O. Semychkina-Glushkovskaya, T. Sindyakova, I. Semychkin-Glushkovskij, Y. Kuznetsova. *Saratov State University, Saratov, Russia*

Aims: The present study was designed to investigate whether there are gender-related differences in nitric oxide (NO) content in normal and hypertensive rats at rest and in immobilization stress (IS, 60 min).

Methods: The experiments were carried out on mongrel rats ($n = 172$) of either sex. To induce high levels of blood pressure (BP) rats were clipped at the renal artery with a silver clip (Goldblatt hypertension, 2K, 1C). Serum NO concentration was measured in blood by a spectrophotometric assay. NO determinations were performed by Griess reaction as NO₂ concentration after NO₃ reduction to NO₂.

Results: We found that the basal NO production was greater in females vs. males. The IS resulted in significant increase in circulating NO levels that were more pronounced in females vs. males. The ischemia of renal artery was accompanied by development of hypertension and atrophical decrease in mass of kidney. Actually, the hypertension was attenuated in females compared with males. The mass of clipped kidney vs. mass of normal kidney was decreased 8.3-fold in females and 15.8-fold in males. We also found that NO production was depressed in hypertensive rats under normal and stress conditions. Notice, that severe hypertension in males vs. females was accompanied by more significant decrease in basal and stress NO secretion.

Conclusion: The present study shows that there are sex differences in NO availability both in normotensive and hypertensive rats under normal and stress conditions. Since NO is a vasorelaxing and important stress-limited factor we hypothesize that there are sex differences in basal and stress NO availability may be responsible for man are at greater risk for cardiovascular disease than women.

PP.29.169 PRESYNAPTIC ADENOSINE RECEPTORS IN SUPERIOR MESENTERIC ARTERY FROM SPONTANEOUSLY HYPERTENSIVE RATS: A FUNCTIONAL AND MORPHOLOGICAL STUDY

C. Rocha-Pereira^{1,2}, P. Fresco¹, S.M. Arribas², M.C. González², M.V. Conde², J. Gonçalves¹, C. Diniz¹. ¹*Faculdade de Farmácia - Serviço de Farmacologia, Requite/Farma, Universidade do Porto, Porto, Portugal*, ²*Facultad de Medicina - Departamento de Fisiología, Universidad Autónoma de Madrid, Madrid, Spain*

Introduction: It is accepted that adenosine may play a role in the development of hypertension by changing sympathetic neurotransmission (Karon et al., 1995). Adenosine may activate four GPCR subtypes: inhibitory (A1, A3); facilitatory (A2A, A2B). The aim of this study was to characterize the function and location of adenosine receptor (AR) subtypes in mesenteric artery (MA) from Spontaneously Hypertensive (SHR) and Wistar Kyoto (WKY) rats.

Methods: Functional study: WKY and SHR MA-segments were pre-incubated with $0.1 \mu\text{M}$ [3H]-NA and submitted to four-identical periods of stimulation (2 Hz, 200pulses, 1ms, 80 mA) every 20 min (S1-S4). Effects of selective AR agonists and/or antagonists on NA release (estimated as tritium overflow) were studied; Morphological study: MA-segments were longitudinally opened, paraformaldehyde-fixed, incubated (overnight, 4°C)

with primary specific anti-AR antibodies (anti-A1/A2A/A2B/A3) and anti-dopamine β -hydroxylase (DBH) and, subsequently, with fluorescent secondary antibodies (50 min; room temperature) mounted on a slide exposing the adventitia and visualized by confocal microscopy.

Results: The A1-agonist CPA (10 and 100 nM) inhibited NA release in MA of WKY ($76.55 \pm 2.75\%$; $61.68 \pm 2.74\%$; $n = 14$) but the inhibition was lower in SHR ($89.09 \pm 3.59\%$; $74.36 \pm 2.85\%$; $n = 14$; $p < 0.05$). The A3-agonist IB-MECA (1 and 10 nM) inhibited NA release in MA of WKY ($91.71 \pm 1.72\%$; $91.39 \pm 0.95\%$; $n = 12$; $p < 0.05$), an effect not observed in MA of SHR. The A2A-agonist CGS 21680 (10 and 100 nM) facilitated NA release only in MA of SHR. Confocal microscopy showed that all AR-subtypes are located on the same structure as DBH-staining.

Conclusions: All AR-subtypes were present in MA noradrenergic terminals of both strains. Nevertheless, functional studies revealed a differential modulation of NA release by presynaptic AR subtypes in the two strains, which may contribute to the described increased NA spillover in SHR: i) a less efficient A1 receptor-mediated inhibition; ii) the absence of A3 receptor-mediated inhibition and iii) the presence of A2A receptor-mediated facilitation of NA release.

PP.29.170 INVOLVEMENT OF REACTIVE OXYGEN SPECIES IN ERYTHROPOIETIN-INDUCED HYPERTENSION IN RENAL FAILURE RATS

M. Lebel, M.E. Rancourt, M.E. Rodrique, M. Agharazii, R. Lariviere. *CHUQ Research Center, Hotel-Dieu de Quebec Hospital, Laval University, Quebec, Canada*

Background: Erythropoietin (EPO) administration in uremic rats leads to an increase in blood pressure. Since chronic renal failure has been associated with oxidative stress, we hypothesize that EPO treatment could accentuate this condition and contribute to hypertension. The present study was designed to investigate the role of reactive oxygen species in EPO-induced hypertension and the effect of tempol, a superoxide dismutase-mimetic.

Methods: Renal failure was induced by a two-stage 5/6 nephrectomy followed by a 3-week stabilization period. Uremic rats were divided into four groups and received for 4 weeks: vehicle; EPO (100 U/kg, subcutaneously, 3 times per week); vehicle + tempol (1 mmol/L in drinking water); and EPO + tempol. Systolic blood pressure and biochemical parameters were assessed before and at the end of the treatment. Renal histology, creatinine clearance rate, ET-1 concentrations and superoxide anion production were assessed at the end of the study.

Results: The uremic rats developed anemia and hypertension. ET-1 concentrations and superoxide anion production were increased. EPO administration corrected anemia, but accentuated hypertension and renal injuries such as glomerulosclerosis, interstitial fibrosis and inflammation. EPO therapy further increased tissue levels of ET-1 and superoxide anion production. Tempol treatment improved hypertension and renal injury, and reduced ET-1 concentrations and superoxide anion production.

Conclusion: Oxidative stress contributes to the development of hypertension and to the progression of renal injuries in uremic rats. EPO administration further increases oxidative stress, which might partly account for the accentuation of hypertension and renal injury.

PP.29.171 RESVERATROL REDUCES BLOOD PRESSURE, CHANGES OF ANTIOXIDANT ENZYME ACTIVITY AND HISTOLOGICAL PARAMETERS IN EXPERIMENTAL MODEL OF MALIGNANT HYPERTENSION

J. Grujic Milanovic¹, N. Mihailovic-Stanojevic¹, Z. Miloradovic¹, V. Jacevic², I. Milosavljevic², S. Milanovic¹, M. Ivanov¹, D.J. Jovovic¹. ¹Institute for Medical Research, University of Belgrade, Belgrade, Serbia, ²Military Medical Academy, Belgrade, Serbia

Objective: Spontaneously hypertensive rats (SHR) treated with NO syntase inhibitor L-NAME, develop malignant hypertension. This study designed to examine the role of chronic administration of resveratrol on blood pressure, activity of antioxidant enzyme and histological parameters in model of malignant hypertension.

Design and Methods: Experiments were performed in adult female SHR, weight 250 g. Two groups of 22 SHR each involved: L-NAME group treated with L-NAME (10 mg/kg per os) and COMB group treated with L-NAME (10 mg/kg per os) and resveratrol (10 mg/kg by gavage). Mean arterial pressure (MAP) and aortal blood flow (ABF) were measured at the end of the 4 weeks treatment period and aortal vascular resistance (AVR) was calculated. Activity of antioxidant enzyme, reduced glutathione (GR) and

glutathione peroxidase (GSH-Px) were estimated in erythrocyte. The aorta was preceded for histopathological analysis.

Results: The mean arterial pressure after treatment significantly dropped in COMB (157.10 ± 7.49 mmHg) compared L-NAME (182.79 ± 2.16 mmHg). Treatment reduced aortal blood flow that leads to significantly decrease of aortal vascular resistance in COMB (35.54 ± 3.31 mmHg min 100 g/ml) vs L-NAME (45.54 ± 3.06 mmHg min 100 g/ml). Resveratrol in COMB increased activity of GR (30951.23 ± 10253.54 μ mol NADPH/min/g Hb) and GSH-Px (9.23 ± 2.10 μ mol NADPH/min/g Hb) vs L-NAME (24034.13 ± 5743.76 μ mol NADPH/min/g Hb; 3.88 ± 1.14 μ mol NADPH/min/g Hb). In model of malignant hypertension histological structure of aorta showed disintegration of endothelial, marked atrophic in tunica media and necrotic modification in smooth muscle cells. Treatment with resveratrol preserved endothelial and reduced morphological changes in tunica media and smooth muscle cells of aorta. Histopathological score of aorta was significantly reduced in the COMB group (2.50 ± 0.13) compared to L-NAME (3.31 ± 0.12).

Conclusions: These results suggest that resveratrol reduced mean arterial pressure and aortal blood flow, probably by decreasing peripheral vascular resistance. Chronic treatment with resveratrol in model of malignant hypertension significantly increased activity of antioxidant enzymes, and reduced morphological changes of aorta. Thus, resveratrol possess antioxidative and antihypertensive effects.

PP.29.172 SOLUBLE EPOXIDE HYDROLASE INHIBITION IMPROVES THE RENAL FUNCTION DURING THE DEVELOPMENT OF MALIGNANT HYPERTENSION IN CYP1A1-REN-2 TRANSGENIC RATS

Z. Honetschlagerova¹, J.D. Imig², S.H. Hwang³, B.D. Hammock³, L. Cervenka¹, L. Kopkan¹. ¹Institute for Clinical and Experimental Medicine - Department of Experimental Medicine, Prague, Czech Republic, ²Medical College of Wisconsin - Department of Pharmacology and Toxicology, Milwaukee, USA, ³University of California - Department of Entomology, Davis, USA

Objective: The present study evaluated the effects of soluble epoxide hydrolase inhibitor (sEH) on blood pressure (BP) and renal function in transgenic rats with inducible expression of mouse Ren-2 renin gene (Cyp1a1-Ren-2).

Methods: Hypertension was induced in Cyp1a1-Ren-2 rats through dietary administration of xenobiotic indole-3-carbinol (I3C, 0.3%) for 3 and 11 day. Non-induced rats served as controls. The sEH inhibitor, cis-4-[4-(3-Adamantan-1-yl-ureido)-cyclohexyloxy]-benzoic acid (c-AUCB) was given in drinking water (1 mg/day) starting 48 hours before the induction of hypertension. Acute clearance studies were performed in c-AUCB treated and untreated anesthetized rats ($n = 9-10$). The blood pressure (BP) was monitored.

Results: 3 and 11 day administration of I3C resulted in substantial hypertension (167 ± 3 and 188 ± 3 vs. 129 ± 2 mmHg, $p < 0.001$) and a marked reduction of renal plasma flow (RPF) (4.2 ± 0.3 and 4.6 ± 0.3 vs. 6.4 ± 0.3 ml/min/g, $p < 0.01$) as compared with noninduced rats. Although c-AUCB treatment did not affect hypertension at 3 day (163 ± 4 mmHg), it significantly attenuated hypertension at day 11 (164 ± 2 mmHg). Moreover, c-AUCB restored RPF in both groups induced for 3 and 11 days (5.6 ± 0.5 and 5.4 ± 0.4 ml/min/g, respectively).

Conclusions: These data demonstrate that sEH inhibitor exerts antihypertensive and renal vasodilator actions after the development of inducible malignant hypertension in Cyp1a1-Ren-2 transgenic rats.

PP.29.173 CONTRIBUTION OF DIFFERENT MECHANISMS TO EXPLAIN THE ANTIHYPERTENSIVE EFFECT OF COCOANOX, A COCOA RICH IN POLYPHENOLS

M. Quiñones Téllez¹, D. Sánchez², B. Muguera³, M. Miguel¹, A. Aleixandre². ¹Instituto de Fermentaciones Industriales (Csic), Madrid, Spain, ²Facultad de Medicina (Ucm), Madrid, Spain, ³Nutraceutical Group, Valencia, Spain

Objetives: Cocoa polyphenols have shown antihypertensive effects. We investigate the mechanism involved in the antihypertensive effect of CocaoNOX (CCX), a cocoa powder prepared by an industrial procedure to prevent polyphenol degradation.

Design and Methods: Male 3-week-old spontaneously hypertensive rats (SHR) were divided into four groups of ten animals that were respectively long-term administered tap water (control), 100 mg/kg/day CCX, 200 mg/kg/day CCX or 400 mg/kg/day CCX. Five 20-week-old rats of each group were sacrificed and the different treatments were then removed in the remaining rats. Arterial blood pressure was weekly measured from the 6th to the 24th

week of life in the SHR and all the rats were sacrificed at the end of the experimental period. The following measurements were performed in the sacrificed SHR: endothelium-dependent aorta relaxation to acetylcholine, plasma malondialdehyde, angiotensin converting enzyme activity in plasma and aorta.

Results: CCX improved in a dose-dependent manner acetylcholine relaxation in the aorta of the treated SHR. Plasma malondialdehyde decreased in the CCX treated SHR. The effects mentioned before were not observed in the SHR after the withdrawal of CCX. CCX treatment did not modify aorta angiotensin converting enzyme activity, but the activity of this enzyme increased in the plasma of the SHR treated with the highest dose of CCX.

Conclusion: The antihypertensive effect of CCX in SHR is mainly mediated by an improvement of endothelial function and by a reduction of oxidative stress.

PP.29.174 EFFECT OF STRESS ON CARDIOVASCULAR ACTIVITY AND SERUM CHOLESTEROL IN NORMOTENSIVE AND HYPERTENSIVE RATS

Y. Kuznetsova, O. Semyachkina-Glushkovskaya, V. Berdnikova, I. Semyachkin-Glushkovskij, *Saratov State University, Saratov, Russia*

Aims: We examined the effect of immobilization stress (60 min) on cardiovascular stress-responses and serum cholesterol levels in normotensive and hypertensive rats.

Methods: The experiments were carried out on mongrel male rats. To induce high levels of blood pressure (BP) rats were been clipped at the renal artery with a silver clip (Goldblatt hypertension, 2K, 1C). Rats were instrumented with polyethylene catheters in artery for measuring of mean arterial pressure (MAP) and heart rate (HR). The hemodynamic parameters were measured using PowerLab system for direct recorder of blood pressure signals. Serum total cholesterol was determined with automated methods by a spectrophotometric assay.

Results: Results showed that ischemia of kidney was accompanied by development of hypertension. Stress induced greater increase in HR and more prolongation of increase in MAP in hypertensive males vs. normotensive males. The basal cholesterol levels were significant lower in hypertensive males than in normotensive males. Stress resulted to increase in total cholesterol concentration in both groups of rats. Interestingly notice that stressed levels of cholesterol were higher in hypertensive males vs. normotensive males.

Conclusion: Thus our data suggest that development of renal hypertension is characterized by decreased basal serum cholesterol. But despite this fact in hypertensive rats vs. normotensive group stress induces more pronounced increase in cardiovascular stress-reactivity which accompanied by more significant increase in serum cholesterol levels.

PP.29.175 CONCENTRATION OF CHOLESTEROL IN THE LIVER AND ENDOTHELIAL FUNCTION IN SPONTANEOUSLY HYPERTENSIVE RATS

P. Slezak, A. Puzserova, P. Balis, J. Kopincova, I. Bernatova, *Institute of Normal and Pathological Physiology, SAS, Centre of Excellence for Cardiovascular Research, Bratislava, Slovak Republic*

Objective: Endothelial dysfunction is a key element in the pathogenesis of atherosclerosis in humans, which is associated with hypercholesterolemia and hypertension. The spontaneously hypertensive rat (SHR) is one of the most widely studied animal models for human essential hypertension. Interestingly, it was shown that the total plasma cholesterol concentration in SHR rats does not differ from that of normotensive Wistar-Kyoto rats (WKY) (1). However, the cholesterol concentration in the SHR liver is little known. Therefore, the aim of this study was to examine endothelium-dependent acetylcholine (ACh)-induced relaxation in the femoral artery (FA) and the content of cholesterol in the liver of 22-week-old WKY and SHR rats.

Design and Method: Blood pressure (BP) was determined by tail-cuff plethysmography. To evaluate the degree of cardiac hypertrophy, weight of wet mass of the left heart ventricle (LVW) was determined in order to calculate their relative weight (LVW/tibial length). Samples of liver tissues were used for cholesterol determination (2). ACh-induced relaxation was investigated in rings of the FA, with the wire myograph. Since vasorelaxation, expressed as a percentage of pre-constriction, was inversely related to

initial tension, relaxing responses were expressed as absolute values (mN/mm) too.

Results: BP of WKY and SHR was 111 ± 3 and 184 ± 6 mm Hg, respectively ($p < 0.001$). There was significant increase in the relative left ventricle weights in SHR vs. WKY ($p < 0.001$). Concentrations of cholesterol were similar in WKY and SHR livers. Relative and absolute ACh-induced relaxation was reduced in SHR vs. WKY.

Conclusions: We supposed that the endothelial dysfunction in SHR rats is not associated with the derangement in the cholesterol synthesis in the liver.

PP.29.176 H2O2-INDUCED STIMULATION OF Cl-/HCO3- EXCHANGER ACTIVITY IN SHR CELLS IS ASSOCIATED WITH OXIDATION OF EXCHANGER THIOL GROUPS

S. Simao, P. Gomes, P. Soares-Da-Silva, *Inst. Pharmacology & Therapeutics, Faculty Medicine University Porto, Porto, Portugal*

Objective: NaCl reabsorption in proximal tubule occurs through apical Cl-/HCO3- exchanger and NHE3. Increased reactive oxygen species production in the kidney decreases sodium excretion. Expression of Slc26a6 (primary candidate for apical Cl-/HCO3- exchange in the kidney) in proximal tubular epithelial (PTE) cells from SHR was 7-fold that in WKY PTE cells. The present study investigated the mechanism by which H2O2-induced stimulation of Cl-/HCO3- exchanger activity is enhanced in immortalized SHR cells as compared to WKY cells.

Methods: Cells were loaded with BCECF-AM and exchanger activity was assayed as the initial rate of pHi recovery after an alkaline load.

Results: The enhanced capacity of SHR cells to produce H2O2, comparatively with WKY cells, paralleled an increase in expression of Nox2 and p22phox and a decrease in expression of SOD2, SOD3, and catalase. In both cell lines, exogenous H2O2 stimulated, in a concentration-dependent manner, Cl-/HCO3- exchanger activity. This stimulation was higher in SHR than in WKY cells. The effect of H2O2 upon exchanger activity was blocked by SP600125 (JNK-inhibitor), but not by U0126 (ERK1/2-inhibitor) or SB203580 (p38-inhibitor) in WKY and SHR cells. DTDP, a thiol-selective oxidizing reagent (membrane permeable), stimulated in a concentration-dependent manner Cl-/HCO3- exchanger activity, in both cell lines. This stimulation was higher in SHR cells. Thimerosal, another thiol oxidizing reagent (poorly membrane permeable) had no effect on exchanger activity in WKY and SHR cells. The effects of H2O2 and DTDP upon the exchanger activity were blocked by DTT (a thiol-selective reducing reagent), in WKY and SHR cells.

Conclusion: H2O2-induced stimulation of Cl-/HCO3- exchanger activity appears to be regulated by JNK in both cell lines. However, the enhanced sensitivity to H2O2-induced stimulation of Cl-/HCO3- exchanger activity in SHR cells may arise from a more marked oxidation of SHR cells exchanger's intracellular thiol groups. Additionally, decreased antioxidant defence in SHR cells may contribute to the enhanced sensitivity of H2O2-induced stimulation of Cl-/HCO3- exchanger activity in this cell line.

PP.29.177 ABNORMAL CALCIUM HOMEOSTASIS IN ARTERIAL MYOCYTES FROM MILAN HYPERTENSIVE STRAIN RATS

A. Zulian¹, S.G. Baryshnikov¹, C.I. Linde¹, J.M. Hamlyn¹, P. Ferrari², V.A. Golovina¹, ¹University of Maryland School of Medicine, Baltimore, Usa, ²Prassis Sigma Tau Research Institute, Milan, Italy

Polymorphisms in the genes encoding adducin, a membrane-skeletal protein, are associated with hypertension in humans and rats (Milan hypertensive strain, MHS). MHS rats, with their control normotensive strain (MNS), are a model for a subgroup of patients with essential hypertension. The relationship between adducin gene polymorphisms and renal dysfunction has been well-studied, but the mechanisms that underlie vascular functional abnormalities are unclear. Ca²⁺ homeostasis plays a crucial role in the genesis of vascular myogenic tone, and increases in cytosolic Ca²⁺ concentration ([Ca²⁺]_{cyt}) appear to underlie at least part of the increased peripheral vascular resistance in hypertension. We hypothesize that Ca²⁺ signaling mediated by Na/Ca exchanger (NCX) and TRPC-encoded receptor-operated Ca²⁺ channels is up-regulated in MHS mesenteric artery myocytes compared with that in MNS. The [Ca²⁺]_{cyt} was determined with digital imaging of Fura-2-loaded freshly dissociated mesenteric artery smooth muscle cells (ASMCs). On average, the MNS rats had a mean systolic BP (SBP) of 113 ± 1 mmHg; the SBP of the MHS rats was significantly higher (144 ± 2 mmHg, $P < 0.05$). Freshly dissociated MHS ASMCs had

significantly higher resting $[Ca^{2+}]_{cyt}$ than did MNS ASMCs (97 ± 2 nM vs. 78 ± 3 nM, $P < 0.05$). Receptor-operated entry was activated by the diacylglycerol analogue, 1-oleoyl-2-acetyl-sn-glycerol (OAG). In the presence of extracellular Ba^{2+} , OAG ($100 \mu M$)-induced elevations of cytosolic Ba^{2+} (Fura-2 340/380 nm ratio) were significantly larger in MHS ASMCs. The ATP ($5 \mu M$)-induced Ca^{2+} responses were also augmented in MHS ASMCs (729 ± 70 nM vs. 533 ± 44 nM, $P < 0.05$). These changes in MHS ASMCs correlate with ~ 3 -fold up-regulation of TRPC6, while

expression of other TRPCs was not changed. Recently we showed that expression of TRPC6 and NCX1 in ASMCs is inter-related and TRPC6 and NCX1 are both up-regulated in ouabain hypertensive rats (Pulina et al., *Amer. J. Physiol.* 298(1):H263-H274, 2010). Here, we show that NCX1 is also robustly (~ 13 -fold) up-regulated in MHS ASMCs. The findings suggest that up-regulation of NCX1 and TRPC6 can represent a general downstream phenomenon intrinsic to various forms of hypertension.

POSTER SESSIONS

POSTER SESSION 30

KIDNEY 2

PP.30.178 THE EFFECT OF L-CARNITINE SUPPLEMENTATION ON THE ARTERIAL STIFFNESS IN PATIENTS ON HEMODIALYSIS

B. Csiky¹, F. Ignacz¹, E. Sulyok², I. Wittmann¹. ¹Nephrological Center and 2nd Dept. of Medicine, Univ. of Pecs, Pecs, Hungary, ²Faculty of Health Sciences, Univ. of Pecs, Pecs, Hungary

Hypothesis and Objectives: The most common cause of morbidity and mortality in patients on chronic hemodialysis is cardiovascular disease. According to data from clinical studies, structural and functional alterations of the large arteries are contributing to the high cardiovascular mortality of these patients. A well accepted way for examining the stiffness of the large arteries is measuring the augmentation index (AIx).

L-carnitine supplementation in hemodialysis patients has beneficial effects on the lipid alterations and is improving cardiac function. There is no data on the effect of L-carnitine supplementation on the arterial stiffness.

The aim of the present study was to evaluate the effect of L-carnitine supplementation on the AIx of hemodialysis patients.

Patients and Methods: Stable chronic hemodialysis patients (n=22, age=59±13 years, male/female: 14/8) were supplemented with L-carnitine. 11 patients were normotensive, 11 patients were treated hypertensives. The patients medical and dialysis treatment was unchanged during the study period. Renal replacement therapy: hemodiafiltration 3x4 hours weekly using polysulphone membranes. L-carnitine supplementation: 1000 mg iv, after each dialysis treatment for 9 weeks. Blood pressure measurements were performed with calibrated automatic devices. AIx was measured by applanation tonometry (SphygmoCor, AtCor Inc) prior to the respective dialysis treatment, before L-carnitine supplementation was started and at the end of the 9th week of supplementation.

Results: Predialysis blood pressure measured at the beginning of the carnitine supplementation period and at its end was unchanged (129.3±18.9/76.4±10.9 vs 127.7±12.7/75.2±10.4 mmHg). The AIx was significantly lower at the end of the L-carnitine supplementation period than before it (30.24±14.18% vs 35.86±10.49%; p<0.05).

Conclusions: L-carnitine supplementation is decreasing the stiffness of the large arteries in chronic hemodialysis patients. Besides its effect on lipid homeostasis and cardiac function, L-carnitine supplementation may decrease the cardiovascular morbidity and mortality of these patients by improving their vascular stiffness.

PP.30.179 DIAGNOSIS OF CHRONIC KIDNEY DISEASE IN PRIMARY CARE

L. Carrascal García¹, I. Rodríguez-Miñón Otero¹, L. Egido Flores¹, C. Cervantes Guijarro¹, N. Del Río Hernández², M. Vicente Cuevas³, R. Clemente Vargas⁴, J.M. Lobos Bejarano¹, J. Castellanos Maroto⁵. ¹Centro de Salud Villablanca (Area 1 Sermas), Madrid, Spain, ²Centro de Salud Artilleros (Area 1 Sermas), Madrid, Spain, ³Centro de Salud Buenos Aires (Area 1 Sermas), Madrid, Spain, ⁴Centro de Salud Torito (Area 1 Sermas), Madrid, Spain, ⁵Centro de Salud Estrella (Area 1 Sermas), Madrid, Spain

Objective: 20% of patients attended in primary care setting have chronic kidney disease (CKD) defined as a glomerular filtration rate (GFR) less than 60 ml/min per 1.73 m². The prevalence of CKD was studied and its association with at-risk populations.

Design and Method: A cross-sectional study involving 4 primary care centres. We randomly selected adult patients that were attended from 1/06/09 to 31/08/09 and had defined CKD or at least one of the following risk factors for CKD: age >60 years, hypertension, diabetes or cardiovascular disease. We estimated GFR in those whose serum creatinine had been

registered in the last year, using MDRD-4 formula. We also examined other multivariable associations.

Results: 405 patients studied. 108 patients (26.6%) had CKD after calculating GFR. Only 10.2% of the latter had their GFR registered previously, in their medical records. However, 94.4% of them had serum creatinine registered. 66.7% of patients with CKD had levels of serum creatinine <1.2 mg/dl (occult kidney disease).

The following differences were observed between patients with or without CKD through regression analysis, respectively: hypertension, 77.8% to 62% (p=0.007); diabetes, 27.8% to 17.7% (p=0.079); cardiovascular disease, 19.4% to 16.9% (p=0.609); mean age, 73.64 to 69.47 (p=0.218).

81.5% of patients with CKD had a body mass index > 25 kg/m² whereas 73.3% without CKD (non-significant difference). In both groups, levels of LDL-cholesterol > 130 mg/dl were about 45–50%. There were no differences in blood pressure control. 29.6% of patients with CKD had been prescribed non-steroidal anti-inflammatories compared to 27.3% without CKD (non-significant difference) during the last year.

Conclusions: Only 5.2% of the 405 patients had their GFR estimation registered. A strong statistical association between hypertension and CKD was observed. CKD patients were older and had diabetes and cardiovascular disease in higher proportions. We concluded that usage of MDRD-4 should be applied to patients at risk of CKD, particularly for hypertension and diabetes evaluation.

PP.30.180 CORRELATES OF BLOOD PRESSURE AND PREDICTORS OF CARDIOVASCULAR MORTALITY IN HEMODIALYSIS PATIENTS: A CLINICAL EXPERIENCE

L. Vernaglione, V. Nosella, S. Chimienti. Nephrology and Dialysis Unit, 'M. Giannuzzi' Hospital, Manduria, Italy

Background: A number of factors can affect the correlation between elevated blood pressure (BP) and cardiovascular (CV) mortality among HD patients. We studied the main correlates of pre- and post-BP components together with the risk factors for CV mortality in stable, prevalent HD patients.

Methods: We enrolled HD stable patients, > 18 years old and HD vintage >3 months. BP was the mean systolic (SBP), diastolic (DBP), mean (MBP) and pulse pressure (PP) in pre- and post-HD within the month before the study. All the main Framingham's risk factors for CV diseases, HD- and uremia-related risk factors were tested in the multiple regression analysis.

Results: 65 patients (55.4% males) consented to the study. Age reversely correlated with pre-HD DBP (B = -0.62; P < 0.0001) and MBP (B = -0.44; P = 0.001); diabetics had higher pre-HD PP (B = 0.35; P = 0.012); PTH (B = -0.35; P = 0.01/B = -0.39; P = 0.002/B = -0.41; P = 0.002) and inter-HD WG (B = -0.31; P = 0.04/B = -0.25; P = 0.05/B = -0.31; P = 0.03) indirectly correlated to post-HD SBP, DBP and MBP respectively; Kt/V was directly associated to post-HD SBP (B = 0.27; P = 0.03). Post-HD SBP and age resulted as significant predictors of CV mortality.

Conclusions: Any epidemiological approach to the pre-HD BP control in HD patients should be adjusted by the influence of age and diabetes, as well as post-HD BP values should be interpreted taking into account the effects of HD vintage, inter-HD WG, PTH and Kt/V values. Moreover, reducing the inter-HD WG and the PTH values and rising the adequacy of HD should improve the lifespan of the patients.

PP.30.181 MICROALBUMINURIA AND CARDIOVASCULAR RISK IN HYPERTENSION PATIENTS, IS IT CORRELATED AT LOW LEVELS? ANNUAL EVOLUTION OF THE MAUASTUR STUDY

F. Fernandez Vega¹, M.A. Prieto Diaz², M. Gorostidi Perez³, A. Alvarez Cosmea⁴, A. De La Escosura Garcia⁵, E. Hevia Rodriguez⁶, J.M. Iglesias Sanmartin⁴, P. Niño García¹, R. Bernardo Alvarez⁷, T. Arias García⁸. ¹Hospital Universitario Central of Asturias S^o Nephrology-HTA Unit, Oviedo, Spain, ²Primary Health Center Vallobin-La Florida, Oviedo, Spain, ³Hospital San Agustín S^o Nephrology, Aviles, Spain, ⁴Primary Health Center Ventanielles, Oviedo, Spain, ⁵Primary Health Center La Corredoria, Oviedo, Spain, ⁶Primary Health

Center Cabañaquinta, Cabañaquinta, Spain, ⁷Primary Health Center Sama de Langreo, Langreo, Spain, ⁸Primary Health Center Colloto, Oviedo, Spain

Objective: To compare the relation between microalbuminuria, measured at level below guidelines recommendations, and cardiovascular risk in a prospective study.

Methods: A descriptive, cross sectional study of a 5 years prospective study. Random selection of hypertensive patients attended in primary care. The following variables were analyzed: associated cardiovascular risk factors (CVRF), target organ damage (TOD), and associated clinical diseases (ACD). Blood pressure (BP) <140/90 mm Hg and <130/80 mmHg in diabetics were considered as target blood pressure values. Cardiovascular risk (CVR) was stratified according to ESC-ESH 2007 guidelines. Threshold for MA level was defined as a ratio of albumin/creatinine > 5 mg/g (both males and females) in a isolated urine sample. We compare this level of MA <= 5 vs > 5 mg/g with the presence of CVRF, TOD, ACD and CVR in the first year of follow-up.

Results: 616 patients were selected, 322 men (52.3%); mean age 66 ± 10 years; systolic blood pressure (SBP) 144 ± 73mmHg; diastolic blood pressure (DBP) 83 ± 10mmHg; and body mass index (BMI) 29.8 ± 8 kg/m². Classification of patients according their CVR was: low 12.5%, moderate 14.9%, high 57.3% very high 15.3%. 342 patients (55.5%) had MA (men 57.1%, women 53.7%). BP control was similar in patients with or without MA, 53.8% vs 46.2%, p = ns. The presence of MA correlated with smoke 71.4% vs 54.1%, p = 0.020, OR 2.11 (1.11–4.02); renal failure 69.8% vs 51.8%, p = 0.000, OR 2.15 (1.41–3.27) and slight increase in plasma creatinine 71.2% vs 54.1%, p = 0.018, OR 2.1 (1.12–3.90). MA was numerically more prevalent in the presence of ACD, 61.4% vs 54%. Patients with MA had higher prevalence of high or very high CVR, 76.9% vs 67.2%, p = 0.007, OR 1.62 (1.14–2.32).

Conclusions: Level of MA higher than 5 mg/g, are associated with kidney TOD, and probably with ACD. This association is independent of the BP control. In our study, patients with MA >5 mg/g showed a higher cardiovascular risk profile with respect to patients with MA <5 mg/g.

PP.30.182 AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE AND HYPERTENSION

J. Chevarría, S. Tallon, K. Perez, B. Hernandez, L. Gomez, M. Torres, Ma. Basterrechea, M. Sanchez, G. De Arriba. *University Hospital of Guadalajara, Guadalajara, Spain*

Objective: Autosomal polycystic kidney disease (APKD) is a common hereditary renal disease with an incidence of 1/1.000 people, it's associated with development of hypertension and chronic kidney disease (CKD), both important cardiovascular risk factors (CRF). We considered this study to see the relationship between hypertension, CRF and CKD in APKD.

Methods: The study was conducted in the Guadalajara's Hospital during 2009. Recording was made for sex, weight, height, BMI, CRF, target organ damage (TOD) (myocardial infarction, heart failure, coronary ischemia, stroke and CKD (GFR < 60 ml/min/1.73m²), comorbidity (Charlson Index). The statistical analysis was carried out by percentages, qualitative variables by chi square and quantitative by Student t test. A p value <0.05 was considered statistically significant.

Table 01. Relation between the presence of hypertension and CRF in patients with APKD.

	%	p	OR	L.L.	U. L.
Female/Male	55,4/44,6	,352	1,667	,567	4,900
Age (M>55 / F>65)	32,1	,009	6,176	1,531	24,917
Smoke	39,3	,752	,840	,285	2,478
Impaired fasting glucose	7,1	,127	,538	,419	,693
Obesity	17,9	,615	,704	,179	2,774
Dyslipidemia	44,6	,352	1,667	,567	4,900
Metabolic Syndrome	8,9	,064	,529	,409	,686
Diabetes mellitus	5,4	,732	1,533	,131	17,968
CKD <60 ml/min/1,73m ²	16,1	,036	7,667	,888	66,219
TOD	16,1	,036	7,667	,888	66,219

Table 02. Relationship between the presence of hypertension and age, BMI and comorbidity.

	Without HTA		With HTA		p	CI 95%	
	Mean	SD	Mean	SD		L.L.	U.L.
BMI	27,1194	4,50995	26,9549	3,81736	0,883	-2,06963	2,39847
Age	44,9217	18,82161	58,5056	17,09379	0,007	-23,3678	-3,80693
Charlson I	0,46	0,779	2,22	1,680	0,0001	-2,502	-1,018

Results: There have been 56 patients with APKD, hypertension was confirmed in 32 (57.1%), 55.4% women, BMI was 27.02 ± 4.08, mean age was 52.82 ± 18.91 and CKD in 9 (16.1%), 16.1% had TOD. The presence of hypertension was related to age >55 years in males and >65 in women (p = 0.009), but there were no significant differences in other CRF such as dyslipidemia, smoking, impaired fasting glucose, dyslipidemia, obesity, diabetes mellitus or metabolic syndrome, although hypertensive patients had more CKD this was not significant (p = 0.063). On the other hand the risk of TOD (p = 0.036, OR: 7.6 [95% CI 0.88–66.2]), age (p:0.007, 95% CI –23.3 to –3.8) and Charlson I. (p = 0.0001, 95% CI –2.50 to –1.01) was higher in hypertensive patients. (Table 01 and 02).

Conclusions: We note a high prevalence of hypertension in patients with APKD. The hypertension in patients with APKD is associated with the presence of TOD, more comorbidity and age, and it's important that eight of nine patients with CKD were hypertensive. Further studies should be conducted to determine the actual role of APKD in the presence of reno-cardiovascular damage, on the other side as there is no specific treatment for APKD, it's important an adequate control of hypertension.

PP.30.183 AGE-RELATED CHANGES IN RENAL EXPRESSION OF OXIDANT AND ANTIOXIDANT ENZYMES AND OXIDATIVE STRESS MARKERS IN SHR AND WKY RATS

P. Gomes, S. Simão, E. Silva, V. Pinto, M.J. Pinho, J.S. Amaral, J. Afonso, M.P. Serrão, P. Soares-Da-Silva. *Institute of Pharmacology and Therapeutics, Faculty of Medicine, University of Porto, Porto, Portugal*

Objective: Oxidative stress has been suggested to play a role in aging and age-associated disorders, such as hypertension, although the underlying mechanisms are still poorly understood. Therefore, the purpose of this study was to assess oxidative stress levels and protein abundance of oxidant and antioxidant enzymes in the kidney tissue from young (3-month-old) and old (12-month-old) spontaneously hypertensive rats (SHR) in comparison with age-matched normotensive Wistar-Kyoto (WKY) rats.

Design and Method: To this end, age-related changes in urinary malondialdehyde levels and H₂O₂ production by the renal cortex and medulla, as well as renal cortical expression of the ROS-generating NADPH oxidase and the main antioxidant enzymes [superoxide dismutase (SOD), catalase and glutathione peroxidase] were determined.

Results: Markers of oxidative stress were similar in young SHRs and WKY rats and were significantly augmented with age in both rat strains. Similarly, protein expression of the NADPH oxidase subunit p22phox was markedly elevated with age in SHRs and WKY rats. In contrast, immunodetectable Nox4 was elevated in both young and old SHRs compared to age-matched WKY rats. SOD1 abundance was diminished in young SHRs, but this difference was attenuated with age, whereas SOD2 and SOD3 protein expression increased with age in both strains. Catalase expression was increased in young SHRs but unchanged in old SHRs when compared to age-matched WKY rats. GPx protein was not different during aging in both strains. Moreover, an increase in body weight with aging was evident in both rat strains, but this increase was more pronounced in WKY rats.

Conclusions: Oxidative stress in aged SHRs and WKY rats is associated with differential expression profile of oxidant and antioxidant enzymes, suggesting that different mechanisms might be involved. We hypothesize that this apparently conflicting result with current view that hypertension is a state of oxidative stress might arise from the fact that normotensive WKY rats develop obesity with aging. Future studies are required to specifically address this possibility.

PP.30.184 BLOOD PRESSURE CONTROL IN PERITONEAL DIALYSIS PATIENTS

J. Malyszko, E. Zbroch, D. Maciorkowska, J.S. Malyszko, M. Mysliwiec. *Medical University, Nephrology Dept., Białystok, Poland*

Hypertension is a common finding in dialysis patients. Over 50 to 60% of HD patients and nearly 30 % PD patients are hypertensive. Current blood pressure target ranges for dialysis patients have been extrapolated from those suggested for the non-dialysis population. Peritoneal dialysis is associated with lower systolic blood pressures than hemodialysis in most, but not all, studies. However, controversy exists over the blood pressure target. There is no data on target BP values in PD population. The aim of the study was to assess the BP control in peritoneal dialysed patients.

Methods: The retrospective analysis of 64 patients was made based on the medical documentation. The medical history, twice blood pressure measurements, laboratory tests, BMI were taken, the presence of the heart failure according to NYHA. The kind of using hypotensive drugs and the connection between the number of them and the blood pressure control was analyzed. The studied group was divided to two groups according to blood pressure control.

Results: The group I – patients with a good control of BP (BP equal or low 130/80 mmHg) classified 28 patients (43,8%), to group II with a bad control of BP (BP above 130/80 mmHg) 36 persons (56,3%). The time of dialysis was shorter in the group I 23 ($\pm 15,9$) months vs. 36,1 ($\pm 25,4$) months $p < 0,05$. There were no differences in the presence and value of diuresis. The peripheral edema was more often in the group II - 26 patients (72,2%) vs. group I - 10 patients (35,7%) $p < 0,05$. There were no differences in the cardiac insufficiency and laboratory parameters. The number of hypotensive drugs was greater in the group II ($3,1 \pm 1,14$) vs. ($2,24 \pm 1,13$) $p < 0,05$. ACEI were used more often in the group II.

Conclusions: There should be the more aggressive salt dietary restriction and the better volume control in our patients and also ACEI should be used more widely, especially in patients with the high risk of cardiovascular disease.

PP.30.185 ATHEROSCLEROTIC RENAL ARTERY STENOSIS: EFFECTS OF PERCUTANEOUS ANGIOPLASTY ON BLOOD PRESSURE AND RENAL FUNCTION

A. Maresca, F. Annoni, C. Mongiardi, L. Montalbetti, L. Mellana, F. Carbone, A. Lippi, E. Nicolini, A.M. Grandi, A. Venco. *University of Insubria - Department of Clinical Medicine, Varese, Italy*

Objective: Despite the large number of patients treated with percutaneous renal angioplasty (PTRA), it is still unclear whether hypertensive patients with atherosclerotic renovascular disease obtain a long term benefit on blood pressure (BP) control and renal function. This longitudinal study was aimed to evaluate the effects of renal angioplasty on BP and renal function, with a follow-up of at least 24 months.

Design and Methods: Among 33 consecutive hypertensive patients with atherosclerotic renal artery stenosis ($>70\%$), 21 patients underwent PTRA+stenting (PTRA group) and 12 patients were treated with medical therapy (control group). At baseline and after > 24 months, all the patients underwent 24 hour ambulatory BP monitoring (ABPM) and evaluation of creatinine clearance (MDRD formula).

Results: At baseline PTRA group and control group were similar with regard to age, gender, BMI, BP values throughout the 24 hours and cardiovascular risk factors. Baseline creatinine clearance was significantly greater in the control group (72 ± 12 ml/min) than in PTRA group (51 ± 12 ml/min, $p < 0.001$). The use (number, type and dose) of antihypertensive drugs, statins and antiplatelet drugs was similar between PTRA and control groups. Mean length of follow-up was 32 ± 8 months in PTRA group and 34 ± 9 months in control group (ns). At the end of the follow-up, in PTRA group clinic systolic BP significantly decreased (from 158 ± 25 to 144 ± 16 mmHg, $p < 0.01$), whereas clinic diastolic BP and all BP parameters from ABPM were unchanged; in the control group all BP parameters (clinic and from ABPM) were unchanged. Compared to baseline the number of antihypertensive drugs was unchanged in PTRA group (from 3.2 ± 1.5 to 3.4 ± 1.3 , ns), whereas in control group the number of drugs increased from 2 ± 1.7 to 3.7 ± 1.4 ($p = 0.01$). Creatinine clearance was unchanged in both groups.

Conclusion: At >2 years PTRA seems not to improve BP control and renal function; however compared to patients treated with medical therapy, PTRA patients have not required an increase in antihypertensive drug treatment.

PP.30.186 VITAMIN D, PARATHYROID HORMONE, CALCITONIN AND DISTURBANCES OF CALCIUM AND PHOSPHORUS METABOLISM IN ARTERIAL HYPERTENSION PATIENTS

E. Reznik¹, G. Gendlin¹, G. Storojzhakov¹, V. Guschina¹, V. Volinkina¹, I. Baranich², M. Tursheva². ¹Russian State Medical University, Moscow, Russia, ²City Clinical Hospital 12, Moscow, Russia

Background: Hyperparathyroidism and abnormalities of calcium and phosphorus metabolism are important prognostic factors in chronic kidney diseases, which are widespread in cardiovascular pathology.

Objective: To investigate vitamin D, parathyroid hormone (PTH), calcitonin, calcium and phosphorus levels in arterial hypertension (AH) patients.

Design and Methods: In 38 untreated AH patients without coronary artery disease, primary renal, endocrine, autoimmune, oncological, bowel and bone diseases [60.5% males, median (interquartile range): age 58.0 (51.0–67.0) years,] we measured serum concentrations of 25-OH vitamin D, intact PTH, calcitonin, calcium, phosphorus and analyzed anamnesis, echocardiography data and renal function [estimated glomerular filtration rate (eGFR, MDRD) 72.5(63.4–86.5) ml/min/1.73m², urinary albumin excretion (UAE, immuno-nzymatic assay) 36.7(17.3–63.6) mg/ml].

Results and Conclusions: Vitamin D [55.6(43.0–64.3) nmol/l] deficiency (<47.7) was in 27.8% patients. PTH level [41.1(24.0–53.6) pg/ml] was elevated (>62) in 21.1%, decreased (<16) in 10.5% patients. Calcitonin concentration [4.9(1.8–11.3) pg/ml] was increased (>2.7) in 5.3%, decreased (<0.2) in 15.8% patients. Calcium level [2.4(2.0–2.5) mmol/l] was elevated (>2.57) in 11.1%, decreased (<2.15) in 41.7% patients. Phosphorus level [1.2(1.1–1.4) mmol/l] was normal (0.81–1.58) in all patients. Vitamin D concentration correlated with end diastolic volume ($r = 0.43$, $p = 0.015$), calcitonin - with serum creatinine ($r = 0.38$, $p = 0.019$). PTH level was higher [52.7(39.4–79.2) vs 35.8(20.8–46.6) pg/ml, $p = 0.009$] and calcitonin - lower [1.8(0.2–4.9) vs 6.7(4.7–14.0) pg/ml, $p = 0.002$] in females. PTH, vitamin D and calcitonin levels didn't associate with age, serum calcium, phosphorus, UAE. Patients with PTH ≥ 41.1 pg/ml had higher body mass index [27.3(26.5–29.4) vs 25.1(24.2–26.7) kg/m², $p = 0.021$], maximal anamnestic systolic blood pressure [220(190–230) vs 185(180–200) mm Hg, $p = 0.003$] and diastolic blood pressure [110(110–120) vs 100(95–110) mm Hg, $p = 0.001$] and lower eGFR [71.9(61.0–82.4) vs 77.6(63.3–98.5) ml/min/1.73m², $p = 0.039$]. So, vitamin D deficiency, secondary hyperparathyroidism, hypocalcaemia are common and associated with blood pressure level and renal function in arterial hypertension patients. Our findings suggest that blood pressure control and nephroprotection may improve calcium and phosphorus homeostasis and bone metabolism in arterial hypertension, especially in females.

PP.30.187 IS MICROALBUMINURIA RELATED WITH OTHER RISK FACTORS IN CHRONIC KIDNEY DISEASE (CKD)?

K. Hoti¹, M. Barbullushi¹, E. Sadiku², G. Burazeri³, A. Idrizi¹, L. Deda⁴, A. Koroshi¹, S. Kodra¹, N. Thereska¹. ¹Service of Nephrology, UHC Mother Teresa, Tirana, Albania, ²Service of Internal Medicine, UHC Mother Teresa, Tirana, Albania, ³Department of Biostatistics, UHC Mother Teresa, Tirana, Albania, ⁴Department of Pharmacology, UHC Mother Teresa, Tirana, Albania

Objectives: The prevalence and the incidence of end-stage renal disease (ESRD) are increasing every day. Data from International Society of Nephrology (ISN) confirm that in 10 years they will be duplicated, confirming a catastrophic situation. The aim of our study was to identify early the subjects with high risk for developing CKD and to intervene in time to prevent later consequences of these diseases.

Methods: In the study, which was cross-sectional, were included 807 subjects both genders, over 20 years old. The subjects were divided in four groups as regard the presence of proteinuria: group 1, proteinuria negative; group 2, proteinuria in range 1–30 mg; group 3, proteinuria in range 31–150 mg; group 4, proteinuria >150 mg.

Results: Prevalence of proteinuria was: negative in group 1, 1–30 mg in the group 2, 31–150 mg in the group 3 and more than 150 mg in the group 4. Only in group 3 and 4 was observed significant difference between proteinuria and systolic blood pressure (SBP) and diastolic blood pressure (DBP) ($P = 0.01$, $P < 0.01$). There was a correlation between proteinuria and glomerular filtration rate (GFR) in four groups: the differences were significant between group 1 and group 4, and between group 2 and group 4.

Conclusions: Microalbuminuria at our population is 9.3%. It has correlation with SBP, DBP and GFR. Early identification of microalbuminuria will be an indicator for detecting and treating subjects with high risk for CKD in an early stage.

PP.30.188 MANAGEMENT OF SOLITARY KIDNEY IN HYPERTENSIVE PATIENTS: EXPERIENCE IN SANTARÉM, PORTUGAL

M. Santos, T. Rodrigues, M. J. Gomes. *Santarém Hospital, Santarém, Portugal*

Background and Objective: Hypertension is one of the most common worldwide chronic diseases. It is highly prevalent, in Portugal represents 43.1% of adult population. A small percentage of patients (2,2 to 10%) have a secondary cause potentially treated. From the list of secondary causes of hypertension, renal and renovascular are the most frequent. In the absence of specific treatment, patients with renal vascular disease develop renal atrophy. This population like individuals with renal agenesis frequently has

hypertension refractory to medical treatment. These patients may respond to revascularization or at the worst to a nephrectomy.

Patients and Method: We conducted an observational retrospective study of hypertensive patients with unilateral renal atrophy followed at Santarém Hospital from 2005 to 2009. Hypertension, renal clearance (by scintigraphy), and hypersecretion of renin (segmental/selective venous renin samples) were studied. We subsequently classified the patients into 3 groups. Medical treatment was optimized for all.

Results: The patients of group 1 were treated medically. Endovascular revascularization was used to treat the subjects for which atrophic kidney function accounted for more than 10% of their total renal function and with stenosis of the renal artery (>70%) (group 2). Those with a small nonfunctional kidney and hypersecretion of renin underwent a nephrectomy (group 3). The systolic blood pressure and diastolic blood pressure were reduced for the overall study population, without any significant aggravation of renal function. In group 1, the reduction in blood pressure was lower, with medical treatment alone. In group 2, revascularization made it possible to improve SBP reduction, without significant impairment of renal function. Group 3 showed the most spectacular improvement in blood pressure. But in this group we observed an aggravation in renal function.

Conclusions: The results of this work underline the importance of multi-disciplinary management of patients. Longitudinal studies are needed to understand the long-term effect and significance of the several pathophysiological changes observed in hypertensive patients with solitary kidney.

PP.30.189 ELEVATED SYMPATHETIC NERVOUS ACTIVITY IS RELATED TO THE DEVELOPMENT OF RENAL INJURY IN PATIENTS WITH DIABETES AND/OR HYPERTENSION

K. Masuo¹, H. Rakugi², T. Ogihara², G. Lambert¹, M. Esler¹. ¹Baker IDI Heart & Diabetes Institute, Melbourne, Australia, ²Osaka University Graduate School of Medicine, Osaka, Japan

Objective: Hypertension (HT) and diabetes (DM) are known as risk factors for renal complications and end-stage renal disease (ESRD). Elevated sympathetic nervous activity (SNA) is known as its association with HT and DM, and as a cardiovascular risk factor. To evaluate the role of SNA on the development of renal injury in patients with HT or DM, we conducted this study.

Methods: Plasma norepinephrine (NE), insulin, leptin, BMI, total body fat-mass and blood pressure (BP) were measured in 4 study groups according to renal function using K/DOQL. i) 290 men with stage-1 (normal renal function, HT alone=63, DM alone=43, HT+DM=41, non-HT+nonDM=143), ii) 41 men with stage-2 (HT=20, DM=7, HT+DM=9, =9, nonHT+nonDM=5), iii) 37 men with stage-3 or 4 (HT=15, DM=7, HT+DM=8, nonHT+nonDM=7) and iv) 73 men with stage-5 (ESRD, HT=23, DM=24, HT+DM=15, nonHT+nonDM=11, follow-up average=8.4yrs).

Results: Plasma NE and BP levels were significantly greater in subjects with stage-5 (ESRD)>stage-3 or 4>stage-2>stage-1 (normal renal function), but plasma insulin, leptin, BMI and fat-mass were greater in stage-1>stage-2>stage-3 or 4>stage-5. Plasma NE, insulin, BMI and fat-mass were greater in HT+DM>DM>HT>nonHT+nonDM in the groups with stage 1-4, however BP levels were greater in HT+DM>HT>DM>nonHT+nonDM. Importantly plasma NE, insulin and BP levels were higher in subjects with DM+HT than DM alone or HT alone. In ESRD patients, plasma NE, leptin, BMI and fat-mass were greater in patients with short-term hemodialysis (<1 yrs) compared to long-term (>8 yrs), although insulin did not change with the duration of hemodialysis. Plasma NE correlated with systolic BP, creatinine and GFR in all subjects especially with moderate renal injury (stage 2-4), but insulin, leptin, BMI or fat-mass did not. In multiple regression analysis, plasma NE was a significant determinant for systolic BP, creatinine and GFR in all subjects.

Conclusions: Plasma NE was closely linked to the development and stage of renal injury (GFR). SNA plays an important role in renal injury and BP levels especially in diabetes and hypertension.

PP.30.190 DOES TUBULO-INTERSTITIAL FUNCTION AFFECT SERUM URIC ACID CONCENTRATION AND BLOOD PRESSURE CONTROL IN PATIENTS WITH IGA NEPHROPATHY?

J. Manitius¹, B. Sulikowska¹, A. Stefanska², G. Odrowaz- Syniewska². ¹Dept. of Nephrology, Hypertension and Internal Diseases, Nicolaus Copernicus University,

Bydgoszcz, Poland, ²Dept. of Clinical Biochemistry, Nicolaus Copernicus University, Bydgoszcz, Poland

Uric acid plays a role in the development of cardiovascular damage and morbidity in essential hypertension and kidney disease. Serum uric acid concentration depends on interplay between its production and excretion. The aim of the study was to evaluate the relation between serum uric acid concentration and its excretion in some respects of tubulo-interstitial functions in patients with IgA nephropathy.

In 46 IgA untreated pts and 15 controls DIR (opis metody) was performed and serum erythropoietin (Epo) before (Epo 0) and after (Epo1) dopamine was estimated. Creatinine and uric acid (UA) in serum and 24 hr urine collections (NAG) were estimated. IgA were divided in 1/2epo increase^{1/2} and 1/2epo decrease^{1/2} according to change of epo (epo1) against (epo0)

Results are presented as mean ± SD

	Epo inc (n = 24)	Epo dec (n = 22)	Controls (n = 15)
Age [yrs]	31.0 ± 7.2	36 ± 9.7	33 ± 6.9
RRsyst [mmHg]	140.9 ± 12.6	127.7 ± 10.9 ^a	112.3 ± 6.9 ^{bc}
RRdiast [mmHg]	90.0 ± 8.5	81.3 ± 6.1 ^a	73.3 ± 6.7 ^{bc}
Great Clearance [ml/min]	102.2 ± 30.3	102.1 ± 20.8	93.8 ± 18.9
UA ser [mg/dl]	7.9 ± 1.7	5.4 ± 1.2 ^a	4.8 ± 1.2 ^b
UA ur/24 hr [g]	0.433 ± 0.12	0.365 ± 0.09 ^a	0.377 ± 0.07 ^b
Epo (0) [U/ml]	5.3 ± 2.7	20.9 ± 6.9 ^a	10.6 ± 4.3 ^{bc}
Δ Epo (Epo1-Epo 0)/Epo 0 [%]	30.0 ± 20.3	-22.9 ± 15.1 ^a	-4.2 ± 21.7 ^{bc}
NAG [U/g creat]	10.3 ± 2.2	4.8 ± 1.3 ^a	4.7 ± 1.1 ^b

a p < 0.001 inc vs dec; b p < 0.001 inc vs contr.; c p < 0.001 dec vs contr;

Correlations: Epo 0 vs UA ser:inc. (-0.46), p < 0.3; dec. (-0.43), p < 0.03; NAG vs UA ur: inc(+0.53), p < 0.01; RR diast vs UA ser:dec (+0.42), p < 0.03.

Conclusions: Low Epo 0 and Epo increase is associated with more advanced tubulo-interstitial damage which affect either blood pressure control or serum uric acid concentration.

PP.30.191 HYPERTENSION IN DIABETIC NEPHROPATHY PATIENTS IN SAUDI ARABIA: ANTIHYPERTENSIVE MEDICATION AND OUTCOME

J. Jamal Al Wakeel¹, D. Durdana Hammad¹, A. Arthur Isnani¹, A. Ahmed Mitwalli¹, A. Abdulkareem Al Suwaidi¹, A. Ali Al Harbi². ¹King Saud University, Riyadh, Saudi Arabia, ²Security Forces Hospital, Riyadh, Saudi Arabia

Background: Despite the increasing burden of hypertension End-Stage Renal Disease and Cardiovascular disease, data is limited regarding prevalence and control of hypertension.

Aim: To examine distribution, treatment and outcome of blood pressure in Saudi DN patients.

Method: Retrospective study conducted between January 1989 and January 2004 on 503 DN patients with proteinuria in a tertiary, hospital in Riyadh, SA. Definitions of hypertension and its appropriate or inappropriate treatment were according to the seventh report of the Joint National Committee of the prevention, detection, evaluation and treatment of high blood pressure (JNC 7). Patients demographic, renal function, treatment, medication, and blood pressure were kept in record.

Results: 503 patients 269 (53.5%) males. age 64.5i 3/4 12.3 yrs. prevalence of hypertension was 409(81.3%) during first year and 447(88.9%) during last visit. isolated systolic hypertension was present in 97 (35.5%)patients. The patient had initial systolic blood pressure 136i 3/4 20 mmHg (100-200), diastolic blood pressure was 79.9i 3/4 10.6 (60-130). 136 patients were controlled, 372(74%) patients took medication during 1st year while 443(88.1%) patients during last year of follow up. ACE inhibitors were used by 254 (50.4%) of patients. Calcium Channel Blockers by 189(37.5%), ARB 72(14.3%), diuretics 44(8.7%), beta blocker by 3(0.6%) patients. Multiple drug therapy was given to 158(31.3%). Hypertension was controlled in 267 (53.1%) patients at last year of follow up. Comparing the outcome end points, patients with uncontrolled hypertension were having significantly higher incidence of of stroke p < 0.05. Higher incidence of myocardial infarction, retinopathy, proteinuria, hospitalization frequency and stay days in CCU were obtained in patients with uncontrolled hypertension. Patients as show in the table below.

	24 hrs urinary protein	Retinopathy	MI	Stroke	Age at Dialysis	Renal failure	Sex Female	Demise
Uncontrolled	1.39±1.02	44(13.3%)	88(26.7%)	67(79.7%)	62.6±12	35(13%)	43.3%	48 (14.5%)
Controlled	1.1±1	18(10.4%)	41(23.7%)	243(13.9%)	68.1±12	38(16%)	53.1%	19 (11%)

▼P Value <0.05

Conclusion: Hypertension is common in Saudi DN patients. Isolated systolic hypertension was frequent. Higher incidences of complications were found in patients with uncontrolled blood pressure. Aggressive approach is warranted to minimize the complications and to achieve target blood pressure levels according to recommended guidelines of JNC7.

PP.30.192 ISOLATED SYSTOLIC HYPERTENSION IN SAUDI PATIENTS WITH DIABETIC NEPHROPATHY: A SERIOUS HEALTH CONCERN

J. Jamal Al Wakeel¹, D. Durdana Hammad¹, A. Arthur Isnani¹, A. Abdulkareem Al Suwaid¹, A. Ali Al Harbi². ¹King Saud University, Riyadh, Saudi Arabia, ²Security Forces Hospital, Riyadh, Saudi Arabia

Background: Isolated systolic hypertension (ISH) is serious health concern causes its threat to the occurrence of stroke, kidney disease and dementia. It is 3 times more prevalence in patients with Diabetes Mellitus Urgent intensified treatment is needed to prevent disability and improve the life quality.

Objective: To see the prevalence and outcome of ISH in Saudi patients with diabetic nephropathy (DN).

Method: Single centre retrospective study conducted between January 1989 and January 2004 on 503 D N patients with proteinuria in a tertiary hospital in Riyadh, Saudi Arabia. Definitions of hypertension were according to the seventh report of the Joint National Committee of the Prevention, Detection, Evaluation and Treatment of high blood pressure (JNC 7).

Results: 503 proteinuric DN patients, 269 (53.5%) males age 64.5 ± 12.3 yrs. prevalence of hypertension was 409 (81.3%). At baseline 136 patients were controlled and 273 patients were uncontrolled. In those 273 patients, ISH was observed in 97 (35.5%) patients, isolated diastolic hypertension (IDH) was present in 14(5.1%) patients and both systolic and diastolic hypertension (SDH) was present in 162 (59.3%) patients. Patients with ISH were elderly with mean age of 65.7 ± 11 yrs, Obese with BMI 29.6 ± 5. Females were at a significantly higher risk, duration of diabetes 15.3 ± 7.3 yrs patients with ISH were having higher incidence of stroke, Myocardial infarction, background retinopathy, cataract, and demise than the other subtypes as shown in the table below.

HTN Sub Type	Sex Female*	Cataract*	MI	Stroke	Retinopathy	Vitreous hemorrhage	Renal Failure	Survival
ISH N=97	59 (54.6%)	48 (49.4%)	31 (31.9%)	23 (23.8%)	28 (28.8%)	2(2.06%)	9(9.2%)	16 (16.4%)
IDH N=14	6 (42.9%)	4 (28.5%)	----	3 (21.4%)	2 (14.2%)	1(7.1%)	1(7.1%)	1 (7.1%)
SDH N=162	62 (38.2%)	53 (32.7%)	36 (22.2%)	25 (15.4%)	32 (19.7%)	17(10.4%)	28(17.2%)	16 (9.8%)

*p<0.06

Conclusion: Isolated systolic hypertension is quite frequent. Females are at significantly higher risk Because of comparatively higher incidence of complications ISH is a serious health concern. Aggressive treatment and close monitoring is warranted in DN patients to improve the outcome and quality of life.

PP.30.193 CORRELATION BETWEEN MIKROALBUMINURIA AND ESTIMATED GLOMERULAR FILTRATION RATE IN PATIENTS PRESENTING ESSENTIAL HYPERTENSION

M. Gjata, E. Nelaj, E. Sadiku, E. Collaku, O. Bare. *Service of Internal Medicine and Hypertension. UHC Mother Teresa, Tirana, Albania*

Background: Changes in renal function related to essential hypertension are associated with an elevated cardiovascular morbidity and mortality. Indices of altered renal function (e.g., microalbuminuria, increased serum creatinine concentrations, decrease in estimated creatinine clearance or GFR, and overt

proteinuria) are independent predictors of cardiovascular morbidity and mortality.

The present study was aimed to investigate correlation between mikroal-buminuria and estimated glomerular filtration rate (moderate decrease <60, mild decreased 60–90 and normal >90 ml/min) in patients with essential hypertension.

Material and Methods: The study interested 65 hypertensive patients, under antihypertensive treatment. The mean age of patients was 59, 5years. The patients were divided in three groups according to the renal function, namely 20 with normal function, 22 presented stage II of CDK and 23 in stage III of CDK. Microalbuminuria (MA) was defined as abnormal urinary excretion of albumin between 30 and 300 mg/d.

Results: In a multiple logistic regression analysis MA was significantly associated with a decrease of renal function, older age, male gender, and systolic blood pressure and left ventricular hypertrophy. The patients with normal renal function presented lower MA and not significant correlation between MA and age, systolic blood pressure, left ventricular hypertrophy.

Conclusions: Microalbuminuria correlated with the decrease of renal function, older age, male gender, blood systolic pressure and left ventricular hypertrophy in patients presenting essential hypertension.

PP.30.194 CARDIOVASCULAR PREDICTORS OF RENAL DYSFUNCTION IN ELDERLY HYPERTENSIVE PATIENTS

K. Protasov, A. Dzizinsky, D. Sinkevich, E. Kozhevnikova. *Advanced Medical Training Institute - Department of Internal Diseases And Cardiology, Irkutsk, Russia*

Objective: To investigate the incidence and cardiovascular predictors of mild renal dysfunction in elderly patients with essential arterial hypertension (AH).

Design and Method: 276 hypertensive patients (108 of those were male) at the mean age of 73.0 ± 7.3 years were examined. The following renal dysfunction indicators were stated: slight plasma creatinine increase 115–133 μmol/l in men or 107–124 μmol/l in women, microalbuminuria (MAU) by urine albumin-creatinine ratio ≥ 2.5 mg/mmol in men or ≥ 3.5 mg/mmol in women and creatinine clearance by Cockcroft-Gault formula (CC) < 60 ml/min/1.73 m². The overt renal impairment was diagnosed in patients with plasma creatinine > 133 μmol/l in men or > 124 μmol/l in women. The 24-h ABPM was carried out. We studied AH risk factors such as serum lipids, smoking, waist circumference and AH target organs (heart and vessels) damage signs: echocardiographic left ventricular mass and ejection fraction (EF), 6-minute walk distance (6MWD), carotid intima-media thickness (IMT), ankle-brachial index, endothelium-dependent brachial artery dilatation test, carotid-femoral pulse wave velocity (PWV). The relations between above-mentioned parameters and renal dysfunction indicators were estimated by multiple logistic regression analysis.

Results: Plasma creatinine level averaged 91.4(77–104) μmol/l, CC – 56.0(49–66) ml/min/1.73 m², urine albumin-creatinine ratio – 0.9(0.2–2.4) mg/mmol. Slight plasma creatinine increase was found in 37 patients (13.4%), MAU – in 52 (18.8%), CC < 60 ml/min/1.73 m² – in 170 (61.6%), renal impairment – in 12 (4.3%). Regression analysis showed that hypercreatininemia was interrelated with male sex and waist circumference (R² = 0.13, predictive value of the model is 81.8%). The level of LDL-cholesterol, waist circumference, IMT, systolic blood pressure hypotension load and EF were associated with MAU presence (R² = 0.34, predictive value 83.0%). Markers of low CC were represented by waist size, PWV and 6MWD (R² = 0.30, predictive value 68.7%).

Conclusions: Elderly hypertensive patients most frequently (61.6%) display a moderate decline of creatinine clearance. The complex of cardiovascular, hemodynamic and metabolic predictors for different variants of hypertensive nephropathy was revealed. Appropriate logistic regression equations were created.

PP.30.195 GLOMERULAR FILTRATION AND THE PREVELANCE OF ATRIAL FIBRILLATION RECURRENCE AFTER PULMONARY VEIN ISOLATION

T. Hussain¹, L. Yu Shu¹, A. Hayat². ¹Union Hospital, Tongji Medical College, Wuhan, China, ²Rawalpindi Medical College, Rawalpindi, Pakistan

Objective: Angiotensin II exerts proinflammatory effects leading to atrial fibrosis, a common finding in atrial fibrillation (AF). Renin-Angiotensin system in kidneys and glomerular filtration are interconnected. Recently it has been proven that the prevalence of AF gradually increases with

decreasing glomerular filtration rate (GFR). However, this study aim was to evaluate, whether the decreasing GFR influences the outcome of pulmonary vein isolation for AF or not.

Methods: The study was conducted at the Cardiology department, Rawalpindi medical college allied hospital from January 2009 to August 2009. 176 consecutive patients with paroxysmal AF underwent pulmonary vein isolation. The relationships between GFR and ablation results were evaluated.

Results: The estimated GFR(eGFR) was lower in patients with recurrent AF after pulmonary vein isolation (PVI) compared to those without recurrence (71.1 ± 20.8 vs 80.1 ± 16.1 ml/min/1.73m², $p < 0.03$). Overall 117 patients (66.5%) were free from AF after initial PVI without antiarrhythmic drugs. AF-recurrence was frequently observed in patients with low GFR (<60 ml/min/1.73m²) compared to those with high GFR (>60 ml/min/1.73m²). Clinical factors that were identified as a independent predictors of recurrence after PVI in this analysis were the decreasing GFR (hazard ratio: 0.97; 95% CI 0.95–0.99, $P < 0.01$) and enlarged LAD (hazard ratio: 1.09; 95% CI 1.02–1.16, $P < 0.008$).

Conclusion: Enlarged LA diameter and decreasing GFR strongly influenced on atrial fibrillation recurrence after pulmonary vein isolation.

PP.30.196 HYPERTENSION AND UNPROVOKED HYPOKALEMIA IN A PATIENT WITH SIMULTANEOUS STENOSIS OF THE INTERLOBULAR RENAL ARTERIES AND MESANGIOPROLIFERATIVE GLOMERULONEPHRITIS. A CASE-REPORT

P. Sarafidis¹, P. Georgianos¹, G. Germanidis¹, K. Giavroglou², P. Nikolaidis¹, A. Lasaridis¹. ¹Section of Nephrology and Hypertension, 1st Department of Medicine, AHEPA University Hospital, Thessaloniki, Greece, ²Laboratory of Radiology, AHEPA University Hospital, Thessaloniki, Greece

We present the case of a 25-year-old man who was referred to our department for uncontrolled hypertension and hypokalemia. Hypertension was diagnosed during a previous hospitalization for acute pyelonephritis. In this hospitalization hepatitis B was diagnosed (with characteristics of chronic active disease – resurgence in the liver biopsy). One month later, the patient was admitted twice to the hospital due to muscle weakness and hypokalemia. In both cases the patient received symptomatic treatment, whereas evaluation for secondary hypertension was performed only on an outpatient basis. The patient reported a past history of recurrent acute pyelonephritis in childhood. The laboratory investigation revealed increased plasma renin and aldosterone levels (secondary aldosteronism). ⁹⁹Tc-DMSA renography showed identical contribution of both kidneys to the renal function and inhomogeneous uptake of the radiolabeled agent in the left kidney. Magnetic resonance (MR) imaging of adrenal glands and MR renal angiography were negative. On admission to our department, blood pressure was 150/100 mmHg and serum potassium was 3.2 mmol/L. Sub-nephrotic proteinuria of 3 gr/day was detected in consecutive 24-hour urine collections. Re-evaluation of renin-angiotensin system (with postural and captopril tests) confirmed the secondary aldosteronism and directed the investigation to renal biopsy (histopathological lesions of mesangioproliferative glomerulonephritis) as well as to invasive renal angiography (stenosis of interlobular renal arteries in the left kidney). Because of possible mixed renal cause of hypertension, selective catheterization of renal veins was also performed, which revealed unilateral renin hypersecretion from the left kidney. The patient was given discharge receiving treatment with lisinopril 10 mg and tolvaptan 245 mg daily. During a 9th-month follow-up at the outpatient clinic, the patient presented satisfactory control of hypertension, progressive reduction of proteinuria and negative HBsAg.

Conclusion: Differential diagnosis of uncontrolled hypertension and hypokalemia includes renal parenchymal and renovascular disease. Secondary aldosteronism represents the key to the diagnostic approach in favour of renal parenchymal and renovascular cause; both conditions need to be investigated with extensive diagnostic evaluation.

PP.30.197 ASSESSMENT OF RENAL ARTERY STENOSIS USING FRACTIONAL FLOW RESERVE - CORRELATION WITH ANGIOGRAPHY AND ULTRASONOGRAPHY

J. Kadziela¹, A. Witkowski¹, L. Kalinczuk¹, E. Warchol¹, I. Michalowska¹, M. Januszewicz², M. Kabat¹, K. Michel-Rowicka¹, P. Zielen¹, A. Prejbsiz², A. Januszewicz¹, M. Kabat¹. ¹Institute of Cardiology, Warsaw, Poland, ²Medical University, Warsaw, Poland

Objective: The aim of the study was to investigate fractional flow reserve and translesional pressure gradient in moderate to high grade renal artery stenosis

(RAS) with respect to angiographic measurements and Doppler-ultrasonography.

Design and Method: 43 hypertensive patients (22F, 21M, mean age 58.5 years) with at least moderate (more than 50%) RAS were investigated. Using the pressure wire, translesional systolic pressure gradient (TSPG), resting Pd/Pa ratio (the ratio of mean distal to lesion and mean proximal pressures) and hyperemic renal fractional flow reserve (rFFR) - after administration of 30 mg intrarenal papaverine- were evaluated. Quantitative angiographic analysis of stenosis severity was performed including minimal lumen diameter (MLD) and percent diameter stenosis (DS) assessment. Renal: aortic ratio (RAR) and resistive index were obtained in Doppler-duplex ultrasonography. The predictive value of different variables was calculated using Receiver-operating characteristics (ROC) curves.

Results: Mean Pd/Pa ratio was 0.85 ± 0.12 and decreased to 0.79 ± 0.13 after papaverine administration. Both Pd/Pa ratio and rFFR strongly correlated with MLD ($r = 0.56$, $p < 0.001$ and $r = 0.63$, $p < 0.001$) and DS ($r = -0.52$, $p < 0.01$ and $r = -0.57$, $p < 0.001$). Patients with Pd/Pa ratio < 0.9 had non-significantly increased RAR (3.43 vs 3.03 , $p = 0.11$) as compared to those with normal Pd/Pa ratio. Patients with rFFR < 0.8 had non-significantly increased RAR (3.44 vs 3.02 , $p = 0.09$) in comparison to patients with normal rFFR. In assessment of more than 50% RAS (in QCA) the areas under the curves for Pd/Pa and rFFR were 0.913 and 0.920 respectively ($p < 0.001$ and $p < 0.001$). The sensitivity and specificity for Pd/Pa ratio < 0.9 were 100% and 62.5% and for rFFR < 0.8 100% and 59.4% respectively. The most predictive cut-off values for RAS were: < 0.92 for Pd/Pa ratio (100% specificity and 75% sensitivity) and < 0.83 for rFFR (100% specificity and 75% sensitivity).

Conclusions: Mean Pd/Pa ratio and renal fractional flow reserve correlated strongly with angiographic data and in a less pronounced manner with parameters reflecting intrarenal blood flow. The best accuracy cut-off points for renal artery stenosis predicting were < 0.92 and < 0.83 respectively.

PP.30.198 ABSTRACT WITHDRAWN

PP.30.199 AGE-INDUCED RENAL INJURY AND EXPRESSION OF RENAL AMINO ACID TRANSPORTER IN THE SPONTANEOUS HYPERTENSIVE RAT

M. Pinho, J.S. Amaral, V. Pinto, S. Simão, E. Silva, J.M. Cabral, P. Gomes, P. Soares-da-Silva. Faculty of Medicine - Institute of Pharmacology and Therapeutics, Porto, Portugal

Objective: The aim of this study was to investigate whether the effects of aging on the expression of amino acid transporters correlate with impairment of renal function and increases in blood pressure.

Design and Methods: 48 h before experiments, 13, 52, and 91 week-old Spontaneous Hypertensive Rats (SHR) and Wistar Kyoto (WKY) rats were placed in metabolic cages for urine collection. Cardiac puncture was used to collect blood. Sodium quantification was performed by an ion-selective electrode. Analysis of non-fasting plasma creatinine, urinary creatinine and urinary proteins was performed on CobasMiraPlus analyzer. Amino acid transporters expression was determined by western blotting.

Results: Tibial length remained constant after maturity. In contrast, kidney weight/tibial length ratio increased 15% and 30% in the older WKY and SHR, respectively. At 13 weeks of age SHR showed a decreased kidney weight/tibial length ratio when compared to age-matched WKY ($WKY: 0.31 \pm 0.01$ vs $SHR: 0.26 \pm 0.01$). Urinary and fractional excretion of sodium and creatinine clearance did not differ between WKY and SHR at 13 and 52 weeks of age. However, 91 week-old SHR showed significantly decreased in urinary sodium excretion relatively to WKY ($WKY: 1.9 \pm 0.1$ vs $SHR: 1.1 \pm 0.2$, mg/24h). Urinary protein excretion was increased in all SHR groups (13wks: 25.6 ± 1.6 ; 52wks: 26.4 ± 3.3 and 91wks: 41.1 ± 2.7 , mg/24h), but identical between WKY groups (13wks: 14.0 ± 0.8 ; 52wks: 13.9 ± 1.2 and 91wks: 14.8 ± 1.2 , mg/24h). Renal expression of amino acid transporters LAT1 and LAT2 did not differ between WKY and SHR. Contrasting, in SHR ageing was accompanied by a sustained increase in the expression of both 4F2hc and ASCT2 (4F2hc-13wks and 52wks: 15% and 91wks: 60%; ASCT2-13wks, 52wks and 91wks: 18% increase when compared to age-matched WKY).

Conclusions: Aged SHR showed evidences of renal injury, such as increased renal hypertrophy, proteinuria and reduced sodium excretion. These age-related changes in renal function and morphology correlate positively with the increased expression of ASCT2 in the SHR. It is suggested that overexpression of ASCT2 may play a role in the age-related changes in kidney function.

PP.30.200 THE DIAGNOSTIC VALUE OF DELTA RI IN THE ASSESSMENT OF SEVERITY OF RENAL ARTERY STENOSIS - CORRELATION WITH ANGIOGRAPHY DATA

I. Michalowska¹, J. Kadziela¹, M. Januszewicz², B. Pregowska-Chwala¹, L. Kalinczuk¹, E. Warchol¹, A. Prejzisz¹, P. Zielen¹, A. Witkowski¹, A. Januszewicz¹, M. Kabat¹. ¹Institute of Cardiology, Warsaw, Poland, ²Medical University, Warsaw, Poland

Objective: The aim of the study was to evaluate the diagnostic value of deltaRI (side-to-side difference of renal resistive index) in moderate to high grade renal artery stenosis (RAS) with respect to angiographic and hemodynamic measurements.

Design and Method: 43 hypertensive patients with at least moderate (more than 50%) RAS were investigated. GFR was calculated according to MDRD formula. Renal resistive index (RI) and deltaRI were obtained in Doppler sonography. Using the pressure wire, resting Pd/Pa ratio (the ratio of mean distal to lesion and mean proximal pressures) and hyperemic renal fractional flow reserve (rFFR) after administration of 30 mg intrarenal papaverine were evaluated. The quantitative angiographic analysis (QAA) of stenosis severity was performed including the minimal lumen diameter (MLD) and the percent diameter stenosis (DS) assessment. The predictive value of different variables was calculated using Receiver-operating characteristics curves.

Results: Mean deltaRI was 0,049+/-0,087. DeltaRI correlated with MLD ($r=0,39$; $p<0,05$), DS ($r=0,36$; $p<0,01$) and rFFR ($r=-0,36$; $p<0,05$). No significant relationship between Pd/Pa ratio and deltaRI was observed. There were no correlations between deltaRI and diastolic pressure measured proximally and distally to the stenosis and GFR. Patients with rFFR $<0,8$ had an increased deltaRI (0,08 vs 0,01, $p<0,1$) in comparison to the patients with normal rFFR. In the ROC analysis for prediction of decreased rFFR ($<0,8$) area under the curve for deltaRI was 0,743 ($p<0,01$). The sensitivity and specificity of deltaRI cut-off values were: for 0,025 - 75% and 60%; for 0,06 - 50% and 70%; for 0,075 - 50% and 85%; for 0,085 - 45% and 90%.

Conclusions: Our data indicate the deltaRI may be a helpful marker of a significant renal artery stenosis.

PP.30.201 INCREASED OXIDATIVE STRESS AND ALDOSTERONE LEVELS IN AGED WISTAR KYOTO AND SPONTANEOUSLY HYPERTENSIVE RATS: EFFECT OF FOOD RESTRICTION

V. Pinto, S. Simão, E. Silva, MJ. Pinho, J. Amaral, J. Afonso, MP. Serrão, P. Gomes, P. Soares-da-Silva. *Institute of Pharmacology & Therapeutics- Faculty of Medicine, Porto, Portugal*

The aim of this study was to investigate on the relationship between the oxidative stress status, aldosterone plasma levels and renal MR functionality in 13- and 84-week old Wistar Kyoto fed ad-libitum (WKY-Ad), or submitted to food restriction (WKY-FR) and spontaneously hypertensive (SHR) rat.

Five-week old male WKY and SHR were obtained from Harlan-Interfauna Ibérica. WKY and SHR were fed ad-libitum until 13 or 84 weeks of age. From 5 weeks of age, the food intake of WKY-FR was restricted to 85% of the mean intake of WKY-Ad until 13 or 84 weeks of age. H₂O₂ levels were measured fluorometrically using the Amplex Red Hydrogen Peroxide Assay kit. Urinary malondialdehyde (MDA) content was analyzed in WKY-Ad, WKY-FR and SHR. All biochemical assays were performed by Cobas Mira Plus analyzer.

WKY-Ad became obese with aging; body weight gain from 13 to 84 weeks of age in WKY-Ad was twice that in SHR. FR resulted in a 20% body weight reduction at the age of 84 weeks. Renal H₂O₂ levels increased significantly with age in both WKY-Ad and SHR. FR significantly reduced H₂O₂ levels when compared with age-matched WKY-Ad. Furthermore, lipid peroxidation was significantly increased in 84 week old WKY-Ad and SHR, however, FR had no effect on urinary MDA levels. Aldosterone plasma levels were significantly higher in 13-week old SHR than those observed in age matched WKY-Ad, but no differences were found between 84-week old WKY and SHR. WKY-FR at 84 weeks of age had reduced aldosterone plasma levels in comparison to age-matched WKY-Ad. The Na⁺/K⁺ urinary ratio, an indirect index of MR functionality, was significantly decreased in aged WKY-Ad and SHR. FR increased the UNa⁺/K⁺ ratio at 13 weeks of age but had no effect at 84 weeks of age.

Aged WKY and SHR develop exacerbated renal oxidative stress accompanied by increased aldosterone plasma levels and MR functionality which are attenuated by weight loss in WKY.

PP.30.202 CILNIDIPINE INHIBITED RENAL INJURY AND RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM IN DEOXYCORTICOSTERONE-SALT HYPERTENSIVE RATS

H. Toba, M. Yoshida, C. Tojo, A. Nakano, M. Kobara, T. Nakata. *Department of Clinical Pharmacology, Division of Pathological Sciences, Kyoto Pharmaceutical University, Kyoto, Japan*

Objective: Recent studies suggest that cilnidipine reduces renal injury by the inhibition of sympathetic nerve activity. The present study investigated that cilnidipine might exert renoprotective effects and inhibit renal renin-angiotensin-aldosterone system (RAAS) in deoxycorticosterone-salt hypertensive rats (DOCA-salt).

Design and Methods: Cilnidipine (1 mg/kg/day) or amlodipine (1 mg/kg/day) was administered to DOCA-salt by gavage for 4 weeks. Systolic blood pressure (SBP) was determined using tail-cuff method. We measured urinary protein and norepinephrine excretion, creatinine clearance (CCr) and plasma angiotensin converting enzyme (ACE) activity. Kidneys were stained with Masson's trichrome, and renal expression of TGF- β mRNA was examined by RT-PCR. Immunoblotting was performed to investigate ACE expression in the kidney. Renal homogenates were used to assay the aldosterone concentration and NADPH oxidase activity.

Results: Cilnidipine and amlodipine slightly, but not significantly, decreased SBP in DOCA-salt. Cilnidipine normalized proteinuria and CCr in DOCA-salt. Glomerulosclerosis and fibrosis in DOCA-salt were attenuated by cilnidipine. Increased urinary norepinephrine excretion in DOCA-salt was reduced by cilnidipine. The renal TGF- β expression and NADPH-oxidase activity, which were enhanced in DOCA-salt, were suppressed by cilnidipine. The expression and activity of ACE and the aldosterone concentration were increased in the kidney of DOCA-salt, and these increases were inhibited by cilnidipine. On the other hand, amlodipine did not cause these changes.

Conclusions: Cilnidipine normalized renal dysfunction, sympathetic nerve activity and renal RAAS in DOCA-salt.

PP.30.203 RENAL OXIDATIVE STRESS RESPONSE TO ATRIAL NATRIURETIC PEPTIDE IN HYPERTENSION

M. Costa, M. Romero, C. Caniffi, G. Bouchet, F. Garrido, R. Elesgaray, A. Tomat, M. Mac Laughlin, C. Arranz. *Cátedra de Fisiología, Facultad de Farmacia y Bioquímica, Universidad de Buenos Aires, Buenos Aires, Argentina*

Objective: The precise mechanisms leading to the pathogenesis of essential hypertension and renal damage remain unknown. Spontaneously hypertensive rats (SHR) is a model of hypertension which is known to be associated to different risk factors that ends in cardiovascular and renal disease. In previous studies we demonstrated that atrial natriuretic peptide (ANP) infusion increases nitric oxide synthase activity in kidney of SHR, but how ANP can modify oxidative stress in this model of hypertension has not been studied yet.

The aim was to investigate the effects of chronic infusion with ANP on renal oxidative stress in SHR.

Methods: 8 weeks-old SHR and Wistar Kyoto (WKY normotensive rats) were infused (14 days, subcutaneous osmotic pumps) with ANP (100 ng/hr/rat) or saline (S). After experimental period, we determined in kidney: thiobarbituric acid-reactive substances (TBARS, nmol/mg protein), glutathione concentration (mg/mg protein), and the activity of: glutathione peroxidase (GPx, pmol/min.mg protein), catalase (CAT, pmol/mg protein) and superoxide dismutase (SOD, USOD/mg protein).

Results:

	TBARS	Glutathione	GPx	CAT	SOD
WKY S	0,113±0,015	0,271±0,038	181,1±19,4	0,847±0,102	7,691±0,505
WKY ANP	0,098±0,010	0,398±0,028*	180,3±21,2	0,956±0,098	8,021±1,654
SHR S	0,162±0,025*	0,178±0,046*	243,1±22,1*	0,951±0,105	7,098±0,653
SHR ANP	0,082±0,009#	0,374±0,027#	303,2±30,3#	1,101±0,142	8,452±0,779

* $p<0,01$ vs WKY S; # $p<0,01$ vs SHR S; n=6 each experimental group.

SHR shown higher levels of TBARS and GPx activity than WKY rats. Renal glutathione concentration was lower in hypertensive rats than in normotensive ones. CAT and SOD basal activities were similar in both groups and ANP treatment induced no changes their activities. In WKY rats, ANP treatment increased glutathione concentration. In hypertensive rats, ANP chronic infusion diminished TBARS and increased renal glutathione concentration and GPx activity, indicating a reduction in renal oxidative stress.

Conclusion: Chronic treatment with ANP improved, almost in part, renal oxidative damage in this model of hypertension in rat.

PP.30.204 THE EFFECT OF PERCUTANEOUS REVASCULARISATION OF ATHEROSCLEROTIC RENAL ARTERY STENOSIS ON BLOOD PRESSURE. META-ANALYSIS OF RANDOMISED TRIALS

B. Symonides, Z. Gaciong. *Medical University of Warsaw - Department of Internal Diseases Hypertension and Angiology, Warsaw, Poland*

Objective: To assess the influence of percutaneous revascularization on blood pressure in patients with atherosclerotic renal artery stenosis [ARAS].

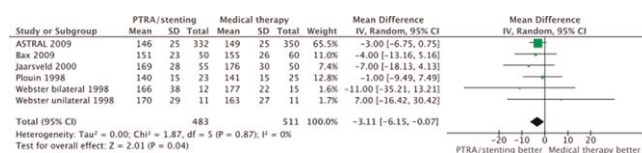
Design and Methods: We performed a meta-analysis comparing the treatment of ARAS with percutaneous angioplasty or stenting [PTRAS] and medical therapy alone [MT].

Results: Five trials that included $n=756$ of patients with ARAS were identified. For analysis we used data from published papers including internet supplements and a previous meta-analysis (Ives et al. 2003).

The analysis revealed significantly lower SBP in PTRAS vs. MT - mean weighted difference -3.11 mmHg.

(95%CI $-6.15, -0.07$; $P=0.04$), and no significant difference in mean weighted DBP: -0.36 mmHg (95%CI $-2.92, 2.20$; $P=0.78$). Although a tendency toward the lower SBP in ARAS vs. MT was observed at baseline, it did not reach statistical significance. Mean weighted difference was -1.96 (95% $-4.86, 0.94$; $p=0.19$).

Conclusion: Percutaneous renal revascularization in patients with ARAS exerts very small effect on systolic blood pressure.



PP.30.205 RENAL ULTRASOUND FINDINGS IN ELDERLY PATIENTS WITH HIGH BLOOD PRESSURE

A. Pacurari, C. Serban, A. Narita, I. Romosan. *IVth Medical Clinic of the University of Medicine and Pharmacy Victor Babes, Timisoara, Romania*

Objective: Because in the elderly the clinical manifestations of chronic kidney disease (CKD) are atypical, the patient's pathology is complex and the investigations are limited (intravenous urography can not be made in all elderly), the renal ultrasound exam is the simplest investigation for elderly patients. In the majority of our patients, the diagnosis of a chronic pielonephritis is possible without other investigations that are more risky and expensive.

The aim of this study is to establish the relationship between hypertension and the renal ultrasound exam.

Design and Methods: The study was carried out on a group of 543 elderly hypertensive patients admitted, in a 3 years period, in the IVth Medical Clinic of the University of Medicine and Pharmacy "Victor Babes" Timisoara. The mean age of the patients was 78.5 ± 13.5 years. Of them 278 were women and 265 men. We performed in all patients a guided anamnesis, a complete clinical exam, and standard biological and imaging tests. We performed in all patients a renal ultrasound exam using an Aloka ProSound 4400 ultrasound system with a 3, 5 MHz transceiver.

Results: In 52,1% of patients the right kidney had less than 10cm, and in 53,03% of patients the left kidney was smaller than 10 cm. The exterior contour of the right kidney was unequal in 50,6% of patients and of the left kidney in 51,7% of patients. The parenchyma index was less than 1,5 in the right kidney of 52,3% patients and in the left kidney of 51,7% patients. The

ultrasound exam was normal according to the age of the patients in 53,2% of all patients. One patient had polycystic kidney disease and 2 patients had just one kidney.

Conclusions: Renal ultrasound exam is an important way to diagnose secondary hypertension. In elderly CKD is very common.

PP.30.206 COMPARISON OF METHODS FOR DETERMINING GLOMERULAR FILTRATION RATE IN HYPERTENSIVE SUBJECTS WITH NORMAL SERUM CREATININE: ROLE OF RENAL SCINTIGRAPHY

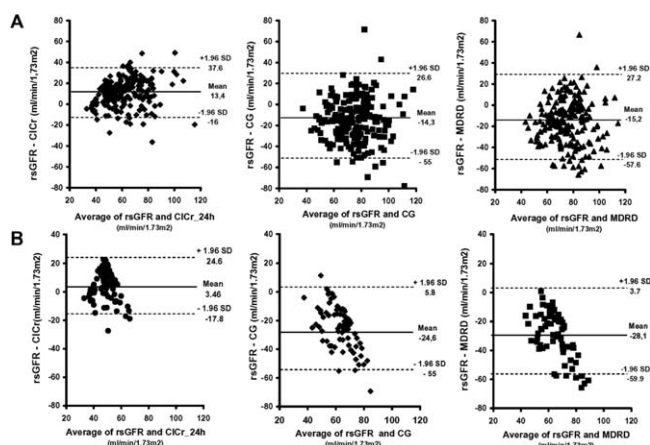
A. Mazza¹, D. Rubello², A. Piccoli³, S. Zamboni¹, S. Cuppini¹, L. Rampin², L. Schiavon¹, A.C. Pessina⁴, E. Casiglia⁴. ¹Department of Internal Medicine, Azienda Ulss 18 Rovigo, Rovigo, Italy, ²Unit of Nuclear Medicine, Azienda Ulss 18 Rovigo, Rovigo, Italy, ³Department of Medical and Surgical Sciences, University of Padua, Padua, Italy, ⁴Department of Clinical and Experimental Medicine, University of Padua, Padua, Italy

Objective: Glomerular filtration rate (GFR) measured through 99mtechnetium-diethyltriamine pentacetic acid (99mTc-DTPA) renal scintigraphy (rsGFR) was compared to that estimated (eGFR) from 24-h creatinine clearance (CrCl_{24h}) and using both the Cockcroft-Gault (CG) formula and the Modification of Diet in Renal Disease (MDRD) formula.

Design and Method: In 200 normoalbuminuric (<30 mg/24h), normocreatinemic, non-diabetic, hypertensive patients (HTs) age 55–75 years without a history of coronary or cerebrovascular diseases, the Bland-Altman method was used to assess the agreement between rsGFR and eGFR, separately in subjects with low (<60) and normal (≥ 60 ml/min/1.73m²) rsGFR. The span between -1.96 and $+1.96$ standard deviations of mean difference (bias) was calculated and used for this purpose.

Results: The Bland-Altman analysis (Figure, panel A) showed that the smallest span between rsGFR and eGFR was evident for CrCl_{24h} values (26.8 ml/min/1.73m²), while higher values were detected with the CG and MDRD formulas (40.60 and 42.4 ml/min/1.73m², respectively). The same results were observed for low rsGFR (Figure, panel B), where a smaller span was found for CrCl_{24h} (21.2 ml/min/1.73m²), while CG and MDRD methods gave greater results (30.4 and 31.8 ml/min/1.73m² respectively); no differences were found between genders. The degree of agreement for eGFR estimated with the CG and MDRD formulas was wider than that derived from CrCl_{24h}, reflecting a greater between-methods variability and a considerable discrepancy of rsGFR values in the former than in the latter.

Conclusions: In normocreatinemic HTs, CrCl_{24h} measurement should be preferred to estimate GFR, while CG and MDRD formulas are of limited efficacy.



PP.30.207 RELATIONSHIP BETWEEN LOW-GRADE INFLAMMATION, URIC ACID, LIPIDS AND RENAL FUNCTION IN HYPERTENSIVE PATIENTS

V. Bezrodnyy, Y. Svyshchenko, L. Mishchenko, L. Bezrodna. *M.D. Strazhesko Institute of Cardiology - Department of Hypertension, Kiev, Ukraine*

Background: Chronic kidney disease (CKD) in hypertensive patients is associated with increased morbidity and mortality from cardiovascular dis-

case (CVD). Low-grade inflammation, uric acid (UA) and lipids disorders are important in kidney damage and CVD development in hypertensive patients.

Objective: To investigate the relationship between high sensitive C-reactive protein (hs-CRP), UA, lipids levels and renal function in patients with hypertensive CKD stage II-III.

Design and Methods: We examined 98 untreated non-diabetics essential hypertensive patients with II and III stage of hypertensive CKD. Inflammatory marker hs-CRP was evaluated by immunoassay, UA serum concentration was determined by fermentative method. 24-h urinary collection for estimation of glomerular filtration rate (GFR) was used. Microalbuminuria (MA) was detected in 24-h urinary samples.

Results: The patients were divided into 2 groups: gr. I pts. – with CKD stage II (n=51) and gr. II pts – with CKD stage III (n=47). Gr. I pts. had significantly lower hs-CRP, UA, total cholesterol, triglycerides and MA than gr. II pts. ($p < 0.04$, $p < 0.001$, $p < 0.001$, $p < 0.01$, $p < 0.001$ accordingly). In univariate analysis GFR was related to hs-CRP ($r = -0.19$, $p < 0.05$), UA ($r = -0.31$, $p < 0.002$), total cholesterol ($r = -0.40$, $p < 0.001$), LDL-C ($r = -0.38$, $p < 0.001$), triglycerides ($r = -0.25$, $p < 0.01$). No correlation was found between hs-CRP and lipid parameters.

Conclusion: Low-grade inflammation, uric acid, total cholesterol and triglycerides were significantly associated with kidney function in hypertensive patients. We suggest that the mechanisms underlying the increased risk for CVD and kidney damage in patients with hypertensive CKD may relate to the combined effects of low-grade inflammation, lipids disorders and uricemia.

PP.30.208 KIDNEY FUNCTION EVALUATION IN THE INTERPRETATION OF CARDIOVASCULAR RISK IN THE GROUP OF HYPERTENSIVE PATIENTS

L. Woznicka-Leskiewicz¹, K. Malaczynska-Rajpold², A. Kuczmarska², I. Lipska². ¹Department of Hypertensiology, Angiology and Internal Diseases University of Medical Sciences, Poznan, Poland, ²University of Medical Sciences, Poznan, Poland

Objectives: Usefulness of kidney function evaluation in the interpretation of cardiovascular risk in the group of patients with arterial hypertension.

Design and Methods: 58 hospitalized hypertensive patients (20 women and 38 men) were divided in two groups: A- 28 patients without coronary artery disease (9 women and 19 men) and B- 30 patients with coronary artery disease (11 women and 19 men). The average age of the group A- 57.79 yrs, B-65.67 yrs. Following measurements were taken on each patient: SBP, DBP, level of glycaemia, uric acid, HDL, LDL and total cholesterol, triglycerides, urea, creatinine, BMI. We also assessed the prevalence of chronic kidney disease (CKD) using estimating GRF (MDRD formula) in these groups. The t-student test was used for the statistical analysis, $\bar{n}$ Spearmana was taken to analyze the correlation of statistically significant values.

Results: According to MDRD formula 79.31% of all hypertensive patients had CKD. 1 stage of CKD was found: in the group A in 25%, in the group B in 6.67%. 2 stage of CKD was found: in the group A in 39.29%, in the group B in 50%. 3 stage of CKD was found: in the group A in 14.29%, in the group B in 23.33%. Only 20.69% of all patients had estimating GRF (MDRD formula) in the reference ranges. We also revealed positive correlation between diastolic blood pressure and GFR (MDRD formula) in the group of hypertensive patients without coronary artery disease ($p = 0.0021$).

Conclusions: We noticed that hypertensive patients with coronary artery disease, in greater percentage, had more severe chronic kidney disease than hypertensive patients without coronary artery disease. The positive correlation between DBP and GFR (MDRD formula) in the group of hypertensive patients without coronary artery disease pointed to a prognostic value of kidney function evaluation in the interpretation of cardiovascular risk in this kind of patients.

PP.30.209 MICROALBUMINURIA AND CARDIOVASCULAR RISK IN HYPERTENSION PATIENTS. ANNUAL EVOLUTION OF THE MAUASTUR STUDY

M.A. Prieto Diaz¹, F. Fernandez Vega², A. Iglesias Garcia³, S. Suarez Garcia⁴, C. Vidal Gonzalez⁵, M.B. Gonzalez Lopez¹, L. Bousquets Toral⁶, E. Fernandez Huelga⁷, R. Alvarez Navascues⁵, R. Marin Iranzo². ¹Primary Health Center Vallobin-La Florida, Oviedo, Spain, ²Hospital Universitario Cen-

tral of Asturias S^o Nephrology -HTA Unit, Oviedo, Spain, ³Primary Health Center Ventanillas, Oviedo, Spain, ⁴Primary Health Center Colloto, Oviedo, Spain, ⁵Primary Health Center Raices, Aviles, Spain, ⁶Primary Health Center Tineo, Tineo, Spain, ⁷Primary Health Center Pumarín, Oviedo, Spain

Objective: To evaluate the relationship of microalbuminuria (MA) with cardiovascular risk factors (CVRF) and cardiovascular disease in patients with hypertension after a year of follow-up.

Methods: A descriptive, cross sectional study of a 5 years prospective study. Population: Random selection of hypertensive patients treated in primary care. The following variables were analyzed and compared in visit 1 (V1) and visit 2 (V2): associated cardiovascular risk factors, target organ damage (TOD) and associated clinical diseases (ACD) defined following ESH-ESC 2007 guidelines. Microalbuminuria was defined by albumin-creatinine ratio > 22 mg/g in males and > 31 mg/g in women in an isolated urine sample.

Results: 616 patients were selected, 322 men (52.3%); mean age 66 ± 10 years. Comparative analysis between V1 and V2 were: systolic blood pressure 144 ± 73 mmHg vs 136 ± 14 mmHg, $p = 0.000$; diastolic blood pressure 83 ± 10 mmHg vs 80 ± 9 mmHg, $p = 0.000$. 130 patients (21%) had MA in V1 and 97 (15.7%) in V2, $p = 0.015$, OR 1.43 (1.06–1.93). The relation of MA in V1 and V2 were: diabetes 46.9% vs 40.2%, $p = \text{NS}$; NS; hypercholesterolemia 57.4% vs 57.7%, $p = \text{NS}$; obesity 50% vs 47.4%, $p = \text{NS}$ and smoke 10.8% vs 14.4%, $p = \text{NS}$. renal failure 26.9% vs 24.7%, $p = \text{NS}$; slight increase in plasma creatinine 9.2% vs 7.2%, $p = \text{NS}$; left ventricular hypertrophy 9.2% vs 10.3%, $p = \text{NS}$. The MA was more prevalent in patients with establish cardiovascular or kidney disease 27.7% 32.3% vs 30.9%, $p = \text{NS}$; coronary heart disease 14.6 vs 12.3%, $p = \text{NS}$, peripheral vascular disease 11.5% vs 9.5%, $p = \text{NS}$; stroke 4.6% vs 4.8%, $p = \text{NS}$, and heart failure 3.1% vs 6.1%, $p = \text{NS}$. The degree of BP control in V1 y V2 was: 30.8% vs 53.6%, $p = 0.000$, OR 2.63 (1.44–4.76) and patients were treated with ARB or ACEI: 78.5% vs 83.5%, $p = \text{NS}$. The prevalence of high or very high CVR 91.5% vs 88.7%, $p = \text{NS}$.

Conclusions: After a year of follow-up, prevalence of MA was decreased significantly, and dependent of the degree of BP control increased. There were no differences in the relation of MA with CVRF, TOD or ACD.

PP.30.210 SEVERE UNCONTROLLED HYPERTENSION FOLLOWING TRAUMATIC RENAL INJURY

A. Murray, M. Godfrey, W. Sapsford. *The Royal London Hospital - Trauma Department, London, United Kingdom*

Background: A 48-year-old man presented with severe left flank pain and haematuria, following slipping in the bath and falling hard on to his left side. On admission to the Emergency department he was hypertensive with a blood pressure (BP) of 205/91 mmHg with a pulse rate of 45 beat per minute.

Method and Results: Computed tomography (CT) scanning revealed a severe left renal injury with evidence of persistent bleeding, therefore the patient proceeded to laparotomy. Complete transection of the left kidney with massive surrounding haematoma was confirmed, requiring total nephrectomy.

Throughout the operation his systolic BP was persistently above 200 mmHg, despite aggressive pharmacological control akin to the management of surgical phaeochromocytoma patients. However when the renal artery was clamped the BP fell sharply to 90/30 mmHg and temporary administration of noradrenaline was necessary.

Conclusion: Systemic hypertension following kidney trauma was initially described by Erwin Page, hence the eponymous term Page kidney. It usually involves blunt trauma to the back or flank, leading to unilateral kidney damage. It is believed compression of the kidney parenchyma from renal capsule haematoma leads to hypoperfusion, and subsequent renin release and activation of the renin-angiotensin-aldosterone axis; resulting in systemic hypertension.

Traditionally Page kidney has been treated with nephrectomy. In cases with a single functioning kidney, conservative management with fluid control and anti-hypertensives has been adequate, though chronic hypertension is a recognised long term complication. In certain cases resolution of hypertension occurred with surgical removal of the renal capsule and haematoma, with preservation of the kidney. There is also increasing use of radiological drainage of the haematoma.

Page Kidney is a rare but potentially treatable cause of secondary hypertension, which can occur following a seemingly minor injury.

PP.30.211 CARDIOVASCULAR DISEASES AND MEDICATION IN PATIENTS WITH CHRONIC RENAL FAILURE

A. Idrizi¹, M. Barbullushi¹, A. Koroshi¹, V. Bajrami¹, M. Heba², A. Deliana², T. Goda², H. Vucini², S. Kodra¹, N. Thereska¹. ¹Service of Nephrology, UHC Mother Teresa, Tirana, Albania, ²Service of Cardiology, UHC Mother Teresa, Tirana, Albania

Introduction: Cardiovascular diseases are prevalent in patients with chronic renal failure (CRF). We studied the prevalence of these problems and the use of cardio- and reno-protective medications in patients with CRF at the time of their visit to a nephrologist.

Methods: 85 patients with cardiovascular diseases were included in the study performed during three years. Inclusion criteria was seric creatinine > 1.5 mg/dl. Patients who had acute renal failure were excluded from the study.

Results: 55% of the patients were male, 45% were female, mean age was 68 years, and the mean estimated glomerular filtration rate was 33 ml/min/1.73m². Prevalence of medical conditions was as follows: hypertension 67%, ischemic heart disease 41%, hypercholesterolemia 47%, previous smokers 46%, current smokers 19%, diabetes mellitus 45%, peripheral vascular disease 21%, cerebrovascular disease 11%, congestive heart failure 18%, atrial fibrillation 10%, and valvular heart disease 7%. 73% of patients had used ARB or ACE-I, 64% had used statins and 36% of them antiplatelet agents. The group treated by ARB or ACE-I had an improve in blood pressure control and also in retarding progression of chronic renal failure.

Conclusion: Cardiac and vascular disease and uncontrolled hypertension is prevalent in patients with CRF at the time of referral to a nephrologist. There exist opportunities to improve blood pressure control and the use of angiotensin system blockade by ARB in these patients is recommended for cardio- and reno-protection.

PP.30.212 THE EFFECT OF LOSARTAN ON RENAL FUNCTION AND METABOLIC RISK FACTORS IN ESSENTIAL HYPERTENSIVE PATIENTS

L. Mishchenko, O. Matova, V. Bezrodnyy, V. Radchenko. *National Scientific Center M.D. Straghesko Institute of Cardiology, Kiev, Ukraine*

Objective: To study the losartan influence on renal function and uric acid (UA), CRP and baseline immunoreactive insulin (IRI) plasma concentration in essential hypertensive (EH) patients (pts) with hypertensive Chronic Kidney Disease (CKD).

Material and Methods: 52 EH pts with II and III stage of hypertensive CKD were evaluated at the beginning and after twelve months of treatment with losartan 100 mg per a day and furosemide (the average dose is 21,48 ± 4,3 mg per a day) in addition. ABPM was performed according to standard protocol with ABPM-04 ("Meditech", Hungary). Uric acid and CRP plasma concentration were determined by fermentative and immunoturbidimetric methods accordingly. GFR was estimated by creatinine clearance according to Reberg method. Statistical analysis was performed with SPSS-13.

Results: IRI, UA and CRP plasma concentrations are inversely correlated with GFR ($r = -0,582$, $p = 0,0001$; $r = -0,451$, $p = 0,0001$; $r = -0,429$, $p = 0,0001$; $r = -0,282$, $p = 0,002$ accordingly) in examined pts. The dynamics of BP, GFR and plasma IRI, CRP and UA concentrations under 12-months losartan treatment are presented in the table.

Index	Before treatment	After treatment	p
24-h SBP	149,1 ± 2,7	138,5 ± 2,4	0,01
24-h DBP	86,9 ± 1,9	79,8 ± 1,7	0,001
GFR	58,2 ± 3,1	62,3 ± 2,9	0,04
IRI	13,8 ± 1,2	11,2 ± 1,3	0,06
CRP	5,7 ± 0,6	3,8 ± 0,4	0,02
UA	358,0 ± 18,9	299,1 ± 15,7	0,001

Conclusions: Losartan treatment promotes to BP decrease and improvement of renal function, and also maintenance reduction in plasma CRP and UA which significantly associated with renal function index – GFR in EH pts with hypertensive CKD.

PP.30.213 IS CHRONIC KIDNEY DISEASE A RISK FACTOR FOR CARDIOVASCULAR DISEASE IN ELDERLY PATIENTS?

A. Pacurari, C. Serban, A. Narita, I. Romosan. *10th Medical Clinic of the University of Medicine and Pharmacy Victor Babes, Timisoara, Romania*

Objective: Chronic kidney disease (CKD) is frequent in elderly patients and is also very difficult to diagnose because in elderly it is often asymptomatic. One of the most common findings in patients with CKD is a high blood pressure. The aim of this study is to establish the relationship between hypertension and CKD in elderly patients.

Design and Methods: The study was carried out on a group of 1073 elderly hypertensive patients admitted, in a 2 years period, in the IVth Medical Clinic of the University of Medicine and Pharmacy "Victor Babes" Timisoara. The mean age of the patients was 78,5 ± 13,5 years. Of them 67% were women and 33% men. Blood pressure values, serum creatinine, lipids values, left ventricular hypertrophy (LVH), and the presence of smoking were observed in each patient. Estimated glomerular filtration rate (GFR) was calculated according to the 4 variable MDRD equation. CKD was defined as an estimated GFR lower than 60 ml/min/1,73 m².

Results: In 24,3% of all patients CKD was present. Of them 87% were women. Dyslipidemia was present in 64,9% of all patients. In the patients with CKD, dyslipidemia was present in 88,9% of the patients. LVH was present in all patients with CKD. 12% of patients were smoking.

Conclusions: CKD is highly prevalent in hypertensive elderly patients and is a strong cardiovascular risk factor.

PP.30.214 IS URINARY TRACT INFECTION A RISK FACTOR FOR HYPERTENSION IN ELDERLY?

A. Pacurari, C. Serban, A. Narita, I. Romosan. *10th Medical Clinic of the University of Medicine and Pharmacy Victor Babes, Timisoara, Romania*

Objective: Urinary tract infection (UTI) is a very common finding in elderly patients. Hypertension is one of the frequent complications of a chronic form of an upper urinary tract infection. The aim of this study is to establish the relationship of hypertension and urinary tract infection in elderly patients.

Design and Methods: The study was carried out on a group of 333 patients admitted, in a 3 years period, in the IVth Medical Clinic of the University of Medicine and Pharmacy "Victor Babes" Timisoara. The patients were diagnosed with one of the clinical forms of urinary tract infection. The patients were aged between 65 and 92 years. Of them 16% were men and 84% were women. We performed in all patients a guided anamnesis, a complete clinical exam, and standard biological and imaging tests.

Results: Of all patients 65,8% had no hypertension at admission and also had no history of hypertension, 24,9% had a history of hypertension longer then the history of UTI, and just 9,3% of the patients with UTI had no history of hypertension but had hypertension at admission. We also observed that hypertension was present just in patients with chronic obstructive or non-obstructive pyelonephritis.

Conclusions: It is very difficult, to establish in elderly, the amount of patients who develop hypertension due to chronic pyelonephritis, because in this age atherosclerosis is also incriminated in the etiopathogeny of hypertension.

PP.30.215 FREQUENCY AND TREATMENT OF HYPERTENSION IN PATIENTS AFTER KIDNEY AND KIDNEY-PANCREAS TRANSPLANTATION

T. Bulum, I. Prkacin, D. Vujanic, M. Knotek. *University Hospital Merkur, Department of Nephrology, Zagreb, Croatia*

Introduction: Hypertension frequently occurs in patients with renal transplant. The incidence of post-transplant hypertension is also contributed with use of immunosuppressive therapy (corticosteroids, cyclosporine and tacrolimus).

The aim of this study was to determine the frequency and degree of control of arterial hypertension in patients after kidney (KT) and kidney-pancreas transplantation (SPKT).

Patients and Methods: 163 consecutive patients (median age 44, range 18–70 years, 97 M/66 F, 102 with KT and 61 with SPKT) have been evaluated for control of blood pressure after transplantation. Blood pressure higher than 130/80 mmHg or taking antihypertensive medications were taken as a criteria for definition of arterial hypertension.

Results: The average systolic pressure in our patients was 124 ± 13 mmHg, diastolic 75 ± 8 mmHg. Arterial hypertension had 94% of all patients, 94.1% with KT and 93.4% with SPKT, 9 (6%) patients did not need to take antihypertensive therapy. Systolic pressure of ≤130 mmHg had 119 (73%), and diastolic pressure of ≤80 mmHg had 133 (81%) patients. Both target value (systolic and diastolic pressure) had 111 (68%) patients. Fifty-two (32%) transplanted patients taking one, 52 (32%) patients two and 49 (30%)

patients three or more antihypertensive medication. The most frequent drugs used in monotherapy were calcium antagonists in 63.4% of patients, followed by beta-blockers in 19.2%, ACE inhibitors in 10%, AT1 receptor antagonists in 4%, and antagonists of alpha-adrenergic receptor in 3.4%. Two antihypertensive medications were taken in 32% of patients, of which the frequency of prescription is calcium antagonists with 80.7%, beta blockers with 61.5%, alpha-antagonists with 23%, AT1 receptor antagonists with 17.3%, ACE inhibitors 11.5%, diuretics 5.7%, and moxonidine with 3.8%.

Conclusion: The presented results show a high incidence of arterial hypertension in patients with KT and SPKT, which is in line with results from other published studies. The satisfactory blood pressure values were obtained in 68% of our patients. Blood pressure of <130/80 mmHg is an adequate treatment goal.

PP.30.216 HYPERTENSION IN RENAL TRANSPLANT RECIPIENTS

L. Redahan, C. Fives, A. Smyth, C. Wall. *Department of Nephrology, Adelaide and Meath Hospital, Tallaght, Dublin 24, Ireland*

Objective: Hypertension is a risk factor for both cardiovascular and renal disease. Hyperuricaemia is common following renal transplantation, and has recently been implicated in the pathogenesis of hypertension. The aim of this study was to review hypertension control and the role of hyperuricaemia in our patient cohort.

Design and Method: We conducted a retrospective review of stable renal transplant recipients between January 1st 2009 and June 30th 2009 and recorded blood pressure and urate levels.

Results: 69 patients were included with mean systolic blood pressure of 143.12mmHg (Standard deviation = 13.18) and diastolic blood pressure of 84.84mmHg (Standard deviation = 7.85). 88.4% (n = 61) were taking anti-hypertensive medications, 26.1% (n = 18) on diuretics and 30.4% (n = 21) had an elevated urate level. 13.0% (n = 9) were on allopurinol, 5 of whom an elevated urate despite treatment. Male patients on average had a higher urate level than females (p = 0.005). There was no association between allopurinol use and systolic or diastolic blood pressure. Elevated systolic and diastolic blood pressure readings were more common in those taking anti-hypertensives (p = 0.027 and p = 0.041 respectively). Systolic and diastolic blood pressure appeared higher in those patients with higher plasma urate levels, but did not reach statistical significance (see Table).

Conclusion: The average blood pressure for our study population was above the recommended target for renal transplant recipients (<130/80mmHg).

There was a trend towards higher blood pressure in those with an elevated urate level, including those taking allopurinol. We have identified the need to improve blood pressure control and a potential role for hyperuricaemia in the pathogenesis of hypertension amongst our renal transplant recipients.

	SBP	DBP
Allopurinol Use		
Yes	143.00	85.78
No	143.13	84.70
p value	0.977	0.717
Antihypertensive Use		
Yes	144.38	85.61
No	133.50	79.00
p value	0.027*	0.041*
Gender		
Male	143.61	84.75
Female	142.24	85.00
p value	0.681	0.900
Diuretic Use		
Yes	149.61	85.39
No	140.82	84.65
p value	0.014*	0.733
Urate Level		
Above normal	146.67	87.19
Normal range	141.56	83.81
p value	0.140	0.100
	Urate Level	p value
Allopurinol use		
Yes	465.11	
No	405.95	0.140
Antihypertensive use		
Yes	420.87	
No	358.75	0.141
Gender		
Male	442.05	
Female	363.72	0.005*
Diuretic Use		
Yes	451.50	
No	400.31	0.095

POSTER SESSIONS

POSTER SESSION 31

LARGE ARTERIES 2

PP.31.217 THYROID FUNCTION AND LARGE ARTERY STIFFNESS WITH ESSENTIAL HYPERTENSION AND ISOLATED OFFICE HYPERTENSION

G. Vyssoulis¹, E. Karpanou², V. Tzamu¹, S.M. Kyvelou¹, T. Gialernios¹, C. Vlachopoulos¹, C. Stefanadis¹. ¹Ist Cardiology Clinic Athens University Hippokraton Hospital, Athens, Greece, ²Ist Cardiology Clinic Onassis Cardiosurgery Clinic, Athens, Greece

Objective: The association between hypothyroidism and increased vascular resistance, arterial wall thickening and endothelial dysfunction is well recognized. The aim of this study was to assess possible associations between thyroid hormones within normal levels and arterial stiffness in essential hypertensive patients versus patients with isolated office hypertension and healthy controls.

Design and Methods: The study comprised 1445 patients with essential hypertension (n=880), isolated office hypertension (n=388) and healthy controls (n=177), all with normal thyroid function. The study participants underwent full clinical and biochemical evaluation. Thyroid function was evaluated with the measurement of serum T3, T4, TSH, FT3 and FT4. Aortic stiffness and arterial wave reflection assessment were evaluated with carotid femoral (PWVc-f) and carotid radial (PWVc-r) pulse wave velocity and aortic augmentation index corrected for heart rate (Aix75).

Results: In patients with arterial hypertension, regression analysis revealed that TSH, FT3, FT4 levels are determinants of PWVc-r [(beta (SE)) = -0.079 (0.038), p=0.039], (beta (SE)) = 0.281 (0.101), p=0.005], (beta (SE)) = 0.595 (0.209), p=0.005], respectively] and additionally all thyroid hormones T3[beta (SE)) = 0.399 (0.197), p=0.0043], T4 [beta (SE)) = 0.071 (0.032), p=0.027], TSH [beta (SE)) = -0.8 (0.041), p=0.049], FT3 [beta (SE)) = 0.253 (0.107) p=0.018] and FT4 [beta (SE)) = 1.277 (0.222) p<0.001] are predictive for PWVc-f. Furthermore, T4 [beta (SE)) = 0.812 (0.253) p=0.001] and TSH [beta (SE)) = -0.751 (0.32) p=0.019] determined Aix75. Finally in patients with isolated office hypertension only FT4 [beta (SE)) = 0.71(0.295) p=0.017] was independently predictive of PWVc-f.

Conclusions: There seems to be an independent association between thyroid hormones, within normal values, and arterial stiffness indices in essential hypertensive patients. Thus, even mild changes in thyroid hormone levels may affect large artery properties.

PP.31.218 LARGE ARTERY FUNCTION AND VENTRICULAR ARTERIAL COUPLING FOLLOWING CARDIOVASCULAR UNLOADING RELATED TO PROLONGED BED REST IN YOUNG HEALTHY SUBJECTS

M. Kozakova¹, C. Palombo¹, G. Bini¹, E. Malshi¹, C. Morizzo¹, F. Santini¹, P. Salvi², M. Pagani³. ¹Department of Internal Medicine, University of Pisa, Pisa, Italy, ²Department of Internal Medicine and Geriatrics, University of Nancy, Nancy, France, ³Centre for Neurovegetative Therapy, Internal Medicine, University of Milan, Milan, Italy

Background: prolonged head-down tilt bed rest (HDTBR) is followed by a decrease in circulating volume possibly affecting large artery structure and function.

Aim of the study was to investigate common carotid artery (CCA) remodeling and ventricular-arterial (VA) coupling after HDTBR.

Methods: ten healthy male volunteers (age 23 ± 2) were studied before and after a 35-day HDTBR. Ultrasound (Esote MyLab30) was used to estimate LV volumes, transmitral and aortic flow velocity (FV), CCA diameter and FV, high resolution IMT (Q-IMT). Applanation tonometry (PulsePen, DiaTece), was used to explore large artery dynamics and wave reflection

(WR). Carotid-femoral pulse wave velocity (PWV) was also estimated (Complior, Alam).

Results: no changes were observed for central BP vs baseline, while LV volumes and stroke volume significantly decreased and HR increased (from 58 ± 2 to 73 ± 6, p<0.05).

Myocardial performance index (MPI), a Doppler derived index of global LV function [isovolumic contraction time+isovolumic relaxation time]/LV ejection time], increased after HDTBR (0.71 ± 0.12 vs 0.52 ± 0.06, p<0.005), as well as arterial elastance (Ea = end systolic pressure/stroke volume) and LV elastance [Elv = end systolic pressure (ESP)/end systolic volume (ESV)] (for Ea: 1.08 ± 0.198 vs 1.31 ± 0.21, p=0.01; for Elv 1.478 ± 0.32 vs 1.765 ± 0.42, p=0.04), with unchanged Ea/Elv (0.74 ± 0.09 vs 0.76 ± 0.1). PWV, CCA diameter, systolic FV and QIMT did not change, while diastolic and mean FV significantly increased (p<0.05: FVd from 25 ± 4 to 29 ± 4 cm/s, FVm from 42 ± 8 to 52 ± 11 cm/s). Pulsatility index [PI = (peak systolic velocity-diastolic velocity)/Mean velocity] decreased from 2.3 ± 0.3 to 1.9 ± 0.2, p<0.02). Applanation tonometry showed no significant changes for Augmentation Index (Aix) and time to WR, while PPI (Pulse Pressure Index: PP/MBP) decreased from 0.55 ± 0.14 to 0.45 ± 0.09, p<0.05).

Conclusions: after prolonged HDTBR, a reduction in LV pump function is observed with unchanged VA coupling. No significant changes are found in intrinsic arterial stiffness, CCA remodelling and WR, while changes in arterial dynamics indicate a reduction in the pulsatile component and an increase in the steady component of BP, possibly associated with reduced circulating volume and increased peripheral vasodilation.

PP.31.219 DIFFERENTIAL EFFECT OF COCOA DRINKS WITH LOW AND HIGH THEOBROMINE DOSE ON PERIPHERAL AND CENTRAL BLOOD PRESSURE: A DOUBLE BLIND PLACEBO CONTROLLED RANDOMISED CROSS-OVER TRIAL

B. van den Bogaard¹, R. Draijer², G.A. van Montfrans¹, B.J.H. van den Born¹. ¹Academic Medical Center, Amsterdam, The Netherlands, ²Unilever Research and Development, Vlaardingen, The Netherlands

Background: Flavonoid containing cocoa products may have a BP lowering effect. It has been suggested that theobromine, due to its vasodilatory properties, could add to this effect. We tested whether flavonoid-rich cocoa drinks low or high in theobromine could lower peripheral and central BP.

Methods: In a double-blind placebo-controlled cross-over trial we assigned 42 healthy individuals (32 males, age 62 ± 4.5 yrs) with low CVD risk and office BP of 130-159/85-99 mmHg to a random treatment sequence of acidified-milk drinks containing (1) placebo, (2) cocoa powder with 500 mg flavonoids and low dose (115 mg) theobromine (LDTC) or (3) cocoa powder with 500 mg flavonoids and high dose (1000 mg) theobromine (HDTC). Treatment duration was three weeks with two weeks wash-out. Measurements were done at baseline and after each treatment period. The primary outcome was 24-hour ambulatory BP. Secondary outcome was central BP two hours after consumption of the test product. Outcomes were analysed using linear mixed models with correction for baseline measurements.

Results: Treatment with placebo, LDTC and HDTC resulted in a mean 24-hour systolic and diastolic BP (±SE) of 123.9 (1.0)/ 76.4 (0.6), 125.4 (1.0)/ 77.7 (0.6) and 127.2 (1.0)/ 77.8 (0.6) mmHg, respectively (p=0.02/p=0.06), while central BP was 128.6 (1.5)/ 82.7 (0.9), 129.5 (1.5)/ 82.8(0.9) and 124.3 (1.5)/ 81.6 (0.9) mmHg (p=0.001/p=0.26).

Conclusions: Treatment of flavonoid-rich cocoa drinks high in theobromine increased 24-hour ambulatory systolic BP, but lowered central systolic BP compared to placebo. There were no differences in peripheral or central systolic and diastolic BP between the cocoa drink low in theobromine and placebo.

PP.31.220 INTIMA-MEDIA THICKNESS (IMT) AND RF-BASED QUALITY INTIMA-MEDIA THICKNESS (RFQIMT) MEASUREMENTS IN A SAMPLE OF PATIENTS ATTENDING AN OUTPATIENT HYPERTENSION CENTRE

G. Germanò¹, O. Martinelli², A. Caparra¹, L. Valente¹, R. Gabrielli², L. Iacè². ¹Dipartimento Scienze Invecchiamento Sapienza Rome University, Rome,

Italy, ²Dipartimento E-U Chirurgia Vascolare Sapienza Rome University, Rome, Italy

Introduction: The RFQIMT (Esaote-Italy) is a method of new generation for real-time measurement of intima-media thickness of the supra-aortic trunks. It is based on the direct radio-frequency analysis of the signal that allows to obtain data at high spatial resolution and thus improve the standard of a measure which has proved as surrogate marker of cardiovascular disease. The absolute values of IMT, indicated as standard ones by current literature and measured by the method recommended by the guidelines of the Italian Society of Vascular Diagnostics (accepted as European Guidelines) do not take into account of independent variables such as age, sex and race that may influence the correlation of this index at any level of vascular and cardiac damage. The aim of our study was to compare the values of intima-media thickness measured by the above method compared to those obtained by the method of radio-frequency taking into account the variables mentioned above.

Materials and Methods: We submitted 250 patients examined in succession in our hypertension centre to measure the intima-media thickness with conventional method (3 measurements at the level of common carotid artery, 1 cm from the carotid bifurcation) and RFQIMT. Patients had a mean age of 52.5 ± 22.5 , 118 were males and 132 females, and all Caucasians. Patients had the following comorbidities: 210 patients were hypertensive patients, 126 dyslipidemic, 87 patients with diabetes, 14 patients with CAD, 72 patients with carotid plaques and 93 patients smokers.

Results: 123 patients had RFQIMT above the normal values and IMT among limits, 56 had normal both RFQIMT and IMT and 71 had both RFQIMT and IMT above the normal values.

Conclusions: When we take into account the value of RFQIMT compared to IMT, the index of cardiovascular risk linked to intima-media thickness increased significantly in more patients: 123 with RFQIMT increased compared with 71 with IMT increased. This preliminar evidence changes the correlations with the co-morbidity and makes the measure that uses radio-frequency more accurate and reliable.

PP.31.221 PERIPHERAL AND CENTRAL PULSE PRESSURE ARE EQUALLY STRONG DETERMINANTS OF INTERMEDIATE CARDIOVASCULAR PHENOTYPES AND TARGET ORGAN DAMAGE

U. Neisius, C. Taurino, S. Padmanabhan, C. Delles, A.F. Dominiczak. University of Glasgow, Glasgow, United Kingdom

Objective: Blood pressure is an important determinant of intermediate cardiovascular phenotypes and end organ damage. Large arteries and the heart are exposed to central blood pressure. It has therefore been proposed that central blood pressure is a more powerful predictor of carotid intima-media thickness (cIMT), aortic pulse wave velocity (aPWV) and left ventricular mass (LVM). We compared predictive values of peripheral (pPP) and central pulse pressure (cPP) for cIMT, aPWV and LVM in a cohort of normotensive and hypertensive subjects.

Design and Method: Subjects from the greater Glasgow area were invited to participate in a study into the genetics of hypertension as part of the InGenious HyperCare Network of Excellence. Here we report on cardiovascular phenotypes in 182 subjects (age 43 ± 16 years; 105 with hypertension). cIMT was assessed by vascular ultrasound, LVM by echocardiography (Teichholz formula) and aPWV using the SphygmoCor device. cPP was derived using radial applanation tonometry (SphygmoCor) from brachial blood pressure.

Results: cIMT (0.65 ± 0.14 vs 0.55 ± 0.09 mm), LVM (99 ± 29 vs 85 ± 20 g) and aPWV (8.7 ± 2.1 vs 6.7 ± 1.4 m/s) were greater (all $P < 0.001$) in hypertensive compared to normotensive subjects. pPP (60 ± 19 vs 50 ± 10 mmHg) and cPP (49 ± 20 vs 37 ± 9 mmHg) were also greater ($P < 0.001$) in hypertensive subjects and strongly correlated with each other ($r = 0.926$, $P < 0.001$). In linear regression analysis including age and body surface area (BSA) there were no differences in predictive power between models containing pPP or cPP (Table).

	cIMT		LVM		aPWV	
	β	P-value	β	P-value	β	P-value
	$R^2_{adj} = 0.522$		$R^2_{adj} = 0.447$		$R^2_{adj} = 0.654$	
Age	0.625	<0.001	0.256	<0.001	0.652	<0.001
BSA	0.159	0.007	0.548	<0.001	0.091	0.116
pPP	0.175	0.007	0.202	0.004	0.298	<0.001
	$R^2_{adj} = 0.533$		$R^2_{adj} = 0.458$		$R^2_{adj} = 0.630$	
Age	0.584	<0.001	0.191	0.011	0.605	<0.001
BSA	0.165	0.005	0.563	<0.001	0.128	0.033
cPP	0.214	0.002	0.264	0.001	0.287	<0.001

Conclusions: cPP when derived from pPP using pulse wave analysis is not superior to pPP as determinant of cIMT, LVM and aPWV. For studies into the predictors of intermediate cardiovascular phenotypes and end organ damage, assessment of central haemodynamic parameters offers no advantage over brachial blood pressure.

PP.31.222 EVOLUTION OF PULSE WAVE VELOCITY IN HYPERTENSIVE PATIENTS AFTER ONE YEAR OF PHARMACOLOGICAL TREATMENT

E. Rodilla Sala, J.A. Costa Muñoz, F. Pérez Lahiguera, J. Cardona, J.M. Pascual Izuel. Hospital de Sagunto, Medicina Interna, Unidad de Hipertensión, Sagunto, Spain

Objectives: To study the influence of antihypertensive treatment on pulse wave velocity (PWV) in hypertensive patients after one year of pharmacological treatment, also looking for possible differences among pharmacological groups.

Design and Method: Longitudinal prospective cohort study in patients attended at the Hypertension Unit of our hospital from October 2007 until September 2009. All consecutive hypertensive patients without previous treatment were included in the study. Laboratory analysis, clinical and ambulatory blood pressure measurements, echocardiography and applanation tonometry were performed at the initial visit and 12 months later.

Results: We included a total of 78 (51.3 % men) newly diagnosed, hypertensive patients without previous pharmacological treatment (median age 50.9 years). Initial office systolic blood pressure (SBP) was 145 mmHg and mean office diastolic blood pressure (DBP) was 85 mmHg. Initial mean PWV was 8.9 (1.9) m/s. The final visit took place after a median of 1.15 years, reduction of SBP was 17.3, reduction of DBP was 8.8 mmHg, PWV after one year was reduced to 8.1 (1.6) m/s. Multivariate linear regression, adjusted by age and gender, showed a significant relationship between reduction of PWV and reduction of SBP ($p < 0.001$) as well as DBP ($p < 0.002$). Defining a significant change of PWV as a difference between initial and final PWV greater than 1 m/s, and a significant change of SBP and DBP as greater than 10 mmHg, the multivariate logistic regression, adjusted by age and gender, confirmed the significant relationship between PWV and blood pressure reduction. There were no significant differences in the evolution of PWV associated to the different pharmacological groups.

Conclusions: Pharmacological reduction of systolic and diastolic blood pressure leads to a significant reduction of pulse wave velocity after one year of follow up in newly diagnosed hypertensive patients, suggesting that at an early stage of the natural history of hypertension, arterial stiffness might be modified, independently of the choice of the pharmacological treatment.

PP.31.223 ABSTRACT MOVED TO PP.10.421 BIS - JUNE 19.

PP.31.224 ARTERIAL STIFFNESS IN HYPERTENSIVES IN RELATION TO THE EXPRESSION OF ANGIOPOIETIN 1 AND 2 GENES IN PERIPHERAL MONOCYTES

M. Marketou¹, J. Kontaraki¹, N. Tsakountakis², E. Zacharis¹, G. Kochiadakis¹, D. Arfanakis¹, G. Chlouverakis³, P. Vardas¹. ¹Heraklion University Hospital, Heraklion, Greece, ²Kastelli Health Center, Heraklion, Greece, ³University of Crete, School of Medicine, Heraklion, Greece

Objectives: Angiopoietins (Ang) are important angiogenic and endothelial cell growth factors with many functions, including influence on the vascular wall. Pulse wave velocity (pwv) is an independent marker of cardiovascular adverse outcome in hypertensives, although all the pathophysiological mechanisms that affect it have not yet been determined. We investigated the relationship between arterial stiffness and Ang1 and Ang2 gene expression in the peripheral blood monocytes of hypertensive patients.

Methods: We studied 53 patients who had untreated grade 1 or grade 2 essential hypertension and no indications of other organic heart disease. Carotid - femoral (c-f) and carotid - radial (c-r) artery waveforms were measured and pwv was determined. The monocytes were isolated using anti-CD14+ antibodies, and mRNAs were estimated by real-time quantitative reverse transcription-PCR.

Results: Systolic blood pressure (BP) on 24-h ambulatory monitoring showed the strongest relation ($r = 0.778$, $p < 0.001$ and $r = 0.758$, $p < 0.001$ for c-f pwv and c-r pwv, respectively). Additionally, diastolic BP ($r = 0.451$, $p = 0.004$

and $r=0.390$, $p=0.001$, respectively) and mean BP ($r=0.581$, $p<0.001$ and $r=0.524$, $p<0.001$, respectively) revealed a positive correlation. Of the other clinical parameters, ejection fraction showed a moderate negative association ($r=0.395$, $p=0.003$ and $r=0.335$, $p=0.014$, respectively) and left ventricular mass index had a moderate positive correlation ($r=0.427$, $p=0.001$ and $r=0.363$, $p=0.007$, respectively). Ang1 gene expression was strongly correlated with both c-f pwv ($r=0.952$, $p<0.001$) and c-r pwv ($r=0.898$, $p<0.001$). Similarly, Ang2 gene expression was significantly correlated with both c-f pwv ($r=0.471$, $p=0.002$) and c-r pwv ($r=0.437$, $p=0.003$).

Conclusion: Our data provide important evidence that Ang 1 and 2 gene expression levels in peripheral monocytes are closely related with pwv in patients with essential hypertension. This positive correlation may suggest a link between angiogenesis and arterial stiffness in those patients.

PP.31.225 ACUTE CHANGES OF ARTERIAL STIFFNESS INDEXES WITH SALT OVERLOAD

F. Margulis, R. Sabbatiello. *Hospital Argerich - Servicio de Nefrología y Trasplante Renal, Buenos Aires, Argentina*

Introduction and Objective: Ambulatory arterial stiffness index (AASI) is a novel measure of large arterial stiffness, and digital volume pressure (DVP), measured by using photoplethysmography let us measure the shape of peripheral artery pressure waves also influenced by arterial stiffness.

The aim of our study was to evaluate the changes of different arterial stiffness indexes induced by salt overload, in salt sensitivity (SS) and salt resistant (SR) healthy people.

Patients and Methods: Data from 17 living kidney donors were included in the present analyses. The subjects were placed on a low-salt diet during 7 days and on a high-salt diet during the following 7 days. On the last day of both periods, arterial stiffness measurement was performed using a photoplethysmograph (Micro Medical, UK). 24-hour ambulatory blood pressure monitoring (ABPM) was performed in both periods with an automated, noninvasive device. We evaluated stiffness index (SI) and reflection index (RI) from DVP and AASI and PP24 from ABPM.

Results: There were 13 women and 4 men with a mean age of 48 ± 10 years (range 27 to 67 years). 47% were SS, with a mean age of 51.3 ± 11 years vs 45.6 ± 10 years in SR ($p=0.16$).

SR people did not shown significant changes between low and high salt diet in AASI: 0.34 ($0.32-0.43$) vs 0.33 ($0.29-0.39$) and PP24: 36.1 ($35-44.2$) vs 38.8 ($36.7-41.4$); but they showed significant changes in SI: 10.3 ± 2 vs 8 ± 2 ($p<0.02$) and RI: 70 ± 11 vs 64 ± 12 ($p<0.05$).

SS people did not show significant changes between low and high salt diet in none of the four indexes AASI: 0.37 ± 0.30 vs 0.53 ± 0.23 ; PP24: 38.8 ± 8 vs 44.3 ± 12 ; SI: 8.4 ± 2 vs 8.1 ± 1 ; RI: 64 ± 10 vs 59 ± 12 .

Conclusion: We did not observe significant changes in AASI and PP24 with salt overload in none of the two groups, DVP showed significant changes in SI and RI in salt resistant but we did not observe it in salt sensitivity healthy people.

PP.31.226 EVOLUTION OF ARTERIAL STIFFNESS AFTER KIDNEY TRANSPLANTATION IN PATIENTS WITH END-STAGE RENAL DISEASE

C. Bachelet-Rousseau¹, L. Frimat¹, A. Kearney-Schwartz^{2,3}, M. Kessler¹, A. Benetos^{2,3,4}. ¹Nephrology-Brabois Hospital-University of Nancy, Nancy, France, ²Clinical Investigations Center-J d Arc Hospital-University of Nancy, Nancy, France, ³Geriatrics-Brabois Hospital-University of Nancy, Nancy, France, ⁴INSERM U961-University of Nancy, Nancy, France

Background: Increased arterial stiffness (AS) is a major determinant of cardiovascular complications in end-stage renal disease (ESRD) patients. Little is known about AS evolution after renal transplantation. The aim of the study was to characterize the evolution of AS after renal transplantation in a population of ESRD patients, in comparison to those patients remaining in dialysis.

Material and methods: One hundred patients were recruited from the waiting list of the Transplant Service of the CHU of Nancy. Two vascular evaluations were performed at one-year interval. AS was assessed by carotid/femoral pulse wave velocity (PWV). During this interval, thirty-nine patients were transplanted and forty-nine remained in dialysis.

Results: At baseline PWV value was 10.6 ± 3.7 m/s. No difference between the two groups was found in the first and the second visit. Mean arterial pressure (MAP) decreased in transplanted group (101 ± 14 vs. 95 ± 10 mmHg, $p<0.01$ respectively) at one-year follow up. Multivariate analysis showed that PWV changes depend by changes in MAP and baseline PWV.

Conclusion: Although no difference in the one-year PWV evolution was found, the lower MAP value in the transplanted group could result to a better long term evolution of arterial stiffness in this group, leading to a better cardiovascular prognosis after renal transplantation.

PP.31.227 CAROTID-RADIAL ARTERY TRANSFER FUNCTION IN THE SEATED POSITION: THEORETICAL BASIS OF THE ESTIMATION OF SEATED CENTRAL BLOOD PRESSURE USING TWO COMMERCIALLY AVAILABLE METHODS

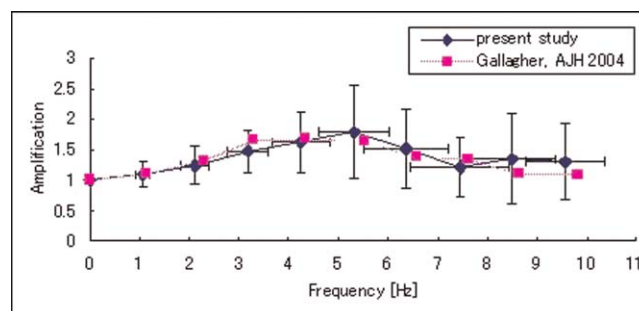
K. Hirata¹, K. Iwao², M. Yamazaki², Y. Miyawaki², S. Momomura¹. ¹Jichi Medical University, Saitama Medical Center, Saitama, Japan, ²Omron Healthcare, Kyoto, Japan

Background: Central blood pressure (BP), estimated using generalized (G) transfer function (TF) has been highlighted as a strong predictor for cardiovascular disease. However, the measurements are restricted to supine central BP because GTF was obtained from supine studies. There have been no practical methods to estimate seated central BP noninvasively, whereas hypertension is defined by seated BP. Theoretically, TF might not be influenced by postural change, suggesting the possibility of accurate estimation of seated central BP with GTF and with a newly developed method using late systolic shoulder in the radial pressure waveform (SBP2).

Methods: In 66 patients with cardiovascular disease (64.3 ± 10.1 y.o), seated central SBP was estimated using GTF (G) and SBP2 method (S). Both values were compared with that from carotid pressure waveforms calibrated by radial mean and diastolic BP (reference method R). Seated carotid-radial artery TF was calculated with Fourier transform. All measurements were performed in the seated position, keeping the wrist at the level of the heart.

Results: Estimated central SBPs were almost identical among three methods (S: 127.5 ± 17.6 mmHg, G: 126.2 ± 16.5 mmHg, R: 128.3 ± 17.1 mmHg). There were close correlations (G vs. R: $r=0.992$, S vs. R: $r=0.988$, G vs. S: $r=0.990$, all $p<0.0001$), which met AAMI SP10 criteria (SD of difference = 2.7 mmHg, 2.2 mmHg, 2.7 mmHg, respectively). Averaged TF was very similar with that in the supine position (Figure).

Conclusions: The present study provided an essential basis for estimating seated central BP with GTF and SBP2 method. The measurements will promise a great contribution to the progress in hypertension research and practice.



PP.31.228 RELATIONSHIP BETWEEN ARTERIAL STIFFNESS AND DIASTOLIC FUNCTION IN POST-MENOPAUSAL WOMEN

R.M. Bruno¹, M.T. Caputo¹, L. Landini¹, A. Bruschi¹, L. Ghiadoni¹, B. Cappagli², M. Gambacciani², A. R. Gennazzani², S. Taddei¹. ¹University of Pisa, Department of Internal Medicine, Pisa, Italy, ²University of Pisa, Department of Obstetrics and Gynecology, Pisa, Italy

Objective: Cardiovascular risk in post-menopausal women is related not only to the prevalence of traditional risk factors but also to the incidence of alterations in cardiovascular function and structure. Arterial stiffness can represent a mechanism involved in development of cardiac alterations. The

aim of this study is to evaluate the relationship between arterial stiffness and left ventricular diastolic function in a group of post-menopausal women entering the prevention program "Woman and Heart".

Design and Methods: In 149 women with no previous cardiovascular events (age 56 ± 6 years, blood pressure-BP $129 \pm 17/76 \pm 9$ mmHg, 38% hypertensives, 30% smokers, 27% hypercholesterolemic, 20% obese, 8% with impaired glucose tolerance or diabetes), carotid-femoral pulse wave velocity (PWV) was measured by applanation tonometry (Sphygmocor, Atcor Medical). Moreover, a trans-thoracic echocardiographic study was carried out to measure mitral inflow pattern, left ventricular mass index (LVMI) and relative wall thickness (RWT).

Results: In the total population, carotid-femoral PWV was 7.2 ± 1.3 m/s. Left ventricular hypertrophy (LVMI >51 g/m^{2.7}) was found in 30% of the population, RWT was >0.42 in 12%, while impaired left ventricular relaxation (E/A ratio <0.8 , deceleration time >200 ms) was found in 24%. An increased PWV was associated with the presence of impaired left ventricular relaxation (PWV 7.72 vs 7.15 m/s, $p<0.01$), but not with left ventricular hypertrophy or concentric remodeling. The only risk factors associated with increased PWV were age, hypertension and altered glucose tolerance. Logistic regression analysis, adjusted for these 3 risk factors, showed that a PWV greater than the median value of 7.1 m/sec was associated with a 2.9-fold greater risk (confidence limits 5–95% 1.11–7.79) of having impaired left ventricular relaxation.

Conclusions: In a post-menopausal female population, evaluated in a primary prevention setting, carotid to femoral PWV is associated to mild diastolic dysfunction even after correction for the most important confounders. These data suggest that an increased aortic stiffness could contribute to left ventricular diastolic dysfunction and possibly to diastolic heart failure in post-menopausal women.

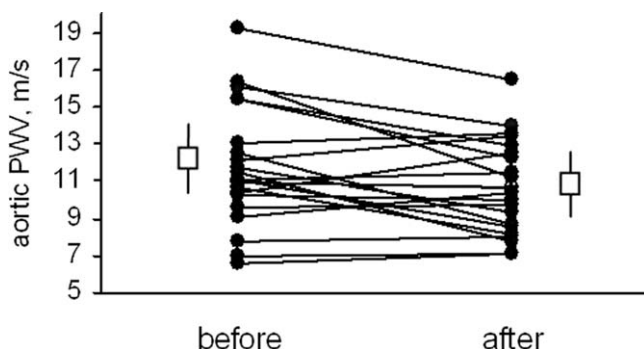
PP.31.229 AORTIC STIFFNESS IS INCREASED IN POLYMYALGIA RHEUMATICA, AND IMPROVES AFTER STEROID TREATMENT

G. Schillaci, G. Pucci, R. Hijazi, L. Settini, M.R. Mannarino, M. Pirro, E. Mannarino. *University of Perugia, Department of Clinical and Experimental Medicine, Perugia, Italy*

Background: Increased arterial stiffness and cardiovascular risk have been observed in diseases inflammatory diseases. Polymyalgia rheumatica (PMR) is a disease which affects primarily the elderly and exhibits evidence of a systemic inflammatory response, but little is known about aortic involvement in PMR. We investigated whether aortic stiffness, an early marker of arteriosclerosis, is increased in PMR, and whether it improves after steroid treatment.

Methods: Thirty-one patients with PMR (age 71 ± 8 years, men 45%, blood pressure $132/74 \pm 14/8$ mmHg) and 31 age-, sex- and blood pressure-matched control subjects underwent aortic pulse wave velocity (PWV) determination with an applanation tonometry device (Sphygmocor). Twenty-one of the PMR patients were reexamined after 4-week treatment with prednisone (starting dose, 12.5–50 mg/day).

Results: Aortic PWV was significantly higher in PMR patients than in control subjects (12.5 ± 3 vs 10.5 ± 2 m/s, $p=0.002$). Treatment was followed by a reduction in heart rate (from 79 ± 13 to 71 ± 10 bpm, $p<0.001$), and no significant change in BP (from $132/75 \pm 13/8$ to $134/75 \pm 15/9$ mmHg, both $p=n.s.$). As shown in the Figure, aortic PWV decreased significantly after steroid treatment (from 11.8 ± 3 to 10.6 ± 3 m/s, $p<0.05$), and the difference was independent from changes in blood pressure and heart rate.



Conclusions: Polymyalgia rheumatica is associated with increased aortic stiffness, which may improve upon reduction of systemic inflammation determined by treatment with corticosteroids.

PP.31.230 ISOLATED SYSTOLIC HYPERTENSION IS ASSOCIATED WITH A GREATER PROXIMAL AORTIC DIAMETER

S. Hickson¹, E. Mousseaux², L. Tomlinson¹, V. Selvarajah¹, M. Graves¹, I.B. Wilkinson¹, C.M. McEniery¹. ¹University of Cambridge, Cambridge, United Kingdom, ²University of Paris - Descartes, Paris, France

Background: It has been suggested that isolated systolic hypertension (ISH) may result from a smaller proximal aortic diameter. However, the available data are conflicting, no doubt because of different techniques and sites of measurement. We compared maximum (systolic) diameter, minimum (diastolic) diameter, and aortic distensibility at various levels along the thoracic aortic arch, between normotensive subjects and those with isolated systolic hypertension (ISH), using MRI.

Design and Method: 26 healthy subjects aged ≥ 60 years, free of cardiovascular disease and medication were recruited from the ACCT Study. A Fiesta sequence (1.5T scanner, GE) was then performed in all subjects at 5 aortic levels: 1 cm above the aortic valve (L1), proximal to the innominate artery (L2), distal to the left subclavian artery (L3), the descending aorta (L4) and at the level of the diaphragm (L5). Maximum systolic diameter and minimum diastolic diameter were determined at each level using ARTFUN software.

Results: Subject were divided into those with a normal blood pressure ($<140/90$ mmHg) and those with ISH (systolic >140 mmHg, diastolic <90 mmHg), and were matched for age. Average systolic and diastolic aortic diameters for L1 to L4 were greater in subjects with ISH (Table 1). Aortic distensibility was greater at all aortic levels in normotensive subjects compared to those with ISH (L1: 0.9 ± 0.6 vs 0.5 ± 0.3 ; L2: 1.5 ± 1.1 vs 0.7 ± 0.6 ; L3: 1.8 ± 0.7 vs 0.9 ± 0.3 ; L4: 3.5 ± 1.5 vs 2.0 ± 0.8 ; L5: 2.1 ± 0.8 vs 1.4 ± 0.8 , units = $10^{-3} \times \text{mmHg}^{-1}$, $P < 0.01$ for all).

Conclusions: Both systolic and diastolic proximal aortic diameters are greater in subjects with ISH compared to normotensive subjects, whereas distensibility is reduced.

Aortic Level	Systolic Diameter (cm) Normotensive	Systolic Diameter (cm) ISH	P	Diastolic Diameter (cm) Normotensive	Diastolic Diameter (cm) ISH	P
L1	3.1 ± 0.3	3.5 ± 0.4	0.016*	2.9 ± 0.3	3.4 ± 0.4	0.011*
L2	3.0 ± 0.2	3.3 ± 0.4	0.006*	2.8 ± 0.3	3.2 ± 0.4	0.004*
L3	2.5 ± 0.1	2.9 ± 0.4	0.002*	2.3 ± 0.2	2.8 ± 0.4	0.001*
L4	2.3 ± 0.2	2.7 ± 0.3	0.002*	2.2 ± 0.2	2.6 ± 0.3	0.001*
L5	2.3 ± 0.2	2.4 ± 0.3	0.127	2.1 ± 0.2	2.3 ± 0.3	0.163

PP.31.231 SURROGATE MARKERS OF ATHEROSCLEROSIS IN HYPERTENSIVES: INTIMA-MEDIA THICKNESS (IMT), RF-QUALITY INTIMA-MEDIA THICKNESS (RFQIMT) AND RF-QUALITY ARTERIAL STIFFNESS (RFQAS)

O. Martinelli¹, A. Caparra², L. Valente², E. Mandilakis², L. Irace¹, G. Germano². ¹Dipartimento E-U Chirurgia Vascolare Sapienza Rome University, Rome, Italy, ²Dipartimento Scienze Invecchiamento Sapienza Rome University, Rome, Italy

Background: Since surrogate markers of atherosclerosis are familiar to the physician for the assessment of asymptomatic phase of cardiovascular diseases (CVs), the question arises if the regression or protection from CVs obtained by modification of such markers may be preferable to risk factors control. This is imperative in many subjects not having an abnormal cardiovascular risk factor profile and, for instance, genetic predisposition or old age. Increased carotid Intima-Media thickness and arterial stiffness are important parameters for the assessment of vascular target organ damage. Both as RFQIMT and RFQAS can be now measured with accuracy by ultrasonography and radio-frequency technology (ESAOTE-Italy). The aim of this study was to assess the value of IMT determined by conventional method and of RFQAS and RFQIMT as markers of early organ damage in hypertensive untreated patients.

Methods: 60 hypertensive patients (32 females and 28 males – age ranging from 30 to 80 years) were included. IMT was measured according to the Mannheim protocol, RFQIMT and RFQAS by the aforementioned methodology.

Results: Thirty six patients (60%) showed a pathological RFQIMT, an altered RFQAS was found in 26 cases (43%), and an abnormal IMT was registered in 16 (26.5%).

Conclusions: The study suggests that high blood pressures were more significantly correlated with carotid RFQIMT than RFQAS and conventional IMT. The difference among RFQAS and IMT in comparison to RFQIMT, better correlated, may reside in the automatically measured last parameter corrected with age and gender.

PP.31.232 INFLUENCE COLCHICINE ON CONTRACTILE REACTIONS OF PULMONARY ARTERY

T. Zaytseva, L. Kapilevich, A. Nosarev, E. Dyakova. *Siberian State Medical University, Tomsk, Russia*

The purpose of this work was to investigate role of microfilament and microtubul for regulation of contractile reactions using guinea pig arterial vascular smooth muscle. Contractile reactions of isolated segments of pulmonary artery have been investigated by means of a mechanographic method. For modulation of cytoskeleton is used colchicine (10 mkM, time of influence 90 min). The amplitude of contractile responses of smooth muscle segments was calculated as a percentage of the amplitude of the control hyperpotassium reduction (40 mM). In the first series of experiments investigated the influence of the disintegration of the cytoskeleton by colchicine pre-treatment on hyperpotassium reduction. Found that all the segments meet the reduction of such impacts, but in some segments of the observed decrease in the amplitude reduction of $15.7 \pm 6.3\%$, in another part of the reduction in segment increased by $36.4 \pm 4.3\%$ compared with control. In the second series of experiments was to study the participation of the cytoskeleton in contractile responses of segments of pulmonary arteries, developing in response to the addition of phenylephrine (0.01 mM). The magnitude of the contractile response to the action of substance to pre-treatment with colchicine was taken as 100%. After pre-treatment with colchicine to reduce the amplitude of phenylephrine decreased to $41.7 \pm 15.7\%$. Thus the participation of the cytoskeleton in the regulation of the contractile response may depend on the nature of the current factor, in one case, it potentiates the reduction in the other - weakens it.

PP.31.233 ANGIOTENSIN RECEPTOR ANTAGONISTS VERSUS CALCIUM ANTAGONISTS EFFECT ON PERIPHERAL / CENTRAL BLOOD PRESSURE AND ARTERIAL STIFFNESS OF HYPERTENSIVE PATIENTS

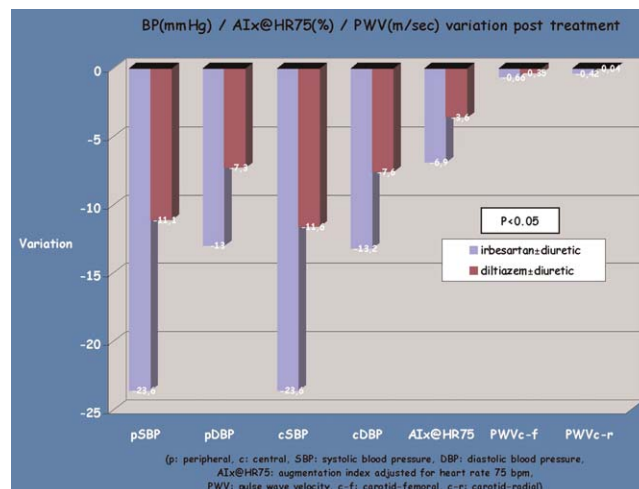
C. Liakos¹, G. Vyssoulis¹, A. Michaelides¹, E. Chatzistamatiou¹, C. Vlachopoulos¹, K. Tsifoulis¹, D. Tousoulis¹, M. Markou², K. Siama¹, C. Stefanadis¹. ¹1st University Department of Cardiology, Athens Medical School, Hippokraton Hospital, Athens, Greece, ²1st Department of Internal Medicine, 417 VA Hospital (NIMTS), Athens, Greece

Objective: Arterial hypertension is strongly and bidirectionally related to arterial stiffness. Both are recognized as major, independent cardiovascular risk factors. The purpose of this study was to comparably evaluate the effect of angiotensin receptor antagonists versus that of calcium antagonists on blood pressure (peripheral / central) and arterial stiffness of hypertensive patients.

Design and Method: This was a cross-sectional study of 47 patients with essential, uncomplicated, untreated or never treated, stage 1 or 2, arterial hypertension (mean age: 46.9 years, 32 males, office peripheral blood pressure: 145/92 mmHg). From all, 33 were treated with irbesartan ± diuretic, while the rest 14 patients with diltiazem ± diuretic. Arterial stiffness was evaluated with non-invasive measurements of: 1. Central (aortic) systolic/diastolic pressure (with the use of sphygmocor® device), 2. Augmentation index (AIx@HR75) of the aortic pressure adjusted for heart rate 75bpm (with the use of sphygmocor® device), 3. Carotid-femoral (c-f) and carotid-radial (c-r) Pulse Wave Velocity (PWV) (with the use of Complior® device). Measurements were taken before and 8 months after treatment.

Results (see image): Treatment with irbesartan induced a significantly ($p < 0.05$) greater reduction in peripheral blood pressure (from $147 \pm 14 / 93 \pm 11$ to $123 \pm 10 / 80 \pm 8$ mmHg) and central blood pressure (from $135 \pm 15 / 94 \pm 11$ to $111 \pm 10 / 81 \pm 8$ mmHg) versus diltiazem (from $139 \pm 7 / 91 \pm 6$ to $128 \pm 9 / 83 \pm 6$ mmHg for peripheral pressure and from $127 \pm 7 / 92 \pm 6$ to $116 \pm 10 / 85 \pm 6$ mmHg for central pressure respectively). Furthermore, irbesartan improved to a significant degree ($p < 0.05$) AIx@HR75 (from 23.6 ± 13.0 to 16.7 ± 15.3 %), PWVc-f (from 7.38 ± 1.14 to 6.71 ± 1.05 m/sec) and PWVc-r (from 8.91 ± 1.27 to 8.49 ± 1.36 m/sec) while diltiazem didn't (from 23.3 ± 6.9 to 19.7 ± 9.8 % for AIx@HR75, from

7.38 ± 1.17 to 7.03 ± 0.54 m/sec for PWVc-f and from 8.85 ± 1.57 to 8.85 ± 1.00 m/sec for PWVc-r respectively, $p = \text{NS}$).



Conclusions: Irbesartan is superior to diltiazem in normalizing blood pressure (peripheral and central) and improving arterial stiffness. The effect of both drugs on central pressures is similar to that on peripheral pressures.

PP.31.234 PROSTATE SPECIFIC ANTIGEN LEVELS WITHIN NORMAL RANGE ARE ASSOCIATED WITH ARTERIAL STIFFNESS IN ESSENTIAL HYPERTENSIVE PATIENTS

G. Vyssoulis¹, E. Karpanou², S.M. Kyvelou¹, V. Tzamou¹, C. Vlachopoulos¹, C. Stefanadis¹. ¹1st Cardiology Clinic Athens University Hippokraton Hospital, Athens, Greece, ²1st Cardiology Clinic Onassis Cardiosurgery Center, Athens, Greece

Objective: Prostate specific antigen (PSA) is an established marker for prostate hypertrophy and cancer. PSA within normal limits reflects both gland hypertrophy and specific inflammation. The aim of the present study was to investigate whether PSA values, within normal levels, are associated with arterial stiffness independently of subclinical inflammation in patients with essential hypertension.

Design and Methods: The study comprised 150 consecutive male patients (mean age 60 years) with uncomplicated never-treated essential hypertension. All patients underwent a complete clinical and laboratory evaluation, including PSA levels. Aortic stiffness and arterial wave reflection assessment was made by using carotid femoral (PWVc-f) pulse wave velocity and aortic augmentation index corrected for heart rate (AIx75). Patients with prostate cancer or benign prostate hyperplasia (PSA > 4ng/ml) were excluded from the study.

Results: PSA levels were positively associated to PWVc-f ($r = 0.426$, $p < 0.001$), AIx75 ($r = 0.264$, $p = 0.001$) and hsCRP ($r = 0.376$, $p < 0.001$). When PSA values were grouped in quartiles, patients in the higher quartile presented with higher PWVc-f ($p < 0.00001$), AIx75 ($p < 0.001$) and hsCRP ($p < 0.001$) values. In multivariate analysis after adjustment for the factors affecting arterial stiffness, PSA remained significant determinant of PWVc-f values ($R^2 = 0.405$, $p < 0.001$), while hsCRP was non-significant ($p = 0.09$).

Conclusions: The present study points to an association of PSA levels to aortic stiffness in untreated essential hypertensive males. Potential causal relationships between PSA and arterial stiffness remain to be further explored.

PP.31.235 THE METHOD OF DISTANCE MEASUREMENT AND TORSO LENGTH INFLUENCES THE RELATIONSHIP OF PULSE WAVE VELOCITY TO CARDIOVASCULAR MORTALITY

A. Tislér¹, Z.S.K. Németh¹, P. Studinger¹, T.E.H. Othmane¹, J. Nemcsik², B.C.S. Fekete¹, G.Y. Deák¹, J. Egresits², M. Szathmáni¹, I. Kiss². ¹1st Department of Medicine Semmelweis University, Budapest, Hungary, ²Division of Angiology and Nephrology, St. Imre Teaching Hospital, Budapest, Hungary

Objective: The method of estimating the distance traveled by the pulse wave, used in the calculation of pulse wave velocity (PWV), is not standardized. Our objective was to assess whether different methods of distance

measurement influenced the association of PWV to cardiovascular mortality in hemodialysis patients.

Design and Methods: 98 chronic hemodialysis patients had their PWV measured using three methods for distance estimation; PWV1: sternal notch–femoral site minus sternal notch–carotid site, PWV2: carotid–femoral site, PWV3: carotid–femoral site minus sternal notch–carotid site. Carotid–femoral distance was used to approximate torso length. Patients were followed for a median of 30 (range 1–51) months and the association of PWV and cardiovascular mortality was assessed using survival analysis before and after stratification for torso length.

Results: The three methods resulted in significantly different PWV values (11.2 (3.3), 14.8 (4.2), 12.6 (3.7) m/s, respectively). During follow up 50 patients died (mortality rate 20.3/100 patient years), 32 of cardiovascular causes. In log-rank tests only PWV1 tertiles but not those of PWV2 or PWV3 were significantly related to outcome (p -values 0.017, 0.257, 0.138, respectively). In adjusted Cox proportional hazards regression only PWV1 was related to cardiovascular mortality (HR for 1m/s higher PWV 1.18[1.03–1.35], 1.10[0.99–1.21], 1.13[1.00–1.27], for the three PWVs respectively). In stratified analysis, however, among patients with below median torso length all three PWV values were related to outcome, while in patients with above median torso length neither PWV methods resulted in significant relationship to outcome.

Conclusion: PWV calculated using the sternal notch–femoral distance minus sternal notch–carotid distance provides the strongest relationship to cardiovascular mortality. Longer torso weakens the predictive value of PWV, possibly due to more tortuosity of the aorta hence more error introduced when using surface tape measurements.

PP.31.236 DIRECT RELATIONSHIP BETWEEN INCREASED MICROALBUMINURIA AND ARTERIAL STIFFNESS INDEX IN MODERATE HYPERTENSIVE PATIENTS

R. Cabrera Sole, S. Garcia Ruiz, S. Martinez Gonzalez, C. Turpin Lucas, M. Aguilera Saldana, J. Cañas Gonzalez. *Albacete University General Hospital, Albacete, Spain*

Purpose: Increased arterial stiffness is an independent predictor of CV morbidity and mortality. It has long been recognized that arterial stiffness is increased in patients with end-stage renal disease. However there are few data about microalbuminuria and arterial stiffness. A recently-proposed parameter called “ambulatory arterial stiffness index” (AASI) is among the simplest methods of evaluating arterial elasticity. We used this method to follow some patients (P) in this study to evaluate the relationship between 24 hours microalbuminuria (MCAB) and AASI.

Material and Methods: We studied 66 P with hypertension (HTA) and MCAB superior to 30 mg/24 hrs, who were divided into two groups: Group I: 36 P with MCAB between 30 to 50 mg/24 hrs and Group II: 30 P with more than 50 mg/24 hrs to compare with control Group III of 50 P with similar level of HTA but without MCAB. All of them were submitted to an ambulatory blood pressure measurement (ABPM) to evaluate AASI, pulse pressure (PP), and to a standard analysis including 24 hours microalbuminuria.

Results of both groups were compared and we found that systolic/diastolic blood pressure in Group I was $162 \pm 5/96 \pm 4$ mmHg compared with $161 \pm 7/94 \pm 6$ mmHg of Group II and $163 \pm 8/96 \pm 7$ of the group III ($p = 0.23$). AASI was in the Group I of $0.9 \pm 0.1^*$, in Group II of $0.65 \pm 0.23^*$ and in Group III 0.3 ± 0.3 (* means p value less than 0.05 with respect to the group III). PP was 58 ± 4 in Group I, 64 ± 5 in Group II and 53 ± 3 in Group III ($p = 0.001$ of group III respect to group II and 0.051 respect to Group I). All others parameters were similar in all groups and without significant differences.

Conclusions: in this study we have demonstrated that there is a direct relationship between increased MCAB and increased arterial stiffness enhancing cardiovascular risk. We have to take into account this situation when we treat P with MCAB because their risk is not only at renal levels but also at all organic level too.

Date of patients:

Date	Systolic blood pressure	Diastolic blood pressure	MCAB	AASI
HTA+MCAB < 30 mg/24 hrs	162 ± 5	96 ± 4	14 ± 6	0.3 ± 0.3
HTA+MCAB 30–50 mg/24 hrs	161 ± 7	94 ± 6	$39 \pm 7^{\circ}$	$0.65 \pm 0.23^{\circ}$
HTA+MCAB >50 mg/24 hrs	163 ± 8	96 ± 7	$61 \pm 5^{\circ}$	$0.9 \pm 0.1^{\circ}$

$^{\circ}$ means p value less than 0.05 respect to the other two groups.

PP.31.237 ASSOCIATION BETWEEN CAROTID ARTERY STIFFNESS ESTIMATED WITH E-TRACKING AND DIASTOLIC DYSFUNCTION ASSESSED WITH TDI IN 105 PATIENTS WITH MASKED HYPERTENSION

F. Natale, L. Aronne, A. Siciliano, G.M. Di Marco, E. Lo Priore, M. Cardaropoli, F. Martone, P. Calabrò, M.G. Russo, R. Calabrò. *Cardiology Department, Second University of Naples, Naples, Italy*

A normal blood pressure in the clinic or office but an elevated blood pressure out of the clinic is defined as masked hypertension. It may occurs in as many 10% of the general population.

Increased arterial stiffness directly increase end-diastolic left ventricular pressure and compromise myocardial relaxation properties.

Thanks to our study we can evaluate the role of carotid artery stiffness parameters on diastolic function in patients with masked hypertension.

Methods: Observing 105 consecutive patients with masked hypertension (proved by 24 H-ambulatory blood pressure monitoring), we have noticed that diastolic early (E') and late (A') velocities were recorded by pulse wave tissue.

Doppler imaging of the lateral mitral anulus in the apical 4- chamber view and carotid artery stiffness parameters were valued by e-tracking on the left carotid with ALOKA a 10 ultrasound system. Pulse wave velocity (PWV), elastic pressure (Ep) and stiffness parameter (B) were measured.

Results: Pwv (m/s) 8 ± 2 , Ep (Kpa) 134 ± 23 , B 12 ± 2 , normalized for age, were increased when compared with healthy subjects. Stiffness parameters correlate significantly with Tissue Doppler imaging diastolic parameters in particularly with E' pwv ($r = 0.68$, $p < 0.05$), Ep ($r = 0.60$, $p < 0.05$) and B ($r = 0.68$, $p < 0.01$).

Conclusion: patients with masked hypertension increased arterial stiffness and abnormal left ventricular diastolic function (particularly with E'), was associated with arterial stiffness, expression of a greater contribution of atrial contraction to left ventricular filling for increased left ventricular end-diastolic pressure due to an high afterload.

PP.31.238 NOCTURNAL BLOOD PRESSURE DECLINE CORRELATES WITH ARTERIAL STIFFNESS IN HYPERTENSIVE SUBJECTS

A. Hermida-Ameijeiras, J.E. Lopez-Paz, M. Pena-Seijo, G. Calvo-Gonzalez, M.L. Romero-Miguez, A. Pascual-Montes, V. Martinez-Duran, C. Calvo-Gomez. *Clinic Hospital, Hypertension Unit, Santiago de Compostela, Spain*

Background: It has been reported the relationship between increased target organ damage and non dipping nocturnal blood pressure. The evidence that increased arterial stiffness is associated with cardiovascular morbidity and mortality, has been supported by the European Society of Cardiology guidelines, to use, when possible as a further measure of cardiovascular risk.

The objective of the present study was to assess the relationship between nocturnal blood pressure decline and several arterial stiffness markers measured by applanation tonometry in those hypertensive subjects without treatment.

Methods: 23 subjects with essential hypertension were included, 45.8 ± 17.6 years old (56.6% male). BP was measured by ambulatory monitoring every 20 min between 07:00 am and 23:00 pm and every 30 min at night with a Spacelabs 90207 device. Right radial artery applanation tonometry was used to derive central systolic (c SBP) and diastolic BP (c DBP), central pulse pressure (cPP), augmentation pressure (AP) or the difference between the first and the second systolic peaks and finally augmentation index (AP/cPP ratio expressed as a percentage) normalized for a heart rate of 75 beats per minute (AIx75). Carotid-radial pulse wave velocity (PWV) was also measured as an index of aortic stiffness by using the At Cor Medical device (Sphygmo Cor Px®, Vx®, Sidney, Australia) wich uses a validated transfer function.

Results: 48-hour systolic/diastolic blood pressure were $138/88$ mmHg, nocturnal blood pressure falling of 18.4%. 71.4% of subjects were dipper; 14.4% very dipper and 14.3% non dipper. cSBP/cDBP was $134/90$ mmHg and cPP was 40 ± 17.3 mmHg. AP was 9.88 ± 9.26 mmHg and AIx75 was 20.57 ± 15.56 %. PWV was 8.47 m/sec ± 1.38 m/sec. Nocturnal blood pressure decline inversely correlates with AP ($r: -0.745$; $p < 0.001$) and AI ($r: -0.558$; $p: 0.02$).

Conclusions: Nocturnal blood pressure decline inversely correlates with AP and AI as arterial stiffness markers. It may be related to increased

cardiovascular morbidity and mortality in those non dipper hypertensive subjects.

PP.31.239 HEAVY ALCOHOL INTAKE COINCIDES WITH IMPAIRED ARTERIAL ELASTICITY IN HYPERTENSIVE IMMIGRANTS OF EASTERN EUROPEAN COUNTRIES

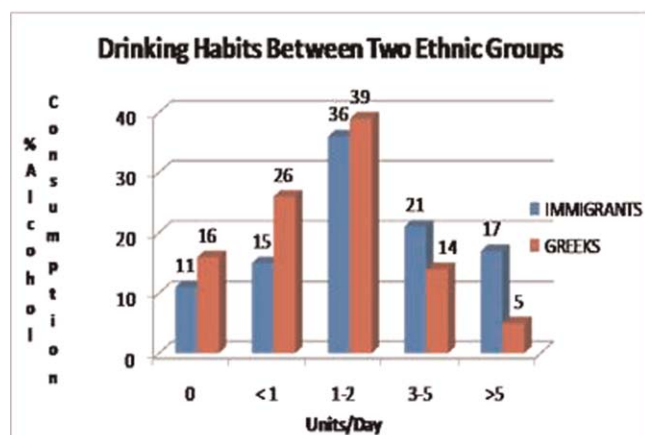
V. Katsi, I. Skiadas, G. Souretis, P. Theodoropoulos, D. Tsartsalis, C. Vlachopoulos, C. Antoniadis, C. Stefanadis, I. Kallikazaros. *Hippokratia Hospital - Department of Cardiology, Athens, Greece*

Objective: The association between excessive alcohol consumption and cardiovascular (CV) risk is robust. Arterial stiffness is an established downstream marker of CV risk. We investigated the differences regarding alcohol consumption and arterial stiffness between first generation Eastern European immigrants and native Greeks.

Design and Method: We studied 67 immigrants with newly diagnosed untreated stage I-II essential hypertension (EH), (aged = 51.5 ± 15 years, 35 male, office blood pressure (BP) = $158/92$ mm Hg) coming from Eastern Europe to Greece within the previous two years and 61 EH natives matched for age, gender and office BP. Arterial stiffness was evaluated on the basis of carotid-femoral pulse wave velocity (c-f PWV). Current alcohol intake was assessed by responding to a question on how many alcohol units they consumed during the day (0, <1, 1-2, 3-5 and >5 units/day).

Results: Hypertensive immigrants compared to natives exhibited significantly higher values of c-f PWV (8.4 ± 0.3 vs 7.1 ± 0.5 m/sec, $p = 0.003$). A significant greater proportion of immigrants reported excessive alcohol intake compared to natives (18% vs 5%, $p = 0.02$ - Image). In the immigrants group, c-f PWV was positively associated with alcohol intake ($r = 0.28$, $p = 0.004$).

Conclusion: Hypertensive immigrants in the setting of similar hemodynamic load are characterized by higher alcohol consumption and stiffer aorta compared to natives. This unfavourable BP profile may contribute to the disproportionate CV risk of this frail population.



PP.31.240 NOCTURNAL BLOOD PRESSURE DECLINE CORRELATES WITH ARTERIAL STIFFNESS IN HYPERTENSIVE SUBJECTS

A. Hermida-Ameijeiras, J.E. Lopez-Paz, M. Pena-Seijo, G. Calvo-Gonzalez, M.L. Romero-Miguez, V. Martinez-Duran, A. Pascual-Montes, C. Calvo-Gomez. *Clinic Hospital. Hypertension Unit, Santiago of Compostela, Spain*

Background: It has been reported the relationship between increased target organ damage and non dipping nocturnal blood pressure. The evidence that increased arterial stiffness is associated with cardiovascular morbidity and mortality, has been supported by the European Society of Cardiology guidelines, to use, when possible as a further measure of cardiovascular risk.

The objective of the present study was to assess the relationship between nocturnal blood pressure decline and several arterial stiffness markers measured by applanation tonometry in those hypertensive subjects without treatment.

Methods: 23 subjects with essential hypertension were included, 45.8 ± 17.6 years old (56.6% male). BP was measured by ambulatory monitor-

ing every 20 min between 07:00 am and 23:00 pm and every 30 min at night with a Spacelabs 90207 device. Right radial artery applanation tonometry was used to derive central systolic (c SBP) and diastolic BP (c DBP), central pulse pressure (cPP), augmentation pressure (AP) or the difference between the first and the second systolic peaks and finally augmentation index (AP/cPP ratio expressed as a percentage) normalized for a heart rate of 75 beats per minute (AIx75). Carotid-radial pulse wave velocity (PWV) was also measured as an index of aortic stiffness by using the At Cor Medical device (Sphygmo Cor Px®, Vx®, Sidney, Australia) which uses a validated transfer function.

Results: 48-hour systolic/diastolic blood pressure were $138/88$ mmHg, nocturnal blood pressure falling of 18.4%. 71.4% of subjects were dipper; 14.4% very dipper and 14.3% non dipper. cSBP/cDBP was $134/90$ mmHg and cPP was 40 ± 17.3 mmHg. AP was 9.88 ± 9.26 mmHg and AIx75 was $20.57\% \pm 15.56\%$. PWV was 8.47 m/sec ± 1.38 m/sec. Nocturnal blood pressure decline inversely correlates with AP ($r = -0.745$; $p < 0.001$) and AI ($r = -0.558$; $p = 0.02$).

Conclusions: Nocturnal blood pressure decline inversely correlates with AP and AI as arterial stiffness markers. It may be related to increased cardiovascular morbidity and mortality in those non dipper hypertensive subjects.

PP.31.241 VASCULAR REMODELING IN ADULTS AFTER COARCTATION REPAIR - IMPACT OF THE DESCENDING AORTA STENOSIS AND AGE AT THE SURGERY

L. Szczepaniak-Chichel¹, O. Trojnariska², K. Mizia-Stec³, M. Gabriel⁴, A. Bartczak², S. Grajek², Z. Gasior³, L. Kramer⁵, A. Tykarski¹. ¹Department of Hypertensiology, Angiology and Internal Medicine, Poznan University of Medical Sciences, Poznan, Poland, ²1st Department of Cardiology, Poznan University of Medical Sciences, Poznan, Poland, ³Department of Cardiology, Medical University of Silesia, Katowice, Poland, ⁴Department of General and Vascular Surgery, Poznan University of Medical Sciences, Poznan, Poland, ⁵Department of Computer Sciences and Statistics, Poznan University of Medical Sciences, Poznan, Poland

Background: Patients after successful repair of coarctation of aorta (CoA) are at risk of hypertension at rest and associated end-organ damage. The aim of the study was to assess arterial stiffness and function in adults after coarctation repair in relation to descending aorta (AoD) residual coarctation and patient's age at operation.

Methods: 85 patients after CoA repair (53 males) aged 34.6 ± 10.3 years; age at operation 0.9 ± 8.2 years. The control group: 30 individuals (18 males) at mean age 33.6 ± 8.2 years. The following central parameters: augmentation pressure (AP) and augmentation index (AI) as well as peripheral vascular parameters: flow mediated dilatation (FMD), nitroglycerine-mediated vasodilatation (NMD), intima-media thickness (IMT) and pulse wave velocity (PWV) were measured.

Results: 47 CoAo repaired patients were normotensive, and even though compared to control, they presented higher values of central parameters AP (7.3 ± 4.6 vs 4.4 ± 3.6 mmHg; $p = 0.002$) and AI (18.6 ± 10.4 vs 13.5 ± 4.3 ; $p = 0.03$); as well as the increased PWV (6.8 ± 1.2 vs 5.4 ± 0.9 m/s; $p = 0.003$), while IMT was comparable (0.053 ± 0.01 vs 0.051 ± 0.01 mm; $p = 0.06$). The vasodilatation was also impaired in the normotensive after CoAo repair patients: FMD (4.8 ± 2.8 vs 8.5 ± 2.3 ; $p = 0.00003$) and NMD (11.3 ± 4.6 vs 19.8 ± 7.2 ; $p = 0.00001$). The comparison of recoarctation (46/54%; gradient across AoD > 19.9 mmHg) to nonrecoarctation (39/46%) patients did not reveal any significant differences in resting systolic and diastolic pressures, as well as the values of AI and the peripheral vascular parameters; only value of AP was higher in the recoarctation patients (10.5 ± 6.9 vs 7.5 ± 4.1 ; $p = 0.02$) and correlated positively with the gradient across AoD ($r = 0.295$; $p = 0.01$). There was no significant linear correlation between age at the time of surgery and any of peripheral arterial parameters.

Conclusions: Residual stenosis in AoD does not affect the arterial vasodilatation nor stiffness in patients after CoAo repair. Early operation has no impact on peripheral vascular remodeling or central pressure which supports the claim that coarctation of the aorta is a systemic vascular disorder which leads to progressive vascular and end-organ damage despite early correction.

PP.31.242 THE INFLUENCE OF SERUM ENDOGENOUS SECRETORY ADVANCED GLYCATION END-PRODUCTS RECEPTOR ON ARTERIAL ELASTICITY IN PATIENTS WITH CORONARY ARTERY DISEASES

H. Wang, Y. Xi, X. Meng, N. Sun. *Dept. of Cardiology, People's Hospital, Peking University, Beijing, China*

Objective: To analyze the influence of serum endogenous secretory advanced glycation end-products receptor (esRAGE) and cardiometabolic risk factors on arterial elasticity in patients with coronary artery disease (CAD).

Methods: 180 patients with CAD diagnosed by coronary angiography were enrolled in. Arterial elasticity parameters (cf-PWV, ba-PWV) and cardiometabolic risk factors (waist circumference, blood pressure, blood glucose, plasma lipids and serum insulin) were measured in all patients. The relationship of serum esRAGE, cardiometabolic risk factors and arterial elasticity were analyzed.

Results: Patients with more than 3 types of cardiometabolic risk factors had higher cf-PWV, ba-PWV and lower esRAGE than that with less risk factors ($P \leq 1/4$ 0.05). Logcf-PWV was positively related to age, blood pressure and logHOMA; ba-PWV was positively correlated with age and blood pressure. Both of cf-PWV and ba-PWV were negatively correlated with esRAGE. Multi-factor regression analysis showed age, SBP and esRAGE associated independently with cf-PWV. Age and SBP associated independently with ba-PWV.

Conclusion: Cardiometabolic risk factors could induce arterial elasticity abnormality. Lower circulating esRAGE level played an important role in the decreasing of arterial elasticity in patient with CAD.

PP.31.243 THE ASSESSMENT CLINICAL AND PROGNOSTIC ROLE OF STRUCTURAL CHANGES OF LARGE ARTERY AND THE STATE OF PERIPHERAL BLOOD FLOW IN HYPERTENSIVE PATIENTS WITH CHRONIC HEART FAILURE

I. Shkurat. *Institute of Cardiology, Kiev, Ukraine*

Objective: To investigate the dependence of structure of a.femoralis (a.F) and peripheral blood flow (PBF) on severity and 12-months survival prognosis of chronic heart failure (CHF)

Methods: Ultrasonography of a.F, a.dorsalis pedis (a.DP) were performed in 129 hypertensive patients with stable CHF (NYHA II-III) and left ventricular ejection fraction (LVEF) <40% (average $35.2 \pm 1.6\%$) and in 30 age-matched healthy subjects. Diameter (D), intima-media thickness (IMT) of a.F, as well as peak systolic (Vps) and end diastolic (Ved) velocities in a.DP were measured; index of relative wall thickness (RWT) of a.F was calculated by formula: $RWT = IMT/D$; index of peripheral resistance (RI) was calculated by formula: $RI = (Vps - Ved)/Vps$. Kaplan-Meier 12-months survival analysis was performed for RWT as well as for Vps, Ved, RI in a.DP based on «below median vs. above median» approach.

Results: In hypertensive pts with CHF IMT and RWT were significantly higher (IMT: 0.99 ± 0.16 vs. 0.59 ± 0.09 mm, $p < 0.001$; RWT: 0.16 ± 0.03 vs. 0.10 ± 0.01 unit, $p < 0.001$) than in age-matched controls. Vps and Ved in a.DP were significantly lower in CHF pts (39.3 ± 2.1 vs. 56.4 ± 6.6 cm/s, $p < 0.01$ and 5.2 ± 0.8 vs. 12.9 ± 1.7 cm/s, $p < 0.01$, respectively), and RI in a.DP was significantly higher (0.83 ± 0.04 vs. 0.77 ± 0.02 unit, $p < 0.01$) than in controls. These changes become more pronounced in pts with NYHA class III-IV than in NYHA class II (Vps 32.3 ± 1.9 vs. 35.7 ± 2.1 cm/s, $p = 0.03$, Ved 5.8 ± 0.7 vs. 6.9 ± 1.3 cm/s, $p = 0.03$ and RI 0.84 ± 0.03 vs. 0.82 ± 0.02 unit, $p = 0.04$, respectively). Kaplan-Meier 12-months survival analysis was performed in relation to the RWT ($p = 0.038$), Vps in a.DP ($p = 0.04$), Ved in a.DP ($p = 0.037$) and RI in a.DP ($p = 0.04$). Significantly lower survival was apparent in pts with $RWT > 0.16$ unit, Vps in a.DP < 36 cm/s, Ved in a.DP < 6 cm/s, RI in a.DP > 0.84 unit.

Conclusions: The present study indicates that process of remodeling involved simultaneously muscular layer of the vessel wall. Remodeling of peripheral blood vessels is accompanied by decrease peripheral arterial blood flow and by increase in resistance of resistive vessels in patients with essential hypertension. RWT Vps, Ved and RI in a.DP may be used for mortality risk stratification in hypertensive patients with CHF.

PP.31.244 LOW NORMAL ANKLE-BRACHIAL INDEX IS ASSOCIATED WITH SUBCLINICAL TARGET ORGAN DAMAGE IN HYPERTENSIVE'S

E. Chatzistamatiou¹, G. Moustakas¹, C. Tsioufis², N. Kalovidouris¹, I. Babatseva Vagena¹, E. Androulakis¹, C. Bakogiannis², C. Liakos², D.

Tsartsalis¹, D. Tousoulis², C. Stefanadis², I. Kallikazaros¹. ¹Cardiology Department, Hippokraton Hospital, Athens, Greece, ²1st University Department Of Cardiology, Athens Medical School, Hippokraton Hospital, Athens, Greece

Background: In symptomatic patients and in patients with increased cardiovascular risk, peripheral arterial disease (PAD) is reliably detected with ankle-brachial index (ABI) values < 0.9 . However, the clinical significance of low normal ABI (1–1.09) in essential hypertensive (EH) patients remains unknown.

Methods: Our population consisted of 310 consecutive newly diagnosed, untreated EH non-diabetic patients (stage I-II, aged 51 ± 12 years, 49% females). All subjects underwent a 24-hour ambulatory blood pressure (BP) monitoring and a complete conventional and Tissue Doppler Imaging (TDI) echocardiographic study. Carotid ultrasound was also used to determine intima-media thickness (IMT). Carotid to femoral pulse wave velocity (cf-PWV) and the heart rate-corrected augmentation index (Aix@75) were evaluated using Complior SP and Sphygmocor devices. ABI was measured using a 8MHz Doppler device. For the purpose of this study were selected only patients with normal ($n = 155$, group A 1.10–1.29) and low normal ($n = 38$, group B 1.0–1.09) ABI.

Results: The two groups did not differ regarding age, sex, BP and smoking habits. Group B compared to A exhibited increased Aix@75 (30.95 ± 10.57 vs. 25.38 ± 9.91 %, $p = .010$), IMT ($.86 \pm .25$ vs. $.75 \pm .20$ mm, $p = .014$) and significantly decreased TDI E velocity of the basal septum (7.97 ± 2.07 vs. 8.9 ± 2.39 cm/sec, $p = .03$). Moreover, group B had significantly higher 24-h and night systolic BP (127.73 ± 12.95 vs. 123.57 ± 11 , $p = .045$ and 120.18 ± 13.15 vs. 114.93 ± 13.24 , $p = .030$, respectively), and significantly higher 24-h, day and night pulse pressure (51.55 ± 9.01 vs. 48.35 ± 7.56 , $p = .026$, 52.23 ± 9.64 vs. 48.87 ± 7.85 , $p = .025$ and 50.10 ± 8.66 vs. 47.03 ± 7.54 , $p = .031$, respectively). In the whole population, ABI was negatively correlated with cf-PWV ($r = -.163$, $p = .017$) and Aix@75 ($r = -.253$, $p = .001$) and positively correlated with body surface area ($r = .174$, $p = .01$), waist and hip circumferences ($r = .189$, $p = .005$, $r = .135$, $p = .047$, respectively) and TDI E and A velocities of mitral annulus ($r = .233$, $p = .001$ and $r = .160$, $p = .020$).

Conclusions: Decreased values of ABI within normal range are associated with more pronounced vascular damage and primary deterioration of diastolic function in newly diagnosed, never treated EH patients.

PP.31.245 MATRIX METALLOPROTEINASES AND EXTRACELLULAR MATRIX PROTEINS IN PATIENTS WITH ASCENDING AORTIC ANEURYSMS

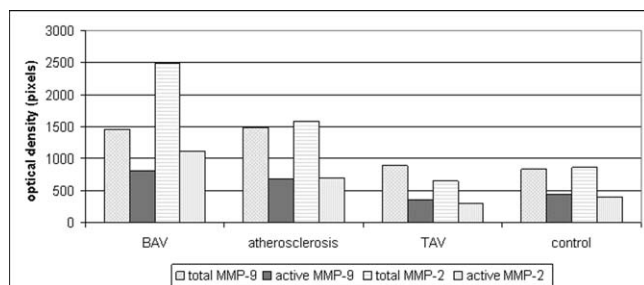
O. Irtyuga¹, D. Gamazin², I. Voronkina², N. Tsoyi¹, V. Uspensky¹, O. Moiseeva¹. ¹Almazov's Federal Heart, Blood and Endocrinology Center, Saint-Petersburg, Russia, ²Institute of Cytology, Saint-Petersburg, Russia

Objective: Matrix metalloproteinases (MMP) are proteolytic enzymes, which increased activity has been shown in ascending aortic aneurysms (AA) and its dissection. However, it is little known about the relationship between the expression of MMPs and the aetiology of aortic dilation.

Methods: We examined 16 pts with AA (age 50.0 ± 17.7 yrs; 2.6:1, ratio m:f). All pts were divided into 3 groups: 7 pts with bicuspid aortic valve (BAV), 4 pts with tricuspid aortic valve (TAV) and 5 pts with an atherosclerosis, 8 pts with IHD and without aortic dilatation were included in control group. Pts with infective endocarditis and rheumatic disease were excluded. During the operation aortic samples were taken for assessment of MMP2 and MMP9 activities by substrate-specific zymographic analysis. The relative abundances of total MMP2 and MMP9, collagen I, elastin and fibrillin were determined by quantitative immunoblotting techniques.

Results: Mean aortic diameter in pts with AA was 63 ± 16.3 mm. The width of the aortic root was consistently larger in pts with atherosclerosis compared with other groups. Total and active MMP-2, -9 were increased in pts with BAV and atherosclerosis compared with the control group. Total MMP9 was elevated in pts with atherosclerosis in comparison with BAV and TAV. But MMP9 activity was much higher in pts with BAV than in pts with atherosclerosis and TAV. Total and active MMP2 in aortic tissue were significantly elevated in pts with BAV in comparison with TAV and atherosclerosis pts. Collagen/elastin ratio was increased twice in BAV pts in comparison with atherosclerosis pts.

Conclusion: High incidence of AA in BAV may be related with increased MMP-2, -9 and disruption in collagen/elastin ratio.



PP.31.246 REDUCTION OF ARTERIAL STIFFNESS VS BLOOD PRESSURE DYNAMICS AS PREDICTOR OF CARDIOVASCULAR EVENTS IN WOMEN WITH HYPERTENSION AND CORONARY ARTERY DISEASE

I. Orlova, A. Plisuk, F. Ageev. *Russian Cardiology Research Center, Outpatients Dept., Moscow, Russia*

The AIM of the study was establish whether changes of brachial-ankle pulse wave velocity (baPWV) after treatment are predictors of major adverse cardiovascular events (MACE) in women already diagnosed with Coronary Artery Disease (CAD).

Methods and Results: baPWV measurement was performed on 88 women with CAD (mean age 65.9 ± 7.7) using conventional therapy (IACE-61%, β -blockers-69%, statins-34%, calcium channel blockers-54%, nitrates-33%) at baseline and after six months. During the 4-year follow-up period 14 patients experienced MACE (acute myocardial infarction, coronary intervention, or cardiac death) (2 before 6 month-point and 12 after).

Results: There are no difference in baPWV at base line between groups with MACE and without MACE. After six months follow-up, baPWV had not improved (delta baPWV $\geq 0\%$ relative to baseline) in 28.4% women (group 1), whereas it had significantly improved (delta baPWV $< 0\%$ relative to baseline) in the remaining 71.6% (group 2). During follow-up 8 events in group 1 and 4 events in group 2 ($p < 0.001$) occurred. Cox analyses demonstrated that independent of age at base line and BP changes, absence of baPWV decrease was predictor of MACE. The negative predictive value of baPWV was 38,1% and the positive predictive value was 92,5%. The sensitivity of baPWV was 67%, and its specificity was 79%. After 6 months SBP and DBP decreased by 8,8% and 6,6%. Changes in BP were not significant associated with a 3,5 years prognosis.

Conclusions: An improvement in arterial stiffness may be obtained after six months of conventional therapy and clearly indicates a more favorable prognosis. Decrease of BP does not relate to meaningful 3,5 years prognosis improvement in women with CAD.

PP.31.247 PULSE WAVEFORM CHARACTERISTICS VERSUS CONVENTIONAL BLOOD PRESSURES - POTENTIAL CLINICAL IMPACT

T. Weber, M. Ammer, M. Rammer, B. Eber. *Cardiology Department Klinikum Wels-Grieskirchen, Wels, Austria*

Background: Pulse waveform analysis (PWA) facilitates non-invasive determination of central blood pressures (central systolic blood pressure – CSBP and central pulse pressure – CPP) and waveform characteristics (Augmentation Index – AIx; AIx normalized for heart rate 75 – AIx 75; Pressure Augmentation – AP). Both have been shown to improve risk prediction, but their potential impact on management of hypertension in clinical practice has not been clarified.

Methods: We performed PWA in 108 patients (58 men, 50.9 ± 12.7 years) undergoing routine examinations including ambulatory blood pressure measurement (ABPM) for suspected or treated hypertension. CSBP, CPP, AIx, and AP $>$ mean $+ 1$ SD (based on published cohorts) were categorized as elevated. The relationships between office and ABPM blood pressures and PWA measures were compared, using t-test or CHI square test.

Results: Mean office blood pressure was 149/92 mm Hg, mean day / night / 24 hour ABPM was 143/91, 129/79, and 140/88 mm Hg, respectively. Based on office blood pressure or ABPM, 81.5 or 86.1 % of patients were hyper-

tensive. With respect to CSBP, CPP, AIx, and AP, 77.8, 50, 23.1, and 33.3 % were categorized as elevated. Patients with hypertension (office BP) had significantly ($p < 0.05$) higher values for CSBP, CPP, AIx 75, and AP, although overlap of categories was incomplete. E.g., 53.3/ 20/ 16.7 % of patients with office normotension and 87.2/ 61.5/ 39.7 % of patients with office hypertension had elevated CSBP / CPP / AP. Considering ABPM, patients with hypertension had significantly higher values of CSBP and AIx 75, although PWA categories did not differ. CSBP, CPP, AIx, AIx 75, and AP were not different across daytime ABPM categories, but patients with nighttime hypertension had significantly ($p < 0.05$) higher values of CSBP, CPP, AIx, AIx 75, and AP. ROC curve analysis revealed an AUC for detecting systolic nighttime hypertension with CSBP of 0.79 ($p < 0.0001$). Dipping pattern was associated with CSBP, CPP, and AP.

Conclusion: Taking PWA characteristics into account would alter labelling of patients as normotensive or hypertensive and, thus, change management. The association between nighttime blood pressure and waveform characteristics is remarkable and deserves further study.

PP.31.248 ABSTRACT WITHDRAWN

PP.31.249 DIAGNOSIS OF EARLY STAGES OF TAKAYASU ARTERITIS WITH MSCT-ANGIOGRAPHY

O. Sivakova, N.M. Chikhladze, S.A. Gaman, V.Y. Sinitsyn, I.Y. Chazova. *Russian Cardiology Research Complex, Moscow, Russia*

Objective: Takayasu arteritis is a chronic inflammatory large-vessel vasculitis that occurs predominantly in young females. The diagnosis is not usually established before arterial stenoses or occlusions are present. The aim of our study to evaluate the possibilities of MSCT-angiography in diagnosis of early inflammatory arterial changes in patients with Takayasu arteritis (TA).

Design and Methods: 42 patients were divided in to two groups (Gr): Gr 1 – 27 patients with TA and arterial hypertension aged 18–68 (41.2 ± 13.2) years; Gr 2 (control group) – 15 patients with normal blood pressure aged 18–63 (38.1 ± 17.8) years without lesions of aorta and its main branches. All patients undergone MSCT-angiography (Aquilion 64, Toshiba, Japan) of aorta and it's main branches (both common, internal, external carotid arteries, both subclavian arteries, renal arteries). Internal, external diameters and wall thickness were detected.

Results: arterial hypertension (AH) was detected in all patients in Gr 1 ($163 \pm 11.6/92 \pm 12.3$ mm Hg). Internal diameters were significantly lower in Gr 1 than in Gr 2 only in right internal carotid artery ($p = 0.02$) and in both subclavian arteries ($p < 0.0001$). External diameters were significantly higher in Gr1 compared with Gr 2 only in right common carotid artery ($p = 0.002$), left common carotid artery ($p < 0.001$) and right internal carotid artery ($p = 0.002$). The wall thickness in Gr 1 patients was significantly higher than in Gr 2 patients ($p < 0.0001$) in all arteries, except both external carotid arteries.

Conclusion: Measuring of wall thickness with MSCT- angiography may provide a reliable and efficient tool for early diagnosis of TA.

PP.31.250 PULSE WAVE VELOCITY BETWEEN HEART AND FEMORAL ARTERY BUT NOT CAROTID AUGMENTATION INDEX CORRELATES WITH LEFT VENTRICULAR MASS ONCE BLOOD PRESSURE HAS BEEN NORMALIZED

S. Rabkin, S. Chan. *University of British Columbia, Vancouver, Canada*

Background: Arterial stiffness can be assessed by Augmentation Index (AI) (difference between the first and second peaks of carotid pulse contour) or Pulse Wave Velocity (PWV). The objective of this study was to compare and determine whether AI measured from carotid pulse wave contour or PWV correlates with left ventricular mass in persons with hypertension on treatment with blood pressure less than 140/90 mmHg or in normotensive individuals.

Methods: Patients without valvular heart disease had measurement of carotid pulse wave contour and pulse wave velocity in three different vascular segments. Left ventricular mass was calculated from the 2 D echocardiogram using ASE standards.

Results: Twenty-nine persons age 63.8±2.4 yr (mean±SEM) with BP of 132/37/7±2 mmHg of whom 86.2% had hypertension on treatment with angiotensin converting enzyme inhibitor or angiotensin receptor blockers (44.8%), diuretics (37.9%), beta blockers (31%) and/or calcium channel blockers (24.1%). Left ventricular mass adjusted for body surface area (LV mass index) was 87.8±15.5 g/m² for men (18/29) and 87.3±15.5 g/m² for women (11/29). There was a significant ($p=0.018$) linear correlation ($r=0.497$) between LV mass index and pulse wave velocity between heart and femoral artery. There was no significant relationship between LV mass and PWV in the heart to carotid artery or femoral artery to ankle arterial segments. There was absolutely no relationship between Augmentation index and LV mass ($r=0.0001$, $p=0.93$).

Conclusion: In hypertensive patients whose blood pressures were less than 140/90 mmHg as well as normotensive subjects, arterial stiffness as assessed by pulse wave velocity in the heart to femoral segment is an indicator of left ventricular mass. In contrast Augmentation Index determined from carotid pulse contour was of no value as an indicator of LV mass.

PP.31.251 RATIO NIGHT/DAY OF BLOOD PRESSURE AS A MARKER OF INJURY ATHEROSCLEROTIC VASCULAR

J.I. Recio-Rodriguez¹, L. Garcia-Ortiz¹, M.A. Gomez-Marcos¹, E. Rodriguez-Sanchez¹, Y. Castaño-Sanchez¹, D. Mendez-Soto¹, R. Magallón Botaya², C. Rodriguez-Martin¹, C. Castaño-Sanchez¹, A. De Cabo-Laso¹, B. Sanchez-salgado¹, M. Martín-Hinojal¹. ¹La Alamedilla, Primary Care Research Unit, Salamanca, Spain, ²Primary Care Research Unit of Zaragoza, Zaragoza, Spain

Objective: To analyze the relationship between ratio night/day of systolic blood pressure and arterial stiffness assessed with carotid intima-media thickness, pulse wave velocity and Augmentation Index.

Methods: Design: Cross-sectional study.

Setting and Participants: 262 hypertensive patients <75 years included by consecutive sampling. Average age 54.96±11.58 years, 61.5% males.

Measurements: Monitoring ambulatory blood pressure (BP) of 24 hours and estimate systolic and diastolic ratio night/day. Pulse wave velocity (PWV), central blood pressure and Augmentation index (AIx) measured with the SphygmoCor System. Carotid intima-media thickness (IMT) measured with ultrasound.

Results: The mean awake BP were 129.45/79.85 mmHg and asleep BP 114.26/66.30 mmHg. IMT mean was 0.74±0.12 mm, and the maximum mean 0.91±0.14 mm. PWV was 9.09±2.21 m/sec. Increase aortic pressure was 14.16±8.82 mmHg, Central pulse pressure (PP) 43.83±13.66 mmHg, Central AIx 30.57±13.30, Central AIx adjusted FC 75 l/m 28.95±11.18 and Peripheral AIx 92.49±21.13. We found positive correlation of systolic ratio night/day with IMT mean ($r=0.268$, $p=0.000$), IMT maximum mean ($r=0.279$, $p=0.000$), PWV ($r=0.226$, $p=0.000$), aortic PP ($r=0.281$, $p=0.000$), increased central blood pressure ($r=0.234$, $P=0.000$) and central AIx (0.153, $p=0.013$). In multiple linear regression (Stepwise) after adjusting for age, sex and antihypertensive drugs, and considering as dependent variable the ratio night / day, persists in equation, central PP and IMT maximum mean.

Conclusions: Ratio night/day of systolic blood pressure was positively associated with markers of arterial stiffness and could be a predictor of atherosclerotic vascular injury.

PP.31.252 COMPARISON OF THE SELECTED BIOCHEMICAL AND CLINICAL PARAMETERS IN THE GROUPS OF HYPERTENSIVE PATIENTS WITH ABDOMINAL AORTIC ANEURYSM

L. Woznicka-Leskiewicz, A. Posadzy-Malaczynska. Department of Hypertensiology, Angiology and Internal Medicine, University of Medical Science, Poznan, Poland

Objectives: Detailed comparison of selected biochemical and clinical parameters between groups of patients with abdominal aortic aneurysm above or equal and below 55 mm.

Design and Methods: 40 examined hypertensive patients were divided in two groups: with AAA below 55 mm (A) and above or equal 55 mm (B). The

average age in groups was: A – 69.28 yrs, B – 69.43 yrs. Following measurements were taken: SBP, DBP, level of glycaemia, uric acid, HDL and LDL cholesterol, triglycerides, urea, creatinine, waist circumference, BMI, coronary artery disease, myocardial infarction and bypass history. The diameter and yearly growth of AAA were also considered. Moreover ankle brachial index (ABI) was examined in both groups. The Chi-square test was used for the statistical analysis, Spearman was taken to analyze the correlation of statistically significant values.

Results: We revealed statistically significant differences between the means: (tab. 1)

	A	B
SBP [mmHg]	144	136
Level of glycaemia [mmol/l]	5.27	5.76
Uric acid [mg/dl]	5.57	6.43
Total cholesterol [mmol/l]	5.78	4.32
LDL [mmol/l]	4.25	2.61
Triglycerides [mmol/l]	2.29	1.32
Urea [mmol/l]	5.18	9.58
Creatinine [mmol/l]	87.65	133.36
Coronary artery disease %	62	100
History of myocardial infarction %	35.2	68.6
History of bypass %	17.5	35.2
Aortic aneurysm diameter [mm]	43.1	61.25
Yearly growth of aneurysm [mm]	3.07	6.5
ABI	0.94	1.16

We revealed a positive correlation between AAA diameter and ABI in group B ($p=0.036$), moreover a positive correlation between yearly growth of AAA and SBP in group A ($p=0.0344$).

Conclusions: We didn't notice the influence of metabolic parameters on dynamics of increasing the diameter of AAA despite statistically significant differences of these values between groups with AAA below and above or equal 55 mm. AAA above or equal 55 mm more often coexist with cardiovascular diseases. Moreover there is a positive correlation between changes of the ABI value and diameter of AAA above or equal 55 mm. SBP has a significant influence on dynamics of increasing the diameter of AAA below 55 mm.

PP.31.253 AWAKE HEAR RATE AS MARKER OF INJURY ATHEROSCLEROTIC VASCULAR

M.A. Gomez-Marcos, L. Garcia-Ortiz, J.I. Recio-Rodriguez, E. Rodriguez-Sanchez, Y. Castaño-Sanchez, P. Moreno-Gonzalez, L.J. Gonzalez-Elena, P. Delgado, A. De Cabo-Laso, B. Sanchez-Salgado, C. Rodriguez-Martin, C. Castaño-Sanchez. La Alamedilla, Primary Care Research Unit, Salamanca, Spain

Objective: To analyze the relationship of awake heart rate and arterial stiffness assessed with carotid intima-media thickness, pulse wave velocity and Augmentation Index.

Methods: Design: Cross-sectional study.

Setting and Participants: 262 hypertensive patients <75 years included by consecutive sampling. Average age 54.96±11.58 years, 61.5% males.

Measurements: Monitoring ambulatory blood pressure (BP) of 24 hours and estimate awake and asleep heart rate (HR). Pulse wave velocity (PWV), central blood pressure and Augmentation index (AIx) measured with the SphygmoCor System. Carotid intima-media thickness (IMT) measured with ultrasound.

Results: The mean awake BP and heart rate were 129.45/79.85 mmHg and 74.64 l/m and asleep 114.26/66.30 mmHg and 62.29 l/m. IMT mean was 0.74±0.12 mm, and the maximum mean 0.91±0.14. PWV was 9.09±2.21 m/sec. Increase aortic pressure was 14.16±8.82 mmHg, central pulse pressure (PP) 43.83±13.66 mmHg, and central AIx 30.57±13.30, adjusted central AIx FC75 l/m 28.95±11.18 and peripheral AIx 92.49±21.13. We found negative correlation of awake heart rate with IMT mean ($r=-0.204$, $P=0.001$), IMT maximum mean ($r=-0.200$, $P=0.001$) central PP ($r=-0.426$, $P=0.000$), increased central pressure ($r=-0.388$, $P=0.000$), central AIx ($r=-0.287$, $P=0.000$) and peripheral AIx ($r=-0.252$, $P=0.000$). In multiple linear regression (Stepwise) after adjusting for age, sex and antihypertensive drugs and considering as dependent variable awake HR, persists in equation central PP, central AIx, central AIxFC75 and PWV.

Conclusions: Awake heart rate was negatively associated with markers of arterial stiffness and could be a predictor of atherosclerotic vascular injury.

PP.31.254 MIDDLE AORTIC SYNDROME AND ILIAC ARTERIES STENOSIS IN 10 - YEAR OLD GIRL WITH SEVERE ARTERIAL HYPERTENSION

J. Antoniewicz¹, A. Kosciesza², R. Grenda¹. ¹*The Children's Memorial Health Institute, Dept. of Nephrology, Kidney Transplantation and Arterial Hypertension, Warsaw, Poland,* ²*The Children's Memorial Health Institute, Dept. of Radiology, Warsaw, Poland*

Middle aortic syndrome (MAS) is an uncommon condition characterized by segmental narrowing of distal thoracic and abdominal aorta, commonly involving the visceral and renal arteries, with poorly controlled arterial hypertension. The aim of this report is to present young girl with MAS and iliac arteries stenosis with severe arterial hypertension (HT). Case report: 10 - year old girl was admitted to the hospital due to severe arterial hypertension 202/120 mmHg with target organ damage: hypertensive retinopathy grade 1, left ventricular hypertrophy (left ventricular mass index LVMI: 71 g/m².7), proteinuria (500 mg/day) with normal renal function. Medical history involves headache and recurrent labial herpes only. Normal physical and mental development (50–75 percentile), BMI 22 kg/m², pallor, marmoration of skin, heart murmur and interscapular bruit, absent femoral pulses and decreased pressure in legs were found. Doppler ultrasound examination followed by contrast enhanced 3D spiral computed tomography reconstruction revealed stenotic abdominal aorta (7–3 mm) and iliac arteries (4–3 mm). Ostial stenosis of celiac, mesenteric superior and renal arteries (1–2 mm) were also diagnosed. Extensive collateral blood flow in the thoraco-abdominal wall was documented. Aortic/arterial inflammatory and infectious diseases were excluded (Takayasu syndrome, tuberculosis, other viral and bacterial infections). A multidrug regimen was initiated. Vascular surgery was not an option due to complexity of the malformation. After 2 years of 6-drug therapy significant reduction of HT was achieved (mean blood pressure 138/76 mmHg), objective regression of target organ damage was documented (LVMI: 45 g/m².7, albuminuria 7 mg/day) with slight impairment of renal function. Nevertheless the prognosis seems to be unclear. Standardized hypotensive therapy with multidrug regimen can successfully reduce HT, but secondary disorders will appear. Final outcome and treatment alternatives have to be discussed.

Conclusions: 1. Severe HT in a young patient can be a consequence of rare subclinical congenital malformation such as middle aortic syndrome. 2. Prognosis in middle aortic syndrome is unclear.

PP.31.255 INVERSE RELATIONSHIP BETWEEN ECHO-TRACKING EVALUATION OF CAROTID STIFFNESS AND GLOMERULAR FILTRATION RATE IN HYPERTENSIVE PATIENTS

D. Skultetyova¹, S. Filipova², J. Skultety³. ¹*Institute of Cardiovascular Diseases, Bratislava, Slovak Republic,* ²*Slovak Medical University, Bratislava, Slovak Republic,* ³*University Hospital, Bratislava, Slovak Republic*

The aim of the study is to: 1) compare carotid AS in hypertensive pts (AH) and in the control group (C group); 2) find out correlations between AS and GFR in AH pts; 3) to compare AS and GFR in the 2 subgroups of AH pts with and without coronary artery disease (CAD).

Methods: 59 pts (age 60.8 ± 12 yrs) with AH were analyzed, in 22 of them CAD was present. C group consisted of 26 healthy subjects (age 47.9 ± 20 yrs). Using ultrasonography echo-tracking parameters of AS of common carotid artery were analyzed (AS = beta value, index of vessel elasticity = Ep, index of blood vessel compliance = AC, augmentation index = AIx and pulse wave velocity = PWV). MDRD GFR calculator corrected plasma creatinine for age, race and gender.

Results: In AH group all parameters of AS were significantly elevated (beta dx: AH group = 9.6 ± 4; C group = 6.8 ± 2, p < 0.001; beta sin: AH group = 9.1 ± 4; C group = 6.5 ± 2; p < 0.001; Ep dx: AH group = 143.7 ± 67 kPa, C group = 89.5 ± 28 kPa, p < 0.001; Ep sin: AH group = 137 ± 56 kPa, C group = 86.3 ± 39 kPa, p < 0.001; AC dx: AH group = 0.66 ± 2 m²/kPa, C group = 0.86 ± 0.3 m²/kPa, p < 0.001; AC sin: AH group = 0.66 ± 0.3 m²/kPa, C group = 0.93 ± 0.3 m²/kPa, p = 0.002; AIx dx: AH group = 17.6 ± 15%, C group = 9.3 ± 13%, p = 0.02; AIx sin: AH group = 15.6 ± 13%, C group = 9.6 ± 11%, p = 0.05; PWV dx: AH group = 7 ± 1.5 m/s, C group = 6 ± 1.6 m/s, p = 0.01; PWV sin: AH group = 6.9 ± 1.3 m/s, C group = 5.8 ± 1.2 m/s, p = 0.02). GFR correlated inversely with the serum creatinine and the age of the AH pts. Parameters beta and Ep and PWV inversely correlated with GFR. Comparing the subgroups significantly higher beta, Ep and GFR in the subgroup with CAD were found.

Conclusions: Stiffness parameters were significantly elevated in AH pts. The results show the relationship between the AS and GFR and these markers may reflect the cardiovascular risk profile of the pts.

POSTER SESSIONS

POSTER SESSION 32

NEURAL MECHANISMS

PP.32.256 EFFECTS OF GHRELIN INFUSION ON SYMPATHETIC NERVOUS SYSTEM ACTIVITY IN HUMANS

M. Schlaich, C. Sari, K. Lee, G. Lambert, T. Dawood, E. Lambert. *Baker IDI Heart and Diabetes Institute, Melbourne, Australia*

Ghrelin is a recently discovered GH-releasing peptide secreted by the stomach with effects on appetite and cardiovascular regulation. Animal studies suggest that ghrelin acts centrally to decrease the activity of the sympathetic nervous system (SNS) and may have a role in mediating behavioural responses to stress. To investigate the effects of ghrelin in humans, we gave 9 lean healthy men (age 21 ± 0.3 years) an intravenous infusion of human ghrelin (5pmol/kg/min for 1 hour) and saline in a randomized fashion. Ghrelin elicited a small decrease in systolic and diastolic blood pressure (-12 mmHg vs -4 mmHg for systolic and -12 ± 1 mmHg vs -6 ± 1 mmHg for diastolic, during ghrelin and saline infusion respectively, $P < 0.05$) without a significant change in heart rate or cardiac output. Ghrelin infusion resulted in a marked increase in muscle sympathetic nervous activity (MSNA), measured by microneurography (from 18 ± 2 to 26 ± 4 bursts per min, $P < 0.05$) while no change occurred during saline infusion (from 18 ± 2 to 17 ± 1 bursts per min). Ghrelin, but not saline, induced a rise in plasma glucose concentration (from 4.4 ± 0.1 to 4.8 ± 0.1 mmol/l, $P < 0.05$). A stress test consisting of 5-min of forced mental arithmetic was performed following the infusion of saline and ghrelin. During saline, stress induced a significant change in mean blood pressure ($+24$ mmHg), heart rate ($+21$ bpm) and MSNA ($+33\%$, $P < 0.05$). During ghrelin infusion, the changes in heart rate were similar but the changes in blood pressure and MSNA were significantly reduced compared with saline infusion ($+18$ mmHg and -9% in MSNA, $P < 0.05$). These results indicate that in healthy human, ghrelin-induced decrease in blood pressure is accompanied by a marked increase, rather than a decrease, in SNS activity. We hypothesize that ghrelin activates the SNS through baroreceptor unloading as a result of a peripheral vasodilatory effect rather than by affecting the central nervous system. Furthermore, ghrelin may contribute to the stress induced cardiovascular responses.

PP.32.257 SIMVASTATIN REDUCES SYMPATHETIC ACTIVITY IN MEN WITH HYPERTENSION AND MILD HYPERCHOLESTEROLEMIA

J. Lewandowski¹, M. Sinski¹, J. Bidiuk¹, P. Abramczyk¹, A. Dobosiewicz¹, A. Ciarka², Z. Gaciong¹. *¹Medical University of Warsaw, Department of Internal Disease, Hypertension and Vascular Disease, Warsaw, Poland, ²Erasme Hospital, Department of Cardiology, Brussels, Belgium*

Objectives: Statins might reduce cardiovascular risk in hypertensive subjects far beyond their hypolipidemic effect. Several mechanisms of that action, including reduction of sympathetic activity have been suggested. Therefore we investigated the hypothesis, that simvastatin decreased muscle sympathetic nerve activity (MSNA) in hypertensive subjects with hypercholesterolemia.

Design and method: Thirty one hypertensive hypercholesterolemic patients (aged 38.7 ± 10 yrs) participated in randomized, placebo controlled, double blinded study. Patients ($n = 15$) were assigned to simvastatin (40 mg/day) or placebo ($n = 16$) and treated for 8 weeks. In all patients before and after therapy MSNA, systolic and diastolic blood pressure, heart rate and baroreceptors sensitivity were measured, and blood samples for plasma catecholamines, neuropeptide Y, aldosterone, endothelin concentrations and plasma renin activity measurements were taken.

Results: Simvastatin significantly reduced MSNA (from 36.5 ± 5 to 27.8 ± 6 burst/minute, $p = 0.001$), heart rate (from 77 ± 6.7 to 71 ± 6.1 beats/min, $p = 0.01$) and both total and LDL cholesterol (from 249 ± 30.6 to 184 ± 28.3 mg/dL, $p = 0.001$ and from 169 ± 30.6 to 117 ± 31.2 mg/dL, $p = 0.01$, respectively). Baroreceptor sensitivity increased during simvastatin therapy (from 10.3 ± 4.1 to 17.1 ± 4.3 ms/mm Hg, $p = 0.04$), while no changes were observed in systolic and diastolic blood pressure, plasma catecholamines,

neuropeptide Y, endothelin, aldosterone concentration and plasma renin activity. MSNA and baroreceptor sensitivity after simvastatin therapy was inversely related ($r = -0.94$, $p < 0.05$).

Conclusion: Simvastatin reduced MSNA in patients with hypertension and hypercholesterolemia. MSNA reduction after therapy with simvastatin was related to increased baroreceptor sensitivity.

PP.32.258 ASSOCIATION OF ARG16GLY POLYMORPHISM OF THE BETA-2 ADRENERGIC RECEPTOR (B2AR) GENE WITH BAROREFLEX SENSITIVITY AND INDICES OF AUTONOMIC CARDIOVASCULAR MODULATION

J.E. Ochoa¹, M.M. Correa², J.A. Gallo³, N. Zapata³, J.G. McEwen³, G. Bilo⁴, D. Aristizabal², G. Parati⁴. *¹Dept. of Molecular Biology, Corporacion Para Investigaciones Biologicas, Medellin, Colombia and Dept. of Clinical Medicine and Prevention University of Milano - Bicocca, Milan, Italy, ²Clinica Medellin, Dept of Preventive Cardiology, Medellin, Colombia, ³Corporacion para Investigaciones Biologicas and School of Medicine, University of Antioquia, Medellin, Colombia, ⁴San Luca Hospital, Istituto Auxologico Italiano, Dept. of Clinical Medicine and Prevention, University of Milano-Bicocca, Milan, Italy*

Objective: Sympathetic nervous system plays a key role in blood pressure control and functional polymorphisms of the beta-2 adrenergic receptor (B2AR) have been implicated in the pathogenesis of hypertension. In particular, functional polymorphism Arg16Gly (46A→G rs1042713), has been proved to be of clinical relevance. However, limited information is available on its association with baroreflex sensitivity (BRS) and other parameters of autonomic cardiovascular regulation. Aim of our study was to explore this issue.

Methods: In the frame of Medellin's Heart Study, a probabilistic sample of 800 subjects from the general population of Medellin (Colombia) was recruited. Individuals with a diastolic blood pressure (DBP) > 70th percentile of distribution curve (DBP > 85 mmHg), aged 30-65 years and not receiving antihypertensive therapy, were selected ($n = 92$). Arg16Gly polymorphism was forward and backward genotyped (accuracy > 99%), using automated DNA sequencer 3730XL (ABI-Prism). Cardiovascular autonomic modulation was assessed by computer analysis of 10 min beat-to-beat BP and ECG recordings obtained in supine position (Task Force Monitor). BRS was estimated by sequence method as the slope of spontaneous concomitant increases or decreases in systolic (SBP) and RR interval. Low-frequency (LF) and high-frequency (HF) spectral components of heart rate variability (HRV) were assessed by Fourier analysis and expressed in normalized units (nu). LF/HF ratio was also calculated.

Results: Allelic distribution of Arg16Gly polymorphism was in Hardy-Weinberg equilibrium. There was highly significant variation in all parameters between Arg/Arg, Arg/Gly and Gly/Gly genotypes. After adjustment for age, sex, smoking, diabetes, SBP and BMI, subjects with Arg/Arg genotype exhibited significantly lower BRS ($p < 0.007$), higher HRV sympathetic indices (LF; $p < 0.003$ and LF/HF; $p < 0.002$) and lower HRV parasympathetic indices (HF; $p < 0.003$) than those with Gly/Gly genotype. See table.

Arg16Gly genotype	BRS (ms/mmHg)	LFnu (%)	HFnu (%)	LF/HF ratio
Arg/Arg (n=31)	12.67 ± 8.78	56.94 ± 13.13	43.05 ± 13.13	1.94 ± 1.86
Arg/Gly (n=37)	12.14 ± 6.27	52.10 ± 18.21	47.89 ± 18.21	1.63 ± 1.37
Gly/Gly (n=24)	18.59 ± 14.30	40.97 ± 19.02	59.07 ± 19.02	1.01 ± 1.00
p (ANOVA)	0.03	0.003	0.003	0.003
Adjusted p (ANCOVA) Arg/Arg vs. Gly/Gly	0.007	0.003	0.003	0.002

Conclusions: These results indicate that ADRB2 gene may be involved in the modulation of cardiac baroreflex and HRV in humans. In particular, Arginine homozygous genotype of Arg16Gly polymorphism was associated with a decreased BRS and higher indirect indices of sympathetic activity in subjects with high blood pressure.

PP.32.259 DIURNAL RHYTHM OF NEUROPEPTIDE Y AND CATECHOLAMINES IN HYPERTENSIVE DIPPERS AND NON-DIPPERS

M. Lapinski, A. Kuch-Wociał, J. Lewandowski, B. Wociał, Z. Gaciong, *Medical University of Warsaw, Department of Internal Medicine, Hypertension and Angiology, Warsaw, Poland*

Objective: Causes of circadian blood pressure rhythm disturbances are not well understood. In hypertensive non-dippers increased catecholamines concentration was found. Neuropeptide Y (NPY) is potent neurotransmitter and mediator of the sympatho-adrenomedullary system, potentially involved in pathogenesis of hypertension. Therefore we investigated circadian rhythm of NPY in dippers (D) and nondippers (ND).

Design and Methods: The study included 43 untreated hypertensive subjects (24F/19M) in mean age 50 ± 11 yrs divided into 30 D and 13 ND. Blood samples for NPY, noradrenalin (NA) and adrenalin (A) were taken in 2, 6, 10 AM and 2, 6, 10 PM. Ambulatory blood pressure monitoring (SpaceLabs 20707) were performed in all patients.

Results: Mean plasma NPY concentration during the day (dNPY) was compared to NPY at 2 PM (2NPY). In D dNPY was significantly higher than 2NPY (7.83 ± 2.99 vs 5.61 ± 3.35 fmol/ml; $p < 0.0087$). In ND dNPY was similar to 2NPY (8.37 ± 3.18 vs 7.33 ± 4.17 fmol/ml; NS). In D plasma 2NPY was higher, while in ND similar to NPY measured at 6AM, 10AM, 2 PM, 6 PM and 10PM. Plasma NA and A patterns were similar to that of NPY, respectively in D and ND. Plasma NA at 2 AM was higher in ND than in D (430 ± 308 vs 243 ± 160 pg/ml; $p < 0.016$). Analysis of variance showed circadian rhythm of NPY in D ($F=3.77$; $p < 0.005$) and did not in ND ($F=0.53$; $p=0.746$). Analysis also revealed circadian rhythm of NA and A in D and no in ND.

Conclusion: Presented data showed that ND in contrast to D are characterized by abnormal circadian rhythm of NPY and catecholamines. It may suggest a role for NPY in development of non-dipping status in hypertensive patients.

PP.32.260 EXCESSIVE SYMPATHETIC ACTIVATION IN HEART FAILURE ASSOCIATED WITH ANEMIA

N. Franchitto¹, F. Despas², M. Labrune³, S. Boveda⁴, M. Galinier³, J.M. Senard², A. Pathak². ¹Department of Legal Medicine, University Hospital of Rangueil, Toulouse, France, ²Department of Clinical Pharmacology, University Hospital of Rangueil, Toulouse, France, ³Department of Cardiology, University Hospital of Rangueil, Toulouse, France, ⁴Department of Cardiology, Clinique Pasteur, Toulouse, France

The role of anemia in determining sympathetic overactivity in chronic heart failure (CHF) patients is unknown. We tested the hypothesis that in CHF patients, anemia could lead to increased sympathetic activity through tonic activation of excitatory chemoreceptor afferents. We conducted a double-blind, randomized, vehicle-controlled study to examine the effect of chemoreflex deactivation on muscle sympathetic nerve activity in CHF patients with and without anemia. We compared the effect of breathing 100% oxygen for 15 min in 18 stable CHF patients with anemia and 18 control CHF patients matched for age, sex, blood pressure and BMI. Baseline muscle sympathetic nerve activity was significantly elevated in CHF patients with anemia compared with patients with CHF alone (56.0 ± 3.2 versus 45.5 ± 3.1 bursts/min; $P < 0.0237$). Administration of 100% oxygen led to a significant decrease in muscle sympathetic nerve activity in CHF patients with anemia (from 56.0 ± 3.4 to 50.9 ± 3.2 bursts/min; $P < 0.0019$). In contrast, neither room air nor 100% oxygen changed muscle sympathetic nerve activity or hemodynamics in patients with CHF alone. We report for the first time direct evidence of increased sympathetic nerve traffic in patients with CHF-related anemia. Sympathetic hyperactivity in patients with CHF and anemia is partially chemoreflex mediated and could explain how anemia contributes to the progression of CHF and increases morbidity and mortality in these patients.

PP.32.261 INFUSION OF E. COLI LIPOPOLYSACCHARIDES TOXIN IN RATS PRODUCES A SEVERE IMPAIRMENT OF BAROREFLEX FUNCTION IN ABSENCE OF BLOOD PRESSURE CHANGES

A. Radaelli¹, P. Castiglioni², C. De Carlini³, F. Soriano³, M. Di Rienzo², G. Mancini³. ¹Ospedale S.Gerardo Monza, Biassono, Italy, ²S.Maria Nascente Research Hospital, Fnd. Don Gnocchi, Milan, Italy, ³Università Milano-Bicocca, Milan, Italy

Septic shock is characterized by a severe impairment of baroreflex function and by high mortality rate. In these patients baroreflex dysfunction is a negative prognostic factor. Nevertheless the causes of baroreflex dysfunction during septic shock have not been completely clarified. In particular it is not clear whether this is consequence of acute changes in blood pressure or it is a direct effect of the toxin. Our aim was to verify whether E. coli lipopolysaccharides (LPS) infusion could alter the baroreflex function even in absence of blood pressure (BP) changes.

Methods: E.Coli LPS was infused in 7 rats for 20 minutes at an infusion rate (0.05 mg/kg/min) that we previously observed not to have any significant effect on BP. Systolic BP (SBP), diastolic BP (DBP) and pulse interval (PI) were continuously recorded for 30 minutes before, during and for 1 hour after the E. Coli LPS infusion. Baroreflex sensitivity was evaluated by applying the sequence method (BRS seq) and by calculating the alpha index in the high-frequency band (HF-BRS).

Results: Neither SBP, nor DBP or PI showed significant differences after the infusion of E.Coli LPS with respect to the basal condition (SBP mean $\pm$ SD: from 93 ± 22 to 99 ± 25 mmHg; DBP: from 57 ± 23 to 50 ± 20 mmHg; PI from 166 ± 49 to 158 ± 43 ms). By contrast, the baroreflex sensitivity was significantly reduced after LPS infusion (BRS seq: from 1.29 ± 0.79 to 0.46 ± 0.27 ms/mmHg, $p < 0.02$; HF-BRS from 1.28 ± 0.97 to 0.31 ± 0.12 ms/mmHg).

Conclusion: In rats, E coli LPS infusion can produce a severe impairment of baroreflex function even in absence of significant changes in blood pressure.

PP.32.262 CORRELATION BETWEEN DIFFERENT MEASURES OF CARDIOVASCULAR AUTONOMIC REGULATION IN ESSENTIAL HYPERTENSION

R.M. Bruno¹, L. Ghiadoni¹, E. Daghini¹, M. Varanini², E. Duranti¹, M. Emdin², S. Taddei¹. ¹University of Pisa, Department of Internal Medicine, Pisa, Italy, ²Institute of Clinical Physiology, National Research Council, Pisa, Italy

Objective: It is well established that essential hypertension is characterized by increased adrenergic tone in different districts. Aim of the study is to examine the correlation between different measures of cardiovascular autonomic regulation, muscle sympathetic nerve activity (MSNA) and spectral analysis of RR interval variability, and their possible relation with plasma markers of renin-angiotensin system and endothelin activity.

Design and Methods: 35 untreated essential hypertensive patients (HT) and 14 normotensive subjects (NT), age- and gender-matched, were included. MSNA was recorded by microneurography of the peroneal nerve, together with beat-to-beat BP and ECG for heart rate (HR) evaluation. Fast Fourier Transform spectral analysis of RR interval variability was applied to obtain normalized high and low frequency (nHF and nLF respectively) power density, and their ratio. Plasma norepinephrine (NE), renin activity (PRA) and endothelin-1 (ET-1) were also measured. Log-transformation was applied for correlation of not normally distributed variables.

Results: HT showed higher MSNA (51.5 vs 41.4 bursts/100 heart beats, $p < 0.001$), NE (342 vs 269 pg/ml, $p = 0.03$), and LF/HF (3.4 vs 1.9 , $p = 0.04$) as compared to NT. MSNA and LF/HF showed a significant correlation in the HT group ($r = 0.36$, $p = 0.04$), but not in the NT group ($r = 0.20$, $p = ns$). MSNA was also inversely related to nHF ($r = -0.48$, $p = 0.004$) in HT. MSNA and LF/HF were not significantly related to HR or NE in both HT and NT groups. In HT patients, but not in NT, nLF was related to NE ($r = 0.43$, $p = 0.03$) and ET-1 ($r = -0.69$, $p = 0.01$), while LF/HF was related to ET-1 ($r = -0.70$, $p = 0.02$). MSNA was not related to any of these humoral parameters in HT and NT.

Conclusions: MSNA increase and sympatho-vagal unbalance in HR modulation are associated in essential hypertension. Spectral components of RR interval variability, but not MSNA, seem to be influenced by endothelin system in HT.

PP.32.263 SYMPATHETIC INFLUENCE ON THE HAEMODYNAMIC RESPONSE TO ISOMETRIC FOREARM CONTRACTION

J. Coulson, J. Cockcroft. *Cardiff University, Wales Heart Research Institute, Cardiff, United Kingdom*

Introduction: The pressor response to voluntary isometric forearm contraction is often used in studies of neurogenic influences on blood pressure. It has been assumed to be under autonomic control. Direct experimental evidence for this hypothesis is lacking in systemic studies in human subjects. We used adrenergic receptor agonists and antagonists to quantify the sympathetic influence on the haemodynamic response to isometric contraction.

Methods: 12 healthy volunteers (6 female), matched for age and body mass index, performed a (baseline) isometric forearm contraction at <5% of their maximum grip and an isometric forearm contraction at 40% of their maximum grip. Plasma catecholamines were measured at baseline and after effort. Tasks were repeated in the presence of intravenous 0.9% saline, esmolol (β_1 -antagonist, 0.2 mg/kg) and phentolamine (α -antagonist, 5 mg), with a 60-minute washout period between drugs. Peripheral alpha and beta adrenoceptor sensitivity and baroreceptor sensitivity were calculated by measuring the haemodynamic response to infused isoprenaline (β -agonist, 0–2 mg) and phenylephrine (α -agonist, 0–200 mg).

Results: Voluntary isometric forearm grip induced a rise in heart rate, $p < 0.05$ and in blood pressure, $p < 0.05$. Plasma noradrenaline was increased by isometric contraction, $p < 0.05$. Plasma adrenaline was not altered. Esmolol abolished the positive chronotropic response pressor response, $p < 0.05$ but not the pressor response. Phentolamine abolished the pressor response, $p < 0.05$, and induced a positive chronotropic response, $p < 0.05$. There was no correlation between alpha and beta adrenoceptor sensitivity or baroreceptor sensitivity.

	Saline	Esmolol	Phentolamine
Mean % Change in SBP	10.7 $\pm$ 2.0*	7.9 $\pm$ 3.1*	3.7 $\pm$ 3.0*
Mean % Change in DBP	17.2 $\pm$ 4.0*	12.5 $\pm$ 4.0*	-1.3 $\pm$ 2.5
Mean % Change in MAP	13.8 $\pm$ 3.2*	10.1 $\pm$ 3.4*	0.8 $\pm$ 2.5
Mean % Change in HR	8.5 $\pm$ 4.70*	2.7 $\pm$ 2.8	10.2 $\pm$ 6.1*

Figure 1: SBP = systolic blood pressure, DBP = diastolic blood pressure, MAP = mean arterial pressure, HR = heart rate. Data are means $\pm$ C.I._{95%}. (*) $p < 0.05$.

Discussion: The pressor response to voluntary isometric grip is under α -adrenoceptor mediated, autonomic, control. This is the first time that this has been demonstrated systemically in human subjects using a pharmacological approach.

PP.32.264 NICOTINIC RECEPTORS SUPPRESS BETA-ADRENOCEPTOR CONTRIBUTION AND VAGAL INTERACTION IN TACHYCARDIA FOLLOWING 4-AMINOPYRIDINE-INDUCED NORADRENALINE RELEASE IN HYPERTENSIVE RATS (SHR)

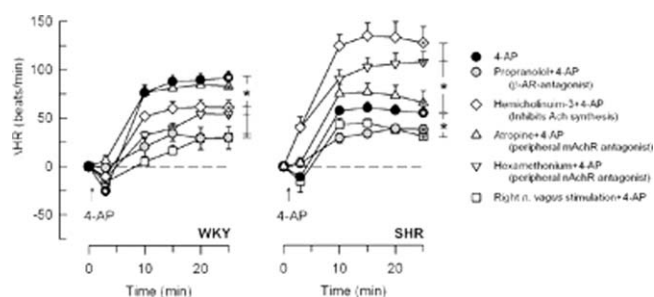
T. Berg¹, J. Jensen². ¹Dept. of Physiology, Medical Faculty, University of Oslo, Oslo, Norway, ²Dept. of Physical Performance, Norwegian School of Sport Sciences, Oslo, Norway

Objective: The parasympathetic and sympathetic nervous control of heart rate (HR) is dysfunctional in essential hypertension in man and spontaneous hypertension in rats (SHR). We aimed to study the nature of this autonomic dysfunction and the mechanisms involved, using SHR as a model.

Design and Methods: The experiments were carried out on 12–14 weeks old, male SHR and their normotensive controls (WKY). The rats were anaesthetized with Nembutal, which abolished baroreceptor reflexes. We studied the HR-response to a bolus injection of 4-aminopyridine (4-AP). 4-AP inhibits voltage-sensitive K⁺ channels, thus causing depolarization and opening of voltage-sensitive Ca²⁺ channels. The entry of Ca²⁺ elicits transmitter release from cholinergic and sympathetic nerve endings, and, through that, 4-AP activates a cardiovascular response.

Results: 4-AP induced an immediate atropine-sensitive bradycardia, followed by a sustained reserpine-sensitive tachycardia. Thus, the HR-response comprised an initial parasympathetic activation, followed by tachycardia due to sympathetic nerve transmitter release.

In WKY, the 4-AP-induced tachycardia was eliminated by β -adrenoceptor (AR) antagonist, and was opposed by electrical vagal nerve stimulation. Furthermore, inhibition of acetylcholine (ACh) synthesis and nicotinic receptor (nAChR) antagonist reduced the tachycardia, indicating a role of presynaptic noradrenaline release-stimulating nAChR in WKY. In SHR, propranolol and vagal nerve stimulation had little effect on the tachycardia, whereas ACh synthesis inhibitor and nAChR but not muscarinic (mAChR) antagonist enhanced the response.



Conclusion: In SHR, activation of peripheral nAChR suppressed 4-AP-induced β -AR-mediated tachycardia and prevented β -AR / vagal nerve interaction.

PP.32.265 COMPARATIVE EFFECTS OF AMLODIPINE AND CILNIDIPINE ON SYMPATHETIC NERVOUS MODULATION IN PATIENTS WITH HYPERTENSION

A. Ikai¹, C. Ogura¹, S. Mitani², S. Miyamoto³, M. Fujita¹. ¹Human Health Sciences, Kyoto University Graduate School of Medicine, Kyoto, Japan, ²Kyoto Prefectural University of Medicine, Kyoto, Japan, ³Kitano Hospital, Tadukefukui Medical Research Institute, Osaka, Japan

Objective: Sympathetic nervous activity may be augmented with the calcium channel blocker (CCB) treatment as a result of decreased blood pressure despite the advent of long-acting CCBs. A dihydropyridine CCB, cilnidipine blocks not only L type but also N type of calcium channels. Accordingly, we compared the effects of amlodipine and cilnidipine on autonomic nervous activity in hypertensive patients.

Design and Methods: Eighteen hypertensive patients under the treatment of amlodipine monotherapy for at least 6 months were randomized to the 2 treatment arms. In 8 patients (70 $\pm$ 9 (SD) years, 1 man and 7 women), amlodipine monotherapy was further continued for 6 months. In 10 patients (70 $\pm$ 4 years, 3 men and 7 women), amlodipine treatment was switched to cilnidipine treatment. Before and after 6-month treatment with amlodipine or cilnidipine, each patient underwent 30 min resting electrocardiographic recording in the morning after an overnight fasting. By using spectral analysis of heart rate variability, frequency-domain measures were calculated. The low frequency (LF: 0.04 to 0.15 Hz)/high frequency (HF: 0.15 to 0.40 Hz) power ratio was used as an index of sympathovagal balance, and HF/total power (TP) ratio was used as an index of vagal activity. Plasma norepinephrine levels were measured by radioimmunoassay.

Results: In patients with continuous amlodipine treatment, systolic and diastolic blood pressures (SBP, DBP) and heart rate (HR) remained unchanged. LF/HF and HF/TP ratios also remained unchanged (LF/HF 1.77 $\pm$ 1.05 vs. 1.83 $\pm$ 1.22, HF/TP 0.419 $\pm$ 0.122 vs. 0.402 $\pm$ 0.116). Plasma norepinephrine levels were comparable (370 $\pm$ 88 pg/ml vs. 491 $\pm$ 137 pg/ml). In patients switched to cilnidipine, SBP, DBP and HR were similar before and after switching. Interestingly, LF/HF ratio decreased significantly ($p = 0.012$) from 2.37 $\pm$ 1.56 to 1.89 $\pm$ 1.42, and HF/TP ratio increased significantly ($p = 0.049$) from 0.366 $\pm$ 0.132 to 0.417 $\pm$ 0.156, despite the comparable HR. Plasma norepinephrine concentrations decreased significantly ($p = 0.009$) from 359 $\pm$ 65 pg/ml to 282 $\pm$ 72 pg/ml.

Conclusions: These findings suggest that cilnidipine may provide beneficial prognosis for hypertensive patients because it suppresses sympathetic nervous activity.

PP.32.266 AUTONOMIC BALANCE AND HEMODYNAMIC PATTERNS IN PRE-HYPERTENSION

S. González, P. Forcada, J. Chiabaut Svane, D. Olano, E. Cavanagh, F. Inerra, S. Obregón, C. Castellano, D. Turri, C. Kotliar. Hospital Universitario Austral, Presidente Derqui, Argentina

Introduction: Autonomic imbalance and hemodynamic disturbances have been described in pre-hypertensive patients (PHT-JNC-VII), with increments in sympathetic drive, cardiac index (CI) and vascular resistances¹. However, these autonomic alterations are not present in all of PHTs, and different status of autonomic balance (AB) could be coexisting with different hemodynamic patterns (HP), as distinct stages in the evolution to sustained HT.

Objectives: a) To evaluate AB and HP in PHTs; and b) To assess different association patterns between them.

Methods: Prospective study. We included 70 patients into three different groups; a) 40 PHTs ($131.4 \pm 5.9/84.2 \pm 5.1$ mm Hg), b) 10 normotensives (NT), ($112.4 \pm 5.3/73.4 \pm 4.9$ mm Hg), and c) 20 mild HTs ($148.8 \pm 13.5/93.6 \pm 7.1$ mm Hg), all of them without treatment. AB was determined by the expiration/inspiration index (E/I) in one second/ECG; and the different HP were evaluated by determination of CI, systemic vascular resistance index (SVRI) and cardiac work index (CWI) with impedance cardiography. A cut off point of 1.25 for E/I was applied. **Results:** a) Abnormal AB (E/I < 1.25) was detected in 56.6% of PHT, 20% of NT and 37.5% of HTs. b) In PHTs, abnormal AB was related with an HP characterized for increased SVR, while subjects with normal AB presented an hyper-dynamic HP, with low SVR. (table), c) HP of PHTs with altered AB was similar to HT patients

	E/I < 1.25 (n:20)	E/I > 1.25 (n:20)	P
SBP (mm Hg)	131.6±5.38	131.2±5.49	0.843
DBP (mm Hg)	84.3±4.31	83.9±5.95	0.820
SVRI (dynes/cm ² ·s·m ²)	2822.8±982.5	1441.0±482.5	<0.01
CI (kg·m ² ·s ⁻¹ ·m ²)	4.16±1.22	5.15±1.24	<0.05
CWI (liters/min·m ²)	3.02±1.01	4.28±1.21	<0.01

Conclusions: More than of 50% of PHTs presented altered AB. Subjects with normal AB showed a hyper-dynamic HP; abnormal AB was related with an HP characterized for SVR elevated, similar to the HT patients. Differences in α and β adrenoceptors sensitivity could be associated with these different HP.

In some PHTs the HP typical of HT starts below of the BP threshold of HT (140/90 mm Hg). Therapeutical measures could be used to prevent the development of HT and related organ damage.

PP.32.267 NEURAL AND STRUCTURAL REMODELING OF ARTERIES IN SHR

Y. Xi, N.L. Sun. *Peking University People's Hospital, Beijing, China*

Objective: This study was to investigate the sympathetic and structural remodelings and the relationship between them in different arteries in blood pressure increasing stage.

Design and Methods: 12 week-old Spontaneously Hypertensive Rats (SHR) were defined as in blood pressure increasing stage. Age-matched Wistar Kyoto (WKY) rats were as controls. Blood pressure of rats was continuously recorded in conscious unrestrained rats. The sympathetic innervations in thoracic aorta and renal artery were examined with anti-tyrosine hydroxylase (anti-TH) immunohistochemistry methods. Arterial structure, the densities of sympathetic innervations, which included innervation area/ total vascular area (TA) and innervation area/ vascular wall area (WA), together with the area of sympathetic innervation were studied.

Results: Compared with that in 12 week-old WKY, External diameter (ED), internal diameter (ID) and total area (TA) were lower, and wall thickness (WT), WT/ID were higher in thoracic aorta of 12 week-old SHR. The areas and densities (both innervation area vs TA and vs WA) of sympathetic innervation in thoracic aorta of 12 week-old SHR were larger than that of WKY (all $P < 0.001$). And in renal arteries of 12 week-old rats, the areas and densities of sympathetic innervation in SHR were larger than that of WKY but without statistical significance (all $P > 0.05$). In thoracic aorta, both the area and the density of sympathetic innervation correlated with vascular WT negatively, with ID and WT/ID positively (all $P < 0.01$). In renal artery, the area of sympathetic innervation correlated with ID, and the density of sympathetic innervation area /TA correlated with WT/ID positively.

Conclusions: In blood pressure increasing stage, vascular structural and sympathetic neural remodelings were observed in thoracic aorta and renal artery, there were some relationships among these two remodelings.

PP.32.268 CORRELATIONS BETWEEN BLOOD SYSTEMIC PRESSURE VARIABILITY AND OXYGEN DEBT DURING PROGRESSIVE ERGOMETER TEST IN 22 ESSENTIAL HYPERTENSIVE SUBJECTS

A. Pierini, D. Ruggiero, C. Gianni, G. Ponticelli, F. Sardella. *Istituto Medicina Cardiovascolare - Fondazione Ca' Granda, Milan, Italy*

Objective: To evaluate the hypothesis that muscle metabolism produces during exercise recovery a lasting vasoconstriction.

Design and Method: 22 hypertensive subjects (male, age 58.4 ± 6.6) not taking any medication at least 1 week, with at basal level SBP 162 mmHg sd 15, DBP 92 mmHg sd 9, HR 78 bpm sd 11, SV 65 ml sd 8, underwent exercise test until maximal theoretical work (150 W sd 15) attained in 10 min sd 1. Using Finometer (Finameter, Nederland) we measured Blood Pressure, Heart Rate and Stroke Volume beat to beat, also by QuarkB2 (Cosmed, Italy) we analysed VO₂, VCO₂, Breath Rate and Tidal Volume. We calculate off-line RR intervals and Diastolic BP variability to obtain in frequency domain, by detrended autoregressive spectrum, the ratio LowFrequency (0.04–0.15 Hz) HighFrequency (0.15–0.4 Hz), or sympathetic-vagal balance (LF/HF) at basal level, at peak exercise, at 1 min and at 4 min recovery. We calculate the exponential equation of oxygen debt and time constant (τ).

Results: We find during recovery a dissociation between heart rate reduction (-30% sd 5% at 1 min) and pressure lowering (-8% sd 3% of Mean BP); a negative correlation between Mean BP at peak and VO₂ max ($R = -0.49$ $p = 0.02$); a positive correlation between Total Peripheral Resistance at 1 min recovery and oxygen debt ($R = 0.55$ $p = 0.01$); a positive correlation between LF/HF diastolic BP at 1 min recovery and oxygen debt ($R = 0.62$ $p = 0.002$); a positive correlation between LF/HF diastolic BP at 4 min recovery and oxygen debt ($R = 0.58$ $p = 0.005$); a positive correlation between Mean BP at peak and τ ($R = 0.68$ $p = 0.001$). Heart rate variability during recovery is not related with oxygen debt.

Conclusion: We hypothesize that in hypertensive subjects the muscular metabolism during isotonic exercise affects the peripheral vasoconstriction through acidosis. Sympathetic-vagal balance is useful parameter to evaluate the splitting heart rate and blood pressure effects at recovery.

PP.32.269 CHARACTERISTICS OF CHANGES OF HEART RHYTHM VARIABILITY IN PATIENTS WITH ESSENTIAL HYPERTENSION

S. Gahramanova, A. Bakhshaliyev. *Scientific-Research Institute of Cardiology names after acad. J. Abdullayev, Baku, Azerbaijan*

Aim of the study was to study the characteristics of autonomic regulation of the cardiovascular system through analysis of heart rhythm variability (HRV) in the spectral area in patients with essential hypertension (EH) I - II stage. The study included 49 patients (29 men and 20 women) of working age who were divided into 3 groups depending on the level of blood pressure (BP): group 1 (control group) included 15 individuals with normal blood pressure, in group 2 - 16 patients with EH stage I, group 3 - 18 patients with EH stage II. HRV in the spectral area studied by Holter monitoring of electrocardiograms «ECG - pro-Holter». Determined by the spectral power density (ms²) by bands of very low (VLF - describes the activity of the renin-angiotensin-aldosterone system), low (LF - characterized by sympathetic influences) and high (HF - characterizes the parasympathetic influence) frequencies, the total power spectrum (TP), calculated values of VLF, LF, HF components of power in percentage; vagosympathetic interaction index (LF / HF). To assess the relative activity of the vagus nerve and the vasomotor center, respectively, were calculated measure of relative vagal activity ($RVA = 102 \times HF / (VLF + LF)$) and the index of relative vasomotor activity ($RVMA = 102 \times LF / (VLF + HF)$). The appearance and progression of hypertension associated with lower absolute values as the total spectral power (TP), and some of its constituent components - very low (VLF) and high (HF) frequencies, and spectral power in the low (LF) frequency and performance vagosympathetic interaction (LF/HF), on the contrary, increased. The study also found a significant decrease in performance relative vagal activity in patients with EH stage II compared with normotensive patients, and EH stage I ($p < 0.001$). As the severity of hypertension significantly increased the relative vasomotor activity ($p < 0.001$), especially in patients with EH stage II.

PP.32.270 ASSOCIATIONS OF OBSTRUCTIVE SLEEP APNEA WITH VASCULAR DAMAGE AND ENDOTHELIAL DYSFUNCTION IN HYPERTENSIVES

A. Kasiakogias, C. Tsioufis, C. Thomopoulos, D. Aragiannis, E. Andrikou, I. Andrikou, A. Mazaraki, D. Roussos, T. Makris, C. Stefanadis. *First Cardiology Clinic, University of Athens, Hippokratou Hospital, Athens, Greece*

Objectives: Incriminating evidence of an adverse effect of obstructive sleep apnea (OSA) on the vasculature is increasing. We investigated the degree of vascular impairment in the high risk population of hypertensives with OSA by diverse atherosclerotic surrogates.

Design and Methods: We studied 62 consecutive patients [49 men, aged 48 ± 7 years, 31 smokers, body mass index (BMI) 32 ± 4 kg/m²] with untreated hypertension and OSA diagnosed by polysomnography (PSG)

[apnea/hypopnea index (AHI) ≥ 5], and a control group of 70 untreated hypertensives without OSA (AHI < 5) matched for age, sex, body mass index, smoking status and 24 h systolic blood pressure (BP). All subjects underwent 24 h ambulatory BP monitoring, echocardiography and aortic stiffness evaluation by means of carotid – femoral pulse wave velocity (PWV) using an automatic device (Complior SP). Metabolic profile, serum creatinine levels (sCr), glomerular filtration rate (eGFR), and asymmetric dimethyl-arginine (ADMA) were assessed from a morning blood sample. The albumin/creatinine excretion ratio (ACR) was calculated from two non consecutive urine morning samples.

Results: Hypertensives with OSA had similar 24 h systolic BP (140 ± 9 vs. 138 ± 6 mmHg, $p = \text{NS}$) but higher 24 h diastolic BP levels (87 ± 6 vs. 84 ± 7 mmHg, $p = 0.03$) compared to the control group. Left ventricle mass index was greater in the OSA group (109 ± 23 vs. 100 ± 25 gr/m², $p = 0.04$), while relative wall thickness (0.43 ± 0.07 vs. 0.43 ± 0.08) and metabolic profile did not differ ($p = \text{NS}$ for all). Although sCr and eGFR were similar between the two groups (0.96 ± 0.18 vs. 0.94 ± 0.18 mg/dl and 114 ± 30 vs. 116 ± 27 ml/min/1.73m², $p = \text{NS}$ for both), patients with OSA exhibited higher levels of logACR and logADMA compared to those without (1.07 ± 0.31 vs. 0.66 ± 0.38 mg/g, -0.25 ± 0.1 vs. -0.31 ± 0.1 mol/l, respectively, $p < 0.0001$ for both) even after adjustment for confounders. Furthermore, PWV was elevated in OSA patients compared to the control group (8.2 ± 0.7 vs. 7.2 ± 0.9 m/sec, $p < 0.001$). In the entire study population logAHI was correlated with PWV ($r = 0.35$, $p < 0.001$), logADMA ($r = 0.30$, $p = 0.001$) and logACR ($r = 0.34$, $p < 0.0001$).

Conclusion: Elevated values of ADMA, PWV and ACR in hypertensives with OSA reveal an atherosclerotic state enhanced by sleep disordered breathing.

PP.32.271 LONGTERM FOLLOW-UP OF SEVERE OBSTRUCTIVE SLEEP APNEA – HYPOPNEA SYNDROME AND PREDICTION OF SYSTEMIC ARTERIAL HYPERTENSION

D. Lighezan, S. Mihaicuta, V. Tudorache, R. Lighezan, D. Cozma, D. Barbat, D. Darabantiu, M. Andor, I. Catu, F. Pascu, H. Branea, R. Cristodorescu, M. Tomescu, A. Vlad, R. Timar, D. Navolan, S. Pescariu, D. Gaita, A. Anghel, S.I. Dragulescu. *Universitatea de Medicina si Farmacie Victor Babes, Timisoara, Romania*

Obstructive sleep apnea (OSA) is an important risk factor for systemic arterial hypertension (SH).

Aim: Identify the best predictors for SH in patients with obstructive sleep apnea – hypopnea syndrome.

Material and Results: We included prospectively 489 consecutive patients (pts) with clinically suspected OSA. The pts were included and followed-up for a mean period of 7 years by sleep questionnaires, anthropometric measurements, polysomnography for apnea-hypopnea index (AHI) (values: normal 0–4, mild 5–14, moderate 15–29, severe over 30) and history of ST. We evaluated the Odds Ratio (OR) together with 95% confidence interval (CI) in a univariate analysis and the independent variables in order to identify the most important predictors for ST. In the study population 346 males (71%) 143 females (29%), age 50 ± 12 years (range 18–84 years) were included. The Body Mass Index (BMI) was 34 ± 6 kg/m² (range 17–56 kg/m²) and the mean AHI 36 ± 28 . Systemic hypertension was found in 59% patients. The time from diagnostic to abnormal changes in blood pressure values was 7 ± 5 years. The structure of the population regarding SH was classified following the European Society of Hypertension 2007 Guidelines as follows: from the 59% of pts with SH 11% with high normal values, 15% stage I hypertension, 29 % stage II hypertension, 8% stage III hypertension. AHI in all 3 levels (mild, moderate and severe), with reference normal, is extremely significant ($p < 0.001$) in hypertensive patients. Still, only severe OSA is the strongest predictor for hypertension, OR 3.2 ($p < 0.001$, CI 1, 67–5, 59). Mild and moderate OSA did not significantly influence the appearance of systemic hypertension ($p < 0.14$, OR 0.58, CI 0.29 – 1.20, $p < 0.24$, OR 1.52, CI 0.76 – 2.86). SH is a weak predictor for OSA in univariate analysis, $p = 0.045$, OR 1.76, CI 1.01–3.08.

Conclusion: Patients with OSA are exposed to a higher risk of developing SH. A strong predictor for SH is only severe OSA.

PP.32.272 ENDOTHELIN CONTRIBUTES TO THE RISE IN BLOOD PRESSURE IN RESPONSE TO HYPOXIA IN PATIENTS WITH SEVERE OBSTRUCTIVE SLEEP APNEAS

C. Janssen¹, M. Gujic¹, S. Beloka¹, A. Pathak², P. van de Borne¹. ¹ULB Erasme, Brussels, Belgium, ²Inserm, Université de Toulouse, Toulouse, France

Background: Obstructive sleep apnea (OSA) is strongly correlated with an increased risk of systemic hypertension. However, the link between systemic hypertension and nocturnal apneas remains incompletely understood. Animal studies suggest an implication of the endothelin system. The aim of the study is to determine if endogenous endothelin (ET) plays a role in the increase in blood pressure observed during hypoxic episodes in OSA patients, in addition to peripheral chemoreflex and sympathetic nerve activation.

Methods: We assessed the effects of the nonspecific ET antagonist bosentan (500 mg; Tracleer; Actelion; Basel, Switzerland) on ventilation, hemodynamics, and muscle sympathetic nerve activity (MSNA) during normoxia and isocapnic hypoxia using a randomized, crossover, double-blinded, placebo-controlled study design, in 13 severely untreated sleep apneic patients (age 50 ± 9 years, apnea-hypopnea index 44 ± 19 per hour).

Results: Hypoxia increased blood pressure, MSNA and minute ventilation as oxygen saturation decreased. Bosentan suppressed completely the increase in systolic blood pressure during a 5 minute hypoxic challenge (143 ± 5 mmHg during hypoxia vs. 133 ± 5 mmHg during normoxia with placebo; 127 ± 3 mmHg during hypoxia vs. 125 ± 3 mmHg during normoxia under bosentan, $p = 0.023$). Diastolic blood pressure, and the rise in MSNA and ventilation during isocapnic hypoxia did not differ between bosentan and placebo.

Conclusion: ET contributes to the rise in systolic pressure in response to acute hypoxia in patients with severely untreated OSA. This was not due to lower chemoreflex activation with bosentan.

PP.32.273 HYPERTENSION AND OBSTRUCTIVE SLEEP APNEA: IS THE BERLIN QUESTIONNAIRE A VALID SCREENING TOOL?

C. Lombardi^{1,2}, R. Carabona³, L. Lonati², S. Salerno², P. Mattaliano², E. Colamartino², F. Gregorini², A. Giuliano^{1,2}, P. Castiglioni³, P. Agostoni⁴, G. Mancini¹, G. Parati^{1,2}. ¹Dept. Clinical Medicine and Prevention, Univ. Milano-Bicocca, Milan, Italy, ²Dept. Cardiology, Istituto Auxologico Italiano, IRCCS, Milan, Italy, ³Polo Tecnologico, Biomedical Technology Department, Fondazione Don Carlo Gnocchi Onlus, Milan, Italy, ⁴Centro Cardiologico Monzino, Univ. Milano, Milan, Italy

Obstructive sleep Apnea Syndrome (OSA) increases the risk of cardiovascular diseases, in particular hypertension. The gold standard for the diagnosis of OSA is polysomnography (PSG). Berlin questionnaire (BQ) is a validated approach to indirectly quantify the risk of OSA in a general population. Aim of our study was to explore the actual prevalence of OSA in a group of unselected hypertensive patients and to evaluate sensitivity and specificity of BQ in determining the risk of OSA in this population vs PSG. Methods. 151 subjects referred to the Hypertension Center of our Institute, were also administered the BQ; 66 of these also performed a cardiorespiratory PSG (Embletta device). 17 subjects were excluded because inconsistency or lack of questionnaire responses or technical problems during PSG.

Results: BQ suggested a high risk of OSA in 96% of cases. PSG showed that 59.2% of subjects presented an apnea-hypopnea index (AHI) > 5 , and 40.8% an AHI < 5 . The two groups were comparable by gender and age and subjective daytime sleepiness. BMI was significantly higher in patients with OSA (OSA 30.3 kg/m², non-OSA 27.1 kg/m², $p < 0.05$). Application of BQ as compared to PSG showed an high sensitivity (0.94) but an extremely low specificity (0), if the BQ is interpreted according to standard guidelines (use of 3 categories of questions, international criteria). If we exclude from the analysis the 3th category (not appropriate in this population because specifically asking for presence of hypertension or BMI > 30), the sensibility is 0.88 and the specificity increases significantly until to 0.39.

Conclusions: Our data confirm the high prevalence of OSA in patients with hypertension. For the first time we compare BQ and PSG data in hypertensive patients. Our data suggest that caution is needed when applying BQ in this population because of inappropriate questions in patients with known hypertension. A specific version of BQ applicable to hypertensive subjects is thus needed for a reliable screening of OSA in this population.

PP.32.274 SEVERITY OF OBSTRUCTIVE SLEEP APNEA RELATED TO ALDOSTERONE LEVELS IN SUBJECTS WITH RESISTANT HYPERTENSION

C. Gonzaga, A.C. Cordeiro, L. Lotaif, M.G. Sousa, O. Passarelli, F.A.O. Borelli, C. Amodeo, A.G.M.R. Sousa. *Dante Pazzanese Institute of Cardiology, Sao Paulo, Brazil*

Background: In resistant hypertension patients, severity of obstructive sleep apnea (OSA) and aldosterone levels have been described suggesting that they may be mechanistically linked.

Objective: This study prospectively evaluated the relation between OSA severity, plasma aldosterone concentration (PAC), and blood pressure in subjects with resistant hypertension.

Methods: Twenty five consecutive subjects (age 56.2 ± 8.7 years; 76% female) with resistant hypertension referred to an ambulatory for resistant hypertension were prospectively evaluated with plasma renin activity (PRA), PAC, blood pressure (BP). All subjects were evaluated by full-night attended diagnostic polysomnography. Patients were divided in two groups: with OSA clinically significant [apnea-hypopnea index (AHI) > 15 events/hr] and mild or absent OSA (AHI ≤ 15 event/hr).

Results: Clinically significant OSA was diagnosed in 68% of subjects. Overall, ambulatory BP was $155 \pm 29.9/95.4 \pm 18.6$ mmHg, body mass index (BMI) 34.1 ± 7.8 kg/m² and the number of anti-hypertensive drugs in use was 4.8 ± 0.9 . There was no difference between groups in neck circumference, BMI, PAC, PRA, number of medicine, and BP. In subjects with clinically significant OSA, AHI correlated to PAC ($r = 0.654$; $p = 0.015$), however it was not present in patients with mild or absent OSA ($r = 0.609$; $p = 0.198$), and in the total group ($r = 0.404$; $p = 0.096$). There was no significant correlation between both PAC and AHI with blood pressure. Values are reported as mean $\pm$ SD, and compared by t-test, Kruskal-Wallis (KW) test, χ^2 test or Fisher's exact test, where appropriate. Correlations were evaluated by Pearson or Spearman where applicable. Two-tailed p-values < 0.05 were considered significant.

Conclusion: OSA is extraordinarily common in patients with resistant hypertension. A significant positive correlation between PAC and severity of OSA is observed in resistant hypertension patients with clinically significant OSA but not in the control group. The correlation observed in the current analysis suggests that aldosterone may contribute to the development or worsen of OSA.

PP.32.275 ROLE OF DIFFERENT METABOLIC SYNDROME COMPONENTS ON THE RISK TO DEVELOP SLEEP APNOEA

A. Barbato¹, G. Rossi¹, A. Venezia¹, S. Avallone¹, D. De Palma¹, R. Ippolito¹, G. Zampa¹, F. Pappuccio², O. Russo¹, F. Galletti¹, L. D'Elia¹, M.A. Miller², P. Strazzullo¹. ¹Department of Clinical & Experimental Medicine, Federico II University Medical School, Naples, Italy, ²Clinical Sciences Research Institute, Warwick Medical School, Coventry, United Kingdom

Objective: In various clinical studies, apnoea sleep disorders have been associated with different cardiovascular and metabolic abnormalities. The aim of this analysis was to assess the relation between a multivariable apnoea prediction index, metabolic syndrome (MS) and its single components in an unselected sample of adult male population.

Design and Method: The relationship between MS (AHA 2005 criteria) and a high apnoea risk (HAR) evaluated by a multivariable apnoea prediction index higher than 0.5, was investigated in 612 (mean age $\pm$ SD = 59.7 ± 6.4 years) participants at the 2002–04 Olivetti Heart Study follow-up.

Results: The prevalence of MS and of HAR were respectively 36.6% ($n = 224$) and 60.8% ($n = 372$). MS and HAR were strongly associated ($\chi^2 = 26.3$; $p < 0.0001$). The prevalence of HAR increased gradually with increasing number of MS components. ($\chi^2 = 36.4$; $p < 0.0001$), the higher the MS score, the higher the prevalence of HAR. Using a logistic regression analysis with apnoea risk as dependent variable and MS components and age as independent factors, hypertension (blood pressure $> 130/85$ mmHg or treatment) and central adiposity (waist circumference > 102 cm) remained the only determinants of HAR with odds ratio (95%CI) of respectively 2.57 (1.53 to 4.33) and 3.84 (2.47 to 5.98).

Conclusion: In this sample of adult male population the prevalence of high apnoea risk was related to both presence and severity of metabolic syndrome. Among different components of MS, blood pressure and central adiposity were the factors more strongly associated to the risk to be affected by sleep apnoea disturbances.

PP.32.276 SLEEP DURATION AND ALL CAUSE-MORTALITY IN 1.3 MILLION PEOPLE WITH OVER 100,000 FATAL EVENTS

F. Cappuccio¹, L. D'Elia², P. Strazzullo², Ma Miller¹. ¹University of Warwick, Coventry, United Kingdom, ²Federico II University, Naples, Italy

Background: Increasing evidence suggests an association between both short and long duration of habitual sleep with adverse health outcomes.

Objectives: To assess whether the population longitudinal evidence supports the presence of a relationship between duration of sleep and all-cause mortality, to investigate both short and long sleep duration and to obtain an estimate of the risk.

Methods: We performed a systematic search of publications using MEDLINE (1966–2009), EMBASE (from 1980), the Cochrane Library and manual searches without language restrictions. We included studies if they were prospective, had follow up > 3 years, had duration of sleep at baseline and all-cause mortality prospectively. We extracted relative risks (RR) and 95% C.I. and pooled them using a random effect model. We carried out sensitivity analyses and assessed heterogeneity and publication bias.

Results: Overall, the 16 studies analysed provided 27 independent cohort samples. They included 1,382,999 male and female participants (follow-up range 4 to 25 years), and 112,566 deaths. Sleep duration was assessed by questionnaire and outcome through death certification. In the pooled analysis, short duration of sleep was associated with a greater risk of death (RR: 1.12; 95% CI 1.06 to 1.18; $p < 0.01$) with no evidence of publication bias ($p = 0.74$) but heterogeneity between studies ($p = 0.02$). Long duration of sleep was also associated with a greater risk of death (1.30; [1.22 to 1.38; $p < 0.0001$) with no evidence of publication bias ($p = 0.18$) but significant heterogeneity between studies ($p < 0.0001$). For short sleep, the effect was consistent across genders, age and socio-economic groups, and when stratified by duration of sleep, follow-up or location. For long sleep, the effect was stronger in older cohorts ($p = 0.01$), in longer duration of sleep ($p = 0.0004$), in East Asian cohorts ($p = 0.01$) and weaker in follow-ups > 20 years ($p = 0.01$).

Conclusion: Both short and long duration of sleep are significant predictors of death in prospective population studies.

PP.32.277 CARDIO-RESPIRATORY ADAPTATION TO HIGH ALTITUDE HYPOXIA IN PROFESSIONAL CLIMBERS VERSUS NON-CLIMBERS. THE HIGHCARE PROJECT

C. Lombardi^{1,2}, P. Meriggi³, P. Castiglioni³, M. Bartesaghi², G. Caldara², A. Faini^{1,2}, G. Bilo^{1,2}, M. Revera^{1,2}, E. Colamartino², F. Gregorini², A. Giuliano^{1,2}, M. Valentini², P. Mazzoleni³, M. Di Rienzo³, P. Agostoni⁴, G. Mancina¹, G. Parati^{1,2}. ¹Dept. Clinical Medicine and Prevention, Univ. Milano-Bicocca, Milan, Italy, ²Dept. Cardiology, Istituto Auxologico Italiano, IRCCS, Milan, Italy, ³Polo Tecnologico, Biomedical Technology Department, Fondazione Don Carlo Gnocchi Onlus, Milan, Italy, ⁴Centro Cardiologico Monzino, Univ. Milano, Milan, Italy

Periodic breathing (PB) affects sleep at high altitude, with differences between males and females as we showed previously. Our aim was to explore cardio-respiratory adaptations to high altitude in trained professional climbers (CL) as compared to male and female non-climbers (NC).

In 45 healthy subjects (23 male NC, 14 female NC and 8 male CL) participating in the HIGHCARE project, we performed an overnight polysomnography with the wearable MAGIC system and the portable Embletta polysomnographic device: at sea level (SL); within 48-h after arrival at 3500m; within 48-h and 12 days after arrival at Mt.Everest Base Camp (5400m). Arterial pressure (Portapres) was also monitored in supine position for 10 minutes during daytime.

In all subjects, mean arterial pressure increased from SL (77 ± 3 mmHg, $M \pm SEM$) to 3500m (82 ± 2) and 5400m (89 ± 2 and 86 ± 2 , acute and prolonged-exposure) and pulse interval decreased from SL (1074 ± 30 ms) to 3500m (896 ± 25) and to acute-exposure to 5400 m (851 ± 24), without significant differences between CL, male and female NC. However, during prolonged-exposure, pulse interval was significantly shorter in NC (806 ± 26) than in CL (950 ± 43 , $p < 5\%$).

At 3500m, apnea-hypopnea index (AHI) was significantly higher in male (40 ± 33) than in female NC (2.4 ± 2.8) or CL (6.5 ± 5), due to central apneas. At 5400m (acute), AHI was significantly higher in male NC (87.5 ± 35) and CL (78 ± 38) than in female NC (41 ± 43). After 12 days at 5400m, AHI was significantly higher in male NC (97 ± 30) only, without significant differences between CL (73 ± 23) and female NC (44 ± 39).

In conclusion, acclimatization differs in CL and NC. At 3500m, PB affects male NC only, while under acute exposure at 5400m it affects both male NC and CL. Under prolonged exposure to 5400m climbers display a better cardio-respiratory performance than NC, suggesting that training facilitates cardiac and respiratory adaptations to high-altitude hypoxia. [unrestricted support by Boehringer Ingelheim, Germany; Banca Intesa San Paolo, Italy and Sapio Life srl, Italy]

PP.32.278 SAFETY AND EFFICACY OF BETA-BLOCKER THERAPY IN OBSTRUCTIVE SLEEP APNEA PATIENTS WITH HYPERTENSION

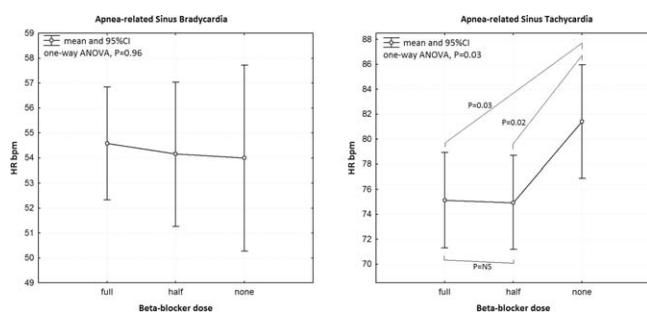
J. Wolf¹, J. Drozdowski², K. Czechowicz^{1,3}, J. Kanarek¹, M. Chrostowska¹, R. Nowak¹, J.M. Slominski², K. Narkiewicz¹. ¹Medical University of Gdansk - Department of Hypertension and Diabetology, Gdansk, Poland, ²Medical University

of Gdansk - Department of Allergy and Pneumology, Gdansk, Poland, ³Polish Academy of Sciences, The Szwedzki Institute of Fluid-Flow Machinery, Gdansk, Poland

Objective: Obstructive sleep apnea (OSA) is characterized by alternating peri-apneic bradycardias and post-apneic tachycardias occurring during sleep. It has been suggested, that beta1-blockers (BB) reduce nighttime blood pressure more effectively than other antihypertensive drugs in OSA patients. However, the effect of BB on periapneic reflex bradycardia and bradyarrhythmias in OSA is unknown. Therefore, we evaluated the influence of BB administration on peri-apneic heart rate alterations and bradyarrhythmias occurrence.

Design and Methods: We studied 88 patients with moderate-to-severe OSA (age 56.4 ± 10.1 , BMI 35.1 ± 6.5 , AHI 37.7 ± 22.3 , SpO₂ 92.4 ± 3.5 ; mean $\pm$ SD). Patients with central sleep apnea, obesity hypoventilation syndrome, atrial fibrillation, implanted pacemakers, as well as marked arrhythmias not related to disordered breathing episodes were excluded. Patients were subdivided into 3 groups according to BB use: none (n = 30), half (n = 34), and maximal registered drug dose (n = 24). Mean values of 50 randomly selected sleep-disordered breathing episodes were analyzed for each patient. We assessed peri- and post-apneic heart rates, as well as apnea-related bradyarrhythmias occurrence.

Results: Age, anthropometrics, polysomnographic indices, and mean sleep heart rate did not differ between the three groups (one-way ANOVA, $P > 0.05$ for all comparisons). Peri-apneic sinus bradycardic response was similar across the groups (Figure – left panel). Post-apnea reflex tachycardia was attenuated in both BB subgroups (Figure – right panel). Bradyarrhythmias occurrence was similar in hypertensives with and without BB (7 vs. 9% respectively, $P = 0.99$).



Conclusions: Beta-blocker therapy in obstructive sleep-apnea patients with hypertension appears to be both safe and effective in terms of heart rate control.

PP.32.279 SLEEP APNEA SYNDROME AND ASSOCIATED COMORBIDITIES

E. Sanchez Ruiz Granados, P. Saez Rosas, A. Grilo Reina, J. Santos Morano, ValmeS Hospital, Seville, Spain

Introduction: In the general population, OSA is by far the commonest form of sleep apnoea.

The severity of OSA is most often reported as the AHI.

Compared with the general population, the prevalence of OSA is higher in populations with cardiovascular conditions, such as hypertension (30–83%), heart failure (12–53%), ischaemic heart disease (30–58%) and stroke (43–91%).

Aim: Our aim is to describe the characteristics and comorbidities of patients with sleep apnea and to compare to patients without sleep apnea.

Material and Methods: This is an observational cohort study, where patients underwent to polysomnography and subsequent comorbidities were verified. The diagnosis of the obstructive sleep apnea syndrome was based on an apnea–hypopnea index of 5 or higher (five or more events per hour); patients with an apnea–hypopnea index of less than 5 or none symptoms for obstructive sleep apnea were used as a comparison group.

A total of 1814 everyone with hypertension and 336 of them with sleep apnea syndrome added to hypertension. Some of the general characteristics of this patients were: Fig 1.

Statistic Analyses: Qualitative variables were measured in frequencies and percentages and quantitative variables in mean and median (on asymmetric variables). We use chi square test to compare the relationship between qualitative variables and T student test to measure the relationship between a quantitative variable and a qualitative one.

Results (Fig 2): Patients with obstructive sleep apnea added to hypertension have more comorbidities than patients with hypertension without sleep apnea. They had more heart failure, more atrial fibrillation, more left ventricular hypertrophy, more arteriopathy and more arteriopathy. And although obesity can be a confusor factor that differences are still present when we analyze by stratificate groups.

Variable	HTN	HTN and OSA	P (statistic significance)
Exitus	18 (1.4)	6 (1.8)	$P > 0.05$
Myocardial Infarction	57 (4.3%)	20 (6%)	$P > 0.05$
Angor	146 (11%)	56 (17%)	$P < 0.004$ RR=1.6
Heart Failure	75 (5.7%)	37 (11%)	$P < 0.001$ RR=2.06
Atrial Fibrillation	44 (3.3%)	27 (8%)	$P < 0.000$ RR=2.3
Left ventricular hypertrophy	658 (50%)	189 (56%)	$P < 0.017$ RR=1.3
Neuropathy	73 (5.5%)	19 (5.7%)	$P > 0.05$
Arteriopathy	197 (15%)	71 (21%)	$P < 0.005$ RR=1.5
Impotence	70 (5.3%)	30 (9%)	$P < 0.012$ RR=1.75
Retinopathy	107 (8%)	31 (9.2%)	$P > 0.05$

Conclusions: Sleep apnea is a syndrome considered an independent risk factor for cardiovascular diseases. It is really important to take it into consideration because if we treat it after doing an early diagnosis, we could decrease the risk of cardiovascular diseases.

PP.32.280 OBSTRUCTIVE SLEEP APNEA (OSA) AND ITS INFLUENCE IN BLOOD PRESSURE CONTROL AND THE CARDIOVASCULAR PROGNOSIS IN HYPERTENSIVE PATIENTS

C. Amodeo, C.C. Gonzaga, A.C. Cordeiro, M.G. Sousa, W.A. Silva, M. Rigon, M. Oliveira, F. Borelli, O. Passarelli, L. Lotaif, A.G.M. Sousa. Dante Pazzanese Institute of Cardiology, São Paulo, Brazil

Introduction: The OSA has a significant prevalence among the hypertensive population and it is associated to a higher risk of cardiovascular event (CV). Despite its importance the OSA continues being underdiagnosed.

Objective: Assess the influence between the OSL and the blood pressure control as well as the CV prognosis at a specialized outpatient hypertension division.

Material and Methods: Berlin's questionnaire was applied in two different groups of hypertensive patients regarding their risk for OSA. We analyzed co morbidities (diabetes, dislipidimia, tobacco smoking) and the incidence of CV events and deaths in a 4 year follow up.

Results: Among the 334 assessed patients, 32% e 68% was on the low and high risk for OSA, respectively. Twelve percent out of the total presented CV event and the obit incidence was 0.89% (3 in the high risk patients group and 0 in the low risk patients group; * $p < 0.001$; † $p = 0.05$).

Conclusion: In the hypertensive population analyzed in this study the high risk patients for OSA had higher rate of CV events and deaths regarding their counter partner high risk patients for OSA.

	Low risk OSA	High risk OSA
Patients (n)	107	227
Age (yo)	58,0 $\pm$ 13,2	57,9 $\pm$ 10,3
Female(%)	51,4	58,6
BSA (kg m ²)	29,4 $\pm$ 4,5	31,5 $\pm$ 6,1*
Weist (cm)	96,6 $\pm$ 13,8	104,9 $\pm$ 61†
Sistolic blood pressure (mmHg)	144 $\pm$ 23,4	145,8 $\pm$ 24,1
Diastolic blood pressure (mmHg)	86,9 $\pm$ 14,6	90,2 $\pm$ 14,9†
Amount of Antihypertensive drugs	3,1 $\pm$ 1,2	2,9 $\pm$ 1,1
CV events, n(%)	8 (7,4)	33 (14,5)
deaths, n(%)	0	3 (1,3)*

PP.32.281 HYPERTENSIVE IMMIGRANTS ARE CHARACTERIZED BY LOWER PREVALENCE OF OBSTRUCTIVE SLEEP APNEA COMPARED TO NATIVE HYPERTENSIVES: A DIFFERENCE BEYOND ARTERIAL STIFFNESS

V. Katsi, I. Skiadas, G. Souretis, D. Tousoulis, C. Antoniadis, D. Tsartsalis, P. Theodoropoulos, C. Stefanadis, I. Kallikazaros. *Hippokratio Hospital - Department of Cardiology, Athens, Greece*

Objective: Obstructive sleep apnea syndrome (OSAS) and essential hypertension (EH) are closely associated, while increased arterial stiffness is a marker of diffuse vascular disease. In light of the mass immigration of Eastern European residents, we sought to investigate the prevalence of OSAS along with the assessment of the arterial stiffness within this high risk population

Design and Method: We studied 67 Eastern European immigrants with newly diagnosed untreated stage I-II EH (aged = 51.5 ± 15 years, 35 = male, office blood pressure (BP) = $158/92$ mm Hg), who immigrated to Greece within the previous two years and 61 untreated hypertensive native inhabitants, matched for age, gender, office BP and smoking status. All participants underwent polysomnography (apnea/hypopnea index >5) and arterial stiffness evaluation on the basis of carotid to femoral pulse wave velocity (c-f PWV) by means of a computerized method (Complior SP), while metabolic profile and anthropometric data were assessed as well.

Results: Hypertensive immigrants compared to native ones demonstrated decreased prevalence of OSAS (9.1% vs 12%, $p = 0.014$) and decreased levels of body mass index (29.3 ± 4 vs 32.2 ± 4 kg/m², $p < 0.05$). There was evidence that c-f PWV was elevated in the group of immigrants (8.4 ± 0.3 vs 7.2 ± 0.5 m/sec, $p < 0.05$). Immigrants also exhibited decreased waist circumference (94 ± 3 vs 101 ± 2 cm, $p < 0.05$). The two groups did not differ with regard to serum glucose and cholesterol levels (99 ± 9 vs 102 ± 8 mg/dl and 226 ± 40 vs 228 ± 35 mg/dl, respectively, $p = \text{NS}$ in both cases). Analysis of covariance revealed that the prevalence of OSAS and c-f PWV values remained statistically different between the two groups after adjustment for confounding factors ($p < 0.05$).

Conclusions: Hypertensive immigrants demonstrate lower prevalence of OSAS but they seem to have stiffer aorta compared to native hypertensives. Efforts should be directed at this vulnerable population focusing on putative mechanisms for this unfavourable and apparently paradox BP phenotype.

PP.32.282 SHORT-TERM CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY IMPROVES LEFT AND RIGHT VENTRICLE DIASTOLIC FUNCTION IN HYPERTENSIVE PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

E. Swierblewska, K. Kunicka, J. Wolf, R. Nowak, W. Kucharska, L. Bieniaszewski, K. Narkiewicz. *Medical University of Gdansk, Department of Hypertension and Diabetology, Gdansk, Poland*

Objective: Obstructive sleep apnea (OSA), particularly when moderate to severe, has been recently shown to be associated with impaired right and left ventricular diastolic function and increased left and right atrial volume. We tested the hypothesis that these abnormalities may be ameliorated by short-term continuous positive airway pressure (CPAP) therapy.

Design and Methods: We enrolled 14 hypertensive subjects with moderate-to-severe OSA (age 53.6 ± 9 , BMI = 33.1 ± 3.8 kg/m², AHI = 39.4 ± 20.1 , SpO₂ = 92.9 ± 2.5 , mean $\pm$ SD). All patients underwent echocardiography (Vivid 7 Pro device with 2,0–3,6 MHz transducer) before, and after one week of effective (AHI <5) CPAP treatment. We have assessed conventional 2D and Doppler mitral/tricuspid inflow parameters, and measured tissue Doppler velocities.

Results: Office blood pressure was not influenced by CPAP treatment. However, CPAP therapy had profound effects on echocardiographic measurements (Table).

Furthermore, linear regression analysis revealed significant correlation between left ventricle ECHO changes during CPAP ($\Delta E/A$'s) and diagnostic sleep study indices: $R = 0.54$, $P = 0.045$ for SpO₂; $r = -0.63$, $P = 0.016$ for mean disordered breathing episode length, and $r = -0.64$, $P = 0.013$ for mean desaturation.

Conclusion: Short-term effective CPAP improves diastolic function of both left and right ventricle in OSA hypertensive patients. These beneficial effects appear to be independent of office blood pressure changes.

	Baseline	After CPAP	P
E'avg (cm/s)	8.5 ± 2	9.1 ± 2.5	$P = 0.05$
E'ls (cm/s)	9.1 ± 2.4	9.9 ± 2.9	$P = 0.03$
E'/A'ls	$0.79 (0.6 - 0.9)$	$0.94 (0.65 - 1.2)$	$P = 0.05$
DecT (ms)	198 ± 35	181 ± 33	$P = 0.05$
LA (cm ²)	$23.8 (22 - 28)$	$22.1 (20 - 25)$	$P = 0.03$
RV E (m/s)	0.52 ± 0.04	0.55 ± 0.05	$P = 0.003$
RV E/A	$1.17 (1.06 - 1.28)$	$1.3 (1.24 - 1.58)$	$P = 0.03$
RA (cm ²)	21 ± 2.96 cm ²	18.7 ± 2.88	$P = 0.002$

E'avg - early diastolic mitral annulus velocity; average of lateral and septal site; E'ls - mitral annulus lateral site velocity; E'/A'ls ratio (A' - late diastolic mitral annulus velocity); DecT - early diastolic mitral wave deceleration time; LA - left atrium area; RV E - early diastolic tricuspid inflow velocity; RV E/A - late diastolic tricuspid inflow velocity; RA - right atrium area. Values are means $\pm$ SD except LA, RV E/A, E'/A'ls (Median and IQR).

PP.32.283 FEATURES OF CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY TO IMPROVE CEREBRAL BLOOD FLOW IN PATIENTS WITH MODERATE HYPERTENSION AND OBESITY

A. Aksenova, A. Litvin, P. Galitsin, M. Bugriy, E. Elfimova, M. Bolotova, V. Sergienko, I. Chazova. *Cardiology Research Complex, Moscow, Russia*

Objective: To explore opportunities to improve perfusion of the brain in hypertensive and obesity patients (pts) after 6 months therapy.

Design and Methods: The study sample consisted of 45 pts. They all had moderate hypertension (SBP = 153 ± 11 mm Hg; DBP = 93 ± 9 mm Hg) and obesity (body mass index 35 ± 5). All patients underwent overnight polysomnography (EMBLA Flaga (Iceland)). They were divided into three groups (gr). Gr.I and gr.II had severe OSAHS, apnea-hypopnea index (AHI 56 ± 23), gr.III without OSAHS. Continuous positive airway pressure therapy (CPAP) was administered to 17 patients of gr.I. Gr.II (11 pts) hadn't received CPAP therapy. All pts received the same antihypertensive therapy. rCBF was analyzed in 8 regions of interests by Ceretec-99M on single photon emission tomography (SPECT) in initial phase and after 6 months of therapy.

Results (%) GR 1: initial phase and after 6 months of therapy ($p < 0.0001$)

Frontal lobe	Frontal lobe d	Occipital lobe s	Occipital lobe d	Parietal lobe s	Parietal lobe d	Temporal lobe s	Temporal lobe d
69.245.1	69.346.5	65.347.4	65.447.8	78.745.4	81.443.9	75.944	75.744.8
88.946.5	86.145.5	79.349.0	77.549.3	97.047.7	99.147.4	16.246.5	96.246.5

GR 2: initial phase and after 6 months of therapy ($p > 0.05$) (* $p < 0.05$)

70.645.0	69.544.5	64.947.8	62.947.8	74.744.4	80.046.1	77.143.1*	78.743.4*
73.744.4	73.243.8	67.642.3	68.143.6	77.3547.4	82.248.5	82.947.1*	83.447.1*

GR 3: initial phase and after 6 months of therapy. * - ($p < 0.0001$)

70.746.7	68.646.6	67.148.5	64.447.6	77.744.2	81.744.2	74.747.4*	76.646.6*
72.848.5	72.3847.9	68.749.1	69.949.1	80.0146.8	83.646.9	84.749.3*	85.548.5*

Patients of first gr. had significantly increased cerebral blood flow in all regions of interests after 6 months of therapy ($p < 0.0001$). Patients of second gr ($p < 0.05$) and third gr. ($p < 0.0001$) had increased rCBF only in temporal lobes.

Conclusions: CPAP-therapy improves regional cerebral blood flow in patients with moderate hypertension, obesity and severe OSAHS.

PP.32.284 RELATIONSHIP BETWEEN SNORING WITHOUT APNEA WITH AMBULATORY BLOOD PRESSURE MONITORING IN HYPERTENSIVE PATIENTS

G. Caruso¹, D. Fernandez¹, M. Perez¹, M. Smurra², M. Sivori¹. ¹Ramos Mejia Hospital, Buenos Aires, Argentina ²Tornu Hospital, Buenos Aires, Argentina

Background: Recent studies have assessed the role of Obstructive Sleep Apnea (OSA) as independent risk factor for hypertension (HT).

Snoring is the principal manifestation of OSA. Apnea and hypoxia has been proposed as the main physiopathological mechanism of this association. However, there are a lot of snorers without apnea.

Objective: To determine in snoring hypertensive patients (HP) without OSA the relationship between the levels of blood pressure (BP) with snoring severity and correlated with the Ambulatory Blood Pressure Monitoring (ABPM) profile in this group of patients.

Methods: We prospectively included 48 male HP (age 55 ± 9 ; BMI 29 ± 4) stratified by ESH criteria. Office BP measurement, ABPM and Polysomnographic study (PSG) were performed in all patients and they were previously evaluated by Berlin questionnaires. Patients with Apnea Hypopnea Index which >5 event/hour, antihypertensive or anxiolytic therapy, smoke or alcohol abuse and respiratory pathology were excluded. Statistics analysis was performed by Kruskal-Wallis test, chi cuadrado and Spearman correlation. $p < 0.05$ was considered statistically significant.

Results: A significant relationship was found between snoring severity and nocturnal systolic or diastolic ($p < 0.01$) as well as 24 systolic BP ($p < 0.03$). This relationship remains when it was adjusted by age and BMI. Office BP didn't correlate with snore severity.

Nocturnal circadian rhythm was absent in 58% of HP.

Twentyfive patients (52%) had Increased Airway Resistance Syndrome (>10 arousals/hour) in the PSG pattern.

Nineteen patients (39.5%) showed inverse dipper pattern in ABPM (mask hypertension-MHT)

Conclusion: In our snoring hypertension population without OSA a significant relationship between snore severity and ambulatory BP level was found, with nocturnal predominance. Interestingly ABPM analysis showed a high incidence of non dipper pattern and MHT.

Our finding might suggest a different mechanism to explain the relationship between snoring and HT whose physiopathology would require further investigations.

PP.32.285 A NEW METHOD TO CAPTURE SLEEP APNEA-INDUCED BLOOD PRESSURE SURGE CORRECTLY AND EFFICIENTLY

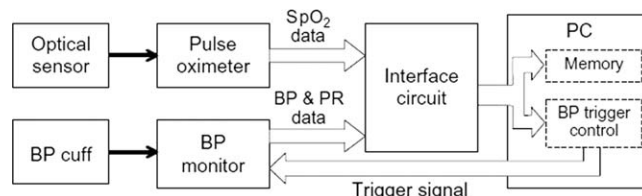
O. Shirasaki¹, M. Kuwabara¹, K. Tagami², K. Shimada³, K. Kario³. ¹Business Development Center, Omron Healthcare, Co., Ltd., Kyoto, Japan, ²Department of Clinical Laboratory, Washiya Hospital, Utsunomiya, Japan, ³Department of Cardiovascular Medicine, Jichi Medical University, Shimotsuke, Japan

Objective: It is well known that obstructive sleep apnea (OSA) causes steep blood pressure (BP) surge while apnea episode takes place. It could be clinically meaningful to measure the BP surge as it can develop cardiovascular risks through huge and repetitive transmural pressure load. However, the OSA-induced BP surge cannot be caught correctly by ambulatory BP monitoring which measures unsynchronizedly with OSA episodes. The purpose of our study was to develop a BP monitoring system capable of precisely capturing OSA-induced BP surge.

Design and Method: Block diagram of our experimental system is shown in the figure. SpO₂ was continuously monitored by a pulse-oximeter. BP measurement (BPM) with an oscillometric BP monitor, HEM-770 (Omron Healthcare, Co., Ltd., Kyoto) was triggered by the PC program. We compared the performance of two PC programs; Program-1 to trigger BPM when SpO₂ dropped down to a fixed threshold which was set as baseline value minus 10% and Program-2 with a variable threshold set depending on time from the last deep desaturation (drop of SpO₂). Thirteen OSA patients (52 ± 12.6 years of age, 1 female) underwent polysomnography (PSG) for two nights simultaneously with BP monitoring with the Program-1 and -2 one night each. The performance of the programs was evaluated based on the correlation between the indices related to the BP surge and AHI (severity of OSA) determined by the PSG, and the number of BPMs.

Results: The correlation coefficient between the BP surge and AHI was 0.693 ($p = 0.009$) with the Program-1, and 0.745 ($p = 0.003$) with the Program-2. The correlation between the timerate (velocity of the BP surge) and AHI was not significant ($r = 0.444$, $p = 0.13$) with the Program-1 whereas that with the Program-2 significant ($r = 0.585$, $p = 0.036$). Mean number of BPMs was 60 ± 55.0 and 36 ± 22.7 times for the Program-1 and -2, respectively ($p = 0.040$).

Conclusion: OSA-induced BP surge was measured more correctly and efficiently with BP measurement triggered by time-dependent threshold in SpO₂ comparing to that with fixed threshold.



PP.32.286 CARDIOVASCULAR RISK ASSESSMENT IN A FOLLOW-UP OF HYPERTENSIVE PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME IN ST PETERSBURG

L. Korostovtseva¹, Y.V. Sviryaev¹, N.E. Zvartau¹, A.O. Konradi¹, A.L. Kalinkin², E.V. Shlyakhto¹. ¹Almazov Federal Heart, Blood and Endocrinology Centre, St Petersburg, Russia, ²Clinical Hospital 83 FMBA, Moscow, Russia

Objective: To estimate the impact of obstructive sleep apnea/hypopnea syndrome (OSAHS) on cardiovascular morbidity and mortality and changes of the main cardiovascular risk (CVR) factors.

Design and Methods: 147 hypertensive patients (90 males), aged 23–80 years (mean 52.1 ± 10.4 years) were recruited in May 2003–March 2007. Based on the sleep study (Embletta Pds, Embla, USA) patients were divided into 2 groups. The control group included 42 non-OSAHS patients (apnea/hypopnea index (AHI) <5 /h), the second group – 105 OSAHS patients (mean AHI 32.9 ± 20.0 /h). Twelve (23.5%) patients from the second group receiving regular CPAP-therapy at home formed the third subgroup. The patients were examined twice per year. The primary (a composite of CV death, fatal/non-fatal myocardial infarction and stroke) and secondary (hospitalization for new or worsened CV disease) endpoints were assessed. Non-parametric statistics, Kaplan-Meier analysis and Cox proportional hazards model were used for data analysis.

Results: By March 2009 the mean follow-up period was 46.4 ± 14.3 months. Overall, events were registered in 23 patients (15.6%), including 13 deaths (8.8%) (mean age 55.5 ± 10.9 years). 20.4% untreated OSAHS patients achieved primary endpoint compared to 8.3% in CPAP-treated and 2.4% in control group. CVR was significantly higher in untreated OSAHS patients than in controls (OR = 8.557 95%CI 1.142–64.131, $p = 0.037$), but similar to CPAP-treated patients (OR = 0.379 95%CI 0.045–3.127, $p = 0.690$). CPAP-treated patients and controls had the same risk as well (OR = 3.727 95%CI 0.215–64.574, $p = 0.398$). Severe OSAHS was a significant indicator of a poor prognosis (OR = 9.203 95%CI 1.176–72.002, $p = 0.034$) independently of other variables (sex, age, body mass index, hypertension duration, smoking, alcohol use, level of physical activity, family history, coronary artery disease, glucose metabolism impairment), while mild-to-moderate OSAHS did not affect survival (OR = 8.588 95%CI 0.999–73.82 and OR = 4.205 95%CI 0.437–40.434, $p > 0.05$). Untreated OSAHS patients had higher hospitalization rate compared to controls (OR 2.750 95%CI 1.100–6.873, $p = 0.04$).

Conclusions: This study confirmed that OSAHS patients, in particular those with severe OSAHS (AHI ≥ 30 /h), have higher CVR, poor outcome, and higher hospitalization rate for CV disease.

PP.32.287 ENDOTHELIAL FUNCTION IN PATIENTS WITH HYPERTENSION AND OBSTRUCTIVE SLEEP APNOE SYNDROME

P. Galitsin, A. Litvin, T. Balakhonova, A. Aksanova, E. Elfimova, I. Chazova. Cardiology Research Complex, Moscow, Russia

Objective: Function assessment of endothelium by endothelial-dependent response of the brachial artery in hypertensive patients (pts) with obstructive sleep apnoe (OSA).

Design and Methods: The study sample consisted of 45 male patients. They were divided into two groups consisted of 30 pts (1gr) with previously diagnosed moderate/severe hypertension (SBP₂₄ = 167 ± 9 ; DBP₂₄ = 111 ± 12) and of 15 pts (2gr) controls. 15 pts from 1gr had moderate/severe obstructive sleep apnoe (AHI = 47.5 ± 2.2). Continuous positive airway pressure therapy (CPAP) was administered to 7 patients for 12 weeks. The participants were matched for age, weight and had no any lipid or carbohydrate metabolism disorders. The brachial artery diameter was measured in all pts during the rest and on 60, 90 reactive hyperemia via HDI 5000 system in 2D-scan mode. The standard polysomnographic

procedure via EMBLA flaga (Australia) and 24-hour blood pressure measurements via Spacelabs 90207 (USA) were performed for 30 subjects.

Results: Flow-dependent vasodilatation (FDVD), measured in brachial artery in 1gr ($m = 6.65 \pm 3.0\%$) was significantly lower than in healthy controls ($m = 11.6 \pm 3.1\%$) ($p < 0.001$). In 15 pts from 1gr with moderate/severe OSA FDVD ($m = 4.93 \pm 2.42\%$) was also significantly lower than in corresponding controls ($p < 0.001$) and was lower than in hypertensive patients ($n = 15$) without OSA ($m = 7.02 \pm 2.77\%$, $p < 0.05$).

After 12 weeks CPAP-therapy we have found a tendency to increasing FDVD from ($m = 5.02 \pm 2.14\%$) to ($m = 5.58 \pm 2.75\%$) ($p = 0.06$).

Conclusions: Endothelial function is more attenuated in hypertensive patients with OSA, than in hypertensive patients without OSA. Thus, the higher risk of cardiovascular events in hypertensive patients with OSA could be explained.

CPAP-therapy improves FDVD in pts with moderate/severe hypertension combination moderate/severe OSA.

PP.32.288 INFLUENCE OF NĖPAP- THERAPY ON ARTERIAL STIFFNESS IN PATIENTS WITH ARTERIAL HYPERTENSION II-III GR. AND SEVERE OBSTRUCTIVE SLEEP APNEA

Z. Sukmarova, A.J. Litvin, A.N. Rogoza, I. Chazova. *Russian Cardiology Research Complex-Department of Systemic Hypertension, Moscow, Russia*

There are many questions about mechanism of cardiovascular complication decreasing on NĖPAP - therapy.

Aims: To research the possibilities of correction of central BP (CBP) parameters and Arterial Stiffness (AS) on Antihypertensive Therapy (AT) and CPAP in prospective, randomized, double-blind, placebo- controlled cross- sectional study.

Materials and Methods: 46 pts (35 men) 55.6 ± 9.4 years with clinical BP $167.5 \pm 12.4/97.1 \pm 12.4$ mm Hg and OSA index 69.3 ± 24.6 , treated with combination of amlodipine 5–10 mg, valsartane 160 mg and HCT 25 mg. After 3–9 week AT pts were randomized in 2 groups: of effective NĖPAP (eCPAP) and CPAP-placebo. After 3 weeks on CPAP we carried out the crossover. At each step of intervention CBP and augmentation BP (AP) measuring were produced. AS was estimated by Ambulatory AS Index (AASI) (BPLab P.Telegin Ru) and by carotid-to-femoral pulse wave velocity (PWV) (Sfygmocor AtCorMedical, Fr.).

Results: CPAP- therapy induced additional reduction of CBP and AP. PWV demonstrated reduction of AS under medication and additional positive effect of eCPAP. Significantly reduction of AASI was detected only in AT and CPAP combination (tab 1). This accompanied to increasing numbers of patients with goal AS indexes in comparison with CPAP- placebo. Sham CPAP didn't change BP and AS (tab 2).

Conclusion: The addition on the CPAP-therapy to the medicament treatment in pts with severe OSA and AH results in improvement of arterial elastic property's and augmentation wave- according to the 24 h observe and standard diagnostic method.

Mean CBP and AS dynamic in treatment patients.

Tab 1

M $\pm$ SD	Initial	AT	AT + eCPAP
PWVcf (m/s)	14.3 $\pm$ 2.7	12.1 $\pm$ 3.2*	11.8 $\pm$ 2.2*#
AASI	0.55 $\pm$ 0.17	0.48 $\pm$ 0.19 ns	0.41 $\pm$ 0.18*ns
Central MBP mmHg	116.6 $\pm$ 12.1	100.5 $\pm$ 11.0*	95.3 $\pm$ 9.1*#
AP mmHg	13.5 $\pm$ 1.1	9.5 $\pm$ 0.9*	8.8 $\pm$ 0.9*

The number of patients achieved goal indexes AS on CPAP-therapy.

Tab 2

Goal indexes	AT	CPAP- placebo	AT + eCPAP
PWV<12 m/s	49	53	62*#
AASI<0.5	67	64	71#

*- $p < 0.05$ vs initial, #- $p < 0.05$ vs medication.

PP.32.289 SLEEP DISORDERS AND DIURNAL BLOOD PRESSURE RHYTHM IN NEVER TREATED HYPERTENSIVE PATIENTS

M. Makowiecka-Ciesla¹, A. Prejbisz¹, P. Bielen², B. Pucilowska-Jankowska¹, E. Florczak¹, M. Kluk¹, K. Purtak¹, A.J. Piotrowska³, T. Piotrowski³, M. Kabat¹, I. Cendrowska-Demkow¹, T. Buchner⁴, P. Sliwinski², W. Szelenger³, A. Januszewicz¹. ¹Institute of Cardiology, Warsaw, Poland, ²Institute of Tuberculosis and Lung Diseases, Warsaw, Poland, ³Medical University, Warsaw, Poland, ⁴University of Technology, Warsaw, Poland

Objective: To establish the relationship between two most frequent sleep disorders - insomnia and obstructive sleep apnea (OSA) and diurnal blood pressure rhythm in patients with never treated hypertension.

Methods: We investigated 121 consecutive patients with never treated hypertension, in 117 patients data concerning both insomnia and OSA were collected (92 M, 25 F; mean age 36.1 ± 10.1 yrs). Based on proportional change from awake to asleep systolic BP subjects were classified as dippers $\geq 10\%$ and non-dippers 0–10%. Insomnia was screened by Athens Insomnia Scale (AIS) and defined as the AIS score of ≥ 16 . All patients underwent polysomnography - apnea/hypopnea index (AHI) was calculated - mild (AHI 5–15) or moderate-severe (AHI > 15) OSA was diagnosed. We divided patients into 4 groups: without OSA and insomnia (OSA-I-), without OSA but with insomnia (OSA-I+), without insomnia but with OSA (OSA+I-), and with both OSA and insomnia (OSA+I+).

Results: Insomnia was diagnosed in 22.2% of patients (median AIS score 9), occurring nonsignificantly more frequently in women than men ($p = 0.062$). Mild and moderate-severe OSA was diagnosed respectively in 29.9% and 19.7% patients (mean AHI 9.7 ± 3.0 and 28.4 ± 14.5 respectively), occurring more frequently in men than women ($p < 0.001$). Both insomnia and OSA occurred in 12 patients (10.3%). Patients in the group OSA-I+ were older. Patients in the OSA+I- and OSA+I+ groups were characterized by higher BMI. There was no difference in non-dipping pattern between the groups (occurring in 46.7%, 46.2%, 43.5% and 18.2% patients in the groups OSA-I-, OSA-I+, OSA+I- and OSA+I+ respectively). There were no differences in BP values as well as BP decline at night and in total sleep time, REM and slow wave sleep time as well as arousal number between the groups.

Conclusions: In our studied group of never treated hypertensive patients there were no differences in BP profile between patients without and with sleep disorders. It should be noted that both insomnia and OSA were mild and did not led to pronounced sleep structure changes.

PP.32.290 ECHOCARDIOGRAPHIC INDICES IN PATIENTS WITH ARTERIAL HYPERTENSION AND OBSTRUCTIVE SLEEP APNEA SYNDROME IN COMBINATION WITH COPD

K. Miheieva. *Institute of Cardiology, Kiev, Ukraine*

Objective: To evaluate the links between the echocardiographic indices and indices of sleep disordered breathing in patients with arterial hypertension (AH) and obstructive sleep apnea (OSA) syndrome in combination with COPD.

Patients and Methods: We observed 54 patients with AH and OSA in combination with COPD. We performed office and ambulatory blood pressure measurement (ABMP04, Meditech), echocardiography (Medical Sono Ace, Philips), overnight polysomnography (SleepLab, Erich Jager) and bodyplethysmography (MasterLab, Erich Jager) in all patients. Results. Mean age of patients was 57.96 ± 1.43 years. Mean respiratory disturbance index was 23.04 ± 2.08 . Mean FEV1 was 66.39 ± 3.15 . Mean FEV1/FVC was 58.35 ± 2.04 . We found positive correlations between desaturation index and left ventricular mass index (LVMI) ($r = 0.64$; $p < 0.05$), and aorta diameter ($r = 0.37$; $p < 0.05$); and negative correlations between minimum O2 saturation and LVMI ($r = -0.63$; $p < 0.05$), and interventricular septum thickness ($r = -0.44$; $p < 0.05$).

Conclusion: In patients with AH and OSA in combination with COPD changes of echocardiographic indices were related to high desaturation index and low indices of oxygen saturation.

PP.32.291 FREQUENCY OF OBSTRUCTIVE SLEEP APNEA AND OTHER COMMON SECONDARY HYPERTENSION CAUSES IN PATIENTS WITH TRUE RESISTANT HYPERTENSION

E. Florczak¹, A. Januszewicz¹, A. Prejbisz¹, I. Cendrowska-Demkow¹, P. Zielen¹, M. Kabat¹, P. Sliwinski², P. Bielen², A. Klisiewicz¹, I. Michalowska¹,

M. Januszewicz³, E. Warchol¹, K. Belka¹, W. Januszewicz¹, P. Hoffman¹, A. Wiecek⁴, K. Narkiewicz⁵. ¹Institute of Cardiology, Warsaw, Poland, ²Institute of Tuberculosis and Lung Diseases, Warsaw, Poland, ³Medical University, Warsaw, Poland, ⁴Silesian Medical University, Katowice, Poland, ⁵Medical University, Gdansk, Poland

Objective: To evaluate the frequency of secondary hypertension causes - obstructive sleep apnea (OSA), renal artery stenosis (RAS) and primary hyperaldosteronism (PHA) in patients with true resistant hypertension and preserved renal function participating in the ongoing study.

Design and Methods: In our ongoing study we investigated 62 patients (36M, 26 F, mean age 48,4±9,6, range 27–65 yrs) with true resistant hypertension (defined as clinic BP >140/90 and ambulatory daytime mean BP >135/85 mmHg staying on 3 antihypertensive drugs including diuretic), without diabetes and impaired renal function (eGFR >60 ml/min/1,73m²) referred to our Clinic in year 2009. All patients underwent meticulous examination including: full night polysomnography, renal artery CT scan, adrenal and renal CT scan and hormonal evaluations for PHA, pheochromocytoma and Cushing syndrome. All secondary causes were diagnosed based on current guidelines.

Results: OSA (apnea/hypopnea index [AHI]>5) was diagnosed in 79,6% of patients. Moderate-severe OSA (AHI>15) occurred in more than half patients (53,7%), more frequently in men than women (77,4% vs.21,7%; p<0,001). In two females atherosclerotic RAS was found and in one man fibromuscular dysplasia and significant RAS was diagnosed. Increased aldosterone to renine ratio (>20) was found in 31,1% patients. In further examination PHA was diagnosed in 7 patients (11,3% of the whole group; 3 patients with adenoma and 4 patients with bilateral hyperplasia). In 2 pts subclinical Cushing disease was diagnosed. In none of the patients pheochromocytoma was diagnosed. In two patients renal tumors were found. All together moderate-severe OSA and other secondary hypertension causes were found in 35 patients (56,5%). Patients with secondary causes were older, more frequently men and were characterized by more pronounced left ventricular hypertrophy as compared to patients without secondary causes.

Conclusions: In our studied group of patients with true resistant hypertension secondary causes were frequent, with moderate-severe OSA occurring in more than half patients. It may be postulated that in patients with true refractory hypertension secondary hypertension should be obligatory screened.

PP.32.292 STUDY OF A SERIES OF 172 CASES OF HELLP SYNDROME AS A SEVERE COMPLICATION OF HYPERTENSION IN PREGNANCY

A.J. Vallejo, M.L. Miranda, L.M. Beltran, L. Gomez, S. Rodriguez, E. Pamies, P. Stiefel, O. Muñoz, S. Garcia-Morillo, J.M. Lopez-Chozas, V. Alfaro, R. Moreno, J. Villar. *Department of Internal Medicine, Hospital Universitario Virgen del Rocío, Sevilla, Spain*

Objective: To study the clinical and biological features of a large series of patients with HELLP syndrome.

Methods: Observational study of a series of consecutive patients that developed HELLP syndrome within the years 1999–2009, this syndrome being defined as the association of hemolysis (anemia, schistocytes, increased LDH, bilirubin >1,20 mg/dl), hepatic dysfunction with increased levels of transaminases (ALT or AST >40 IU/l) and thrombocytopenia <150x10⁹/l. General and obstetric characteristics, associated clinical data and morbidity, and biochemical parameters, were recorded.

Results: 172 pregnant women had HELLP syndrome. The presence of fetal non-viability (n=24) was associated with lower gestational age and fetal weight (p<0,001), higher frequency of history of preeclampsia (p=0,036), requirement for transfusion (p=0,023), and increased systolic blood pressure (BP) (p=0,012) and D-dimer levels (p=0,013). A direct relationship was found between gestational age and fetal weight (p<0,001); levels of systolic and diastolic BP were higher in cases of lower gestational age (p<0,002) and fetal weight (p<0,001).

Conclusions: The onset of the syndrome was in the postpartum period in a significant percentage of cases; it means that it is necessary to be alert also in the early puerperium. More frequent symptoms were epigastric pain and headache, which, although non-specifics, may serve to suspect the development of the syndrome in pregnant with hypertension. Results of correlation study may suggest that the disease could be more severe in cases of an earlier onset. Findings related to fetal mortality were lower gestational age and fetal weight, higher levels of systolic BP and D-dimer and a history of preeclampsia. Although the syndrome is uncommon, it is necessary to pay attention to the presence of risk factors and establish an early diagnosis and a

multidisciplinary management to avoid complications as consequence of this serious disease.

Age (years)	31,4±5,3
Hypertension previous to gestation	11,8%
Primiparity	74,1%
Preeclampsia in previous gestations	8,2%
Multiple gestation	18,1%
Gestacional age (weeks)	32,7±5,0
Postpartum onset	21,8%
Systolic BP (mmHg)	177,6±25,2
Diastolic BP (mmHg)	105,5±12,7
Proteinuria	91,9%
Edema	88,8%
Renal failure	15,8%
Heart failure	5,3%
Epigastric pain	46,8%
Nausea and/or vomiting	25,0%
Liver haematoma	0,6%
Disseminated intravascular coagulation	28,0%
Transfusion	30,6%
Headache	38,6%
Visual symptoms	12,3%
Eclampsia	8,8%
Maternal death	0,6%
Fetal distress	16,8%
Abruptio placentae	8,9%
Fetal viability	85,9%
Fetal weight (gr)	1987,1±839,6
Cesarean	74,9%
Haemoglobina (g/dl)	9,2±1,7
LDH (U/l)	671,3±441,8
Bilirubina (mg/dl)	1,6±2,2
AST (U/l)	234,9±338,4
ALT (U/l)	230,3±387,6
GGT (U/l)	32,8±29,9
Phosphatase alkaline (U/l)	331,4±233,3
Platelets (x10 ⁹ /l)	82,0±36,0

PP.32.293 PREGNANCY AND ANTIHYPERTENSIVE DRUGS

M. Leppée¹, J. Culig¹, N. Colak², M. Eric³. ¹*Andrija Stampar Institute of Public Health Zagreb, Zagreb, Croatia*, ²*Colpharm Doo, Siroki Brijeg, Bosnia Hercegovina*, ³*Medical School Novi Sad, Novi Sad, Serbia*

The aim of the study was to assess the prevalence of antihypertensive drug use and the rate of congenital malformations in neonates at in utero exposure to these drugs. The study was performed at departments of gynecology and obstetrics in four medical institutions in Zagreb and was conducted by use of a simply structured standardized questionnaire that consisted of two parts: mother's interview and hospital records. The epidemiological study involved 893 pregnant women. At least one drug was used during pregnancy and early postpartum period by 96.2% of 893 study women, with a mean of 2.7 drugs per woman. During the first trimester of gestation, which is most important for fetal development, drugs were taken by 859 (96.2%) women. Relatively large number of women used atenolol during pregnancy (a total of 82 or 9.2%); before pregnancy it took seven women, in the first trimester 17 pregnant women, in the second 32 and in third 62 pregnant women, which indicates that the number of pregnant women taking this medicine increased in parallel with the duration of pregnancy. According to FDA classification atenolol belongs to category D. Among the women who have birth children with heart and blood vessels malformations, one have taken atenolol during the entire pregnancy. It is a negligible percentage of impressions malformations and can not relate taking atenolol with the emergence of malformations of the heart and blood vessels. Calcium channel blockers verapamil have been taken one woman in the first, 11 in the second and 17 in the third trimester. Nifedipine have used negligible number of women (three in the first, two in the second and four in the third trimester). Eight women have been used ACE inhibitors (lisinopril four, cilazapril and enalapril two). Accordingly, the use of ATC group C agents increases with pregnancy advancement, as also indicated by our results. The usage of the most common used antihypertensive drugs, assume to be safe during lactation.

PP.32.294 GESTATIONAL HYPERTENSION: RISK FACTORS, CLINICAL AND LABORATORY FINDINGS

A. Molina Ordas¹, A. Rodriguez Gomez, M. Heras Benito, M.J. Fernandez-Reyes Luis, R. Sanchez Hernandez, F. Alvarez-Ude Cotera. ¹*Hospital General de Segovia, Segovia, Spain*

Gestational hypertension is not an uncommon situation. Previous studies have shown up hypertensive disorders complicate 5 to 10 percent of pregnancies. Multiple risk factors in gestational hypertension development have been described, just as: previous obstetrical preeclampsia history, first pregnancy, age, hypertension family history, obesity, multiple gestation. . . We have collected all gestational hypertension cases and its clinical and laboratory findings from our hospital between 1st January 2003 and 31st December 2009. We have evaluated 46 women. As a result of, we have found out the hypertension beginning was of 24.02 $\pm$ 12.36 weeks. The gestation ending was of 36.65 $\pm$ 2.70 weeks [5% women by caesarean section]. 15 women [32.6%] had developed hypertension in previous pregnancy and 17 [37%] had hypertension familiar history. Only 6 women [15.9%] were diabetic or had developed gestational diabetes. The most frequent antihypertensive treatment was Captopril [85.4%] followed by nifedipine [34.8%], labetalol [30.4%], and methyldopa [15.2%]. The most frequent laboratory findings were low levels of albumin [3.18 $\pm$ 0.53], proteinuria [1.20 $\pm$ 1.82] and a rise level in LDH [520.65 $\pm$ 408], uric [6.02 $\pm$ 1.7], and AST [44.13 $\pm$ 87.36], ALT [44.35 $\pm$ 72.06]. Hypertension familiar history patients have a bigger proteinuria [$p=0.06$]. It was more frequent the hypertension development of a previous gestation [$p=0.024$] and hypertension beginning after gestation [$p=0.014$]. The gestational hypertension beginning was earlier in women with a previous pregnancy hypertension history [$p=0.001$]. Finally, patients who required methyldopa treatment ended their pregnancy before the others [$p=0.039$].

POSTER SESSIONS

POSTER SESSION 33

NEW THERAPEUTIC DEVELOPMENT

PP.33.295 EFFECTS OF THE CYCLOOXYGENASE INHIBITING NITRIC OXIDE DONATOR NAPROXINOD VERSUS NAPROXEN AND IBUPROFEN ON 24-HOUR BP IN PATIENTS WITH OSTEOARTHRITIS AND HYPERTENSION

W. White¹, T. Schnitzer², P. Longlade³, R. Fleming³, J. Dijian³. ¹University of Connecticut School of Medicine, Farmington, USA, ²Northwestern University School of Medicine, Chicago, USA, ³NicOx S.A., Sophia-Antopolis, France

Background: Nonsteroidal anti-inflammatory drugs (NSAIDs) may induce destabilization of 24-hour blood pressure (BP) control in patients with osteoarthritis (OA) and treated hypertension, due in part to reduction in prostacyclin and increases in volume retention. Hence, we assessed the 24-hour BP effects of naproxinod and the conventional NSAIDs naproxen and ibuprofen.

Methods: The 24-hour ambulatory systolic BP effect of 2 doses of naproxinod (750 and 375 mg bid) vs 2 equimolar doses of naproxen (500 and 250 mg bid) and ibuprofen (600 mg tid) were studied in a 1:1:1:1:1 randomization scheme in a 16-week (90 days of active treatment) double-blind, randomized study involving 299 patients with OA, all of whom had controlled hypertension (< 140/90 mmHg) on 1-2 antihypertensive agents.

Results: At baseline, patients were 61 ± 9 years, 64% female, and 83% non-black. Baseline systolic BPs were similar in the 5 groups (Table). Mean increases from baseline in the 24-hour systolic BP were numerically less in patients on naproxinod compared to both naproxen and ibuprofen (Table).

Conclusions: These data confirm that the mean 24-hour BP increase was less with naproxinod compared to naproxen. Further, these are the first data to show a lesser BP effect of naproxinod versus ibuprofen. These findings have important clinical implications for OA patients with hypertension.

TABLE. EFFECTS OF NAPROXINOD, NAPROXEN, AND IBUPROFEN ON 24-HOUR SBP (13 WEEKS)

	Naproxinod 750 mg	Naproxinod 375 mg	Naproxen 500 mg	Naproxen 250 mg	Ibuprofen
Patients randomized/completed ¹⁾	59/48	65/50	60/48	60/44	55/35
Baseline SBP (mmHg) ²⁾	123 ± 10	123 ± 11	125 ± 11	124 ± 12	123 ± 9
Proportion on RAS blocker ¹⁾	56%	65%	68%	73%	73%
Δ in SBP (mmHg) (within group) ²⁾	0.9 ± 9.5	0.3 ± 10.0	2.9 ± 11.4	1.5 ± 8.1	3.8 ± 11.1
Δ in SBP (mmHg) for naproxinod 750 mg between groups ²⁾	----	----	2.0	----	2.8
Δ in SBP (mmHg) for naproxinod 375 mg between groups ²⁾	----	----	----	1.3	3.5

*RAS = renin-angiotensin system (ACE inhibitors and ARBs)

1) safety population (n=299) 2) modified ITT population (n=213)

PP.33.296 AT2 RECEPTOR STIMULATION - NOVEL THERAPEUTIC APPROACH FOR THE TREATMENT OF CHRONIC KIDNEY DISEASE

U. Steckelings¹, H. Peters, S. Krämer, N. Althoff, T. Loof, H.H. Neumayer, T. Unger. ¹Center for Cardiovascular Research, Institute of Pharmacology, Charité-Universitätsmedizin Berlin, Berlin, Germany, ²Dept. of Nephrology,

Center for Cardiovascular Research, Charité-Universitätsmedizin Berlin, Berlin, Germany

Angiotensin II plays a key role in the progression of chronic kidney disease (CKD) and has been shown to act profibrotic and proinflammatory via the angiotensin AT1 receptor (AT1R). Consequently, ACE-inhibitors and AT1R-blockers are standard medication in the treatment of some types of CKD such as diabetic nephropathy. The AT2-receptor (AT2R) counteracts actions of the AT1R and also of cytokines and growth factors. Here, we tested the therapeutic potential of AT2R-stimulation in a rat model of CKD using the novel selective, non-peptide AT2R agonist Compound 21 (C21).

CKD was induced in Wistar rats by subtotal nephrectomy (SNX). For 12 weeks, animal groups were formed as follows: sham surgery (sham; n=4); SNX (n=10) and SNX+C21 (0.15 mg/kg BW/day, n=10).

SNX resulted in increased systolic blood pressure (155 ± 5 mmHg) and protein excretion (242 ± 29 mg/d). C21 had moderate, non-significant effects on blood pressure (-7%), but significantly lowered proteinuria (-40%). On the molecular level, renal TGF-β 1 and fibronectin mRNA-expression was up-regulated in SNX animals (+6.0-fold; +6.5-fold vs. sham) and significantly reduced by C21 (-59%; -35%). Likewise, protein expression of TGF-β 1 and fibronectin was increased in SNX rats (+3.7-fold and +8.1-fold vs. sham) and significantly lowered in the C21 group (-46%; and -54%). In SNX, collagen I protein deposition was 2.4-fold increased and reduced by C21 treatment by -39%. Furthermore, SNX kidneys showed elevated infiltration with macrophages (+14-fold), lymphocytes (+24-fold) and proliferating cells (+20-fold). C21 treatment significantly decreased the number of renal macrophages, lymphocytes and proliferating cells by 56%, 54%, and 68%, respectively.

In this study, pharmacological stimulation of the AT2R improved renal fibrosis and inflammation and ameliorated proteinuria in rats with CKD. These findings introduce selective AT2R-agonism as a novel RAS-interfering concept for the treatment of CKD.

PP.33.297 BLOOD PRESSURE RESPONSE AND HIGHER COUNT OF CIRCULATING ENDOTHELIAL PROGENITORS PREDICT ANGIOGENIC GENE THERAPY EFFECTIVENESS IN HYPERTENSIVE PATIENTS WITH CHRONIC LIMB ISCHEMIA

K. Talitskiy, O. Bulkina, T. Arefieva, O. Vorobieva, T. Balakhonova, A. Samko, I. Levitskiy, D. Filatov, O. Stukalova, Y. Parfyonova, Y. Karpov. Russian Cardiology Research Centre, Moscow, Russia

Background: Therapeutic angiogenesis is a new promising treatment strategy for patients with chronic limb ischemia who are not candidates for interventional treatment. Several studies show improvement of ischemia after angiogenic gene therapy, while others do not. Endothelial progenitor cells (PC) are presumed to contribute to endothelial repair and angiogenesis. We sought to determine a link between circulating PC number and the effect of angiogenic therapy.

Methods: 27 hypertensive patients with Fontaine IIb-IV atherosclerotic limb ischemia and no option for surgery or angioplasty were randomized for vascular endothelial growth factor (VEGF) gene therapy (GT) or conventional treatment (CT). GT group (n=20) received intramuscular injections of VEGF-plasmid in 2 sets 7 days apart. All patients received appropriate medication and exercise training. The numbers of circulating CD45-CD34+AC133+ PCs were measured by flow cytometry in all patients before treatment and during follow-up.

Results: 3 months after treatment GT group shows significant improvement of walking distance, everyday activity and ankle-brachial index. GT group shows increase of limb perfusion assessed by 99mTc-MIBI scintigraphy, contrast MRI and transcutaneous oxymetry, while angiography shows increase of collateral network. 35% of GT patients had a good treatment effect, 45% had modest effect, and 20% had no effect. No significant change of clinical or laboratory indices were found in CT group patients (n=7). On subgroup analysis, GT patients with a good treatment effect had significantly higher PC level than non-responders (p=0.01). Blood pressure (BP) tended to decrease in GT patients during 2 weeks after VEGF-plasmid injection

despite no change in antihypertensive medication. However, this trend became significant only in GT patients with good treatment effect.

Conclusions: Angiogenic stimulation with VEGF-plasmid is overall effective in hypertensive patients with chronic limb ischemia. Better effect of angiogenic therapy in patients with higher endothelial PC number and greater BP decrease after VEGF gene transfer may reflect a role of endothelial function in angiogenesis.

PP.33.298 FUNCTIONAL SAFETY IN RESISTANT HYPERTENSIVE PATIENTS WITH BAROREFLEX ACTIVATION THERAPY

I. Scheffers¹, J. Schmidli², A. Kroon¹, J. Toiridoir¹, M. Mohaupt², Y. Allemann², J. Jordan³, S. Engeli³, U. Liebeskind⁴, F. Luft⁵, S. Eckert⁶, B. Hansky⁶, P. de Leeuw¹. ¹Maastricht University Medical Center and Cardiovascular Research Institute Maastricht, Maastricht, The Netherlands, ²University Hospital Inselspital, Bern, Switzerland, ³Institute for Clinical Pharmacology Medical School of Hannover, Hannover, Germany, ⁴Hospital Siloah, Hannover, Germany, ⁵Experimental & Clinical Research Center, Charité Campus Buch & Max Delbrück Center for Molecular Medicine, Berlin, Germany, ⁶Heart and Diabetes, Bad Oeynhausen, Germany

Objective: Present study measures functional safety of a novel implantable device to treat resistant hypertension. This device activates the carotid baroreflex to reduce blood pressure. Effects on functional safety are to be investigated.

Methods: We measured the effects of chronic continuous device therapy on renal function, (using serum creatinine), ability to exercise (using 6-minute hall walk), development of carotid artery stenosis (using ultrasound), and occurrence of orthostatic hypotension (using postural-related blood pressure readings).

Results: Blood pressure (BP) was significantly reduced by the device with 27/13 mmHg in 38 subjects who completed 3 months of therapy. This reduction was sustained and showed a mean fall of 31/18 mmHg in 31 subjects who completed 1 year of therapy (all: $P < 0.005$). Serum creatinine, measured in 22 subjects was 91.3 $\mu\text{mol/l}$ after 1 year of therapy and not changed compared with 91.8 $\mu\text{mol/l}$ at pre-implant. The walk distance was significantly increased after 1 year from 469 m to 516 m ($P = 0.02$) as measured in 14 subjects. None of the subjects had developed carotid artery stenosis after 1 year and no subjects had shown orthostatic hypotension.

Conclusions: Chronic carotid baroreflex activation significantly reduces arterial pressure, causing no decrease in renal function and an increase in ability to exercise. There is no evidence for development of carotid artery stenosis or the occurrence of orthostatic hypotension. The reproducibility of these findings will have to be determined via a randomized controlled trial which is currently underway.

PP.33.299 SELECTIVE AT2-RECEPTOR STIMULATION PROMOTES NEUROREGENERATION AND IMPROVES FUNCTIONAL OUTCOME IN AN ANIMAL MODEL OF SPINAL CORD INJURY

P. Namsolleck¹, F. Boato², K. Schwengel¹, C. Thöne-Reineke¹, K. Seidel¹, K. Lucht¹, S. Hendrix³, T. Unger¹, U.M. Steckelings¹. ¹CCR, Center for Cardiovascular Research, Charité, Universitätsmedizin Berlin, Berlin, Germany, ²Centrum für Anatomie, Charité, Universitätsmedizin Berlin, Berlin, Germany, ³Department of Morphology and Biomedical Research Institute (BIOMED), Hasselt University, Hasselt, Belgium

We have previously shown that the angiotensin AT2-receptor (AT2R) is upregulated in neuronal injury and when stimulated with angiotensin II promotes reinnervation and remyelination. The present study aimed to test AT2R-stimulation by the novel selective, non-peptide AT2R-agonist Compound 21 (C21) as a potential therapeutic approach for the treatment of experimental spinal cord injury in mice. Complementary experiments in primary neurons and organotypic cultures served to identify underlying neuroprotective mechanisms.

Spinal cord injury was induced by controlled extradural contusion (10 mN for 10 sec) at T9 in anaesthetized female Balb/C mice. 0.5 μl fluorescent dextrane was injected into the left motor cortex for ex vivo tracking of motor neurons. Animals were treated with C21 (0.3 mg/kg/day i.p.) or vehicle for 4 weeks. Locomotor deficits were evaluated daily by Basso Mouse Scale and foot print analysis. The impact of C21 (1 μM) on reinnervation was evaluated in a co-culture system consisting of green-fluorescent-protein-(GFP)-positive entorhinal cortices and hippocampal target tissue. Neuronal differentiation and apoptosis were investigated in primary murine, neuronal cells.

After spinal cord injury, C21 significantly attenuated locomotor deficits when compared to vehicle treatment (1.6 points on Basso Scale). Functional recovery was accompanied by a significantly increased number of motor neurons crossing the lesion area. In vitro, C21 significantly induced axonal ingrowth from entorhinal cortices into the hippocampal target tissue (+50%) as well as neurite outgrowth (+25%) from primary neurons. C21-induced neurite outgrowth was absent in neurons derived from AT2R-deficient mice. Treatment with C21 further significantly induced expression of anti-apoptotic Bcl-2 (+75.7%), of the neurotrophin BDNF (+53.7%), the neurotrophin receptor TrkB (+57.4%) and the marker for neurite sprouting, GAP43 (+103%).

Specific stimulation of the AT2 receptor with the non-peptide AT2R-agonist C21 ameliorated locomotor function after experimental spinal cord injury in mice through the promotion of axonal outgrowth resulting in reinnervation and through anti-inflammatory, anti-apoptotic and neuroprotective mechanisms. Thus AT2R-stimulation may be considered a novel therapeutic approach for disease states requiring neuroprotection and neuroregeneration.

PP.33.300 MUSIC THERAPY CONTRIBUTING TO THE QUALITY OF LIFE OF HYPERTENSIVE PATIENTS

C. Zanini¹, P.C. Jardim², C. Salgado², T. Jardim². ¹School of Music and Scenic Arts and Hypertension League of the Federal University of Goiás, Goiânia, Brazil, ²School of Medicine and Hypertension League of the Federal University of Goiás, Goiânia, Brazil

Hypertension (HTN) represents a significant challenge to public health, and among the many treatment goals for this condition, one of the most important is to maintain quality of life for our patients.

Objectives: Evaluating the effect of Music Therapy in the Quality of Life (QL) of patients with hypertension participating in a multidisciplinary patient-care program and establish a correlation between the results from two known and validated QL assessment instruments, the SF-36 and the Bulpitt and Fletcher Questionnaire.

Methods: Controlled clinical trial. The investigators evaluated patients > 50 years, with stage 1 HTN, registered in the multiprofessional service for the treatment of hypertension. These patients were divided in two groups: an experimental group (EG) and a control group (CG). In addition to receiving the conventional course of treatment offered by the service, patients allocated to the EG participated in weekly music therapy sessions for twelve weeks. Patients in the CG received only the standard care provided by the service. Before and after the intervention, patients in both groups answered the SF-36 and the Bulpitt and Fletcher questionnaires. The main therapeutic resource used was human voice. Statistical analysis: Student's T test, the Wilcoxon test, and Pearson or Spearman's correlations ($p < 0.05$ was considered significant).

Results: The groups were initially similar with regards to sex, age, schooling and QL, as assessed. According to the two instruments used in the evaluation, at the end of the study, patients in the EG experienced a significant improvement detected in both instruments of evaluation ($p < 0.05$). There was also a positive correlation between the two instruments used to assess the QL.

Conclusions: Both evaluation instruments were well correlated and demonstrated that music therapy contributed to improving the QL of these individuals. The study also demonstrated that this therapy modality can be inserted in a multidisciplinary care program for hypertensive patients.

PP.33.301 AUTOMOBILE AS THE NEW TREATMENT SYSTEM FOR THE HYPERTENSION

T. Yambe, R. Kawashima, M. Munakata, M. Yoshizawa. *Tohoku University, Sendai, Japan*

In the history, function of the Human body has been expanded with various vehicles like automobile, ship and plane, so exercise of the human body was tended to decrease by the vehicle, unfortunately. However, if the information of human body will be detected by the motor car and several kinds of intervention was added to the body, the automobile can become the treatment system. Several investigators have been studying about the man-machine interface. □ In this study, we added the diagnosis and therapeutic effect for the autonomic nervous system during driving. ECG recording system and pulse wave recording system was added to the handle and drive console in the experimental system. Air pressure sensors to detect the respiration and aortic pulse wave were inserted into the drive seat. By the evaluation of the ECG and pulse wave, we can evaluate the circulation dynamics. Furthermore, we can evaluate the pulse wave velocity, so, blood pressure was calculated from each driver data base. And fluctuations and baroreflex sensitivity were also

calculated. By the use of the information, several kinds of Aroma, Massage to the Acu-points or the automatic Moxibustion will be added to the driver. So, the automobile can control the hemodynamics and autonomic nerve condition during driving (Jpn.Pt.Appl.2009-326215). After ethical committee allowance, we evaluated the effect of aroma therapy and acu point stimulation on driver during drive simulation and recognition tests by the use of the healthy adult male volunteers. Hemodynamics, HRV and baroreflex sensitivity were tended to altered depending of the kinds of Aroma and stimulation to the several kinds of acupoints, suggesting the effect of alternative treatment to the driver. So, baroreflex system may be controllable during driving by alternative medical treatment. Furthermore, the Arousal and driving behavior were tended to altered by the alternative therapeutic intervention. These results suggest that automobile can become diagnosis and treatment machine to prevent hypertension.

PP.33.302 NORMOBARIC HYPOXIC THERAPY - NONMEDICINAL METHOD FOR PREVENTION OF AND TREATMENT OF ARTERIAL HYPERTENSION IN CHILDREN AND ADOLESCENTS

A. Vlasenko, V. Dolgikh, L. Richkova. *Scientific Center of the Family Health Problems and Human Reproduction SD RAMS, Irkutsk, Russia*

With a tremendous development of pharmacology, the methods of traditional medicine are becoming undeservedly forgotten, namely physiotherapy. Therefore we consider it actual to study the effect of normobaric hypoxic therapy according to modified method on the values of arterial pressure and state of emotional sphere of children and adolescents with arterial hypertension. Ninety-one children with arterial hypertension received correction by normobaric hypoxic therapy in our clinic. The treatment course consisted in 10 daily procedures on the apparatus "Everest-1" with frequency of breathing during the first procedures 3:1, later on 5:1 with gradual increase of exposition from 10 to 40 minutes according to the modified method. The values of arterial pressure on the data of diurnal monitoring of arterial pressure and psychologic study – determination of anxiety level by J.Teilor were used as efficiency criteria. The results obtained were compared with the control group (75 children) analogous in gender and age that received electrosleep according to the standard method as a nonmedicinal correction. During the analysis of means both night and day values of arterial pressure and diurnal indices of time of hypertension we determined significant reduction of arterial pressure in the subjects who received normobaric hypoxic therapy as a nonmedicinal correction, whereas in the control group we did not mark such significant changes. The study results proved the effect of normobaric hypoxic therapy on the emotional state of children and adolescents with arterial hypertension by significant reduction of the level of anxiety in the treated patients aged 12–15 years from 23.8 ± 1.1 to 16.9 ± 1.2 points and in adolescents above 15 years of age from 21.6 ± 1.1 to 15.1 ± 1.1 points ($p < 0.05$).

Thus method of normobaric hypoxic therapy in modified regime may be widely used in complex medical rehabilitation of children and adolescents with arterial hypertension. The criteria of the efficacy of nonmedicinal correction in children and adolescents with arterial hypertension are: reduction of the values of arterial pressure and level of anxiety.

PP.33.303 THE BEDTIME DOSING OF BARNIDIPINE HYDROCHLORIDE RESTORES CIRCADIAN RHYTHM IN NONDIPPER HYPERTENSIVE PATIENTS

G. Crippa, A. Cassi, E. Bravi, M.L. Fares, P. Cavallotti. *Hypertension Unit, G. da Saliceto Hospital, Piacenza, Italy*

Nondipper pattern (blunted or absent nocturnal decrease of blood pressure) is associated with increased cerebral, cardiovascular and renal events. Therefore, the normalization of blood pressure (BP) circadian rhythm is an important goal of antihypertensive treatment.

Aim of this study was the evaluation of the effect of a bedtime administration of the calcium channel blocker (CCB) barnidipine hydrochloride on blood pressure dipping status of treated hypertensive subjects.

Patients were selected according to the presence of a nighttime fall in systolic BP $< 10\%$ of daytime systolic BP on a previous ambulatory BP monitoring (ABPM).

The reproducibility of non-dipping status was confirmed through a second 24-h ABPM monitoring in 48 patients (mean age 59 ± 16 years, 20 females), whose treatment did not include a CCB.

On top of the previous stable treatment regimen, a bedtime (10.00–11.00 pm) 10 mg dosing of barnidipine was added to all subjects.

At study entry, mean daytime ABP was $135/83 \pm 7/8$ mmHg, while mean nighttime was ABP $131/82 \pm 7/7$ mmHg. After 12 weeks of add-on treatment with barnidipine a 24-h ABPM was repeated.

At study end, mean daytime ABP resulted slightly reduced ($126/79 \pm 7/6$, $-9/4$ mmHg), while mean nighttime ABP decreased in overt fashion ($115/74 \pm 6/6$, $-16/8$ mmHg).

The decrease in systolic and diastolic mean ABP induced by barnidipine bedtime administration resulted statistically significant (daytime systolic $p < 0.05$, daytime diastolic $p < 0.05$; nighttime systolic $p < 0.025$, nighttime diastolic $p < 0.025$; Student's t test for paired data; two-sided p, α level $p < 0.05$).

Among the 48 nondipper patients 27 (56%) of them showed complete normalization of circadian rhythm. Add-on treatment with barnidipine resulted generally well tolerated. Two patients developed mild symptomatic diurnal hypotension and 4 individuals presented mild leg oedema.

In conclusion, in treated hypertensive patients presenting nondipper pattern, bedtime dosing of the CCB barnidipine (added to previous stable treatment regimen) significantly reduced nighttime systolic and diastolic mean ABP and, in 56% of the subjects restored the previously altered circadian rhythm.

PP.33.304 HYPERURICEMIA, CRONOTHERAPY WITH ALOPURINOL AND HYPERTENSION

C. Calvo¹, J.E. Lopez Paz¹, A. Hermida Ameijeiras¹, M. Pena Seijo¹, G. Calvo González¹, M.L. Romero Miguez², A. Coca Payeras². ¹Hypertension and Vascular Risk Unit of Hospital Clínico Universitario, Complejo Hospitalario Universitario de Santiago, Santiago, Spain, ²Hypertension Unit, Hospital Clínico de Barcelona, Santiago, Spain

Background: Many studies have shown the existing relationship between uricemia and cardiovascular disease and, (JAMA 2008; 300:924-32). Uric acid values have circadian variation reaching its maximum intensity in the middle of the night, when circadian expression of circulating nitric oxide (NO) is minimal. The objective of this study is to analyse the effects of Alopurinol on uricemia and BP when administered on a time-dependent basis.

Subjects and Methods: 65 male patients (aged 23.4 ± 4.4 years) with asymptomatic hyperuricemia (blood UA levels > 7 mg/dl), preserved renal function and drug-naïve were included. Patients were assigned to 3 treatment groups for a 12-week period: one group received only hygienic-dietetic recommendations (no pharmacological intervention); the second group took Alopurinol 300 mg OD on awakening; third group took Alopurinol 300 mg OD at bedtime. In all cases, a clinical and biological assessment was performed, including Ambulatory Blood Pressure Monitoring (ABPM).

Results: In one group, neither uricemia (-0.3 mg/dl) nor ambulatory BP (-1.6 mmHg SBP-24h; -1.0 mmHg DBP-24h) modifications were observed. In the second group, a significant reduction was shown in uricemia levels (-1.8 mg/dl; $p < 0.001$ regarding the baseline value) and in SBP-24h (-3.1 mmHg; $p < 0.001$) and DBP-24h (-1.7 mmHg; $p = 0.178$). Finally, in the third group, significant reduction was shown in blood UA levels (-3.2 mg/dl; $p < 0.001$ regarding the baseline value) and in ambulatory BP (reduction of 6.7 mmHg in SBP-24h and of 4.4 mmHg in DBP-24h; $p < 0.001$ regarding the baseline ABPM; $p < 0.001$ regarding the other two treatment groups).

Conclusions: Administration of Alopurinol in young men with hyperuricemia decreases in a significant way both the AU levels in blood and the ambulatory BP. When administration is at bedtime, it not only increases the hypouricemic effects (when compared to awakening administration), but it also lowers ambulatory SBP and DBP in a statistically significant way. The findings of this study confirm the existing relationship between uricemia and development of hypertension.

PP.33.305 NON-COMPLIANCE OR THERAPEUTIC INERTIA AS A CAUSE OF POOR BLOOD PRESSURE CONTROL?

J.L. Llisterri¹, J. Galera², G. Muñoz², I. Teixidor³. ¹Health Care Center Ingeniero Joaquín Benlloch, Valencia, Spain, ²Novartis Farmaceutica S.A., Barcelona, Spain, ³Adkoma Health Research S.L., Barcelona, Spain

Objective: To evaluate the influence of physician's therapeutic inertia (TI) and the non-compliance in the blood pressure (BP) control.

Design and Methods: Cross-sectional, multicenter study with review of clinical records conducted in primary care (PC) centers and specialists of

Spain. Patients were hypertensive, ≥ 18 years old and had given their informed consent. Current and retrospective data (6, 12, 18 and 24 months) were recorded. Poor control of BP was defined when BP values were ≥ 140 and/or 90 mmHg. Compliance of patient was assessed through the Morisky-Green questionnaire. TI was considered the lack of treatment intensification (increased dose and/or addition of drugs and/or change of treatment due to lack of effectiveness) in patients with poor control of BP at any visit for the last 2 years.

Results: 5,307 patients were included: 54.2% men, mean age 65.3 years. 22.7% had controlled current BP and 77.3% non-controlled. 75.8% had poor control of current BP and in the last two years. 2,295 patients (43.9%) were compliant and 2,923 non-compliant (56.1%) in the current visit. 13% of patients were compliant with controlled BP, 31% were compliant with non-controlled BP, 9.7% were non-compliant with controlled BP and 46.3% were non-compliant with non-controlled BP. During last 2 years, TI was observed in 80.7% of patients (86.0% in PC and 74.5% for specialists). Poor BP control without changing treatment in visits 24, 18, 12 and 6 months before was observed in 53.5%, 45.3%, 48.6% and 50.6% of patients, respectively. The TI was more common in males, non-obese and patients treated with monotherapy or two-drug therapy.

Conclusions: In PC and specialist consultations, the percentage of patients achieving optimal BP values remains low. In more than five out of 10 patients shows poor compliance and eight in 10 physicians make TI. In compliant patients, there is a low rate of BP control that implies a high responsibility by physician in the lack of control.

PP.33.306 ADMINISTRATION TIME OF HIGH-DOSE VALSARTAN IN NON DIPPER HYPERTENSIVE PATIENTS

M. Pena-Seijo¹, A. Hermida-Ameijeiras¹, J.E. Lopez-Paz¹, G. Calvo-Gonzalez¹, M.L. Romero-Miguez¹, A. Coca-Payeras², C. Calvo-Gomez¹.
¹Clinic Hospital of Santiago, Santiago of Compostela, Spain, ²Clinic Hospital of Barcelona, Barcelona, Spain

Previous results with angiotensin II receptor blockers have shown their efficacy in reducing blood pressure (BP) throughout the 24 hours, independently of the administration time. However, the intake of these ARBs at night increased the diurnal/nocturnal ratio of BP. That is the reason why in this study we have analysed the chronotherapeutic efficacy of high-dose Valsartan in non dipper hypertensive patients.

45 patients (24 women) aged 62.3 ± 11.4 years-old with non-treated essential hypertension confirmed by ambulatory BP monitoring (ABPM) and with a non dipper circadian pattern were studied. After clinical and biological assessment, patients were assigned to two treatment groups according to the administration time of Valsartan 320 mg/day: on awakening (AWA) or at bedtime (BED). ABPM was performed (Spacelabs 90207 device), before and after 3 months of treatment and both the antihypertensive efficacy and the changes in the circadian pattern of BP were compared.

After 3 months of treatment, there was a significant decrease in 24h-BP and diurnal BP ($p < 0.001$), similar in both groups, with proved antihypertensive efficacy throughout the 24 hours (decrease in 24h-SBP/DBP: 16.6/10 mmHg on AWA, 18.8/11.6 mmHg at BED; decrease diurnal SBP/DBP: 16.6/10.2 mmHg on AWA, 17.1/10.4 mmHg at BED). However, there were a higher nocturnal BP decrease in patients taking Valsartan 320 mg at bedtime (decrease in nocturnal SBP/DBP: 15.5/9.7 mmHg on AWA; 24.3/15.5 mmHg at BED; $p < 0.001$). Diurnal/nocturnal ratio of BP showed no change with Valsartan AWA ($-0.4/+0.1\%$) but it increased in a significant way with Valsartan BED ($+6.3/+7.4$; $p < 0.001$) so 69.9% of the patients changed to a dipper circadian pattern.

Administration of Valsartan 320 mg/day in non dipper hypertensive patients shows an excellent antihypertensive efficacy independently of the administration time. Nevertheless, when the medication is taken at bedtime, there is a higher decrease of nocturnal BP together with an increase in the diurnal/nocturnal ratio of BP which, in many cases, restores to normal the altered circadian pattern of these patients.

PP.33.307 THE ROLE OF PHYSICAL ACTIVITY ON REGULATION OF BLOOD PRESSURE IN HYPERTENSIVE TREATED PATIENTS

G. Papadimitriou, M. Papavasileiou, K. Giannakopoulos, M. Seferou, A. Anastasopoulou, S. Karas. *Sismanoglion General Hospital, Athens, Greece*

Objective: To evaluate the effect of different levels of physical activity on proper regulation of blood pressure of hypertensive treated patients, on top of medical or other treatment.

Methods and Material: Evaluated were 362 hypertensive patients with treated arterial hypertension, who visited our hypertension clinic for the first time, of mean age 63.5 ± 13 years and MS/DBPo $139.2/84.6 \pm 19.2/10.98$ mmHg. In the assessment of their medical history included was the evaluation of their physical activity, by a personal questionnaire according the EPIC physical activity questionnaire (EPIC2) stratification. This represents a subjective estimation of the time and type of their physical activity, modified according to Greek activity habits.

Stage 0: no physical activity

Stage 1: Occasional involvement in walking, swimming or fishing

Stage 2: training twice per week, regular walking twice per week, equivalent swimming, bicycling or sport activity.

Stage 3: regular systematic participation in aerobic training programs or equivalent sport activity at least 4 times per week.

All patients underwent echocardiographic - Doppler evaluation of structure and function of the left ventricle and LV mass was calculated.

Results:

Table 1

	SBP ₀ mmHg	DBP ₀ mmHg	Mass gr
Stage 0	144.3 $\pm$ 19.8	85.9 $\pm$ 11	255.3 $\pm$ 88.2
Stage 1	136.9 $\pm$ 16.7	83.0 $\pm$ 12.3	250.2 $\pm$ 76.6
Stage 2	135.9 $\pm$ 18.2	82.8 $\pm$ 9.1	239.8 $\pm$ 71.4
Stage 3	134.6 $\pm$ 11.2	84.7 $\pm$ 11.2	226.9 $\pm$ 59
p value (ANOVA)	0.001	0.06	NS

SBP₀/DBP₀: office systolic/diastolic blood pressure

Mass: left ventricle mass

Conclusion: In hypertensive patients, under medication, intense physical activity participates in better SBP regulation and left ventricle mass tends to be smaller.

PP.33.308 SELECTIVE SEROTONIN REUPTAKE INHIBITORS AND ARTERIAL STIFFNESS: UNVEILING NEW LINKS

V. Katsi¹, I. Skiadas¹, K. Koutangelos², D. Tsartsalis¹, G. Souretis¹, G.N. Papadimitriou², C. Stefanadis¹, I. Kallikazaros¹. ¹Hippokratia Hospital - Department Of Cardiology, Athens, Greece, ²Medical School Of Athens - Eginitio Hospital - 1st Department Of Psychiatry, Athens, Greece

Objective: In view of the high likelihood that hypertensives will have comorbid anxiety and depression, all hypertensives should be screened for concurrent psychiatric illnesses and treatment. The aim of the study was to investigate the relationship between the administration of selective serotonin reuptake inhibitors (SSRIs) and arterial stiffness, a hallmark of the cardiovascular aging process.

Design and Method: We studied 210 consecutive untreated stage I-II essential hypertensive subjects (aged = 62 ± 9 years, 110 female, office blood pressure (BP) = $163/91$ mm Hg). The participants were divided into group A ($n=83$), those receiving SSRIs and group B ($n=127$), those without taking any antidepressant therapy. Arterial stiffness was evaluated on the basis of carotid to femoral pulse wave velocity (c-f PWV) by means of a computerized method (Complior SP). Venous blood sampling was performed for the estimation of routine metabolic profile.

Results: The two groups did not differ regarding age, gender, office systolic/diastolic BP as well as serum glucose and triglycerides levels (83 ± 9 vs 84 ± 8 mg/dl and 128 ± 8 vs 119 ± 9 mg/dl, respectively, $p=NS$ in all cases). Group A was characterized by increased levels of body mass index (32.4 ± 3 vs 29.2 ± 4 kg/m², $p=0.015$) and elevated cholesterol plasma levels compared to group B (231 ± 32 vs 220 ± 36 mg/dl $p < 0.05$). Group A compared to group B exhibited significantly increased c-f PWV (8.4 ± 0.3 vs 7.2 ± 0.5 m/sec, $p=0.02$) and this difference remained significant after adjustment for confounders ($p=0.03$). In the SSRIs treated- hypertensives, c-f PWV was correlated with age ($r=+0.35$, $p=0.015$) and office systolic BP ($r=+0.33$, $p=0.02$), while no significant correlation was demonstrated with cholesterol levels ($p=NS$).

Conclusions: In essential hypertension, the administration of SSRIs exerts an incremental effect on arterial stiffness, accelerating the vascular ageing process.

PP.33.309 NON-COMPLIANCE TO THERAPY AS A FREQUENT CAUSE OF RESISTANT HYPERTENSION – HOW COMMON AND HOW TO DETECT IT?

B. Strauch¹, O. Petrak¹, J. Rosa¹, T. Zelinka¹, Z. Somloova¹, J. Kurcova², L. Chytil², R. Holaj¹, J. Widimsky Jr¹. ¹3rd Internal Clinic, General Teaching Hospital, 1st Faculty of Medicine, Charles University, Prague, Czech Republic, ²Institute of Forensic Medicine and Toxicology, Toxicology Laboratory, General Teaching Hospital, 1st Faculty of Medicine, Prague, Czech Republic

Objective: Non-compliance with the antihypertensive treatment is a frequent cause of resistant hypertension, but is relatively difficult to assess. The aim of our study was to assess the prevalence of pseudo-resistant hypertension caused by non-compliance among patients with hypertension grade 3 resistant to a combination of at least 3 antihypertensive drugs in maximal doses including a thiazide diuretic.

Design and Methods: 60 hospitalized patients (22 females) with resistant hypertension and 30 out-patients (14 females) with resistant hypertension were enrolled in our study. All patients underwent a clinical investigation including unplanned blood sampling for the measurement of concentration of several plasma antihypertensive drugs (amlodipin, betaxolol, bisoprolol, doxazosin, losartan, metoprolol, telmisartan, doxazosin, losartan, metoprolol, verapamil, hydrochlorothiazide, perindoprilat and ramiprilat) which was performed in a toxicological laboratory by fast liquid chromatographic technique coupled with tandem mass spectrometric detection (LC-MS/MS).

Results: The mean office blood pressure in out-patients was $180 \pm 29/101 \pm 19$ mmHg, in hospitalized patients $167 \pm 23/100 \pm 15$ mmHg. In 40% of out-patients, the levels of antihypertensive drugs were non-detectable, in next 40%, only levels of some of the prescribed drugs were positive and in the rest 20% of patients plasma drug concentrations were within therapeutic limits. In hospitalized patients, 80% of them were taking all assessed medication, in 12% of the patients the levels of antihypertensive drugs were non-detectable and 8% only levels of some of the prescribed drugs were positive.

Conclusions: We have observed a surprisingly very low compliance to the antihypertensive treatment among investigated out-patients with severe hypertension. This may lead us to suggest this evaluation in all of them before exclusion of secondary hypertension. The compliance among hospitalized patients was better probably due to a greater motivation of these patients.

So, the evaluation of antihypertensive drugs concentrations is a useful and very precise method for assessment of a possible noncompliance to the antihypertensive treatment. Noncompliance to therapy in resistant hypertension is frequent.

PP.33.310 A CROSS-OVER COMPARISON OF ANTI-ALBUMINURIC EFFECTS AMONG 4 TYPES CALCIUM CHANNEL BLOCKERS ON CHRONIC KIDNEY DISEASE

T. Konoshita, Y. Makino, T. Kiura, M. Fujii, S. Wakahara, K. Arakawa, I. Inoki, I. Miyamori. *Fukui University School of Medicine, Eiheiji, Japan*

Background and Objectives: At the intervention for hypertension with chronic kidney disease (CKD), albuminuria is one of the pivotal targets as well as strict blood pressure (BP) control for organ protection. Calcium channel blocker (CCB) is one of the most expected agents for CKD. Currently CCBs have been classified by half-life, drug delivery system and channel types. We tested anti-albuminuric effect and humoral factors level of 4 types of CCBs in CKD.

Methods: Subjects were 50 hypertensives with CKD (male/female 22/28, age 69.8 ± 10.8 yrs, SBP/DBP $164.7 \pm 17.1/92.3 \pm 12.2$ mmHg, s-Cr 0.81 ± 0.37 mg/dl, urinary albumin excretion (UAE) $69.4 (33.5-142.6)$ mg/gCr). CCBs were administered for 12 weeks in a crossover manner. Tested agents were nifedipine CR, a long biological half-life L type CCB with controlled release system, cilnidipine, an N/L type CCB, efonidipine, a T/L type CCB and amlodipine, a long biological half-life L type CCB with trans-membrane approach.

Results: Comparable BP reductions were obtained. UAE at endpoints were as follow (mg/gCr, * $P < 0.05$): nifedipine CR $30.8 (17.3-81.1)$, * cilnidipine $33.9 (18.0-67.7)$, * efonidipine $51.0 (21.2-129.8)$, amlodipine $40.6 (18.7-94.7)$. By all agents, significant augmentations were observed in PRA, angiotensin I and angiotensin II (AngII). AngII at cilnidipine was significantly lower than that at amlodipine. PAC at cilnidipine and efonidipine was

significantly lower than that at amlodipine. Nifedipine CR significantly reduced ANP concentration.

Conclusions: It is revealed for the first time that, although all tested drugs reduced UAE, only nifedipine CR and cilnidipine could reach statistical difference. Thus, it is suggested that, in respect of albuminuria reduction, the 2 CCBs might be favorable for organ protection in CKD.

PP.33.311 CHANGES IN WAVE PULSE VELOCITY INSIDE A GROUP OF NON PREVIOUSLY TREATED HYPERTENSIVE PATIENTS

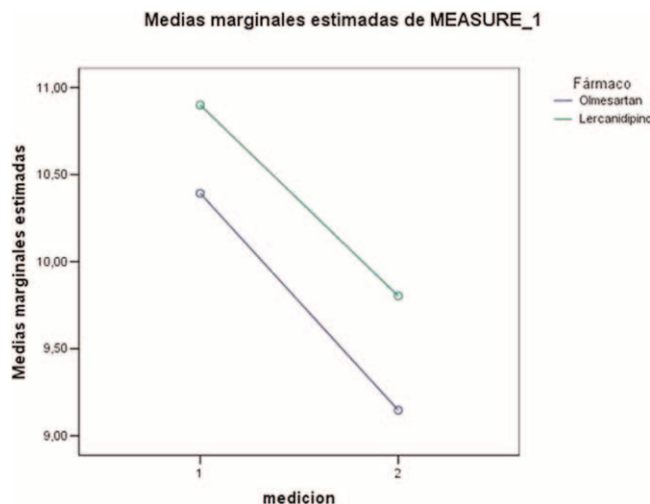
F. Jaén Águila, J.D. Mediavilla García, A. Ruiz Sancho, D. Esteva Fernández, C. Fernández Torres, J. Jiménez Alonso. ¹Virgen De Las Nieves University Hospital, Granada, Spain, ²San Cecilio University Hospital, Granada, Spain

Introduction: The improvement of vascular distensibility has been related to Blood Pressure descent in several studies.

Objective: This study analyses the results of Olmesartan (angiotensine II AT1 receptor blocker) and Lercanidipine (third generation calcium channels blocker) over the vascular wall, estimated through Wave Pulse Velocity (WPV), and determines the correlation with Blood Pressure descent.

Patients and Method: 82 patients were included. Arterial stiffness was assessed through Wave Pulse Velocity (WPV) according to the Complior system. The analysis was carried out with SPSS 13.0 for Windows, and $p < 0.05$ was considered as significant.

Results and Conclusions: Olmesartan achieved a reduction of 1.24 m/s (from 10.38 ± 1.81 to 9.14 ± 1.60 m/s), that is 11.94% , with $p < 0.05$ and independently from the degree of BP reduction. Lercanidipine also achieved statistically significant results at the end of the treatment, with a reduction of 0.71 m/s (from 10.51 ± 1.88 to 9.80 ± 1.83 m/s), 6.75% , with $p < 0.05$. WPV was reduced regardless of the degree of BP reduction and there were no differences regarding gender. The descent was more noticeable in patients between 40 and 55 years, despite the fact that BP descent was not as marked in this group as in those of older ages.



PP.33.312 DIFFERENCE IN INCIDENCE OF COUGH INDUCED BY IMIDAPRIL AND RAMIPRIL: ROLE OF PROSTAGLANDIN SYNTHESIS INHIBITION

R. Fogari¹, A. Mugellini¹, P. Preti¹, A. Zoppi¹, T. Perrone¹, L. Corradi¹, A. Salvetti². ¹Department of Internal Medicine, University of Pavia, Pavia, Italy, ²Internal Medicine, University of Pisa, Pisa, Italy

It has been reported that the ACE-inhibitor related cough is less with imidapril than with some other ACE-inhibitors. Aim of this study was to evaluate whether treatment with imidapril reduce cough induced by ramipril and to evaluate the effect of addition of indomethacin, a known inhibitor of prostaglandins synthesis, to the 2 ACE-inhibitors on cough frequency and intensity.

After 1 week placebo period 84 hypertensive patients who developed cough during chronic ramipril treatment were randomized to ramipril 10 mg or imidapril 20 mg for 8 weeks. Subsequently patients still complaining cough continued the respective ACE-inhibitor treatment, but in each arm they were allocated to receive also indomethacin 50 mg twice daily or placebo twice daily for 4 weeks according to a double masked, double dummy, cross-over design. At the end of each phase of the study cough was assessed by means of a self-administrated questionnaire with an ordinal 10-point visual analogue scale for rating daily cough intensity and frequency.

At the end of the 8 weeks monotherapy phase 41 of 42 (98%) patients randomized to ramipril complained cough, while among the patients randomized to imidapril cough was complained by 23 of the 42 patients (55%), the difference between the 2 groups being statistically significant ($p < 0.01$). Indomethacin addition eliminated cough in 20% of patients in ramipril group and in 22% of patients in imidapril group while reduced cough intensity and frequency in 51% of patients in ramipril group and in 52% of patients in imidapril group; no significant difference was observed between the 2 treatment groups.

These results indicate that incidence of cough is lower with imidapril than with ramipril and that prostaglandins play a role in the cough induced by ACE-inhibitors. The finding that the effect of indomethacin is the same with the 2 ACE-inhibitors suggests that the lower incidence of cough observed with imidapril is mediated by same mechanism independent of prostaglandin synthesis.

PP.33.313 THERAPEUTIC INERTIA AND PERSISTENCE IN THE LAST TWO YEARS ACCORDING TO THE CURRENT DEGREE CONTROL OF BLOOD PRESSURE

J.L. Llisterri¹, J. Galera², G. Muñoz², I. Teixidor³. ¹Health Care Center Ingeniero Joaquín Benlloch, Valencia, Spain, ²Novartis Farmaceutica S.A., Barcelona, Spain, ³Adkoma Health Research S.L., Barcelona, Spain

Objective: To evaluate therapeutic inertia (TI) during the last two years according to the current control of blood pressure (BP).

Design and Methods: Cross-sectional study with review of clinical records conducted in primary care (PC) centers and specialists of Spain. Patients were hypertensive, ≥ 18 years old and had given their informed consent. Current and retrospective data (6, 12, 18 and 24 months) were recorded. TI was considered the lack of treatment intensification (increased dose and/or addition of drugs and/or change of treatment due to lack of effectiveness) in patients with poor control of BP (≥ 140 and/or ≥ 90 mmHg) at any visit for the last 2 years. TI in any follow-up visit was considered partial and at all visits total.

Results: 5,307 patients were included (54.2% men, mean age 65.3 years). TI was observed in 80.7% of patients (10.1% partial and 70.6% total). Highest percentage of total (9%) and partial (51.9%) TI was observed in patients with poorly controlled BP values two years before and at the time of the study. TI was 86.0% in PC and 74.5% in specialist centers ($p < 0.05$). At the study visit, 22.7% of patients had C and 77.3% NoC. 47.2% of C patients and 73.5% of NoC underwent treatment intensification being drug addition the most frequent option (65.8% and 71.4% respectively), followed by increasing dose (48.6% and 61.2% respectively). Among patients with NoC two years ago treatment was intensified in 49.7% of the C at the time of the study and 74.1% of NoC in that moment. The probability of TI was associated with patients attended in PC (OR 1.71) and older attending physician (OR 1.52).

Conclusions: TI is observed in 8 of 10 patients poorly controlled, being especially important in patients uncontrolled both 2 years before and today, as well as attended in PC. When the intensification of treatment is performed, it fails to achieve optimal BP values.

PP.33.314 EARLY BLOOD PRESSURE CONTROL BY THE NIFEDIPINE GITS/TELMISARTAN COMBINATION

G Mancia¹, G Parati^{2,1}, G Bilo^{2,1}, LM Ruilope³, on behalf talent Investigators. ¹Dept. of Prevention and Clinical Medicine; University of Milano-Bicocca, Milan, Italy, ²Ospedale San Luca, Istituto Auxologico Italiano, Milan, Italy, ³Hypertension Unit, 12 de Octubre Hospital, Madrid, Spain

Background: Guidelines recommend combination treatment to be used as initial step in hypertensive patients at high cardiovascular (CV) risk because in this condition the earlier blood pressure (BP) control (and CV protection) achievable by two vs. one antihypertensive drug administration may be desirable.

Goals: To determine whether initial treatment with telmisartan plus nifedipine GITS provides an earlier office and ambulatory BP control compared to initial treatment with the combination components in monotherapy and to verify whether initiating treatment with a combination allows a better long-term BP control, compared to use of combination treatment after initial monotherapy.

Methods: 405 subjects with office systolic BP at inclusion ≥ 135 mmHg and with a high CV risk because of diabetes, metabolic syndrome and/or organ damage were randomized to initial administration of telmisartan plus nifedipine GITS (80 mg and 20 mg daily, respectively), to telmisartan alone or nifedipine GITS alone in a 2:1:1 ratio. Treatment was continued for 24 weeks shifting the monotherapy groups to combination treatment after 8 weeks. Office and ambulatory blood pressure were measured respectively after 2, 8, 16 and 24 and after 8, 16 and 24 weeks of treatment.

Results: The main results for the per-protocol population ($N=327$) are shown in the Table.

Table. Systolic (S) and diastolic (D) office and ambulatory BP (least square means $\pm$ SE; mmHg) in the three study groups: Telmisartan 80 mg ($N=74$), Nifedipine GITS 20 mg ($N=89$); combination ($N=164$). All subjects were on combination therapy starting from week 8. No significant baseline differences were found between groups.

	Group	Baseline	2 weeks	8 weeks	16 weeks	24 weeks
Office SBP	Telmisartan	153.5 $\pm$ 1.4	142.0 $\pm$ 1.3 *	139.2 $\pm$ 1.5	134.6 $\pm$ 1.5	134.3 $\pm$ 1.5
	Nifedipine GITS	153.4 $\pm$ 1.4	142.7 $\pm$ 1.2 #	140.2 $\pm$ 1.5	133.8 $\pm$ 1.4	136.2 $\pm$ 1.4
	Combination	152.9 $\pm$ 1.0	138.7 $\pm$ 0.9	138.7 $\pm$ 1.1	135.4 $\pm$ 1.1	135.2 $\pm$ 1.1
Office DBP	Telmisartan	91.5 $\pm$ 1.1	84.4 $\pm$ 0.9	84.3 $\pm$ 1.0	82.5 $\pm$ 1.0	81.2 $\pm$ 1.0
	Nifedipine GITS	90.2 $\pm$ 1.0	85.1 $\pm$ 0.8 *	85.0 $\pm$ 0.9	81.8 $\pm$ 1.0	82.8 $\pm$ 1.0
	Combination	90.4 $\pm$ 0.8	83.2 $\pm$ 0.6	83.1 $\pm$ 0.7	82.2 $\pm$ 0.7	81.9 $\pm$ 0.7
24 h SBP	Telmisartan	135.5 $\pm$ 1.5	-	128.9 $\pm$ 1.2 *	123.7 $\pm$ 1.2	122.9 $\pm$ 1.3
	Nifedipine GITS	136.4 $\pm$ 1.4	-	130.3 $\pm$ 1.1 #	125.2 $\pm$ 1.1	125.1 $\pm$ 1.2
	Combination	136.1 $\pm$ 1.0	-	126.1 $\pm$ 0.8	124.9 $\pm$ 0.9	125.1 $\pm$ 0.9
24 h DBP	Telmisartan	81.4 $\pm$ 1.2	-	77.3 $\pm$ 0.7 *	74.2 $\pm$ 0.8	73.8 $\pm$ 0.8
	Nifedipine GITS	79.8 $\pm$ 1.1	-	78.5 $\pm$ 0.7 #	74.8 $\pm$ 0.7	74.3 $\pm$ 0.7
	Combination	80.4 $\pm$ 0.8	-	75.7 $\pm$ 0.5	74.8 $\pm$ 0.5	74.7 $\pm$ 0.6

* - $p < 0.05$, # - $p < 0.01$ vs. combination group

Conclusion: Combination and monotherapy treatments all lowered systolic and diastolic BP substantially, the 24 h data showing that the effect was long lasting. Compared to the monotherapy, initiating treatment with the calcium antagonist/angiotensin receptor blocker combination allowed BP reduction and control to be achieved earlier, this being the case both for office and for ambulatory BP. Longer term BP control, on the other hand, was similar irrespective of the initial (combination or monotherapy) treatment strategy.

PP.33.315 INFLUENCE OF TELMISARTAN ON MICROINFLAMMATION PROCESS IN OBESE PATIENTS WITH ARTERIAL HYPERTENSION

M. Adamczak¹, M. Kubik¹, J. Chudek^{1,2}, A. Wiecek¹. ¹Department of Nephrology, Endocrinology and Metabolic Diseases, Medical University of Silesia, Katowice, Poland, ²Department of Pathophysiology, Medical University Of Silesia, Katowice, Poland

Objective: There are several lines of evidence suggesting that angiotensin II receptor 1 antagonists have anti-inflammatory properties. The aim of the present study was to estimate changes of plasma concentrations of selected proinflammatory cytokines after long-term antihypertensive treatment with telmisartan in obese hypertensive patients.

Design and Methods: Thirty four previously untreated obese adults with arterial hypertension were enrolled into the study. A daily dose of telmisartan (40 or 80 mg/d) was adjusted to achieve blood pressure values below 130/80 mmHg. Plasma concentrations of hsCRP, TNF α , IL-6, IL-8 were estimated before and after 6-months telmisartan therapy.

Results: Twenty five patients completed the study. Telmisartan therapy was followed by 14.2% decrease of systolic and by 19.6% decrease of diastolic blood pressure, hsCRP and IL-8 concentrations also decreased significantly by 19.2% (5.1 ± 2.9 vs 4.1 ± 1.9 mg/L, $p=0.02$) and by 28.9%, (3.8 ± 2.1 vs 2.7 ± 1.9 ng/mL, $p=0.03$), respectively. The plasma concentrations of IL-6 and TNF α also tended to decrease, but the observed changes did not reach statistical significance (3.5 ± 2.4 vs 3.5 ± 2.3 pg/mL and 4.4 ± 2.0 vs 4.1 ± 1.0 pg/mL, respectively).

Conclusions: 1. Telmisartan in monotherapy reduces microinflammation in obese patients with arterial hypertension. 2. Such additional potential benefit of telmisartan therapy may contribute to the slowing of atherosclerotic

process and development of cardiovascular complications in obese hypertensive patients.

PP.33.316 DETERMINANTS OF THIAZIDE INDUCED HYPONATREMIA IN THE ELDERLY

W. Frenkel¹, P. Deen², M. Levi¹, B.J. van den Born¹. ¹Academic Medical Center, Amsterdam, The Netherlands, ²Nijmegen Center of Molecular Life Science, Nijmegen, The Netherlands

Background: Thiazide diuretics are widely used for the treatment of hypertension; they are effective, cheap and generally well tolerated. Hyponatraemia frequently complicates the use of thiazide diuretics, but its mechanisms are incompletely understood.

Hypothesis: Thiazide-induced hyponatraemia is caused by impaired free water excretion either due to changes in osmoregulation or impaired renal sodium handling.

Methods: A controlled experiment comparing osmoregulation and renal sodium handling after administration of a single dose of hydrochlorothiazide (HCTZ) in elderly hypertensive patients previously admitted with thiazide-induced hyponatraemia and matched hypertensive controls without hyponatraemia during thiazide treatment.

Preliminary Results: We included 13 patients (5 males, mean age 75.5 years) and 9 controls (3 males, mean age 73.1 years). Patients had lower serum sodium levels at baseline (138 vs. 142 mmol/l, $p=0.05$). Four hours after a single dose HCTZ 50 mg, serum sodium levels decreased compared to baseline in patients ($3.0 \text{ mmol/l} \pm 2.3$, $p=0.001$), but not in controls ($1.7 \text{ mmol/l} \pm 2.9$, $p=0.1$). An increase in fractional sodium excretion (FENa) was seen in both groups ($+1.0\%$, $p=0.001$ vs. $+0.7\%$, $p=0.03$) compared to baseline. However, the increase in FENa persisted longer in patient compared to the controls (FENa after 8 hours: $+1.1\%$ vs $+0.6\%$ and FENa after 24 hours: $+0.8\%$ vs $+0.3\%$). Free water excretion and antidiuretic hormone (ADH) levels remained unchanged.

Conclusion: Patients previously admitted with thiazide-induced hyponatraemia, have a more pronounced increase in FENa after re-exposition to HCTZ. The lower serum sodium level at baseline in patients suggests an insensitivity of osmoreceptors or reset osmostat.

PP.33.317 CLINICAL PROFILE OF HYPERTENSIVE SUBJECTS NOT CONTROLLED WITH A COMBINATION OF 2 ANTIHYPERTENSIVE DRUGS

A. De La Sierra¹, J. Redon², M. Orellana³, R. Aristegui³. ¹Hospital Mutua Terrassa, University Of Barcelona, Terrassa, Spain, ²Hospital Clinico, University Of Valencia, Valencia, Spain, ³Medical Affairs, Daiichi Sankyo, Madrid, Spain

Purpose: Combination therapy is able to produce a more intense BP reduction, thus leading to a better treatment adherence and BP control. However, still a significant proportion of hypertensives remain with values above the goal. The current study aimed to evaluate the clinical profile of hypertensive subjects treated with a combination of 2 antihypertensive drugs whose blood pressure remained above 140/90 mmHg.

Patients and Methods: This is an observational, cross-sectional study in a cohort of 816 hypertensive patients attended in primary care centres or referral units. Inclusion criteria were: diagnosis of essential hypertension and treatment with a 2 antihypertensive drug combination (either in a fixed-dose schedule or as a free combination) whose blood pressure remained above or equal 140 and/or 90 mmHg at the time of the visit.

Results: Mean age (SD) was 64 (13) years and 39% were women. BMI was 30.1 (5.2) Kg/m² and waist circumference 102 (12) cm for men and 96 (16) cm for women. Mean systolic and diastolic BP was 147 (17) and 84 (12) mmHg. Additional cardiovascular risk factors were distributed as follows: type 2 diabetes 45%, dyslipidemia 75%, smoking habit 25%, and family history of premature cardiovascular disease 18%. Renal disease was present in 36%, coronary heart disease in 27%, previous stroke in 18% and peripheral artery disease in 18%. Diuretic-based combinations (54%) were the most frequently used, either with ARB (34%) or with ACE inhibitors (12%), followed by calcium channel blocker-based combinations (31%), either with ARB (20%) or with ACE inhibitors (6%). 38% of patients received treatment in single pill fixed-dose combination, whereas in the remaining 62% treatment was administered in a 2 pills free combination.

Conclusion: Hypertensive patients not controlled with 2 antihypertensive drugs are a group of high cardiovascular risk, with a significant proportion of

diabetics or established cardiovascular or renal disease. Most patients still receive this treatment with 2 drugs in a 2 pill free combination, being the diuretic-based combination the most frequently used.

PP.33.318 REAL-LIFE MEDICINE AND EVIDENCE BASE MEDICINE IN THERAPY OF HYPERTENSION – LESSONS FROM SLOVAKIA.

J. Lietava¹, T. Foltanova², G.J. Fodor. ¹2-nd Department of Internal Medicine, Comenius University, Bratislava, Slovak Republic, ²Department of Pharmacology and Toxicology, Faculty of Pharmacy, Comenius University, Bratislava, Slovak Republic, ³University of Ottawa Heart Institute, Ottawa, Canada

Introduction: Prospective trials provide knowledge for evidence-based medicine (EBV) in therapy of arterial hypertension (AH), however, their application in praxis (real-life medicine) (RLM) often provide ambiguous experience. Many differences between EBV and RLM are determined by socioeconomical factors, interregional variances and inconsistencies to guideline therapy.

Population: We analysed therapy in cohorts of low risk subjects (worksites study WHICO), AH pts in project NEMESYS and high risk cardiovascular pts (CV) enrolled into HOPE-TOO trial in Slovakia.

Results: White collars (N = 298) shown only 11.0% prevalence of known and treated AH, of whom 73.1% were controlled. Newly discovered AH was in 9.0% of subjects. Blue collars (N = 1189) had 41.6% prevalence of AH, of whom were 51.8% treated, but only 26.6% controlled. Project NEMESYS (N = 10 300) of consecutive out-ward pts demonstrated 78.5% pts with AH, of whom were 53.6% treated and 38.7% controlled. Drug duplicities were present in 8.2% of AH pts, drug interactions in 4.6%. Cohort of HOPE TOO trial in Slovakia involved 849 high risk CV pts of whom 79.9% had AH, of whom 12.6% not treated during the whole trial. Only 18.6% of pts had controlled hypertension.

In 52.3% pts was found combined therapy with potential drug-drug interactions of degree 3 (serious health-threatening) and of degree 4 (life-threatening), which was associated with significant increase of mortality in whole cohort (OR = 2.15 [1.61–2.87]) as well as in AH pts (OR = 1.69 [1.22–3.28]).

Despite of rationale structure of antihypertensive therapy (ACEI – 65.6–72.7%; AT2 blockers 7.2–11.6%; beta blockers 32.4–45.4%; calcium channel blockers 42.6–45.6%; diuretics 33.9–43.3%), dosage reached only 50% of recommended doses.

Conclusion: Worksite studies in white collar workers shown low prevalence and high control of hypertension contrary to in blue collar workers, probably effected by different socio-economical factors.

Patient studies confirmed low control of hypertension with high risk of potential drug-to-drug interactions. Especially high risk cardiovascular patients are treated in real-life medicine with potentially deleterious drug combinations, which should be controlled, monitored and prevented.

PP.33.319 ANTIHYPERTENSIVE DRUG THERAPY IN HAEMODIALYSIS PATIENTS

D. Pavlovic¹, B. Heinrich², M. Jakic³, I. Bogadi⁴, P. Petric⁵, D. Germin-Petrovic⁶, D. Mihaljevic³, V. Coric-Martinovic⁷, S. Dits⁸, B. Kudumija⁸, B. Iskra⁹, V. Lovcic¹⁰, J. Vujic¹⁰, Z. Ivankovic¹¹, R. Ladavac¹², N. Pavlovic¹, K. Cala¹. ¹Sestre Milosrdnice University Hospital, Department of Nephrology and Dialysis, Zagreb, Croatia, ²General Hospital Dr. T. Bardek, Department of Dialysis, Kopriwnica, Croatia, ³University Hospital Osijek, Department of Dialysis, Osijek, Croatia, ⁴General Hospital Varazdin, Department of Dialysis, Varazdin, Croatia, ⁵General Hospital Pozega, Department of Dialysis, Pozega, Croatia, ⁶Dialysis Centre Umag, Umag, Croatia, ⁷General Hospital Vinkovci, Department of Dialysis, Vinkovci, Croatia, ⁸Dialysis Centre Avicenna, Zagreb, Croatia, ⁹General Hospital Virovitica, Department of Dialysis, Virovitica, Croatia, ¹⁰General Hospital Cakovec, Department of Dialysis, Cakovec, Croatia

Blood pressure is raised in the majority of haemodialysis (HD) patients. Many of them need antihypertensive medications and some of them are resistant of antihypertensive medication.

The purpose of the present cross-over observational study was to investigate the use of anti-hypertensive drugs and to compare these results with those from a preliminary study three years ago.

A total of 11 dialysis centers were included in the study. Age, sex, HD duration, systolic and diastolic blood pressure before and after HD were recorded, as well as the anti-hypertensive drugs used in HD pts: beta-blockers (BB), calcium

channel blockers (CCB), diuretics (D), angiotensin –converting enzyme inhibitors (ACEI), angiotensin II-receptor blockers (ARB), alpha-blockers (AB) and centrally acting drugs (CAD). Hypertension was defined as blood pressure > 140/90 mmHg before HD, or less if pts were on antihypertensive treatment.

A total of 780 pts were included and hypertension was observed in 652, i.e. 83.6%. Average blood pressure before HD was 158.2 ± 24.2 systolic and 88.3 ± 15.2 mmHg. In the preliminary study three years ago the prevalence was the same, i.e. it was 84%. The most frequently used drug were CCB, in 550 pts (70%), after that BB in 335 (43%) of pts, ACEI in 312 (40%) of pts. ARB were used in only 148 (19%) of pts, diuretics in 93 (19%) and CAD in 78 (10%) of pts. The majority of pts were on combined therapy, 2–4 antihypertensive drugs. ACEI and CCB were the most used combination, i.e. in more than 380 pts.

Compared to the preliminary results, BB are much more frequently used today, 43% vs 20% three years ago.

The management of hypertension in HD pts is still a challenge for the nephrologist. It is obvious that in a majority of the pts a multidrug regiment is necessary. In majority of pts it is not enough. Nonpharmacological measures like salt and water restriction and adequate dialysis is of tremendous importance.

PP.33.320 USING NEBIVOLOL FOR TREATMENT PATIENTS WITH MASKING ARTERIAL HYPERTENSION

I. Osipova¹, O. Antropova¹, A. Zalzman², I. Kurbatova², A. Popov¹. ¹Altai State Medical University, Department of Internal Medicine, Barnaul, Russia, ²Non-State Railroad Hospital, Barnaul, Russia

The purpose was to estimate the influence of long-term monotherapy of nebivolol on the hemodynamics in subjects of stressful professions with masking arterial hypertension (mAH). Open prospective controlled study of nebivolol (Nebilet®, «Berlin-Chemie») efficiency in 30 males with mAH during 12 months was performed. Nebivolol was prescribed in the initial dose 2.5–5 mg per day with increasing over 2.5 mg each 2 weeks if the target blood pressure (BP) was not reached. At the end of 12-month period the dose was 4.9 ± 0.1 mg. “Office” systolic (SBP), diastolic (DBP) BP, BP before the work (10.4 ± 4.7 measurements/ a month), Holter monitoring of BP was estimated. Nebivolol developed effect during a week, SBP and DBP decreased over 16.3 and 13.6% ($p < 0.001$). Maximal decreasing of SBP over 19.3% ($p < 0.001$) was on the 12 week of treatment and remained during all 12 months (18.5% from the basal BP, $p < 0.001$). DBP had not any differences on the 7 day, in 12 weeks and 12 months ($p > 0.05$). Decreasing DBP in 12 weeks and 12 months of the treatment was 14.5 and 13.8% ($p < 0.001$). In 88% subjects monotherapy was effective, in 12% subjects combined therapy was used. Average monthly SBP and DBP before the work was within target ranks at treating nebivolol during all 12-month period. According to Holter monitoring of BP average SBP decreased (day SBP-over 10.0% ($\delta < 0.001$), night-7.0% ($\delta < 0.001$) and daily SBP decreased over 6.8% ($\delta < 0.001$). Day DBP decreased over 6.5% ($\delta < 0.01$), night – over 6.0% ($\delta < 0.01$), daily DBP 6.2% ($\delta < 0.01$). Variability of SBP decreased at day hours over 15.7% ($\delta < 0.01$) and night hours over 15.6% ($\delta < 0.05$), also variability of DBP decreased during day hours over 14.7% ($\delta < 0.05$) and at night over 12.8% ($\delta < 0.05$). Nebivolol decreased pulse BP over 8.0% ($\delta < 0.001$). Thus, nebivolol in subjects with mAH permits to control “office” BP, BP before work and daily BP effectively. Nebivolol positively influence on the main indicators of daily BP according to Holter monitoring and pulse BP.

PP.33.321 CHANGES OF ALBUMIN URINARY EXCRETION IN A GROUP OF NON PREVIOUSLY TREATED HYPERTENSIVE PATIENTS

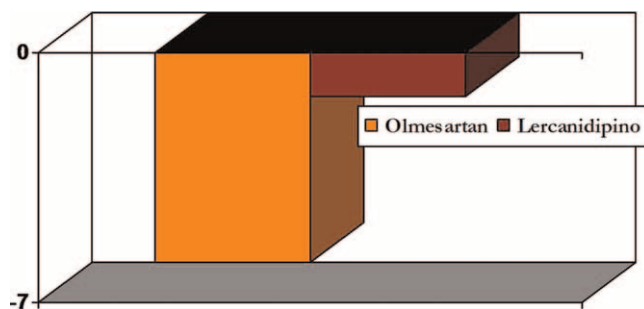
F. Jaén Águila¹, J.D. Mediavilla García¹, A. Ruiz Sancho², D. Esteve Fernández¹, C. Fernández Torres¹, J. Jiménez Alonso¹. ¹Virgen De Las Nieves University Hospital, Granada, Spain, ²San Cecilio University Hospital, Granada, Spain

Introduction: Blood Pressure control reduces Albumin Urinary Excretion (AUE). A drop in AUE due to a treatment with Angiotensine Converter Enzyme Inhibitor (ACIE) has shown a close correlation with the descent in the progression of renal damage and cardiovascular morbid mortality in diabetic patients. Olmesartan and Lercanidipine effects have not been studied thoroughly enough in non treated hypertensive patients.

Objectives: Analysing the results of Olmesartan (angiotensine II AT1 receptor blocker) and Lercanidipine (third generation calcium channels blocker) over AUE.

Patients and Method: 82 patients were included. AUE was measured in 24 hour urine and the albumin was determined through radioimmunology, at the beginning and after 16 weeks of treatment. The statistic analysis was carried out through SPSS 13.0 for Windows, being $p < 0,05$ taken as significant.

Results and Conclusions: The group of patients treated with Olmesartan reduced significantly their AUE in 51% (from $11,42 \pm 10,26$ mg/g at the beginning, to $5,99 \pm 5,33$ mg/g at the end), with $p < 0,05$. There was a tendency towards a higher AUE reduction, the higher the SBP reduction was. On the other hand, Lercanidipine reduced AUE at the end of the study in 9,05% (from $7,07 \pm 8,50$ mg/g at the beginning to $6,43 \pm 3,24$ mg/g at the end), although this descent was not significant. Notwithstanding, these results lend Lercanidipine a nephroprotecting effect which has not been observed in other calcium channels blocking drugs.



PP.33.322 EFFECT OF ANGIOTENSIN II RECEPTOR BLOCKER ON HEART, VESSEL AND METABOLIC PARAMETERS IN HYPERTENSIVE PATIENTS: COMPARATIVE STUDY WITH TELMISARTAN AND VALSARTAN

S. Lim, E.J. Kim, J.O. Na, D.J. Oh, H.S. Seo, C.G. Park, S.W. Rha, J.W. Kim, H.E. Lim, C.U. Choi. Cardiovascular Center, Korea University Guro Hospital, Seoul, South Korea

Background: Angiotensin II receptor blockers (ARBs) are known to be effective in improving heart structure, vascular functions and metabolic indices, but few clinical comparative studies with different ARBs have been performed. The aim of this study is to compare those effects between hypertensives who were treated with telmisartan and valsartan.

Methods: The subjects with essential hypertension (48.4 ± 9.6 years) were randomly assigned to take either telmisartan (80 mg/day, n = 30) or valsartan (160 mg/day, n = 30) for 12 weeks. Their anthropometric data, laboratory measurements, vascular indices and echocardiographic data were measured at the baseline and the study end.

Results: Baseline characteristics were not significantly different between the two groups except carotid-femoral pulse wave velocity (cfPWV, telmisartan group vs. valsartan group; 841.2 ± 131.0 vs. 761.1 ± 104.4 cm/s, respectively, $p = 0.041$). Systolic and diastolic blood pressures (BP) were significantly decreased in both groups at the study end and the changes were not significantly different between the two. Compared with the baseline, telmisartan group achieved significant reductions in cfPWV (-7.6% , $p = 0.023$) and left ventricular mass index (LVMI, -9.6% , $p = 0.018$) and showed trends for reduction in total cholesterol (-5.7% , $p = 0.075$) and triglyceride (-13.7% , $p = 0.058$) at the study end, while valsartan group did not. There were no significant changes in other vascular and metabolic parameters in both groups. When we compared, however, the changes during the study between the two groups, there was the only significant difference in LVMI ($p = 0.036$).

Conclusions: Although the level of BP reduction was similar in both groups, telmisartan significantly improved LVMI compared with valsartan and the result may be based on the significant effect of telmisartan on cfPWV. There were no significant changes in both groups regarding metabolic parameters.

PP.33.323 ADMINISTRATION OF BENZODIAZEPINES AND ARTERIAL STIFFNESS THROUGH ESSENTIAL HYPERTENSION

V. Katsi, I. Skiadas, G. Souretis, D. Tsartsalis, G. Trantalidis, A. Hatzilyanni, C. Stefanadis, I. Kallikazaros. Hippokratia Hospital, Athens, Greece

Objective: Blunted reduction of blood pressure (BP) fall as well as psychological stress have both been related to adverse cardiovascular prognosis and potentially share the altered sympathetic tone as a common pathophysiological substrate. We sought to investigate the association between dipping status and benzodiazepine's administration (sympatholytic action) in the setting of essential hypertension (EH).

Design and Method: Our population consisted of 134 consecutive subjects with stage I-II untreated EH (aged 52 ± 9 years, 72 male, office BP = 151/97 mm Hg). They were classified according to the nocturnal BP fall on 24-hour ambulatory BP monitoring, to non-dippers (those with $<10\%$ nocturnal systolic and diastolic BP fall, $n=36$) and dippers (the remaining subjects, $n=98$). All participants underwent arterial stiffness evaluation on the basis of carotid to femoral pulse wave velocity (c-f PWV) by means of a computerized method (Complior SP). Anthropometric data were recorded and venous blood samples were drawn for estimation of high sensitivity C-reactive protein (hs-CRP) and homocysteine levels. Self-reported data about benzodiazepine's administration were obtained via interview.

Results: Non-dippers compared to dippers did not differ regarding age, gender, body mass index, office and 24-hour systolic and diastolic BP ($p=NS$ for all cases). Non-dippers had significantly increased 24-hour pulse pressure (54 ± 8 vs 49 ± 9 mmHg, $p<0.05$). Additionally, they exhibited higher c-f PWV values (8.5 vs 7.6 m/sec, $p<0.05$), increased hs-CRP (2.8 ± 0.8 vs 2.1 ± 0.6 mg/L, $p<0.05$) and homocysteine levels (14.6 ± 6.8 vs 11.9 ± 5.4 mmol/L, $p<0.05$). Benzodiazepine's administration as anxiolytic therapy, was significantly more prevalent among non-dippers compared to dippers (78% vs 23%, $p<0.05$).

Conclusions: Non-dippers compared to dippers hypertensives are characterized by increased benzodiazepine's administration, impaired arterial elasticity and more pronounced activation of proatherogenic mechanisms.

PP.33.324 ACHIEVEMENT OF LIPID TARGETS IN NON ALCOHOLIC FATTY LIVER DISEASE DURING STATIN TREATMENT

L. Maroni, L. Castiglioni, F. Marino, S. Contini, V. Macchi, A. De Leo, G. Gaudio, M. Tozzi, M. Cosentino, L. Guasti. *University of Insubria, Varese, Italy*

Objective: Nonalcoholic fatty liver disease (NAFLD) is associated with both dyslipidemia and increased risk for cardiovascular disease. Despite the indication to treat in patients affected by both dyslipidemia and NAFLD, an undertreatment in statin therapy due to the potential liver damage is frequently observed.

We sought to evaluate retrospectively the impact of statin on the lipid profile and on the achievement of Low density Lipoprotein (LDL) cholesterol targets in relation to the Adult Treatment Panel III (ATP III) cardiovascular risk in dyslipidemic patients presenting with a clinical diagnosis of NAFLD and elevated liver enzymes before statin prescription. As a secondary endpoint we investigated whether statin could be associated with changes of liver enzymes.

Design and Method: 43 dyslipidemic NAFLD patients presenting with increased values of aspartate aminotransferase and/or alanine aminotransferase and/or γ -glutamyl-transferase at baseline were analyzed retrospectively as regard the lipid profile and liver enzymes (values reported before statin and during statin therapy).

Results: Total cholesterol, LDL and triglycerides were significantly reduced at follow-up (5.4 ± 5.4 months). The LDL target was achieved at the second visit in 30 patients (69.8%). The number of patients achieving the LDL target was significantly higher in low risk group as compared with moderate and high risk subjects. Liver enzyme levels showed no significant changes between baseline and follow-up.

Conclusions: Statin treatment was effective (without changes in liver enzymes) in patients with dyslipidemia and NAFLD and therefore presenting a profound alteration in lipoprotein metabolism. The number of patients achieving LDL target was related to the ATP III risk classification, being higher in the patients with lower risk.

PP.33.325 ASSOCIATIONS BETWEEN BLOOD PRESSURE CONTROL AND WELLBEING IN PRIMARY CARE PRACTICE

T. Nair¹, N. Beckett². ¹PRS Hospital - Department of Cardiology, Killipalam, Trivandrum, India, ²Imperial College School of Medicine - Section of Care of the Elderly, Du Cane Road, London, United Kingdom

Introduction: Among hypertensive patients under treatment, less than half achieve blood pressure (BP) control. Against the background of conflicting

evidence, this study explores the changes in patients' wellbeing during antihypertensive treatment, and the influence of such changes on BP control in the primary care practice of India.

Design and Methods: A representative sample of physicians from 32 cities across India recruited 1545 patients between 40–70 years with untreated or uncontrolled hypertension. IndapamideSR 1.5 mg a day was prescribed as monotherapy, or in addition to existing treatment for 90 days. The Nottingham Health Profile Questionnaire was used to assess wellbeing. Primary outcomes were the mean changes from baseline in BP and wellbeing scores.

Results: Mean age of patients (64.1% men) was 56.8 ± 8.6 years. BP was elevated to grade 1 in 26.6%, to grade 2 in 48.8%, and to grade 3 in 24.7%. Mean(95% Confidence interval, CI) systolic blood pressure of 164.6(163.8–165.4) decreased to 133.6(133.0–134.2)mmHg, and diastolic blood pressure from 98.2(97.8–98.6) to 83.6(83.3–83.9)mmHg after treatment. This BP response was accompanied by a mean (95%CI) improvement in patients' perception of lack of energy by 34.3%(32.2–36.5, $P<0.001$); emotional problems by 17.1%(16.1–18.6, $P<0.001$); and disturbed sleep, by 15.4%(14.1–16.8, $P<0.001$). On an intention to treat basis, 842 patients(54.5%; 95%CI, 52.0–57.0) achieved blood pressure control. On average (95%CI), patients who achieved BP control (compared to those who did not), felt more energetic by 6.3%(8.2–4.3, $P<0.0001$); emotionally better by 5%(6.3–3.6, $P<0.0001$); and had improved sleep by 5.6%(7.4–4.1, $P<0.001$).

Conclusions: In primary care, hypertensive patients perceive a serious loss of wellbeing. IndapamideSR 1.5 mg controlled blood pressure in most patients, and significantly improved their wellbeing. This impact on wellbeing was also significantly associated with achieving short term BP control. Whether wellbeing is sustained long term, and pertains to other agents as well, needs elucidation. Preferential selection of antihypertensive agents which also improve wellbeing could help improve BP control rates in the community.

PP.33.326 CHANGES OF VASCULAR INFLAMMATORY MARKERS IN A GROUP OF PATIENTS AFTER 16 WEEKS OF ANTIHYPERTENSIVE TREATMENT

F. Jaén Águila, J.D. Mediavilla García, D. Esteve Fernández, J.L. Ramos Cortes, C. Fernández Torres, J. Jiménez Alonso. *Virgen De Las Nieves University Hospital, Granada, Spain*

Introduction: Chronic vascular inflammation plays a decisive role in atherosclerosis, and through its markers we can foretell this injury. The blockage of AT1 receptors could slow down the process. Third generation calcium channels blockers, more lipophilic, have also demonstrated an antioxidant effect.

Objective: Analysing the results of Olmesartan (angiotensin II AT1 receptor blocker) and Lercanidipine (third generation calcium channel blockers) over inflammatory vascular biomarkers.

Patients and Method: 82 patients were included. They were measured classic inflammation markers (ESR, leucocytes, fibrinogen) and emergent ones (CPR, IL-6, alpha TNF, homocysteine); both at the beginning and after 16 weeks of treatment. The statistic analysis was carried out through SPSS 13.0 for Windows, and $p<0,05$ was considered as significant.

	Olmesartan	Olmesartan	Lercanidipine	Lercanidipine
	Basal	16 Weeks	Basal	16 Weeks
Leucocytes	6782,6 $\pm$ 1257,1	6922,2 $\pm$ 1329,1	6192,0 $\pm$ 1670,5	6148,1 $\pm$ 1845,6
ESR	13,08 $\pm$ 7,31	16,26 $\pm$ 9,027	15,00 $\pm$ 11,28	13,59 $\pm$ 6,41
CPR	4,64 $\pm$ 5,04	4,81 $\pm$ 8,86	2,56 $\pm$ 2,06	2,43 $\pm$ 2,06
Fibrinogen	291,36 $\pm$ 57,58	311,32 $\pm$ 887,64	324,64 $\pm$ 84,00	296,05 $\pm$ 54,52
IL-6	33,43 $\pm$ 27,42	13,81 $\pm$ 20,27	5,48 $\pm$ 12,94	6,21 $\pm$ 13,39
Alpha TNF	34,07 $\pm$ 22,47	23,02 $\pm$ 19,13	28,72 $\pm$ 21,42	22,51 $\pm$ 9,99
Homocysteine	11,00 $\pm$ 7,82	9,62 $\pm$ 5,48	11,14 $\pm$ 5,30	11,47 $\pm$ 5,19

Results and Conclusions: Classic markers were not statistically significant in comparison with the emergent markers. Lercanidipine did not affect significantly the levels of IL6, alpha TNF or homocysteine; probably, because it did not act over inflammatory cytokines. However, Olmesartan reduced IL-6, alpha TNF and homocysteine levels after treatment. This effect seems

to be independent from blood pressure drop, most likely due to the blockage of angiotensin II action. IL-6 basal values were markedly diminished in the Olmesartan group (from 33.43 ± 27.4 pg/ml to 13.81 ± 20.27 pg/ml), as well as those of homocysteine (from 11.00 ± 7.8 umol/l to 9.62 ± 5.4 umol/l). This effect has not been observed in other renine angiotensin II blockers.

PP.33.327 EFFECTS OF ANTIHYPERTENSIVE, HYPOLIPIDEMIC AND REPERFUSION THERAPY ON IN-HOSPITAL MORTALITY IN PREDOMINANTLY HYPERTENSIVE PATIENTS WITH THE FIRST MYOCARDIAL INFARCTION (FMI)

J. Peleska¹, H. Grünfeldova², J. Reissigova¹, M. Tomeckova¹, Z. Monhart³, D. Rysava⁴, T. Velimsky⁵, L. Ballek⁶, J. Hubac⁷. ¹Centre of Biomedical Informatics IM06014 ME CR, Institute of Computer Science AS CR, v.v.i., Prague, Czech Republic, ²Dept. of Medicine, Municipal Hospital Caslav, Caslav, Czech Republic, ³Dept. of Medicine Hospital Znojmo, Znojmo, Czech Republic, ⁴Dept. of Medicine Hospital Kutna Hora, Kutna Hora, Czech Republic, ⁵Dept. of Medicine Hospital Pisek, Pisek, Czech Republic, ⁶Dept. of Medicine Hospital Jindrichuv Hradec, Jindrichuv Hradec, Czech Republic, ⁷Dept. of Medicine Hospital Chrudim, Chrudim, Czech Republic

The aim was to evaluate effects of the therapy initiated at the day of admission on in-hospital mortality (HM) in patients with FMI - 5-year pilot registry (2003–2007) of six Czech small district hospitals referring patients for primary PCI to larger cathlab centers.

The sample consisted of 2108 eligible patients, 56.2 men and 43.8 % women, aged 65.3 and 73.9 years, respectively. Their risk factors (RF) were (in %): hypertension (EH: 71.5), dyslipidemia (DLP: 44.9), diabetes (36.2) and smoking (27.2). There were 35.8 % STEMI and HM was 8.8 %. The previous therapy consisted of aspirin (ASA) in 28.7, β -blockers (BB) 32.1, ACEI/ARB 48.1 and statins in 13.9 % of patients.

The odds of death (OD) increased with each year of age (1.1 in odds ratio – OR), influence of gender on death was not proven. Smoking was not significant as it was strongly negatively correlated with age. OD were associated especially with presence of heart failure (HF, OR = 3.5), DM (OR = 1.5) and STEMI compared to NSTEMI (OR = 4.1). The reperfusion therapy for STEMI decreased OD to the level of NSTEMI. Contrary to DM, the partially treated EH and DLP significantly reduced OD (both OR = 0.6). Aspirin (OR = 0.5), β -blockers (OR = 0.6) and statins (OR = 0.4) reduced OD. ACEI/ARB did not change OD (OR = 1.0) but reduced them significantly when used in HF (OR = 0.4). OD decreased with increasing number of recommended drugs – 1: OR = 0.55, 2: OR = 0.34, 3: OR = 0.15 and 4 drugs: OR = 0.10. The most frequent drug in monotherapy was ASA (23.8) and drug combinations ASA+BB (10.3), ASA+BB+statin (12.5) and ASA+BB+statin+ACEI/ARB (19.3 %).

The therapy for both dyslipidemia and hypertension reduced OD below the risk level of normolipidemic and normotensive patients with FMI. Due to the fact that the study is observational, the loss of RF significance could happen when a given therapy during hospitalization overwhelms its significance. The simultaneous use of aspirin, statin, β -blocker and ACEI/ARB reduced the odds of death in FMI to one tenth.

PP.33.328 HOSPITALARY MORBIDITY ASSOCIATED TO THE USE OF ORAL ANTICOAGULANTS

A. Calvo Fernandez¹, M. Hurtado Lara, S. Arenas Del Pozo, R. Gandulla Soriano, A. Quirce Vazquez, L. Galiano Muñoz, F. Quirce Andres. ¹University Health Center La Florida, Alicante, Alicante, Spain, ²Hospital General Universitario Alicante, Alicante, Spain

Objective: Primary care physicians control patients treated with Oral Anticoagulant Therapy (OAT). The progressive aging of the population, with the increase of cardiovascular morbidity, have enlarged the number of patients that receive OAT. Despite their increased risk, we unknown the incidence of thrombotic-hemorrhagic events. We analyzed the frequentation in the emergencies service in our reference hospital, the morbidity and its association to the use of OAT.

Design and Method: This is a descriptive study of patients receiving OAT for 6 months during 2008. The variables were obtained after the approval of the Ethical Committee, adjusted to the Organic Law of Personal Data Protection. We calculated the number of patients with HyTex®. We sought an accuracy of 5% in the estimation of a proportion (normal asymptomatic confidence interval with correction for finite population, 95% two-sided). Expected proportion of 50% and a loss of 10%, the final size was 275 patients. We searched for a relation of hospitalary attendance and duration of admission with OAT. The quantitative variables were mean and standard deviation;

frequency as qualitative (95% confidence intervals). We analyzed patient subgroups. All statistical tests were two-tailed. We regarded as significant $p < 0.05$. The software used was SPSS 15.0.

Results: 53.6% of the patients were attended in the emergency service. We assessed 371 admissions. The mean duration was 3,26 days, (global stay of 1209 days). The most frequent diagnoses: heart failure, respiratory tract infection and atrial fibrillation. In terms of the International Classification of Diseases, cardiac pathology provokes 32,9% of the admissions. In 62 cases, it was appreciated a relation of the cause of the admission with the use of OAT, and hemorrhagic events, where the most frequent were nasal, oral, subconjunctival and bladder hemorrhage. Other included: gastrointestinal bleeding, cerebrovascular and heart events. One person died of a cerebral hemorrhage.

Conclusions: Our patients asked for attendance for causes normally non-related with the use of OAT. The detected pathology matches the expected adverse effects, involving a scarce mortality.

PP.33.329 LONG-TERM FOLLOW-UP OF HYPERTENSIVE PATIENTS

G. Papadimitriou, M. Papavasileiou, A. Anastasopoulou, M. Seferou, K. Giannakopoulos, S. Karas. *Sismanoglion General Hospital, Athens, Greece*

Objective: To evaluate the development of haemodynamics, metabolic profile and renal function of hypertensive patients after long-term follow-up.

Methods: We monitored for a long time (11.71 ± 4.2 years), 159 hypertensive patients of mean age at the beginning 53.03 ± 12.9 years and we evaluated: 1) the levels of their office blood pressure and heart rate (SBP0, DBP0, HR0), 2) haemodynamic (E and A of trasmitral flow, EF) and structural (LVDd, LVDs, IVSd LVPWd, LAD, Mass, mass index-MI, EF) parameters of the left ventricle, using the Doppler-echocardiography method, 3)renal biochemical parameters (urea-Ur, creatinine-serum Cr) 4) metabolic parameters (total cholesterol- t-chol, triglycerides-TGL, HDL, LDL), serum glucose levels-Glu and serum uric acid levels (UA) at the beginning as well as at the end of our long-term follow-up. We compared the initial with the final values of these parameters, using the statistical method of paired samples t-test.

Results:

Table 1 Characteristics of the patients at the beginning and at the end of the study.

	Initial values	Final values	p value
Age (years)	53.03 ± 12.9	63.38 ± 15.1	0.000
SBP ₀ (mmHg)	150.76 ± 16.37	131.14 ± 9.42	0.012
DBP ₀ (mmHg)	94.53 ± 11.46	81.56 ± 7.27	0.000
HR (bpm)	74.7 ± 11.07	72.79 ± 8.5	0.000
BMI (kg/cm ²)	27.9 ± 3.8	28.3 ± 4.17	0.000

Table 2. Left ventricle structural and functional parameters

	Initial values	Final values	p value
LVDd (mm)	47.57 ± 5.7	49.7 ± 4.7	0.000
LVDs (mm)	28.16 ± 5.1	30.34 ± 4.7	0.001
IVSd (mm)	10.2 ± 2.1	10.47 ± 1.88	0.000
LVPWd (mm)	9.7 ± 1.83	9.9 ± 1.6	NS
Mass (gr)	222.53 ± 83.1	239.58 ± 65.07	0.000
Mass Index-MI (gr/m ²)	117.61 ± 37.98	126.53 ± 30.33	0.004
MI/height (gr/cm)	1.3 ± 0.49	1.43 ± 0.37	0.000
LAD (cm)	31.7 ± 6.3	36.8 ± 4.9	0.001
A (cm/sec)	738.28 ± 160.17	787.3 ± 220.0	0.000
E (cm/sec)	735.7 ± 158.4	698.9 ± 180.12	0.000
E/A	1.04 ± 0.3	0.94 ± 0.3	0.000
EF%	77.8 ± 8.7	75.8 ± 7.1	0.029

Table 3: Biochemical parameters

	Initial values	Final values	P value
Glu (mg)	98.68 ± 19.34	109.03 ± 23.28	0.000
Ur (mg/dL)	40.1 ± 13.15	40.3 ± 14.83	NS
Cr (mg/dL)	0.92 ± 0.23	2.24 ± 0.2	NS
Clearance Cr (ml/min/1.73m ²)	59.3 ± 18.3	52.4 ± 17.9	0.000
UA (mg/dL)	4.89 ± 1.64	5.2 ± 1.3	0.000
t-chol (mg/dL)	231.74 ± 53.8	205.7 ± 35.2	0.000
TGL (mg/dL)	121.06 ± 83.28	121.27 ± 44.6	0.000
HDL (mg/dL)	50.9 ± 12.9	51.97 ± 11.7	0.000
LDL (mg/dL)	160.48 ± 53.95	129.18 ± 31.96	0.000

LVDd: LV end-diastolic diameter, LVDs: LV end-systolic diameter, IVSd: interventricular septum thickness at diastole, LVPWd: posterior wall

thickness at diastole, MI/height: mass index corrected with height, LAD: LAtrial longitudinal diameter, A: trasmitral flow velocity during late-diastole, E: trasmitral flow velocity during early-diastole, EF: LV ejection fraction.

At the beginning of the study only 4.1% of the patients were taking statin to manage dyslipidaimia and at the end of the study this percentage was 41.8%.

As long as antihypertensive treatment is concerned, initially 27% of the patients were on a regimen.

Conclusion: The patients blood pressure was treated very well until the end of the study; despite this a statistically significant negative change of the LV functional output was noted during the years. LV mass was also increased as well as the body weight. In regard with the metabolic profile, increase in glucose levels was important and the contribution of hypo-lipidaimic drugs obvious. Renal function was not preserved during the follow-up years, despite the good control of blood pressure in hypertensive patients.

PP.33.330 ARE THERE DIFFERENCES BETWEEN ZOFENOPRIL AND NEBIVOLOL EFFECT ON BLOOD PRESSURE, SERUM LEPTIN, ADIPONECTIN AND ENDOTHELIN-1 IN OBESE HYPERTENSIVE PATIENTS?

T. Morozova, T. Andrushchishina, S. Oshorova. *Moscow Medical Academy-Department of Clinical Pharmacology and Pharmacotherapy, Moscow, Russia*

Purpose: To compare the effect of zofenopril (Z) and nebivolol (N) on blood pressure (BP), serum leptin, adiponectin and endothelin-1 in obese hypertensive patients.

Methods: 61 pts (f – 27, m – 34, mean age 51,6 ± 9,7 years) with essential hypertension (EH) and obesity (body mass index 34,3 ± 4,8 kg/m²) were enrolled in randomized, open-labeled study. We performed the oral glucose tolerance test, the office measurement and 24-hours ambulatory blood pressure monitoring (ABPM), test of serum leptin, adiponectin, endothelin-1 before and after 12 weeks therapy by Z (30 mg/day, 31 pts) and N (5 mg/day, 29 pts).

Results: In obese hypertensives mean office BP was 150,2 ± 14,6/92,1 ± 10,8 mmHg before treatment. According ABPM there was abnormal circadian profile of BP in 63,9% of pts. The impaired glucose tolerance was revealed in 47,5% of pts. The endothelin-1 hyperactivity was defined in obese hypertensives in comparison with control group (normal weight hypertensives, n = 20) - 0,38 (0,25; 0,89) and 0,30 (0,25; 0,59) fmol/ml accordingly (p < 0,05). Office BP was decreased on 16,3/5,8 mmHg (p < 0,05) and 16,4/11,4 mmHg (p < 0,05) after 12 weeks of Z (37,5 mg/d) and N (7,5 mg/d) treatment. ABPM parameters have significantly improved: mean daytime SBP on 8,0 and 5,0 mmHg, mean daytime DBP on 4,3 and 6,2 mmHg, mean nighttime SBP on 12,3 and 6,0 mmHg, mean nighttime DBP on 7,2 and 5,0 mmHg, mean daily SBP on 9,0 and 5,1 mmHg, mean daily DBP on 4,5 and 5,4 mmHg (p < 0,05 in all cases) with improvement of circadian BP profile. The serum leptin was decreased from 18,7 to 17,5 ng/ml (p < 0,05) in Z group, the serum adiponectin was increased from 10,4 to 13,6 mcg/ml (p < 0,05). The serum endothelin-1 was decreased significantly in N on 0,10 fmol/ml (p < 0,05) and non significantly in Z group.

Conclusions: In obese hypertensives both the angiotensin-converting enzyme inhibitor zofenopril and β1-adrenoblocker nebivolol demonstrates similar antihypertensive activity but different beneficial effects on adipokynes profile.

PP.33.331 PERIPHERAL AND CENTRAL HEMODYNAMIC EFFECTS OF TOCOLYTIC MEDICATIONS IN HEALTHY NON-PREGNANT WOMEN

I. Fabry, P. De Paepe, L. van Bortel. *Heymans Institute of Pharmacology, Ghent University, Ghent, Belgium*

Objective: Atosiban and ritodrine are frequently used tocolytics. Only a few studies investigated the hemodynamic effects of atosiban. We therefore aimed to study the central and peripheral hemodynamics of both medications.

Methods: Twenty healthy female volunteers (19–41 yrs) were given atosiban (300 µg/min over 2 h) and placebo intravenously (IV) in a random crossover design. Eight of them also received ritodrine IV in escalating doses up to 400 µg/min over 2 h. The hemodynamics were investigated at steady state using blood pressure (BP) at the brachial artery (BA), pulse wave analysis on the common carotid artery and echocardiography for cardiac output (CO). Statistical analysis was done using Friedman and Wilcoxon tests (value of significance at 0.05).

Results: Effects on atosiban/placebo on n=20 did not differ from n=8.

Parameters	Ritodrine (n=8)	Atosiban (n=8)	Placebo (n=8)	p-value*
SBP _{CCA} (mmHg)	113±13**	102±8	102±7	0.012
SBP _{BA} (mmHg)	114±13**	105±8	104±6	0.004
DBP _{BA} (mmHg)	55±11**	69±6	68±5	0.008
HR(bpm)	111±20**	59±10	57±9	0.002
CO(l.min ⁻¹)	5.36±1.65**	3.15±1.08	2.99±0.93	0.002
AIx@HR75	-8.67±12.30	5.58±16.78	4.58±13.33	0.225
TPR(kPa.l ⁻¹ .min ⁻¹)	2.15±0.82**	4.04±1.50	4.14±1.30	0.005

SBP (systolic BP); DBP (diastolic BP); HR (heart rate); AIx@HR75 (augmentation index at heart rate 75); TPR (total peripheral resistance).

\$ Friedman-test; * significant vs. atosiban; # significant vs. placebo.

Conclusion: Ritodrine has important hemodynamic effects reflected by cardiac stimulation (increase in CO and HR increase) and a decrease in peripheral resistance (TPR) with a trend for decreasing wave reflections (AIx@HR75). The effect of atosiban did not differ from placebo.

PP.33.332 THE EFFECT OF LOW DOSE SPIRONOLACTONE ON RESISTANT HYPERTENSION

I. Jacobsen¹, M. Engbaek¹, M. Hjerrild¹, J. Hallas². ¹Odense University Hospital, Hypertension Clinic, Department of Endocrinology, Odense, Denmark, ²Odense University Hospital, Department of Clinical Pharmacology, Odense, Denmark

Objective: To estimate the effect of addition of low dose spironolactone to previous antihypertensive therapy in cases of resistant hypertension.

Methods: Patients who had 25 – 50 mg of spironolactone once daily added to the treatment of hypertension uncontrolled despite previous combination of three classes of antihypertensive drugs were identified by the aid of Odense Pharmaco-Epidemiologic Database. The effect on blood pressure one, three and six months later was estimated by office measurements. Serum potassium was measured at the same points in time and adverse effects were registered.

Results: 544 patients were identified as having received low dose spironolactone. 200 were excluded from the sample because of secondary hypertension, other indications for spironolactone than hypertension, previous antihypertensive therapy with less than three drugs unless demonstrated intolerance to a third drug, insufficient compliance and lack of follow-up data. Thus, 344 cases were included in the analysis. The population was 62.1 ± 12.8 years old, 45.1 % were males and 43 % had cardiovascular comorbidity.

Mean blood pressure before the addition of spironolactone was 169/88 mmHg despite treatment with an average of 3.3 antihypertensive drugs. At one month after the addition, blood pressure was decreased by an average of 16.6/7.0 mmHg (p < 0.001). At three months the blood pressure reduction was 23.9/9.7 mmHg, which is significantly different from the values before spironolactone and after one month (p < 0.001). At six months the blood pressure was 26.0/10.7 mmHg lower than the initial value (p < 0.001). Serum potassium increased from an average of 3.7 mmol/L to 4.1 mmol/L (p < 0.001). Spironolactone was discontinued because of hyperkalemia in 4.1 % of the cases. 18 % of all patients had adverse effects which in 9.9 % led to discontinuation of the drug. 5.2 % of the males developed gynecomastia.

Conclusion: Low dose spironolactone was in this retrospective, uncontrolled analysis found to be highly effective when added to previous treatment of patients with resistant hypertension.

PP.33.333 THERAPEUTIC INERTIA WHEN MANAGING HIGH-NORMAL BLOOD PRESSURE LEVELS IN PATIENTS AT HIGH CARDIOVASCULAR RISK. A STUDY ON PRIMARY-CARE PHYSICIANS' ATTITUDE

M. Martinez¹, F. Hortiguera², P. Ó Doherty², A. Nevado², J. Rosado², I. Laguna², V. Castell², J.C. Obaya², J. Palau², T. Mantilla², J. Garcia-Puig³. ¹Hospital Infanta Sofia, Madrid, Spain, ²Primary Care Centre, Madrid, Spain, ³Hospital Universitario La Paz, Madrid, Spain

Objectives: 1)To asses the magnitude of clinical inertia when managing high-normal blood pressure (BP) levels in patients at high cardiovascular

(CV) risk; and 2) To analyse physician and patient factors underlying clinical inertia.

Design and Methods: An anonymous survey was conducted in primary-care physicians of Madrid in order to assess their attitude towards initiation or intensification of antihypertensive medications in a set of four hypothetical clinical cases. Physicians demographic features and primary-care-centres characteristics were analysed.

Each case described a situation in which a patient at high CV risk had high-normal BP levels (BP:135–139/85–89 mmHg). The cases were characterised by one of the following clinical features: 1) metabolic syndrome; 2) type II diabetes; 3) moderate renal insufficiency due to glomerulosclerosis; and 4) ischemic stroke. Physicians were asked to decide whether or not to initiate or intensify a previous treatment and otherwise give reasons for not modifying it.

Results: Two hundred and seventy-five physicians participated. Overall, the physicians decided to initiate or intensify a previous treatment in 2.5 ± 0.7 cases. Physicians' attitude was very different depending on the clinical cases: Most physicians (87%) decided to intensify the treatment in the renal insufficiency case, while only 47% of them did so in the metabolic syndrome case. Most doctors who did not modify the previous treatment (74%) argued that clinic BP might not reflect "real life" BP. The remaining 26% doctors considered that patients' BP values were acceptable. CV Working Group membership and routine use of CV stratification risk were both associated ($p < 0.05$) with a more "aggressive" therapeutic attitude.

Conclusions:

1) Our results suggest an important therapeutic inertia when managing high-normal BP at primary care settings. However, they might not reflect what physicians actually decide in the real clinical setting.

2) The degree of clinical inertia is influenced by physician factors (routine use to stratification risk tables and membership to CV working groups) and patient factors (specific clinical features related with CV risk).

PP.33.334 EFFECT OF ACE INHIBITOR AND THIAZIDE DIURETIC ON RENAL PLASMA FLOW IN POSTMENOPAUSAL HYPERTENSIVE WOMEN ACCORDING HORMONE REPLACEMENT THERAPY (HRT) TAKING

A. Posadzy-Malaczynska, L. Stryczynski, L. Woznicka-Leskiewicz. *Department of Hypertensiology, Angiology and Internal Diseases University of Medical Sciences, Poznan, Poland*

Objective: The aim of the study was to compare the effect of ACE inhibitor (ACEI) and thiazide diuretic (ThD) on renal plasma flow (RPF), renovascular resistance (RVR) in hypertensive (HT) postmenopausal women according hormone replacement therapy (HRT) taking.

Methods: 180 postmenopausal women (mean age 53.17 ± 2.92 years) were studied. 120 (HT) were randomly assigned to receive either ACEI (perindopril 4 mg) or ThD (hydrochlorothiazide 25 mg) as antihypertensive therapy for 12 months. Both groups of HT and normotensive (NO) were divided on to 3 subgroups (20 women each) according to period of HRT with transdermal patch (Estracomb TTS) taking. Two groups were observed for 6 months without HRT, then HRT was started for the next 6 months and next two groups were received HRT all 12 months and other two groups were without HRT. NO were also studied receiving HRT the same way. RPF was measured as clearance of J-125 hippurate. RVR was calculated from mean arterial blood pressure (MAP) and RPF.

Results: RPF differ significantly at baseline between HT and NO postmenopausal women: RPF (ml/min) 422.95 ± 75.14 ; 496.6 ± 44.99 ($p < 0.05$) respectively, and RVR (U) differ significantly 0.29 ± 0.07 ; 0.21 ± 0.02 ($p < 0.001$). After 6 months ACEI therapy RPF significantly increased 485.5 ± 60.2 ($p < 0.0001$) and decreased from baseline, during ThD therapy 343.55 ± 53.9 ($p < 0.001$) and RVR decreased significantly on ACE-I $0.22, 96 \pm 1.88$ and increased on ThD 31.38 ± 4.02 ($p < 0.001$). HRT further increased RPF in ACEI group 521.7 ± 47.64 ($p < 0.001$ from baseline) and significantly increased from baseline in ThD group 445.9 ± 67.64 ($p < 0.001$). RVR in ACE-I group did not change and decreased significantly in ThD group 0.24 ± 0.04 ($p < 0.001$).

Conclusions:

1. The RPF in postmenopausal women is significantly higher than in hypertensives.
2. Thiazide diuretic treatment decreased while ACEI increases RPF in postmenopausal women with hypertension.

3. HRT during thiazide treatment increased RPF and decreased RVR and has an additive effect on RPF in hypertensive women taking ACE inhibitor.

PP.33.335 TELMISARTAN IMPROVES ENDOTHELIAL FUNCTION IN SCLERODERMA PATIENTS WITH PULMONARY HYPERTENSION

N. Yatsyshyn, R. Yatsyshyn, Y.E. Neyko. *Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine*

Background: The most often clinical features of systemic scleroderma (SSc) is the pathology of microcirculation, lungs and kidney. It can result to pulmonary arterial hypertension (PAH). Hypertension is associated with endothelial dysfunction and increased renal vascular resistance. Angiotensin receptor blockers (ARBs) may beneficially affect these parameters via antagonism of angiotensin type 1 (AT1) receptor-mediated vasoconstriction. We therefore investigated whether the ARB telmisartan improves endothelial function in patients with scleroderma PAH.

Methods: 37 patients with SSc PAH were randomized to receive telmisartan ($n = 33$) or the calcium channel blocker nifedipine ($n = 34$) for 6 weeks in a prospective, parallel group study. Brachial artery flow-mediated (endothelium-dependent) dilation (FMD) and renal vascular resistance index (RVRI) were evaluated using high-resolution ultrasound before, at 3 weeks (low dose), and at 6 weeks (high dose) after initiation of treatment. Levels of IL-1 β , TNF- α in the serum of patients were performed with a ELISA. We studied the level of PAH-SSc and pulmonary disorders. Time to clinical worsening, WHO functional class and survival were determined.

Results: At baseline, FMD and RVRI did not significantly differ between treatment groups. After 3 weeks of treatment neither treatment significantly changed FMD or RVRI. After 6 weeks of treatment, patients randomized to receive telmisartan, but not those treated with nifedipine, displayed a significantly improved FMD, whereas RVRI values again were not significantly different as compared to those at baseline. Patients in the nifedipine-group deteriorated by 22.3 m, while patients in the telmisartan group improved by 14.4 m in the 6-minute walk test (mean nifedipine-corrected effect $+35.9$ m in favour of telmisartan (95% CI: -21.5 ; 95.0 ; $p = 0.24$). The production of IL-1 β and TNF- α were significantly lower in the telmisartan group than in the nifedipine group.

Conclusion: In our study cohort of patients with PAH, treatment with telmisartan improved FMD but did not change RVRI. Future studies will demonstrate whether this telmisartan-induced effect may contribute to a blood pressure-independent reduction in cardiovascular morbidity.

PP.33.336 FACTORS ASSOCIATED WITH A CHANGE IN THE STATUS OF HYPERTENSION CONTROL DURING ONE YEAR FOLLOW UP. TAPAS STUDY

C. Suárez¹, A. Galgo², T. Mantilla³, M. Leal⁴, F. De Los Arcos⁵, J. Calvo⁶, J. Creixell⁷, A. Mora⁸, J. Iraldo⁹, M. Gutierrez¹⁰. ¹Hospital Universitario de la Princesa, Madrid, Spain, ²Primary Care Center Espronceda, Madrid, Spain, ³Primary Care Center Prosperidad, Madrid, Spain, ⁴AstraZeneca, Madrid, Spain, ⁵Primary Care Center Dacon, Orense, Spain, ⁶Primary Care Center Gil y Morte, Valencia, Spain, ⁷Primary Care Center CAP Vallirana, Barcelona, Spain, ⁸Primary Care Center Cristobal Acosta, Burgos, Spain, ⁹Primary Care Center Adeje, Tenerife, Spain, ¹⁰Primary Care Center Xinzo de Limia, Orense, Spain

Aims: The objective was to identify factors associated with the loss or achievement of hypertension control in treated hypertensives followed for one year in a primary care setting in Spain.

Methods: Retrospective study of 1678 hypertensive patients at Primary Care setting throughout the Spanish territory. We evaluated control of hypertension (blood pressure (BP) $< 140/80$ mmHg and $< 130/80$ mmHg in diabetics) at the beginning and after one year of follow-up. Patients were classified in 4 cohorts predefined before inclusion: cohort 1: BP not controlled in first and last visit; cohort 2: BP not controlled one year ago and good control in last visit; cohort 3: BP controlled one year ago and lost control in the last visit; cohort 4: BP controlled in both visits. Comparison of continuous variables in more than 2 groups was done using ANOVA or Kruskal-Wallis test. Comparison between 2 groups was done using T-Student. For comparisons of categorical variables Chi-square test was performed and in case of non-applicability of the above Fisher test was performed. Comparisons were made bilaterally and were considered statistically significant only when $p < 0.05$.

Results: Mean age was 64 years, with 53% males. 23.24% of hypertensive patients were not controlled at baseline and at the last visit; 19.25% lost BP control in the last visit. 31.76% maintained a good control of their BP at baseline and a year later, and 25.74% achieved good BP control at both visits.

The variables associated with the loss of control of hypertension or the lack of achievement of control are listed in the table below:

	Cohort 1	Cohort 2	Cohort 3	Cohort 4	p
Diabetes, N(%)	152(39.48%)	120(28.17%)	121(37.81%)	127(24.10%)	<0.0001
Dyslipidemia N(%)	227(58.81%)	249(58.45%)	184(57.86%)	244(46.39%)	0.0001
Renal Impairment N(%)	31(7.99%)	29(6.81%)	21(6.62%)	15(2.84%)	0.0044
Smoker at baseline visit, N(%)	100(26.04%)	69(16.20%)	51(16.14%)	63(11.95%)	<0.0001
Smoker at final visit, N(%)	91(23.58%)	62(14.59%)	49(15.31%)	62(11.74%)	<0.0001
Alcohol consumption at baseline visit, N(%)	95(24.61%)	85(20.00%)	54(16.98%)	60(11.36%)	<0.0001
Alcohol consumption at final visit, N(%)	94(24.48%)	76(18.10%)	54(16.88%)	60(11.43%)	<0.0001
Urinary Albumin excretion rate (UAE) mg/g	88.7	160.7	153.9	27.4	0.0371
LVI at baseline, N(%)	56(18.98%)	49(14.29%)	29(11.89%)	39(9.63%)	0.0036
Ankle/Brachial Index (ABI) <0.9 at baseline, N(%)	32(42.11%)	20(22.22%)	14(24.14%)	30(37.50%)	0.0160
Change in BMI between visits	313	332	256	426	0.0537
NSAIDs at baseline visit, N(%)	144(38.20%)	125(30.27%)	81(26.30%)	133(26.23%)	0.0006
NSAIDs at final visit, N(%)	125(33.33%)	115(28.75%)	89(29.28%)	120(23.76%)	0.0188
Cholesterol at baseline visit (mg/dl)	377	423	315	521	0.0003
LDL-cholesterol at baseline visit (mg/dl)	355	396	296	481	0.0002

Conclusion: A history of diabetes, dyslipidemia, renal impairment; organ damage expressed by LVH, UAE or pathological ABI; increased levels of total and LDL cholesterol; alcohol, tobacco, or NSAIDs consumption, all of these are factors associated with the lack or loss of control of Hypertension in the patients studied.

PP.33.337 KNOWLEDGE-BASED PRESCRIBING ERRORS PERTAINING TO CARDIOVASCULAR/ANTI-DIABETIC MEDICATIONS: A PRESCRIPTION AUDIT IN PRIMARY CARE

K. Al Khaja¹, R.P. Sequeira¹, A.H.H. Damanhori². ¹Arabian Gulf University - Department of Pharmacology & Therapeutics, Manama, Bahrain, ²Ministry of Health - Primary Care, Manama, Bahrain

Objective: To identify the knowledge-based errors pertaining to cardiovascular/ antidiabetic medications in prescriptions issued by primary care physicians to patients with hypertension.

Methods: A retrospective, nation-wide audit of prescriptions (n=2773) issued by primary care physicians (n=194) of 20 health centers in Bahrain.

Results: Approximately one-fifth (22.2%) of prescriptions ordered by two-third of primary care physicians had knowledge-based errors. No significant differences with respect to overall errors were evident in prescriptions ordered by the general practitioners and the family physicians. The most common error (in 8.0% of prescriptions) was prescribing beta-blockers and/or thiazide diuretics or their combinations to patients on lipid-lowering drug therapy. Irrational prescribing of multiple antihypertensives, with a similar mechanism, accounted for 2.2% errors: approximately half of these were two ACE inhibitors co-prescribed. In 0.7% of prescriptions, beta-blockers were ordered to patients on salbutamol treatment as well. High dose metformin (3 g/day) was prescribed to approximately 4% diabetic hypertensives; of these 1% were elderly patients. Prescribing high dose glibenclamide (median dose 15 mg) to the elderly accounted for 3.6% of the overall errors. Polypharmacy, such as aspirin along with an immediate-release dipyridamole, was practiced on some patients (0.25%), particularly by the general practitioners (p=0.0139).

Conclusion: Knowledge-based prescribing errors are common in primary care, in Bahrain. Some of these prescribing errors have the potential to result in harm to patients. Effective measures to prevent and detect such errors are needed to improve the quality of healthcare. Educational intervention is an important strategy to achieve these goals.

PP.33.338 EFFECTS OF LISINAPRIL ON CIRCULATING ENDOTHELIAL PROGENITOR CELLS IN PATIENT WITH ESSENTIAL HYPERTENSION

E. Karelkina, O. Moiseeva, V. Moroshkin, O. Irtuga, E. Shlyakhto. *Almazov's Federal Heart, Blood and Endocrinology Centre-Department of Non-Coronary Diseases, Saint-Petersburg, Russia*

Background: Now circulating endothelial progenitor cells (CEPCs) can be used as an independent cardiovascular prognostic factor. ACE inhibitor

lisinopril reduces cardiovascular events in patients with essential hypertension (HT). But, the beneficial effect of lisinopril mediated in part through CEPCs is yet to be determined.

Methods: 15 untreated hypertensive pts (age 57.4 ± 4.0 yrs, BMI 29.1 ± 1.5 kg/m²) and 15 normotensive healthy volunteers (age 40.8 ± 2.8 yrs, BMI 25.6 ± 0.6 kg/m²) were enrolled. Endothelial function was assessed by measuring flow-mediated dilatation of brachial artery using high resolution ultrasound. In all subjects 24-hour ABP monitoring, echocardiograms, carotid intima-media thickness, C-reactive protein, lipid test were performed. The quantity of circulating CD34+CD133+ and CD34+CD133+ + VEGFR-2+ cells was assessed by flow cytometry (Becton Dickinson FACScan). Proliferation ability of endothelial progenitor cells was evaluated by calculation of colony-forming units with J.M.Hill's method. HT pts took lisinopril in dose 10–20 mg/daily. The HT pts were re-examined through 12 weeks with lisinopril's therapy.

Results: There were no significant differences in number of circulating CD34+, CD133+ cells in HT pts in comparison with healthy controls. But we revealed the declining trend in number of CD34+,CD133+,VEGFR-2+ in HT pts. There were significant differences in the colony-formation ability in HT pts and healthy controls (1.4 ± 0.2 versus 2.6 ± 0.3 units/mm²; $p < 0.01$). Age was found to be more significant factor for proliferative activity than BP and total cholesterol levels. Lisinopril reduced office mean blood pressure on 16 ± 2 mm Hg. Also therapy was associated with increased number of CD34+, CD133+, CD34+,CD133+,VEGFR-2+ cells and their colony-formation ability. Increased CEPCs level was associated with decreased CRP level. Addition of lisinopril in CEPNs culture resulted in increased proliferative activity at small concentrations and decreased in large concentrations.

Conclusion: The results of the present study define a novel mechanism of action of lisinopril in patients, related to CEPNs mobilization and augmentation of their proliferative activity.

	Before lisinopril therapy M± m	12 weeks lisinopril therapy M± m	p
24-h SBP, mm Hg	155 ± 3	121 ± 4	<0,01
24-h DBP, mm Hg	101 ± 2	78 ± 2	<0,01
FMD of brachial artery, %	9,0 ± 2,1	12,4 ± 1,7	>0,05
CRP, mg/l	2.19 ± 0.73	1.40 ± 0.62	<0,05
CD34 ⁺ CD133 ⁺ *10 ⁶ MNC	1380 ± 340	2200 ± 471	=0,02
CD34 ⁺ CD133 ⁺ VEGFR-2*10 ⁶ MNC	55 ± 14	125 ± 37	>0,05
Colony-formation ability, units/mm ²	1.4±0.2	2.6±0.6	<0,01

PP.33.339 REFLEXE STUDY - OBSERVATION OF THE THERAPEUTIC DECISION FOR UNCONTROLLED AND UNTREATED HYPERTENSIVE PATIENTS

B. Fiquet¹, S. Quere¹, A. Francillon¹, M. Galinier². ¹Novartis Pharma SAS, Clinical Research and Development, Rueil-Malmaison, France, ²CHU Rangueil, Cardiology Department, Toulouse, France

The study aim was to observe the therapeutic decision made by physicians for uncontrolled and untreated hypertensive patients (pts) (BP $\geq 140/90$ for non diabetic (DB) and BP $\geq 130/80$ mmHg for DB pts). Three treatment approaches were assessed: lifestyle and diet recommendations without treatment (LD), treatment initiation by a single antihypertensive agent (SD) or by two antihypertensive agents (TD).

French cross sectional study conducted with 1048 GPs and 155 cardiologists in 2008. Each physician included the first 5 consecutive hypertensive pts according to above inclusion criteria. Cardiovascular (CV) risk factors (RF) and associated diseases were collected to compare pts characteristics in the 3 groups.

5965 pts were included. Mean age was 58 ± 12 years (y) and 59% were men. Mean duration of hypertension (HTN) was 1.9 ± 3 y. Mean BP was $160 \pm 12/93 \pm 8$ mmHg. 55% of pts had moderate HTN and 12% severe. Therapeutic decisions and pts characteristics are reported in the table below:

	LD	SD	TD
n (%)	491 (8.2)	4031 (67.6)	1443 (24.2)
Age (y)	54±14	58±12	61±12
HTN duration (y)	1.1±2	1.3±2.4	3.6±4.6
SBP (mmHg)	152±9	160±11	164±13
DBP (mmHg)	91±7	93±8	95±9
Ambulatory BP assessment (%)	63.1	76.1	82.9
Active smoking (%)	32.3	33.8	36.4
Diabetes (%)	4.1	13.4	31.9
Dyslipidemia (%)	29	49.7	66.7
Coronary heart disease (CHD) (%)	0.6	3.5	12.4
Lower limb arteriopathy (LLA) (%)	1.5	4.2	12.9

Physicians chose to start an antihypertensive treatment for 90% of the pts. As expected, pts for whom no treatment was started were younger than in the other groups with a less severe and more recent HTN and less CV RF and associated diseases. About 25% of the pts were prescribed a two-drug antihypertensive treatment immediately. These pts were older than in the other groups with more severe and longer duration of HTN. They also had more CV RF and associated diseases. Ambulatory BP assessment also seemed to have influenced therapeutic decision.

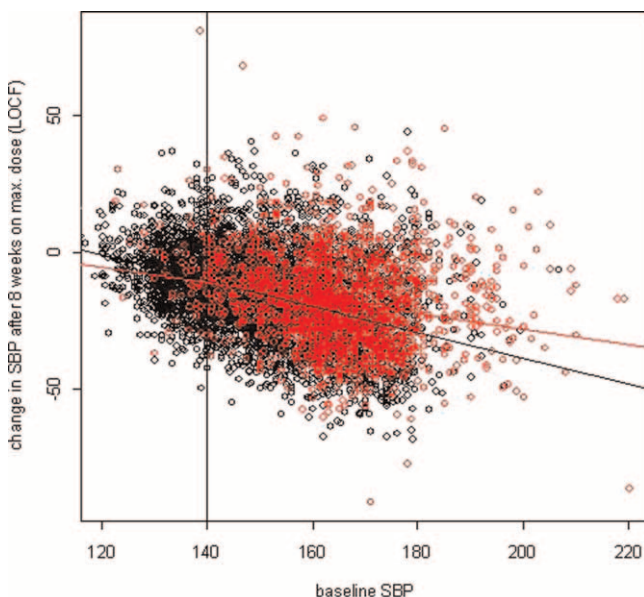
These results indicate that physicians are reluctant to start the more severe hypertensive pts on a single drug therapy in spite of French national recommendations.

PP.33.340 EFFICACY OF ANTIHYPERTENSIVE THERAPY IN THE ELDERLY—AN INTEGRATED ANALYSIS

F.H. Messerli¹, D.H. Zappe², N. Crikelair², D. Levy². ¹St. Luke's-Roosevelt Hospital, New York, USA, ²Novartis Pharmaceuticals Corporation, East Hanover, USA

Objective: The blood pressure (BP) decrease with a given antihypertensive drug depends on the pretreatment BP level—the higher the BP level the greater the antihypertensive response. It is unknown whether the relationship between antihypertensive response and BP level is different in the elderly when compared to younger patients. We compare by age the relationship between pretreatment systolic BP (SBP) levels and antihypertensive response of SBP change in a large population of elderly and younger patients with essential hypertension.

Methods: Data were pooled from 12 randomized, double-blind, parallel-group studies, with a 2–4 week washout or run-in period. Approximately, 2061 elderly (≥ 65 y) and 6175 younger (< 65 y) patients receiving either valsartan, HCTZ or amlodipine monotherapy or a combination of these drugs were evaluated at endpoint (week 8 or 8 weeks at full dose).



Results: Baseline SBP but not diastolic BP was higher ($p < 0.05$) in the elderly ($164.4 \pm 13/97.4 \pm 7$ mmHg) compared to younger patients ($152.4 \pm 13/98.7 \pm 5$ mmHg). Regardless of the treatment, the overall BP control rate ($< 140/90$ mmHg) was lower in the elderly group (37%) than in the younger patients (49%). The slope of the regression line between baseline SBP and the antihypertensive response (SBP change from baseline)

was significantly ($p < 0.0001$) steeper in the younger compared to older patients indicating a lesser fall in SBP in the elderly with regard to pretreatment level than in the younger patient (Figure). No significant ($p > 0.05$) difference between young (-11.0 ± 8 mmHg) and elderly patients (-11.6 ± 9 mmHg) was seen in the antihypertensive response to any monotherapy or combination therapy.

Conclusion: For any given pretreatment level, antihypertensive efficacy as measured by the fall in systolic pressure is diminished in elderly patients when compared to younger patients with essential hypertension. Regardless of the antihypertensive drug or drugs selected, the elderly need more aggressive therapy than the younger patient.

PP.33.341 DO WE INTERVENE SUFFICIENTLY IN PATIENTS WHOM WE FAIL TO CONTROL? TAPAS STUDY

A. Galgo¹, T. Mantilla², C. Suárez³, M. Leal⁴, A. Bernad⁵, L. Marqués⁶, J. García⁷, M.P. González⁸, R. Vázquez⁹, F. Carbonell¹⁰. ¹Primary Care Center Espronceda, Madrid, Spain, ²Primary Care Center Prosperidad, Madrid, Spain, ³Hospital Universitario de la Princesa, Madrid, Spain, ⁴AstraZeneca, Madrid, Spain, ⁵Primary Care Center Son Ferriol, Mallorca, Spain, ⁶Primary Care Center Guillem de Castro, Valencia, Spain, ⁷Primary Care Center Torrellano, Elche, Spain, ⁸Primary Care Center Cristóbal Acosta, Burgos, Spain, ⁹Primary Care Center Acuña, Orense, Spain, ¹⁰Primary Care Center Mislata, Valencia, Spain

Aims: Assess the evolution of Blood Pressure (BP) and the number of prescribed antihypertensive drugs in poorly controlled patients that after one year of intervention persist with poor control, and compare the evolution of BP levels and the number of prescribed drugs with the rest of hypertensive patients.

Methods: Retrospective study in Primary Care setting throughout the Spanish territory, including 1678 hypertensive patients classified in 4 cohorts predefined before inclusion: cohort 1: BP not controlled in first and last visit; cohort 2: BP not controlled one year ago and good control in last visit; cohort 3: BP controlled one year ago and lost control in the last visit; cohort 4: BP controlled in both visits. Variables analyzed: demographic, clinical (Systolic BP and Diastolic BP at baseline and at the end and its change) and therapeutic (mean number of antihypertensive treatments prescribed at baseline and at the final visit and its change).

Results: Mean age was 64 years, with 53% males. In the following table are described the evolution of the SBP and DBP, and their treatment before and after one year of follow up within each cohort

	Cohort 1	Cohort 2	Cohort 3	Cohort 4	p
SBP at baseline. Mean ± SD	158.7±13.9	154.4±13.9	132.6±11.8	131.0±10.8	<0.0001
SBP at last visit. Mean ± SD	150.2±14.3	131.3±11.5	146.3±13.8	127.6±8.3	<0.0001
Change in SBP between visits. Mean ± SD	-8.9±16.2	-23.5±14.7	14.3±16.9	-3.5±10.4	<0.0001
DBP at baseline. Mean ± SD	89.2±9.2	89.3±9.3	78.1±8.4	76.7±7.5	<0.0001
DBP at last visit. Mean ± SD	87.0±9.0	78.4±8.1	85.6±9.6	75.2±7.0	<0.0001
Change in DBP between visits. Mean ± SD	-2.4±10.1	-10.7±10.5	8.3±9.9	-1.3±7.4	<0.0001
Mean number of antihypertensive treatments at baseline / last visit.	1.6/1.8	1.5/1.6	1.5/1.6	1.4/1.4	0.0382
Change between visits in the number of antihypertensive treatments	0.3±0.5	0.2±0.5	0.1±0.5	0.0±0.3	<0.0001
CI 95%	(0.2,0.3)	(0.1,0.2)	(0.1,0.2)	(0.0,0.1)	

Conclusion: Despite not achieving BP control, patients who were poorly controlled initially decreased their BP (SBP: 8.9 and DBP 2.4 mmHg) after one year follow up suggesting that an active intervention has occurred, but insufficiently. Reinforcing this idea is the fact of an increase, though small, in the number of antihypertensive drugs from baseline to the final visit (mean at baseline 1.6, mean at final visit 1.8).

PP.33.342 EFFECT OF HIGH-DOSE ARB (VALSARTAN) ON THE HYPERTENSIVE ORGAN DAMAGE - SUB-ANALYSES WITH/WITHOUT CHRONIC KIDNEY DISEASE (CKD) OR METABOLIC SYNDROME (METS)

E. Geshi, S. Irie, T. Katagiri. Showa University, Yokohama, Japan

Objectives: In the recent mega trials, severe control of blood pressure and use of high-dose ARB have been indicated primary and secondary preventions for hypertensive cardiovascular events. On the other hand, in addition to the classical cardiovascular risk factors, patients with CKD and Mets are considered as higher risk group for subsequent cardiovascular events. We investigated usefulness of high-dose ARB (valsartan) for hypertensive organ damage markers in hypertensive patients focused on sub-analyses with/without CKD or Mets.

Methods: In hypertensive patients (n=122, mean ages; 67 years) who treated and not well-controlled using standard dose of ARB, CCB, diuretic or these combinations at least for 3 months were enrolled. They were divided with/without CKD or Mets according to the new diagnostic criteria in Japan, respectively. At 6 month after the switching to high-dose ARB (valsartan; 160 mg/day), blood pressure, some of hypertensive organ damage markers, renal function, and metabolic syndrome related factors were evaluated.

Results: Systolic ($p < 0.01$) and diastolic BP ($P < 0.01$) have been significantly decreased already at 1 month after the switching and these effects were kept to 6 months. Hs-CRP and serum BNP revealed no significant differences, however, urinary albumin index ($p < 0.05$) could be significantly reduced and this was more effective in Mets ($p < 0.05$ vs non-Mets). There was no significant changes in fasting blood glucose, however, HOMA-IR ($p < 0.05$), fasting-IRI ($p < 0.05$) and triglyceride ($p < 0.05$) were significantly decreased and these were more significantly reduced in Mets ($p < 0.05$ vs non-Mets). On the other hand, eGFR was significantly decreased at 6 month, however it was significantly maintained in CKD ($p < 0.05$ vs non-CKD). No severe adverse effect was observed during treatment.

Conclusion: Switching for high-dose valsartan indicated not only blood pressure lowering effect but also improving for organ damage markers, especially renal function in CKD and insulin resistance in Mets complicated with hypertension. Severe control of blood pressure using high-dose ARB was consequent strategy to reduce cardiovascular complications in hypertensive subjects with CKD or Mets.

PP.33.343 THERAPEUTIC DECISION FOR UNCONTROLLED AND UNTREATED HYPERTENSIVE PATIENTS: DIFFERENCES BETWEEN CARDIOLOGISTS AND GPs - REFLEXE STUDY

B. Fiquet¹, S. Quere¹, A. Francillon¹, M. Galinier². ¹Novartis Pharma SAS, Clinical Research and Development, Rueil Malmaison, France, ²CHU Rangueil, Cardiology Department, Toulouse, France

The study aim was to observe the therapeutic decision made by GPs or cardiologists for uncontrolled and untreated hypertensive patients (pts) (BP >= 140/90 for non diabetic (DB) and BP >= 130/80 mmHg for DB pts). Three treatment approaches were assessed: lifestyle and diet recommendations without treatment (LD), implementation of a single drug antihypertensive treatment (SD) or prescription of two antihypertensive agents (TD).

French cross sectional study conducted with 1048 GPs and 155 cardiologists in 2008. Each physician included the first 5 consecutive hypertensive pts according to above inclusion criteria. Cardiovascular (CV) risk factors (RF) and associated diseases were collected to compare pts characteristics in the 3 groups.

5201 pts were included by GPs and 764 pts by cardiologists (see table below).

	GPs	Cardio
Age (years), mean ± SD	58±12	58±13
M/F Ratio, %	59/41	57/43
HTN duration (years), mean ± SD	1.9±3.3	1.5±2.8
SBP/DBP (mmHg), mean ± SD	160±12 / 93±8	160±14 / 94±9
Ambulatory HTN assessment, %	75	87
Mild/severe HTN, %	33 / 12	33 / 12
Diabetes, %	17	19
Coronary heart disease, %	5.1	7
Lower limb arteriopathy, %	6.1	5.3
History of stroke or transient ischemic attack, %	3.5	4.5

Overall physicians mostly chose to start an antihypertensive treatment: only 7.9% of pts followed by GPs remained without treatment versus 10.6% of pts managed by cardiologists.

Cardiologists were more disposed to immediately prescribe a two-drug regimen than GPs, respectively 32.7 and 22.9%, even though their patients didn't have more severe HTN or more associated cardiovascular risk factors or diseases.

Therapeutic management for uncontrolled and untreated hypertensive patients differ between cardiologist and GPs, with cardiologists adopting a more aggressive approach despite the same cardiovascular risk of their pts.

The more frequent ambulatory BP measurement prescribed by cardiologists could explain partly the differences observed in therapeutic decision.

PP.33.344 ANTIHYPERTENSIVE TREATMENT ANALYSIS IN HYPERTENSIVE TYPE II DIABETES PATIENTS

M. Barabanshikova, L.S. Pak, E.A. Prochorovich. Moscow Medical Stomatological State University, Moscow, Russia

Objective: The aim was to evaluate the antihypertensive treatment administration with observed drug classes, and its pharmaceutical substance and dosage in patients with hypertension and diabetes mellitus type II in routine general practice.

Design and Methods: Clinical data, evaluation of medications and target drug dosage, risk factors controls were recorded from 288 hypertensive type II diabetes patients attended Moscow city cardiologic outpatient clinic in 2005–2006 years.

Results: The study included patients of mean age 59.6 ± 9.6 years, females was 66.7%. Medical history of diabetes was 4.1 ± 0.1 years, arterial hypertension duration was 10.2 ± 0.1 years. Mean SBP was 145.9 ± 31.4 mmHg and DBP 86.6 ± 17.4 mmHg. The treatment management included antihypertensive drugs used in 94.4% patients, hypolipidemic therapy was given for 28.8% of patients, administration of hypoglycemic drugs were registered in 59.4% of attendees, 55.9% of group had antithrombotic treatment. The antihypertensive drugs prescribed were ACE inhibitors used in 80.2%, beta blockers in 61.1%, calcium antagonist in 30.9%, diuretics 47.6% of all patients accordingly. The structure of the hypertensive drug was modified by the specialized cardiology clinic in comparison with general outpatients practice for wide usage of ACE inhibitors and calcium channel blockers with prolonged action and selective beta-blockers. Regarding ACE-inhibitors: perindopril was recommended in 26.3%, fosinopril in 28.1% and intake captopril 0.4%. The administered dosage was for fosinopril 18.1 ± 2.6 and perindopril 4.0 ± 0.1 . The structure of the beta-blockers changed from decreased atenolol administration in 11.5%, increased metoprolol intake in 32.3%. The administered used dosage for atenolol was 56.0 ± 5.2 and metoprolol 51.4 ± 6.7 . On the therapy only 4.4% of patients have reach the BP < 130/80 mm Hg.

Conclusion: In hypertensive type II diabetes patient's ACE inhibitors were the most widely used antihypertensive drugs as recommended in current guidelines. The target dosage has greater impact on the efficient BP control than the class of antihypertensive drug. The dosage of the administered antihypertensive drug should be tightly controlled in order to reach the target BP levels.

PP.33.345 THE EFFECT OF IRBESARTAN AND LOSARTAN ON BLOOD PRESSURE AND COGNITIVE FUNCTION IN HYPERTENSIVE PATIENTS

N. Afanasyeva, V. Mordovin. Research Institute of Cardiology of Siberian Branch of Russian Academy of Medical Sciences, Tomsk, Russia

Background and Purpose: Cognitive impairment also arises at early stages of hypertension. Angiotensin receptor blocker (ARB) suppress activity of sympathetic nervous system and are capable to eliminate factors which raise vascular risk in hypertensive patients. The aim of the present study was to study hypotensive and cerebroprotective efficacy of ARB irbesartan and losartan in hypertensive patients.

Methods: Forty five hypertensive patients (21 women and 24 men), aged between 28–56 years, were randomized to treatment with either blockers irbesartan 150–300 mg or losartan 50–100 mg during 6 month. 24-hours ambulatory blood pressure monitoring and neurocognitive assessment by Wechsler Memory Scale (WMS) were performed in all patients at baseline and in course of the treatment.

Results: Irbesartan reduced significantly 24-h SBP (with 156.8 mm Hg up to 134.0 mm Hg; $P = 0.009$), 24-h DBP (with 96 mm Hg up to 88 mm Hg; $P = 0.012$), time-index 24-h SBP (with 72% up to 44%; $P = 0.014$) and time-index 24-h DBP (with 64% up to 42%; $P = 0.018$). Losartan reduced significantly 24-h SBP (with 148.8 mm Hg up to 132.0 mm Hg; $P = 0.008$), 24-h DBP (with 98 mm Hg up to 89 mm Hg; $P = 0.024$), time-index 24-h SBP (with 58% up to 42%; $P = 0.028$) and time-index 24-h DBP (with 46% up to 38%; $P = 0.034$). Later 6 months hypotensive therapies by results of proof test were marked statistically significant reduction the quantity of errors (irbesartan with 6 up to 1.8; $P = 0.003$, losartan with 5 up to 4.2; $P = 0.062$). By results of tables of Shulte psychomotor speed has increased (irbesartan with 48 sec up to 36 sec; $P = 0.026$, losartan with 48 sec up to 44 sec; $P = 0.242$), indicators of long-term memory have increased (irbesartan with 68.5 word up to 52.6 word; $P = 0.005$, losartan with 60.4 word up to 56.2 word; $P = 0.084$).

Conclusions: Our study demonstrates, that long controllable treatment of hypertension with irbesartan and losartan reduces blood pressure and improves cognitive function. The most expressed positive effect on cognition rendered irbesartan.

PP.33.346 IS MAGNESIUM IMPORTANT IN ARTERIAL HYPERTENSION TREATMENT?

S. Radenkovic¹, G. Kocic¹, V. Kalezić², P. Vuksanovic². ¹Medical Faculty, University of Nis, Nis, Serbia, ²Clinic of Nephrology, Clinical Center Nis, Nis, Serbia

Objective: It is well known that Mg++ has an important role as a blockator of slow Ca++ channels and it reduces the release of Ca++ from sarcoplasmic reticulum of smooth muscle cells in blood vessels. However, the opinion about the significance of magnesium (Mg++) in arterial hypertension is divided. For that reason, we set as a goal the evaluation of the influence of oral Mg++ supplementation on blood pressure changes in patients with the arterial hypertension stage I.

Design and Method: The research included 156 subjects of both sexes (82 male, 74 female), averagely aged 53 ± 12 out of which 30 healthy subjects were in the control group, and 136 newly diagnosed untreated patients of arterial hypertension were in the clinical group. The clinical group was further divided into two subgroups: first (N=70) was on six months treatment with 300mg of magnesium oxide, and the second (N=66) without any treatment.

Results: In the clinical group, before the treatment, Mg++ value in serum was 0.65 ± 0.087 mmol/l, which is statistically significantly lower in comparison to the control group (0.76 ± 0.079 mmol/l; $p=0.02$). After six months treatment with Mg++ supplementation, an insignificant increase of Mg++ in serum was noticed in the first clinical subgroup in comparison with the values before the treatment (0.64 ± 0.07 mmol/l vs. 0.66 ± 0.052 mmol/l). In the same subgroup the values of blood pressure after the treatment were significantly lower than before the treatment (152 ± 8 vs. 145 ± 10 mmHg, $d. 96 \pm 7$ vs. 92 ± 5 mmHg, $p=0.05$). As for the second clinical subgroup, blood pressure after six months was significantly higher in comparison with the first subgroup ($s. 153 \pm 10$, $d. 95 \pm 7$ mmHg, $p < 0.05$).

Conclusions: The decrease of blood pressure is directly connected with Mg++ vasodilatory effect, which is significant in arterial hypertension treatment.

PP.33.347 THERAPEUTIC INERTIA IN VASCULAR RISK UNIT

E. Ferrer, R. Acal, A. Villagrasa, B. Borjabad, M. Vila, E. Sanchez, E. Llargues. Internal Medicine Service, Hospital General Granollers, Barcelona, Spain

Study Purpose: To analyze the cardiovascular risk factors control and the therapeutical inertia (TI) in a vascular risk unit. To identify the factors related to TI.

Methods: Review VisualCor ® database, used as a clinical record in the Vascular Risk Unit in a country hospital. We reviewed a random sample of patients controlled in the unit with a minimum of 3 follow-up visits.

Results: We have studied 79 patients, average age 60.1 ± 12.6 years, 64.6% male, 64.5% with diagnosis of hypertension, with average of 2.4 prescription drugs, 41.7% type 2 diabetes mellitus (DM2), with an average of 1.5 drugs, 86.6% diagnosed with dislipidemia (DLP), with an average of 1.2 prescription drugs, obese 59.4%, 32.9% former smokers and 43.0% in secondary prevention situation. We have analyzed the attitude in the treatment of hypertension in 150 visits, of DM2 in 81 visits and the DLP in 191 visits.

34.6% of patients had a good control of hypertension (blood-pressure in visit $< 140/90$, or $< 130/80$ in DM2, self blood-pressure measurement $< 135/85$ or ambulatory monitoring blood-pressure $< 130/80$), DM2 control (HbA1c $< 7\%$) 41.9% and DLP control (LDL < 130 mg/dl for primary and < 100 mg/dL in secondary prevention) 20.9%.

High blood pressure above objectives were found in 98 visits in Hypertensive patients, treatment was not changed in 43 (43.9%). In the 47 visits of patients with DM2 in 31 (65.9%) no change in treatment. 151 visits of patients with poorly controlled DLP, no change in treatment in 113 cases (74.8%).

We have analyzed whether the TI in HBP, DM2 and DLP was related to gender, age < 65 years, coexistence of cardiovascular risk factors, the situation of primary or secondary prevention or the number of drugs received, no differences had been found in any case

Conclusions: The TI in the patients with HBP is similar to that described in the literature. In HBP patients is lower than that observed in patients with DM2, or DLP.

There aren't differences in TI in primary and secondary prevention.

PP.33.348 ANTIPLATELET THERAPY IN HOSPITALIZED PATIENTS WITH ASYMPTOMATIC PERIPHERAL ARTERIAL DISEASE

B. Roig-Espert¹, J.J. Tamarit-García², F. García-Tolosa², A. Sáez-Segura², J. Giner-Morales², I. Carbonell-Casañ², L. Sánchez-Suárez², C. Sala-Sainz², V. Navarro-Ibáñez¹, A. Artero-Mora². ¹Manises University Hospital, Valencia, Spain, ²Dr. Peset University Hospital, Valencia, Spain

Objective: To review the antiplatelet therapy in patients, with asymptomatic peripheral arterial disease (PAD), hospitalized in an Internal Medicine Service and then, to assess the possible clinical impact in this treatment after the performance of an ankle brachial index (ABI) test.

Method: A transversal, descriptive and observational trial was carried out among hospitalized patients with acute or deteriorated non vascular disease in the Internal Medicine Service of the University Hospital Dr. Peset (Valencia, Spain) during a 3-month period. Patients were selected taking into account the age, sex and cardiovascular risk factors, such as smoking, high blood pressure, diabetes mellitus (DM), lipid disorders, personal and familiar cardiovascular precedents. Previous evidence of symptomatic arteriosclerosis, uncontrolled cancer or cognitive deterioration were exclusion criteria.

Results: Of 189 clinical checked files, 41 patients fulfilled inclusion criteria. Of these patients, 28.6 % were in treatment with aspirine, 21.4 % in treatment with clopidogrel, 14.3 % in treatment with aspirine and clopidogrel association, nobody in treatment with oral anticoagulation and the 35.7 % without antiplatelet therapy. The ABI test showed these results: 34 % had an ABI of < 0.9 , 48.8 % had a normal ABI ($0.9 - 1.2$) and in 17.2 % an ABI of > 1.2 %. Surprisingly, in 14.3 % of patients treated with double antiplatelet therapy, exclusively, due to the presence of atrial fibrillation and the contraindication of oral anticoagulation therapy or patients' denial to take this treatment. We found it remarkable that none of the patients with a pathological ABI test were taking the oral anticoagulation treatment.

Conclusions: There is a high prevalence of asymptomatic peripheral arterial disease that can be detected by doing an ABI, simple and low cost test. About 40 % patients with pathological ABI test and without antiplatelet therapy before going into hospital, needed to take this treatment after hospital discharge. Aspirin was the most commonly used drug as a monotherapy in the treatment for peripheral arterial disease in our patients.

PP.33.349 SEXUAL ALTERATIONS PRODUCED BY ANTIHYPERTENSIVE DRUGS

A. Sangrador¹, L. Vara². ¹Gerencia De Atencion Primaria Santander-Laredo, Santander, Spain, ²Centro De Salud Castilla-Hermida, Santander, Spain

Objective: To inform of the side effects (which appear in the drug prospectus in the most widely used drugs) of how patients sex life is affected by the use of antihypertensive drugs.

Methodology: Drug prospectuses, approved by the Spanish Agency for Drugs and Sanitary Products, of 1465 pharmaceutical specialties belonging to the treatment of arterial hypertension and existing bibliography were reviewed. For statistical purposes SPSS v.14 was used.

Results: In the therapeutic group of adrenergic transmission blockers the prospectus states that 84.3% of the drugs produce impotence, a lower libido in 3.5% of patients and sexual malfunction in 1.7%.

In Diuretics: 71.1% impotence and gynecomastia 5.3% of patients. The drugs affecting the renin-angiotensin system produced impotence in 68.2% of patients, gynecomastia in 35%, lower libido in 21.7% and sexual malfunction in 1.3%.

In calcium antagonists: impotence was registered at 59.9% of patients, gynecomastia in 68.7% and sexual disfunction in 1.5%. The combination of other groups impotence was found at 70.1%, 20.1%, lower libido at 24% and sexual malfunction at 11%.

Conclusions: A high number of drugs used in the treatment of hypertension produce adverse effects on patients sex life. As health professional we have to be informed of these side effects in order to correctly inform patients before they start treatment.

PP.33.350 THE INFLUENCE OF METOPROLOL ON BLOOD PRESSURE AND TOLERANCE TO PHYSICAL ACTIVITY IN HYPERTENSIVE PATIENTS WITH ISCHEMIC HEART DISEASE AFTER CORONARY ARTERY BYPASS GRAFT SURGERY

A. Brodskaya, V. Mordovin, N. Afanasyeva. Research Institute of Cardiology of Siberian Branch of Russian Academy of Medical Sciences, Tomsk, Russia

Background and Purpose: The hypertension is observed at 75–85 % of patients with a coronary atherosclerosis, and all these patients require in hypotensive therapies after surgical treatment. The aim of the present study was to study efficacy of hypotensive therapies on dynamics of test with physical activity in hypertensive patients with the ischemic heart disease (IHD), after Coronary Artery Bypass Graft (CABG) Surgery.

Methods: 20 hypertensive patients with IHD, in 6 months after CABG, aged between 48–70 years, were followed-up in the study, was appointed beta-blocker metoprolol 50–100 mg per day during 3 month. 24-hours ambulatory blood pressure monitoring and bicycle test were performed in all patients at baseline and in course of the treatment.

Results: Metoprolol reduced significantly 24-h SBP (with 145 mm Hg up to 135 mm Hg; $P=0.001$), 24-h DBP (with 84 mm Hg up to 75 mm Hg; $P=0.001$), day SBP (with 147 mm Hg up to 139 mm Hg; $P=0.001$), day DBP (with 84 mm Hg up to 76 mm Hg; $P=0.001$), night SBP (with 143 mm Hg up to 130 mm Hg; $P=0.001$), night DBP (with 80 mm Hg up to 70 mm Hg; $P=0.001$). Later 3 months therapies with metoprolol by results of bicycle test were marked statistically significant improvement: tolerance increase to physical activity (on 3.7 min; $P=0.003$) and decrease in degree stress of the induced increases the SBP (with 167 mm Hg up to 137 mm Hg; $P=0.001$) and DBP (with 86 mm Hg up to 76 mm Hg; $P=0.003$) was marked. The SBP and DBP upon a test pique have statistically significantly decreased. Metoprolol reduced signs of the latent coronary disease which were criterion of the termination of bicycle test (with 5 patients up to 1 patients; $P=0.009$)

Conclusions: Our study demonstrates, that metoprolol effectively reduces the BP and raises tolerance to physical activity in hypertensive patients with ischemic heart disease after after Coronary Artery Bypass Graft (CABG) Surgery.

PP.33.351 SHORT-TERM EFFICACY OF A COMBINED NUTRACEUTICAL ON BP, LIPID LEVELS AND ESTIMATED CVD RISK IN SUBJECTS TREATED WITH ACE-INHIBITORS (ACE-IS) OR CALCIUM CHANNEL BLOCKERS (CCBS)

A. Cicero¹, B. Gerocami¹, C. Benvenuti², I. Setnikar², L. Rovati². ¹*Atherosclerosis and Metabolic disease Research Unit, University of Bologna, Bologna, Italy*, ²*Rottapharm-Madaus SpA, Monza, Italy*

A relatively large literature support the use of some nutraceuticals (mainly berberine and monakolines) to improve the management of moderate dyslipidemias. We aimed at evaluating the efficacy and tolerability of a combined nutraceutical (Armoprev(R)) containing a standardized Ortosiphon stamineus extract 100 mg, added to berberine 500 mg and monakoline 3 mg, in hypertensive dyslipidaemic patients not a target for their blood pressure (BP) beyond treatment with ACE-inhibitors (ACE-Is) or Calcium Channel Blockers (CCBs).

Methods: We enrolled 40 hypertensive hyperlipidaemic patients, 20 subjects on established treatment with ACE-inhibitors since at least 6 months and 20 with dihydropyridine CCBs, both in primary prevention for cardiovascular disease. At the baseline the two groups were sex-, age-, BP- and lipid-matched. They were all treated with Armoprev(R) and re-evaluated after 4 weeks of treatment. Estimated 10-years CV risk change was evaluated applying the official Italian risk algorithm.

Results: All patients experienced a significant improvement in plasma lipid, without significant differences between the treatment groups (LDL-C: -60 ± 17 mg/dL, TG: -30 ± 20 mg/dL, HDL-C: $+4 \pm 4$ mg/dL). Armoprev(R) use was associated to a significantly improved BP control in either ACE-Is and CCBs treated patients, without significant difference between the treatment groups (beyond a trend for a higher efficacy when associated to ACE-Is): SBP -4.7 ± 1.8 mmHg ($p < 0.001$), DBP: -2.4 ± 2.3 mmHg ($p < 0.001$). BP reduction obtained by Armoprev(R) use was proportional to the baseline level (the relationship is more evident for treatment with ACE-Is) and reversed after treatment interruption. Estimated CV disease risk was significantly reduced after Armoprev(R) use, especially in men (who started by a higher baseline risk): $M = -5.8 \pm 3.2\%$, $F = -1.6 \pm 1.5\%$. No significant change was observed as it regards transaminases, CPK and creatinine.

Conclusion: A combined nutraceutical can further reduce BP and estimated CV disease risk in either ACE-Is and CCB treated patients.

PP.33.352 PECULIARITIES OF TREATMENT OF PATIENTS WITH ESSENTIAL HYPERTENSION WITH DIFFERENT DOSES OF CARVEDILOL

T. Ovdiienko. *NSC The M.D. Strazhesko Institute of Cardiology, AMS, Kiev, Ukraine*

Objectives: The purpose of this study was to determine the peculiarities of treatment of patients with essential hypertension (EH) with carvedilol (C).

Design and Methods: All patients (pts) had previously untreated EH (stage II). 1 group (gr)-33pts were treated with C in daily dose 42.2 ± 2.6 mg, 2gr – 11pts – in daily dose 95.5 ± 3.0 mg. 1gr of pts were separated: by patient's age – <50 years – 20pts, by mean age 41.0 ± 1.4 years; >50 years – 13pts, by mean age 57.7 ± 1.4 years; by nocturnal blood pressure (BP) patterns – dipping pattern (DP) – 14pts, non-dipping pattern (NDP) – 13pts. Ambulatory blood pressure monitoring (ABPM) was recorded using Meditech Cardio-Tens System. All examinations were carried out before and 4 weeks after C therapy.

Results: After 4 weeks, according to ABPM, we noticed that increase of C daily dose from 50 mg to 100 mg makes its antihypertensive efficiency significantly stronger: the decrease degree of 24hSBP in 1gr was $(-3.8 \pm 0.7\%)$ in 2gr – $(-7.7 \pm 1.3\%)$, increase of decrease degree of 24hDBP was the same. We observed that intensity of antihypertensive and chronotropic action of the C therapy (in daily dose 42.2 ± 2.6 mg) doesn't depend on the patient's age: in gr <50 years decrease degrees of 24hSBP, 24hDBP and 24HR were $(-2.9 \pm 0.7\%)$, $(-5.8 \pm 1.0\%)$ and $(-7.5 \pm 1.0\%)$; in gr >50 years, accordingly, $(-5.7 \pm 0.9\%)$, $(-8.8 \pm 1.0\%)$ and $(-4.9 \pm 1.1\%)$. There wasn't any significant difference between daytime and nighttime BP decrease under treatment of NDP pts with C and was stronger for daytime unlike nighttime in DP pts, therefore the nocturnal pattern remained unchanged. The decrease degrees of SBP and DBP in NDP pts for daytime were $(-5.2 \pm 1.6\%)$ and $(-7.8 \pm 2.1\%)$, in DP pts, accordingly, $(-3.7 \pm 1.0\%)$ and $(-7.9 \pm 1.2\%)$, for nighttime, accordingly, in NDP pts $(-6.6 \pm 1.9\%)$ and $(-9.1 \pm 2.0\%)$, in DP pts $(1.1 \pm 1.0\%)$ and $(-2.3 \pm 1.7\%)$.

Conclusion: Our results showed that increase of carvedilol daily dose from 50 mg to 100 mg makes its antihypertensive efficiency significantly stronger. Intensity of antihypertensive and chronotropic action doesn't depend on the patient's age. Carvedilol therapy has differential effects on the BP level depending on the nocturnal BP pattern. Carvedilol therapy doesn't influence significantly on nocturnal BP pattern.

PP.33.353 THE EFFECT OF DIURETIC DRUGS ON THE LEVELS OF URIC ACID

S. Patiakas¹, C. Charalampous². ¹*General Hospital of Kastoria, Kastoria, Greece*, ²*Pathologic Clinic of Psychiatric Hospital of Thessaloniki, Thessaloniki, Greece*

Objective: To study the effect of various diuretic drugs in relation to the appearance of hyperuricemia (abnormally high levels of uric acid in the blood).

Design and Method: 145 hypertensive patients were studied (83 male and 62 female), with average age 70.3 ± 12.8 years of age. The medication of all the patients was examined, while the uric acid levels were determined with the use of a biochemical analyzer.

Results: 78 patients out of 145, a 53.8% percentage, had normal levels uric acid values, while 67 patients (46.2%) had elevated uric acid values. Only one patient had an episode of acute uric arthritis, leading to the immediate interruption of the diuretic drug (spironolactone). Further study revealed that out of the 67 patients, (41 male and 26 female), 53 were already under treatment with diuretic drugs (79.10%). The vast majority of diuretics used was thiazide diuretics (26 patients, 49%) and furosemide (22 patients, 41.5%).

Conclusions: Therefore, it is proven that in a large percentage of hypertensive patients (almost 1 out of 2 patients), the use of diuretics has an increasing effect on the serum uric acid values. This should always be taken into consideration, given the fact that besides the effect of diuretics on the lipidemic profile of patients, there is always the danger of acute uric arthritis.

POSTER SESSIONS

POSTER SESSION 34

OBESITY AND METABOLIC SYNDROME

PP.34.354 FAST HEART RATE AS PREDICTOR OF OVERWEIGHT IN SUBJECTS SCREENED FOR STAGE 1 HYPERTENSION

P. Palatini¹, G. Garavelli², A. Bortolazzi³, L. Mos⁴, M. Santonastaso⁵, O. Vriz⁴, R. De Toni¹, G. Maraglino¹. ¹University of Padua, Padua, Italy, ²Town Hospital, Cremona, Italy, ³Town Hospital, Rovigo, Italy, ⁴Town Hospital, San Daniele del Friuli, Italy, ⁵Town Hospital, Vittorio Veneto, Italy

Objective: Increased sympathetic activity has been found to predict body weight (BW) gain. We did a prospective study to investigate whether clinic heart rate (HR) and 24 h ambulatory HR assessed at baseline and changes in heart rate during follow-up were independent predictors of subsequent increase in BW.

Design and Methods: The study was conducted in a cohort of 1008 white stage 1 hypertensive subjects from the HARVEST never treated for hypertension and followed-up for an average of 7 years. Clinic heart rate was the average of 6 readings. Ambulatory heart rate was obtained in 701 subjects. Data were adjusted for baseline body mass index, blood pressure, age, gender, physical activity habits, parental hypertension, cigarette smoking, and alcohol consumption.

Results: At the baseline, clinic heart rate was 74.7 ± 9.7 bpm and body mass index was 25.4 ± 3.4 Kg/m². During the follow-up BW increased by 2.1 ± 7.2 Kg. Both clinic HR ($p=0.005$) and 24 h HR ($p=0.02$) were significant predictors of BW gain. Also changes in HR measured in the clinic ($p=0.005$) or with 24 h recording ($p=0.004$) during the follow-up were independent associates of BW gain. In multivariable Cox regression, baseline body mass index ($p<0.001$), male gender ($p<0.001$), systolic blood pressure ($p=0.01$), baseline clinic HR ($p=0.02$) and follow-up changes in clinic HR ($p<0.001$) were independent predictors of overweight at the end of the follow-up. Subjects with persistent tachycardia (heart rate ≥ 80 bpm) but not transient tachycardia had a 40% increase in the adjusted risk of overweight in comparison with subjects with normal heart rate ($p=0.02$). In the subgroup of subjects with ambulatory HR data, clinic HR remained a significant predictor of subsequent BW gain ($p=0.008$) whereas 24 h HR was excluded from the model.

Conclusions: Baseline clinic HR and HR changes during the follow-up are independent predictors of BW gain in young persons screened for stage 1 hypertension suggesting that sympathetic nervous system activity may play a role in the development of obesity in hypertension.

PP.34.355 OBESITY AND HIGH BLOOD PRESSURE AMONG SCHOOLCHILDREN IN GREECE

A. Kollias¹, E. Skliros², G. Stergiou¹, N. Leotsakos², A. Gikas², F. Tolika², A. Sinapi², A. Sotiriou², M. Papadopoulou², M. Saridi², D. Garifallos². ¹Hypertension Center, Third University Dept of Medicine, Sotiria, Athens, Greece, ²Health Center of Kalivria, Attica, Greece

Objective: Childhood obesity seems to be increasing at alarming rates worldwide, including Greece. The aim of this study was to determine the relationship of obesity with the presence of high blood pressure (BP) in a sample of Greek children.

Design-Methods: This is a cross-sectional, school-based study conducted in seven schools in Eastern Attica, the greater area of Athens. Students were subjected to anthropometric and BP assessment according to the International Obesity Task Force references and the guidelines of the 4th Report on the Diagnosis, Evaluation and Treatment of High Blood pressure in children and adolescents respectively.

Results: 780 students (9.2 ± 1.8 years old, 415 boys) were included in the analysis. Approximately 22% of the participants were overweight and 8%

obese. The prevalence of high BP in the range of prehypertension and hypertension was 17% and 26% respectively. Overweight and obese children compared with normal-weight children had higher BP levels ($108.3 \pm 11.8/71.7 \pm 9.5$ mmHg systolic/diastolic vs. $105 \pm 11/69.8 \pm 9.7$ mmHg respectively, $p<0.05$ for both comparisons). In multiple regression analysis with age, gender and body mass index (BMI) as independent variables, BMI was associated with higher levels of systolic BP ($\beta=0.496 \pm 0.106$, $p<0.001$) and diastolic BP ($\beta=0.227 \pm 0.09$, $p=0.02$), independently of age and gender.

Conclusions: High rates of childhood overweight and obesity were recorded in this study population. Moreover, the presence of overweight/obesity was related to increased levels of BP independently of age and gender. Taking into account that these parameters are associated with an increased risk for cardiovascular events, the need for preventive measures against childhood obesity emerges urgently.

PP.34.356 HIGH RATE OF UNDETECTED ARTERIAL HYPERTENSION IN PATIENTS WITH NON-ALCOHOLIC STEATOHEPATITIS (NASH)

H. Steffen, M. Demir, S. Lang, S. Schulte, U. Töx. Department of Gastroenterology and Hepatology, University Hospital of Cologne, Koeln, Germany

Background and Aims: Non-alcoholic fatty liver disease (NAFLD) is an emerging disorder characterized by fatty infiltration of the liver in the absence of alcohol consumption. NAFLD ranges from simple steatosis to NASH, which might progress to end-stage liver disease. This progression is related to insulin resistance, which is strongly linked to the metabolic syndrome consisting of central obesity, dyslipidemia, and hypertension. Each of these abnormalities carries a risk for cardiovascular disease. The aim of this study was to determine the prevalence of arterial hypertension in patients with liver disease and to identify the rate of undetected hypertension in patients with NAFLD and NASH.

Methods: Patient records from 2006 to 2008 of the in- and outpatient department of the Department of Gastroenterology and Hepatology of the University Hospital of Cologne with biopsy proven NAFLD ($n=16$) or NASH ($n=30$) were retrospectively reviewed for the prevalence of arterial hypertension (blood pressure $>140/90$ mmHg). Patients with a history of hypertension or concomitant therapy with blood pressure lowering agents were categorized as known hypertensives. Patients with chronic hepatitis C virus infection served as a control group ($n=122$).

Results: The number of known hypertensives was 13/122 (10.7%) in the HCV group, 3/16 (18.7%) in the NAFLD group and 5/30 (16.7%) in the NASH group. The number of previously undetected hypertensives was 25/122 (20.5%) in the HCV group, 3/16 (18.8%) in the NAFLD group and 9/30 (30%) in the NASH group. Thus, the prevalence of arterial hypertension was 31.1% in the HCV group, 37.6% in the NAFLD group and 46.7% in the NASH group.

Conclusion: We observed a high rate of undetected and untreated arterial hypertension in patients with liver disease, especially NASH. Since the incidence of NAFLD/NASH is expected to rise in Western countries gastroenterologists and hepatologists should be encouraged to take the opportunity to measure blood pressure routinely and attend to an adjustment of antihypertensive therapy during specialized care for this high risk population.

PP.34.357 IMPACT OF OBESITY AND FAT DISTRIBUTION IN METABOLIC DYSLIPIDEMIA OF THE ELDERLY IN SPAIN: A POPULATION-BASED STUDY

J. Redon¹, L. Cea-Calvo², B. Moreno³, S. Monereo⁴, V. Gil-Guilén⁵, J.V. Lozano⁶, J.C. Martí-Canales⁷, J.L. Llisterrri⁸, J. Aznar⁹, C. Fernandez-Perez¹⁰, E. Lurbe¹. ¹INCLIVA Universidad de Valencia, and CIBER of Obesity and Nutrition (CB 03/06), Carlos III Institute of Health, Valencia, Spain, ²Clinical Research Department, Merck Sharp & Dohme de España, Madrid, Spain, ³Obesity Unit, Hospital Gregorio Marañón, Madrid, Spain, ⁴Section of Endocrinology, Hospital of Getafe, Madrid, Spain, ⁵Universidad Miguel Hernandez Elche, Alicante, Spain, ⁶Serreria 2 Health Center, Valencia, Spain, ⁷San Antonio Health Center, Motril, Spain, ⁸Ingeniero Joaquín Benlloch Health Center, Valencia, Spain,

⁹Research Unit, Hospital Marina Alta, Denia, Spain, ¹⁰ Research Unit, Hospital Clinico San Carlos, Madrid, Spain

Studies on the impact of weight excess and fat distribution on metabolic dyslipidemia are usually limited to young and middle-aged population, and data on the elderly are scarce.

The objective was to assess the impact of obesity and their abdominal component in the prevalence of metabolic dyslipidemia.

Subjects and Methods: We performed an analysis of PREV-ICTUS, a population-based study on subjects aged 60 years-old or more in Spain, to assess the impact of weight excess, stratified by body mass index (BMI) (normal <25; overweight 25–29.9; obesity greater than or equal to 30 kg/m²), and waist circumference (WC) (increased if greater than or equal to 88 cm [women] or greater than or equal to 102 cm [men]), on the prevalence on metabolic dyslipidemia.

Results: In 5173 subjects (mean age 71.7 years-old, 53.5% women), prevalence of obesity was 30.8%, and 60.6% showed an increased WC. Low HDL cholesterol was present in 17.4% and high triglycerides (TG) were in 35.3%. BMI and WC showed an independent impact on the prevalence of low HDL cholesterol and high TG in men but in women only were linked with high TG. In a multivariate model including age, sex, BMI and WC, prevalence of low HDL was higher in the increased WC group (OR 1.32 compared to normal), and prevalence of high TG was higher in the overweight and obesity group (1.38 and 1.67 compared to normal weight) and in the increased WC group (OR 1.17 compared to normal WC).

Conclusion: In the elderly population, BMI and WC showed an independent and direct impact on the prevalence of metabolic dyslipidemia that can contribute to the additive cardiovascular risk linked to obesity and fat distribution.

PP.34.358 ADIPONECTIN AND C-REACTIVE PROTEIN ARE POSITIVELY ASSOCIATED WITH MICROALBUMINURIA IN AN ADULT CAUCASIAN POPULATION

M. Pruijm¹, P. Vollenweider², V. Mooser³, P. Marques-Vidal⁴, D. Teta¹, F. Paccard⁴, G. Waeber², M. Burnier¹, M. Bochud^{1,4}. ¹Department of Nephrology, University Hospital of Lausanne (CHUV), Lausanne, Switzerland, ²Department of Internal Medicine, University Hospital of Lausanne (CHUV), Lausanne, Switzerland, ³Division of Genetics, GlaxoSmithKline, Philadelphia, USA, ⁴Institute of Social and Preventive Medicine (IUMSP), University Hospital of Lausanne (CHUV) and University of Lausanne, Lausanne, Switzerland

Objective: Microalbuminuria (MAU) is a marker of early kidney injury and cardiovascular risk. We assessed the association of MAU with plasma adiponectin, leptin, and hsCRP as inflammatory marker, accounting for hypertension, diabetes and obesity.

Design and Methods: Population based, cross-sectional study in Caucasian subjects aged 35 to 75 years in Lausanne, Switzerland. MAU, measured by quantitative immunonephelometry on spot morning urine, was used either as a continuous (MAU) or dichotomized variable (MA defined as MAU > 2.5 and >3.5 mg/mmol creatinine in men and women, respectively).

Results: The 2955 women (age 53.3 ± 10.7, mean ± SD years) had mean body mass index (BMI) 24.9 ± 4.5 kg/m². The 2479 men (age 53.1 ± 10.8 years) had mean BMI 27.0 ± 3.9 kg/m². Median hsCRP was 1.3 and 1.3 mg/L, median adiponectin 6.2 and 10.6 µg/mL in men and women, respectively. MA prevalence was 4.9% in women and 9.8% in men. In multivariate regression analysis adjusting for potential confounders (age, sex, hypertension, diabetes, eGFR, BMI, percent fat mass, insulin and smoking), log-transformed MAU was positively associated with hsCRP (P < 0.001) and adiponectin (P = 0.002), but not with leptin. The association of adiponectin with MAU was stronger in subjects with low hsCRP, and vice versa (P interaction < 0.001).

Conclusion: Adiponectin and hsCRP are significant positive determinants of MAU, independently of diabetes, hypertension and fat mass. A negative interaction between hsCRP and adiponectin was found for their effect on MAU. Whether hyperadiponectinemia represents an adequate protective response to vascular stress or has negative causal impact on the development of MAU should be assessed in further studies.

PP.34.359 ROLE OF ABDOMINAL FAT COMPARTMENTATION ON WAVE REFLECTIONS: DIFFERENCES BETWEEN MEN AND WOMEN

V. Katsi, I. Skiadas, G. Sourmetis, P. Theodoropoulos, C. Vlachopoulos, C. Tsioufis, D. Tousoulis, C. Stefanadis, I. Kallikazaros. *Hippokratia Hospital - Department Of Cardiology, Athens, Greece*

Objective: Central obesity is an established cardiometabolic risk factor. However, gender specific abdominal fat compartmentation is less well studied. We sought to evaluate the effect of subcutaneous and preperitoneal fat compartments as expressed by abdominal fat index (AFI), on metabolic profile and arterial properties of hypertensive men and women.

Design and Method: We studied 369 consecutive never treated essential hypertensive men (n = 183, age = 52 ± 10 years) and women (n = 186, 57 ± 12 years), non diabetic, with normal waist circumference (92 ± 9 and 73 ± 13 cm, respectively). In all participants anthropometrics variables were recorded and venous blood samples were taken to determine their metabolic profile. Arterial stiffness was evaluated, on the basis of c-f PWV by means of a computerized method (Complior SP). Heart rate-corrected augmentation index (AIx75) was estimated as a measure of wave reflections. Ultrasonography was used for the assessment of abdominal fat distribution. Subcutaneous (S) and preperitoneal (P) fat layers were measured at their maximum and minimum thickness sites on the upper median abdomen. AFI was calculated as Pmax to Smin ratio.

Results: Women had better metabolic profile than men, according to fasting plasma glucose, total cholesterol, low-density lipoprotein, triglyceride and high-density lipoprotein levels (97 ± 9 vs. 97 ± 5 mg/dl p = 0.869, 201 ± 43 vs. 213 ± 38 mg/dl p = 0.036, 133 ± 40 vs. 139 ± 43 mg/dl p = 0.043, 116 ± 52 vs. 140 ± 79 mg/dl p = 0.010, 59 ± 14 vs. 42 ± 10 p < 0.001, respectively) and lower AFI (0.87 ± 0.52 vs. 1.24 ± 0.72 p < 0.001), though more subcutaneous (18 ± 7 vs. 15 ± 6 p < 0.0001) than preperitoneal fat accumulation (14 ± 6 vs. 16 ± 6 p = 0.078). On the contrary, women had increased AIx75 than men (30.3 ± 6 vs. 23 ± 10 p < 0.001), while they did not differ regarding c-f PWV (8.52 ± 1.6 vs. 8.6 ± 1.9 m/sec p = 0.611).

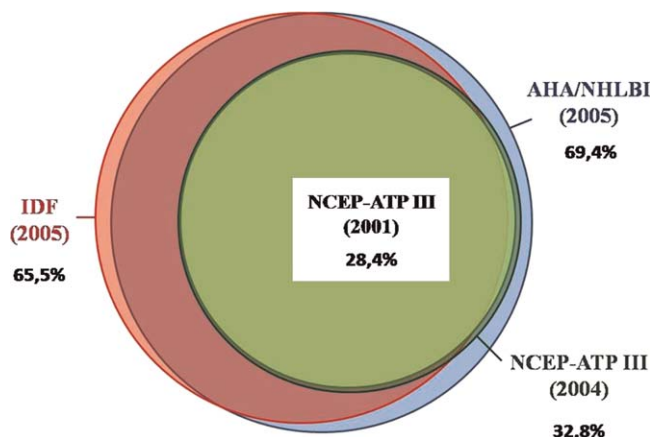
Conclusions: This study suggests that hypertensive women exhibit lower abdominal fat index and higher subcutaneous fat accumulation than men. This is associated with better metabolic profile and augmented peripheral wave reflections.

PP.34.360 COMPARISON OF DEFINITIONS OF METABOLIC SYNDROME IN RELATION TO THE RISK OF CORONARY HEART DISEASE AND STROKE

N. Cortez-Dias¹, S. Robalo Martins¹, A. Belo², M. Fiuza¹. ¹Santa Maria University Hospital, Lisbon, Portugal, ²Portuguese Society of Cardiology, Lisbon, Portugal

Aims: To compare definitions of metabolic syndrome (MS) with regard to their association with coronary artery disease (CAD) and stroke.

Methods: Cross-sectional study performed in a primary care setting, involving 719 general practitioners pursuant to stratified distribution proportional to the population density. The first 2 adult patients scheduled for an appointment on a given day were invited to participate, irrespective of the reason for the consultation. A questionnaire for social-demographic, clinical and laboratory data was applied. MS diagnosis was defined according to NCEP-ATP III 2001, NCEP-ATP III 2004, IDF and AHA/NHLBI criteria. Multivariate logistic regression analysis was used to assess the risk of CAD and stroke according to sex, age, body mass index, waist circumference, HDL-cholesterol, triglycerides, hypertension (HT), diabetes and MS according to each definition.



Results: The study included 16,856 individuals (58.1 ± 15.1 years). The prevalence of MS adjusted to sex, age and size of the regions by NCEP-ATP

III 2001, 2004, IDF and AHA/NHLBI definitions was 28.4%, 32.8%, 65.5% and 69.4%, respectively. The degrees of agreement according to the κ statistics were modest and only 60.3% simultaneously fulfilled the criteria of all definitions. HT was the treatable risk factor most strongly associated to CAD and stroke. Only the IDF and AHA/NHLBI definitions of MS were independently associated to CAD (OR: 1.74 and 2.26, respectively). Regarding to stroke, only AHA/NHLBI criteria provided statistically significant association (OR: 1.85).

Conclusions: The definition of MS according to the AHA/NHLBI criteria appears to be a better predictor of CAD and stroke in the Portuguese population. MS as defined by AHA/NHLBI criteria remains an independent risk factor for CAD and stroke after adjustment to its individual components.

PP.34.361 VISCERAL ADIPOSITY: DISCORDANCE BETWEEN ARTERIAL STIFFNESS AND PERIPHERAL WAVE REFLECTIONS

V. Katsi, I. Skiadas, G. Sourmetis, D. Tsartsalis, D. Tousoulis, C. Vlachopoulos, C. Stefanadis, I. Kallikazaros. *Hippokratio Hospital - Department of Cardiology, Athens, Greece*

Objective: Excess body fat accumulation is considered to be a determinant of arterial stiffness, as expressed by increased carotid - femoral pulse wave velocity (c-f PWV) and Augmentation index (Aix). However, in the context of visceral obesity, the relationship between Aix and c-f PWV is less well established. We sought to evaluate the influence of abdominal fat distribution, as reflected by abdominal fat index (AFI) on arterial stiffness and peripheral wave reflections.

Design and Method: We studied 185 newly diagnosed, untreated, non diabetic, essential hypertensive subjects (aged 57 ± 10 years, male=96, office blood pressure=156/92 mm Hg, waist circumference=89 $\pm$ 13 cm). In all participants anthropometric data were recorded and venous blood sampling was performed to determine their metabolic profile. Aortic stiffness was evaluated on the basis of c-f PWV by means of a computerized method (Complior SP). Heart rate-corrected augmentation index (Aix75) was estimated as a measure of wave reflections. Ultrasonography was used for the assessment of abdominal fat distribution. Subcutaneous (S) and preperitoneal (P) fat layers were measured at their maximum and minimum thickness sites on the upper median abdomen. AFI was calculated as P_{max} / S_{min} ratio.

Results: Excess visceral adiposity as expressed by increased AFI was negatively correlated with Aix75 ($r = -0.28$, $p = 0.04$) and positively with c-f PWV, glomerular filtration rate, triglycerides and homocysteine levels ($r = +0.18$ $p = 0.44$, $r = +0.32$ $p = 0.02$, $r = +0.16$ $p = 0.04$, $r = +0.28$ $p = 0.79$, respectively). On multiple regression analysis, 57% of the variance in Aix75 was carried out with the following significant predictors: age, smoking, glucose, mean systolic blood pressure and waist circumference.

Conclusions: In the setting of essential hypertension, excess of visceral adiposity is associated with increased arterial stiffness but decreased peripheral wave reflections.

PP.34.362 OBESITY RELATED HYPERTENSION IN PATIENTS WITH VASCULAR DISEASE

J. Vernooij¹, Y. van der Graaf², F. Visseren¹, W. Spiering¹. ¹University Medical Center Utrecht, Utrecht, The Netherlands; ²Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht, The Netherlands

With increasing weight there is an increase in the prevalence of vascular risk factors, especially hypertension. In patients with vascular disease the vascular risk of the combination of obesity and hypertension is unknown. Aim of the present study was to evaluate the prevalence and the vascular risk of the combination of obesity and hypertension in patients with vascular disease.

A cohort of patients with vascular disease ($n = 4868$) was screened for vascular risk factors and followed (median follow-up 4.0 years, interquartile range 1.9 to 6.8 years) for the occurrence of vascular events (stroke, myocardial infarction, and cardiovascular death). In the period 1996 - 2008, 605 vascular events occurred and 593 patients died.

The prevalence of obesity ($BMI > 30 \text{ kg/m}^2$) was 18% (95%CI 17-19%) and the prevalence of hypertension (SBP above 140 mmHg and/or use of blood pressure lowering medication) was 83% (95%CI 82-84%). The prevalence of the combination of obesity and hypertension was 16% (95%CI 15-17%), while the prevalence of hypertension in the patients with obesity 88% (95%CI 86-90%) was. Per unit BMI (1 kg/m^2) there was an increase in SBP of 0.3 mmHg ($\beta = 0.28$ 95%CI 0.13-0.42, adjusted for age and gender). Analysis of endpoints showed per unit increase of BMI hazards

for the combined vascular endpoint and mortality of 0.98 (95%CI 0.96-1.01), respectively 0.97 (95%CI 0.94-0.99), thus showing an obesity paradox. BMI and SBP did not show interaction, meaning that patients with a high BMI have the same risk for vascular events and mortality associated with hypertension than patients with a low BMI.

In conclusion, it was found that in patients with vascular disease there is a low prevalence of the combination of hypertension and obesity, there is only a weak relation between BMI and SBP, and the combination of both risk factors does not confer a higher risk than each risk factor alone. Based on these results the concept of obesity related hypertension remains uncertain in patients with vascular disease.

PP.34.363 BLOOD PRESSURE IS DEPENDENT ON ADIPOSITY IN PREPUBERTAL CHILDREN

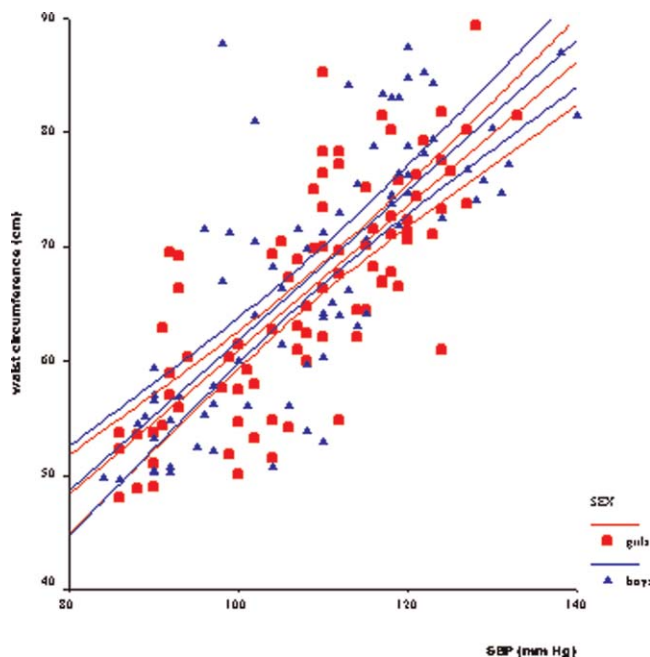
Y. Yotov¹, S. Galcheva², E. Diankov³, V. Iotova³. ¹Medical University Hospital - 1st Cardiology Clinic, Varna, Bulgaria; ²Medical University Hospital - Department of Paediatrics, Varna, Bulgaria; ³Medical University Hospital - Department of Paediatrics, Varna, Bulgaria

Arterial hypertension (AH) is significantly related to overweight. Their correlation may be traced in childhood.

Aim: To study the effect of obesity, especially central obesity, on blood pressure and heart rate in prepubertal urban children.

Participants and Methods: We evaluated 168 healthy children (78 boys and 90 girls) at a mean age of 8.1 ± 1.2 years. The participants were divided in three groups - normal (NW, 31.5%), overweight (OW, 27.4%) or obese (OB, 41.1%) according to their body mass index (BMI) and waist circumference (WC). Their blood pressure (BP) and heart rate (HR) were measured in sitting position after 5 minutes rest. The mean and pulse BP were calculated. Family history for AH, diabetes and obesity was recorded.

Results: All arterial BP measurements were significantly higher in the OW and OB groups than in the NW - 108.2 and 118.2 vs. 96.4 mmHg for the systolic BP (SBP), $p < 0.0001$, 66.0 and 73.0 vs. 57.6 for the diastolic (DBP), $p < 0.0001$, 80.1 and 88.0 vs. 70.5 mmHg for the mean (MBP), $p < 0.0001$, 42.2 ($p = 0.058$) and 45.2 ($p < 0.0001$) vs. 38.79 mm Hg for the pulse BP (PBP). WC is highly correlated with BP, with partial correlation coefficients $r = 0.74$ for the SBP



and MBP, 0.68 for the DBP and 0.35 for the PBP ($p < 0.0001$ for all), after adjusting for age and sex. The same is found for the logBMI - partial $r = 0.74$ for the SBP, 0.71 for the DBP, 0.76 for the MBP and 0.30 for the PBP ($p < 0.0001$). In multiple linear regression WC is the only significant predictor of SBP and PBP while BMI is the only one for DBP and MBP after adjusting for age, sex, blood glucose, family history of hypertension and weight and height at birth. No relation was found between weight, WC and heart rate.

Conclusions: BP is significantly higher in children with overweight and obesity. Thus, the prevention of AH can be started in childhood.

PP.34.364 ADIPONECTIN RESPONSE TO METABOLIC STRESS IN GENETIC VS. ENVIRONMENTALLY INDUCED METABOLIC SYNDROME

Y. Sharabi, E. Peleg, Z. Shabtay, E. Grossman. *Sheba Medical Center, Tel Hashomer, Israel*

The etiology of the metabolic syndrome (MS) includes both genetic and environmental factors. Metabolic stress increases adiponectin levels. The current study compares the different effect of high carbohydrates diet on adiponectin levels in genetic compared to environmentally induced MS models.

Methods: We have previously shown that high sucrose diet given to male spontaneously hypertensive rats (SHR) is a model of genetic MS and high fructose diet given to male Sprague Dawley rats (SDR) is a model of environmentally induced MS. Within each group rats were assigned to either the high sugar diet (SDR with fructose enriched diet and SHR with sucrose enriched diet) or standard rat chow (control group). The rats were followed for 7 weeks. Plasma adiponectin at baseline and at the end of the study were measured. The relative change of adiponectin in response to the diet was compared between the two models.

Results: Both models showed the components of the MS, namely – high blood pressure, triglycerides, insulin and impaired glucose tolerance. The metabolic stress with high sugar induced a significant increase in plasma adiponectin ($\text{mg/dl} \pm \text{S.E.}$) compared to control in both models: In the Fructose - SDR group - from 3.3 ± 0.18 at baseline to 4.3 ± 0.26 , $p < 0.005$ compared to no change in the Chow-SDR group (from 4.1 ± 0.28 to 3.4 ± 0.28 , $p = \text{NS}$) and in the sucrose SHR - from 4.1 ± 0.21 to 7.2 ± 0.39 , $p < 0.001$ compared to 4.3 ± 0.29 to 4.4 ± 0.14 , $p = \text{NS}$ in the chow-SHR group. The relative increase was significantly greater in the genetic model of MS: $80 \pm 10.9\%$ vs. $30 \pm 6.7\%$, $p < 0.05$.

Conclusions: Metabolic stress with high sugar diet results in an increase of plasma adiponectin in both genetic and environmental model of MS, however, this effect is much greater in the latter. The clinical significance of this finding should be further investigated.

PP.34.365 COMPARISON OF ANTYHYPERTENSIVE AND METABOLIC EFFECTS OF CARVEDILOL AND METOPROLOL IN HYPERTENSIVE PATIENTS WITH OVERWEIGHT AND OBESITY. CAMELLIA TRIAL.L

S.Y. Martsevich, N.P. Kutishenko, A.D. Deev, R.G. Oganov, S.A. Shalnova. *State Research Center for Preventive Medicine, Department of Preventive Pharmacology, Moscow, Russia*

Aim: To compare two therapies based on two β -blockers Carvedilol (C) or Metoprolol (M) in hypertensive patients with overweight or obesity.

Material and Methods: 320 patients (pts) were involved in multicenter, randomised open parallel study. Both groups were comparable on the main clinical characteristics. 160 pts were treated with C 12.5 mg bid, and 160 pts were treated with M 25 mg bid. Doubling dose of C or M and switching pts to combined therapy with amlodipine (AML) 5–10 mg/day and than with hydrochlorothiazide (HCT) 12.5–25 mg/day was performed to achieve target blood pressure levels. Duration of the study was 24 weeks.

Results: Significant reduction of systolic and diastolic blood pressure (SBP, DBP) were revealed in both groups, there were no differences in antihypertensive effect between two groups ($p = 0.88$ for SBP and $p = 0.61$ for DBP). Combined therapy with AML and HCT was administered more often in M group than in C group ($p > 0.05$). Significant reduction in glucose ($p < 0.01$) and uric acid levels ($p < 0.001$) were registered in C group as well as the tendency to lowering of total cholesterol and low density lipoprotein cholesterol levels. C did not have negative effect on serum potassium and creatinine levels. Adverse effects rate was 6.3% in C and 3.8% in M group.

Conclusion: The results of the study confirmed antihypertensive effect and good tolerability of carvedilol as well as demonstrated some its advantages over metoprolol in pts with overweight and obesity. Carvedilol has positive metabolic effects on lipid, glucose and uric acid levels in comparison with metoprolol. Carvedilol therapy is more preferable in pts with arterial hypertension and metabolic risk factors.

PP.34.366 OBESITY AND CARDIOVASCULAR RISK FACTORS IN CHILDREN AND ADOLESCENTS

I. Torro^{1,2}, J. Alvarez^{1,2}, F. Aguilar^{1,2}, J. Alcon^{1,2}, J. Redon^{2,3}, E. Lurbe^{1,2}. ¹Pediatrics, Hospital General Universitario, University of Valencia, Valencia, Spain, ²CIBERobn, Health Institute Carlos III, Madrid, Spain, ³Internal Medicine, Hospital Clinico University of Valencia, Valencia, Spain

Association between overweight and cardiometabolic risk factors has been reported in adults, but very little is known about this association in paediatric age.

Objective: To assess the prevalence of cardiometabolic factors in overweight children and adolescents.

Design and Methods: 298 overweight, Caucasian children and adolescents (130 females), of European origin, 6 to 18 years of age (mean age 10.9 $\pm$ 2.8) were selected. Subjects with BMI from the 85th to 97th percentile were defined as overweight while those higher than the 97th as obese. A validated oscillometric method was employed to measure ambulatory BP (Spacelabs 90207) over 24 hours. Fasting glucose and insulin were measured, and the HOMA index (HI) was calculated. Lipid profile was also assessed. Hypertension and metabolic abnormalities were defined following the ESH Guidelines in Children and Adolescents (J Hypertens, 2009). Insulin resistance was considered when the HOMA index was greater than or equal to 4.5. Factors associated with the number of clustered cardiometabolic risk factors were assessed by multiple regression analysis.

Results: The prevalence of cardiometabolic risk factors was the following: 1) Office HTN 2.8% and ambulatory HTN 11.8% (isolated SBP 19 cases, isolated DBP 3 cases and SBP-DBP HTN 12 cases); 2) High HOMA index 33%; 3) Hypercholesterolemia 5.1%; 4) HypoHDL 0.7%; 5) Hypertriglyceridemia 10.5%. The percentage of subjects with one or more risk factors associated with overweight was: one factor 33%, two factors 8.6%, three factors 1.7% and four factors 0.3%. Factors associated with the number of clustered cardiometabolic risk factors were BMI z-score ($p < 0.001$) and age ($p < 0.001$) in a multivariate analysis. Hypertension was associated with a high prevalence of abnormal HOMA index and with hypercholesterolemia and hypertriglyceridemia. Abnormal HOMA index was associated with hypertriglyceridemia.

Conclusions: Practically half the overweight children and adolescents have one or more cardiometabolic risk factors. The association is greater in subjects with hypertension than it is in normotensives. The potential impact of overweight in cardiovascular disease operates early in life.

PP.34.367 INSULIN RESISTANCE, TUMOR NECROSIS FACTOR- α IN OBESITY-ASSOCIATED HYPERTENSION

T. Ambrosova, O. Kovalyova, T. Ashcheulova. *Kharkiv National Medical University, Internal Medicine Department, Kharkiv, Ukraine*

Objective: It was proposed that adipokines such as tumor necrosis factor- α (TNF- α), in addition to their role in immune response in hypertension, are involved in the development of insulin resistance and obesity. The aim of our clinical study was to assess plasma TNF- α levels, body mass, glucose, insulin, HbA1c levels, and HOMA means in hypertensive patients depend on presence of insulin resistance.

Design and Methods: 67 hypertensive patients were examined by anthropometric methods (height, body mass, body mass index (BMI), waist circumference). Plasma TNF- α by ELISA, fasting glucose, insulin, HbA1c, and HOMA were measured.

Results: Patients were divided into two groups depend on insulin resistance (IR) presence according to HOMA means: 1 group without IR – 25 ($37 \pm 6\%$) patients with $\text{HOMA} < 2.77$, 2 group with IR – 42 ($63 \pm 6\%$) patients with $\text{HOMA} > 2.77$. It was found that waist circumference ($98.74 \pm 1.8 \text{ cm}$) and BMI $35.04 \pm 0.88 \text{ kg/m}^2$ in insulin resistant patients were statistically higher than in hypertensives without IR ($82.0 \pm 1.9 \text{ cm}$; $29.71 \pm 1.14 \text{ kg/m}^2$; $p = 0.001$, correspondingly). Plasma insulin levels ($23.17 \pm 2.13 \mu\text{U/ml}$) in patients with IR was threefold as compared with patients without IR ($7.28 \pm 0.67 \mu\text{U/ml}$; $p = 0.001$). fHbA_{1c} means ($7.52 \pm 0.43\%$ vs $5.75 \pm 0.4\%$; $p = 0.004$) and HOMA (8.43 ± 1.23 vs 1.61 ± 0.14 ; $p = 0.001$) were also statistically higher in insulin resistance patients. Comparison of TNF- α levels reveals significant its elevation in insulin resistance presence ($36.02 \pm 3.62 \text{ pg/ml}$) as compared with normal insulin metabolism ($17.49 \pm 1.51 \text{ pg/ml}$; $p = 0.001$).

In hypertensive patients with IR correlations between TNF- α and insulin $r = 0.75$, $p = 0.001$, fHbA_{1c} ($r = 0.70$, $p = 0.001$), and fHbA_{1c} ($r = 0.42$, $p = 0.001$) were determined.

Conclusions: Our results showed carbohydrates metabolism alterations in hypertensive patients related to obesity presence and TNF- α activity. Insulin resistance that revealed in 63 $\pm$ 6% patients with arterial hypertension was associated with increased TNF- α production. In insulin resistant hypertensives close relationships between TNF- α and insulin, HOMA were revealed that can suggest influence of cytokine on insulin resistance development.

PP.34.368 BODY MASS INDEX AS A PREDICTOR OF PLASMA ALDOSTERONE LEVELS IN OVERWEIGHT/OBESE HYPERTENSIVE PATIENTS IN CHRONIC ANTI-HYPERTENSIVE TREATMENT

R. Sarzani, F. Guerra, L. Mancinelli, L. Roberti, M. Bordicchia, P. Dessi-Fulgheri, A. Rappelli. *Dept of Internal Medicine, University of Ancona - Politecnica Marche, Ancona, Italy*

Objective: To evaluate plasma renin activity (PRA) and plasma aldosterone concentration (PAC) in a population of overweight/obese hypertensive patients with not optimally controlled blood pressure despite good adherence to anti-hypertensive therapy.

Design and Method: Two hundred and fifty caucasian essential hypertensives with BMI $\geq$ 25 kg/m² were enrolled in this study. Exclusion criteria were age $>$ 65 years, LVEF $<$ 50%, heart failure (NYHA class III-IV), GFR $<$ 30 ml/min, treatment with aldosterone antagonists, potassium-sparing diuretics, oral contraceptives or changes of anti-hypertensive medications in the previous six months. Treatment Intensity Score (TIS) was used to adjust for chronic treatment as previously reported.

Results: One hundred fifty one (60%) patients were treated either with angiotensin receptor blockers (ARBs) or angiotensin converting enzyme inhibitors (ACE-I). Mean PAC was 153.36 $\pm$ 93 ng/dl. PAC was directly correlated to BMI both in the entire population ($r = 0.187$; $p = 0.003$) as well as in ACE-I/ARBs treated subgroup ($r = 0.267$; adjusted; $p = 0.001$). In a multiple linear regression model comprehending age, PRA, mean blood pressure (MBP), BMI and TIS, only PRA ($r = 0.181$; $p = 0.006$), MBP ($r = 0.197$; $p = 0.002$), and BMI ($r = 0.135$; $p = 0.038$) were significantly related to PAC. This experimental model explained 8.8% of PAC variation. In the same model applied to patients treated with ACE-I or ARBs ($n = 145$), only PRA ($r = 0.255$; $p = 0.003$) and BMI ($r = 0.170$; $p = 0.038$) showed a direct correlation to PAC.

Conclusions: BMI appears to be an useful predictor of aldosterone levels in overweight/obese essential hypertensive patients independently of age, PRA, blood pressure and anti-hypertensive treatment, maintaining this relation even in patients treated with an ACE-I or an ARB. Inappropriately high aldosterone levels due to overweight/obesity may cause reduced response to ACE-I/ARB therapy, thus leading to higher BP levels and higher risk of cardiovascular morbidity.

Overweight/Obese Hypertensives (n=250)			ACE-I/ARB treated subgroup (n=151)		
Variable	r	p	Variable	r	p
Age (years)	-0.062	0.330	Age (years)	0.058	0.482
PRA (ng/ml/h)	0.181	0.006	PRA (ng/ml/h)	0.255	0.003
MBP (mmHg)	0.197	0.002	MBP (mmHg)	0.137	0.089
BMI (kg/m ²)	0.135	0.038	BMI (kg/m ²)	0.170	0.038
TIS	0.037	0.579	TIS	0.105	0.210

PP.34.369 SINGLE-DRUG THERAPY FOR HYPERTENSIVE PATIENTS WITH NORMAL WEIGHT, OVERWEIGHT, AND OBESITY - COMPARISON OF BMI-RELATED DIFFERENCES IN BLOOD PRESSURE RESPONSE

Y. Li¹, R. Hui^{1,2}, X. Fan^{1,2}, C. Xiao³, Y. Bian³, S. Li². *¹Sino-German Laboratory for Molecular Medicine & Key Laboratory for Clinical Cardiovascular Genetics, Beijing, China, ²Hypertension Division, Department of Cardiology, Cardiovascular Institute & FuWai Hospital, Beijing, China, ³Department of Cardiology, The Second Hospital of Shanxi Medical University, Taiyuan, China*

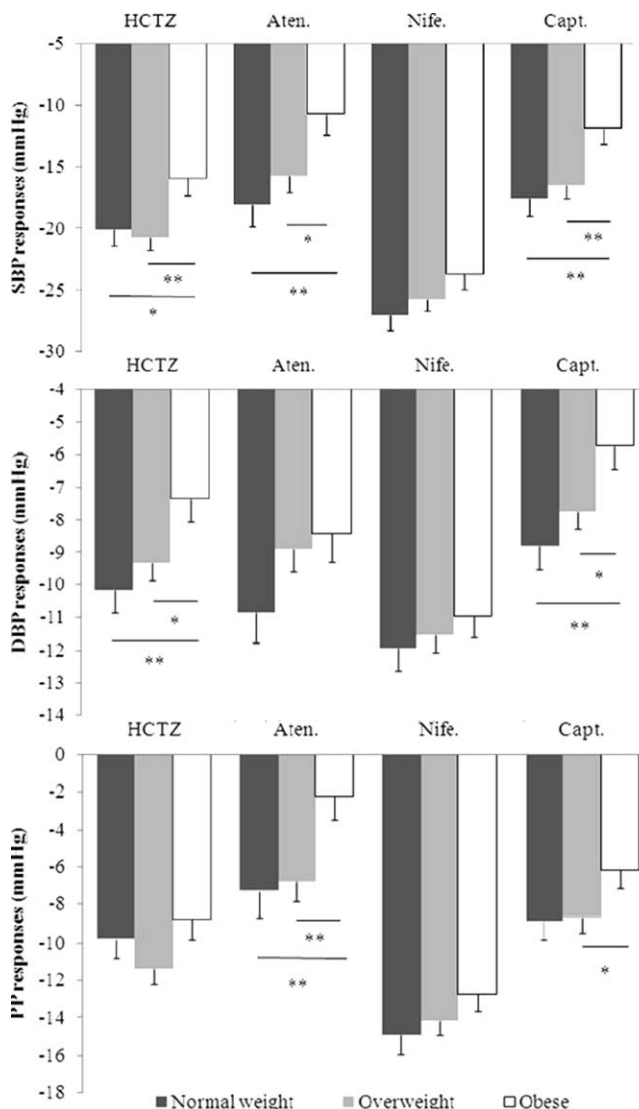
Background: Little evidence from the article show body-weight-related differences of response to single-drug antihypertensive therapy.

Objective: To investigate BMI-related differences in blood pressure (BP) response to single antihypertensive drug in a community-based, double-blind, active-controlled, randomized prospective clinical trial.

Methods and Results: The study was conducted in 7 rural communities in Henan, China. In total, 3535 untreated hypertensive patients, aged 40–75 years, were recruited. Subjects were randomized to 1 of 4 drug groups: hydrochlorothiazide (HCTZ), atenolol, nifedipine, and captopril. Duration of the study was 8 weeks. Patients in each treatment group were stratified

into 4 categories of BMI: thin, normal weight, overweight, and obesity. BP response and BP control rate were compared among normal weight, overweight, and obesity groups. In HCTZ, atenolol, or captopril treatment group, obesity predicted increased uncontrolled systolic blood pressure (SBP) (adjusted OR, 1.866, 95%CI: 1.084–3.213, $p < 0.05$; OR, 2.393, 95%CI: 1.262–4.541; $p < 0.01$; OR, 1.817, 95%CI: 1.130–2.921, $p < 0.05$; respectively). And also in those 3 single-drug groups, adjusted means of SBP reductions were significant lower through obese hypertensive to non-obese hypertensive. No significant BMI-related difference in BP response to nifedipine was found.

Conclusions: The study demonstrates that HCTZ, atenolol, and captopril are less effective in hypertensives with obesity than with normal weight when used as monotherapy. But the same effect was not found on BP response to nifedipine. These data may help to develop the guidelines for obesity-associated hypertension. Whether BMI-related differences in long-term outcomes of 4 single antihypertensive drugs would exist, is unknown, and would require further study.



PP.34.370 PREVALENCE OF METABOLIC SYNDROME IN FEMALE PATIENTS WITH CHRONIC RENAL FAILURE

T. Bozek¹, I. Prkacin², D. Pocanic². *¹University Clinic Vuk Vrhovac, Zagreb, Croatia, ²Clinical Hospital Merkur, Zagreb, Croatia*

Background and Aims: Metabolic syndrome (MS) refers to a cluster of metabolic disorders related to insulin resistance. Relationship between metabolic syndrome and increased risk of cardiovascular disease is well established.

Renal function abnormalities are associated with enhanced CV risk, considered to be due to the presence of associated risk factors.

Methods: 164 hypertensive female patients (mean age 62.8 ± 7.1 yrs) with chronic renal failure (CRF) were enrolled in the study. Complete clinical data were collected (weight, height, waist circumference, BP). Blood sample and 24-h urin collection were obtained to measure serum values of complete blood count, creatinine, glucose, total cholesterol, HDL and LDL cholesterol, tryglycerides, hsCRP, serum uric acid, sodium, potassium, creatinin clearance (CC) and microalbuminuria. Cardiac ultrasonography was performed to asses wall thickness of the left ventricle. According to the CC value (60–90;30–60;15–30;<15 ml/min per 1,73m²) patients were assigned to four stages of CRF.

Results: The prevalence of MS among the patients with CRF was 41,8%. In group of patients with MS significantly higher level of hsCRP ($10,21 \pm 2,82$ mg/L vs. $5,24 \pm 1,52$ mg/L, $p < 0,01$) and serum uric acid ($574 \pm 153,06$ umol/L vs. $366,03 \pm 72,24$ umol/L, $p < 0,01$) was found compared to the group without MS.

Patients with MS were predominantly in the stage III, in contrary the patients without MS were mainly in stage IV of CRF (46 ml/min vs. 34 ml/min; $p < 0,01$). A difference in level of uric acid and hsCRP was observed according to the stage of CRF, but not significant. Left ventricle hypertrophy was detected in 88,4% of patients with MS while in group of patients without MS in 53,7%.

Conclusions: Our results suggest significant prevalence of MS in patients with CRF. Combination of lifestyle changes and usage of antihypertensive and uricostatic drugs as well as statins and folic acid should be considered in patients with MS and CRF.

PP.34.371 THE EFFECT OF OBESITY ON LEFT ATRIAL SIZE IN THE EARLY STAGES OF HYPERTENSION. THE IMPORTANCE OF WAIST CIRCUMFERENCE MEASUREMENT

E. Taxiarchou, C. Tsioufis, D. Syrseloudis, D. Roussos, C. Thomopoulos, D. Aragiannis, A. Kasiakogias, D. Tsiachris, I. Kallikazaros, C. Stefanadis. *First Cardiology Clinic, University of Athens, Hippokration Hospital, Athens, Greece*

Objective: Obesity, except from its association with increased cardiometabolic risk, cardiovascular events and mortality, has been shown to be a risk factor for first atrial fibrillation. Left atrial (LA) enlargement represents an early and common finding in hypertensive heart disease and has been also identified as independent determinant of new onset atrial fibrillation. Our aim was to investigate the possible interrelationship between LA size and obesity in hypertensive subjects and to evaluate the interaction of anthropometric measurements with LA volume index.

Design and Method: 460 consecutive newly diagnosed subjects (aged 51.3 ± 9.8 years, 304 males) with stage I-II untreated essential hypertension (office blood pressure = $151/97$ mmHg) underwent a complete echocardiographic study and 24-hour ambulatory blood pressure monitoring. The study population classified according to body mass index (BMI) to obese ($\text{BMI} > 30 \text{ kg/m}^2$, $n = 162$) and non obese ($n = 298$) subjects. LA volume was measured according to an established method and was indexed for body surface area to estimate LA volume index (LAVI).

Results: Obese compared to non obese hypertensives did not differ according to age, sex and office blood pressure. However, obese compared to non obese had significantly increased 24-h pulse pressure (52.8 ± 7.8 vs 50.5 ± 8.9 mmHg, $p < 0.01$), LA diameter (4.02 ± 0.40 vs. 3.75 ± 0.45 cm, $p < 0.001$), left atrial volume (51.4 ± 15.2 vs. 43.1 ± 12.3 ml, $p < 0.001$), and LAVI (24.6 ± 6.9 vs. 22.7 ± 6.1 ml/m², $p < 0.005$). In the entire study population, LAVI exhibited positive relationships with age ($r = 0.204$, $p < 0.001$), BMI ($r = 0.108$, $p < 0.05$), waist circumference ($r = 0.113$, $p < 0.05$), waist to hip ratio ($r = 0.099$, $p < 0.05$) and 24-h pulse pressure ($r = 0.228$, $p < 0.001$). Multiple regression analysis models revealed that among anthropometric measurements only waist circumference was an independent predictor of LAVI ($\beta = 0.113$, $p < 0.05$).

Conclusions: Our results indicated that in patients with newly diagnosed uncomplicated essential hypertension obesity is accompanied by LA enlargement, suggesting that there may be a common pathophysiologic pathway leading to cardiovascular events and especially to incident atrial fibrillation.

PP.34.372 RELATIONSHIP BETWEEN OBESITY AND PLASMA ALDOSTERONE IN ESSENTIAL HYPERTENSION: INFLUENCE OF GENDER

G. Mule', E. Nardi, P. Cusimano, R. Riccobene, T. Bellavia, G. Andronico, S. Cottone, G. Cerasola. *Università di Palermo - ESH Excellence Centre, Palermo, Italy*

Clinical studies exploring the relationship between obesity and plasma aldosterone (PAC) yielded conflicting results. Moreover, little is known about the potential influence of gender on this relationship.

The aim of our study was to evaluate the relationships between PAC, body mass index (BMI) and waist circumference (WC), in a wide group of non-diabetic essential hypertensive subjects, attending our Hypertension Centre.

We enrolled 590 hypertensive patients (mean age: 43.8 ± 12.5 years; 61% males), with a PAC/ plasma renin activity ratio < 400 and free from renal and cardiovascular complications. In all patients, 24-h urinary sodium and potassium excretion, serum sodium and potassium levels, PAC, and plasma renin activity ratio (PRA) were determined, with the subjects kept in the supine position for one hour. All the subjects underwent also a 24-h ambulatory blood pressure (BP) monitoring.

In the overall population we observed direct and statistically significant correlations of PAC (logarithmically transformed) with both BMI ($r = 0.13$; $p = 0.002$) and WC ($r = 0.14$; $p = 0.001$). These associations held ($p < 0.01$) in stepwise multiple regression models, in which PAC was considered dependent variable, and age, sex, urinary sodium, clinic or 24-h, BP values, (log) PRA, and BMI (or WC) were included as explanatory variables. Even if the interaction factor "BMI (or WC) x gender" was not statistically significant when added to the multivariate models ran in the overall population, the multiple regression analyses separately performed in men and women, showed that the relationships of BMI and of WC with PAC remained significant only in men ($\beta = 0.11$; $p = 0.02$ and $\beta = 0.10$; $p = 0.03$, respectively). Moreover, when we grouped the study population in normal weight, overweight and obese subjects, PAC disclosed a stepwise significant increase in men, but not in women.

Our results seems to suggest that obesity is positively associated with PAC, even if this association seems to be significant only in men.

PP.34.373 ESTIMATED CARDIOVASCULAR RISK AND ADIPOKINE PRODUCTION IN DYSLIPAEIC NON-DIABETIC PATIENTS WITH METABOLIC SYNDROME: EFFECTS OF HIGH-DOSE ATORVASTATIN. THE ADELINA STUDY

F. Martinez Martin¹, C. Comi Diaz². ¹Hypertension Clinic, Hospital Dr. Negrin, Las Palmas, Spain, ²Endocrinology Dpt., Hospital Dr. Negrin, Las Palmas, Spain

Objective: To assess the reduction of estimated cardiovascular risk and the changes in adipokines with high-dose atorvastatin treatment in hypercholesterolemic patients with metabolic syndrome.

Methods: 102 non-diabetic patients with metabolic syndrome and uncontrolled hypercholesterolemia (LDL-C $100 - 160$ mg/dl) were enrolled for the study. Previous antihyperlipidaemic treatments were washed out for 4 weeks. All patients received atorvastatin 40 mg/day. After 14 + 2 weeks, the dose of atorvastatin was doubled in patients who maintained LDL-C > 100 mg/dl. The study concluded after an additional 14 + 2 weeks. Blood pressure, heart rate, lipid profile, CRP, adiponectin, TNF- α and PAI-1 were measured in each visit. The cardiovascular risk was estimated by the local CDC adaptation of the Framingham Table.

Results: 93 patients completed the protocol, of which 39 (41.9%) had their doses doubled. The absolute cardiovascular risk was reduced ($p = 0.008$) from a median of 19.3% (interquartile range 12.8 – 29.3%) to 13.7% (9.6 – 21.1%). CRP and PAI-1 were reduced (by 37.3%, $p = 0.002$, and 19.3%, $p = 0.032$). Adiponectin and TNF- α were not significantly modified. Two patients (1.96%) were withdrawn due to moderate muscular pain. There was a modest reduction in blood pressure (median 6/3 mmHg, interquartile range 4/2 – 9/5 mmHg; $p = 0.037$).

Conclusions: Treatment with high-doses atorvastatin in non-diabetic patients with moderate hypercholesterolemia and metabolic syndrome was highly effective, and well tolerated. The reduction of the estimated cardiovascular risk was highly significant: 5.6% for absolute risk and 29.0% for relative risk. Blood pressure, CRP and PAI-1 were significantly reduced.

PP.34.374 SEX HORMONES AND ADIPOKINES IN HEALTHY PRE-MENOPAUSAL, POST-MENOPAUSAL AND ELDERLY WOMEN, AND IN AGE-MATCHED MEN: DATA FROM THE BRISIGHELLA HEART STUDY

A. Cicero¹, P. Magni², P. Lentini³, F. Strollo⁴, C. Borghi¹, Brisighella Study Group¹. ¹Hypertension Research Center, University of Bologna, Bologna, Italy, ²Endocrinology, Physiopathology and Applied Biology, University of Milan, Milan, Italy, ³Hypertension Center, Madre Giuseppina Vannini Hospital, Rome, Italy, ⁴Unit of Endocrinology and Metabolism, Dept. of Metabolic Diseases, Nutrition and Wellness, INRCA-IRCCS, Rome, Italy

Background: Sex hormones and adipokines seem to differently interact in both sexes at different ages.

Aim: We aimed at comparatively evaluate the serum level of different adipokines and sex hormones in healthy non-pharmacologically treated pre-menopausal women, post-menopausal women and elderly women, and in age-matched men.

Methods: From the database of the historical cohort of the Brisighella Heart Study we selected 199 adult healthy subjects (M: 89; F: 110), aged 62.5 ± 12.4 years. Men and women included in the age-class sub-groups were also matched for BMI, waist circumference, blood pressure, heart rate, fasting plasma glucose, plasma lipids. For all people we obtained the serum level of testosterone, estrone, dehydroepiandrosterone (DHEAS), leptin, adiponectin and ghrelin.

Results: Leptin did not differ among various age classes in men, while pre-menopausal displayed significantly lower serum leptin than post-menopausal women (-6.7 ± 2.2 , $p = 0.036$), but not than elderly women. Post-menopausal women had significantly higher serum leptin when compared with age-matched men ($+13.1 \pm 2.0$, $p < 0.001$), as well as elderly women when compared with elderly men ($+11.2 \pm 2.3$, $p < 0.001$). Adiponectin and ghrelin were similar in men and women at any age. At any age, women had significantly lower serum testosterone/estrone ratio than age-matched men (p always < 0.01). Serum DHEAS was significantly lower in adult-elderly men (-0.5 ± 0.1 , $p = 0.001$) and in elderly men (-0.7 ± 0.1 , $p < 0.001$) when compared to adult ones, and in post-menopausal (-0.4 ± 0.1 , $p = 0.04$) and elderly women (-0.7 ± 0.1 , $p < 0.001$) when compared to the pre-menopausal ones. The main predictors of adiponectin level are age in men ($p = 0.27$) and BMI in women ($p = 0.003$). The main predictors of leptin levels are BMI and the testosterone/estrone ratio in both sexes ($p < 0.05$). The testosterone/estrone ratio is also the main predictor of ghrelin levels in women ($p = 0.006$). Age is the main predictor of DHEAS level in both sexes ($p < 0.001$).

Conclusion: Sex hormones and adipokines show specific interactions in different sexes and in different age-classes in a representative sample of adult healthy subjects.

PP.34.375 THE EVALUATION OF PLASMINOGEN ACTIVATOR INHIBITOR, TUMOR NECROSIS FACTOR-ALFA AND TOTAL ANTIOXIDANT STATE LEVELS IN OBESE WOMEN WITH METABOLIC SYNDROME

M. Szulinska, P. Bogdanski, D. Pupek-Musialik. *Department of Internal Medicine, Metabolic Disorders and Hypertension Medical University of Medical Sciences, Poznan, Poland*

Objective: The metabolic syndrome (MS) is associated with an excess of atherosclerosis and in part by fibrinolytic dysfunction. Hypertension, dyslipidaemia, hyperglycemia do not totally account for the cardiovascular events associated with obesity. In recent times, a pro-thrombotic state involving disturbances in the homeostatic and fibrinolytic pathways are being increasingly recognized as contributing to the excess cardiovascular risk in obesity. The aim of this study was to evaluate levels of PAI-1 (plasminogen activator inhibitor), TNF- α (tumor necrosis factor- α) and TAS (total antioxidant state) and their relationships in obese women with MS.

Design and Methods: 45 hypertensives women with metabolic syndrome were studied. As a control 20 healthy volunteers were used. Plasminogen activator inhibitor-1, TNF- α and TAS concentrations were assessed with use of ELISA method. Insulin sensitivity value (M) was calculated after euglycemic clamp.

Results: Women with metabolic syndrome had significantly higher levels of PAI-1, TNF- α and significantly lower levels of TAS compared with that from the control. We have notice a statistically significant negative correlation between PAI-1 and insulin sensitivity ratio M and between PAI-1 and TAS in studied group.

Conclusions: Metabolic syndrome is associated with abnormal fibrinolytic function, pro-inflammatory state and oxidative stress. Oxidative stress in adipose tissue may play a central role in linking most of the features that characterize the MS and plasma PAI-1 concentration.

PP.34.376 FIRST-LINE ALISKIREN/HYDROCHLOROTHIAZIDE COMBINATION THERAPY LOWERS BLOOD PRESSURE MORE EFFECTIVELY THAN HYDROCHLOROTHIAZIDE ALONE IN OBESE OLDER PATIENTS WITH STAGE 2 HYPERTENSION

J. Basile¹, S. Babazadeh², M. Lillestol³, M. Wright⁴, A.K. Laflamme⁴, R. Weitzman⁵. ¹Ralph H. Johnson VA Medical Center, Charleston, SC, USA, ²Crest

Clinical Trials, Inc., Santa Ana, CA, USA, ³Lillestol Research LLC, Fargo, ND, USA, ⁴Novartis Pharma AG, Basel, Switzerland, ⁵Novartis Pharmaceuticals Corporation, East Hanover, NJ, USA

Objective: Patients with obesity and stage 2 hypertension are at high cardiovascular risk. These patients require large BP reductions to help them achieve BP goals; treatment with two or more antihypertensives is often needed. This analysis assessed the efficacy of the direct renin inhibitor aliskiren in combination with hydrochlorothiazide (ALI/HCT) compared with hydrochlorothiazide alone (HCT) in the subgroup of obese patients (BMI ≥ 30 kg/m²) from an 8-week, randomized, double-blind study of older patients (≥ 55 years) with stage 2 hypertension (baseline mean sitting systolic BP [msSBP] $160 < 200$ mmHg).

Design and Method: After a 1–4-week washout, patients received ALI/HCT 150/12.5 mg or HCT 12.5 mg alone once daily for 1 week, then double the dose for a further 7 weeks. Amlodipine 5 mg was added at weeks 4 or 6 if msSBP was ≥ 160 mmHg. BP summary statistics were predefined by BMI subgroup (< 30 kg/m² or ≥ 30 kg/m²), and $< i > post hoc < i >$ ANCOVA was used for between-treatment comparisons.

Results: In obese patients, at week 4 endpoint (primary), ALI/HCT provided significantly larger reductions in msSBP than HCT alone (Table), with a between-treatment difference in least-squares means (LSMs) of -8.0 mmHg (95% CI: -11.8 , -4.3 ; $< i > p < i > < 0.0001$). ALI/HCT also provided significantly larger msSBP reductions than HCT alone in non-obese patients (Table; $< i > p < i > < 0.001$ for between-treatment difference in LSMs from ANCOVA). BP reductions with ALI/HCT $\pm$ amlodipine were also significantly greater than with HCT $\pm$ amlodipine in both subgroups at week 8 endpoint. Amlodipine was added to treatment in 13.0% and 21.1% of obese patients receiving ALI/HCT and HCT alone, respectively; in non-obese patients, amlodipine was added in 12.5% and 22.8% of patients, respectively. All treatments were generally well tolerated in obese and non-obese patients.

Conclusions: ALI/HCT lowered mean SBP (by 29 mmHg from baseline) significantly more effectively than HCT alone in obese older patients with stage 2 hypertension. Thus, aliskiren/HCT represents an important and effective potential treatment option for stage 2 hypertension in these patients.

	BMI < 30 kg/m ²		BMI ≥ 30 kg/m ²	
	ALI/HCT 300/25 mg (n=102)	HCT 25 mg (n=113)	ALI/HCT 300/25 mg (n=123)	HCT 25 mg (n=109)
Mean baseline				
BP, mmHg	168.7/90.6	168.8/90.4	169.4/92.2	168.4/92.1
Change from baseline at week 4 endpoint, mmHg (mean$\pm$SD [median])				
msSBP	-30.3 ± 14.8 [-30.7]	-23.0 ± 14.7 [-24.7]	-28.7 ± 15.0 [-31.0]	-21.0 ± 13.4 [-20.7]
msDBP	-10.0 ± 9.2 [-10.7]	-7.4 ± 7.5 [-6.7]	-8.6 ± 8.6 [-9.0]	-6.0 ± 9.4 [-5.3]

ALI, aliskiren; BMI, body mass index; BP, blood pressure; HCT, hydrochlorothiazide; msDBP, mean sitting diastolic blood pressure; msSBP, mean sitting systolic blood pressure.

PP.34.377 CARDIAC STRUCTURE ABNORMALITIES AND ELECTROCARDIOGRAM ASSESSMENT IN PATIENTS WITH AND WITHOUT METABOLIC SYNDROME IN HAEMODIALYSIS: A CASE-CONTROL STUDY

V. Esteve Simo¹, K. Salas Gama¹, J.C. Gonzalez Oliva¹, M. Pou Potau¹, A. Sanchez Hidalgo², M. Fulquet Nicolas¹, A. Saurina Sole¹, V. Duarte Gallego¹, M. Ramirez De Arellano¹. ¹Nephrology Department, Hospital De Terrassa, Consorci Sanitari Terrassa, Terrassa, Spain, ²Cardiology Department, Hospital De Terrassa, Consorci Sanitari Terrassa, Terrassa, Spain

Metabolic syndrome (MS) is characterized by the presence of metabolic hydrocarbonate disorders, high blood pressure, lipid disorders and obesity. MS is also associated with several functions and structural disorders in the myocardium.

Objectives: 1. Describe the main clinical features, biochemical values and cardiac abnormalities in MS on HD. 2. Compare the data collected in MS with the other dialysis patients.

Material and Methods: Analysis of clinical features, Echo-Doppler data and ECG register between MS and non MS haemodialysis patients. All the patients underwent a Doppler echocardiography and ECG register. MS patients were diagnosed using NCEP-ATP III criteria.

Results: We analyzed 55 patients on haemodialysis. MS were diagnosed in 24 patients. Demographical data showed MS patients were younger, had more abdominal perimeter and BMI. MS were more diabetic (76 vs 37%, $p < 0.05$) and dyslipemics. A significant non favorable metabolic profile was shown in MS vs non MS. Echocardiography (MS vs non MS): LVMI 157 ± 45.1 vs 138.9 ± 42.3 g/m² ($p < 0.05$), PWT 11.8 ± 2.2 vs 11.2 ± 2.3 mm, LVTD 52.1 ± 9.8 vs 48.8 ± 7.2 mm, LV LVTEF 56.5 ± 15.5 vs 66.5 ± 12.1 % ($p < 0.05$). MS had more atrial fibrillation (16 vs 8%, $p < 0.1$) and diastolic dysfunction (42 vs 30 %, $P < 0.1$). The prevalence of LVH was higher in MS for LVMI, Cornell voltage and CPV. Sokolow-Lyon voltage did not found neither LVH in both groups. In relation to non fatal cardiovascular events, MS were totally higher, mainly due to ischemic heart disease (21 vs 6%; $p < 0.05$) and peripheral vascular disease (26 vs 15%, $p < 0.1$).

Conclusions: 1. We observed a high prevalence of cardiac abnormalities in MS dialysis patients in our study. 2. Echocardiogram data results more useful than ECG register in order to evaluate LVH. 3. The worst functional and structural cardiac abnormalities in MS patients could explain in part, the more comorbidity and cardiovascular events in these patients.

PP.34.378 THE CORRELATION OF BLUNTED NOCTURNAL BLOOD PRESSURE FALL WITH METABOLIC SYNDROME AND DIASTOLIC HEART DYSFUNCTION

R. Siliste, G. Puiu, I. Savulescu-Fiedler, C. Homentcovschi, M. Muraru, I. Bruckner. *Department of Cardiology and Internal Medicine, Coltea Clinical Hospital, Bucharest, Romania*

Background and Aims: Although still controversial, there is a growing body of evidence suggesting that a nondipping BP pattern is associated with a greater risk of target organ damage among individuals with essential hypertension. Metabolic syndrome (MS) is also associated with increased cardiovascular risk and a higher percent of nondipping blood pressure pattern. Knowledge of the potential factors associated with an altered nighttime BP pattern is of importance because it can help identify persons at risk for nondipping BP patterns and potential target organ damage.

Method and Patients: Only hypertensive patients with blunted night blood pressure fall on ambulatory 24-hour blood pressure monitoring (37 women, 14 men; mean age 63 ± 10 years) were evaluated for criteria of metabolic syndrome. The patients were classified in 2 groups: first group with metabolic syndrome and the second without metabolic syndrome. All patients underwent transthoracic echocardiography in order to establish the presence of ventricular hypertrophy and diastolic dysfunction.

Results: 38 (73%) nondippers patients had metabolic syndrome. Both groups had similar left ventricular systolic and diastolic diameters. Patients with metabolic syndrome had significantly higher values of left atrium (43 ± 4.6 vs. 39 ± 5.1 , $p = 0.005$), interventricular septum thickness (12.63 ± 3.4 vs. 12.25 ± 1.5 , $p = 0.001$) and posterior wall thickness (11.90 ± 1.3 vs. 11.62 ± 2.2 , $p = 0.005$). Both groups had similar mitral E and A waves, E/A ratio, E-wave deceleration time, isovolumetric relaxation time, and tissue Doppler-derived A' wave. Group B had a significantly lower E/E' ratio (11 ± 3.4 vs. 13.2 ± 3.6 ; $p = 0.005$). Both groups had almost the same day to night SBP index, but patients with metabolic syndrome had a higher pulse pressure (61.10 vs. 57.75 , $p = 0.5$).

Conclusions: 1. Nondippers have higher incidence of LV hypertrophy and diastolic dysfunction.

2. The majority of the patients with nondipping BP pattern have metabolic syndrome and an associated supplementary risk of potential target organ damage.

3. Patients with metabolic syndrome had a higher pulse pressure.

PP.34.379 RELATION OF THE METABOLIC SYNDROME COMPONENTS TO CARDIOVASCULAR REMODELING AND LEFT ATRIUM SIZE IN HEALTHY POPULATION

O. Rotar, I.V. Fursova, O.I. Yakovleva, O.B. Dubrovskaya, N.A. Dziubenko, E.G. Malev, E.A. Sokaliskaya, V.N. Solntsev, E.V. Litvinenko, A.O. Konradi, E.V. Shlyakhto. *Almazov Federal Center of the Heart, Blood And Endocrinology, Saint-Petersburg, Russia*

Objective: To assess the relation of cardiovascular risk factors to cardiovascular remodeling in the subjects with metabolic syndrome (MS).

Design and Methods: 1600 mentally working subjects were screened for MS. 377 (127 males and 250 females) subjects who had at least one component of MS, no established cardiovascular events passed echocardiography (Vivid 7) and vascular ultrasound. Left ventricular mass index (LVMI) and carotid intima-media thickness (IMT) was appreciated.

Results: The mean value of LVMI was 98 ± 21 g/m² in males and 100 ± 24 g/m² in females. The proportion of patients with LVH according to ASE 2005 criteria in females was 50,8% ($n = 127$) and in males 36,2% ($n = 46$). Correlation analysis revealed relation of LVMI with age ($r = 0,35$, $p < 0,001$ for males and $r = 0,25$, $p < 0,001$ for females). IMT was twice stronger associated with age ($r = 0,65$ and $0,41$, $p < 0,01$, respectively). Blood pressure (BP), in particular systolic, was also significant predictor of LVMI (in males $r = 0,28$ for SPB and $r = 0,27$ for DBP, $p < 0,001$; in females $r = 0,37$ and $r = 0,30$, $p < 0,001$), but it was also associated with age. No relation of BP with IMT was found neither in males nor in females. The strongest correlation of obesity was observed with left atrium (LA) size ($r = 0,43$ for BMI and $0,48$ for WC in males and $r = 0,55$ and $0,59$, $p < 0,001$ in females, respectively). There was very weak but significant correlations of LA with age and BP ($< 0,25$) in both sexes. Obesity was not related to IMT. No significant relation of cardiovascular remodelling with cholesterol, glucose and HDL was found. Multiple regressions found age to be the only predictor of LVMI in males, and age and SBP – the major determinants in females.

Conclusions: Age and systolic BP are the major determinants for LVH. Carotid IMT is generally determined by age, but not related to WC or BMI. For LA size increased BMI and WC are stronger predictors than age and BP what can explain high prevalence of atrial fibrillation in obesity.

PP.34.380 ADIPONECTIN BLOOD LEVEL AT PATIENTS WITH ESSENTIAL HYPERTENSION AND THE METABOLIC SYNDROME DURING OLMESARTAN THERAPY DYNAMICS

S. Koval, I. Snegurskaya, O. Mysnychenko, D. Miloslavsky. *Institute of Therapy of the L.T. Malaya Name of Academy of Medical Sciences of Ukraine, Kharkiv, Ukraine*

Objective: To study the dynamics of adiponectin blood level at patients with essential hypertension (EH) and metabolic syndrome (MS) during olmesartan therapy.

Design and Methods: The 37 patients with EH and MS are inspected. Middle ages of patients – ($48,1 \pm 5,1$) years, 20 men and 17 women, the EH duration – ($6,0 \pm 0,6$) years. Comparison group – 35 patients with EH without MS of comparable on age and disease duration, control group – 10 healthy volunteers. The MS presence was set taking into account the ATP²²² criteria. Clinical, anthropometric researches of patients was conducted, determination of lipids spectrum by a fermentative method, levels of blood glucose and insulin, adiponectin blood levels by immunoassay method. Insulin resistance (IR) was estimated on the HOMA index. Olmesartan appointed by a patient in a dose 20 mg in days during 24 weeks.

Results: The reliable changes in the production of blood adiponectin level at EH even without the MS are set: decrease of adiponectin blood level ($12,91 \pm 1,03$) mcg/ml by comparison to practically healthy persons ($19,91 \pm 1,01$) mcg/ml ($\delta < 0,01$). At the EH combination with MS further decrease of adiponectin is marked: ($9,24 \pm 0,9$) mcg/ml ($\delta < 0,05$). The maximal low blood adiponectin level ($7,34 \pm 0,9$) mcg/ml were exposed in the group EH and MS and them combination with glucose intolerance, high IR and low level cholesterol of LPHD.

After a 24 week's the olmesartan monotherapy EH patients with MS the special purpose BP levels were attained at 70,9 % cases, ($\delta < 0,05$). The olmesartan treatment also resulted in the reliable decline IR, to growth of adiponectin blood level of the patients with EH and MS ($12,90 \pm 0,11$) mcg/ml ($p < 0,05$).

Conclusions: The reliable decline of adiponectin blood level at patients with EH is set, especially in combination with MS. The protracted 24 week's olmesartan therapy of the patients with EH and MS effectively lowered the special purpose BP levels, that was accompanied by the reliable rise of adiponectin blood level on a background the meaningful IR reduction.

PP.34.381 WAIST CIRCUMFERENCE AS A CARDIOVASCULAR RISK FACTOR IN A POPULATION EXAMINED IN A PROPHYLACTIC CAMPAIGN LADIES IN RED

K. Malaczynska-Rajpold¹, L. Woznicka-Leskiewicz², A. Kuczmarska¹, I. Lipska¹, J. Janura¹, I. Klorek². ¹University of Medical Sciences, Poznan, Poland, ²University of Medical Sciences, Department of Hypertension, Angiology and Internal Diseases, Poznan, Poland

Objective: Assessment of the waist circumference as a cardiovascular risk factor, during a prophylactic campaign.

Design and Method: 343 patients (195 women and 148 men), aged 18 to 87 were examined during prophylactic campaign "Ladies in red". Patients were divided into two groups according to central obesity prevalence: (A) obese (WC>80 cm in women and WC>94 cm in men) - 206 patients and (B) slim (the others) - 137 patients. Following measurements were taken during the campaign: blood pressure (BP), weight, height, BMI, waist circumference and adipose tissue content (ATC). Also the lipid measurements were taken.

Results: We revealed significant difference in age [(A) 50+/-15 yrs; (B) 39+/-16 yrs; $p < 0,0001$] and the level of systolic (SBP) [(A) 142+/-22 mmHg; (B) 131+/-19 mmHg; $p < 0,0001$] and diastolic (DBP) [(A) 86+/-12 mmHg; (B) 80+/-12 mmHg; $p < 0,0001$] blood pressure. We also observed statistically significant difference in BMI [(A) 27,6+/-3,9 kg/m²; (B) 22,3+/-2,7 kg/m²; $p < 0,0001$] and adipose tissue content [(A) 31,81+/-6,83%; (B) 25,68+/-6,65%; $p < 0,0001$] between the two analyzed groups. Besides positive correlation between waist circumference and adipose tissue content was observed ($r = 0,1919$; $p = 0,0004$). We also revealed statistically significant correlation between waist circumference and the prevalence of dyslipidaemia [(A) 45 patients; (B) 11 patients; $p = 0,0012$]. Moreover statistically significant correlation between BMI value and the systolic ($r = 0,2879$; $p < 0,0001$) and diastolic ($r = 0,3522$; $p < 0,0001$) blood pressure and also between the ATC and the systolic ($r = 0,1187$; $p = 0,0279$) and diastolic ($r = 0,1288$; $p = 0,017$) blood pressure were observed.

Conclusions: 1) Waist circumference has a significant influence on SBP and DBP values. 2) Patients with central obesity developed dyslipidaemia more often than those, who were slim. 3) Patients who had lower BMI and ATC had also lower values of SBP and DBP. 4) Slim figure that coexists with low ATC and BMI influence the level of SBP and DBP and lipid metabolism. In this way reducing central obesity can be interpreted as a cardiovascular risk reducing factor and should be an essential element of a healthy lifestyle.

PP.34.382 RELATIONSHIPS OF DIFFERENT DEFINITIONS OF METABOLIC SYNDROME WITH LEFT VENTRICULAR MASS IN ESSENTIAL HYPERTENSIVE PATIENTS

G. Mule', E. Nardi, P. Cusimano, L. Canale, M. Costanzo, A. Palermo, C. Geraci, S. Cottone, G. Cerasola. *Università di Palermo - ESH Excellence Centre, Palermo, Italy*

Several studies documented that metabolic syndrome (MetS) is associated with an increased left ventricular (LV) mass. Limited information is available about the ability of different diagnostic criteria of MetS to identify LV hypertrophy (LVH). Moreover, the dichotomous nature of the current MetS definitions may be a potential limitation, because would limit the power to correctly assess the cardiovascular risk in every patient.

Our study was aimed to compare the ability of different definitions of MetS to identify LVH in patients with essential hypertension.

We enrolled 724 non-diabetic hypertensives (mean age 45.3 ± 11.7 years; 63% males), free from cardiovascular complications. In all subjects routine blood chemistry, echocardiographic examination and 24-h ambulatory blood pressure monitoring were obtained. We adopted 4 definitions of MetS, 2 dichotomous (ATPIII and IDF) and 2 quantitative. Of these latter, one was defined on the basis of the mean value of the sex-specific Z score for every component (MetS Z score), and the other as the average of the percent deviation from the ATPIII cut-off values (MetS δ %).

The areas under the ROC curves, for every definition of MetS, with respect to the diagnosis of LVH (LVM > 51 g/m^{2.7}), were higher when we used the quantitative definitions (MetS Z score = 0.645 ± 0.023 and MetS δ % = 0.636 ± 0.023), in comparison to the ATPIII (0.597 ± 0.023) (respectively $p = 0.008$ and $p = 0.02$), and to the IDF definitions (0.574 ± 0.023) (respectively $p = 0.001$ and $p = 0.008$). In logistic multiple regression models LVH was more closely associated with quantitative definitions (MetS Z score: $p < 0.0001$; MetS δ %: $p = 0.007$) than it was with categorical definitions (ATPIII: $p = 0.01$; IDF: $p = 0.03$).

Our results seem to suggest that in hypertensive patients the adoption of quantitative definitions of MetS allows to better identify subjects with LVH than the traditional dichotomous definitions.

PP.34.383 CORRELATION BETWEEN NT-PRO-BNP PLASMA LEVELS AND METABOLIC DISORDERS IN PATIENTS WITH ARTERIAL HYPERTENSION

I.M. Petrov¹, S.S. Bagisheva², E.F. Dorodneva², S.U. Volkova², I.V. Medvedeva¹. ¹South-Ural Scientific Center of Russian Academy of Medical

Sciences - Tyumen Department, Tyumen, Russia, ²Tyumen State Medical Academy, Tyumen, Russia

Aim: To estimate NT-Pro-BNP plasma levels in patients with arterial hypertension (AH) and to find it's correlation with metabolic disorders.

Materials and Methods: 148 the Extreme North inhabitants (Noviy Urengoy city) with AH 1-3 stages were examined. Age mediana 49 years (27-60 years) (interquartile range 44.5-51 years). 16.2 % (24) were males, 83.2 (124) - females.

Results: In the group of practically healthy people NT-pro-BNP concentration mediana (interquartile range) was 182 (177-217) pg/ml. In the AH 1 stage group of patients NT-pro-BNP level varied significantly, though statistically did not significantly differ -203 (143-288) pg/ml. NT-pro-BNP concentration in patients with AH 2 stage was 348.5 (286-451) pg/ml, that is statistically higher than in controls ($p < 0.001$) and in the group of AH 1 stage patients ($p < 0.001$). AH 3 stage patients had NT-pro-BNP concentration as 345.5 (286-451) pg/ml, that is statistically higher than in controls ($p < 0.001$) and in the group of AH 1 stage patients ($p < 0.001$). The highest Spirman range correlation coefficient was to duration of AH ($r = 0,78$; $p = 0,000003$). Then comes very high additional risk ($r = 0,58$; $p = 0,0001$), CRP-concentration ($r = 0,56$; $p = 0,0007$), number of additional risk factors ($r = 0,48$; $p = 0,003$), stage of AH ($r = 0,43$; $p = 0,008$), hypercholesterolemia ($r = 0,4$; $p = 0,013$), systolic blood pressure level ($r = 0,38$; $p = 0,02$), heart disease family anamnesis ($r = 0,37$; $p = 0,02$) and TNF- α concentration ($r = 0,34$; $p = 0,03$).

Conclusion: The main NT-Pro-BNP concentration predictor in serum of AH patients without any heart failure symptoms is AH duration, very high additional risk of cardiovascular complications, and inflammation markers (CRP). NT-Pro-BNP concentration does not depend upon age, sex, body mass excess, though depends on hypercholesterolemia and family history of CVD.

PP.34.384 AMBULATORY BLOOD PRESSURE MONITORING AND CONVENTIONAL AT OFFICE MEASUREMENTS IDENTIFY DIFFERENT GROUPS OF HYPERTENSIVE OBESE WOMEN

J. Silva-Nunes, L. Duarte. *Curry Cabral Hospital, Lisbon, Portugal*

Aims: To evaluate the accuracy of conventional at hospital office measurement of blood pressure (BP) and ambulatory BP monitoring (ABPM) in the identification of high BP in obese women.

Materials and Methods: We studied 94 Caucasian obese women without known hypertension. We characterized them for BMI, waist circumference, waist: hip ratio (WHR) and percentage of body fat (%fat). Two BP measurements were made at standardized conditions to obtain mean systolic (mSBP) and diastolic (mDBP) levels; hypertension was considered if mean values $> 140/90$ mmHg. An ABPM registration was obtained for a 24 hours period to obtain mean BP values during daytime (mSBP_daytime and mDBP_daytime), nighttime (mSBP_nighttime and mDBP_nighttime) and 24 hours period (mSBP_24h and mDBP_24h); hypertension was considered if mean values, respectively, $> 135/85$ mmHg, $> 120/70$ mmHg and $> 130/80$ mmHg. We studied correlations of mean BP values at office with mean values in ABPM. We looked for the degree of concordance between hypertensive women identified by at office or ABPM criteria.

Results: Women were characterized by mean age = 34 ± 8.2 yrs, BMI = 43.4 ± 7.6 Kg/m², waist circumference = 117.3 ± 14.4 cm, %fat = 47.6 ± 5.2 %, mean systolic BP (mSBP) = 124.5 ± 16.6 mmHg and mean diastolic (mDBP) = 79.7 ± 10.5 mmHg. ABPM values were as follows: mSBP_daytime = 124.1 ± 9.2 mmHg, mDBP_daytime = 76 ± 7.3 mmHg, mSBP_nighttime = 112.2 ± 11.3 mmHg, mDBP_nighttime = 63.5 ± 8.3 mmHg, mSBP_24h = 121 ± 8.9 mmHg and mDBP_24h = 72.7 ± 6.5 mmHg. There was a good correlation of mSBP with mSBP_24h, mSBP_daytime and mSBP_nighttime ($p < 0.001$, for all) and of mDBP with mDBP_24h ($p < 0.001$), mDBP_daytime ($p = 0.001$) and mDBP_nighttime ($p = 0.007$). Twenty five (26.6%) women were hypertensive according to conventional office measurements and 37 (39.4%) by ABPM criteria. However, the groups of hypertensive women were discordant ($p = 0.047$): only 56% of those considered hypertensive at office also presented ABPM criteria for hypertension; only 37.8% of those with criteria for hypertension in ABPM were considered hypertensive based at office BP.

Conclusions: Hypertension is quite prevalent in the so-called non-hypertensive obese women. There is a good association between mean BP values at office and in ABPM. Nevertheless, whether we use one or the other measurements for the recognition of hypertension, we are identifying different groups of obese women at higher cardiovascular risk.

PP.34.385 EVALUATION OF QUALITY OF LIFE IN HYPERTENSIVES WITH DYSLIPIDEMIA

V. Katsi¹, D. Tsartsalis¹, C. Koutoangelos², K. Koundi², I. Skiadas¹, E. Dragioti³, P. Sakkas², C. Stefanadis¹, GN. Papadimitriou², I. Kallikazaros¹.
¹Hippocraton Hospital - Department of Cardiology, Athens, Greece, ²Medical School of Athens - Eginition Hospital - 1st Department of Psychiatry, Athens, Greece, ³Sotiria Hospital - Department of Psychiatry, Athens, Greece

Background: Essential hypertension (EH) has a negative impact on health-related quality of life (H-rQoL) while dyslipidemia very often accompanies the hypertensive sequelae. In this study, we investigated the combined effect of EH and dyslipidemia on H-rQoL.

Methods: We studied 145 subjects with newly diagnosed stage I-II untreated EH (aged 56 ± 7 years, 47=dyslipidemic, office blood pressure = 156/92 mmHg). Venous sampling was performed for estimation of lipidemic profile. The validated Greek version of Short Form 36 (SF-36) General Health Survey questionnaire was administered. The 8 subscales of SF-36 were further grouped into two summary scales: the physical component summary scale (PCS) and the mental component summary scale (MCS). Non-parametric Mann-Whitney and Spearman rho tests were performed.

Results: Dyslipidemic hypertensives demonstrated significantly lower scores in all SF-36 dimensions compared to non dyslipidemic (Table). There was a negative correlation between scores in general health and the total SF-36 score with serum triglycerides level ($r = -0.284$ $p = 0.009$, $r = -0.287$ $p = 0.014$, respectively).

Conclusions: In essential hypertension, dyslipidemia exerts an additive detrimental effect on quality of life. Whether the abovementioned association contributes to the high cardiovascular risk observed in those patients remains to be determined in future studies.

Comparison of SF-36 scores between dyslipidemic and non dyslipidemic hypertensives

	DYSLIPIDEMIA (n=47)	NODYSLIPIDEMIA (n=98)	P- VALUE
Physical Functioning	45.12	51.76	0.25
Bodily Pain	45.08	50.82	0.29
General Health	40.29	54.46	0.02
Vitality	47.36	49.36	0.67
Social Functioning	46.28	50.04	0.48
Mental Health	48.37	50.34	0.75
PCS	43.68	51.28	0.17
MCS	47.54	50.62	0.44
TOTAL SF-36 SCORE	46.18	51.23	0.34

PP.34.386 NUTRACEUTICALS FOR BLOOD PRESSURE CONTROL IN PATIENTS WITH METABOLIC SYNDROME

R. Izzo, F. Rozza¹, A. Vasta¹, V. Trimarco², R. Giudice¹, C.S. Cimmino¹, B. Trimarco¹.
¹Department of Internal Medicine and Cardiovascular Sciences, Naples, Italy, ²Department of Neurosciences, Naples, Italy

In patients with metabolic syndrome (MS), reduction of blood pressure (BP) may contribute to remove this diagnosis, which is associated with doubled cardiovascular (CV) risk. However, guidelines for the management of arterial hypertension suggest that use of pharmacological antihypertensive treatment is not indicated for this kind of patients when BP values do not reach the hypertension threshold. Thus we investigated the effects of a combination of nutraceuticals (Orthosiphon stamineus, coenzyme Q10, berberine, red yeast rice extract, policosanol and folic acid) (Armolipid Prev, Rottapharm Spa) on BP values in patients with MS. After 2 weeks with a standardized diet, 30 patients with MS were randomized to 4-week treatment with placebo (A) or the combination of nutraceuticals (B), and BP was measured before and after treatment. The reduction in systolic & diastolic BP values was -19.6 ± 9.7 & -13.6 ± 5.5 mmHg in group A and -3.6 ± 8.1 & -2.3 ± 5.3 mmHg in group B ($p < 0.0001$). After treatment only 5 patients in A vs 12 in B still satisfied the diagnosis of MS ($p < 0.01$).

In order to evaluate whether the antihypertensive effects was accounted for by the presence of Orthosiphon stamineus, in a further group of 22 patients with MS we performed a 24-hour non-invasive ambulatory BP monitoring in baseline conditions and after 4 weeks of treatment with the combination of

nutraceutical previously described with ($n = 13$) (C) or without ($n = 9$) (D) Orthosiphon stamineus. The 24-hour reduction in systolic & diastolic BP value after treatment was -4.0 ± 5.3 & -2.2 ± 3.5 mmHg in group C ($p < 0.005$), while it was not statistically significant in group D ($+2.8 \pm 4.1$ & $+1.5 \pm 3.9$).

Thus, nutraceuticals may represent a new promising not pharmacological approach to associate to therapeutic lifestyle changes in order to obtain a greater improvement in CV prognosis in patients with MS.

PP.34.387 HYPERTENSION IN YOUNG RUSSIAN PEOPLE WITH OBESITY

A. Starodubova, O. Kisliak, E. Petrova, D. Sargaeva, G. Storozhakov, A. Kopelev, S. Kosyura, V. Svetlakov. Russian State Medical University, Moscow, Russia

Objective: Little is known about obesity-related hypertension in younger adults. The aim of this study was to evaluate office blood pressure and 24 hour ambulatory blood pressure measurements in young Russian people with obesity.

Design and Method: 101 young obese untreated people 15–25 y.o. were enrolled (53% females, mean age 18.8 ± 3.6 years, mean body mass index (BMI) 34.64 ± 4.51 kg/m², BMI range 30–56 kg/m²). Height, weight, BMI, waist circumference, office and 24-h systolic and diastolic blood pressure were measured. Night-time, day-time and 24-h systolic and diastolic blood pressures were evaluated by 24 h ambulatory blood pressure monitoring. Mann-Whitney test, Spearman's correlation coefficient and multiple stepwise linear regression analyses were calculated.

Results: On the basis of clinic and ambulatory blood pressure and patient diaries, 51% of obese subjects were hypertensive (36% females and 68% males were hypertensive, $p = 0.015$). 85.2% pts had isolated systolic hypertension, and only 14.8% systolic/diastolic hypertension in both sexes. White-coat hypertension was diagnosed in 21% pts. Masked hypertension was diagnosed in 23% pts (mainly in females), most of hypertensive females were asymptomatic. The presence of hypertension correlated with sex, height, body mass, abdominal obesity, waist/hip ratio. In multivariate analysis after controlling for sex only height remains.

Conclusions: We suggest that obesity-related hypertension in young Russian people appears to be characterized by a preponderance of isolated systolic hypertension, and is more frequent in males. The presence of white-coat and masked hypertension syndromes in young pts with obesity creates the concern that the office blood pressure measurements are not reflective of an individual patient's true blood pressure values. We think that ambulatory blood pressure monitoring is absolutely necessary in all young patients with obesity.

PP.34.388 METABOLIC SYNDROME AND EARLY KIDNEY DAMAGE IN RURAL POPULATION

I. Vukovic Lela¹, S. Karanovic¹, V. Capkun², I. Pecin³, M. Miletic-Medved⁴, D. Cvoriccec⁵, J. Sertic⁵, A. Cvrtkovic⁴, M. Bitunjac⁶, Z. Reiner³, D. Kuzmanic¹, D. Juric⁴, V. Premuzic¹, B. Jelakovic¹.
¹Department of Nephrology and Arterial Hypertension UHC Zagreb, School of Medicine University of Zagreb, Zagreb, Croatia, ²Department of Nuclear Medicine, UHC Split, Split, Croatia, ³Department of Metabolic Diseases, UHC Zagreb, School of Medicine University of Zagreb, Zagreb, Croatia, ⁴Public Health Institute County of Slavonski Brod, Slavonski Brod, Croatia, ⁵Laboratory For Clinical Diagnosis UHC Zagreb, School of Medicine University of Zagreb, Zagreb, Croatia, ⁶General Hospital Dr Josip Benecic, Slavonski Brod, Croatia

Objective: To analyze prevalence of metabolic syndrome (MS) in early phases of chronic kidney disease (CKD) and effect of its components on early renal impairment.

Design and Method: In this survey 1003 farmers from continental, rural part of Croatia were enrolled (386 men; 617 women; average age 52(30-95); females were older(Mann-Whitney test $z = 3.6$; $p < 0.001$). After extended questionnaire and clinical exam, fasting blood was drawn and second morning urine sample was collected (for microalbuminuria (MA) and alpha1 microglobulinuria ($\alpha 1$ MG)). Blood pressure (BP) was measured following the ESH/ESC guidelines, metabolic syndrome (MS) was defined according to the NCEP ATP III recommendations. Subjects were classified into the CKD stages groups according to the KDOQI classification.

Results: In general rural population prevalence of MS was 22,6% (30% men, 70% women; $p = 0.045$). Prevalence of MS was significantly higher in subjects with CKD stage 3 as compared to the CKD stage 1

($\chi^2=4$; $p=0.045$) as well as in subjects with MA compared to those with normal values ($\chi^2=5.85$; $p=0.016$), while there was no difference between subjects with elevated and normal values of $\alpha 1\text{MG}$ ($\chi^2=0.19$; $p=0.662$).

We observed significant difference between stages CKD 1 and 3 in BP ($\chi^2=15.6$; $p<0.001$), waist circumference (WC) ($\chi^2=26.8$; $p<0.001$), fasting blood glucose (FBG) ($\chi^2=22$; $p<0.001$), triglyceridies (TG) ($\chi^2=7.4$; $p=0.024$) and HDL level ($\chi^2=0.621$; $p<0.001$).

Significant differences in BP, FBG, WC and TG were observed between subjects with MA in comparison with normal values ($\chi^2=8.1$; $p=0.004$; $\chi^2=23.2$; $p<0.001$; $\chi^2=6.85$; $p=0.009$; $\chi^2=9.0$; $p=0.003$, respectively). Multivariate age-adjusted OR for development of MA was significant for FBG and TG (OR 2.143–2.8; $p<0.001$; OR 1.59(1.02–2.5); $p=0.043$, respectively).

Only systolic BP was significantly associated with $\alpha 1\text{MG}$ ($\chi^2=2.59$; $p<0.001$) with multivariate age-adjusted OR for development of $\alpha 1\text{MG}$ of 1.52 (1.01–2.28); $p=0.043$.

Conclusions: Prevalence of MS and its components increase with CKD stage. MS, and especially FBG and TG are risk factors for MA while systolic BP is a risk factor for proximal tubule damage i.e. $\alpha 1\text{MG}$.

PP.34.389 INFLUENCE OF WAIST CIRCUMFERENCE IN AMBULATORY BLOOD PRESSURE MONITORING OF OVERWEIGHT CHILDREN AND ADOLESCENTS

C. Salgado, J.K.B. Viana, P.C.B.V. Jardim, T.S.V. Jardim. *Hypertension League Federal University of Goiás (UFG), Goiânia, Brazil*

Objective: Comparing BP measurements using Ambulatory Blood Pressure Monitoring (ABPM) in overweight children and adolescents with and without increased waist circumference (WC).

Methods: Children and adolescents between 5 and 15 years of age were evaluated in a center specialized in treating hypertensive patients. Exclusion criteria: arm circumference >30 cm, diagnosis of secondary hypertension. A validated oscillometric method was used for the ambulatory BP measurements during a 24-hour period (SPACELABS 90207). Individuals with a BMI percentile >85 were considered overweight and were divided into groups, according to cut-off points for WC by age and sex (J. Pediatr. 2004; 145:439). One group presented with a normal WC and the other with an increased WC. Student's T test was used for establishing the comparison, and $p<0.05$ was considered significant.

Results: The study evaluated 108 children and adolescents, and studied the 46 individuals with excess weight (9.09 ± 2.89 years, 58.7% males and 58.6% non white). When comparing individuals from the normal WC and increased WC groups, no differences were found regarding weight, height and BMI ($p>0.05$). BP data are shown in Table 1.

Conclusion: In overweight children and adolescents, increased waist circumference is associated to a higher DP during sleep and lower night dipping of the SP and DP. These changes could be another marker for cardiovascular risk, in addition to the excess weight associated to an increased waist circumference.

Table 1. Comparing BP by ABPM in individuals from the normal WC and the increased WC groups.

n=46	Normal WC (n=21)	Increased WC (n=25)	p
Day SP ABPM (mm Hg)	118.28 $\pm$ 8.57	117.60 $\pm$ 7.85	0.779
Day DP ABPM (mm Hg)	71.24 $\pm$ 3.51	71.20 $\pm$ 5.33	0.978
Night SP ABPM (mm Hg)	106.38 $\pm$ 6.69	110.04 $\pm$ 8.96	0.130
Night DP ABPM (mm Hg)	58.90 $\pm$ 4.75	62.48 $\pm$ 6.34	0.039
SP Night dipping (%)	10.28 $\pm$ 3.81	6.42 $\pm$ 4.52	0.003
DP Night dipping (%)	17.21 $\pm$ 6.53	12.03 $\pm$ 03.79	0.026

Student's T test

PP.34.390 GENDER FEATURES OF THE VEGETATIVE STATUS AND RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM ACTIVITY IN HEALTHY PERSONS AND PATIENTS WITH METABOLIC SYNDROME

V.I. Podzolkov, A.E. Bragina, E.K. Panferova. *Moscow Medical Academy, Moscow, Russia*

Objective: To investigate gender differences of heart rate variability (HRV) time domain and its associations with the components of renin-angiotensin-aldosterone system (RAAS) in healthy persons and patients with metabolic syndrome (MS).

Methods: there were investigated 84 patients (52 perimenopausal women and 32 men) with MS (mean age 54.3 ± 5.4 years) and 15 healthy volunteers (10 women and 5 men) with comparable characteristics. All participants underwent 24-hours ECG-monitoring for the estimation of the HRV. Plasma renin activity and serum aldosterone levels were detected by immuno-enzyme assay. The results were processed with SPSS-11.0 software.

Results: RMSSD was significantly higher in healthy females in contrast to healthy men 53.9 ± 28.2 vs 30.8 ± 7.2 ($p<0.05$), accordingly. Women with MS revealed lower HRV time domain unlike healthy females: SDNN 134.5 ± 42.0 and 160.3 ± 21.1 , SDANN 128.0 ± 30.0 and 143.9 ± 18.9 , SDNNi 29.7 ± 13.0 and 42.4 ± 13.9 , RMSSD 39.0 ± 24.5 and 50.6 ± 28.2 ($\delta<0.05$), respectively. HRV parameters in the group of healthy males and male patients with MS did not differ. Correlation analysis in female hypertensives disclosed association of SDANN with both plasma renin activity ($r=0.91$, $p=0.01$) and serum aldosterone level ($r=0.83$, $p=0.002$), and RMSSD with plasma renin activity ($r=-0.52$, $p=0.05$).

Conclusion: healthy females have been demonstrated more vagal activity in contrast to healthy males. In perimenopausal females with MS there have been revealed depression of all HRV parameters, which is typical for sympathetic activation, and their relations to the components of RAAS.

PP.34.391 THE INFLUENCE OF THE ANGIOTENSIN-CONVERTING ENZYME INHIBITOR ZOFENOPRIL ON THE EVOLUTION OF RENAL FUNCTION IN PATIENTS WITH METABOLIC SYNDROME

T. Morozova, E. Shilov, T. Andrushchishina, A. Beloborodova. *Medical Sechenov Academy - Department of Clinical Pharmacology and Pharmacotherapy, Moscow, Russia*

Purpose: To assess whether zofenopril (Z) delays the progression of renal and endothelial dysfunction in patients with metabolic syndrome (MS).

Materials/Patients: In 74 patients (f – 43, m – 31, mean age 52.84 ± 11.32 years, mean office BP $143.33 \pm 14.18/85.24 \pm 7.66$ mm Hg) with MS there were estimated the renal function by measurement of glomerular filtration rate (GFR) by Cockcroft-Gault and microalbumin excretion (MAE). 21 pts (f – 12, m – 9) took Z (31.43 ± 16.19 mg od) during 6 months. The clinical efficacy, office blood pressure, heart rate, safety and tolerability were assessed during the study. The serum endothelin-1 as a marker of endothelial dysfunction was measured before and after of active treatment period.

Results: In patients with MS there were some kinds of renal dysfunction as hyperfiltration – 14.3%, normofiltration – 19.0% and hypofiltration – 66.7%. Results obtained showed that in patients with MS there were significant increase in the level of MAE (8.35 ± 8.56 mg/ml) and in the level of endothelin-1 (0.41 ± 0.40 fmol/ml). After 6 months of the Z therapy 66.64% pts achieved office BP $<130/80$ mm Hg (systolic BP lowered by 19 mm Hg, $p>0.05$; diastolic BP lowered by 6 mm Hg, $p>0.05$). At the end of study total serum cholesterol, HDL cholesterol and fasting serum glucose were not significantly changed. Anybody was not withdrawn from the study due to adverse events. After Z treatment the mean rate of decline of GFR was significantly changed as decrease of number of pts with hypofiltration to 57.1% and pts with hyperfiltration to 9.5% and increase of number of pts with normofiltration to 33.3%. The level of MAE decreased significantly to 6.68 ± 7.33 mg/ml ($\delta>0.05$). There were the tendency to decrease of level of endothelin-1 to 0.39 ± 0.44 fmol/ml after 12 weeks of Z therapy ($\delta>0.05$).

Conclusion: In patients with metabolic syndrome the angiotensin-converting enzyme inhibitor zofenopril demonstrates beneficial renoprotective effect and positive influence on level of endothelin-1 as well.

PP.34.392 MORPHOFUNCTIONAL CHANGES OF MYOCARDIUM IN PATIENTS WITH HYPERTENSION AND DIFFERENT BODY MASS

E.A. Poddubskaya, M.N. Mamedov, A.V. Kontsevaya, A.A. Aleksandrov. *National Research Center for Preventive Medicine, Moscow, Russia*

Aim: To evaluate the role of obesity and its metabolic consequences in the formation of the left ventricular (LV) geometry.

Methods: Study included 89 with hypertension 1 or 2 degree aged 25–60. Patients were divided in two groups: 1 group – patients with HP and obesity ($n=46$) and 2 group – patients with HP without obesity ($n=43$).

The investigation of patients included anthropometry (waist circumference) and biochemistry (glucose and insulin blood concentration: fasting and glucose tolerance test). Echocardiography included the evaluation of LV posterior wall, LV interventricular wall, thickness ratio and LV mass index (LFMI).

Results: First group included 17,4% of patients with 1 degree obesity, 71,74% patients with 2 degree obesity, and 10,8% patients with 3 degree obesity. In the first group fasting insulin levels and levels after glucose tolerance test were significantly higher compared with the 2 group. Glucose levels in two groups were similar. Patients with HP and obesity also have significantly higher thickness of LF posterior wall ($1,02 \pm 0,01$ sm versus $0,96 \pm 0,02$ sm, $p < 0,002$), LF interventricular wall ($1,03 \pm 0,02$ sm versus $0,98 \pm 0,02$ sm, $p < 0,005$), LFMI ($207,6 \pm 7,60$ versus $171,1 \pm 5,51$, $p < 0,001$). Increasing of end diastolic volume of patients with obesity depended on the fasting insulin level and level after glucose tolerance test.

In the first group most of the patients had left ventricular hypertrophy (LVH) (70,6%), remodelling was found in 29,4%. In the second group LVH was revealed in 10% of patients and 90% had remodelling. In the first group most of the patients had eccentric LVH (66,7%), 25% had concentric LVH and only 8,3% had asymmetric LVH.

Conclusion: In most HP patients obesity is associated with hyperinsulinemia and LVH. When choosing antihypertensive drugs, it is necessary to evaluate metabolic disturbances and LV geometry changes.

PP.34.393 ABSTRACT WITHDRAWN

PP.34.394 OBESITY AND TOLERANCE OF PHYSICAL LOAD IN OUT-WARD DEPARTMENT PATIENTS WITH ARTERIAL HYPERTENSION

J. Lietava, J. Murin, M. Pollak. *2-nd Department of Internal Medicine, Comenius University, Bratislava, Slovak Republic*

Obesity and decreased tolerance of exercise are associated and clinically manifested as dyspnoea, orthopnoic position during sleep as well as sexual dysfunction. These obvious associations are, however, seldomly studied in clinical practise. We analysed relationship between markers of cardiometabolic risk and subjective tolerance of physical load in patients with arterial hypertension.

Methods: Multicentric study STAIRS consisted of 3353 pts (M=1664 (49,6%), F=1689 (50,4%)) with moderate arterial hypertension (AH) with mean blood pressure (BP)= $154,4 \pm 14,1/92,5 \pm 8,3$ mmHg, overweighted (BMI = $28,9 \pm 4,6$) in middle age $60,0 \pm 12,9$ yrs. Tolerance of physical load was defined as number of stairs without dyspnoea, visual analogue scale (VAS), orthopnoic position during night (21,2%), nycturia (27,1%) and self reported sexual dysfunction (13,4%). Cardiometabolic risk was defined as presence of obesity or increased waist circumference (IDF 2005) or diabetes mellitus type 2.

Results: Obesity was present in 34,4% of pts, who reported dyspnoea in lower number of stairs ($24,7$ vs $29,3$ s; $p < 0,01$) and reported lower subjective tolerance of physical load (30,3% vs 37,7% of VAS; $p < 0,001$) in comparison with non-obese AH pts. Surprisingly, obesity did not influenced perception of sexual dysfunction 16,4% vs 16,9%; (NS), as compare to non-obese AH pts. Sexual dysfunction was significantly more frequently associated with smoking (21,7% vs. 15,3% ($p < 0,002$)) and shown direct relationship with BP: (for SBP $\rho = 0,08$; $p = 0,001$ and for DBP $\rho = 0,04$; $p = 0,033$). Obesity had indirectly correlated with number of tolerated stairs ($r = -0,13$; $p < 0,05$) but not with sexual dysfunction ($r = -0,15$; $p < 0,056$).

Increased waist was directly related to sexual dysfunction ($\rho = 0,08$; $p = 0,001$) and to nycturia ($\rho = 0,04$; $p = 0,028$).

Subgroup with diabetes mellitus (17,2%) had lower tolerance of stairs without dyspnoea (23,6 vs. 28,6 stairs; $p < 0,001$), but expressed only trend to sexual dysfunction 19,0% vs. 16,0% (NS).

Conclusion: Obesity and other cardiometabolic risk markers are indirectly associated with tolerance of physical load, but other physiological exercise tolerance mechanisms as sexual function could be dependent on different factors as smoking or hypertension.

PP.34.395 ECHOCARDIOGRAPHIC DATA IN OVERWEIGHT ESSENTIAL HYPERTENSIVE PATIENTS WITH DIFFERENT TYPES OF LEFT VENTRICULAR HYPERTROPHY

A. Barsukov, Z. Bagaeva, T. Lokshina, V. Kitsyshin, S. Shustov. *Military Medical Academy, Saint-Petersburg, Russia*

Objective: To compare the main ultrasound heart parameters in overweight essential hypertensive patients with concentric (CLVH), eccentric (ELVH) left ventricular hypertrophy and normal left ventricular geometry.

Methods and Design: 777 not regular treated persons with 1st-3rd levels of blood pressure (BP) increase (ESC, 2007). Among them 270 subjects had CLVH, 289 ones had ELVH and 218 patients had normal LV geometry. Data are shown as mean $\pm$ std. dev. The groups were adjusted by mean age ($63,2 \pm 10,5$; $63,8 \pm 10,3$; $62,3 \pm 8,8$; $p > 0,05$), gender (males 61,48%; 65,74%; 62,84%; $p > 0,05$), body mass index (BMI) ($29,3 \pm 5,05$; $29,3 \pm 4,77$; $30,1 \pm 3,84$ kg/m²; $p > 0,05$). Duration of hypertensive anamnesis (years) was similar in each group ($16,2 \pm 11,3$; $14,6 \pm 11,3$; $13,6 \pm 10,4$ yrs; $p > 0,05$). The office pulse BP in CLVH persons was higher than in ELVH ($p = 0,002$) and normal LV geometry ones ($\delta = 0,0018$). Differentiation between types of LVH was established on the base of relative wall thickness magnitude [RWT, units = (interventricular septum in diastole, mm + LV posterior wall thickness in diastole, mm)/ LV diastolic diameter, mm]. Border magnitude of RWT was considered as 0,45.

Results: In CLVH patients IVSd and LV PWd were significantly thicker than in ELVH and normal LV geometry ones (IVSd: $13,4 \pm 1,7$; $12,2 \pm 0,7$; $11,2 \pm 0,8$; $p = 0,0005$; LV PWd: $12,8 \pm 1,3$; $11,9 \pm 0,6$; $11,03 \pm 0,9$; $p = 0,0000$, $p = 0,0000$). Left atrium (LA), LV diastolic diameter (LVDD) in CLVH and normal LV geometry patients were much less than in ELVH ones (LA: $43,0 \pm 5,6$; $41,9 \pm 5$; $44,1 \pm 5,8$; $\delta < 0,05$, $p < 0,001$; LVDD: $52,0 \pm 3,6$; $52,4 \pm 3,7$; $57,6 \pm 4,7$; $\delta < 0,05$, $p < 0,001$). Ve/Va relation was the least in CLVH patients ($0,85 \pm 0,3$) in comparison with ELVH patients ($0,96 \pm 0,5$; $p < 0,05$) and with normal LV geometry patients ($1,01 \pm 0,3$; $\delta < 0,001$). ELVH patients had much greater LV myocardium mass index (153 ± 26 g/m²) than persons with CLVH (148 ± 31 ; $p > 0,05$) and normal LV geometry 108 ± 15 ; $p < 0,001$).

Conclusions: High risk overweight hypertensive patients with eccentric LVH are characterized by much greater LV myocardium mass, left atrium size however by better condition of diastolic LV function in comparison with concentric LVH persons.

PP.34.396 RENAL HYPERFILTRATION IN YOUNG INDIVIDUALS WITH METABOLIC SYNDROME

R. Sanchez, G. Giunta, G. Trentadue, A. Hnatiuk, L. Chiamonti, A. Pereyra, A. Stampone, P. Mendez, A.J. Ramirez, H. Baglivo. *Favaloro Foundation, Buenos Aires, Argentina*

Metabolic syndrome is closely related to insulin resistance and dysglucemia and able, by this mechanism, to alter renal function. Consequently, kidney hyperfiltration is the first finding in these individuals.

Aims: We evaluated in 182 subjects the incidence of this renal dysfunction and its relation with different components of the metabolic syndrome.

Methods: From 182 subjects studied, 41 % (mean age: 49y, 46–55) had metabolic syndrome (MS) according to NCEP criteria and 59% (mean age: 45y, 39–53) were without metabolic syndrome (non-MS). Blood pressure was registered automatically by triplicate with a Dinamap, Critikon (Tampa FL, USA) device and by ABPM (Space labs 90207), microalbuminuria (mAlb) was measured by RIA, glomerular filtration rate (GFR) was calculated by MDRD. In this group of subjects, hyperfiltration was defined as GFR higher than mean+2SD of the complete cohort. An independent value was defined for men and women.

Results: The prevalence of hypertension was 76.9% in MS subjects while in non-MS, 56.8% had hypertension ($p < 0,005$). GFR was higher in MS (126 ± 42 ml/min) than in non-MS ($106,0 \pm 26$ ml/min; $p < 0,001$). In MS, 18% had hyperfiltration compared with 0.9% in non-MS ($p < 0,001$). The multiple regression analysis showed that BMI, male gender, age, uric acid, number of MS individual criteria and mAlb, independently predicts GFR variability.

In 40 hypertensives with MS and hyperfiltration, a double blind randomization treatment was performed. Twenty hypertensives were treated with Irbesartan (I), 300 mg/day, and 20 hypertensives with Ramipril (R), 10 mg/day, for 24 months. Both treatments similarly reduced and normalized glomerular filtration rate, (baseline: I: 148 ± 20 ml/min, R: 150 ± 12 ml/min; 24m: I: 121 ± 12 ml/min, R: 118 ± 9 ml/min and mAlb (baseline: I: 48 ± 10 ml/min, R: 58 ± 14 ml/min; 24m: I: 22 ± 10 ml/min, R: 20 ± 6 ml/min).

Conclusions: Metabolic syndrome may alter renal function and prognosis. These alterations (hyperfiltration and mAlb) can be normalized by treatment with either angiotensin II antagonists or converting enzyme inhibitors.

PP.34.397 ARTERIAL HYPERTENSION CONTROL IN THE EXTREME NORTH POPULATION OF THE EMPLOYABLE AGE

A.U. Efanov, I.M. Petrov, S.S. Bagisheva, T.V. Tatueva, E.V. Kovalenko, I.N. Vasilyeva, I.V. Medvedeva. *Tyumen State Medical Academy, Tyumen, Russia*

Aim: To investigate prevalence of arterial hypertension (AH) in the organized group of the Extreme North population, and to estimate their compliance to therapy.

Materials and Methods: 432 the Extreme North entrants (Noviy Urengoy city) of the employable age (21–60 age), who mainly do intellectual work, were investigated during prophylactic examination. Age mediana was 39 years (interquartile range 34.5–45 years). Dwelling duration in the Extreme North – 15 years (9–19).

Results: AH prevalence in the examined group was 34.3 % (148), 28.91% in males (24), 35.5 % in females (124), that is statistically more significant (Fisher exact $p = 0.045$). AH 1 stage was found in 15.9 % (69), AH 2 stage – in 11.8% (51432) and AH 3 stage in 6.5% (28). Historically 81.1% of the examined patients with AH were aware of their high blood pressure, that is quite a lot. 53.4 % (79) of patients with AH received hypotensive medicines periodically. Among them: AH 1 stage – 31.9 % (22), AH 2 stage – 58.8 % (30), AH 3 stage – 96.4% (27). Only 21.6% (32) of patients with AH re-ceived antihypertensive treatment regularly. Among them: AH 1 stage – 2.9% (2), AH 2 stage – 27.5% (14), AH 3 stage 57.1% (16). At the examination blood pressure target was found in 16.21 % (24148) of patients with AH. Among them: AH 1 stage – 10.1% (7), AH 2 stage – 23.5 % (12), AH 3 stage – 17.8% (5). 25.8% of patients received ACE-inhibitor monotherapy, 13.3 % - B-blocker mono-therapy, 9.2% - combination of B-blocker with ACE-inhibitor, 14.2% - combination of B-blocker with diuretic, 7.5% - combination of ACE-inhibitor and diuretic.

Conclusion: AH prevalence in the examined organized Extreme-North employable age population group was 34.3% (28.9 % males, 35.5 females). Blood pressure targets were found in 16.21 % of patients with AH. These results show necessity of the scientific approach elaboration of antihypertensive therapy efficacy increase in the organized population.

PP.34.398 INFLUENCE DIFFERENT TYPE OF ANTIHYPERTENSIVE THERAPY IN PATIENTS WITH ARTERIAL HYPERTENSION (AH) AND METABOLIC SYNDROME (MS) ON INSULIN RESISTANCE DEPENDS ON SEX

O. Rekovets, Y.U. Sirenko, S. Savitskiy, E. Pavlyuk, A. Vaschylko, G. Primak. *NSC Institute of cardiology, Kiev, Ukraine*

Objection: To evaluate the changes of glucose and HOMA in patients with AH and MS during 6-month of antihypertensive treatment with different agents depends on sex.

Patients: We observed 110 patients with mild to moderate AH and MS (according ATP III criterias). Patients with diabetes mellitus were excluded.

Methods: All patients were divided in 3 groups. In 36 patients (1st group: 23 female, 13 male) treated by atenolol, 38 patients (2nd group: 22 female, 16 male) - by fosinopril, 36 patients (3rd group: 20 female, 16 male) - by telmisartan. In all patients before and after 6 month of therapy we performed ABMP and OGTT estimation of serum glucose, HOMA.

Results: The blood pressure control was equivalent in all groups. At the beginning groups were comparable. At end we observed the significant worsening of OGTT data in man and woman treated by atenolol. On man treated by atenolol fasting glucose increased 5.48 ± 0.16 to 5.62 ± 0.19 mmol/l ($\delta < 0.05$) on woman - 5.44 ± 0.16 to 5.65 ± 0.18 mmol/l ($\delta < 0.05$). On man treated by fosinopril glucose changed 5.56 ± 0.23 to 5.54 ± 0.18 mmol/l ($\delta > 0.05$), on woman - decreased 5.54 ± 0.14 to 5.37 ± 0.14 mmol/l ($\delta < 0.05$). On man treated by telmisartan glucose decreased 5.61 ± 0.22 to 5.11 ± 0.25 mmol/l ($\delta < 0.05$), on woman - 5.42 ± 0.19 to 5.35 ± 0.21 mmol/l ($\delta < 0.05$). At the end we observed the significant worsening HOMA in man and woman treated by atenolol: on man HOMA increased 2.78 ± 0.40 to 4.43 ± 0.80 ($\delta < 0.05$), on woman HOMA - 1.88 ± 0.31 to 3.63 ± 0.66 ($\delta < 0.05$). On man treated by fosinopril HOMA changed 2.13 ± 0.40 to 2.06 ± 0.30 ($\delta > 0.05$), on woman HOMA decreased 2.45 ± 0.28 to 1.99 ± 0.22 ($\delta < 0.05$). HOMA significantly decreased in two groups treated by telmisartan: on man decreased 2.33 ± 0.39 to 1.66 ± 0.27 ($\delta < 0.05$), on woman - 2.41 ± 0.35 to 1.59 ± 0.24 ($\delta < 0.05$).

Conclusion: The 6-month therapy in man and woman with AH and MS by atenolol significantly increased insulin resistance, HOMA. Therapy by fosinopril not significant changed HOMA, and by telmisartan signifi-

cantly improved state insulin resistance, HOMA not depends from sex in all groups.

PP.34.399 EFFECT OF MANIDIPINE IN CHRONIC KIDNEY DISEASE PATIENTS WITH METABOLIC SYNDROME. PLASENCIA STUDY

P.M. Gonzalez-Castillo, P.J. Labrador. *Nephrology Unit, Virgen del Puerto Hospital, Plasencia, Spain*

Aim of the Study: To study the metabolic effects that the addition of manidipine has in patients with chronic kidney disease (CKD) and metabolic syndrome (MS).

Method: Adult patients were included with CKD (glomerular filtration rate estimated using MDRD-4 < 60 ml/min/1.73m²) and MS criteria (IDF definition) with BP $> 130/80$ mmHg. Patients with DM and/or treated with another calcium antagonist were excluded.

Manidipine 20 mg was administered in a single night-time dose. Patients underwent one-, three- and six-month follow-ups. A blood test was performed at baseline and after 6 months, BP was taken in accordance with European hypertension guidelines, and abdominal circumference, weight and height were measured.

Results: 32 patients (16 women) were included. The addition of manidipine was well tolerated and only one patient withdrew from the study due to hypotension; a further two left the study. The mean age was 71 ± 8.3 years. Baseline BP and after 1, 3 and 6 months were: 151/80, 144/76, 140/73 and 141/75 (baseline SBP vs. 6-month SBP: $p = 0.001$ and baseline DBP vs. 6-month DBP: $p = 0.038$). The target BP was reached after 1, 3 and 6 months in 20, 33.3 and 20%, respectively. After 6 months, 36.7% no longer met the criteria for MS. The estimated glomerular filtration rate went from 44 ± 9 to 48 ± 13 ml/min/1.73m² ($p = 0.001$) and the albumin/creatinine ratio went from 66 ± 177 to 36 ± 70 mg/g ($p = \text{NS}$). At the beginning of the study, 44.8% of the patients presented microalbuminuria/proteinuria, and after 6 months this figure had dropped to 24.1% ($p = 0.01$).

Conclusions: The addition of manidipine 20 mg in a night-time dose is well tolerated in patients with CKD and MS with poor BP control, achieving BP control in one of three patients and improving their metabolic profile. It increases the estimated glomerular filtration rate and almost 50% of the patients with microalbuminuria at the start present negative values.

PP.34.400 HIGH TG/HDL RATIO HELPS IN THE EVALUATION OF C-V RISK OF HYPERTENSIVE PATIENTS WITHOUT METABOLIC SYNDROME

L. Ferrara¹, B. Russo¹, V. Di Fronzo¹, R. Gente¹, L. Staiano¹, T. Marotta². ¹Dept. of Clinical and Experimental Medicine, Naples, Italy, ²ASL 1, Naples, Italy

Metabolic syndrome (MS) is associated to higher risk of cardiovascular events. Its diagnosis is based on the concomitant presence of at least 3 of the 5 factors indicated by the AHA. Direct evaluation of insulin sensitivity, however, is not included among these components for several reasons. The TG-to-HDL chol ratio $\Rightarrow > 3$, on the other hand, has been indicated as a proxy of insulin resistance in patients with overweight. Aim of the present investigation was to evaluate in 230 hypertensive patients with or without MS if this ratio might help in selecting patients exposed to higher cardiovascular risk, needing therefore a more intensive therapeutic approach. MS was present in 90/230 patients (39%) and 55 of them had also a TG/Hdl $\Rightarrow > 3$. These patients did not differ from the group without MS for age, heart rate, diastolic blood pressure and other metabolic factors apart from those included in the diagnosis of the syndrome. Ten-year cardiovascular risk calculated according to the Framingham equation was 8.3 ± 5 % in patients without MS with low TG/HDL ratio and 14 ± 8 % in those without MS but with TG/HDL ratio $\Rightarrow > 3$ ($p < 0.001$). On the other hand, in the group with MS risk increased from 12.6 ± 9 % in those with TG/HDL ratio < 3 to 16.3 ± 11 % in the others; however, this difference did not reach statistical significance ($p = 0.09$). Patients with MS were also divided according to the number of factors concomitantly present: despite risk was higher in the subgroup with high TG/HDL ratio, in no case statistical significance was reached (13.4 ± 10 vs 13.7 ± 9 in those with 3 components; 16.0 ± 10 vs 20.7 ± 6 in those with 4 components). In conclusion this investigation indicates that a proxy of the insulin resistance as the TG/HDL ratio does not add further information to the 10-year calculated risk of cardiovascular events in hypertensive patients with MS but appears to be really useful for hypertensives without MS.

PP.34.401 INTERCOMMUNICATION OF HYPERURICEMIA WITH CLINICAL, HAEMODYNAMIC AND METABOLIC INDEXES FOR PATIENTS WITH ARTERIAL HYPERTENSION

V. Bozhko, S. Koval, L. Reznik, O. Guibanova. *Institute of Therapy AMS of Ukraine, Kharkov, Ukraine*

A purpose of work is determination of intercommunication between hyperuricemia (GU), clinical, haemodynamic and metabolic indexes for patients with arterial hypertension (AH).

Materials and Methods: 71 patients with AH in age from 35 to 65 were inspected. For 50 patients (70,4 %) was found out metabolic syndrome (MS). 38 patients with AH and GU as basic group, 33 patients with AH and normal uric acid (NUE) level for comparison group. All patients were conducted for blood levels of uric acid (UA), glucose on empty stomach and peroral test of tolerance to glucose (PTTG), general cholesterol (GC), cholesterol of lipoprotein of high-density (CLPHD), cholesterol of lipoprotein of low-density (CLPLD), cholesterol of lipoprotein of very low-density (CLPVL), triglycerides (TG) of exchanges.

Results: It is found that patients on AH from GU differed higher values of body mass ($\delta < 0,05$), volume of waist, ($\delta < 0,05$), frequency of obesity on abdominal type (71,1% and 33,4%, $\delta < 0,05$) in comparing with patients for AH and NUE. Levels of glucose in blood on empty stomach are did not differ for both groups, but in 2 hours after the leadthrough of PTTG patients had higher level of glucose in blood on AH and GU ($5,82 \pm 0,121$) mmol/l, ($5,09 \pm 0,093$) mmol/l accordingly, $\delta < 0,05$. The lipid exchanges analyses found out higher maintenance of TG ($2,23 \pm 0,163$) mmol/l, ($1,87 \pm 0,204$) mmol/l, $\delta < 0,05$) with simultaneous decline the level of CLPVL in blood of patients with AH and GU ($1,33 \pm 0,056$), ($1,54 \pm 0,072$) accordingly, $\delta < 0,05$). Index of myocardium mass of the left ventricle was for patients on AH and GU: ($233,52 \pm 6,63$), for AH and NUE ($217,49 \pm 4,42$), $\delta < 0,05$.

Conclusions: GU for patients with AH associated with the presence of abdominal obesity, high level of TG, the lower level of CLPVL? violation of tolerance to glucose. This Information can serve as additional grounds for attributing of GU to MS components list.

PP.34.402 VASCULAR COMPLICATIONS IN PATIENTS WITH METABOLIC SYNDROME

S. Naydenov, T. Donova. *Alexandrovska University Hospital, Medical University, Sofia, Bulgaria*

Objective of the Study: Assessment of the risk profile and frequency of vascular complications in patients with metabolic syndrome (MS).

Design and Method: A retrospective study that included 122 consecutive patients - 70 females (57,4%) and 52 males (42,6%), mean age $63,1 \pm 11,9$ with signs for MS according to the criteria of the International Diabetic Federation out of the total number of 2619 patients who were admitted to our clinic for a period of 1 year (January-December 2008). These patients with MS were analysed about their risk profile and the vascular complications that had occurred till the moment of the current hospitalization.

Results: The bigger number of patients with MS - 46 (37,7%) were in the age group 55-65 years. In regard to the grade of obesity most of the patients had mild obesity (body-mass index 30-34, average waist circumference $101,43 \pm 2,64$ and $88,4 \pm 3,23$ cm for the males and females respectively). Arterial hypertension was the leading risk factor in the constellation of MS, affecting 120 (98,4%) of the analysed patients, followed by dyslipidemia, found in 89 (73,0%) and impaired glucose tolerance or diabetes - 58 (47,5%). Vascular complications of the patients with MS included undergone myocardial infarct - 20 (16,4%), ischemic cerebral stroke - 20 (16,4%), both myocardial infarct and stroke - 5 (4,1%), chronic peripheral arterial insufficiency - 17 (13,9%).

Conclusion: Metabolic syndrome is an important medical and social problem, related to high risk of vascular complications.

PP.34.403 SOME LABORATORY PARAMETERS IN ESSENTIAL HYPERTENSIVE TYPE 2 DIABETES MELLITUS PATIENTS WITH OR WITHOUT ATRIAL FIBRILLATION

A. Barsukov, T. Sveklina, S. Shustov. *Military Medical Academy, Saint-Petersburg, Russia*

Objective: To compare glycemic, lipid, purine profile in essential hypertensive patients having high risk type 2 diabetes mellitus (DM) and metabolic syndrome with or without atrial fibrillation (AF).

Methods and Design: In a result of initial analysis of 1192 high risk hypertensive (1st-2nd level of blood pressure increase (ESC, 2007)) patient's cards there were chosen 194 ones. Of them there were chosen 40 patients with metabolic syndrome (IDF, 2005). Data are shown as means $\pm$ standard deviation of the mean. The patients, divided into 2 groups, were adjusted by gender, age, body mass index. 1st group - 23 persons without atrial fibrillation (13 males and 10 females, mean age 60 ± 6 y). 2nd group - 17 subjects with atrial fibrillation (8 males and 9 females, mean age 63 ± 7 y). Patients of the 1st group and persons of the 2nd group had similar BMI ($35,7 \pm 7,3$; $38,0 \pm 6,0$ kgm²; $p > 0,05$). Up to the moment of research 47% and 42% patients of the 1st and the 2nd group respectively intook oral glucose lowering drugs or used insulin, 34% and 47% subjects respectively intook statins. There were studied a number of laboratory parameters: HbA1c level (%), total cholesterol level (mmol/L), low density lipids level (mmol/L); triglycerides level (mmol/L), serum creatinin level (fmol/L), uric acid serum level (umol/L).

Results: In a result of subanalysis patients of the 1st group and persons of the 2nd group had similar HbA1c level ($8,6 \pm 2,2$; $8,9 \pm 2,2$ %; $p > 0,05$), total cholesterol level ($5,54 \pm 1,34$; $5,73 \pm 1,43$ mmol/L; $p > 0,05$), low density lipids level ($4,51 \pm 1,68$; $4,0 \pm 0,5$ mmol/L; $p > 0,05$); triglycerides level ($2,12 \pm 0,52$; $2,07 \pm 0,95$ mmol/L; $p > 0,05$), serum creatinin level ($83,3 \pm 18,4$; $79,5 \pm 11,4$ fmol/L; $p > 0,05$). Uric acid serum level was higher in patients with AF than in subjects without AF (441 ± 127 ; 331 ± 172 umol/L; $p < 0,05$).

Conclusions: Researched by us hypertensive high risk essential hypertensive subjects simultaneously suffering from type 2 DM and metabolic syndrome with or without atrial fibrillation have similar glycemic and lipid profile, but different purine pattern.

PP.34.404 INSULIN RESISTANCE DETERMINES TELOMERE SHORTENING IN PHAGOCYTIC CELLS FROM METABOLIC SYNDROME PATIENTS. INVOLVEMENT OF NADPH OXIDASE-MEDIATED OXIDATIVE STRESS

L. Montero, M.U. Moreno, G. San Jose, P. Garcia-Berbel, O. Beloqui, J. Díez, A. Fortuño, G. Zalba. *Foundation for Applied Medical Research (FIAMA), University of Navarra, Pamplona, Spain*

Objective: Telomere attrition has been reported in blood cells from metabolic syndrome patients. Oxidative stress has been postulated as a potential mechanism that may favor telomere shortening. The aim of this study was to analyze the relationship of NADPH oxidase-mediated oxidative stress with telomere shortening in phagocytic cells from MetS patients.

Design and Method: IR was defined by the homeostasis model assessment index. Telomere length was determined by PCR in genomic DNA isolated from blood samples. NADPH oxidase-dependent superoxide production was evaluated by luminescence in peripheral blood mononuclear cells obtained from patients with MetS. As an index of oxidative stress, plasma concentrations of thiobarbituric acid-reactive substances (TBARS) were measured. Intima-media thickness (IMT) was determined by ultrasonography in carotid arteries. To ascertain the mechanisms involved in vivo, we performed in vitro experiments in cultured macrophages.

Results: Telomere length was lower ($P < 0,05$) in IR than in IS metabolic syndrome patients. NADPH oxidase-dependent superoxide production was augmented ($P < 0,05$) in IR patients with respect to IS patients. Finally, carotid IMT was higher ($P < 0,05$) in IR than in IS patients. After adjusting for age and sex, telomere length correlated ($P < 0,05$) inversely with glucose, with phagocytic NADPH oxidase activity and with TBARS values, and with carotid IMT. In vitro studies showed that a chronic activation of NADPH oxidase was associated with a relevant shortening of telomere length in cultured macrophages.

Conclusions: Telomere shortening in phagocytic cells associates with CV risk in MetS patients with IR. This process may be mediated by oxidative stress mechanisms, which involve, among others, the overactivity of NADPH oxidase in phagocytic cells.

PP.34.405 INFLUENCE OF NONALCOHOLIC FATTY LIVER DISEASE ON PLASMA LEVELS OF THE DISTANT MARKERS OF FIBROSIS, NONSPECIFIC FACTORS OF GROWTH AND IMMUNE INFLAMMATION IN PATIENTS WITH METABOLIC

L. Zhuravlyova, O. Lavrynenko, V. Khvorostynka. *Kharkiv National Medical University, Kharkiv, Ukraine*

Not all authors admit nonalcoholic fatty liver disease (NAFLD), unlike arterial hypertension (H), insulin resistance and abdominal obesity as the component of metabolic syndrome (MS). Insulin-like growth factor-1 (IGF-1) is synthesized in liver and able to stimulate the processes of remodelling of myocardium and angiogenesis, plays role in protecting of cardiomyocytes against apoptosis. Collagen degradation is supervised by condition of interstitial collagenases, in particular matrix metalloproteinases 1 type (MMP-1). It is necessary to define tissue inhibitor of metalloproteinases-1 (TIMP-1) and tumor necrosis factor-alpha (TNF-alpha) to substances regulating activity of MMP-1. The result of disturbance of balance between a synthesis and degradation of collagen is development of interstitial, reactive fibrosis of myocardium with the increase of its inflexibility and also development of liver fibrosis.

Aim: To study the dynamics of IGF-1, proMMP-1, TIMP-1 and TNF-alpha in patients with MS and H with- and without NAFLD.

Materials and Methods: 2 groups of patients were investigated with MS, 1 group included 30 patients with MS without NAFLD, 2 group - 40 patients with MS and NAFLD and 20 healthy persons were examined. The diagnosis of NAFLD was confirmed by histology. Criteria MS were IFD (2007). Plasma levels of proMMP-1, TIMP-1, TNF-alpha, IGF-1 by ELISA method were studied.

Results: Progressing and significant increase of levels of proMMP-1, TIMP-1, TNF-alpha and decrease of IGF-1, both in comparison with control group, and between groups were revealed in process of MS increase and accompanied by NAFLD.

Groups of patients	Plasma levels			
	proMMP-1, ng/ml	TIMP-1, ng/ml	TNF-alpha, pg/ml	IGF-1, ng/ml
Control group, n=20	1.4 ± 0.05	373.0 ± 1.6	22.8 ± 1.4	267.0 ± 10.2
MS, n=30	2.0 ± 0.096*	396.0 ± 2.8*	40.1 ± 1.6*	161.6 ± 3.12*
MS+NAFLD, n=40	3.6 ± 0.12*/**	442.0 ± 2.4*/**	108.2 ± 2.0*/**	82.4 ± 3.38**

* - vs control group, ($\delta < 0,05$). ** - MS+ vs IS+NAFLD ($\delta < 0,05$)

Conclusions: Increase of levels of proMMP-1, TIMP-1, TNF-alpha and decrease of IGF-1 in patients with MS were aggravated with damage of liver and contribute to clinical outcomes.

PP.34.406 CENTRALLY ADMINISTERED INSULIN POTENTIATES THE PRESSOR RESPONSE TO ANGIOTENSIN II BY MAPK ACTIVATION IN RATS

A. Puyó, M.A. Mayer, J. Giani, C. Höcht, M. Muñoz, F. Dominici, B.E. Fernández, C. Taira. *Facultad de Farmacia y Bioquímica, University of Buenos Aires, Buenos Aires, Argentina*

Objectives: Insulin-resistance related hypertension could be due to insulin actions at central level. As insulin and angiotensin II (Ang II) exert some effects at hypothalamic level by MAPK intracellular pathway activation, we evaluated if insulin modifies the central pressor response to Ang II in control (C) and insulin-resistant rats.

Methods: Two groups of male Sprague-Dawley rats were studied: C: tap water; fructose (F)-treated: F solution (10% w/v) to drink for 6 weeks (n=20). A cannulae was inserted in one carotid artery to measure mean arterial pressure (MAP; mmHg). Vehicle or insulin (12 mU/h) was perfused intracerebroventricularly. Changes in MAP were evaluated in response to Ang II 5 pmol. Afterwards hypothalami were removed to determine ERK1/2 phosphorylation levels.

Results: MAP basal value was elevated in F rats (90 ± 3 vs. C: 75 ± 3 , $p < 0.05$). Ang II increased MAP only in insulin pre-treated C animals (dMAP: 6.3 ± 0.8 vs. vehicle, $p < 0.01$); meanwhile it elevated MAP in a similar manner in insulin and vehicle pre-treated F rats (dMAP: 5.5 ± 1.1 and 4.0 ± 1.0 respectively, $p < 0.01$ vs. C vehicle). Basal phospho-ERK 1/2 hypothalamic levels were similar in both groups. In C and F Ang II or insulin infusion increased more than two fold phospho-ERK 1/2 hypothalamic levels ($p < 0.05$ vs. C vehicle). C animals that received insulin infusion followed by Ang II injection presented 4.5 higher values of phospho-ERK 1/2 than those receiving vehicle ($p < 0.01$) meanwhile F rats showed 3.5 higher levels ($p < 0.05$ vs. C vehicle). Both groups increased twice phospho-ERK 1/2 than those treated with Ang II without insulin pre-treatment ($p < 0.05$).

Conclusions: Centrally administered insulin potentiates the pressor effects of Ang II in C rats, suggesting a novel mechanism, involving MAPK activation, by which insulin influences blood pressure control at central level. The existence of a pressor response to Ang II in F rats, and the absence of changes in this response after previous administration of insulin could be due to the chronic hyperinsulinemia present in this model.

PP.34.407 IMPACT OF METABOLIC SYNDROME ON IN-STENT RESTENOSIS AND CLINICAL OUTCOMES AFTER PERCUTANEOUS CORONARY STENT IMPLANTATION

L. Han Cheol, C. Jae Hoon, K. Sang Pil, L. Yong Whan, L. Hyeo Won. *Pusan National University Hospital, Busan, South Korea*

Background and Objective: Patients with metabolic syndrome (MS) are considered to be more likely to develop cardiovascular events than patients without it. However, the impact of MS on in-stent restenosis (ISR) and the long-term clinical outcomes of patients with significant coronary artery disease after they are treated with percutaneous coronary intervention (PCI) with stent implantation is poorly understood. Here, we investigated the impact of MS on the occurrence of ISRs and long-term major adverse cardiac events (MACE), including cardiovascular death, myocardial infarction, and target vessel revascularization (TVR), during a follow-up period of 36 months.

Methods and Results: In this observational retrospective study, 338 patients treated in our hospital by stent implantation in January, 2002-December, 2004 were enrolled. MS was defined by National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP) β criteria with slight modifications. The prevalence of MS was 50.3% (n=170). The median follow-up duration was 36 months. By the 36-month follow up, 17.1% and 19.4% of the patients with MS had ISR and MACE, respectively, compared to 13.1% and 12.5% of the patients without MS, respectively. Kaplan-Meier survival analysis failed to detect a significant association between the presence of metabolic syndrome and an increased risk of MACE (log-rank $P = 0.105$). Multivariate Cox regression analysis showed that the hazard ratio of metabolic syndrome with respect to MACE was 1.643. (95% confidence interval 0.943-2.863, $p = 0.079$).

Conclusion: Metabolic syndrome was not an independent predictor of increased ISR and MACE after PCI with stent implantation in patients with significant preexisting coronary artery disease.

PP.34.408 NONINVASIVE ESTIMATION OF VASCULAR REMODELING IN OVERWEIGHT PATIENTS WITH ARTERIAL HYPERTENSION

O. Kovalyova, G. Demidenko. *Kharkiv National Medical University, Department of Propedeutics to Internal Medicine, Kharkiv, Ukraine*

Endothelial dysfunction has been considered as a main factor in the development of hypertension and cardiovascular remodelling in overweight patients. Diameter of brachial artery and intima-media thickness are key physiological parameters, which can be evaluated noninvasively with Doppler scan during vasodilator stress.

Aim: Estimation of endothelial functional state of vessels in relation with remodelling in overweight patients with arterial hypertension.

Materials and Methods: 98 overweight patients with arterial hypertension were examined by Doppler scanning. Examination was performed by ultrasound scanning system «Siemens G50», USA using test of Celermajer-Sorensen for studying endothelium dependent and endothelium independent vasodilatation. Coefficient of endothelial relaxation was calculated. The thickness of a complex intima-media (IMT) was measured by ultrasound imaging (Pignoli methodics). The patients were divided into 5 groups. The 1st gr.-non obese patients with hypertension, 2nd.gr.-pre-obese patients with hypertension, 3rd.gr.-patients with hypertension and obesity 1st., 4th.gr.-patients with hypertension and obesity 2st., 5th.gr.-patients with hypertension and obesity 3st.

Results: Constriction of a brachial artery was revealed after reactive hyperemia in all groups (the percentage of vessel diameter changing): 1st gr.-7.20%, 2nd-28.50%, 3rd-24.09%, 4-32.8%, 5-41.3%, incomplete restoration of a diameter of a vessel was observed in patients with obesity of 3 degree, even after administration of pharmacological stimulus (nitroglycerine 2×0.4) 6.62% ($p < 0.05$). Coefficient of endothelial relaxation in obese patients with hypertension was 0.85 - 0.81. Thickness of a complex intima - media: 1st gr. - 0.27 ± 0.11 , 2nd- 0.33 ± 0.12 , 3rd- 0.52 ± 0.09 , 4th- 0.78 ± 0.14 , 5th- 0.83 ± 0.13 . In patients with hypertension and obesity 3st. IMT was higher compared to non-obese ones (0.53 ± 0.13 , $p < 0.05$). Minor alterations of parameters of a functional condition of endothelium were marked in

hypertensive pre-obese patients and non-obese hypertensive patients compared to healthy persons.

Conclusions: The pronounced vasoconstriction and significant intima-media thickness were revealed in overweight patients with arterial hypertension. These data prove, that increased body mass-index contribute to endothelial dysfunction in patients with hypertension.

PP.34.409 LIPID PROFILE AND PLASMA ANTIOXIDANT STATUS IN SWEET CARBONATED BEVERAGE-INDUCED METABOLIC SYNDROME IN RATS

J. Milei¹, M. Otero Losada¹, D.R. Grana¹, A. Müller¹, G. Ottaviano¹, G. Ambrosio². ¹Instituto de Investigaciones Cardiológicas (ININCA) UBA-CONICET, Buenos Aires, Argentina, ²Div. Cardiology, School of Medicine, University of Perugia, Perugia, Italy

Oxidative stress is involved in the pathophysiology and cardiovascular complications of metabolic syndrome.

Objective: To investigate changes in plasma profile of biomarkers of altered redox mechanisms and lipid metabolism, associated with experimentally-induced metabolic syndrome.

Methods: Forty-eight male Wistar rats were allowed to drink ad libitum: 1) regular cola (sucrose-sweetened carbonated drink); 2) diet cola (non-nutritive sweetener containing, low-calorie carbonated drink); 3) tap water (controls). After 6 months, all groups were switched to an additional 6 months of tap water drinking (wash-out). Plasma concentrations of the endogenous antioxidants α -tocopherol and ubiquinone-10 were measured using RP-HPLC with UV detection. Plasma concentrations of glucose, triglycerides, total cholesterol and HDL-cholesterol were measured by standard enzymatic methods. Determinations were performed at 6 months (end of treatment) and 12 months (end of wash-out).

Results: In group 1, 6 months of sucrose-sweetened beverage drinking led to significant weight gain ($7 \pm 1\%$, $p < 0.01$), hypertension ($7.5 \pm 0.5\%$ increase in systolic blood pressure, $p < 0.01$), hypertriglyceridemia (3-fold, $p < 0.01$), hyperglycemia ($15 \pm 1\%$, $p < 0.05$), and low ubiquinone-10 levels ($52 \pm 2\%$ decrease, $p < 0.05$). Light cola-drinking rats showed normoglycemia, but an unexpected tendency to hypertriglyceridemia (2-fold, N.S.) and hypercholesterolemia (29% increase in total cholesterol, N.S.); CoQ10 levels were slightly decreased compared to controls (27%, N.S.), but higher than group 1 (51% increase, N.S.). These metabolic alterations reversed after wash-out, except for hypertriglyceridemia and low ubiquinone-10 levels. Interestingly, by this time decreased α -tocopherol concentrations and hypercholesterolemia were observed in all 3 groups (i.e., unrelated to treatment).

Conclusions: Experimentally-induced metabolic syndrome induces oxidative stress-related biochemical changes; some of these alterations may be shared by the natural aging process.

PP.34.410 ABSOLUTE RISK (SCORE 2005) IN OUTWARD-PATIENTS WITH ARTERIAL HYPERTENSION AND WITH/WITHOUT METABOLIC SYNDROME. INTERGENDER DIFFERENCES

V. Kosmalova, M. Polak, P. Turek, J. Lietava. *II nd. Department of Internal Medicine University Hospital, Bratislava, Slovak Republic*

Introduction: Metabolic syndrome (MS) increases risk of cardiovascular mortality and morbidity. Arterial hypertension, forming a component of MS, should be decreases to targeted values, which are different in both entities. According to national and international guidelines, absolute risk (SCORE 2005) (AR) should be central point of therapeutic strategies, however, the real comparison between AH pts management and MS was not analysed in respect to AR.

Method: Crosssectional multicentric study NEMESYS (New METabolic SYndrome in Slovakia) screened 10300 consecutive out-ward pts aged > 18 yrs, of them 5498 pts with treated AH and 1085 without therapy of AH (16,5%). MS was defined according IDF 2005 criteria.

Results: AH out-ward pts aged 52.9 ± 16.1 yrs [18–96 yrs] exhibited 48.7% prevalence of MS (37.6% in males; 45.5% in females; $p < 0.001$). Prevalence of $AR \geq 5$ was substantially lower 14.0%, with prevail of M over F (25.0% vs. 6.8%; ($p < 0.001$), mean AR was low 2.70 ± 3.13 with high intergender difference (M vs F = 4.34 vs 1.94 ; ($p < 0.001$).

MS was associated with higher AR 2.70 ± 3.13 vs 1.36 ± 2.44 ; ($p < 0.001$) both in males 4.34 ± 4.33 vs 2.10 ± 3.28 ; ($p < 0.001$) and females 1.94 ± 1.94 vs 0.84 ± 1.40 ; ($p < 0.001$),

AH therapy was more frequent in MS pts (2,13 vs 1,86; ($p < 0.001$) and ORs for treating by given class of antihypertensives were substantially higher in MS pts (except of beta blockers). (Table 1). BP control was lower in MS pts: 31.0% vs. 51.2%; ($p < 0.001$) and BP higher: (SBP 142.7 vs 134.7 mmHg; $p < 0.001$); (DBP 84.3 vs 82.0 mmHg; ($p < 0.001$)). OR for treatment acc. to AR are smaller than OR acc. to MS. Age and smoking habit decreased differences.

Conclusion: Out-ward patients with arterial hypertension and metabolic syndrome are more intensively, but less effectively treated as compared to hypertensives without MS. Metabolic syndrome is associated with increased absolute risk for cardiovascular events especially in males. Absolute risk $= > 5$ hypertensives are treated more intensively.

Table 1. AH therapy in MS+/MS- and according to $AR < 5$ / $AR \geq 5$

	ACE-I	ARB	AlfaB	BB	CaB	DIU
	[%]	[%]	[%]	[%]	[%]	[%]
MS-	32,8	26,7	24,1	35,1	30,4	30,1
MS+	67,2	73,3	75,9	64,9	69,6	69,9
OR	1,79	2,0	2,16	1,61	1,9	1,86
Signif.	0,001	0,001	0,001	0,001	0,001	0,001
$AR < 5$	51,2	12,1	1,9	47,7	44,7	33,6
$AR \geq 5$	64,0	12,6	4,1	39,1	39,1	38,0
OR	1,55	1,04	2,05	0,75	1,3	1,23
Signif	0,001	NS	0,001	0,001	0,001	0,01

PP.34.411 ASPECTS OF ENDOTHELIAL DYSFUNCTION IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROM AND HEPATIC DISEASE

M. Anton¹, S. Avram¹, M. Muraru¹, E. Lupeanu², I. Bruckner¹, G. Anton³. ¹Coltea Clinical Hospital, Bucharest, Romania, ²Ana Aslan Gerontology and Geriatri Institute, Bucharest, Romania, ³Stefan Nicolau Institute of Virology, Bucharest, Romania

Introduction: The metabolic syndrome components are associated with endothelial dysfunction, first step of cardiovascular events. Hypertension has a central position in metabolic syndrome, in obesity and atherosclerosis. Obesity and atherosclerosis share similar pathophysiologic pathways, the link between them being represented by systemic inflammation. In obesity the adipocytokines induce insulin resistance, endothelial dysfunction, hypercoagulability and the alteration in fatty acids and triglycerides storage. The long term nutrient excess and unbalanced energy expenditure leads to fatty acid accumulation in the liver and altered hepatic functions, especially synthesis, coagulation and glycoregulation. When other hepatic aggressions superposed (toxins, viral infections, and fatty storage) the expression of endothelial markers is affected.

Objective of this study is to establish a correlation between some endothelial markers and liver injury in patients with metabolic syndrome.

Design and Methods: 60 patients with metabolic syndrome (MS) were investigated. The group was divided in three equal subgroups according to hepatic pathology: ethanol, hepatic steatosis and viral infection (HBV or HCV). Hepatic disorders were evaluated by biochemical tests, ultrasonographic and endoscopic investigations and, in some cases, by hepatic biopsy. Plasmatic levels of adipocytokines (leptin and adiponectin), homocysteine, coagulation function determined by von Willebrand factor (vWF) and fibrinogenemia (as inflammation marker) were analyzed.

Results: In patients with ethanolic hepatitis elevated values for vWF (65%), homocysteinemia (80%) and fibrinogenemia (60%) were noticed; adipocytokines were elevated only by leptin (40%) while adiponectin presented no significant variations.

In patients with viral infection vWF (85% cases) and homocysteine levels (60%) were elevated. No oscillation for adipocytokines levels were noticed while fibrinogenemia was slowly elevated.

In group with hepatic steatosis homocysteine was elevated to 70% patients and vWF and fibrinogenemia were raised in 50% of them. Leptin was significant elevated in 55% patients.

Conclusion: 1) vWF and homocysteinemia were significantly elevated in hypertensive patients with metabolic syndrome.

2) Plasmatic values of adipocytokines were modified (leptin especially) in steatosis and ethanol co-morbidity.

3) Fibrinogenemia as inflammation marker was elevated in all hepatic aggressions.

PP.34.412 UNCONTROLLED AND CONTROLLED RESISTANT HYPERTENSION: REALLY ONLY ONE HYPERTENSIVE CONDITION?

H. Moreno¹, L.C. Martins¹, V.N. Figueiredo¹, T. Quinaglia¹, L.M. Boer Martins¹, J.F. Vilela Martin², J.C. Yugar Toledo², E. Pimenta³, D.A. Calhoun⁴. ¹Faculty of Medical Sciences - State University of Campinas, Campinas, Brazil, ²Rio Preto Faculty of Medicine, Rio Preto, Brazil, ³University of Queensland School of Medicine, Princess Alexandra Hospital, Brisbane, Australia, ⁴Division of Cardiovascular Disease, Department of Medicine, University of Alabama at Birmingham, Birmingham, USA

Introduction: Resistant hypertension (RH) is defined as BP that remains above goal in spite of the concurrent use of three antihypertensive agents, ideally, one being a diuretic. Recent AHA guidelines (2008) include patients who are well controlled but are also considered as having resistant hypertension if they require four or more medications. However, we do not know if both "uncontrolled" (UCRH) and "controlled" (CRH) resistant hypertension patients have a similar impact on the cardiac and vascular structure and function.

Objective: To compare the main clinical/laboratorial characteristics and cardiovascular alterations between UCRH and CRH subjects.

Casuistic and Methods: Ninety RH patients were divided in 2 subgroups: UCRH (n = 47) and CRH (n = 43) patients. Body mass index (BMI), office blood pressure (BP), plasma aldosterone concentration (PAC), plasma renin activity (PRA), pulse wave velocity (PWV) and left ventricular mass index (LVMI) were evaluated. Parametric and nonparametric statistical tests and multivariate and univariate linear regression analysis were performed.

Results: BMI, Systolic BP (SBP), diastolic BP (DBP), PAC, PWV and LVMI were higher in UCRH (BMI=32±2.1Kg/m²; SBP=170/150/204 and DBP=100/88/130mmHg; PAC=24.4±3.2ng/dL; PWV=10.9/8/15.3m/s; LVMI=179±49.2 g/m²) than in CRH group (BMI=28.3±1.5Kg/m²; SBP=143/130/163 and DBP=90/70/116 mmHg; PAC=19.7±2.6 ng/dL; PWV=9.5/6.8/11.3 m/s; LVMI=140.3±30.1 g/m²) (p<0.001). PRA was higher in CRH (PRA=4.3±1.2ng/mL/h) than in UCRH (PRA=1.08±0.32ng/mL/h)(p<0.001). Multivariate linear regression analysis of variables in function of age the influence of aging was more important in the former group.

Conclusions: Clearly, LV hypertrophy and arterial stiffness were more prominent in UCRH individuals and the influence of aging was more important in this group. Also, PAC and BMI were higher elevated in the UCRH group. Taken together these results allow us to conclude that UCRH and CRH are quite different conditions. Also, these findings reinforce the concept that links obesity and uncontrolled BP levels through the hyperaldosteronism.

PP.34.413 THE EFFICACY OF CORONARY STENTING WITH DRUG ELUTING STENTS IN PATIENTS WITH METABOLIC SYNDROME AND ARTERIAL HYPERTENSION

Y. Pronina, N. Danilov, V. Mychka, A. Savchenko, I. Chazova. *Cardiology Research Complex, Moscow, Russia*

Objective: To assess long-term follow-up of using intracoronary drug eluting stents (DES) in hypertensive's with manifestations of metabolic syndrome (MS).

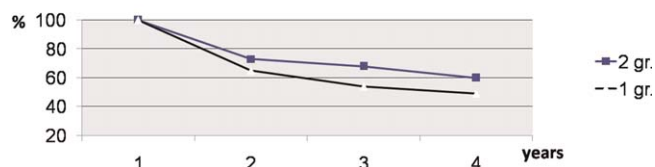
Design and Method: We included 415 pts (mean age 52±21) who underwent successful PTCA with implantation of DES during 4 years. Pts formed 2 groups – 1 gr. 280 pts with MS and arterial hypertension (AH) vs. 2 gr. 135 pts without MS and AH. Baseline angiographic data were similar between groups. Every patient underwent outpatient visit, follow-up coronary angiography was performed under indications in 209 (51%) cases.

Results: Body mass index (BMI) was 31,7±5 vs. 25,15±1,6 in 1 gr. and 2 gr. respectively (p<0,0001) and systolic blood pressure was 165±12 mm Hg vs. 128±4 mm Hg respectively (p<0,01). The BMI in 1 gr. significantly correlated with the fasted level of blood insulin (r=0,47; p<0,01). Fasted glucose level was higher in 1 gr. (6,9±0,5 vs. 5,2±0,3 mmol/l, p<0,05), fasted level of blood insulin was higher in 1 gr. (196,3±31,2 vs. 67±12,8 μmol/l, p<0,05). No difference was found in C-peptide levels between 1 and 2 grs. (192±18 vs. 154±22 pmol/l, p=ns). The frequency of in-segment restenosis was the same (11% vs. 6%, p=ns) between groups. The in-stent late loss of diameter was equally low (0,95±0,34 vs. 1,13±0,52 mm, p=ns). The incidence of MACE (death, Q-wave MI) did not differ during 4 years (2,6% vs. 1,9%), but target vessel revascularization (TVR)-free survival was low in both groups. The reason for TVR was

recurrent angina in all cases. The probability of TVR-free survival between 1 and 2 grs. was 62% vs. 77% and 46% vs. 59% in 2 and 4 years, respectively (p=ns).

Conclusions: The implantation of DES results in low rate of restenosis and improved long-term clinical outcomes irrespective of presence of MS and AH. The reason for TVR in pts with or without MS and AH is progression of coronary atherosclerosis with recurrent angina.

Target vessel revascularization event-free survival after DES implantation



PP.34.414 BODY COMPOSITION, HEMODYNAMIC PARAMETERS ON HYPOCALORIC DIET AND PHYSICAL TRAINING IN PATIENTS WITH ABDOMINAL OBESITY

O. Belyeva, A. Berezina, O. Berkovich, E. Baranova, E. Shlyakhto. *Saint-Petersburg State Medical University n. a. I.P. Pavlov, Saint-Petersburg, Russia*

Introduction: To evaluate the influence of hypocaloric diet and physical training on body composition, heart rate (HR) and blood pressure (BP) in patients with abdominal obesity (AO).

Methods: 105 patients with AO (age 43,2±0,8 yrs, body mass index (BMI) – 32,5±0,4 kg/m²) were examined. Body fat (BF, %) and lean body mass (LBM, kg) were estimated. Heart rate (HR) and BP were measured at rest and at the peak of exercise treadmill test (ETT). Patients were randomized in two groups: 1 gr. - diet (n = 60), 2 gr. - diet and physical training (n = 45). Parameters were analyzed basically and in 3 months of treatment.

Results: The treatment completed 30 patients from gr.1 and 32 from gr.2. 43 patients refused to change their life style and they were included in group 3. Basically all parameters were similar in three groups. After treatment BMI, BF decreased in both groups without significant difference between them (p>0,05) and mean values were the following: 32,1±0,5 kg/m² and 29,1±0,5 kg/m²; 24,5±0,8% and 20,5±0,9%; (p=0,0001, p=0,0001 respectively). Patients with life style changes had lower values of BMI than those who refused to do it (29,4±0,5 kg/m², and 32,5±0,6 kg/m²; p=0,0001) and lower BF (20,5±0,9%, and 26,8±1,0%, p=0,0001). HR and BP at rest and at peak of ETT did not change significantly before and after treatment in both groups (p>0,05). After treatment HR at rest was greater in gr.3 vs gr.2 (86,8±1,6 bpm vs 80,4±1,6 bpm; p=0,014). Positive correlations between HR at rest and BF (r=0,2, p=0,03), SBP at rest and LBM (r=0,3, p=0,003), SBP at peak of ETT and LBM (r=0,4, p=0,0001) were revealed. Negative correlations between HR at peak of ETT and BF (r=-0,3, p=0,006) were found.

Conclusion: Both hypocaloric diet and diet plus physical training reduced BMI and caused changes of body composition by diminishing percent of body fat in obese patients. Hemodynamic parameters depended from body composition and did not depend from method of weight loss in patients with AO.

PP.34.415 MELATONIN DECREASES BLOOD PRESSURE VIA INCREASED BRAIN NITRIC OXIDE SYNTHASE ACTIVITY IN RATS WITH METABOLIC SYNDROME

J. Parohová, S. Vranková, A. Barta, M. Kováčová, O. Pechánová. *Institute of Normal and Pathological Physiology and Centre of Excellence for Cardiovascular Research, SAS, Bratislava, Slovak Republic*

Objective: Melatonin, a multitasking indolamine, seems to be involved in a variety of physiologic and metabolic processes via both receptor-mediated and receptor-independent mechanisms.

Design and Method: The aim of this study was to determine whether melatonin can affect blood pressure and nitric oxide synthase (NOS) activity in the model of metabolic syndrome (MS) represented by obese,

spontaneously hypertensive rats [SHR/ND mcr-cp (cp/cp)]. Animals were divided into two groups: male 6-week-old MS rats treated with melatonin (10 mg/kg/day) for 3 weeks and age-matched MS controls. Blood pressure was measured by tail-cuff plethysmography once a week. NOS activity was determined by measuring the formation of L-[3H] citrulline from L-[3H] arginine in the aorta, heart, kidney, cerebellum, brain cortex and brain stem.

Results: Blood pressure was decreased by 10% already after the second week of melatonin treatment and this decrease persisted till the end of the treatment in comparison with age-matched untreated MS rats. While melatonin treatment failed to affect NOS activity in the aorta, heart and kidney, it was able to increase total NOS activity in all brain parts investigated. As no changes in NOS activity in peripheral organs were found, we hypothesized that nitric oxide produced in brain may be responsible for blood pressure decrease after 3 weeks of melatonin treatment in rats with metabolic syndrome.

Conclusion: These data suggest that melatonin might play an important role in blood pressure decrease via increasing brain NOS activity in rats with metabolic syndrome.

PP.34.416 IN VITRO HYPERCOAGULABILITY WITH ARTERIAL MODIFICATIONS IN ZUCKER RATS

N. Sloboda, R. Said, H. Louis, K. Hess, C. Labat, J.P. Max, R. Nzietchueng, S.N. Thornton, A. Benetos, P. Lacolley, V. Regnault. *Inserm U961, Nancy, France*

Aims: The metabolic syndrome is associated with an increased risk of thrombosis and structural and functional alterations of the arterial wall. We have investigated variations of the clotting system and arterial stiffness in male Zucker rats used as a model of the metabolic syndrome.

Methods: Obese Zucker rats (fa/fa) were compared with age-matched lean controls (FA/FA) at 25 and 85 weeks of age. Aortic stiffness was assessed by the measurement of carotid-femoral pulse wave velocity (PWV). Carotid modulus was measured using an echotracking system. Thrombin formation was assessed using plasma recalcified in the presence of a low concentration of human recombinant tissue factor.

Results: At week 25, systolic blood pressure (tail-cuff) in conscious fa/fa rats was significantly higher than that of FA/FA rats, and this difference was accentuated at week 85 (178 ± 10 versus 134 ± 8 mmHg $p < 0.05$). In anaesthetized animals, the elastic modulus / wall stress curve showed an increase in arterial stiffness with age in both groups. Arterial stiffness and the collagen/elastin ratio in the fa/fa rats were higher than in FA/FA at 85 weeks old ($p < 0.05$). In addition, in vitro thrombin generation was significantly elevated in obese rats whatever the age ($p < 0.001$). It was accompanied by an increase in fibrinogen and appeared to be independent of platelet activation.

Conclusion: We found an increase in arterial stiffness in all fa/fa rats explained by a higher collagen/elastin ratio. In addition, we found an early increase in thrombin generation already seen at 25 weeks in relation with an augmentation in fibrinogen. We suggest that cellular effects of thrombin on the vascular smooth muscle cell phenotype and vasomotor tone may accelerate vascular aging.

PP.34.417 EFFECT OF SPECIFIC DIETS ON VISCERAL FAT IN HYPERTENSION

H. Grassos¹, D. Gourlis², A. Pittaras³. ¹Hypertension Unit, Western Attica Hospital, Athens, Greece, ²Private Hypertension Office, Nea Erythraea, Athens, Greece, ³Mediton Medical Center, Athens, Greece

Objective: It is established visceral fat is directly linked to metabolic syndrome and insulin resistance and is an independent cardiometabolic risk factor. The purpose of this pilot trial was to investigate the possible effect and correlation between the Mediterranean diet and the DASH diet on the visceral fat and blood pressure of stage I hypertensives.

Design: 34 patients, 22 male and 12 female, drug naive, with newly diagnosed hypertension stage I and with visceral obesity.

Method: Patients with newly diagnosed hypertension of stage I according to current ESH guidelines, drug naive and visceral obesity $>10\%$ measured with Omron BF 500 at the outpatient clinic, were included in the trial. The patients were instructed to follow the Mediterranean diet or the DASH diet and were re-examined after 4 months. The statistical analysis was made using the unpaired t-test.

Results:

	Baseline	Follow up visit	p value
Mean Systolic BP	148.53 $\pm$ 5.66	145.59 $\pm$ 6.17	= 0,044
Mean Diastolic BP	89.71 $\pm$ 4.41	87.12 $\pm$ 3.44	= 0,0088

Visceral Fat measurement	Baseline	Follow up visit	p value
Total visceral fat	13.03 $\pm$ 1.82	11.97 $\pm$ 1.96	=0,0241
Mediterranean diet	13.41 $\pm$ 1.70	12.41 $\pm$ 1.80	=0,1039
DASH diet	12.65 $\pm$ 1.90	11.53 $\pm$ 2.07	=0,1105

Both the systolic blood pressure and the diastolic blood pressure decreased significantly after 4 months. The visceral fat percentage decreased significantly in the whole patient cohort, but there was no difference between the 2 different dietary groups ($p = 0.3901$).

Conclusion: In accordance to the current ESH guidelines, it seems prudent to follow a change of lifestyle plan, including a specific dietary plan for stage I hypertensives before initiating drug therapy. This way, the patient improves on the cardiometabolic parameters, including the visceral fat percentage, thus decreasing the overall cardiovascular risk, even before the initiation of antihypertensive medication.

PP.34.418 LINKING ULTRASOUND ASSESSMENT OF RENAL ARTERIES TO THE BIOLOGICAL PROFILE OF INFLAMMATION AND COAGULATION AT HYPERTENSIVE PATIENTS WITH OR WITHOUT METABOLIC SYNDROME

A. Gavrila¹, C. Searpe¹, M. Marinescu², A. Rosu¹, S. Marinescu¹, M. Ciobanu¹, C. Pritulescu¹, V. Sbarcea¹. ¹University Hospital C.F. - Department of Internal Medicine, Craiova, Romania, ²Papworth Hospital - Department of Cardiology, Cambridge, United Kingdom

The purpose of the study was to estimate how the ultrasound parameters of the renal arteries correlate with the pro-inflammatory and pro-thrombotic imbalances at hypertensive patients (pts) with or without metabolic syndrome (SM).

Methods: 40 hypertensive pts (mean age = 61.3 ± 7.8 years, 52.5 % males) – group 1 and 40 hypertensive pts with SM, matched for age and sex (mean age = 62.7 ± 7.3 years, 55 % males) – group 2.

Vascular ultrasound parameters performed in renal arteries were: peak systolic velocity (PSV), resistance index (RI), end-diastolic velocity (EDV), systolic acceleration time (SAT), renal versus aortic systolic velocity ratio (RAR). Inflammatory profile was estimated by serum measurement of C reactive protein (CRP) and fibrinogen (F). Pro-thrombotic profile was determined by serum measurement of von Willebrand factor (vWf), anti-thrombin III (AT III) and plasminogen activator inhibitor (PAI-1).

Results: In group 1, higher RI was significantly associated with higher level of CRP (0.78 ± 0.09 vs 0.53 ± 0.11 , $p = 0.03$). In group 2, higher level of CRP was significantly more frequent at pts with greater RI (0.81 ± 0.08 vs 0.51 ± 0.12 , $p = 0.01$) and with higher RAR (3.7 ± 0.2 vs 2.3 ± 0.3 , $p = 0.03$). In the same group, pts with greater level of vWf have longer SAT in a significantly higher proportion (75 ± 7 ms vs 41 ± 5 ms, $p = 0.008$) and a greater proportion of PAI-I is significantly associated with higher RAR (3.8 ± 0.1 vs 2.1 ± 0.2 , $p = 0.04$).

Conclusions: Higher RI in renal arteries seems to reflect a pro-inflammatory status at hypertensive pts, especially with MS. Moreover, greater RAR and longer SAT at hypertensive pts with MS appears to express both pro-inflammatory status and pro-thrombotic imbalance.

PP.34.419 MOXONIDINE THERAPY, SERUM LEPTIN CONCENTRATION, LIPID AND CARBOHYDRATE METABOLISM IN HYPERTENSIVE POSTMENOPAUSAL WOMEN WITH METABOLIC SYNDROME

E. Chubenko, O. Belyaeva, O. Bolshakova, O. Berkovich, E. Baranova, E. Shlyakhto. *Saint-Petersburg State Medical University - Department of Faculty Therapy, Saint-Petersburg, Russia*

Study Objective: To evaluate influence of moxonidine on serum leptin concentration, lipid and carbohydrate metabolism in hypertensive postmenopausal women with metabolic syndrome (MS).

Material and Methods: 26 hypertensive (AH grades 1–2) postmenopausal women with MS 52.5 ± 0.4 years old. MS was diagnosed according to ESC-ESH (2007) criteria. Patients were treated with moxonidine (200–600 mcg/day orally) during 12 weeks. Serum leptin and plasma insulin levels were

determined by ELISA. Serum lipids were defined by immunoenzymatic assay. The homeostasis model assessment (HOMA-IR and HOMA-FB) was applied to assess insulin resistance and insulin secretion. Statistical analyses were performed using SPSS 17.0 for Windows (SPSS, Inc., Chicago, IL, USA).

Results: Postmenopausal hypertensive women with MS had high level of serum leptin concentration (107.2 ± 12.0 ng/ml), HDL cholesterol concentration was 1.3 ± 0.09 mmol/l, glucose plasma was 5.33 ± 0.10 mmol/l, HOMA-IR - 3.8 ± 0.3 and HOMA-FB index was 204.7 ± 30.1 . Plasma glucose level >5.6 mmol/l had 8 (27%) women, dyslipidemia was revealed in 22 (84.6%) patients. HOMA-IR index elevation was revealed with 19 (73%) patients. Moxonidine therapy did not influenced serum leptin level - 107.2 ± 12.0 ng/ml vs 101.4 ± 11.7 ng/ml ($p=0.06$); HDL cholesterol increased from 1.3 ± 0.09 mmol/l to 1.5 ± 0.09 mmol/l ($p < 0.05$), LDL cholesterol, triglycerides and total cholesterol did not changed, HOMA-IR index did not changed, and plasma glucose level did not changed (5.33 ± 0.10 mmol/l vs 5.15 ± 0.13 mmol/l; $p=0.07$). By the end of 12 weeks of moxonidine therapy HOMA-FB index increased from 204.7 ± 30.1 to 222.3 ± 27.8 ($p < 0.05$).

Conclusion: In hypertensive postmenopausal women with metabolic syndrome moxonidine therapy improved some parameters of lipid composition (HDL cholesterol elevation), and increased HOMA-FB index, but serum leptin, plasma insulin and plasma glucose levels did not significantly changed.

PP.34.420 BIOCHEMICAL EXPRESSION OF LEFT VENTRICULAR DIASTOLIC DYSFUNCTION IN PATIENTS WITH METABOLIC SYNDROME

A. Vintila¹, C. Grigore¹, I. Hantulie¹, S. Avram², I. Bruckner¹, M. Muraru¹.
¹Coltea Clinical Hospital, Internal Medicine and Cardiology Department, Bucharest, Romania, ²Coltea Clinical Hospital, Hematology Department, Bucharest, Romania

Objective: To identify possible biochemical markers of left ventricular diastolic dysfunction in patients with metabolic syndrome.

Design and Method: Prospective study of 40 patients with metabolic syndrome, aged 60.2 ± 10.2 years, assessed by plasma levels of von Willebrand factor, NT-proBNP, C reactive protein (CRP), lipid profile and transthoracic echocardiography. All patients were in sinus rhythm and with normal left ventricular ejection fraction. Left ventricular (LV) diastolic function was assessed using left atrium volume index, mitral E wave velocity (E) and deceleration time (EDT), mitral E/A ratio, isovolumic relaxation time (IVRT), mitral A wave velocity (A) and duration (Adur), amplitude and duration of A wave in the upper right pulmonary vein flow, mitral flow propagation velocity (fpv) and tissue Doppler parameters, including mitral annulus E wave velocity (E'), mitral annulus A wave velocity (A') and E/E' ratio. Patients with ischemic heart disease or other possible endothelial damaging conditions were excluded. The total cardiovascular risk was calculated using SCORE programme.

Results: Von Willebrand factor was correlated with classic echocardiographic parameters of LV diastolic function (A: $r=0.514$, $p=0.001$, E/A: $r=-0.483$, $p=0.002$, EDT: $r=0.398$, $p=0.011$; IVRT: $r=0.313$, $p=0.049$ and fpv: $r=-0.389$, $p=0.014$) and with some tissue Doppler parameters (A': $r=0.592$, $p=0.043$, trend for E/E': $r=0.537$, $p=0.072$). NT-proBNP was more strongly correlated with parameters derived from tissue Doppler echocardiography (E/E': $r=0.787$, $p=0.007$) and with left atrium volume index ($r=0.709$, $p=0.032$), but was weakly correlated with parameters derived from transmitral flow. CRP was correlated with E/E' ratio ($r=0.607$, $p=0.036$) and with total cardiovascular risk ($r=0.709$, $p=0.01$). There was also a correlation between von Willebrand factor and NT-proBNP ($r=0.399$, $p=0.026$).

Conclusions: Von Willebrand factor, NT-proBNP and C reactive protein are correlated with elements of left ventricular diastolic dysfunction in patients with metabolic syndrome. A multimarker strategy may be useful in evaluating cardiovascular status in this type of patients.

PP.34.421 ANTIHYPERTENSIVE EFFICACY OF AMLODIPINE/ VALSARTAN/HYDROCHLOROTHIAZIDE TRIPLE COMBINATION IN PATIENTS WITH OBESITY: A SUBGROUP ANALYSIS

D.A. Calhoun¹, Y. Lacourciere², N.A. Crikelair³, J. Yen³, R.D. Glazer³.
¹University of Alabama at Birmingham, Vascular Biology and Hypertension Program, Sleep/Wake Disorders Center, Birmingham, USA, ²Centre Hospitalier de l'Université Laval, Hypertension Research Unit, Ste-Foy, Canada, ³Novartis Pharmaceuticals Corporation, East Hanover, USA

Objective: To evaluate the efficacy of amlodipine/valsartan/hydrochlorothiazide (A/V/H) combination compared with V/H, A/V, A/H in obese patients.

Methods: This was an 8-week, double-blind, parallel-group trial in pts with BP $\geq 145/100$ and $<200/120$ mmHg, randomized to receive amlodipine/valsartan/hydrochlorothiazide (A/V/H) 10/320/25 mg, V/H 320/25 mg, A/V 10/320 mg, or A/H 10/25 mg. Post hoc analyses were performed in subgroups of pts with BMI <30 kg/m² (non-obese) and ≥ 30 kg/m² (obese) to evaluate change from baseline in mean systolic BP (SBP), diastolic BP (DBP), and BP control rate (BP $<140/90$) at endpoint.

Results: A total of 2271 pts were randomized, of which 1270 (56%) were obese. Baseline demographics and characteristics were well balanced across the treatment arms and generally similar between obese (mean BMI = 36.1 kg/m²) and non-obese (mean BMI = 26.6 kg/m²) pts (male: 53 vs 58%, Caucasian: 71 vs 74%, mean age: 52.1 vs 54.7 yrs, BP: 169.5/106.7 and 170.4/106.3 mmHg, respectively) with the exception of a slightly higher prevalence of diabetes in the obese (12 vs 6%). Reductions in SBP and DBP were significantly greater ($p < 0.05$, for all) with A/V/H triple therapy compared with dual therapies in both subgroups (Table). Overall, BP control rates were significantly greater ($p < 0.05$, for all) with A/V/H triple therapy in obese and non-obese pts (67% and 76%, respectively) compared to dual therapies V/H (44% and 53%), A/V (54% and 55%), and A/H (38% and 53%). The triple combination was well tolerated with a safety profile generally comparable across the two subgroups.

Conclusion: In conclusion, A/V/H triple therapy was more effective than the dual therapies in pts with moderate to severe hypertension and obesity.

Treatment, mg	SBP/DBP (mmHg)	
	Obese patients (BMI ≥ 30 kg/m ²) N=1252	Non-obese patients (BMI < 30 kg/m ²) N=972
A/V/H 10/320/25	38.1/23.7	41.6/26.0
V/H 320/25	30.7*/19.2*	33.8*/20.4*
A/V 10/320	33.1*/20.9*	33.9*/22.1*
A/H 10/25	29.5*/18.3*	33.7*/20.8*

* $p < 0.05$ vs. A/V/H by ANCOVA

PP.34.422 URIC ACID AND OXIDATIVE STRESS IN NON-SMOKING METABOLIC SYNDROME PATIENTS

C. Grigore¹, A.M. Vintila¹, I. Stoian², L. Dawkins³, D. Isacoff¹, I.V. Bruckner¹.
¹University of Medicine and Pharmacy Carol Davila-Coltea Clinical Hospital-Internal Medicine Department, Bucharest, Romania, ²University of Medicine and Pharmacy Carol Davila-Biochemistry Department, Bucharest, Romania, ³University of Southampton - The Wessex Institute for Health Research & Development, Southampton, United Kingdom

Substantial evidence suggests that serum uric acid is an important, independent risk factor for cardiovascular and renal disease especially in patients with hypertension, heart failure, or diabetes. Oxidative stress alters the plasma lipoprotein profile, the coagulative parameters, the endothelium and the cell membranes.

Aims: To investigate uric acid, oxidative stress, hs C-reactive protein and classical cardiovascular risk factors, in a non-smoking hypertensive adult patients group (TA: $154.1 \pm 12.5/91.2 \pm 8.52$ mmHg; age: 58.24 ± 6.33 years) with/without MetS vs smoking hypertensive adult patient (TA: $156.42 \pm 20.5/92.85 \pm 6.98$ mmHg; age: 51.42 ± 4.96 years) with/without MetS and age-, sex-matched control group.

Methods: We analyzed spectrophotometrically the concentration of serum and erythrocyte superoxiddismutase, catalase and malonaldehyde, ceruloplasmin. All the other risk factors (uric acid, fasting glucose, lipid profile, hsCRP) were assessed by validated standard procedures.

Results: Plasma levels of oxidative stress parameters determined and CRP are significantly higher than the control group ($p < 0.0001$). There are no significant statistical differences between the smoking and the non-smoking groups apart from the number of the MetS inclusion criteria (2.57 ± 0.97 vs 3.62 ± 1.11 , $p=0.029$, $\alpha=0.05$) and age (51.42 ± 4.96 vs 58.24 ± 6.33 years, $p=0.012$, $\alpha=0.05$). Oxidative stress markers in non-smoking hypertensive group are strongly correlated ($r > 0.7$) with the number of criteria for MetS and CRP, they have an average correlation with age, weight, BMI, waist,

fasting glucose, triglyceride, HDL-C and are not correlated with BP values. The coefficient of determination is significantly increased between the number of criteria for the MetS and oxidative stress parameters. Uric acid levels are correlated on average with weight, BMI, average BP, diastolic BP and erythrocyte SOD and CAT. Level of CRP activity is strongly correlated with the number of criteria for MetS, fasting glucose, oxidative stress markers and has an average correlation with TG, HDL-C.

Conclusions: Increase oxidative stress activity and CRP levels are associated with MetS, but not with BP values. Oxidative stress activity is influenced by systolic BP, fasting glucose, TG, HDL-C, LDL-C, total-C, number of criteria for MetS. Uric acid activity is influenced by diastolic BP, weight. CRP levels are strongly influenced by age, waist, HDL-C. Clinical utility of oxidative stress for prediction of cardiovascular risk has to be explored in future studies.

PP.34.423 EFFECT OF OBESITY ON HEART FUNCTION IN POSTMENOPAUSAL WOMEN

K. Nikoghosyan, S. Gurgenyanyan, S. Vatinian. *Institute of Cardiology, Department of Arterial Hypertension, Yerevan, Armenia*

Objective: Aim of study is a comparative assessment of obesity's influence on left ventricular function in hypertensive and normotensive postmenopausal women.

Methods: We examined 72 postmenopausal women (53.5±2.9 years). Patients were randomized into three groups - 24 persons in each: I group - women with blood pressure ≤140/90 mm Hg, body mass index (BMI) 30.0–34.9 kg/m², II group - non-obese female with moderate hypertension (BMI ≤125.0 kg/m²), III group - postmenopausal obese women with moderate hypertension (BMI 30.0–34.9 kg/m²). By echocardiography and Doppler-echocardiography end diastolic diameter (EDD) of left ventricle, the thickness of the interventricular septum (IVST) and posterior wall thickness (PWT) in diastole, left ventricular mass index (LVMI), maximum relative velocity of early (E) and late (A) blood filling (E/A), isovolumetric relaxation time (IVRT) of left ventricle and blood flow deceleration time (DT) were determined.

Results: In I group IVST and PWT were within normal limits, increase in EDD, decrease of E/A ratio to 0.98±0.04 ($p < 0.05$) due to lengthening of IVRT to 139.0±6.20 sec ($p < 0.05$) and DT to 180.3±7.45 sec ($p < 0.05$) were recorded. In II group recorded increase of LVMI to 168.4±6.3 g/m², increasing EDD to 5.50±0.09 cm ($p < 0.05$), IVST to 1.26±0.05 cm ($p < 0.05$), decrease of E/A ratio to 0.94±0.03 ($p < 0.05$), elongation of IVRT and DT to 146.1±3.0 ms ($p < 0.05$) and to 186.4±3.9 ms ($p < 0.05$) respectively. In III group LVMI increased to 188.0±7.9 g/m² ($p < 0.05$), EDD - up 5.98±0.07 cm ($p < 0.05$), IVST to 1.36±0.05 cm ($p < 0.05$), PWT - up 1.28±0.07 cm ($p < 0.05$), decreasing of E/A ratio to 0.89±0.05 ($p < 0.05$), elongation of IVRT to 152.0±5.1 ms ($p < 0.05$) and DT - up 189.8±2.6 msec ($p < 0.05$).

Conclusion: In normotensive obese postmenopausal women showed an increase of EDD and normal values of PWT and IVST. Obesity is independent risk factor for left ventricle's diastolic dysfunction in normotensive postmenopausal women. In hypertensive women with concomitant obesity is compounded typical arterial hypertension dysfunction of heart.

PP.34.424 HEALTHY OFFSPRING OF PATIENTS WITH METABOLIC SYNDROME ARE CHARACTERIZED BY ADVERSE SURROGATES OF CARDIOVASCULAR RISK: FOCUSING ON A HIGH RISK GENERATION

C. Thomopoulos¹, O. Papazachou¹, M. Daskalaki¹, N. Rodolakis¹, D. Papadopoulos², A. Komnoui¹, T. Makris¹. ¹Dept. Cardiology, Elena Venizelou Hospital, Athens, Greece, ²Dept. Cardiology, Laiko General Hospital, Athens, Greece

Objective: To investigate the influence of metabolic syndrome (MS) in healthy offspring of affected parents. In the offspring population we hypothesized a premature enhancement of pre-clinical molecular indexes such as leptin and insulin which in turn has been associated with future MS development.

Methods: Among 93 consecutive subjects, aged from 15 to 25 years we studied those with a positive family history for MS in one at least of their parents ($n=21$, 12 males, 18±3 years, body mass index 23±1.4 kg/m²). From the remaining population with a negative family history for MS we separated a group of 32 healthy subjects matched for age, sex, and BMI compared to the offspring population with a positive history for MS. Apart from a careful physical examination, BP and heart rate (HR) assessment was performed in three different visits, while from a morning fasting venous

sample we determined glucose, lipid, insulin and leptin levels in the two groups of subjects.

Results: The group of subjects with a positive family history for MS as compared to the group without, demonstrated higher levels of systolic and diastolic BP (109±3 vs. 107±4 and 76±3 vs. 74±2 mmHg, $p < 0.05$ for both cases) as well as higher HR (76±5 vs. 71±6 beats/min, $p < 0.01$). Plasma glucose, leptin and insulin were increased in the former group with respect to the latter (82±9 vs. 77±5 mg/dl, 9.2±4.8 vs. 5.8±2.4 ng/ml and 19.8±8 vs. 14.6±6 IU/ml, respectively, $p < 0.01$ for all), while offspring of parents without MS as compared to those of parents with MS had higher levels of HDL-cholesterol (52±4 vs. 48±6, $p < 0.01$). In multivariable regression models family history of MS remained a significant correlate for both insulin and leptin ($p < 0.01$ for both).

Conclusion: The healthy offspring of patients with MS demonstrated an unfavorable metabolic profile, as depicted by hyperinsulinaemia and hyperleptinaemia conjointly with increased haemodynamic load. The premature increase of these measures in young subjects may predispose for adverse outcome including the future MS development.

PP.34.425 THE CONCENTRATION OF ADIPOCYTOKINES AND INFLAMMATORY MARKER (HSCRP) IN OBESE HYPERTENSIVES

K. Musialik. *Poznan University of Medical Sciences, Poland, Dept. of Internal Medicine, Metabolic Disorders and Hypertension, Poznan, Poland*

Visceral tissue secretes cytokines: resistin, tumor necrosis factor, adiponectin. Adipocytokines, are able to modificate insulin resistance in obese patients with arterial hypertension (AH).

The Aim: 1) The evaluation of serum blood concentration of resistin and adiponectin in obese hypertensives. 2) Estimation of correlation between resistin, adiponectin and insulin resistance (IR) and blood pressure. 3) Evaluation of hsCRP concentration in patients with AH. 4) Determination of correlation between IR, mean value of systolic and diastolic blood pressure (SBP, DBP) and chosen antropometric parameters: BMI, WHR – waist hip ratio.

Materials and Methods: We investigated 44 patients with Iú and IIú grade of AH. SBP and DBP were measured according to ESH. 22 women and 22 men, (mean age was 45.2±9.3), BMI 30–35 kg/m², SBP – 156.41±19.32 DBP – 98.52±8.25 mmHg. Serum Resistin (SR) was estimated using immunoenzymatic method, adiponectin and insulin with radioimmunochemical method and hsCRP using turbidimetric method. Assessment of insulin resistance was performed using HOMA index. Control group was 10 healthy volunteers; BMI 20–24 kg/m².

Results: SR concentration was higher in AH than in control group 21.8±2.8 µg/dl vs 6.2±1.2 µg/dl ($p < 0.05$). Serum adiponectin (SA) concentration was higher in the control group 6989±2563 ng/ml vs 5624±2485 ng/ml in patients with AH. Patient with AH were having higher concentration of insulin ($p < 0.01$), higher HOMA index (IR). Positive correlation has been found between SR and hyperinsulinemia ($r=0.534$, $p < 0.05$) and IR ($r=0.4815$, $p < 0.05$); and between IR and SBP ($r=0.4954$, $p < 0.05$) and DBP ($r=0.5217$, $p < 0.05$). There was no correlation between IR and SA. hsCRP was higher in group with AH, than in the control group – 3.4 mg% vs 1.1 mg% ($p < 0.05$). Positive correlation was found between SR and WHR ($r=0.576$, $p < 0.05$) and BMI ($r=0.875$, $p < 0.05$).

Conclusions: 1) SR is significantly higher in obese hypertensives

2) Higher levels of hsCRP might be regarded as strong predictor of subacute chronic inflammatory process in patients with AH.

3) IR correlates with SR, DBP and SBP. It may suggest indirect influence of SR on AH.

4) SR correlates with visceral obesity.

PP.34.426 FACTORS RELATED TO BLOOD PRESSURE CONTROL OF TREATED HYPERTENSIVE PATIENTS - STUDY IN IN-HOUSE CLINIC

H. Kawabe, I. Saito. *Health Center, Keio University, Tokyo, Japan*

Objective: It has been reported that the proportion of treated hypertensive patients whose blood pressure is appropriately controlled is low. This study investigated the factors associated with blood pressure control of treated patients.

Design and Method: The subjects were 156 university staff with essential hypertension (129 men and 27 women, mean age: 55.0 years) who had

received antihypertensive drugs for 1 year or more as of October 2006. Their blood pressure and heart rate were measured for 1 year from October 2006 and the mean value was calculated. In addition, the class of antihypertensive drugs was examined.

Results: The mean blood pressure for 1 year revealed that the well-controlled patients (< 140/90 mmHg) was 90 (57.7%, well-controlled group) while the poorly-controlled patients ($\geq$ 140/90 mmHg) was 66 (42.3%, poorly-controlled group). Because female patients were significantly greater in the well-controlled group, differences in background factors between these two groups were studied in 129 male patients. Triglyceride level in the poorly-controlled group (n = 60) was significantly higher than in the well-controlled group (n = 69). Furthermore, metabolic syndrome-related factors were significantly greater and the patients diagnosed with metabolic syndrome were also significantly greater (20.0% vs. 48.1%, $p < 0.01$) in the poorly-controlled group. The patients under treatment for lipid abnormalities were significantly greater in the well-controlled group, but we had no significant difference in other investigated matters between the groups.

Conclusions: The proportion of treated patients with well-controlled blood pressure was 57.7% at the in-house clinic, which was not a satisfactory outcome. Furthermore, the metabolic syndrome might be a factor associated with poor control in male patients.

PP.34.427 THE INFLUENCE OF METABOLIC SYNDROME ON RIGHT VENTRICLE STRUCTURE

B. Ivanovic, M. Tadic, D. Simic, S. Matic. *Clinic for Cardiology, Belgrade, Serbia*

Objective: The metabolic syndrome (MS) is associated with structural changes of left (LV) and right ventricle (RV). The aim of this study was to evaluate the impact of MS on the RV structure.

Method: The study included 175 subjects with MS and 89 controls adjusted by age. MS was defined by the presence of three or more of ATP-NCEP III criteria. All subjects underwent 24-hours ambulatory blood pressure monitoring, laboratory blood tests, and complete two-dimensional echocardiography. Right-sided chambers were measured in parasternal long axis at the outflow tract and subcostal view. Relative left ventricle wall thickness (RWT) was calculated for all subjects.

Results: Subjects with the MS had a greater RWT (0.43 ± 0.08 vs. 0.40 ± 0.07 , $p = 0.003$). Compared with controls LV mass was higher in the MS group (51.7 ± 11.2 vs. 45.6 ± 10.9 g/m^{2.7}, $p < 0.001$). RV wall thickness was greater in subjects with MS (6.8 ± 1.4 vs. 5.6 ± 1.1 mm, $p < 0.001$). Univariate linear regression revealed that all factors of MS, except HDL level, are related to the RV wall thickness. Whereas, multivariable linear regression showed that 24h systolic blood pressure ($\hat{\alpha} = 0.561$, $p < 0.001$), abdominal obesity ($\hat{\alpha} = 0.483$, $p < 0.001$) and fasting blood glucose ($\hat{\alpha} = 0.322$, $p < 0.001$) are independently associated with RV wall thickness.

Conclusions: The MS is associated with remarkable structural changes of RV. Systolic blood pressure, abdominal obesity and blood glucose level are the major factors of that bad influence.

PP.34.428 ALANINE AMINOTRANSFERASE AS A PREDICTOR OF METABOLIC SYNDROME IN KOREANS

L. Han Cheol, C. Jae Hoon, K. Sang Pil, M.S. An, Y.W. Lee. *Pusan National University Hospital, Busan, South Korea*

Aims: Alanine aminotransferase (ALT) is associated with insulin resistance, and is independent of the general metabolic measures.

Method: A total of 1203 Koreans who visited the Institute of Health in Pusan National University Hospital were enrolled in this cross-sectional study. Their median age was 51 years old, and the prevalence of metabolic syndrome was 16.4% (n = 197).

Results: For all the patients in the metabolic syndrome group, the median homeostatic assessment of insulin resistance (HOMA-IR), the waist circumference, the fasting blood glucose level, the systolic and diastolic blood pressure were all associated with the ALT level ($P < 0.05$). For the non-metabolic syndrome group, all the metabolic risk factors were associated with the ALT level ($P < 0.05$). On logistic regression analysis, after correction for age, alcohol intake, HOMA-IR and body mass index, the logALT maintained a highly predictive value for metabolic syndrome, and this was better than the logGGT [odds ratio (OR) of logALT: 18.489, odds ratio of logGGT: 2.024] ($P < 0.001$). The risk of developing metabolic syndrome was

significantly higher in the above 50 percentile and the above 75 percentile of ALT than in the lowest quartile. [for men: 3.6; 95% confidence interval (CI), 2.2–5.9; OR: 6.9; 95% CI: 4.3–10.9] [for women: 2.7; 95% CI: 1.5–4.7; OR: 6.5; 95% CI: 3.8–11] ($P < 0.001$). The cut-off value of ALT by the ROC curve was 24 IU/L for men (sensitivity: 64.3%, specificity: 66%, negative predictive value: 99.5%) and 20 IU/L for women (sensitivity: 78.9%, specificity: 61.4%, negative predictive value: 84.9%).

Conclusions: Even although patients can have an ALT level that's included within the upper normal level, we may consider the probability that these patients will have metabolic syndrome. Furthermore, in our analysis, the ALT level is a better predictor of metabolic syndrome than the GGT level.

PP.34.429 EFFECT OF DIET ON HYPERTENSION IN PATIENTS WITH VISCERAL OBESITY

E. Dimitrellos, D. Gourelis. *Clinical Hypertension Unit, 2nd internal medicine department, Sismanogloio General Hospital, Maroussi, Greece*

Objective: The aim of this trial was to investigate the possible effect of the Mediterranean diet and the DASH diet in newly diagnosed hypertensive patients with increased visceral fat.

Design: 34 patients, 22 male and 12 female, newly diagnosed with hypertension stage I and with visceral obesity, were enrolled in the study. The patients were drug naive.

Method: Eligible patients were newly diagnosed with hypertension stage I at the outpatient clinic, according to current ESH guidelines. The visceral obesity was measured with the Omron BF 500 and they were included in the analysis when the visceral fat percentage was high ($> 10\%$). The patients were divided in 2 groups, one receiving instructions to follow a Mediterranean style diet and the other the DASH diet. In case they were smokers, instructions to quit smoking were provided. No other lifestyle modification instructions were given at that point. Patients were re-examined after 3 months. For the analysis of the results we used the unpaired t-test.

Results: The average age of the patients was 52 years old. The average visceral fat percentage at baseline was 13.82.

	Baseline	Follow up visit	p value
SBP – Med diet	148.88 $\pm$ 6.00	146.06 $\pm$ 6.60	0.2011
DBP – Med diet	91.71 $\pm$ 3.04	88.24 $\pm$ 2.46	0.0009
SBP – DASH	148.18 $\pm$ 5.47	145.12 $\pm$ 5.87	0.1259
DBP – DASH	87.71 $\pm$ 4.74	86.00 $\pm$ 3.95	0.2629

SBP: Systolic blood pressure, DBP: Diastolic blood pressure, Med: Mediterranean diet, DASH: Dietary Approaches to Stop Hypertension diet.

The difference of the SBP decrease between the Mediterranean diet and DASH diets was not significant ($p = 0.8036$). However, there was a very significant decrease of the DBP in the Mediterranean diet group compared to the DASH diet group (3.59 ± 1.46 for the Mediterranean group vs 1.82 ± 1.29 for the DASH group, $p = 0.0007$).

Conclusion: In newly diagnosed hypertensive patients, with confirmed visceral fat obesity, even after a short period of 3 months, there was a significant decrease of the diastolic blood pressure when following the Mediterranean style diet. This has very important implications in the daily clinical practice, promoting a healthy lifestyle approach to the patients, even before the initiation of drug treatment.

PP.34.430 LEPTIN/ADIPONECTIN RATIO AS A MARKER OF CARDIOVASCULAR DISEASES AT THE PATIENTS WITH METABOLIC SYNDROME

I. Chulaievskia, V. Romanov, N. Chulaievskia, O. Mitchenko. *Institute of Cardiology, Kyiv, Ukraine*

Aim: Optimizing detection of risk factors for cardiovascular disease in patients with metabolic syndrome (MS) and obesity (Ob).

Materials and Methods: We examined 88 patients, which divided 5 groups: 1gr. -with excessive body weight; 2 gr.-with Ob.I; 3 gr.- with Ob.II; 4 gr.-with Ob.III; 5 gr. – control with hypertension and normal weight. Depending on the HOMA-index patients were divided into two groups: 1-st- without insulin resistance (IR) (HOMA-index < 2.77); 2 gr. with the IR (HOMA-index > 2.77).

Were observed: the waist circumference, body mass index (BMI), glucose, fasting insulin, HOMA-index, lipid profile, leptin levels, adiponektyn and their ratio (L/A).

Results: The most informative indicator of endocrine activity of adipose tissue was the L/A ratio. Progression of BMI in men and women is accompanied by increasing L/A ratio. The minimum value of L/A was determined in control 5 group and was lowest among all groups. The maximum value of this parameter revealed in the 4-th group with the highest BMI. The increase of L/A was associated with progression of abdominal Ob, the development of lipid and carbohydrate disorders.

Women without IR had adiponektyn higher than with IR. In contrast, the L/A ratio increased in the group with IR compared with the women without IR. This dependence is observed in male groups.

Conclusions: It was found out that clear link between degree of Ob and leptin, adiponektyn levels was not observed in groups of women and men with MS and Ob, while increase in BMI was associated with a linear increase of ratio L/A. Presence of IR in men and women with MS and Ob is accompanied by reduced levels of adiponektyn and increase of the L/A as an important token of formation and detection contingent MS patients with high risk of cardiovascular disease.

PP.34.431 THE IMPACT OF METABOLIC SYNDROME ON LEFT VENTRICULAR STRUCTURE: DOES SEX IMPORTANT?

M. Tadic, B. Ivanovic, D. Simic. *Clinic for Cardiology, Belgrade, Serbia*

Objective: The metabolic syndrome (MS) is a multiplex risk factor for cardiovascular disease and type 2 diabetes mellitus. The aim of this study was to evaluate the influence of gender on the relationship between MS and left ventricular (LV) structure.

Method: The study included 175 subjects with MS (57% women) and 89 controls (60% women) adjusted by age. MS was defined by the presence of three or more of ATP-NCEP III criteria. All subjects underwent 24-hours ambulatory blood pressure monitoring, laboratory blood tests, and two-dimensional echocardiography. Left ventricle hypertrophy (LVH) was defined by LV mass index equal or higher than 51/47 g/m^{2.7} in men and women, respectively.

Results: In comparison with women without the MS, those with the syndrome had a 23% greater LV mass (51.3+/-11.3 vs. 41.7+/-10.2 g/m^{2.7}, p<0.001), while the difference was only 9.5% in men (52.8+/-10.6 vs. 48.2+/-10.7 g/m^{2.7}, p=0.04). Women with MS had a greater prevalence of LV hypertrophy than men (40% vs. 21%, p=0.02). Multiple logistic regression analysis found that independent risk factors for LVH in women with MS are abdominal obesity (OR 2.86, 95%CI 1.43-4.65, p<0.001), fasting blood glucose (OR 2.57, 95%CI 1.18-3.83, p<0.001) and 24 h systolic blood pressure (OR 2.09, 95%CI 1.08-3.92, p=0.011) while in men with MS the only independent factor for LVH was abdominal obesity (OR 3.05, 95%CI 1.87-6.12, p<0.001).

Conclusions: MS has a different impact on LV structure in men and women. The effect of MS is more remarkable in women.

PP.34.432 GREATER EFFICACY WITH AMLODIPINE/VALSARTAN COMBINATION INTENSIVE VS MODERATE TREATMENT FOR HYPERTENSIVE PATIENTS WITH CARDIOMETABOLIC SYNDROME UNCONTROLLED ON ARB MONOTHERAPY

J. Sowers¹, T. Giles², E. Ofili³, B. Pitt⁴, Y. Seifu⁵, R. Samuel⁵, R. Hilkert⁵, S. Oparil⁶. ¹University of Missouri School of Medicine, Columbia, USA, ²Tulane University, New Orleans, USA, ³Morehouse School of Medicine, Atlanta, USA, ⁴University of Michigan School of Medicine, Ann Arbor, USA, ⁵Novartis Pharmaceuticals Corporation, East Hanover, USA, ⁶University of Alabama at Birmingham, Birmingham, USA

Objective: Hypertensive patients (pts) with cardiometabolic syndrome (MetS) are at high-risk and require ≥2 agents for BP control. Previously in a 12-week study, initial treatment with an intensive dose of amlodipine/valsartan (A/V 5/320 to 10/320 mg) provided significantly greater BP lowering and control than moderate dose (5/160 mg) in hypertensive patients (pts) unresponsive to ARB monotherapy. Here we present the data in a subset of MetS pts by ATP III criteria.

Methods: Pts aged ≥18 years on ARB (other than V) for ≥28 days (with treatment-naïve pts or those not controlled on agents other than ARB treated with open-label olmesartan 20 or 40 mg, respectively, for 28 days) and with uncontrolled mean sitting systolic BP (MSSBP; ≥150- <200 mmHg) were randomized to A/V 5/320 or 5/160 mg; increased to 10/320 mg in the intensive arm at Week 2. HCTZ 12.5 mg was added to both arms at Week 4. Optional up-titration with HCTZ 12.5 mg at Week 8 was allowed if MSSBP >140 mmHg.

Results: In the subset of 345 MetS pts (mean age 56 years, 51% women), baseline MSSBP was similar between groups (table). Intensive treatment provided significantly greater BP reductions vs moderate treatment from Week 4 (primary endpoint) to Week 12. At Weeks 4 and 8, significantly more pts in the intensive vs moderate arm achieved BP goal (<140/90 mmHg). In the overall study, percent adverse events (AEs) were similar in both groups (36.3% intensive, 37.6% moderate); most common AEs were peripheral edema (8.7%, 4.5%) and dizziness (5.1%, 3.9%).

Conclusion: Initiating treatment in hypertensive MetS pts with an intensive dose of A/V provided significantly greater antihypertensive efficacy than moderate treatment.

	Intensive (n=172)	Moderate (n=173)
Baseline SBP/DBP, mmHg	163.5/95.3	163.6/93.6
Least-squares mean change from baseline, SBP/DBP, mmHg		
Week 4	-22.1*/-10.6*	-18.5/-8.6
Week 8	-26.6**/-14.1***	-21.9/-10.8
Week 12	-27.0*/-13.3*	-23.6/-10.7
BP goal, <140/90 mmHg %		
Week 4	44.8*	31.8
Week 8	63.4***	45.1
Week 12	61.0	50.9

*p<0.05; **p<0.005; ***p≤0.0005 vs moderate treatment.
Intensive dose: A/V 10/320→A/V/HCTZ 10/320/12.5 or 10/320/25 mg.
Moderate dose: A/V 5/160→A/V/HCTZ 5/160/12.5 or 5/160/25 mg.

PP.34.433 PREVALENCE AND PATTERNS OF HYPERTENSION IN OBESE BARIATRIC PATIENTS

A. Montereggi¹, A. Leone¹, G. Castelli¹, C. Guido², L. Bracci¹, K. Baldini¹, K. Viràg¹, M. Lucchese³. ¹Cardiologia S Luca AOU Careggi, Florence, Italy, ²Anestesia e Rianimazione 2 AOU Careggi, Florence, Italy, ³Chirurgia Generale 1 AOU Careggi, Florence, Italy

Extreme obesity, with body mass index (BMI) over 40, is a pathological condition increasingly more frequent and bariatric surgery is proving to be one of the solution to this problem.

Aim the study was to evaluate the prevalence of arterial hypertension (AH) (both known or unknown) in a group of 233 patients (pts) (52 M 181F, mean age 42 y, mean BMI 43.6) before bariatric surgical intervention (gastric bending, gastric by pass or biliopancreatic diversion).

The whole group was divided as follows: Group A pts with known AH on pharmacological or non pharmacological therapy (nr 82, 35%); Group B pts with no history of AH and no hypotensive treatment (nr 151, 65%). The pts of Group B were submitted to clinic blood pressure measurements (Clinic BP) and to 24 hour ambulatory blood pressure monitoring (ABPM), values over 140 for systolic and/or 90 mmHg for diastolic BP were considered pathological at Clinic BP, whereas 125 and 80 mmHg were the threshold values at ABPM.

In the Group B office hypertensive pts (Clinic BP ≥/ = 140/90 mmHg) were 66/151 (44%). Integrating the results of Clinic BP and ABPM the Group B was further divided into 4 subgroups:

- B1. true hypertensives (Clinic BP ≥/ = 140/90 and ABPM ≥/ = 125/80): 33%
- B2. isolated clinic hypertensives/white coat hypertensives (Clinic BP ≥/ = 140/90 and ABPM < 125/80): 11%
- B3. true normotensives (Clinic BP < 140/90 and ABPM < 125/80): 42%
- B4. masked hypertensives (Clinic BP < 140/90 and ABPM ≥/ = 125/80): 14%

Hence the prevalence of AH (Group A + B1 + B4) in a population of extremely obese pts, even if relatively young, is quite high (66%).

In conclusion we maintain that ABPM is an extremely useful tool to stratify the hypertensive risk in extremely obese pts evaluated for bariatric surgery, in order to identify the degree of AH. It may be helpful to prescribe a correct hypotensive therapy in order to reduce the cardiovascular risk in this situation.

PP.34.434 RELATIONSHIP BETWEEN GLUCOSE METABOLISM AND ENDOTHELIAL DYSFUNCTION IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME

O. Gonzalez Albarran¹, S. Calvo¹, M. Lahera², M. Carrasco¹, G. Perez¹, J. Gomez¹, J. Sancho¹. ¹Hospital Ramon Y Cajal - Endocrinology Dpt, Madrid, Spain, ²Hospital Infanta Sofia - Endocrinology Dpt, Madrid, Spain

Objectives: To study the possible relationship between glucose abnormalities and endothelial function, and their possible relationship with adipokine markers in patients with hypertension and metabolic syndrome (MS).

Methods: We studied 28 hypertensive patients with MS, according to NCEP-ATPIII criteria. IR was estimated by HOMA index. According to OGTT (75 g), we divided into two groups: Patients with normal glucose tolerance (Fasting glucose <100 mg/dl and 2 h glucose <140 mg/dl) (NG=8 patients) and patients with abnormal glucose tolerance (9 subjects with glucose intolerance and 11 patients with type 2 diabetes). Endothelial dysfunction was evaluated by brachial artery ultrasonographic (Echo Blaster 128; transducer 7.5 MHz), endothelial dependent-vasodilatation (EDVD) was measured during reactive hyperaemia (%change in the diameter of brachial artery after 1 min of hyperaemia). Endothelial independent-vasodilatation (EIVD) was measured by the nitroglycerin (0.4 mg sublingually) administered after at least 10 minutes of rest following reactive hyperemia. Maximum vasodilation occurs three to four minutes after administration. Adiponectin levels were measured by RIA.

Results: AG patients had more insulin resistance than subjects in NG group. Moreover, AG subjects were elderly (67.2 ± 4.5 vs 46.8 ± 5.6 ; $p < 0.05$), and lower adiponectin levels ($p < 0.05$). The percentages of change in EDVD and EIVD were: 19.54 ± 12.5 y 6.68 ± 5.2 , respectively. In AG group ($n = 20$), the percentage of change in EDVD was lower (10.1 ± 6.2) than NG group (29.34 ± 15). Any relationship between insulin resistance and endothelial dysfunction was found ($r = -0.12$ y -0.009 ; $P = NS$, respectively). Adiponectin levels (6.64 ± 4.5 μ g/ml) showed a significant relation with insulin resistance ($r = -0.59$; $p < 0.05$). We did not find any significant correlation between adiponectin and EDVD or EIVD ($r = -0.01$; $p = NS$).

Conclusion: Glucose metabolism abnormalities in hypertensive patients with metabolic syndrome are related to elderly, lower adiponectin levels and lower vascular reactivity (estimated by EDVD). Although we did not find any significant association between endothelial dysfunction and insulin resistance or adiponectin levels, more studies with a larger sample of patients will be necessary to confirm these outcomes

PP.34.435 PLASMA LEPTIN CONCENTRATION, INSULIN RESISTANCE, CLINICAL AND BIOCHEMICAL PARAMETERS IN PATIENTS PRESENTING ESSENTIAL HYPERTENSION WITH OR WITHOUT METABOLIC SYNDROME

J. Foremska-Iciek, D. Pupek-Musialik. *Karol Marcinkowski University of Medical Sciences-Department of Internal Diseases, Metabolic Disorders and Hypertension, Poznan, Poland*

Objective: Leptin is one of the cytokines secreted by adipocytes and plays an important role in the regulation of food intake, energy expenditure, insulin secretion and activation of sympathetic tone. The aim of the study was to estimate the relationship between plasma leptin concentration, insulin resistance, sympathetic nervous system activity, blood pressure values and metabolic parameters in patients presenting essential hypertension with or without metabolic syndrome.

Design and Methods: The study group consisted of 53 patients divided into 2 subgroups: 1. subjects with metabolic syndrome and hypertension ($n = 31$), 2. subjects with essential hypertension, without obesity ($n = 22$). The control group included 15 normotensive, non-obese individuals in comparable age (group nr 3). In all subjects fasting leptin concentration was measured using RIA test. Fasting and postprandial glucose and insulin levels, lipid profile, systolic and diastolic blood pressure (SBP, DBP), heart rate (HR), BMI, waist circumference and adipose tissue mass – were also assessed. Mean insulin resistance ratio (IR) was calculated by quotient of fasting insulin and glucose concentrations.

Results: Mean plasma leptin concentrations ($\pm$ SD) in 3 groups were: (1) 22.86 ± 10.52 ng/ml; (2) 16.44 ± 11.02 ng/ml; (3) 11.18 ± 5.87 ng/ml respectively. Significant differences ($F = 12.5$, $p = 0.001$) were found in 1 vs. 2 and vs. 3. Significantly higher leptin levels were characteristic for women ($F = 11.94$, $p = 0.001$) in all groups. Mean IR in all groups were: (1) 0.17 ± 0.15 , (2) 0.15 ± 0.05 , (3) 0.17 ± 0.04 respectively. There were no statistical differences between groups. In group 1 a significant positive correlation was found between leptinaemia and mean SBP, HR, IR, BMI, waist circumference and percentage of adipose tissue mass, whereas in group 2 only between leptin level and mean SBP, HR and IR.

Conclusions: The results indicate that in patients with metabolic syndrome leptin can participate in different mechanisms responsible for metabolic disorders. Positive correlations between leptin, IR, HR, SBP in both study

groups suggest that leptin may contribute to blood pressure value through both sympathetic nervous system activity and insulin resistance irrespective of body mass.

PP.34.436 INCIDENCE AND CHARACTERISTICS OF METABOLIC SYNDROME IN ELDERLY PATIENTS

S. Lelia¹, C. Serban², A. Pacurari¹, I. Mozos², L. Radu¹, C. Dascau², I. Romosan². ¹University of Medicine and Pharmacy Victor Babes - IVth Medical Clinic, Timisoara, Romania, ²University of Medicine and Pharmacy Victor Babes - Pathophysiology Department, Timisoara, Romania

Objective: In elderly, increased fat level and decreased skeletal muscle amount are observed. It is known that metabolic syndrome (MS) increases with aging. The purpose of this study was to evaluate the prevalence of MS and of MS components in elderly patients.

Design and Method: The study comprised 210 elderly patients, 103 men and 107 women, aged between 65–84 years (mean age 72.3) hospitalized between January 2007 until January 2009 in The IVth Medical Clinic of University of Medicine and Pharmacy Victor Babes Timisoara. After NCEP-ATP III criteria, the diagnosis of MS was made in presence of at least three of the following: abdominal obesity (waist circumference > 102 cm in M and > 88 cm in F); serum triglycerides > 150 mg/dL and/or HDL-cholesterol < 40 mg/dL in M and < 50 mg/dL in F; fast glycemia > 110 mg/dL; blood pressure $> 130/85$ mmHg. No difference was observed in mean age between males and females.

Results: By all 210 elderly patients, 96 (45.71%) were with MS, the prevalence was increased in women (54.16) comparative with men (45.84%). The prevalence of MS according to age range was 36.7% in 65–69 years group, 50.4% in 70–74 years group, 38.4% in 75–79 years group and 51.2% in 80–84 years range. The frequency of each component of MS, we observed that 78.8% of them were with hypertension, 91.8% with abdominal obesity, 83.3 with hyperglycemia, 38.9% with hypertriglyceridemia and 54.6% with low HDL-cholesterol levels. After sex criteria, hypertension was found in 81.4% of M and 80.5% of F, abdominal obesity in 84.3% of M and 96.6% of F, hyperglycemia in 81.4% of M and 80.3% of F, hypertriglyceridemia in 42.6% of M and 38.7% of F and low HDL-cholesterol in 51.6% of M and 52.1% of F.

Conclusions: The prevalence of MS is increased and underevaluated in aged population. Abdominal obesity is the most frequent component of MS. It is necessary to diagnose and proper treat metabolic syndrome in elderly.

PP.34.437 CORTISOL PLASMA LEVEL: THE LINK TO POSTPRANDIAL HYPERINSULINEMIA, OBESITY, DYSLIPIDEMIA AND GENDER IN PATIENTS WITH ARTERIAL HYPERTENSION

L. Zhuravlyova, A. Yankevich, I. Ilchenko. *Kharkiv National Medical University, Kharkiv, Ukraine*

Objective: The participation of cortisol in the metabolic abnormalities associated with essential arterial hypertension is not fully established yet. This can be partly explained by significant individual variations of cortisol blood plasma concentration and high sensitivity to environmental factors. Nevertheless, the regulatory role of this hormone in the maintenance of cardiovascular performance in case of essential hypertension is still of great interest.

The aim of study was to investigate the relationship between cortisol plasma concentration and some markers of metabolic state in patients of arterial hypertension.

Design and Method: 80 patients with arterial hypertension (49 females and 31 males) and 12 healthy persons (7 females and 5 males) were enrolled in the study. The cortisol plasma concentration was determined by immunoassay. The insulin plasma concentration was determined by radioimmunoassay. The degree of obesity was determined by body mass index. Data are presented as mean $\pm$ standard deviation.

Results: The cortisol plasma level was lower in males than in females in the group of hypertensives (225.9 ± 78.3 vs. 480.6 ± 166.5 nmol/l, $p < 0.001$) and in the control group (172.5 ± 38.2 vs. 475.6 ± 157.0 nmol/l). Moreover, hypertensive females, included in this study, had higher level of plasma insulin after 2 h of 75 glucose intake (56.8 ± 40.2 vs. 39.0 ± 27.8 μ U/ml, $p < 0.05$) and also higher body mass index (31.5 ± 6.1 vs. 28.0 ± 2.3 kg/m², $p < 0.01$)

In hypertensive females cortisol correlates positively with low density lipoprotein cholesterol ($r = 0.36$, $p = 0.011$) and negatively with high density

lipoprotein cholesterol ($r = -0.41$, $p = 0.004$). In males such significant correlations were not found.

Conclusions: Cortisol can be considered as one of factors which regulate metabolic background of essential arterial hypertension. Its plasma concentration is dependent of gender and probably is associated with atherogenic dyslipidemia in hypertensive females.

PP.34.438 ABSTRACT WITHDRAWN

PP.34.439 PATIENTS WITH ESSENTIAL HYPERTENSION HAVE INCREASED PREVALENCE OF METABOLIC SYNDROME

J. Papadakis, H. Mavrogeni, G. Vrentzos, M. Zeniodi, E. Ganotakis. *Dept. of Internal Medicine, University Hospital of Heraklion, Heraklion, Greece*

Objective: The metabolic syndrome (MetS) is recognized as a cluster of cardiovascular risk factors. We sought to study the prevalence of MetS, defined by the Adult Treatment Panel III criteria, in patients with Essential Hypertension.

Methods: We studied 541 hypertensives (205 men), of median age 60 (range: 19–87) years. A health questionnaire was completed for all participants, including personal history of hypertension, diabetes mellitus (DM), ischemic heart disease (IHD), smoking habits and medications taken. The waist circumference and blood pressure were measured. Fasting blood samples were obtained in order to measure glucose, and a complete lipid profile.

Results: Three hundred sixty one out of 541 patients (66.7%) met the criteria for MetS. MetS was more prevalent in females than in males (70.2% vs 61.0%, $p < 0.05$). The overall prevalence of MetS in hypertensives was about 3 fold higher compared with that of the general Greek population (20%).

When we divided our population in 3 groups according to their age groups (less than 45, between 45 and 65, and greater than 65 years old), we did not find any significant difference in the prevalence of MetS between them (57.7%, 65.4% and 72.3%, respectively).

Concerning MetS related factors, increased waist circumference was by far the most common one (90.3%) among hypertensives who met the criteria for MetS. Patients under antihypertensive treatment had increased risk to have MetS than those who were untreated (70.7% vs 60.5%, $p = 0.01$).

Eighty-five out of 93 (91.4%) of DM patients met the criteria for MetS. There was no significant difference in the incidence of smokers between hypertensives with or without MetS (23.0% vs 18.2%).

Conclusion: Our results suggest that the prevalence of MetS is dramatically increased in patients with Essential Hypertension, especially in women, compared to the general population. There was no significant increase in the prevalence of MetS with age.

PP.34.440 PREVALENCE OF THE METABOLIC SYNDROME IN ESSENTIAL HYPERTENSION PATIENTS

J. Klossi, O. Bare, M. Gjata, M. Tase. *University Hospital Center - Department of Internal Medicine and Hypertension, Tirana, Albania*

Objective: Metabolic syndrome is a cluster of metabolic abnormalities including obesity, dyslipidemia, hypertension and hyperglycemia. The aim of this study is to assess the prevalence of metabolic syndrome in patients with essential hypertension.

Design and Methods: A total of 452 subjects with untreated and treated essential hypertension, aged > 25 years were included in this study. These patients were hospitalized at Internal Medicine and Hypertension Department near University Hospital Center "Mother Theresa" in Tirana from 2005 – 2009. 25.3% (114/452) patients from this group were diagnosed to have metabolic syndrome. The definition of metabolic syndrome proposed by National Cholesterol Education Program – Adult Treatment Panel III (NCEP-ATP III) was used in this study.

Results: We studied 452 hypertensive patients, 48.6% (220/452) males and 51.4% (232/452) females. Age range was 25–85 years, and mean age 55 ± 11.2 year. Over all metabolic syndromes is seen in 25.3% (114/452) of patients, 38.6% (44/114) males and 61.4% (70/114) females. The prevalence of dyslipidemia was seen in 89.5% (102/114), diabetes mellitus in 68%

(77/114), and glucose intolerance in 32% (37/114), central obesity was seen at 85% (97/114). We found that stage I hypertension was 20% of patients, with stage II 35% of patients and stage III was found 45% of patients from this group we found that 18% of this group with resistant hypertension. Men with the metabolic syndrome had 54% ischemic heart disease comparative to 20% of women. Myocardial infarction was found at 10% in male comparative with female 2%. Atherosclerosis of carotid artery was found 44% of all patients. We found cerebrovascular disease in 4% of men and 1% of women.

Conclusion: Increases in high blood pressure, waist circumference, and dyslipidemia accounted for much of the increase in the prevalence of the metabolic syndrome, particularly among women. Highest prevalence of metabolic syndrome obliges us to be focused in needed on controlling hypertension in people with high cardio metabolic risk and diabetes.

PP.34.441 ACTIVITY OF LOCAL FAT DEPOTS AS RISK FACTORS OF RESTENOSIS AT PATIENTS AFTER MYOCARDIUM REVASCULARIZATION

G. Chumakova¹, N. Veselovskaya^{2,3}, A. Kasarenko^{2,1}. ¹Altay State Medical University - Department of Hospital Therapia, Barnaul, Russia, ²Research Institution of Cardiology - Department of Multifocal Atherosclerosis, Barnaul, Russia, ³Altay Cardiology Dispensary - Department of Hypertension, Barnaul, Russia

Objective: To evaluate effects of the neurohumoral activity of local fat depots at patients with a metabolic syndrome (IS) in risk of development of restenosis in arteries after coronary stenting.

Design and Methods: 64 patients, all men, middle age 52, 3 ± 5 , 6 with a stable exertional angina (functional class II-III) with MS (group 1, 38 patients) or without MS (group 2, 26 patients). All patients were undergoing coronary stenting with bare metal stents. Before operation were measured waist circumference, epicardial fat thickness of right ventricle on an echocardiography, levels of leptin and adiponectin in plasma by enzyme immunoassay.

Results: Waist circumference in first group was about 108 ± 5.3 mm, and in second group- 95 ± 4.7 mm, epicardial fat thickness in first group was 9.7 ± 1.2 mm, in second group – 3.6 ± 0.3 mm. In first group leptin levels were about 78.3 ± 5.1 ng/ml, and levels of adiponectin were 4.1 ± 2.1 mcg/ml, in second group – 61.3 ± 4.1 and 7.1 ± 4.8 respectively. At 12 patients in first group and at 2 patients in second group has been revealed abnormality glucose tolerance. The arterial hypertension of different degrees was available for 24 patients in group 1 and at 5 in group 2. The average level of low-density lipoproteins was authentically above in group 2, and triglycerides in group 1. In 6 months of supervision restenosis of coronary arteries in group 1 have developed at 21 % of patients, and in group 2 at 7.7 %. A year after our study these results became 26, 3 % and 11, 5 % accordingly. Also, it is important that in a year of supervision with help of coronarography at 10 patients from the first group were found new stenosis of coronary arteries and in second group only at 2 patients accordingly.

Conclusions: Patients with increased volume of local fat depots, high levels of leptin and low levels of adiponectin, have great risk in development of restenosis CA after revascularization (stenting).

PP.34.442 MOXONIDINE THERAPY, HEART AND CAROTID ARTERIES REMODELING IN HYPERTENSIVE POSTMENOPAUSAL WOMEN WITH METABOLIC SYNDROME

E. Chubenko, O. Belyaeva, O. Bolshakova, O. Berkovich, S. Nifontov, A. Kozlenok, E. Baranova, E. Shlyakhto. *Saint-Petersburg State Medical University - Department of Faculty Therapy, Saint-Petersburg, Russia*

Study Objective: To evaluate influence of moxonidine therapy on carotid wall thickness, heart structural and functional parameters in hypertensive postmenopausal women with metabolic syndrome (MS).

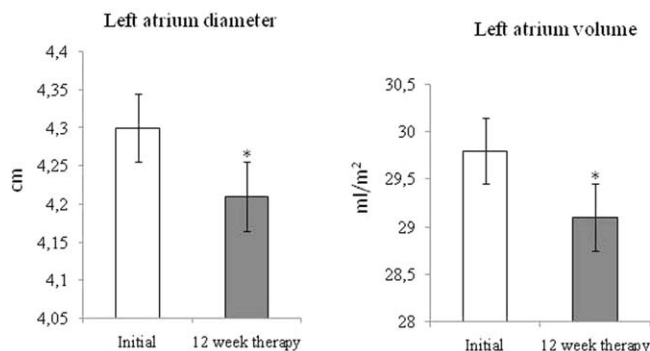
Material and Methods: 26 hypertensive (AH grades 1–2) postmenopausal women with metabolic syndrome 45–55 years old (52.5 ± 0.4 years). MS was diagnosed according to ESC-ESH (2007) criteria. Patients were treated with moxonidine (200–600 mcg/day) orally. Structure and function of the heart and the intima-media thickness of carotid arteries were reviewed by ultrasound method before therapy and on 12-th week of treatment with moxonidine. Statistical analyses were performed using SPSS 17.0 for Windows (SPSS, Inc., Chicago, IL, USA).

Results: 14 (53.8%) hypertensive postmenopausal women with MS had elevated left ventricle mass index (LVMI more than 110 g/m^2). 9 (34.6%) patients had LV diastolic dysfunction. We revealed correlation between LVMI, interventricular septum thickness, E/A ratio and systolic BP ($r = 0.4$; 0.4 and -0.4, accordingly; $p = 0.02$; 0.04 and 0.02 accordingly). Positive

correlation was revealed between interventricular septum thickness and diastolic BP ($r = 0.4$; $p = 0.07$); left atrium diameter and diastolic BP ($r = 0.4$; $p = 0.04$).

Moxonidine therapy did not changed intima-media thickness of carotid arteries (0.86 ± 0.03 mm vs 0.81 ± 0.04 mm; $p = 0.05$) and LVMI (114.0 ± 3.4 g/m² and 113.9 ± 3.4 g/m², $p > 0.05$). LV diastolic function improved: E/A ratio increased from 1.05 ± 0.03 to 1.20 ± 0.03 ($p < 0.001$), and IVRT decreased from 97.3 ± 3.0 msec to 91.8 ± 3.1 msec ($p < 0.001$). Number of patients with E/A ratio less than 1.0 decreased from 9 (34.6%) to 2 (7.7%) women ($\delta < 0.05$). Left atrium diameter reduced (4.30 ± 0.08 cm and 4.21 ± 0.07 cm; $p < 0.05$), left atrium volume also decreased (29.8 ± 0.6 ml/m² and 29.1 ± 0.6 ml/m²; $p < 0.05$), (picture).

Conclusion: Moxonidine therapy improved left ventricle diastolic function and decreased left atrium diameter and left atrium volume in hypertensive postmenopausal women with metabolic syndrome.



PP.34.443 A MODEL FOR ASSESSMENT OF ENDOTHELIAL DYSFUNCTION IN METABOLIC SYNDROME

V. Aursulesei, A. Cozma, M.D. Datcu. *University Of Medicine And Pharmacy Gr. T. Popa - 1st Department Of Medical Cardiology, Iasi, Romania*

Objective: To evaluate the profile of endothelial dysfunction and its relation with traits of metabolic syndrome.

Design and Method: 123 patients with metabolic syndrome and 50 control subjects were studied. The patients were categorized according to the number of traits of the metabolic syndrome (69.2% arterial hypertension, 29.7% abdominal obesity, 43.9% low HDL-cholesterol, 61.2% high triglycerides, 55.6% abnormal oral glucose tolerance). Endothelial dysfunction was assessed using vascular brachial ultrasound and Complior method. The tested parameters were flow mediated vasodilation (FMD), procentual variation of arterial diameter after nitroglycerin 0.4 mg (DNTG%), velocity (V) = hyperemia velocity/mean velocity. For Complior method we used the procentual variation of carotid-femoral (c-f) and carotid-radial (c-r) pulse wave velocity with Ventolin spray 400 µg (BRc-f/c-r) and nitroglycerin 0.4 mg (NR1c-f/c-r).

Results: Endothelial dysfunction parameters have a large interindividual variability both in patients with metabolic syndrome and control subjects. This feature is still present after adjusting for blood pressure values (ANCOVA). There are significant differences for both peripheral and central NO-dependent vasodilation studied by Complior compared with control subjects (BRc-f $13.62 \pm 3.52\%$ vs $20.39 \pm 7.96\%$, BRc-r $7.53 \pm 2.1\%$ vs $16.14 \pm 7.1\%$, $p = 0.002$). FMD has a similar behaviour ($7.89 \pm 2.11\%$ vs $15.32 \pm 1.19\%$). NO-independent component is heterogenous, with significant differences compared with control subjects especially in peripheral arterial territory (DNTG% $14.61 \pm 1.84\%$ vs $17.92 \pm 2.67\%$; NR1c-r $10.86 \pm 2.19\%$ vs $16.23 \pm 2.76\%$, $p = 0.04$). V and NR1c-f are related with abdominal obesity ($r = 0.34$, $r = 0.41$, $p = 0.005$); HDL-cholesterol and glycaemic values have a strong influence upon several parameters (FMD, V, BRc-f, NR1c-f). Blood pressure components have a heterogenous influence, obviously for pulse pressure upon FMD and BRc-f ($p = 0.02$).

Conclusions: Endothelial dysfunction is a generalized and heterogenous phenomena, influenced by the traits of the metabolic syndrome. Complior is a noninvasive, useful tool for global assessment of endothelial dysfunction which can be used to complete ultrasound informations.

PP.34.444 ETHNIC PECULIARITIES OF METABOLIC SYNDROME IN THE REPUBLIC OF BELARUS

I. Karabko, T. Nechesova, M. Liventseva, V. Paulava, T. Horbat. *Republican Scientific Practical Center Cardiology, Minsk, Belarus*

Objective: To study detectibility of metabolic syndrome in outpatient's care institutions and its ethnical peculiarities in the Republic of Belarus.

Material and Methods: 414 case histories (CH) of dispensary group of patients with I-III degree arterial hypertension (AH) in outpatient's care institutions of Minsk. The presence of metabolic syndrome (MS) was diagnosed subject to ATPIII recommendations. The mean age of patients was 49.3 ± 9.5 , 119 males to 295 females.

Results: In the result of the analysis of CH the frequency of separate MS components. In this way, abdominal obesity (AI) was diagnosed in 24% of cases, triglyceride increase (TG) – in 30% and hyperglycemia (HG) – in 78%, high-density lipoprotein cholesterol decrease – in 42%. Subject to the patient examination data according to CH information, MS was diagnosed in 5, 75% of pts. The level of systolic and diastolic blood pressure (BP) was 162 ± 2.7 to 100 ± 1.7 mmHg respectively. The target BP level ($< 140/90$ mmHg) was achieved in just 6 pts. (10%).

With the help of randomized study a group of patients for in-depth study was formed to reveal MS components (107 pts.). The results of the in-depth study of 107 pts. with I-III degree AH showed that MS was revealed in 54 pts. (50.5%) – 42 females and 12 males subject to ATPIII. In this same group, according to CHs, only 8 pts. (7.5 %) showed the MS. When analyzing the MS components there was revealed the most frequent combination of AH, AI, TG – in 21 patients (39%). The combination of AH, AI, HG, TG was present in 14 pts. (26%). The signs of AO were revealed in 20 pts. (18.7%) while examining with the absence of other MS components.

Conclusions: A low level of MS diagnosis in outpatient's care institutions was revealed. The most frequent MS components in Belarus are AO, AH and TG.

POSTER SESSIONS

POSTER SESSION 35

ORGAN DAMAGE

PP.35.445 RETINAL VASCULAR DAMAGE AND CARDIAC REMODELING IN ESSENTIAL HYPERTENSION: A TALE OF PARALLEL ESCALATION

V. Katsi, G. Sourtis, I. Skiadas, C. Vlachopoulos, D. Tsatsalis, D. Tousoulis, C. Stefanadis, I. Kallikazaros. *Hippokratia Hospital - Department of Cardiology, Athens, Greece*

Objective: In the setting of essential hypertension, scarce data exist regarding the associations between retinal vascular alterations and cardiac remodeling process. The aim of our study was to evaluate the link between fundus vascular changes and echocardiographically derived parameters of cardiac maladaptation.

Design and Method: Our study population consisted of 229 stage I-II untreated essential hypertensive subjects (aged 62 ± 10 years, 120 female, office blood pressure 155 ± 92 mmHg), free of clinically evident cardiovascular disease. All participants underwent routine blood test analysis, 24 hour ambulatory blood pressure monitoring (ABPM), complete echocardiographic study and funduscopy examination. The subjects were divided into five categories according to Scheie's fundus grading system of severity (0, I, II, III, IV: normal, arteriolar narrowing, arteriovenous nipping, hemorrhages-exudates and papilloedema respectively).

Results: The five groups did not differ concerning age, sex, basic ABPM parameters, as well as their metabolic profile (fasting glucose, serum lipids, uric acid). Deterioration of the retinal vascular category was associated with a statistically significant impairment of ejection fraction ($63\% \pm 2$ vs $61\% \pm 1.8$ vs $60.3\% \pm 2.2$ vs $58.2\% \pm 1.5$ vs $56.1\% \pm 2.4$, respectively, $p = 0.01$) accompanied by an increase in interventricular septum enddiastolic thickness (9.9 ± 0.24 vs 10 ± 0.28 vs 10.3 ± 0.35 vs 10.4 ± 0.4 vs 10.7 ± 0.45 mm, respectively, $p = 0.013$) and left atrial anteroposterior diameter (37 ± 0.7 vs 39.11 ± 1.1 vs 39.26 ± 1.2 vs 41.06 ± 1.31 vs 42.01 ± 1.53 mm, $p = 0.029$). On the contrary, the five categories did not differ regarding left atrial volume ($p = 0.287$), left atrial volume index ($p = 0.319$) and posterior wall enddiastolic thickness ($p = 0.232$).

Conclusions: In essential hypertensive patients, progressive escalation of fundus vasculature damage is accompanied by commensurate left atrial and ventricular remodeling, as well as respective global impairment of left ventricular systolic function.

PP.35.446 IN RESISTANT HYPERTENSION, A CUTOFF FOR URINARY ALBUMIN EXCRETION LOWER THAN THE CURRENT DEFINITION OF MICROALBUMINURIA IS SIGNIFICANTLY ASSOCIATED WITH BLOOD PRESSURE

A. Oliveras¹, P. Armario², R. Hernández Del Rey², L.M. Cuadrado³, P. Gómez⁴, A. Veiga⁵, I. Martínez⁶, M. Olmos⁷, J. Redón⁸, A. De La Sierra⁹. ¹Hypertension Unit, Nephrology Dpt, Hospital del Mar, Barcelona, Spain, ²Hypertension Unit, Internal Medicine Dpt, Hospital de l'Hospitalet, L'Hospitalet Llob, Spain, ³Hospital Príncipe de Asturias, Madrid, Spain, ⁴Nephrology Dpt, Hospital del SAS, Jerez de la Frontera, Spain, ⁵Centro de Salud de Verín, Ourense, Spain, ⁶Hospital de Galdakao, Galdakao, Spain, ⁷Hospital La Fe, Valencia, Spain, ⁸Hypertension Unit, Internal Medicine Dpt, Hospital Clínic Valencia, Valencia, Spain, ⁹Internal Medicine Dpt, Hospital Mútua de Terrassa, Terrassa, Spain, ¹⁰Spanish Society of Hypertension - Resistant Hypertension Registry, Spain

Microalbuminuria (MA) is a target organ damage marker that correlates with true resistant hypertension (T-RH) better than with isolated office-resistant hypertension (IO-RH). The best cutoff value for urinary albumin excretion (UAE) to discriminate between both groups remains undetermined.

Objective: To determine the cutoff value of UAE that better identifies patients with T-RH with respect to subjects with IO-RH.

Design and Method: 529 RH patients were consecutively recruited from Spanish Hypertension Units. Inclusion criteria: age > 18 yr, office-RH diagnosis (BP ≥ 140 and/or 90mmHg despite treatment with ≥ 3 drugs, diuretic included), secondary hypertension ruled-out, glomerular filtration rate > 30 mL/min/1.73m². All subjects underwent laboratory evaluation and 24h-ABPM. We defined IO-RH if office-BP ≥ 140 and/or 90mmHg and 24h-ABPM $< 130/80$ mmHg. UAE: average of three first-morning-void urine determinations of urinary albumin/creatinine ratio. The best cutoff value of UAE associated with T-RH was assessed by ROC curve analysis. Student's test was used to compare the associations of the new found and classical UAE cutoff values, with 24h-ABPM and office-BP measures.

Results: area under ROC curve: 0.66 [IC95%: $0.59-0.73$; $p < 0.001$]; best cutoff: UAE = 15 mg/g. Patients were categorized for MA according to: (A): UAE ≥ 22 mg/g (males) or ≥ 31 (females); (B): UAE ≥ 30 ; (C): UAE ≥ 15 . Bivariate analysis: there was no significant association of office-SBP or office-DBP and patients with MA according to A, B or C criteria. Day-SBP was significantly higher in patients with MA according to C (144.8 ± 17.5 vs. 138.7 ± 17.3 ; $p = 0.0014$) but not according to A or B. Both day-DBP and night-SBP, night-DBP, 24h-SBP and 24h-DBP were significantly associated with MA as defined by A, B or C criteria.

Conclusions: 1) both office-SBP and -DBP poorly correlate with UAE, in comparison to the excellent association of UAE with 24h-ABPM measures, reinforcing the key role of 24h-ABPM to identify patients with T-RH but also to detect those with more target organ damage. 2) cutoff value of 15 mg/g for MA appears to have a better discrimination power to identify patients with T-RH, detecting those with high day-SBP better than when current accepted cutoff values for MA are used.

PP.35.447 TARGET ORGAN DAMAGE AND CIRCADIAN VARIABILITY OF BLOOD PRESSURE

S. Cinza-Sanjurjo¹, J.E. Lopez-Paz², A. Hermida-Ameijeiras², G. Calvo-Gonzalez², C. Calvo-Gomez². ¹C.S. Malpica De Bergantiños, Santiago de Compostela, Spain, ²Clinic Hospital Of Santiago, Hypertension Unit, Santiago de Compostela, Spain

Ambulatory blood pressure (ABPM) correlates with target organ damage (TOD) better than clinical BP measurements. The objective of this study is to evaluate the correlation between ambulatory BP and TOD. 405 patients with essential hypertension submitted to our Hypertension Unit (53.8% women), 55.5 years old, were included. Patients underwent glomerular filtration rate (GFR) calculated by MDRD, urinary albumin excretion rate (UAER) and microalbuminuria (MAL), an echocardiographic study (to evaluate left ventricular mass (LVM) and ventricular function) and 24h-ABPM (monitor SpaceLabs 90207). We analyze the relationship between ABPM (mean, circadian BP variation and nocturnal BP) and the TOD (cardiac and renal). 248 patients (61.23%) have left ventricular hypertrophy (LVH), and it is more frequent in women, diabetic patients and those with previous pharmacologic treatment ($p < 0.05$). Nocturnal BP increase associated with LVM increase ($p < 0.0001$) and showed a negative correlation between diminished nocturnal BP decline and LVM increase ($p < 0.0001$). DM was associated with lower GFR (67.1 ± 2.6 mL/min/1.73m² vs 82.9 ± 1.6 mL/min/1.73m²; $p < 0.0001$) and greater UAER (45.1 ± 2.8 mg/24 h vs 26.8 ± 0.96 mg/24 h; $p < 0.0001$). The non-dipper circadian variation was more frequent in patients with TOD (35.2% in LVM vs 22.3% in non-LVM; $p < 0.0001$, 42.3% in patients with GFR < 60 mL/min vs 26% with GFR > 60 mL/min; $p < 0.0001$) and 40.5% in patients with MAL vs 24.2% without MAL; $p < 0.0001$. Nocturnal systolic BP associated with lower GFR ($r = -0.18$; $p = 0.0044$) and greater UAER ($r = 0.27$; $p = 0.0002$), and also the nocturnal diastolic BP (GFR: $r = -0.13$; $p = 0.04$; EUA: $r = 0.21$; $p = 0.0056$). We saw a positive correlation between diminished nocturnal BP decline and lower GFR ($r = 0.35$; $p < 0.0001$) and a negative correlation with the increase of UAER ($r = -0.49$; $p < 0.0001$). The multivariate analysis showed relationship between age of the patients ($p = 0.0055$), gender ($p < 0.0001$), nocturnal BP decline ($p < 0.0009$) and the LVMI ($p < 0.0001$), with GFR. TOD were associated with nocturnal BP increase and with a diminished nocturnal BP decline. These results show the importance of ABPM in the diagnostic, evaluation and stratification cardiovascular risk in hypertensive patients.

PP.35.448 MARKED VARIATION OF MRI ASSESSED PULSE WAVE VELOCITY AND LEFT VENTRICULAR MASS IN HYPERTENSIVE PATIENTS WITH IDENTICAL CARDIOVASCULAR RISK

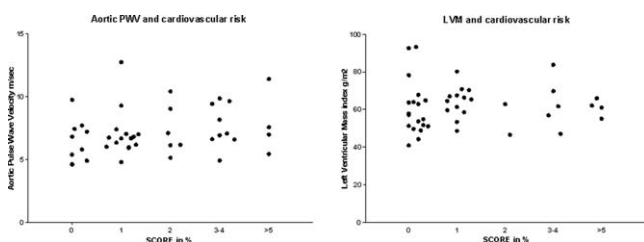
A. Brandts¹, N. Tjeerdema², J.J.M. Westenberg¹, M.A. van Buchem², L.J.M. Kroft¹, M.V. Huisman², A. de Roos¹, J.T. Tamsma². ¹Leiden University Medical Center, Department of Radiology, Leiden, The Netherlands, ²Leiden University Medical Center, Section of Vascular Medicine, Department of General Internal Medicine & Endocrinology, Leiden, The Netherlands

Objective: The inter-individual variation of pulse wave velocity (PWV) and left ventricular mass index (LVM) in hypertensive patients stratified for cardiovascular risk is largely unknown. Insight in variation of PWV and LVM may help to further develop individualized approaches in diagnosis and treatment of hypertension. The aim of our study was to explore MRI assessed aortic PWV and LVM in patients with hypertension stratified for cardiovascular disease (CVD) risk profile.

Design and Methods: Forty-six hypertensive patients without CVD or diabetes mellitus (28 women and 18 men; mean age $\pm$ standard deviation, 50.9 years $\pm$ 7.5; mean systolic blood pressure, 151.6 mmHg $\pm$ 22.1; mean diastolic blood pressure, 89.2 mmHg $\pm$ 13.0) were enrolled. All patients underwent MRI measurement of aortic PWV and LVM. Left ventricular hypertrophy (LVH) was defined as LVM $>$ 85 g/m² (male) and LVM $>$ 66.91 g/m² (female). Patients were stratified using the SCORE prediction chart into 0%; 1%; 2%; 3–4%; and $\geq$ 5% 10-year risk of CVD mortality. ANOVA was used for statistical analysis.

Results: LVM was significantly correlated with systolic blood pressure ($r = 0.39$, $p < 0.05$). Mean (SD) PWV was not significantly different across the SCORE groups 0% to $\geq$ 5%; 6.4 ($\pm$ 1.7), 7.0 ($\pm$ 1.8), 7.2 ($\pm$ 1.9), 7.7 ($\pm$ 1.7), 7.8 ($\pm$ 2.1) m/sec. In line with this observation, PWV showed marked variation and ranged from 4.6 m/sec to 12.7 m/sec showing a 3.2 fold increase from lowest to highest value. Mean (SD) LVM across the stratified groups were significantly different: 58.1 ($\pm$ 16.3), 58.7 ($\pm$ 10.0), 62.1 ($\pm$ 9.2), 58.1 ($\pm$ 5.3), 66.3 ($\pm$ 12.1) g/m² $p = 0.001$. However, also for LVM, marked inter-individual differences were observed. The highest LVM value was 2.2 fold higher compared to the lowest measured value (range: 43.0 g/m² to 95.9 g/m²) and was found in the lowest stratum.

Conclusions: Remarkable high MRI measured PWV and LVM values with marked inter-individual variability were observed in these hypertensive patients at low to intermediate cardiovascular risk. If some hypertensive patients are more vulnerable to end organ damage than other despite similar blood pressure and SCORE values, this implies treatment strategies should be reconsidered for these patients.



PP.35.449 ALTERATIONS OF RETINAL MICROVASCULAR NETWORK IN THE HIGH-NORMAL BLOOD PRESSURE STATE: EVIDENCE AND MECHANISMS

C. Mineo¹, R. Dell'Oro¹, S. Buzzi¹, M. Volpe¹, G. Brambilla¹, C. Cuspidi², G. Mancia¹, G. Grassi¹. ¹Clinica Medica Ospedale San Gerardo, University of Milano-Bicocca, Milan, Italy, ²Istituto Auxologico Italiano, Milan, Italy

Objective: Alterations of retinal vessels network are frequently detectable in established hypertension. Whether this is the case also in the high-normal blood pressure (BP) state is unknown.

Design and Method: In 94 untreated patients of both genders (age 53.5 $\pm$ 2.1 yrs, mean $\pm$ SEM) with BP values in the high-normal range (ESH 2007 classification) we measured, along with anthropometric and haemodynamic variables, arterial-venular ratio (AVR), central retinal artery and vein equivalents (CRAE and CRVE, non-mydratric retinography (TopCon TRC-NW200)). Measurements included 24-hour ambulatory BP (90207 Spacelabs), left ventricular mass index (LVMI, echocardiography) and metabolic parameters (HOMA index, leptin, adiponectin and tumor necrosis factor 1).

Results: In the population as a whole AVR was significantly and directly related to CRAE ($r = 0.49$, $P < 0.005$) and inversely to CRVE ($r = -0.36$, $P < 0.01$). 27.6% of the subjects showed an AVR value in the normal range (> 0.92 , control group), while 60% between 0.91 and 0.79 (group with mild arterial narrowing) and 13.4% < 0.78 (group with severe arterial narrowing). The arterial narrowing process was paralleled by an increase in clinic BP (130.7 $\pm$ 1.9/85 $\pm$ 1.7 mmHg, 134.5 $\pm$ 2.1/86.1 $\pm$ 1.8 mmHg and 139.2 $\pm$ 2.3/88.7 $\pm$ 2.0 mmHg), the AVR values being significantly and inversely related to clinic systolic BP ($r = -0.75$, $P < 0.0001$), night-time systolic BP ($r = -0.24$, $P < 0.05$) and to clinic DBP ($r = -0.34$, $P < 0.005$). LVMI showed a tendency to be greater in patients with reduced AVR. Metabolic and anthropometric parameters were similar in the 3 groups, the only exception being leptin, whose increase in patients with retinal alterations was inversely related to CRAE and CRVE ($r = -0.48$ and $r = -0.47$ $P < 0.01$ for both).

Conclusion: Thus retinal microvascular alterations are 1) of early appearance in the clinical course of hypertension and 2) of frequent detection in the high-normal BP state. They also suggest that the BP overload, particularly systolic, as well as hyperleptinemia (throughout an endothelial dysfunction and/or a sympathetic activation) may participate at the retinal microvascular disarray.

PP.35.450 CAROTID INTIMA-MEDIA THICKNESS IN RELATION TO GENETIC VARIATION IN RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM IN PROSPECTIVE OBSERVATION

K. Stolarz-Skrzypek¹, A. Olszanecka¹, W. Wojciechowski¹, M. Loster¹, M. Cwynar², T. Grodzicki¹, K. Kawecka-Jaszcz¹. ¹I Department of Cardiology and Hypertension, Jagiellonian University Medical College, Krakow, Poland, ²Department of Internal Medicine and Gerontology, Jagiellonian University Medical College, Krakow, Poland

Objective: The essential role of the renin-angiotensin-aldosterone system (RAAS) in controlling blood pressure has been well established. Genes encoding components of the RAAS have been proposed as candidate genes that determine genetic predisposition to hypertension and the risk of developing cardiovascular complications.

The aim of the study was to evaluate follow-up changes in carotid intima-media thickness (IMT) in relation to genetic polymorphisms in 5 genes of the RAAS: angiotensin-converting enzyme (ACE I/D), angiotensinogen (AGT, A-6G), aldosterone synthase (CYP11B2, T-344C), angiotensin II receptors type 1 (AT1R, A1166C) and type 2 (AT2R, G1675A).

Design and Methods: We examined 147 subjects, members of 45 nuclear families, enrolled in the population-based study in Krakow. The subjects underwent at baseline and on follow-up (6.4 $\pm$ 0.5 yrs) conventional BP measurement during two separate visits, 5 times on each visit. Anthropometric data were collected with standardized protocol. Peripheral blood was sampled for genotyping. Carotid IMT was measured by carotid ultrasound (Hewlett Packard Sonos 2000 - baseline and VIVID 7 GE Pro - follow-up). In our analyses, we adjusted for covariables and non-independence among related subjects.

Results: The study group included 71 M/76 F, at baseline mean age was 37.6 $\pm$ 14.2 yrs, BMI 26.0 $\pm$ 5.2 kg/m², BP 128.1 $\pm$ 17.6/80.0 $\pm$ 11.2 mmHg. In multivariate analyses, the change in IMT on follow-up was significantly associated with ACE I/D polymorphism ($p = 0.008$). The ACE II homozygotes showed higher increase in IMT as compared to D-allele carriers (change in IMT 0.252 $\pm$ 0.043 vs. 0.093 $\pm$ 0.022 mm, $p = 0.002$). The results were consistent among male and female, and among parents and offspring. The genetic polymorphisms in CYP11B2, AGT, AT1R or AT2R did not associate with phenotype under study.

Conclusion: Insertion/deletion (I/D) polymorphism of the ACE gene associates with prospective increase in carotid intima-media thickness. However, the present findings need further confirmation in a larger/multicentre cohort.

PP.35.451 PREVALENCE OF TARGET ORGAN DAMAGE IN SUBJECTS WITH BLOOD PRESSURE HIGH NORMAL. THE PREVASTURIAS STUDY

M.A. Prieto Diaz¹, R. Marin Iranzo², M. Gorostidi Perez³, M.I. Pastrana Pastrana⁴, M. Fernandez Menendez⁵, M.J. Fernandez Menendez⁶, J. Florez Garcia⁷, T. Lopez Ruiz⁸, J. Baños Martinez⁹, M.B. Gonzalez Lopez¹. ¹Primary Health Center Vallolob - La Florida, Oviedo, Spain, ²Hospital Universitario Central de Asturias S Nephrology - HTA Unit, Oviedo, Spain, ³Hospital San Agustín S Nephrology, Aviles, Spain, ⁴Primary Health Center El Parque, Gijón, Spain, ⁵Primary Health Center El Cristo, Oviedo, Spain, ⁶Primary Health Center La Eria, Oviedo, Spain, ⁷Primary Health Center La Magdalena, Aviles,

Spain, ⁸Primary Health Center Lada, Langreo, Spain, ⁹Primary Health Center Pola de Laviana, Pola de Laviana, Spain

Objective: The aim is to know the prevalence of target organ damage (TOD) in subjects with prehypertension (category blood pressure high normal).

Methods: A descriptive, cross sectional study of a 5 years prospective study. Population: 27 investigators had selected patients with blood pressure high normal (130–139/85–89 mmHg), in correlative order, attended in primary care, both sex and age between 40 and 65 years. Diabetics subjects, cardiovascular or kidney disease or need to treatment with cardiovascular agents with antihypertensive effects were excluded. TOD was defined according to ESC-ESH 2007 guidelines: left ventricular hypertrophy (LVH) by electrocardiography (Sokolow-Lyon >38 mm; Cornell >2440 mm*ms), decrease of glomerular filtration rate (GFR) by the MDRD formula (<60 ml/min/1.73m²), microalbuminuria by albumin-creatinine ratio (> 21 men, > 30 mg/g en women) and slight increase in plasma creatinine (men: 1.3–1.5 mg/dl, woman (1.2–1.4 mg/dl). The present work shows the basal data of the analyzed population.

Results: 646 subjects were selected, 48.5% men; mean age 53.8 ± 6.7 years; systolic blood pressure 134.3 ± 4.4 mmHg; diastolic blood pressure 84.9 ± 4.3 mmHg. We had observed the following alterations: Smoking: 22%. Obesity: 31%. Fasting plasma glucosa: 29%, LDL-Cholesterol ≥160 mg/dl: 29%, Triglycerides ≥150 mg/dl: 30%. Metabolic syndrome by ATP III criteria: 37%. GFR < 60 ml/min/1.73m²: 2.8%. Microalbuminuria: 2.6%. Hyperurycemia ≥7 mg/dl: 10.2%. 40 subjects (6.4%) had any TOD, women: 6.6%, men: 6.3%, p=NS. In order of frequency TOD was: GFR < 60 ml/min/1.73m²: 2.8%, microalbuminuria: 2.6%, slight increase in plasma creatinine: 1.5%, LVH: 0.7%. We found an association between presence of TOD and metabolic syndrome: 9.1% vs 4.9%, p=0.038, OR 1.95 (1.02–3.71).

Conclusions: Only a 6.4% of population with blood pressure high normal had TOD. Kidney TOD (decrease of GFR, microalbuminuria and slight increase in plasma creatinine) was more frequent. Subjects with blood pressure high normal and metabolic syndrome, had more prevalence of TOD.

PP.35.452 RISK FACTORS INDEPENDENTLY ASSOCIATED WITH THE PRESENCE OF MICROALBUMINURIA IN THE GENERAL POPULATION OF SOUTH-WESTERN EUROPE. THE HERMEX STUDY

F. Felix-Redondo¹, D. Fernandez-Berges², N. Robles³, J. Perez⁴, L. Lozano⁵, M. Zaró⁴, A. Garcia⁴, P. Alvarez-Palacios², V. Tejero², A. Hidalgo², Y. Morcillo². ¹Servicio Extremoño Salud, Villanueva Serena, Spain, ²FundesaLud, Villanueva Serena, Spain, ³Servicio Extremoño Salud, Badajoz, Spain, ⁴Servicio Extremoño Salud, Don Benito, Spain, ⁵Servicio Extremoño Salud, Merida, Spain

Objective: To identify which modified risk factors are independently associated with the presence of microalbuminuria in the general population.

Design and Methods: Observational, cross sectional, descriptive population based study. 3402 subjects between 25 and 79 years living in the health area of Don Benito-Villanueva (Badajoz, Spain) were randomly selected from the database of Health System. Excluded: non-residents, institutionalized, disability, pregnancy, and unable to give consent. Fasting blood samples, blood pressure (BP) and a survey history of risk factors were collected. A first morning urine sample was collected in order to measure urinary albumin excretion (mg/ml) and creatinine (g/l). It was considered microalbuminuria (MAL) if the ratio albuminuria / creatinine was greater than 22 (men), 31 mg/g (women) and less than 300 mg/gr in both. We considered as variables associated with MAL: age, gender, body mass index (BMI), waist circumference, smoking, history of hypertension (AH), diabetes (DM), hypercholesterolemia (HC), mean systolic BP (SBP) and diastolic BP (DBP), fasting glucose (FG), glycated hemoglobin (GHb), total cholesterol, LDL, HDL, and triglycerides (TG) mg/dl. Those variables which showed association in the univariate analysis (UAn), were introduced in a multivariate analysis (MAn) of binary logistic regression. Dependent variable was MAL.

Results: 2092 persons participated (participation rate 81.1%). The sample mean age was 51.9 years, median 50 (IR 24), female gender 53%. MAL prevalence was 4.7% (95% CI: 3.9% - 5.7%). Age, gender, Ob, DM, FG, GHb, AH, SBP, DBP, LDL, HDL, and TG were associated with MAL in the UAn. The MAn showed: age by decades OR: 1.223 (95% CI: 1.025 – 1.460), SBP OR: 1.016 (95% CI: 1.005 – 1.027), FG OR: 1.005 (95% CI: 1.000 – 1.010), TG OR 1.003 (95% CI: 1.001 – 1.005), and HDL OR: 0.983 (95% CI: 0.966 – 0.999).

Conclusions: The study suggest as major risk factors for the presence of microalbuminuria SBP levels and glycemia, highlighting the novelty of HDL and TG.

PP.35.453 AVL R WAVE VOLTAGE DETERMINANTS IN NEVER TREATED HYPERTENSIVES

P. Coulon, P. Gosse, A. Cremer, J. Litalien, G. Papaioannou, P. Lemetayer. University Hospital of Bordeaux, Hypertension and Cardiology Department, Bordeaux, France

Purpose: A recent study of Verdecchia (J Hypertens 2009, 27:1697–1704) showed the pronostic significance of the aVL R wave voltage and its correlation with LVM. We aimed to confirm this finding in the Cohorte Bodelaise of never treated essential hypertensives.

Patients: 1010 patients have been included in this cohort since 25 years. In this population, Sokolow index was measured in 980 patients, aVL R wave and V3 S wave voltage in 816 patients. This 3 measurements and the left ventricular mass index (g/m^{2.7}) are available in 712 patients.

Results: The stronger correlation with LVMI (53 ± 15 g/m^{2.7}) is observed with aVL R wave (5.8 ± 3.7 mm, r=0.412, p<0.0001), then with V3 S wave (10.3 ± 5.2 mm, r=0.156, p<0.0001) and third with sokolow index (24.2 ± 7.6, r=0.07, p<0.05). multivariate analysis show significant correlations between aVL R wave and LVMI, weight (75 ± 15, r=0.254), age (48 ± 13, r=0.243), SBP (158 ± 17, r=0.253). This four variables explain 23% of aVL R wave variance. In this population, 47% of the patients have an aVL R wave voltage >5.7 mm, Verdecchia best cut-off for cardiovascular risk assessment.

Conclusion: This study confirme aVL R wave voltage as the best electrical sign of left ventricular hypertrophy in hypertensives. It also depends of weight, SBP and age. The cut-off defined by Verdecchia may lack specificity because it is present in almost half our population.

PP.35.454 PREVALENCE OF ABNORMAL URINARY ALBUMIN EXCRETION IN THE GENERAL POPULATION OF SOUTH-WESTERN EUROPE. THE HERMEX STUDY

F. Felix-Redondo¹, D. Fernandez-Berges², N. Robles³, J. Perez⁴, M. Zaró⁴, L. Lozano⁵, P. Alvarez-Palacios², A. Garcia⁴, V. Tejero², Y. Morcillo², A. Hidalgo². ¹Servicio Extremoño Salud, Villanueva Serena, Spain, ²FundesaLud, Villanueva Serena, Spain, ³Servicio Extremoño Salud, Badajoz, Spain, ⁴Servicio Extremoño Salud, Don Benito, Spain, ⁵Servicio Extremoño Salud, Merida, Spain

Objective: To determine the prevalence of subjects with abnormal urinary albumin excretion in the general population.

Design and Methods: Observational, cross sectional, descriptive population based study. 3402 subjects between 25 and 79 years living in the health area of Don Benito-Villanueva (Badajoz, Spain) were randomly selected from the database of the Health System. We excluded non-residents, institutionalized, deceased persons, disability, pregnancy, and people unable to give written informed consent. We determined age, gender, body mass index (BMI), medical history of risk factors, blood pressure, total cholesterol, fasting glucose and a first morning urine sample. Urinary albumin excretion was considered pathological (UAEp) if the ratio of albuminuria / creatinine was greater than 22 in men or 31 mg / g in women. Risk factors: obesity (Ob): BMI = > 30. Current smokers (S), ex-smoker (ExS): more than 1 year. Hypertension (AH): with previous diagnosis or presenting an average of the 2nd and 3rd measurement =>140/90. Diabetes (DM): previous diagnosis or fasting glucose => 126 mg / dl. Hypercholesterolemia (HC): previous diagnosis or total cholesterol levels => 200 mg / dl. Statistical test used was U of Mann-Whitney and χ².

Results: 2579 subjects were eligible and 2092 subjects participated (participation rate 81.1%). Mean age 51.9 years, median 50 (IR 24), female gender 53%. Ob 36.6%. AH 41.3%. HC 66.6%. DM 14.7%. S 30.7%. ExS 21.2%. Prevalence of UAEp: 5.5% (95% IC: 4.6 - 6.6%) (microalbuminuria: 4.7%; proteinuria 0.8%). UAEp increases with age (25–34: 3.8%, 35–44: 2.1%, 45–54: 4.3%, 55–64: 5.0%, 65–74: 7.1%, 75–80: 19.1%) p=0.000. UAEp median age 64.5 (IR 25) years vs. 50.0 (IR 24) (p=0.000). UAEp is more common in men (7.0% vs. 4.2%) p=0.006, Ob (8.2% vs. 4.0%) p=0.000, AH (10.1% vs. 2.4%) p=0.000 and diabetics (15.6% vs. 3.8%) p=0.000.

Conclusions: UAEp is rare in the general population of our region. Your search is warranted in diabetic, hypertensive and/or obese subjects.

PP.35.455 PREMENOPAUSAL WOMEN ARE AT HIGHER RISK OF HYPERTENSIVE COMPLICATIONS THAN MEN

P. Palatini¹, L. Mos², M. Santonastaso³, P. Visentin¹, S. Cozzio⁴, F. Pegoraro⁵, D. D'Este⁶, A.C. Pessina¹. ¹University of Padua, Padua, Italy, ²Town Hospital,

San Daniele del Friuli, Italy, ³Town Hospital, Vittorio Veneto, Italy, ⁴Town Hospital, Trento, Italy, ⁵Town Hospital, Dolo, Italy, ⁶Town Hospital, Mirano, Italy

Objective: Little is known about whether hypertension has a different impact on target organs in young to middle-age women compared to men. The purpose of this study was to describe sex-specific differences in target organ involvement in a cohort of never treated hypertensive subjects followed for a median of 7 years.

Design and Methods: Participants were 626 adults (451 men) aged 18 to 45 years screened for stage 1 hypertension. Ambulatory blood pressure (BP) at entry was $127.5 \pm 12.5/83.7 \pm 8.2$ mmHg in women and $131.9 \pm 10.3/81.0 \pm 7.9$ mmHg in men. Patients were seen every six months for BP and global risk assessment until they needed drug therapy according to current guidelines. Ambulatory BP, albuminuria, and echocardiographic data (n=470) were obtained at entry, every 5 years, and/or before starting treatment. Data were adjusted for age, body mass, BP, physical activity, parental hypertension, smoking, coffee and alcohol use.

Results: Female gender was a significant predictor of urinary albumin ($p=0.002$) and left ventricular mass indexed to height (LVMI, $p=0.002$) at final assessment. At follow-up end, microalbuminuria was more common among women than men (13.7% versus 6.2%, adjusted $p=0.001$) as was left ventricular hypertrophy (LVH, 26.4% versus 8.8%, $p<0.0001$). These differences remained significant also when adjusted for baseline urinary albumin or LVMI. In a multivariable Cox analysis, female gender was a significant predictor of time to development of microalbuminuria ($p=0.002$) with a HR(95%CL) of 2.6(1.4–4.7), and of LVH ($p=0.01$) with a HR of 2.1(1.2–3.8). After inclusion of BP changes over time in the models, HRs were 3.2(1.7–5.9) and 2.7(1.5–5.1), respectively. When baseline urinary albumin or LVMI were taken into account, the associations remained highly significant with HRs of 2.7(1.4–5.1) and 2.5(1.3–4.6), respectively.

Conclusions: These data show that in young-to-middle-age hypertensive subjects the risk of target organ damage is much greater among women than men irrespective of the BP changes over time. This raises the question about whether early antihypertensive treatment should be considered for premenopausal women.

PP.35.456 ELECTROCARDIOGRAPHIC LEFT VENTRICULAR REGRESSION INDUCED BY AN ANGIOTENSIN RECEPTOR BLOCKER-BASED REGIMEN IN HYPERTENSIVE PATIENTS ACCORDING TO BODY MASS INDEX

A. Calderon¹, V. Barrios², C. Escobar³, S. Barrios², R. Echarri³, J. Navarro-Cid². ¹CS Rosa Luxemburgo, Madrid, Spain, ²Cardiology Unit, Hospital Ramón y Cajal, Madrid, Spain, ³Hospital Infanta Sofia, Madrid, Spain

Aims: This study examined the influence of body mass index (BMI) on left ventricular hypertrophy (LVH) detected by different electrocardiographic (ECG) criteria and the potential changes induced by an antihypertensive therapy from the SARA study database.

Patients and Methods: The SARA study was aimed to determine the effect of a 12-month candesartan-based regimen on ECG-LVH. Overall, 264 patients were included. Patients were divided into 2 groups according to BMI. Obesity was defined as a BMI >27 Kg/m². The analyzed ECG-LVH criteria were: Cornell voltage index (CorV), Cornell product (CorP), Sokolow-Lyon voltage index (SokV), and Sokolow-Lyon product (SokP).

Results: At baseline, 53.8% (n=142) had a BMI >27 Kg/m² (Ob) vs 46.2% with BMI <27 kg/m² (No-Ob). The main clinical characteristics of both groups (No-Ob vs Ob): age 62.23 ± 12.74 vs 63.41 ± 10.53 years, $p=NS$; gender [women] 42.7% vs 54.4%, $p<0.01$; BMI 24.83 ± 1.59 vs 30.46 ± 3.45 Kg/m², $p<0.001$; diabetes 10.3% vs 20.6%, $p<0.001$; systolic blood pressure 160.42 ± 12.96 vs 161.35 ± 15.72 mmHg, $p=NS$, and diastolic blood pressure 93.67 ± 8.83 vs 94.40 ± 10.26 mmHg, $p=NS$. At baseline, no differences were found in the prevalence of ECG-LVH, between groups regardless the ECG criteria analyzed. However, at study end, the reduction of CorV criterion with the candesartan-based therapy was significantly higher in obese patients (-0.30 vs -1.49 mm, $p=0.021$); and there was a trend with CorP (-6.66 vs -152.93 mm x mV, $P=0.078$), without significant differences between groups when SokV and SokP were analyzed. These data were more evident in male (No-Ob vs Ob): CorV $+0.54$ vs -0.95 mm, $p=0.021$; CorP $+125.98$ vs -120.35 mm x mV, $p=0.048$; SokP -66.56 vs -257.86 mm x mV, $p=0.044$; and SokV $+0.21$ vs -1.65 mm, $p=0.076$.

Conclusions: Although the prevalence of ECG-LVH was similar at baseline regardless BMI values, obese patients achieved higher reductions in ECG-LVH than non obese hypertensive patients with a candesartan-based regimen after a 12-month follow-up.

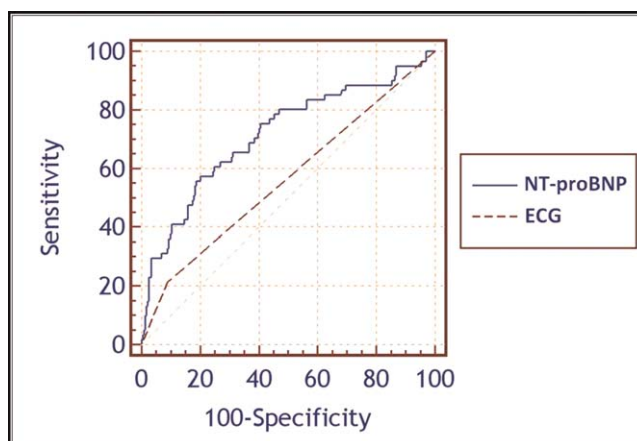
PP.35.457 USEFULNESS OF AMINO-TERMINAL PRO-B-TYPE NATRIURETIC PEPTIDE (NT-PROBNP) TO DIAGNOSE LEFT VENTRICULAR HYPERTROPHY IN PATIENTS WITH ARTERIAL HYPERTENSION

H. Andrade Gomes, J. Quiles Granado, P. Morillas Blasco, I. Mateo Rodríguez, P. Agudo Quílez, J. Castillo Castillo, J. Roldán Morcillo, M.D. Masía Mondéjar, B. Miralles Vicedo, V. Bertomeu Martínez. Hospital Universitario San Juan, Alicante, Spain

Objectives: The 2007 Guidelines for the management of arterial hypertension recommends the search of left ventricular hypertrophy (LVH) in the hypertensive patients to identify a major cardiovascular risk population. The electrocardiogram (ECG) is still the most used method for this purpose in spite of the low sensitivity, since the echocardiography is not very accessible in the daily practice. The aim of the present study is to verify the utility of plasmatic levels of NT-proBNP as marker for the diagnosis of LVH in hypertensive patients compared with ECG.

Design and Methods: We studied 295 consecutive hypertensive outpatients, analyzing with echocardiography the presence of LVH through left ventricular mass index (LVMI) according to the Guidelines, a 12-lead ECG and a measurement of NT-proBNP plasmatic levels. The definition of LVH by ECG was determinate by classics Sokolow-Lyon or Cornell criteria. Patients with left ventricular dysfunction (ejection fraction $<50\%$) or atrial fibrillation were excluded.

Results: The studied population has 55.6 (± 12.8) years old; 38% female, 40.3% dyslipidemics, 26.2% current smokers and 20.6% diabetics. Sixty-one patients were diagnosed of LVH with echocardiography (20.7%). These patients have significantly higher plasmatic levels of NT-proBNP than patients without LVH (305.8 pg/ml versus 111.2 pg/ml, $p<0.001$). We found a significant correlation between levels of NT-proBNP and LVMI ($r=0.347$; $p<0.001$). The area under de ROC curve (AUC) of NT-proBNP for diagnosis of LVH was 0.717 (IC 95%: 0.661–0.767; $p<0.001$), establishing 141.8 pg/ml as a cutoff (Sensitivity 57.4%, Specificity 79.9% and negative predictive value 87.8%). The AUC of ECG was 0.562 (IC 95%: 0.503–0.619; $p<0.05$), with a significantly difference area compared with NT-proBNP of 0.155 (IC 95%: 0.050–0.260; $p=0.004$, NT-proBNP better).



Conclusions: Plasmatic levels of NT-proBNP can be useful to identify LVH in hypertensive patients, improving significantly the capability of ECG.

PP.35.458 EARLY RENAL HEMODYNAMIC CHANGES IN YOUNG SMOKING HYPERTENSIVE MEN WITH I STAGE OF ARTERIAL HYPERTENSION

V.I. Podzolkov, T.A. Safronova. Moscow Medical Academy, Moscow, Russia

Objective: To investigate early renal hemodynamic changes in young hypertensive men and to assess the impact of smoking on the functional state of kidneys.

Methods: We measured 24-hour ambulatory BP and glomerular filtration rate (GFR) by renal scintigraphy. The monitor was mounted on the nondominant arm between 8:00 AM and 10:00 AM and removed 24 hours later. Recordings were made every 15 minutes between 6:00 AM and 23:00 PM and every 30 minutes between 23:00 PM and 6:00 AM. We analyzed the ambulatory BP monitoring by examining BP load, calculating the percentage of BP readings that were elevated during the period of interest. BP load was calculated 24-hours-a-day, including both waking and sleeping periods. Thresholds were

140/90 mmHg during the waking period and 120/80 mmHg during sleep. Patients were classified as having sustained increase of BP during 24-hour ambulatory measuring if the corresponding value of BP load was >50%, and having transient elevation of BP if BP load was within 20–50%. Patients aged 18–35 years (mean 23.7 ± 5.6) had I stage of arterial hypertension with mean systolic 149.35 ± 9.03 and diastolic BP 93.48 ± 5.32 mm Hg.

Results: The survey 118 patients revealed that 61 (52%) people smoke more than 5 cigarettes per day. In the results obtained were found significant differences between the values of GFR at I stage AH in smoking and nonsmoking patients: 194.5 ± 68.2 ml/min vs. 138.7 ± 41.6 ml/min ($\delta < 0.05$). BP load within 20–50% was detected in 85 (72%) patients and >50% was found in 33 (28%) patients. Comparing renal function in patients with transient and sustained AH was found significantly increase of GFR in group with BP load >50%: 132.0 ± 33.5 ml/min and 165.57 ± 38.5 ml/min ($p = 0.04$). Smoking persons more often had BP load >50%: 39 (64%) patients.

Conclusions: This data suggest that early vascular remodelling processes take place in young hypertensive male adults, especially smoking ones. These findings underscore the importance of increased BP and smoking in early evolution of target-organ damage, denote the need to quit smoking and to begin preventive therapy.

PP.35.459 ARTERIAL STIFFNESS AND TARGET ORGAN DAMAGE IN HYPERTENSIVE IMMIGRANTS FROM EASTERN EUROPEAN COUNTRIES: THE CONTRIBUTION OF THE MIGRATING HABITS

V. Katsi, I. Skiadas, G. Sourmetis, D. Tousoulis, C. Antoniadis, D. Tsatsalis, C. Tsioufis, C. Stefanadis, I. Kallikazaros. *Hippokratia Hospital - Department of Cardiology, Athens, Greece*

Objective: Much of the variance in hypertension-related sequelae across ethnic groups is highly related to differences in socioeconomic conditions, attitudes and deficits in accurate health related data. In light of the mass immigration of Eastern European residents, we sought to evaluate the target organ damage in this vulnerable hypertensive population.

Design and Method: The study population consisted of 128 hypertensive patients: 67 immigrants from Eastern Europe to Greece and 61 native inhabitants, matched for age, gender and office BP. Demographic characteristics were recorded, while echocardiography was performed and arterial stiffness was estimated by measuring carotid-femoral pulse wave velocity in all subjects. In addition, glomerular filtration rate (GFR) was evaluated and funduscopy was performed in all study subjects.

Results: Although immigrants exhibited lower body mass index (BMI) compared to natives, they had significantly increased arterial stiffness ($p = 0.003$), increased left atrial volume index ($p < 0.05$) and left ventricular mass index ($p < 0.05$), worse left ventricular diastolic dysfunction ($p < 0.05$), elevated levels of serum cholesterol ($p = 0.046$) and sodium urinary excretion ($p < 0.05$) and considerably lower GFR ($p < 0.05$). Finally, univariate analysis showed a positive correlation between LVMI and LAVI ($r = 0.43$, $p < 0.0001$), and a negative correlation between LAVI and GFR ($r = -0.45$, $p = 0.001$) as well as between PWV and GFR ($r = -0.538$, $p < 0.0001$) in both groups.

Conclusions: Hypertensive immigrants appear to have lower BMI compared to native Greeks, but they are characterized by unfavourable lipidemic profile, increased aortic stiffness, structural and functional atrio-ventricular maladaptations and marked acceleration of the renal damage. Evidence indicate that dietary peculiarities like augmented salt intake might partially explain the increased target organ damage burden in this group.

PP.35.460 RETINAL DAMAGE AND METABOLIC SYNDROME WEAVE THROUGH HYPERTENSION

V. Katsi, G. Sourmetis, I. Skiadas, D. Tsatsalis, C. Vlachopoulos, D. Tousoulis, C. Tsioufis, C. Stefanadis, I. Kallikazaros. *Hippokratia Hospital - Department of Cardiology, Athens, Greece*

Objective: In the ongoing debate about metabolic syndrome (MS), it is still unresolved whether it is a marker or a mechanism. We sought to unravel the mystery of the causative interrelationships of the hypertensive fundus, a time honored TOD, especially in the setting of MS.

Design and Method: Our population consisted of 202 consecutive subjects with newly diagnosed untreated stage I-II essential hypertension (aged 60 ± 11 years, 122 female), without overt cardiovascular disease. All participants underwent funduscopy examination and were classified according to Scheie's grading system into 5 categories (Scheie's scale 0, I, II, III, IV:

normal, arteriolar narrowing, arteriovenous nipping, hemorrhages - exudates and papilloedema respectively). Anthropometric parameters, as well as lipid profile, plasma glucose, high sensitivity C-reactive protein (hs-CRP) and serum creatinine levels were assessed. Renal function was classified according to the estimated glomerular filtration rate (GFR) calculated by the Cockcroft-Gault formula. MS was identified according to the Third Report of the National Cholesterol Education Program Adult Treatment Panel. The subjects were divided in two groups regarding the absence (group A), or the presence of MS (Group B).

Results: Group B compared to group A had increased levels of uric acid and hs-CRP (5.5 ± 0.33 vs 4.5 ± 0.27 mg/dl and 2.9 ± 0.18 vs 1.6 ± 0.11 mg/dl respectively, all $p < 0.05$) and significantly lower GFR (81 ± 5 vs 96 ± 7 ml/min, $p < 0.05$). The two groups did not differ regarding age, sex and office blood pressure. In each of the five Scheie's categories there was a significant divergence, within the categories, in the constellation of MS components, presenting a prevalence of 6%, 14%, 47%, 71% and 62%, respectively ($p < 0.05$).

Conclusions: The metabolic syndrome, although not an established pathogenetic entity, is associated with marked acceleration of the hypertensive retinal damage, kidney dysfunction and inflammatory activation.

PP.35.461 FUNDUSCOPIC EXAMINATION AND CHANGES IN BLOOD PRESSURE

Y. Izumi¹, N. Takeshita¹, Y. Ozawa², Y. Kasamaki², M. Ohta², T. Nakayama³, H. Kawamura⁴, X. An⁵, M. Maisumu⁶. ¹Department of Medicine, Kanazawa Medical University Hime Municipal Hospital, Hime, Japan, ²Department of Medicine, Nihon University School of Medicine, Tokyo, Japan, ³Department of Pathology and Microbiology, Nihon University School of Medicine, Tokyo, Japan, ⁴Department of Medicine, Nippon Dental University, Tokyo, Japan, ⁵Department of Ophthalmology, Xinjiang Medical University, Urumqi, China, ⁶Department of Cardiology, Xinjiang Medical University, Urumqi, China

Background: Retinal changes have been evaluated as markers of progressive increase in blood pressure. However, several investigators have reported that funduscopy examination is not suitable for monitoring hypertension. We conducted a medical survey in Xinjiang, China, wherein funduscopy examination was performed in elderly people, and the findings were compared with blood pressure and other parameters.

Methods: Blood and urine samples were obtained from 394 subjects (age, 65–70 and >90 years) from 3 races; 24-h ambulatory blood pressure monitoring (ABPM), echocardiography, and funduscopy examination were performed for these subjects. Retinal changes were evaluated according to the Scheie classification (0–4 grades) by an ophthalmologist.

Results: Scheie grade (SG) 0 was not found in any subjects. The mean SG value did not differ between hypertensive and normotensive subjects. Parallel changes in SG and blood pressure were not observed in any subjects. SG corresponded to the increase in the cardiac left ventricular mass, serum uric acid, and diameter of the common carotid artery in all but subjects with SG 4. SG corresponded to the decrease in glomerular filtration rate (GFR) (excluding subjects with SG 4) and serum HDL-cholesterol.

Conclusion: The present study clearly showed that funduscopy examination does not reflect the progress of hypertension. Parallel changes in SG and other parameters suggested that retinal findings are markers of vascular damage and are independent of the blood pressure.

PP.35.462 DETERMINANTS OF HYPERTENSION SEVERITY AND TARGET ORGAN DAMAGE IN CHILDREN WITH ESSENTIAL HYPERTENSION

J. Sladowska-Kozłowska¹, A. Niemirska¹, A. Wierzbicka², R. Janas³, M. Litwin¹. ¹Dept. of Nephrology & Arterial Hypertension, The Children's Memorial Health Institute, Warsaw, Poland, ²Dept. of Biochemistry, The Children's Memorial Health Institute, Warsaw, Poland, ³Dept. of Radioimmunology, The Children's Memorial Health Institute, Warsaw, Poland

In 86 children (14.1 ± 2.4 years) with newly diagnosed essential hypertension (EH) the determinants of stage of hypertension (HT) and target organ damage (TOD) were assessed.

Results: 58.1% of pts had stage 1 of HT and 41.9% stage 2. Pts with stage 2 of HT in comparison with pts with stage 1 of HT had significantly lower birth weight (3182 ± 751 vs 3469 ± 555 , $p < 0.05$), greater left ventricular mass (LVM) (42.3 ± 12.1 vs 35.7 ± 8.7 g/m^{2.7}, $p < 0.01$), higher LDL concentration (125.2 ± 29 vs 109 ± 34.2 mg/dl, $p < 0.05$). Pts with stage 2 in comparison with pts with stage 1 tended to be younger (13.6 ± 3 vs 14.5 ± 1.7 yrs, $p = 0.08$), visceral obese (waist – hip ratio (WHR): 0.87 ± 0.07 vs 0.84 ± 0.07 ,

$p=0.08$) and had tendency to greater albuminuria (32.2 ± 49.0 vs 20.1 ± 19.4 mg/24h, $p=0.1$). Birth weight negatively correlated with 24h SBP ($p<0.05$, $r=-0.27$), 24h DBP ($p<0.05$, $r=-0.25$), albuminuria ($p<0.05$, $r=-0.23$), 120 min-glucose concentration after oral load ($p<0.05$, $r=-0.26$) and positively correlated with insulin sensitivity index (ISI[0,120]: $p<0.05$, $r=0.23$). Step-wise regression analysis revealed that the main predictor of HT stage was WHR ($R^2=0.195$, $\beta=0.442$, $p=0.009$). The main predictor of LVM was waist circumference ($R^2=0.279$, $\beta=0.561$, $p=0.008$) and of carotid intima-media thickness – fasting insulin concentration ($R^2=0.208$, $\beta=0.510$, $p=0.04$).

Conclusions: Lower birth weight and visceral obesity are main factors differentiating stage of HT and development of TOD in children with EH. Main predictors of TOD in children with EH are related with visceral obesity and hyperinsulinemia.

PP.35.463 ROLE OF PULSE WAVE VELOCITY IN DETECTING ORGAN DAMAGE AND IMPROVING CARDIOVASCULAR RISK STRATIFICATION IN HYPERTENSIVE PATIENTS

S. Stea, L. Ghiadoni, R.M. Bruno, A. Magagna, C. Benedetti, I. Di Paco, S. Taddei, L. Ghiadoni. *University of Pisa, Department of Internal Medicine, Pisa, Italy*

Objective: Measurement of arterial stiffness through carotid-femoral Pulse Wave Velocity (PWV) has been included in the 2007 European guidelines for the management of arterial hypertension as a measure of target organ damage (TOD). The present study is aimed to determine the clinical usefulness of PWV beyond other measures of organ damage in improving the risk stratification of hypertensive patients.

Design and Methods: 234 consecutive hypertensive patients (age 56.6 ± 12.0 years; 135 men; 85% already under antihypertensive therapy) were enrolled among those referring to the outpatient clinic of the Hypertension unit for a program including medical history, physical examination, blood pressure (BP) measurement, blood and urine samples with determination of lipid profile, blood glucose, serum creatinine, and microalbuminuria (urinary albumin to creatinine ratio; UACR), EKG, echocardiography, carotid ultrasound and PWV measurement with Sphygmocor® system. A threshold of 8.3 m/s was used as marker of increased PWV.

Results: On the basis of history, examination, BP, and blood and urinary exams including UACR, patients were classified at low (33%), moderate (33%), high (29%), or very high (5%) added risk. Median PWV was 7.88 (25th-75th percentile 7.05–8.95) m/s. PWV was associated with renal, carotid, or cardiac TOD. Patients reclassified to an higher risk class were 21% by adding PWV, 14% by echocardiography, and 50% by carotid ultrasound. When all TOD markers except PWV were used, patients were classified as low (6%), moderate (23%), high (66%), or very high (5%) risk. Adding PWV detected TOD in 10 further patients, but only 3 of them were reclassified into high added risk category.

Conclusions: PWV measurement is useful to classify added risk in low and moderate risk patients, but it adds little information in patients already studied with both cardiac and carotid ultrasound. Its main advantage over other TOD measures could be represented by the relatively low cost and expertise required.

PP.35.464 ASSESSMENT OF RENAL FUNCTION IN DETECTION OF SUBCLINICAL ORGAN DAMAGE AND RISK STRATIFICATION IN HYPERTENSIVE PATIENTS

S. Villevalde, E. Tyukhmenev, R. Akhmetov, Z. Kobalava. *Russian Peoples' Friendship University, Moscow, Russia*

Objective: Reduction in glomerular filtration rate (GFR) and microalbuminuria (MAU) are independent predictors of cardiovascular morbidity and mortality. ESH-ESC guidelines (2007) list a slight reduction of creatinine clearance by Cockcroft-Gault formula (CICr) or GFR-MDRD among signs of subclinical organ damage. The aim of study was to evaluate the impact of various methods of renal function assessment on detection of subclinical organ damage and risk stratification.

Methods: In 576 non-diabetic hypertensive pts without established cardiovascular or renal disease (291 male, 53.0 ± 10.1 years ($M \pm SD$), BMI 29.4 ± 4.4 kg/m², 38% smokers, BP $156 \pm 13/99 \pm 8$ mmHg, Cr 94.3 ± 17.4 μ mol/l, FPG 5.2 ± 0.6 mmol/l) and in 158 hypertensive treatment-naïve type 2 diabetes mellitus (T2DM) pts (82 male, 56.2 ± 8.2 years, BMI 31.5 ± 4.4 kg/m², 30% smokers, BP $138 \pm 14/82 \pm 7$ mmHg, Cr 81.5 ± 15.1 μ mol/l, FPG 9.1 ± 2.4 mmol/l) MAU by albumin/creatinine urine ratio, CICr and GFR-MDRD were assessed.

Results: In non-diabetic pts CICr was 96.7 ± 15.5 ml/min, GFR-MDRD 69.4 ± 20.1 ml/min/1.73m². Prevalence of slight Cr increase, CICr <60 ml/min, GFR-MDRD <60 ml/min/1.73m² and MAU was 15.6, 5.9, 28.1 and 7.1%. Subclinical kidney damage and high/very high risk was detected in 15.6 and 30.7% of pts based on Cr increase and reduced CICr or GFR-MDRD. Based on Cr increase, MAU and reduced CICr or GFR-MDRD kidney damage was revealed in 22.4 and 37.5%. In T2DM pts CICr was 104.3 ± 29.1 ml/min, GFR-MDRD 81.7 ± 15.6 ml/min/1.73m², cystatin C 0.91 ± 0.12 mg/l. Prevalence of CICr <60 ml/min, GFR-MDRD <60 ml/min/1.73m², MAU and cystatin C >0.9 mg/l was 4.4, 8.2, 7.6 and 37.3%, respectively. MAU and reduced GFR-MDRD coexist within 7 (3.4%) and 2 (8%) of non-diabetic and T2DM pts.

Conclusions: Combined assessment of GFR-MDRD and MAU improves the detection of subclinical kidney damage in hypertensive pts. Due availability, low cost and high predictive value it should be the first step in assessment of subclinical organ damage for cardiovascular risk assessment. Cystatin C, the novel alternative marker of renal function, is high sensitive in detection of renal damage in pts with T2DM.

PP.35.465 INCREASED INTERLEUKIN-18 PLASMA LEVELS IN HYPERTENSIVE PATIENTS AFTER ACUTE STROKE

C. De Ciuceis¹, E. Porteri¹, M. Magoni², A. Costa², A. Pilu¹, G.E.M. Boari¹, C. Platto¹, G. Bulgari¹, D. Avanzi¹, C. Agabiti Rosei¹, R. Spezi², D. Rizzoni¹, E. Agabiti Rosei¹. ¹Internal Medicine, University of Brescia, Brescia, Italy, ²Stroke Unit, Spedali Civili di Brescia, Brescia, Italy

It was previous suggested that experimental acute ischemic stroke may be associated with an increased oxidative stress and/or inflammation, which might play a role also in worsening clinical outcome.

The aim of the present study was to investigate circulating indices of inflammation/oxidative stress during and after an acute ischemic stroke in humans.

We have enrolled 13 patients with an acute ischemic stroke (blood pressure values $158/89 \pm 11/8$ mm Hg), admitted to the stroke unit of our Hospital. Interleukin 6, interleukin 18, lipoperoxides, antioxidant capacity (PAO) and macrophages chemotactic factor 1 (MCP-1) plasma circulating levels were evaluated at admission (Basal), after 5 days and after 3 months (Follow up) by ELISA.

Results are summarized in the Table (**= $p<0.01$ vs. Basal).

Table	Basal	5 days	Follow up
Interleukin 6 pg/ml	8.48 ± 5.31	6.36 ± 0.82	5.97 ± 2.11
Interleukin-18 pg/ml	1359 ± 622	$2547 \pm 999^{**}$	1261 ± 644
Plasma lipoperoxides μ M/L	5.99 ± 7.51	1.18 ± 0.62	3.63 ± 2.52
Plasma antioxidant capacity μ M/L	798 ± 245	779 ± 43.7	730 ± 180
MCP-1 pg/ml	459 ± 392	325 ± 88.4	710 ± 713

In conclusion, our data suggest that, shortly after an acute stroke in humans, an increase in interleukin-18 occurs, while other circulating indicators of oxidative stress/ inflammation do not show any significant further increase compared with baseline values (at admission). Therefore, circulating interleukin-18 seems to be the best indicator of a condition of systemic inflammation after an acute stroke.

PP.35.466 RELATIONSHIP BETWEEN SERUM URIC ACID AND ARTERIAL STIFFNESS AND CARDIAC AND CAROTID ARTERY STRUCTURE IN A GENERAL POPULATION IN NORTHERN ITALY

M. Salvetti, M.L. Muiesan, A. Paini, C. Agabiti Rosei, C. Aggiusti, D. Stassaldi, F. Beschi, C. Monteduro, M. Castellano, E. Agabiti Rosei. *Internal Medicine, University of Brescia, Brescia, Italy*

Background: The relationship between serum uric acid (UA) levels and cardiovascular (CV) disease has been described since the late 19th century. The role of UA as an independent risk factor for CV events and its association with target organ damage (TOD) is however less clear.

Aim of the study was to assess the relationship between UA and different forms of TOD in a general population in Northern Italy (Vobarno Study).

Methods: 385 subjects (age 56 ± 9 yrs, 44% males, 64% hypertensives, 32% treated) underwent laboratory examinations and both clinic and 24 hours BP measurement (Spacelabs 90207). Left ventricular and carotid artery structure were assessed by ultrasound and carotid-femoral PWV was measured using Complior SP (Artech, Pantin, France).

Results: Subjects with increased UA (defined as >6 mg/dl in ♀ and >7 mg/dl in ♂) were older, had greater BMI, higher BP, glucose, cholesterol and triglycerides levels and lower HDL cholesterol and estimated glomerular filtration rate (e-GFR)(MDRD). Subjects with increased UA had also increased arterial stiffness (PWV: 11.1 ± 4.1 vs 13.3 ± 3.7 m/sec, $p < 0.0001$), and a slight, but statistically significant, increase in left ventricular mass index (LVMI) (38.7 ± 10.6 vs 43.0 ± 11 gr/m^{2.7}, $p < 0.05$) and IMT (Meanmax 1.1 ± 0.28 vs 1.2 ± 0.29 mm, $p < 0.05$). After adjusting for possible confounders, including also e-GFR, in a multivariable model, PWV was significantly greater in subjects with increased UA (11.1 ± 2.41 vs 13.4 ± 3.7 m/sec, $p < 0.001$), while no significant difference in LVMI and IMT was observed. A significant correlation between UA levels and, respectively, PWV ($r = 0.279$, $p < 0.001$), LVMI ($r = 0.157$, $p < 0.001$), meanmax IMT ($r = 0.159$, $p < 0.001$) was observed. After adjusting for possible confounders in a multivariate model, serum UA levels were independently correlated to PWV, but not to LVMI and IMT.

Conclusions: In a general population sample subjects with increased serum uric acid levels have increased arterial stiffness, but comparable left ventricular anatomy and carotid artery structure. The increase in arterial stiffness might contribute to the higher risk of cardiovascular events these observed in these subjects.

PP.35.467 CAPTOPRIL IMPROVES HYPERTENSION-RELATED INFLAMMATORY HEART PROCESS

S. Zambrano Sevilla¹, A.J. Blanca¹, J.L. Miguel-Carrasco¹, A. Mate¹, M.T. Monserrat², J.L. Arias², O. Aramburu², C.M. Vazquez¹. ¹Department of Physiology and Zoology, Faculty of Pharmacy, University of Seville, Seville, Spain, ²University Hospital Virgen Macarena, Seville, Spain

Objectives: To investigate the effects of captopril (an inhibitor of the angiotensin converting enzyme, ACE) on the inflammatory process that accompanies arterial hypertension, and to evaluate possible mechanisms of action of captopril as a cardioprotective drug in the hypertensive process.

Design and Methods: We used four groups of rats: 1) Wistar- Kyoto (WKY) rats, as a control group; (2) Spontaneously Hypertensive Rats (SHR); (3) WKY rats treated with captopril, and (4) SHR treated with captopril. The treatment consisted of an oral dose of 80 mg per kg of body weight per day, and was maintained for 12 weeks. After this period, blood and heart samples were obtained to determine the serum levels and gene expression (by real-time PCR) of the inflammatory markers, namely interleukin- β (IL- β) and IL-6. In addition, we measured the gene expression of ACE, angiotensin II receptor 1 (AT1 receptor), and the NF- κ B/I κ B system, in order to evaluate the role of this transcription factor in captopril-mediated effects.

Results: The chronic administration of captopril resulted in a complete normalization of diastolic and systolic blood pressure values in hypertensive rats. The same results were obtained with regard to the relative heart weight. The serum levels of IL- β and IL-6, which were also elevated in SHR, returned to normal after treatment with captopril, too. IL- β and IL-6 mRNA expression, which was significantly higher in hypertensive than in control rats, decreased after the treatment. In addition, higher expression of ACE, AT1 receptor and NF- κ B, and lower expression of the inhibitory subunit I κ B, was measured in hypertensive animals, all these alterations being corrected after captopril administration. On the other hand, no effects were observed in captopril-treated normotensive (WKY) rats.

Conclusions: Our study shows anti-inflammatory and cardioprotective effects of captopril in arterial hypertension, since this drug was able to decrease the amount of pro-inflammatory cytokines at both systemic and cardiac levels. This cardioprotective role of captopril is mediated by inhibitory actions on the renin-angiotensin system and the transcription factor NF- κ B.

PP.35.468 EVOLUTION OF ANKLE-BRACHIAL INDEX IN A HYPERTENSIVE POPULATION AFTER ONE YEAR FOLLOW-UP

P. Morillas Blasco, J. Quiles, I. Mateo, J. Morcillo, P. Agudo, J. Castillo, H. Andrade, B. Miralles, M. Masia, V. Bertomeu. Hospital Universitario San Juan, San Juan, Spain

Objectives: The actual Guidelines for Hypertension recommend the systematic determination of the ankle-brachial index (ABI) for the initial risk stratification in the hypertensive patient, although it is not specified whether there should be evolutionary controls or not. The aim of our study was to analyze the evolution of the ABI after one year follow-up in the hypertensive patients that come to our cardiovascular risk consultation according to the good or bad control of blood pressure.

Methods: We have analyzed 145 consecutive hypertensive patients sent to our consultation. Risk factors and cardiovascular history of patients were collected; blood test and ABI at the basal visit and one year after follow-up were performed. Patients were divided into two groups according to blood pressure control (good/bad) after one year ($140/90$ mmHg in the general population and $130/80$ mmHg in the diabetic patients). Patients who had ABI >1.4 were excluded.

Results: The mean age of population was 56 years, 65.5% were males, 19.3% were diabetic, 35.2% were dyslipemic, 23.4% were smokers and 70.3% had target organ damage. The mean basal systolic blood pressure was 153 ± 19.5 mmHg, and the mean basal diastolic blood pressure was 88 ± 12 mmHg. After one year follow-up, 80% of the population had good blood pressure control. The mean basal ABI was 1.05 ± 0.14 . Patients with a good clinical control of the blood pressure had a statistically significant increase in the ABI after one year (1.043 vs. 1.075 , $p = 0.012$). No differences were found in the ABI after one year in patients who had bad blood pressure controls (1.083 vs. 1.066).

Conclusions: A good clinical control of blood pressure after one year follow-up is associated with an increase in the ABI. However this increase is small, with low relevance in the clinical practice, and therefore we consider that the serial short-term determination of ABI would not be useful.

PP.35.469 ARTERIAL STRUCTURE AND FUNCTION IN AIDS PATIENTS: THE IMPACT OF RENAL DAMAGE

A. Capra¹, C. Giannattasio¹, M. Failla¹, F. Citterio¹, D. Dozio¹, S. Nava¹, M. Cairo¹, M. Corciulo¹, A. Maloberti¹, A. Gori², F. Sabadini², N. Squillace², G. Castoldi³, A. Mariani³, A. Stella³, G. Mancina¹. ¹Clinica Medica, San Gerardo Hospital and University of Milano-Bicocca, Monza, Italy, ²Divisione Malattie Infettive, San Gerardo Hospital, Monza, Italy, ³Clinica Nefrologica, San Gerardo Hospital and University of Milano-Bicocca, Monza, Italy

Objective: The use of combination antiretroviral therapy has decreased AIDS-related mortality. It has been observed that treated AIDS patients now have a greater cardiovascular mortality and early organ damage even without hypertension. Goals of our study have been to determine whether 1) in normotensive AIDS patients with or without renal damage there are functional (arterial stiffening) and structural (carotid wall thickening) large artery alterations and whether 2) this leads to alterations in an important predictor of cardiovascular events, i.e. central blood pressure (BP).

Design and Methods: We studied 40 treated, normotensive, normocholesterolemic, euglycemic AIDS patients, with ($n = 20$, age 52.0 ± 2.6 years; BP $131/77 \pm 4/2$ mmHg, means $\pm$ SE) or without ($n = 20$, age 44.0 ± 2.0 years; BP $130/76 \pm 2/1$ mmHg) renal damage, and 20 healthy controls (C, age 52.0 ± 1.0 years; BP $124/77 \pm 2/1$ mmHg). Renal damage was defined by microalbuminuria and/or glomerular filtration rate < 60 ml/min. Arterial distensibility was measured by aorto-femoral Pulse Wave Velocity (PWV), central systolic BP by tonometry (Sphygmocor) and carotid artery intima-media thickness (IMT) by semi-automatic echotracking (WTS).

Results: Compared to C AIDS patients without renal damage showed similar values of carotid IMT (543 ± 26 vs 554 ± 24 μ m), PWV (11.0 ± 0.5 vs 10.3 ± 0.4 m/sec) and central BP ($117 \pm 2/77 \pm 1$ vs $115 \pm 2/70 \pm 3$ mmHg). In contrast, all values were greater in AIDS patients with renal damage (IMT: 608 ± 26 μ m, PWV: 11.0 ± 0.5 and central BP $130 \pm 3/77 \pm 2$ mmHg), the difference being statistically significant ($+ 13$ mmHg, $p < 0.05$) for central systolic BP. In AIDS patients, PWV showed a not significant correlation with creatinine ($r = 0.3$) and filtration rate, both when measured by Cockcroft-Gault and by MDRD ($r = 0.35$ and 0.31) formula, while automatically calculated IMT and systolic BP significantly correlated between each other ($r = 0.4$).

Conclusion: In normotensive AIDS patients with no major cardiovascular risk factors there is no apparent alteration in arterial structure and function. This alteration is evident in AIDS patients with renal damage, leading to a greater central BP value that might account for their increased cardiovascular risk.

PP.35.470 PREVALENCE OF DIFFERENT LEFT VENTRICULAR REMODELING PATTERNS IN HYPERTENSIVE PATIENTS ACCORDING TO NEW ASE CRITERIA

A. Conrady, O. Rudomanov, O. Yakovleva, D. Zakharov. Almazov Federal Heart, Blood and Endocrinology Center, St.Petersburg, Russia

Objective: The study addresses the impact of different criteria of left ventricular hypertrophy (LVH) and concentric remodelling to prevalence of remodelling patterns in hypertension. The ASE 2005 recommendations

significantly reduced the threshold for LVH detection and relative wall thickness (RWT) threshold for concentric geometry pattern.

Design and Methods: We examined 734 patients with essential hypertension 9EH) who had no concomitant diseases and medication. Echocardiography was performed and analyzed by one observer. The left ventricular mass index (LVMI) and RWT were calculated. The remodelling patterns were assessed by classification of Ganau et al 1991 and new ASE criteria (2005). The concentric (CLVH) and eccentric (ELVH) LVH were diagnosed as well as normal Geometry (NG) and Concentric remodelling (CR).

Results: According to Ganau et al (1991) criteria the prevalence of CLVH was 237 (32.3%), E LVH - 231 (31.5%), concentric remodelling - 49 (6.7%) and 217 (29.5%) patients had normal geometry. When recalculated by ASE 2005 criteria it became 380 (51.8%), 175 (23.8%), 50 (6.8%), and 129 (17.6%) respectively. Thus, implementation of new ASE criteria for LV remodelling in hypertension significantly increases the proportion of patients with CLVH, who are considered to be at higher risk of complications. This was explained by both criteria changes – decreased threshold for LVH and 25 patients and changing of threshold for RWT from 0.45 to 0.42 (117 cases).

Conclusions: The introduction of new criteria for LVH with lower threshold and changes of RWT threshold significantly increases the proportion of patients with high risk, who need more aggressive antihypertensive treatment and thus significantly contributes to hypertension management including economic consequences.

PP.35.471 INFLUENCE OF METABOLIC SYNDROME ON TARGET-ORGAN AND ARTERIAL SYSTEM IN ESSENTIAL HYPERTENSIVE PATIENTS

S. Gurgenyanyan, S. Vatinian, K. Nikoghsyan. *Cardiology, Yerevan, Armenia*

Background: Metabolic syndrome (MetS) is a major risk factor for both cardiovascular disease and nephropathy. Aim: We examined the inter-relationship between MetS, left ventricular (LV) hypertrophy, arterial stiffness (AS) and renal function in essential hypertensive (EH) patients (pts)

Methods: There were observed 63 EH pts (mean age = 56.17 ± 1.4 years) with MetS according to the IDF criteria and 61 EH pts without MetS (mean age = 54.16 ± 1.1 years) with office blood pressure (BP) > 160/100 mmHg. The EH pts were divided into two gr: I – with MetS, II – without MetS. LV structural and functional parameters were determined by echocardiography, AS – on the basis of carotid to femoral pulse wave velocity (PWV) by means of a computerized method (Complior SP). In pts were also evaluated glomerular filtering rate (GFR), albumin excretion (AE), serum creatinine (SC).

Results: In I gr pts the LV mass index (LVMI) is significantly increased and LV eccentric hypertrophy is prevalening (LVEH: 67.6%), in II – concentric hypertrophy (LVCH: 75.0%). In difference from II gr pts in I there was more disturbance of diastolic function and systolic dysfunction is recorded more often. In I gr pts PWV is considerably greater in comparison with II (14.85 ± 1.21 m/sec vs 11.34 ± 0.82 m/sec, $p < 0.05$). In correlation analysis in I gr pts PWV there is positive connection with LVMI ($r = 0.81$, $p < 0.01$) and enddiastolic diameter ($r = 0.88$, $p < 0.001$) and negative – with relative wall thickness ($r = -0.78$, $p < 0.001$). In II gr pts the same relationships were absent. In I gr pts renal function is more deteriorated in comparison with II: GFR < 60 ml/min, AE and SC greatly increase (243.1 ± 15.2 mg/mmol/l, $p < 0.05$).

Conclusion: MetS intensifies the damage effect on target-organ in EH, probably more increasing deteriorations of arterial function.

PP.35.472 BLOOD PRESSURE VARIABILITY AND SUBCLINICAL TARGET ORGAN DAMAGE

O. Azevedo, F. Ferreira, F. Almeida, C. Ferreira, J. Guardado, M. Fernandes, I. Machado, R. Medeiros, J. Almeida. *Cardiology Department - Centro Hospitalar do Alto Ave, Guimarães, Portugal*

Objective: To evaluate blood pressure variability (BPV) and its relation to the occurrence of subclinical target organ damage (STOD) in hypertensive patients.

Design and Methods: Retrospective study. We selected 100 consecutive hypertensive patients who performed ambulatory blood pressure monitoring (ABPM) from Jul/2004 to Jun/2005. Studied variables: gender, age, cardiovascular risk factors (CRF), parameters of ABPM, occurrence of STOD (proteinuria, left ventricular hypertrophy) in the next two years. BPV was

evaluated based on the standard deviation (SD) of the mean of the various ABPM parameters. The weighted average of the SD of blood pressure (BP) parameters in the daytime and nighttime was also evaluated to exclude the interference of BP reduction during nighttime in the BPV.

Results: Previous STOD was detected in 32 patients (32%). The remaining 68 patients without STOD were mostly females (54.4%) and the mean age was 59 ± 13 years. Dyslipidaemia was the most frequently encountered CRF (71%). History of previous cardiovascular events was found in 50% of cases. At the beginning, the patients presented a mean 24 h BP of 152–88 mmHg. Two years later, the mean 24 h BP was 140–82 mmHg and 16% of patients had developed STOD. There was no difference concerning gender, age or CRF between patients who developed STOD and patients who did not ($p > 0.05$). The averages of the maximal (max) values of systolic blood pressure (SBP) in the 24 h, daytime and nighttime were higher in patients who developed STOD (SBP max – 24 h: $p = 0.029$; daytime: $p = 0.029$; nighttime: $p = 0.046$). The SD of SBP and MBP in the 24 h and daytime were higher in patients who developed STOD (SBP – SD 24 h: $p = 0.009$; SD daytime: $p = 0.017$) (MBP – SD 24 h: $p = 0.035$; SD daytime: $p = 0.012$). The weighted average of the SD of the SBP (daytime/nighttime) was also higher in patients who developed STOD ($p = 0.005$).

Conclusion: An association between BPV and STOD was observed in hypertensive patients, which suggests that BPV may be a relevant prognostic factor in these patients.

PP.35.473 DEVELOPMENT OF SUSTAINED HYPERTENSION AFTER 9 YEARS IN WHITE-COAT HYPERTENSIVES

O. Paez, C. Majul, P. Pulcio, M. De Maria, M. Gorosito. *Hospital Santojanni, Buenos Aires, Argentina*

Objective: In 2000, we studied three groups of white-coat hypertensives (WCH); sustained hypertensives (SH) and normotensives (N) concluding that WCH showed an intermediate behavior between SH and N, related to left ventricular mass index (LVMI) and stress test. Our aim this year was to reevaluate how many WCH became SH compared to N and the possible differences in LVMI.

Methods: A prospective cohort study, 113 patients (58 women) of WCH and N diagnosed in 2000 were reevaluated. The three groups of patients were defined according to office blood pressure (OBP) and daytime pressure, registered with 90207 spacelab ambulatory monitoring (AMBP). WCH: OBP > 140 and/or 90, AMBP < 135 and 85. SH OBP > 140 and/or 90, AMBP > 135 and/or 85, N OBP < 140 and 90, AMBP < 135 and 85. An echocardiogram was performed. Statistics: Anova, Tukey test.

Results: New onset SH since 2000: original 60 WCH: 36.6% (22 p). Original 53 N: 11.3% (6 p)

	WCH 38 p	SH 28 p	N 47 p	p
Age years	54.4 ± 3	54 ± 3.2	55 ± 3.3	NS
BMI kg/m ²	27 ± 3	26.7 ± 3.3	26 ± 3.2	NS
Systolic OBP mmHg	155 ± 8	158 ± 10	118 ± 6	0.01*
Diastolic OBP mmHg	92 ± 6	94 ± 7	82 ± 6	0.01*
Systolic AMBP mmHg	118 ± 12	150 ± 10	116 ± 10	0.02**
Diastolic AMBP mmHg	78 ± 4	90 ± 5	77 ± 4.3	0.05**
LVMI g/m ²	115 ± 26	123 ± 30	85 ± 23	<0.001*

*N different of WCH and SH, ** SH different of WCH and N

Conclusion: Our results show that WCH have more LVMI than N and are at increased risk of developing SH nine years after first diagnosis, this behaviour appears to be worse compared to N subjects.

PP.35.474 ASSESSMENT OF METABOLIC PARAMETERS AND RENAL FUNCTION AS PROGNOSTIC FACTORS IN CARDIOVASCULAR DISORDERS IN HYPERTENSIVE PATIENTS

K. Malaczynska-Rajpold¹, L. Woznicka-Leskiewicz², I. Klorek², A. Kuczmarska¹, I. Lipska¹. ¹University of Medical Sciences, Poznan, Poland, ²University of Medical Sciences, Department of Hypertension, Angiology and Internal Diseases, Poznan, Poland

Objective: Usefulness of the assessment of metabolic and renal parameters in cardiovascular risk estimating in patients with hypertension.

Design and Method: 58 hospitalized hypertensive patients, aged 29 to 83, were examined (20 women and 38 men). Patients were divided into two groups: A - without coronary artery disease (CAD) (28 patients) and B - with CAD (30 patients). Both groups were not significantly different in the level of systolic (SBP) [(A) 140 $\pm$ 18 mmHg; (B) 139 $\pm$ 15 mmHg] and diastolic (DBP) [(A) 88 $\pm$ 13 mmHg; (B) 82 $\pm$ 11 mmHg] blood pressure as well as in glomerular filtration rate (GFR) [(A) 78,57 $\pm$ 24,25 ml/min/1,73m²; (B) 76,76 $\pm$ 22,11 ml/min/1,73m²]. GFR was estimated according to MDRD formula. Both groups did not differ significantly in hypotensive and lipid lowering therapy. Following measurements were taken: blood pressure (BP), lipid profile and serum creatinine level. Echocardiography was performed in each patient, following parameters were measured in the end-diastolic phase: left ventricle diameter (LVd), right ventricle diameter (RVd), left atrium diameter (LAd), posterior wall thickness (PW) and intraventricular septum thickness (IVS); ejection fraction (EF) was assessed and left ventricle mass index (LVMI) was estimated according to Penn's formula.

Results: We revealed statistically significant difference in the levels of total cholesterol [(A) 5,45 $\pm$ 1,20 mmol/l, (B) 4,55 $\pm$ 0,94 mmol/l; $p=0,0028$] and LDL-cholesterol [(A) 3,47 $\pm$ 1,03 mmol/l, (B) 2,63 $\pm$ 0,77 mmol/l; $p=0,0009$] between both groups. We also observed significant negative correlation between LVMI and GFR ($r=-0,4820$; $p=0,0081$), LVMI and total cholesterol level ($r=-0,3754$; $p=0,0448$) and LVMI and LDL-cholesterol level ($r=-0,3771$; $p=0,0438$) in the group A. We observed significant positive correlation between GFR and EF ($r=0,4737$; $p=0,0109$) in the same group. None of these correlations was noticed in group B.

Conclusions: 1) In patients with CAD cardiovascular complications are so advanced, that no direct relationship to the metabolic parameters and renal function may be seen. 2) Assessment of metabolic parameters and its influence on LVMI is of greater significance in patients with hypertension and without CAD in prevention of renal failure and CAD.

PP.35.475 COMPARISON BETWEEN AORTIC PULSE WAVE VELOCITY AND CAROTID INTIMA-MEDIA THICKNESS: WHICH ONE IS BETTER IN THE PREDICTION OF CORONARY ARTERY DISEASE

M. Rhee¹, J.H. Bae², D.Y. Nah², Y.S. Kim¹, Y.K. Kim¹, M.M. Lee¹, H.Y. Kim³. ¹Cardiovascular Center, Dongguk University Hospital, Gyeongju, South Korea, ²Cardiovascular Center, Dongguk University Hospital, Gyeongju, South Korea, ³Department of Dental Hygiene, Eulji University, Seongnam, South Korea

Background: We investigated whether heart-femoral pulse wave velocity (hFPWV) is better than carotid intima-media thickness (cIMT) in the prediction of the presence and severity of coronary artery disease (CAD).

Methods: We prospectively enrolled subjects who were scheduled for coronary angiography (n=354; 59 $\pm$ 11 years; 200 men). Subjects with heart failure, acute myocardial infarction, arrhythmia, previous coronary revascularization, stroke and peripheral artery disease, were excluded. hFPWV (VP-2000, Colin, Japan) and cIMT (M'ATH, France) were measured before coronary angiography. Severity of CAD was assessed using modified Genisini stenosis score (GSS) and a simple classification in 1, 2 and 3 vessel disease (VD), with the assistance of quantitative coronary analysis (QCA). CAD was defined as diameter stenosis >50%.

Results: Both hFPWV and cIMT showed a significant correlation with GSS (correlation coefficient, hFPWV 0.324, cIMT 0.232; $p<0.001$). In multivariate regression analysis adjusted with hypertension, diabetes, smoking, age, gender, body mass index, hypercholesterolemia and the use of beta blockers, calcium antagonists, ACE inhibitors, statin and ARBs, there was significant correlation of GSS with hFPWV ($\beta=0.137$, $p=0.006$), and cIMT ($\beta=0.117$, $p=0.046$). In multivariate logistic regression analysis, hFPWV was associated with the presence of CAD (OR=1.002, 95%CI 1.001~1.003; $p=0.001$) and OR for the difference between the first and forth quartile was 2.659 (95%CI = 1.200~5.893; $p=0.016$). However, cIMT was not associated with the presence of CAD (OR=3.005, 95%CI=0.296~30.484; $p=0.352$), and OR for the difference was 1.332 (95%CI 0.648~2.738; $p=0.435$). hFPWV of 1, 2 and 3 VD was significantly higher than that of normal ($p=0.002$). However, cIMT was not different ($p=0.461$). The area under a receiver operating characteristic curves was 0.654 for hFPWV and 0.603 for cIMT.

Conclusion: Measurement of hFPWV may be better than measurement of cIMT as a surrogate marker for the presence and severity of CAD.

PP.35.476 RELATIONSHIP BETWEEN SLEEP APNEA AND TARGET ORGAN DAMAGE IN NEVER TREATED HYPERTENSIVE PATIENTS

E. Florczak¹, A. Januszewicz¹, A. Prejbisz¹, P. Sliwinski², I. Cendrowska-Demkow¹, B. Pregowska-Chwala¹, B. Kusmierczyk-Droszcz¹, P. Bielen², M. Makowiecka-Ciesla¹, G. Kowalewski¹, A. Wojcik¹, M. Januszewicz³, I. Michalowska¹, M. Kluk¹, M. Kabat¹, P. Hoffman¹, T. Zielinski¹. ¹Institute of Cardiology, Warsaw, Poland, ²Institute of Tuberculosis and Lung Diseases, Warsaw, Poland, ³Medical University, Warsaw, Poland

Objective: To establish the relationship between the obstructive sleep apnea (OSA) and target organ damage in patients with never treated hypertension.

Design and Methods: We investigated 121 patients with never treated hypertension (96M, 25F; mean age 35,9 $\pm$ 10,1 range 18–58yrs). In all patients metabolic syndrome (MS) components as well as albuminuria were assessed. MS was diagnosed according to ESH/ESC 2007 guidelines. All patients underwent polysomnography - apnea/hypopnea index (AHI) was calculated. Left ventricular mass index (LVMI) and echocardiography including tissue Doppler indices (DT, IVRT, E, Eprim, Aprim, E/Eprim) were calculated. The intima-media thickness of the common carotid arteries (CIMT) was measured. RI and PI were measured in Doppler duplex examination of renal arteries.

Results: Mild (AHI 5-15), moderate (AHI 15-30) and severe (AHI>30) OSA was diagnosed respectively in 29,9%, 12,8% and 6,8% patients. Patients were divided into 3 groups: group 1 - without OSA, group 2 - with mild OSA and group 3 - with moderate-severe OSA. MS was more frequent in the groups 2 and 3 as compared with the group 1 (41,9% and 68,2% vs. 23,4%; $p<0,01$). Group 3 was characterized by more pronounced IMT as compared with groups 1 and 2 (743 μ m vs. 612 and 602 μ m; $p<0,01$) and by non-significantly higher albuminuria in 24-h collection. IMT was higher in the group 3 both in patients with and without MS as compared with groups 1 and 2. There were no differences in echocardiographic indices except higher E/Eprim ratio and faster Eprim velocity in group 3 as compared with the groups 1 and 2. E/Eprim was higher in patients in the group 3 only in patients with MS. There were no differences in RI and PI and GFR between the groups.

Conclusions: In our studied group of never treated hypertensive patients, patients with mild and moderate OSA were characterized by more frequent MS and more pronounced organ damage. The relationship between OSA and IMT was independent of MS.

PP.35.477 NATRIURETIC PEPTIDES AS A MARKER OF LEFT VENTRICULAR DIASTOLIC DYSFUNCTION IN PATIENTS WITH OBESITY AND HYPERTENSION: RELATIONSHIP WITH DOPPLER TISSUE IMAGING

J. Spac, M. Soucek, H. Nemcova. Masaryk University, Faculty Hospital St. Ann, Brno, Czech Republic

Background: Natriuretic peptide (NP) increased early in patients with left ventricular (LV) systolic dysfunction, but early markers of HF development in patients with obesity and hypertension (HT) and LV diastolic dysfunction (DD) are already not very well known.

Methods: 118 (56 $\pm$ 3 years, 62 men) consecutive HT pts (stage I and II) with obesity using the value of 30 of body mass Index (BMI) as a cut-off was divided into two groups: A with BMI<30 (n=56) and B with BMI>30 (n=62). LV function was assessed by natriuretic peptide plasma levels (BNP, NT pro BNP). Relative wall thickness, cardiac mass, LV volumes and ejection fraction, velocity of early and late diastolic LV filling maximal velocity (E, A), E/A ratio, deceleration E time from transmitral Doppler, and pulsed doppler tissue imaging of velocities of mitral annular movements (Sm, Em, Am) were calculated by echo.

Results: Pts revealed normal systolic function of the LV and the same degree of LVH (61,19 versus 63,4 g/m²). There was no correlation between standard Doppler mitral inflow as well as with parameters of systolic LV function. with NP. $P<0.001$ for all) were found between NT pro BNP and Em ($r=-0.82$), Sm ($r=-0.7$), E/Em ratio ($r=0.61$) and relationship was less significant as the obesity of pts was rising. NP were significantly higher in group A than in group B. The best discriminative for dg. of DD using NT pro BNP in group A was > 280 pg/ml (sensitivity 82%, specificity 76%) and > 170 pg/ml (sensitivity 78%, specificity 74%) in group B.

Conclusions: NP can reveal only more severe DD in asymptomatic pts with HT and obesity. Pts with obesity and HT have lower values of NP and diagnostic thresholds of NT pro BNP for DD should be lower than in HT pts without obesity.

PP.35.478 RELATIONSHIP BETWEEN CAROTID INTIMA-MEDIA THICKNESS AND CARDIOVASCULAR RISK FACTORS IN HYPERTENSIVE PATIENTS

O. Yarynkina¹, E. Svyshchenko¹, L. Mishchenko¹, N. Tchyrluneva¹, M. Mospan¹, V. Yegorushkin². ¹National Science Centre Institute of Cardiology - Department of Hypertension, Kiev, Ukraine, ²Open Joint Stock Company Ukrtelecom - Department of Transport Communications, Kiev, Ukraine

Objective: Carotid intima-media thickness (CIMT) was proposed as intermediate marker of target organ damage and predictor of stroke and myocardial infarction. We evaluate relationship between CIMT and other cardiovascular diseases risk factors in 77 pts with mild and moderate essential hypertension(EH),average age 58,7±1,2.

Design, Methods: The study protocol included: measurement of office BP, blood lipids, glucose, creatinine, uric acid. CIMT was measured by ultrasonography, left ventricular values by Doppler echocardiography.

Results: There were found increase of IMT >0.9mm in 33,8% pts, carotid artery stenosis >20% in 55,8% pts with EH. We observed significant correlation of IMT with systolic BP (r=0,35, p=0,003), pulse pressure (PP) (r=0,33, p=0,005) and age(r=0,35, p=0,003), between IMT and the left atrium (LA) size (r=0,30, p=0,01), and the left ventricular ejection fraction (LVEF)(r=0,20, p=0,05). In subgroup of pts with IMT > 0.9 mm (1st group) there were reliably higher levels of systolic BP, PP, LA size, the left ventricle internal end-diastolic diameter (LVIDD), total and LPLD cholesterol level (tab).

We found the significant interrelation of IMT with LVIDD (r=0,25, p=0,01x10⁻⁶), LVIDS(r=0,56, p=0,01x10⁻⁴), and LVEF(r=0,31, p=0,01x10⁻⁷). IMT tightly correlated with the level of total cholesterol and LPLD cholesterol (r=0,66, p=0,01x10⁻⁷; r=0,73, p=0,003, respectively), and also with the content of creatinine (r=0,83, p=0,01x10⁻⁸) in the 1st group pts. By the standardized regression analysis increase in IMT was associated predominantly with lipid exchanges: coefficients β of IMT with total cholesterol was 0,297, p=0,042 in the 1st gr.pts. For pts with IMT <0.9mm the age and systolic BP had more significant influence on IMT: coefficients β were 0,593, p=0,0001 and 0,456, p=0,002 respectively.

Conclusions: At the elastic common carotid artery IMT changes is related with BP elevation, in part with pulsatile component of BP (SBP,PP) and with age. The vessel wall thickening is associated with total cholesterol level elevation and IMT >0.9mm may be a marker of atherosclerosis. There are significant correlations between heart and vessels damage in hypertensive patients.

Mean±SD	IMT>0,9mm, n=24	IMT<0,9 mm, n=53	P
SBP,mmHg	156,8±2,6	146,9±3,1	<0,003
PP,mmHg	64,3±1,9	54,7±2,5	<0,003
LA size,cm	3,93±0,07	3,62±0,10	<0,008
LVIDD,cm	5,21±0,08	4,94±0,10	<0,04
Total cholesterol, mmol/l	7,24±0,54	6,23±0,87	<0,0001
LPLD cholesterol,mmol/l	4,88±0,72	3,47±0,94	<0,01

PP.35.479 EFFECT OF KOREAN RED GINSENG ON ARTERIAL STIFFNESS IN SUBJECTS WITH HYPERTENSION

M. Rhee¹, Y.S. Kim¹, J.H. Bae², D.Y. Nah², Y.K. Kim¹, M.M. Lee¹, H.Y. Kim³. ¹Cardiovascular Center, Dongguk University Hospital, Goyang, South Korea, ²Cardiovascular Center, Dongguk University Hospital, Gyeongju, South Korea, ³Department of Dental Hygiene, Eulji University, Seongnam, South Korea

Objectives: Korean Red Ginseng (KRG) has been known to improve endothelial function and lower blood pressure (BP). Improvement of endothelial function and lowering of BP may affect arterial stiffness. The present study evaluated whether treatment with KRG can improve arterial stiffness in subjects with hypertension.

Subjects and Methods: Eighty hypertensive subjects, treated with antihypertensive agents were randomly assigned to active (KRG 3g/day) or placebo treatment group by double blind manner. Subjects were asked to continue their antihypertensive medications. Change of antihypertensive medications was not allowed. Systolic BP (SBP) and diastolic BP (DBP) were measured at baseline, 1, 2, and 3 months. Arterial stiffness was assessed by the measurement of brachial-ankle pulse wave velocity (baPWV) at baseline, 1, and 3 months.

Results: Thirty subjects in active group (AG) and thirty four subjects in placebo group (PG) completed 3 months treatment and per-protocol analysis was done. SBP and DBP at baseline, 1, 2, and 3 month were not different between AG and PG (p > 0.05). After 3 month of treatment, SBP of AG was not changed from BP at baseline. However, DBP of AG, SBP and DBP of PG after 3 month of treatment, were significantly reduced (p < 0.05). Reduction of baPWV at 1 and 3 month was significant in both group (p < 0.05), and baPWV was not different between groups at each time points. Analysis after adjustment with time dependent mean arterial BP and heart rate (HR), showed that reduction of baPWV in AG was BP and HR independent but not that of PG.

Conclusion: KRG improves arterial stiffness in subjects with hypertension after 3 months of treatment, and it was BP independent.

PP.35.480 OVERWEIGHT, SMOKING AND SUBCLINICAL VASCULAR DAMAGE IN YOUNG HEALTHY PERSONS

T. Pronko. Grodno State Medical University Department of Internal Diseases, Grodno, Belarus

One of the main tasks of the cardiology is decrease of cardiovascular morbidity and mortality. Strategy for solution of this task is detection of groups of high cardiovascular risk for realization of preventive actions. Pulse-wave velocity correlates well with arterial distensibility and stiffness and is a useful non-invasive index to assess arteriosclerosis. The most frequent controlled risk factors of atherosclerosis are smoking and overweight.

The aim of the study was to define the correlations between pulse wave velocity and risk factors of atherosclerosis in young healthy persons.

Methods: The study population included 62 healthy volunteers (37 men 25 women), average age 26.0±2.4 years. Patients were divided into 4 groups: group A includes 16 healthy persons without risk factors of atherosclerosis, group B includes 18 active smokers, group C – 13 overweight persons, group D – 15 active smokers with overweight. Carotid femoral pulse wave velocity (PWV) was measured noninvasively.

Results: The body mass index (BMI) was 23.19±1.3, PWV was 5.41±0.73 m/s in group A. Smokers have BMI 22.3±1.7. However, PWV was on 58% higher (8.58±0.88 m/s, (δ < 0.05)) to compare with group A. The BMI in group C was 29.18±3.2, PWV was 8.05±0.94 m/s, what is on 48% higher (δ < 0.05) to compare with group A. The BMI in group D was 28.93±3.8, PWV was 8.66±0.67 m/s, what is on 60% higher (δ < 0.05) to compare with healthy persons without risk factors. PWV positively correlated with smoking (r=0.36; p < 0.05) and positively correlated with BMI (r=0.41; p < 0.05).

Conclusions: Smoking and overweight increase carotid femoral PWV even in healthy young persons. Non-invasive measurement of carotid femoral PWV can be used in clinical practice in assessment of pre-clinical atherosclerosis and detect groups of high cardiovascular risk. It is necessary to popularize healthy life-style, to decrease development of arteriosclerosis.

PP.35.481 INFLUENCE OF HYPERTENSION ON HEART RATE VARIABILITY IN PATIENTS WITH ACUTE Q-WAVE MYOCARDIAL INFARCTION

E.N. Amosova¹, A. Bezrodnyi¹, I.V. Prudkiy¹, N.V. Netyazhenko¹, Y.A. Sichenko¹, O.M. Gerula². ¹National O.O. Bogomolets Medical University, Kyiv, Ukraine, ²Alexandrovska City Hospital of Kyiv, Kyiv, Ukraine

Objective: The aim of study was to assess the influence of hypertension on heart rate variability (HRV) in patients with Q-wave myocardial infarction (Q-MI).

Design and Methods: We examined 84 patients with Q-MI. They were divided into two groups: 1-st gr. – with hypertension and 2-nd gr. – without it. The groups had no differences in age, smoking status, gender distribution and received therapy. HRV was measured using Schiller CS-100 on the 5-th day of admission. Dopplerechocardiography was performed.

Results: HRV was significantly depressed in hypertensive patients of gr.1 comparing to patients of gr.2. (Table).

Parameters	Gr.1 pts (n=46)	Gr. 2 pts (n=38)
SDNN (ms)	17,2±1,6	25,1±1,4*
HF (n.u.)	8,1±1,1	11,4±1,2*
LF/HF	3,78±0,32	2,96±0,24*

*-p<0,05 in comparison with gr.1

Bivariate correlation analysis revealed significant positive relation of SDNN with ejection fraction (EF) and end diastolic index (EDI) ($r = 0,71$, $p < 0,001$ and $r = -0,53$, $p < 0,02$, respectively). Positive association existed between LF/HF and EDI ($r = 0,37$, $p < 0,04$) and negative between LF/HF with EF ($r = -0,68$, $p < 0,008$).

Conclusion: Patients with Q-MI and hypertension are characterized by more expressed activation of sympathetic nervous system and depressed parasympathetic nervous system according to values of HRV comparing to normotensives. Our data suggest that hypertension and activation of sympathetic nervous system contributes to progression of LV systolic dysfunction in Q-MI.

PP.35.482 SYMMETRICAL REGRESSION OF AMBULATORY ARTERIAL STIFFNESS INDEX AS A PREDICTOR OF EARLY ORGAN DAMAGE IN PREVIOUSLY UNTREATED HYPERTENSIVE PATIENTS

A. Prejbisz¹, H. Janaszek-Sitkowska¹, K. Paschalis-Purtak¹, B. Pucilowska-Jankowska¹, G. Kowalewski¹, M. Kluk¹, M. Makowiecka-Ciesla¹, I. Cendrowska-Demkow¹, E. Florczak¹, I. Michalowska¹, M. Januszewicz², K. Michel-Rowicka¹, B. Pregowska-Chwala¹, T. Buchner³, A. Januszewicz¹, M. Kabat¹. ¹Institute of Cardiology, Warsaw, Poland, ²Medical University, Warsaw, Poland, ³University of Technology, Warsaw, Poland

Objective: Arterial stiffness is thought to be an independent predictor of cardiovascular mortality and morbidity. There is limited data concerning the role of Ambulatory Arterial Stiffness Index (AASI) as an indicator of early organ damage - especially among young and previously untreated hypertensive patients. Moreover little is known about the superiority of performing symmetric regression on AASI over standard one while characterizing patients clinical parameters. The aim of the study was to evaluate whether the use of symmetrical regression on AASI provides better correlation with early organ damage in previously untreated hypertensive patients.

Design and Methods: The study included 340 patients (248 males, mean age $38 \pm 11,4$ yrs) with recently diagnosed and untreated hypertension. Basing on 24-h ABPM readings AASI was calculated as 1 - diastolic versus systolic slope. Other parameters consisted of interlobar renal resistive index (RI) and Intima Media Thickness (IMT) evaluated by Doppler examinations, trans-thoracic echocardiography examinations (LVMI) and biochemical parameters. GFR was calculated using CKD-EPI formula.

Results: Symmetrical AASI correlated with RI ($r = 0,23$; $p < 0,05$), IMT ($r = 0,3$; $p < 0,05$), Metabolic Syndrome ($r = 0,17$; $p < 0,05$), SBP ($r = 0,20$; $p < 0,05$), DBP ($r = 0,15$; $p < 0,05$), GFR ($r = -0,26$; $p < 0,05$). Standard AASI correlated only with IMT ($r = 0,02$; $p < 0,05$) and RWT ($r = 0,23$; $p < 0,05$). Both symmetrical and standard AASI did not correlate with LVMI, serum uric acid levels and 24-h urine albumin excretion.

Conclusions: Symmetrical AASI correlates better with early signs of organ damage in comparison to standard AASI.

PP.35.483 A SYSTEMATIC STUDY OF RELATION BETWEEN ARTERIAL STIFFNESS AND SOME PREDICTORS OF CLINICAL OUTCOME IN ARTERIAL HYPERTENSION

V. Aursulesei, I. Amitoaic, A. Cozma, M.D. Datcu. *University Of Medicine And Pharmacy Gr. T. Popa - 1st Department Of Medical Cardiology, Iasi, Romania*

Objective: To evaluate the relation between pulse wave velocity (PWV), an independent marker of cardiovascular risk and other parameters with prognostic significance: carotidian intima media thickness (IMT), left ventricular hypertrophy (LVH), flow mediated vasodilation (FMD) and microalbuminuria in patients with essential arterial hypertension.

Design and Method: 173 hypertensive patients (aged $59,7 \pm 2,1$ years, 67% females, with associated cardiovascular risk factors except diabetes) were studied before and after 6, 12 months of treatment with Enalapril/Amlodipine + Indapamide. Arterial stiffness was assessed by carotidian-femoral pulse wave velocity (Complior method). Carotidian/brachial ultrasound was used for evaluation of IMT and FMD, respectively. LVH was defined by index of mass (LVMI) and geometric patterns (normal, concentric/eccentric hypertrophy, concentric remodeling). Microalbuminuria was noted as absent/present.

Results: PWV is strongly related with LVMI and concentric hypertrophy pattern irrespective the moment of evaluation ($p = 0,001$), regimen of treatment ($p = 0,002$) and gender ($p = 0,01$). Correlation with eccentric hypertrophy is evident at baseline only for females (t-test) and influenced by abdominal circumference (ANCOVA). PWV is related with carotidian IMT ($r = 0,43$, $p = 0,04$) at baseline and only in Enalapril + Indapamide

subgroup after 12 months. Presence of microalbuminuria is related with PWV at baseline irrespective the regimen of treatment ($r = 0,29$, $r = 0,41$ for Amlodipine/Enalapril subgroup respectively, $p = 0,04$). We cannot establish a constant relation with FMD, probably because of the heterogeneous influence of cardiovascular risk factors (ANCOVA).

Conclusion: Our study suggests a complex interrelation between non-invasive parameters of atherosclerosis, which is influenced especially by gender, abdominal obesity and antihypertensive regimen. The combination of these measurements is of stronger clinical relevance.

PP.35.484 IMPACT OF CARBOHYDRATE DISORDERS ON LEFT VENTRICULAR MASS AT PATIENTS WITH ARTERIAL HYPERTENSION AND METABOLIC SYNDROME

G. Kaspruk, V. Romanov, O. Mitchenko. *Institute of Cardiology, Kyiv, Ukraine*

Aims: To investigate the relationship between carbohydrate disorders (CD) and left ventricular hypertrophy (LVH) evaluation at patients with arterial hypertension and metabolic syndrome.

Methods: 190 essential hypertensive (60% females), mean age $54,1 \pm 0,7$, mean body mass index (BMI) $32,8 \pm 5,9$ kg/m², free of the major cardiovascular diseases underwent determination of anthropometric, biochemical parameters and measurement of 24-blood pressure (BP). All subjects performed an echocardiographic study. Patients was divided into 4 groups: 1-without CD, 2-with insulin resistance, 3-with impaired glucose tolerance, 4-with diabetes type 2.

Results: Patients of gr.1 was demonstrated significantly less LV mass (LVM, g) - ($226,5 \pm 7,2$) and LVM index (g/m², 7) - ($57,9 \pm 2,1$), than patients gr.2 - ($263,1 \pm 9,4$), ($64,4 \pm 2,4$), 3 - ($259,7 \pm 7,8$), ($65,6 \pm 1,8$), 4 - ($296,8 \pm 13,1$), ($72,3 \pm 7$) (all $p < 0,001$). LVH evaluation was: in gr.1 - 77% (concentric LVH - 19%), 2 - 86% (26%), 3 - 95% (31%), 4 - 100% (37%). There were established significant correlation of LVH and LVMI with glucose level (for both $r = 0,32$; $p < 0,001$) and relative LV wall thickness with HOMA index ($r = 0,20$; $p < 0,05$ only at females). The independent association of LVM with potential predictors was confirmed by linear multiply regression analysis (beta for BMI = 0,33, for glucose = 0,22; (both $p < 0,001$), beta for systolic BP = 0,19, $p = 0,003$).

Conclusion: Carbohydrate disorders seems to increase LVM over the contribution of blood pressure levels, sex, BMI, age at patients not only with diabetes but also with prediabetes and may contribute to development of most prognostic unfavourable concentric LVH, especially at females.

PP.35.485 CLINICAL MANIFESTATIONS OF NONSIGNIFICANT RENAL ARTERY STENOSIS

A. Laucyte, M. Miglinas. *Vilnius University, Medical Faculty, Vilnius University Hospital Santariskiu Klinikos, Nephrology, Vilnius, Lithuania*

Background: Renal artery stenosis (RAS) can cause renovascular hypertension (RVH) and ischaemic nephropathy leading to end-stage renal disease. The issue of nonsignificant renal artery stenosis and its clinical correlates is largely unknown.

Purpose: To assess the clinical manifestations and the prevalence of target organ damage in nonsignificant renal artery stenosis.

Methods: This retrospective study was accomplished in the General Nephrology Unit at the Vilnius university hospital Santariskiu klinikos. Out-patient records and discharge summaries of 96 patients were analyzed. There were 42 male (mean age: $54 \pm 13,5$) and 54 female (mean age: $57 \pm 9,5$) patients. All subjects underwent computed tomography angiography (CTA) of renal arteries for resistant hypertension and/or unexplained renal failure in the year 2009. All of them had nonsignificant unilateral RAS (diameter reduction $< 50\%$). Imaging echocardiography was performed and signs of damage to the retina caused by hypertension were evaluated in all study subjectst. Laboratory values of serum creatinine, uric acid (UA), 24-hour urine protein, total serum cholesterol were analyzed.

Results: Hypertensive retinopathy was detected in 53% of patients; renal failure (creatinine > 115 mkmol/l for men, > 107 mkmol/l for women) was in 23%; left ventricular hypertrophy (LVH $> 126,9$ g/m² for men, $> 112,0$ g/m² for women) was presented in 78% of patients. Normalalbuminuria was found in 43,3 % ($n = 29$), microalbuminuria in 29,9% ($n = 20$), and macroalbuminuria/proteinuria in 26,9% ($n = 18$) of analyzed patients. Mean data values of study subjects were as follows: serum creatinine level (mkmol/l): 144 ± 96 ($n = 39$) in male patients, 99 ± 95 ($n = 44$) in female patients; uric acid level (mmol/l): 460 ± 271 ($n = 10$) in male patients; 356 ± 100 ($n = 5$) in female patients; total cholesterol level: $5,37 \pm 1,59$ in male patients ($n = 28$),

5.75 ± 1.79 (n=25) in female, 24-hour urine protein (mg/24hrs) 486,64 (range 4,00 to 9870,00).

Conclusion: The results suggest that even nonsignificant unilateral RAS is responsible for the high prevalence of target organ damage in this condition.

PP.35.486 MASKED ARTERIAL HYPERTENSION AND DAMAGE OF TARGET ORGANS

G. Chumakova¹, A. Kasarenko^{2,1}, N. Veselovskaya^{2,3}. ¹Altay State Medical University - Department of Hospital Therapy, Barnaul, Russia, ²Research Institute of Cardiology - Department of Multifocal Atherosclerosis, Kemerovo, Russia, ³Altay Cardiological Dispensary - Department of Hypertension, Barnaul, Russia

Objective: To reveal masked arterial hypertension at patients with damage of target organs.

Design and Methods: 38 men were at age from 24 to 45 years, whose office arterial blood pressure (BP) was high normal. But when the veloergometry was conducted it was found that all they had hypertensive reaction to the exercise stress. Were executed BP monitoring, an echocardiography, measuring thickness of intima-media (TIM) of carotids, and also level of microalbuminuria. It has been revealed that at 26 patients at BP monitoring was found increasing of systolic BP to 155 ± 23 mmHg or/and diastolic BP to 97 ± 10 the afternoon during 6,2 ± 1, 5 hours. Thus at 22 from the same patients had no sufficient decrease of BP at night (type «non dipper»). At 18 patients has been revealed microalbuminuria to 115 ± 21 mg/day. Also there was 21 patient who had the signs of initial hypertrophy of left ventricular with the index of mass myocardium under 156,7 ± 21,3 g/m². For 9 patients there was found an increase of TIM carotids to 1,3 ± 0,1 mm. For all patients was given recommendations to correct life-style and operating conditions.

Result: In a year after, investigations were repeated. It has been revealed that only third of patients corrected their life style and risk factors: have given up smoking, have lowered weight. In this group only 2 patients had new subclinical signs of damage of target organs. In addition at 5 of them has been revealed microalbuminuria, at 3 patients has been found the increase in an index of left ventricular weight, at 2 patients we found the increase of (TIM) more than 0,9 mm.

Conclusions: Revealing of the masked arterial hypertension is actual clinical problem, because it can help us to begin in due time preventive actions and to warn disease progressing. Also with help of BP monitoring it is possible to reveal increase both systolic and diastolic pressure within the several hours usually corresponding to working day.

PP.35.487 THE AFFECT OF THE REGRESSION OF THE LEFT VENTRICULAR HYPERTROPHY OF THE FUNCTIONAL CAPACITY IN HYPERTENSIVE PATIENTS

B. Lovic¹, M. Lovic², D. Lovic¹, I. Tasic², D. Djordjevic², N. Tasic². ¹Clinic for Internal Disease InterMedica-dr Lovic, Nis, Serbia, ²Institute Niska Banja, Nis, Serbia

The objective of our study was to evaluate the effects of long-term anti-hypertensive treatment (after 8 years) in left ventricular hypertrophy (LVH), physical working capacity and arrhythmogenic markers (QTc interval dispersion).

Methods: 73 hypertensive patients were analyzed (44 male, aged 55.4 ± 8 years and 29 female aged 57.3 ± 6 years) who were an antihypertensive treatment with echocardiographic LVH (left ventricular mass index: 163 ± 30.3 g/m²). Each subject underwent two-dimensional and Doppler echocardiography, 12-lead electrocardiogram examination and exercise stress testing (Bruce - protocol).

Results: Decrease of index LVM (I group - regression LVH) was achieved in 37 pts (51% - 172.2 vs 142.08 g/m²; p < 0.005), while in 36 pts it was increased (II group - progression LVH) (49% - 152.5 vs 158.7; ns). The reduction was due to a decrease in septal (13.4 vs 12.3; p < 0.05) and posterior wall thickness (11.4 vs 10.7 vs 1.2; p < 0.03), without changes in LV diameter. In patients of the I group ratio of the velocity time integrals of »E to »A mitral waves increase (E/A before Th 0.83 vs 0.92, p < 0.05). Patients with reduction of the left ventricular mass could be shown a significant reduction of QT dispersion from 64.9 ± 21.8 to 51.1 ± 15.9 ms (p < 0.009), opposite the patients with progression LVH (49.5 ± 14.5 vs 45 ± 12.5; ns). After regression LVH (I group), the functional capacity was increase (6.35 vs 7.56 METs; ns), decrease maximum systolic BP (205.7 vs 201.6 mmHg, ns), decrease peak double products (26.8 vs 26.2, ns), and significantly decrease double product/

METs (2.6 vs 1.9, p < 0.05) in third minutes while it remained unchanged in pts of the II group.

Conclusion: LVH regression in our patients was achieved by the decrease of wall thickness of the left ventricle and it is followed by the improvement of the functional capacity and by the reduction of QT dispersion.

PP.35.488 THE EVALUATION OF PWV IN ELASTIC AND MUSCULAR ARTERY TYPES AFTER THE ANTIHYPERTENSIVE THERAPY

S. Kushnir, J. Kudina, G. Ponomareva. Institute of Cardiology, Kiev, Ukraine

The aim of our research was to evaluate the influence of different anti-hypertensive drugs on elastic capacities of muscle and elastic arteries in patients with hypertension. 211 hypertensive patients (WHO - classification) took part in our research. All patients were performed weight growth measurement, left ventricular mass index, BMI, glomerular filtration measurements, office blood pressure, heart rate measurements, ambulatory blood pressure monitoring, biochemical blood analysis, PWV on muscular and elastic types arteries. Sartans, ACE inhibitors, CA find combination all had high antihypertensive effectivity, and lead to the aim levels of BP achievement, significant reduction of office SBP/DBP and mean SBP/DBP. Effective 6 - month long antihypertensive therapy lead to significant reduction of PWV on elastic and muscle artery types, independently of antihypertensive medicine class prescribed. In patients who were prescribed losartan the reduction of PWV on elastic and muscle artery types was more quick and greater significantly. Changes of PWV in patients who took ACE inhibitors, CA and combinative therapy correlated with the reduction of BP, while in patients, who took BRA this changes did not correlate with the degree of BP reduction.

PP.35.489 THE ROLE OF THE INVESTIGATION OF PULSE WAVE VELOCITY AND TOTAL PERIPHERAL RESISTANCE IN CARDIOVASCULAR RISK STRATIFICATION IN HYPERTENSIVE PATIENTS

D. Bajcsi, P. Légrády, G.Y. Ábrahám. 1st. Department of Internal Medicine, University of Szeged, Szeged, Hungary

Besides classical risk factors, non-invasive parameters investigating vasculature and measuring stiffness play more and more important role in cardiovascular risk stratification.

In our study we investigated the carotid-femoral pulse wave velocity (PWV), the augmentation index (Aix), the total peripheral resistance (TPR), the ascending aorta characteristic impedance (Zao) and the total arterial compliance (Cwk) in 16 hypertensive patients (HT, age: 46.4 ± 8.3 years) having small and moderate cardiovascular risk and in 16 metabolically healthy, normotensive control persons (C, age: 41.8 ± 9.91).

We measured PWV and Aix with PulsePen and determined the TPR, Zao and the Cwk at diastolic pressure - in lying and standing position.

In the group of HT patients the PWV (HT: 8.5 ± 4.07 m/s, C: 6.3 ± 1.10 m/s; p < 0.05), the TPR measured in lying (TPRI) and standing position (TPRs) were significantly greater than in control persons (TPRI: HT: 0.94 ± 0.414; C: 0.67 ± 0.147, p < 0.05; TPRs: HT: 1.10 ± 0.428; C: 0.82 ± 0.235); there was no statistically significant difference considering other parameters.

Regarding all the enrolled persons and investigating linear regression, the TPRI and TPRs negatively correlated with eGFR (calculated using the Cockcroft-Gault formula) (TPRI: p = 0.200, r = 0.415; TPRs: p = 0.008, r = 0.469), TPRI positively correlated with age (p = 0.031, r = 0.388). In multiple regression analysis we revealed significant negative correlation between TPRI and eGFR (p = 0.020, r = -0.459).

Considering only the HT patients, the TPRI and TPRs revealed positive correlation with age (TPRI: p = 0.020, r = 0.593; TPRs: p = 0.019, r = 0.597), the TPRI with the level of triglyceride (p = 0.037, r = 0.541), the TPRs negatively correlated with eGFR (p = 0.017, r = 0.606). In multiple regression analysis a significant positive correlation was found between TPRI and age (p = 0.020, t = 2.655), and negative between TPRs and eGFR (p = 0.017, t = -2.743).

In conclusion PWV and TPR values - also within normal range - could play a role in the risk stratification in middle-aged hypertensive patients having small and moderate cardiovascular risk. Considering our results the role of eGFR in estimating the cardiovascular risk in hypertensive patients not having renal insufficiency is worthwhile investigating further.

PP.35.490 RELATION BETWEEN THE SCORE CARDIOVASCULAR RISK AND ASYMPTOMATIC PERIPHERAL DISEASE IN HOPITALIZED PATIENTS

J. Tamarit-García¹, B. Roig-Espert², C. Sala-Sainz¹, F. García-Tolosa¹, A. Sáez-Segura¹, J. Giner-Morales¹, I. Carbonell-Casañ¹, L. Sánchez-Suárez¹, V. Navarro-Ibáñez², A. Artero-Mora¹. ¹Dr. Peset University Hospital, Valencia, Spain, ²Manises University Hospital, Valencia, Spain

Objectives: To determinate the relation between the cardiovascular risk measured by Score and the presence of peripheral arterial disease (PAD) (ankle brachial index (ABI) <0.9) in patients hospitalized in a Service of Internal Medicine and then, to value the degree of antiplatelet therapy for these patients with cardiovascular high risk and pathological ABI test.

Method: A transversal, observational and descriptive trial was carried out in hospitalized patients with acute diseases or deteriorated not vascular disease in our Internal Medicine Service during a 3-months period. Patients were selected according to the age, sex and cardiovascular risk factors such a smoking, high blood pressure, diabetes mellitus (DM), lipid disorders, personal and familiar cardiovascular precedents. Previous evidence of symptomatic arteriosclerosis, uncontrolled cancer or cognitive deterioration were exclusion criteria.

Results: Of 189 clinical checked histories, 41 patients fulfilled inclusion criteria and we observe the following distribution of the pathological ABI (<0.9) according to SCORE's classification:

- LOW RISK (<3%) - 0%
- MODERATE RISK (3-4%) - 21.4%
- HIGH RISK (5-9%) - 35.7 %
- VERY HIGH RISK (9%) - 42.9 %

* Percentage of patients with antiplatelet therapy depending on the SCORE classification and pathological ABI:

	MODERATE (21.4%)		HIGH (35.7%)		VERY HIGH (42.9%)	
	AA	No AA	AA	No AA	AA	No AA
ABI <0.9	25%	12.5%	11.1%	22.2%	42.8%	14.3%
ABI >0.9	0	62.5%	5.5%	61.2%	14.3%	28.6%

- AA = Antiagregation - No AA= No antiagregation.

Conclusions: There is a high prevalence of asymptomatic peripheral arterial disease that can be detected performing an ABI, simple and low cost test. A lot of patients with a low and a very high risk, during our study, don't necessarily have any benefit after an ABI test, because there will be no change in the therapeutic attitude. Patients with a moderate cardiovascular risk and without previous antiplatelet therapy are the group that would obtain a major benefit after the performance of the test. ABI test should be performed systematically in all moderate/high vascular risk hospitalized patients that don't have any antiplatelet therapy.

PP.35.491 EFFECTIVENESS OF OLMESARTAN IN COMBINED THERAPY WITH ZOFENOPRIL RELATED TO HYPERTENSION AND ORGAN DAMAGE IN ELDERLY PEOPLE

F. D'amico, C. Lo Balbo, G. Lombardo, G. Gaglio. *Department of Geriatrics, Laboratory of Hypertension, Laboratory of Cardiovascular Echography, Hospital of Patti, Messina, Italy*

Objective: Aim of this study was to evaluate the effectiveness of angiotensine II antagonist Olmesartan and the combined therapy with zofenopril ACE inhibitor on blood pressure and organ damage in elderly subjects.

Design and Method: We evaluated 43 elderly subjects (M 21, F 26, mean age 71±5) with mild-moderate hypertension. All subjects were administered Olmesartan 20 mg monotherapy and were studied for 12 months.

Those who still did not have controlled blood pressure after 4 weeks were also prescribed a 40 mg dose of Olmesartan or were associated Idroclorotiazide 12,5 mg or Zofenopril 30 mg. Design of the study included before and after follow-up: 1) clinic measurement of blood pressure; 2) ambulatory blood pressure measurement (ABPM); 3) colordoppler echocardiogram; 4) epiaortic colordoppler. Left ventricular hypertrophy (LVH) was assessed through the following criteria: MVS/1 > 125/110 gr/m²; MVS/h > 51/47 gr/h 2.7. Thickness of intima-media (IMT) carotid was assessed through IM >1.0 <1.3 mm.

Results: After 4 weeks: 1) 9 subjects maintained the same dose of 20 mg Olmesartan; 2) 11 subjects assumed a 40 mg dose of Olmesartan; 3) 12 subjects were associated Idroclorotiazide 12,5 mg; 4) 11 subjects were associated Zofenopril 30 mg. Before and after the follow-up period subjects treated with Olmesartan showed: 1) blood pressure: SBP 163±21 vs 134±13 mmHg (p < 0.01); DBP 97±11 vs 89±12 mmHg (p < 0.01); 2) PP: 78.16±4 vs 62.9±3 mmHg (p < 0.05); 3) LVH: 73% vs 57 % (p < 0.01); 4) IMT 2.3 ± 1.4 mm. vs 1.8 ± 1.2 mm. Patients treated with Olmesartan 20 mg. (p < 0.01) and Zofenopril 30 mg. showed a better control of BP also in the prevention of organ damage. .

Conclusions: Angiotensine II antagonist Olmesartan shows a good effectiveness on hypertension in elderly subjects and is able to check the evolution of cardiovascular organ damage. Patients administered a Olmesartan 20 mg and Zofenopril 30 mg. combined therapy showed better clinic results.

PP.35.492 THE INFLUENCE OF HYPERTENSION ON FEMOROPOPLITEAL BYPASSES PATENCY

A. Ban, I. Mirkovic, R. Vidos, D. Pikot, I. Srdoc, F. Rozman, A. Angelini, A. Ardic. *OB Pula, Surgery, Pula, Croatia*

The aim of the paper: On the basis of our own results and medicine literature we wanted to determine if hypertension influences the patency of femoropopliteal bypasses.

Methods: Documentation study and comparative method have been used.

Examinees: They were patients of the Pula General Hospital who underwent surgery in the Department of Surgery from January 1st 1991 to December 31st 2001. 131 patients underwent surgery and 147 femoropopliteal bypasses were implanted.

There were 55 hypertensive patients in the group examined who had 62 femoropopliteal bypasses implanted.

Results: The theory about endothel damage says that arteriosclerosis can occur due to mechanical causes, for example hypertension.

Hypertension is the cause for arteriosclerosis to occur more often and in earlier stages in places where blood strikes the blood vessel's wall and whirls, like in places where the vessels bend or branch. The kinetic energy of turbulent blood causes vibrations of the blood vessel's wall, turns into thermal energy and damages the endothel cells which facilitates the occurrence of arteriosclerosis. We were interested in the length of patency of femoropopliteal bypasses with hypertensive patients compared to non hypertensive patients. In our research 18 bypasses occluded in postoperative time with hypertensive patients. Due to gangrene development, in nine cases a leg amputation was needed. Gangrene occurred in four cases of bypasses occlusion done by prosthesis and in five cases of bypasses occlusion done by vein safena.

There were 30 cases of bypasses occlusion with non hypertensive patients. Gangrene development and leg amputation occurred in 17 cases.

There is not a statistically important difference in the number of gangrenes or amputations between hypertensive and non hypertensive patients.

Conclusion: In our research we did not determine a statistically important difference in the number of gangrenes and amputations occurrence with hypertensive and non hypertensive patients who had a bypass implanted due to arteries occlusion in the femoropopliteal segment of lower limbs.

POSTER SESSION

POSTER SESSION 38

HOT LINE 3

PP.38.493 HYPERTENSION IN TAKAYASU'S ARTERITIS

B. Ben Dhaou, F. Boussema, S. Ketari, O. Cherif, L. Rokbani. *Internal Medicine Department Habib Thameur Hospital, Tunis, Tunisia*

Introduction and Purpose: Takayasu's arteritis is a rare chronic inflammatory disease, which normally affects the aorta and its main branches, and less often, the pulmonary arteries. Hypertension is common in Takayasu's arteritis and may be related to changes of vascular compliance, renal vascular ischaemia with hyperreninaemia or increased sensitivity of the carotid body. The aim of our study was to determine the etiologic profile of hypertension in Takayasu's disease.

Patients and Methods: We carried out a retrospective study of 7 cases of Takayasu's arteritis admitted to our department from January 1999 to April 2009. Diagnosis was established according to the classification criteria of the American College of Rheumatology (ACR) in 1990.

Results: Seven women were studied; mean age at diagnosis was 34, 57 years. Classification criteria were abnormal arteriography in 100% of cases, diminished brachial pulses in 100%, vascular bruits in 85%, claudication of lower limbs in 57%, difference of blood pressure between arms ($>10\text{mmHg}$) in 57% and age <40 years in 85%. Mean clinical manifestations were malaise in 42%, syncope in 14%, acute cerebrovascular accident in 14%, arthralgia in 28% and visual disorders in 28% of cases. Hypertension was noted in 4 cases (57%). The mean age was 25.5 years (21 – 35 years). In the 4 cases arteriography was abnormal showing renal artery stenosis. Stenosis was bilateral in one case. In one case, the patient was admitted for malignant hypertension and the diagnosis of TA was making. All patients were treated with calcic blockers drugs in association with specific treatment. The surgical treatment was angioplasty of the left renal artery in one case and bypass of the left renal artery in one case.

Conclusion: The diagnosis and treatment of hypertension in this disease is imperative, as the commonest causes of death are congestive heart failure, myocardial infarction and strokes, while retinopathy and severe systemic hypertension are predictive of increased mortality.

PP.38.494 ARTERIAL WAVE REFLECTION AND ARTERIAL STIFFNESS INDEPENDENTLY PREDICT CARDIOVASCULAR EVENTS

T. Weber¹, M. Ammer¹, C. Biber¹, M. Windpessl¹, S. Wassertheurer^{2,3}, B. Hametner², C. Mayer², J. Kropf^{2,3}, M. Rammer¹, E. Lassnig¹, B. Eber¹. *¹Cardiology Department Klinikum Wels-Grieskirchen, Wels, Austria, ²Health and Environment Department, Austrian Institute of Technology, Vienna, Austria, ³Institute of Analysis and Scientific Computing, Vienna University of Technology, Vienna, Austria*

Background: Whereas the predictive value of wave reflection (pressure augmentation-AP) and arterial stiffness (pulse wave velocity-PWV) on cardiovascular events has been shown in different populations, only very few studies investigated their independent prognostic impact.

Methods, patients: In 654 patients (372 men, mean age 62.8 years) with preserved systolic function undergoing coronary angiography for suspected coronary artery disease (CAD), we measured aortic PWV invasively. Wave reflections were determined from non-invasive radial tonometry and transfer-function derived aortic waveforms, using pulse wave analysis (AP) as well as pulse wave separation (amplitude of forward – Pf – and backward – Pb – wave). Wave separation technique was based on mechanistic flow models and validated against combined ECHO-doppler and pressure measurements in 131 patients. A combined cardiovascular endpoint (death, myocardial infarction, stroke, coronary, cerebrovascular and peripheral revasculari-

zation) served as outcome variable in uni- and multivariate Cox proportional hazards regression models.

Results: After a mean follow-up of 1110 days, 87 patients reached the combined endpoint. In univariate analysis, the relative risk of the combined endpoint increased with increasing levels of AP (for 1 SD, i.e. 8.0 mm Hg, relative risk 1.23; 95% CI 1.04–1.46; $p=0.017$), Pf (for 1 SD, i.e. 9.4 mm Hg, relative risk 1.34; 95% CI 1.11–1.55; $p=0.001$), Pb (for 1 SD, i.e. 6.9 mm Hg, relative risk 1.34; 95% CI 1.13–1.59; $p=0.0008$), and aortic PWV (for 1 SD, i.e. 2.4 m/sec, relative risk 1.36; 95% CI 1.17–1.58; $p<0.0001$), respectively.

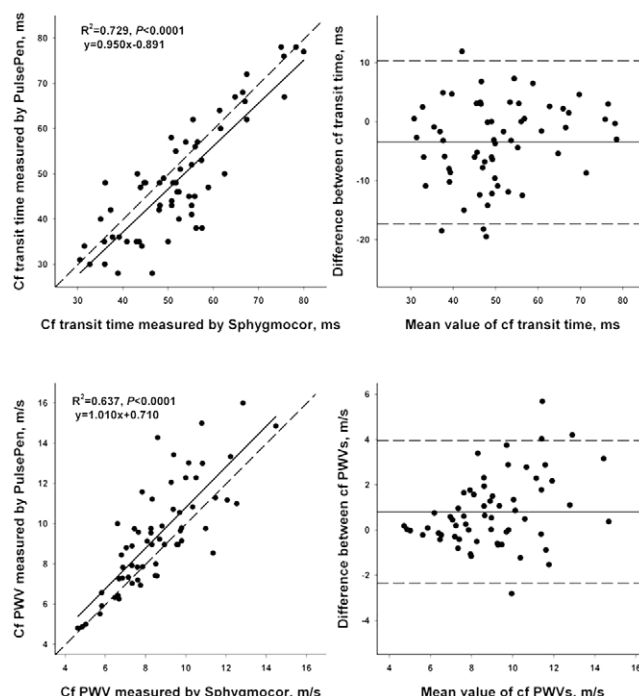
In multivariate analysis, Pb (relative risk for 1 SD 1.32; 95% CI 1.05–1.66; $p=0.017$) or Pf (relative risk for 1 SD 1.27; 95% CI 1.02–1.57; $p=0.03$) and aortic PWV (relative risk for 1 SD 1.26 and 1.27 and $p=0.03$ with models including Pb and Pf, respectively) remained significantly associated with the occurrence of the combined endpoint after adjustment for gender, age, smoking status, extent of CAD, presence of peripheral arterial disease, diastolic function, and mean blood pressure.

Conclusion: Arterial stiffness as well as wave reflections are important and independent predictors of cardiovascular risk.

PP.38.495 RANDOMIZED COMPARISON STUDY OF HEMODYNAMIC PARAMETERS OBTAINED FROM TWO TONOMETRY-BASED DEVICES

Y. Zhang¹, D. Agnoletti¹, M.E. Safar¹, P. Salvi², J. Topouchian³, A.D. Protogerou⁴, J. Blacher¹. *¹Paris Descartes University; AP-HP; Diagnosis and Therapeutic Center, Hôtel-Dieu, Paris, France, ²Department of Geriatrics, University of Nancy, Nancy, France, ³Centre de Médecine Cardiovasculaire, Paris, France, ⁴Hypertension Center, Department of Propædæutic Medicine, Laiko Hospital, National and Kapodistrian University of Athens, Athens, Greece*

Objective: The present study aimed to compare hemodynamic parameters assessed by Sphygmocor and PulsePen.



Methods: Measurements of pulse wave analysis (PWA) and velocity (PWV) were obtained by the two broadly-used tonometry-based devices,

Sphygmocor and PulsePen, in 68 consecutive patients (59.5 $\pm$ 15.7 years) from our cardiovascular department.

Results: All hemodynamic variables, including PWV, carotid systolic blood pressure (cSBP) and carotid augmentation index (cAI), measured by the two devices were strongly correlated ($R \div \leq 0.637$, $P < 0.0001$). Although compared to Sphygmocor, PulsePen significantly estimated higher PWV, cSBP and cAI, by 0.8 ± 1.5 m/s, 4.7 ± 10.2 mmHg and 5.7 ± 10.2 %, respectively, no significant interclass difference was found between the two devices ($P \leq 0.065$). Furthermore, high interclass correlation coefficients ($ICC > 0.76$) were obtained when the two devices were compared, and no significant difference was observed between 1 and slopes of correlation plots of hemodynamic parameters, which varied from 0.888 to 1.010.

Conclusions: The significant discrepancies of hemodynamic parameters observed between Sphygmocor and PulsePen were neglectable in the setting of population study, and did not influence the capability of the two device in cardiovascular risk assessment for individual.

PP.38.496 DIFFERENCES IN BIOAVAILABILITY OF NIFEDIPINE OSMOTIC PUSH-PULL SYSTEMS: PREDICTIVE RESULTS FROM IN-VITRO COMPARED TO IN-VIVO

M. Anschutz¹, M. Wonnemann², B. Schug¹, C. Toal³, F. Donath¹, A. Pontius⁴, K. Pauli⁴, E. Brendel⁵, H. Blume¹. ¹SocraTec R&D GmbH, Oberursel, Germany, ²SocraMetrics GmbH, Erfurt, Germany, ³Bayer Inc., Toronto, Canada, ⁴Bayer HealthCare, Berlin, Germany, ⁵Bayer HealthCare, Elberfeld, Germany

Two similar osmotic push-pull systems were investigated in-vitro and compared to in-vivo PK data obtained in healthy subjects. Reference contains a bilayer core and Test contains a monolayer core. Identical batches were used for in-vitro and in-vivo testing of the products having a marketing authorisation in Canada.

In-vitro dissolution tests over 24 hours were performed prior to the study. The clinical study was conducted in a 4-period crossover design with 26 subjects. Investigations were performed under fasting or fed conditions.

Accumulated 24-hour in-vitro tests were performed using USP paddle apparatus in 900 mL surfactant-containing buffer under sink conditions at 37°C. 12 tablets of each product were investigated. Samples were taken every 60 minutes and nifedipine concentration was determined using HPLC.

After oral administration, blood samples were taken until 48 h post dosing. Quantification in plasma was performed using validated HPLC-MS/MS method. PK parameters were determined model-independently for each treatment directly from measured concentrations.

In-vitro profiles of Test and Reference indicated deviations in initial and terminal release of nifedipine with later onset and lower quantity of drug release for Test, which were confirmed by the findings obtained from in-vivo investigations. Test showed a delayed onset of absorption combined with a later achievement of the plateau phase. Parameter for early exposure, AUC0-tmax(Ref) differed between both products by almost a factor of two.

Under fasting condition, C_{max}-values obtained were equivalent, but for total exposure, determined as AUC_{0-tlast}, 90% confidence intervals for mean ratio Test/Reference surpassed acceptance range and bioequivalence could not be shown. Confirmation of bioequivalence was not possible under fed condition, where point estimates indicated a reduction of almost 20% and confidence intervals did not include 100%.

Differences in completeness of delayed onset and drug release from monolayer system as observed in-vitro is obviously relevant for in-vivo performance and led to delayed onset of absorption and lower exposure, especially under fed condition. These significant differences may have clinical implications for blood pressure control.

PP.38.497 EFFECT OF AN EDUCATIONAL INTERVENTION ON WEIGHT AND BLOOD PRESSURE IN OBESE HYPERTENSIVE PATIENTS. TWO YEARS OF FOLLOW-UP

A. Gonzalez-Benitez¹, A. Prudencio Muñoz², G. Jarava Rol¹, G. Uribarri Sanchez¹, V. Castellanos Guerrero², M. Maiz Jimenez¹, A. Perez Rivera¹, C. Luque Amado¹, A. Muñoz Claros¹, I. Gallardo¹, A. Ruiz Cantero. ¹Internal Medicine Department, Hospital La Serrania, Ronda, Spain, ²Hypertension Out-patient Clinic, Hospital La Serrania, Ronda, Spain

Objective: To assess the effect on weight and blood pressure of an educational intervention in obese hypertensive patients.

Material and Methods: A before-after study was conducted to evaluate the effect of a 12-month educational intervention on weight and blood pressure in obese hypertensive patients. The individualized educational programme consisted of: nutrition information, motivation test, individualized portion-controlled diet and reinforcement of information once a month with measurement of weight, waist circumference (WC) and BMI. Measurements of BMI (kg/m²), WC (cms), systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean arterial pressure (MAP) were performed at the beginning of the study, one year later (when the educational intervention ended) and two years later.

Results: 61 patients were studied (32 men, 29 women), aged 59.84 $\pm$ 14.59. BMI decreased in 56 patients (91.8%) and WC in 54 patients (88.5%). The evolution of BMI and WC was: BMI0 33.68 $\pm$ 3.56, BMI1 31.65 $\pm$ 4.29, BMI2 31.27 $\pm$ 3.94, WC0 107.36 $\pm$ 10.65, WC1 104.04 $\pm$ 10.94, WC2 102.75 $\pm$ 10.36. There were differences statistically significant among BMI0 and BMI1 (average reduction 2.03, IC95% 1.46, 2.59, $p < 0.05$). BMI1 and BMI2 were similar. The average reduction of WC was 3.31 (IC95% 1.94, 4.68), $p < 0.05$, at one year and 4.61 (IC95% 3.06, 6.17), $p < 0.05$, at two years. The evolution of SBP, DBP and MAP was: SBP0 138.33 $\pm$ 15.30, SBP1 136.12 $\pm$ 16.26, SBP2 125.76 $\pm$ 15.30, DBP0 83.77 $\pm$ 8.37, DBP1 82.29 $\pm$ 9.45, DBP2 75.69 $\pm$ 7.42, MAP0 102.71 $\pm$ 10.08, MAP1 101.14 $\pm$ 11.16, MAP2 92.5 $\pm$ 11.11. The reduction in blood pressure at one year is not statistically significant, but it reaches statistical significance at two years: average reduction in SBP 12.89 mmHg (IC95% 8.63–17.10) $p < 0.05$, in DBP 8.30 (IC95% 5.88–10.72) $p < 0.05$ and in MAP 10.45 (IC95% 7.24–13.67) $p < 0.05$.

Conclusion: An individualized educational intervention in obese hypertensive patients lowers BMI, WC and blood pressure among studied individuals. Waist circumference continues its reduction after concluding the intervention.

PP.38.498 FURTHER TREATMENT IN UNCONTROLLED HYPERTENSIVE PATIENTS WITH EXFORGE (FUTURE STUDY)

I. Barna¹, K. Nagy, L. Pál, ZS. Schanberg. ¹Semmelweis University Faculty of Medicine I.Dept.of Int.Med, Budapest, Hungary, ²Novartis Hungary Healthcare, Budapest, Hungary

Objective: To evaluate the efficacy of Exforge[®] (single-pill combination of amlodipine and valsartan) therapy in hypertensive patients who were previously uncontrolled (SBP $\geq$ 140 mmHg and/or DBP $\geq$ 90 mmHg) with amlodipine mono- or amlodipine based combination therapy. Secondary objectives were tolerability and compliance with Exforge[®] therapy.

Patients and Methods: An open-label, multicenter, non-interventional, observational study, evaluated 3390 consecutive patients (mean age 58.36 $\pm$ 12.11 years) at baseline (visit 1) and at weeks 4, 8, 12 (visits 2–4). The administration of Exforge[®] was done according to the approved prescribing information and dosage left to the discretion of the physician. Vital signs, risk stratification, medical treatment, adverse events, compliance and laboratory parameters (optional) were recorded at each visit. Repeated measures analyses of variance, and Friedman χ^2 and McNemar χ^2 tests were applied for continuous and categorical variables, respectively. The significance level was 5%.

Results: Mean sitting blood pressure was 164.2/94.9 mmHg at baseline, and 131.0/79.8 mmHg at week 12, reflecting a reduction of 33/15 mmHg ($p < 0.0001$). 75.9% of the total patient population reached the target blood pressure $< 140/90$ mmHg at week 12. 64.8% of patients reaching this blood pressure target were treated exclusively with Exforge[®]. The average dose of Exforge was 6.36 ($\pm$ 2.13) mg amlodipin/126.26 ($\pm$ 37.15) mg valsartan. No clinically relevant changes regarding the laboratory parameters (total plasma cholesterol, LDL-cholesterol, HDL-cholesterol, blood sugar, serum GOT and GPT, serum creatinine and potassium) were observed during the study. The Exforge[®] therapy was well tolerated, the most frequent AE was localized oedema (1.9%). Patient compliance to Exforge[®] therapy reached 94.3% at week 12.

Conclusion: Exforge[®] provides powerful incremental BP reductions in patients uncontrolled on amlodipine mono- and amlodipine-based therapies with excellent patient compliance and good tolerability.

PP.38.499 THE INFLUENCE OF DIFFERENT ANTIHYPERTENSIVE DRUGS ON BLOOD PRESSURE VARIABILITY

S. Negrea, L. Latea, S. Bolboaca. University of Medicine and Pharmacy Iuliu Hatieganu, Cluj-Napoca, Romania

Background: The exploration of Blood Pressure (BP) variability and of the influence of different antihypertensive drugs on BP variability may improve

understanding of the mechanism involved in BP changes induced by drugs. We therefore evaluated the long-term effects of the angiotensin-receptor blocker Valsartan and of the ultrasensitive beta blocker Nebivolol.

Methods: A prospective study was conducted at the regional outpatient Diagnosis and Treatment Center from Cluj-Napoca, Romania. The study included newly diagnosed adult hypertensives of either sex. All patients underwent 24 hour ambulatory blood pressure monitoring (ABPM) and systolic and diastolic 24 hour blood pressure variability was measured. A total of 80 hypertensive patients were randomly assigned to receive 80 mg of Valsartan or 5 mg of Nebivolol. Patients were divided into two groups according to antihypertensive medication: group A included 42 hypertensive patients treated with Valsartan and group B included 38 hypertensive patients treated with Nebivolol.

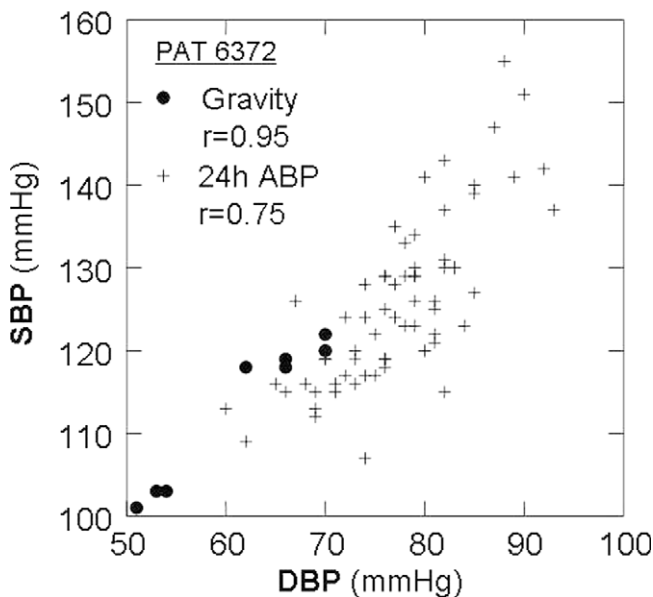
Results: Both Valsartan and Nebivolol decreased 24h BP variability but long-term treatment with Valsartan proved to be more efficient in reducing SBP variability during the night time period. Valsartan significantly reduced systolic BP variability during the night time period when compared to Nebivolol (-10.35 ± 3.01 mmHg vs. 6.27 ± 4.26 mmHg, $p < 0.05$).

Conclusions: Treatment with ARBs (Valsartan) and BBs (Nebivolol) efficiently reduces the BP variability during the day and night period of time as first line antihypertensive agents. Valsartan significantly reduces systolic BP variability during the night time period when compared to Nebivolol. Antihypertensive treatment using long acting agents like an angiotensin receptor blocker or an ultrasensitive beta blocker could offer a better cardiovascular protection by reducing the BP variability.

PP.38.500 **COMPARING THE SYSTOLIC-DIASTOLIC PRESSURES RELATIONSHIP DETERMINED USING 24H AMBULATORY VERSUS GRAVITY GENERATED BLOOD PRESSURE VARIATIONS IN RESPONSE TO CHANGING ARM LEVEL**

M. Bursztyn¹, M. Litvak¹, J. Mekler¹, B. Gavish², ¹Hadassah-Hebrew University Medical Center, Mount-Scopus, Jerusalem, Israel, ²Intercure Ltd., Lod, Israel

Objectives: To examine relationship between 24-hour systolic BP (SBP) and diastolic BP (DBP), compared to relationship from few office measurements at different arm levels (Gravity method).



Methods: Forty patients, M/F 18/22; age 58 ± 13 , 70% medicated; average 24h BP $129 \pm 11/76 \pm 10$ mmHg. A series of nine BP measurements were performed consecutively, using the same device, at arm levels that positioned the cuff center at 4 different vertical levels (heart; shoulder; shoulder-head; head). An example is shown below. The measurements took 15–20 minutes. SBP and DBP variability generated from the effect of gravity on BP, was expressed by standard deviations SDs and SDd, respectively. SBP-on-DBP slope was estimated by the expression SDs/SDd , called BP Variability Ratio (BPVR). A related variable called Arterial Stiffness Index (ASI) was estimated by $1 - 1/BPVR$.

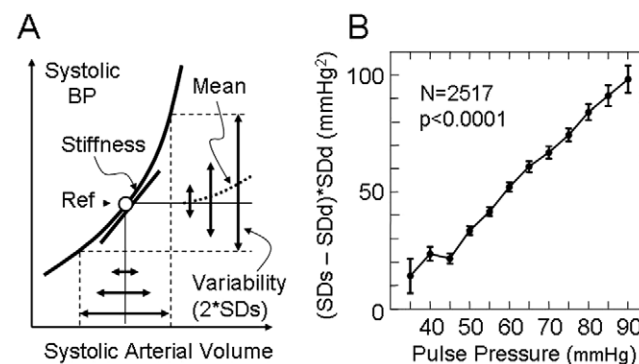
Results: BPVR (mean $\pm$ SE) estimated from Gravity and ambulatory methods were 1.25 ± 0.07 and 1.36 ± 0.04 respectively ($p > 0.1$). For BPVR restricted to over 0.85 (35 of 40 patients), the same comparison gives 1.34 ± 0.07 vs. 1.37 ± 0.05 ($p > 0.6$). However, individual BPVRs were weakly correlated ($r = 0.32$). The SBP-DBP correlation coefficient was better using the Gravity method 0.92 ± 0.01 vs. 0.74 ± 0.01 ($p < 0.0001$). This difference compensated the effect of over-7-fold smaller number of data points but resulted in a similar average SE of BPVR for individual patients (6.6% vs 4.9%). Age and pulse-pressure dependences were similar in both methods. The Gravity and ambulatory methods provide similar values for restricted BPVR in medicated (1.37 ± 0.08 vs. 1.40 ± 0.06 , $p > 0.7$) and unmedicated patients (1.25 ± 0.13 vs. 1.28 ± 0.08 , $p > 0.8$). BP variability achieved by the Gravity method was comparable to the ambulatory one $10.6/8.2$ vs $13.5/10.0$ mmHg (nearly 80%), as was ASI.

Conclusion: Relationship of SBP to DBP variability generated by employing gravity effect at different arm levels during a short clinic visit are similar to prognostically important one obtained during 24 hour ABPM.

PP.38.501 **A FUNDAMENTAL RELATIONSHIP BETWEEN BLOOD PRESSURE DISPERSION AND ARTERIAL PROPERTIES**

B. Gavish. Intercure Ltd., Clinical and Regulatory, Lod, Israel

Evidence shows that blood pressure (BP) variability may depend on mean BP and possesses prognostic significance. Using model approach this study aimed to show that the known increase of arterial stiffness at greater pressures is a mechanism that couples average BP to variability. The 'static' mechanical properties arteries in situ is characterized by the variation of arterial pressure P in response to changes in blood volume V (or arterial diameter), as illustrated in Figure A. On this P-V curve arterial stiffness at a reference point (e.g. at the systolic BP (SBP) or diastolic BP (DBP)) is represented by the slope of the curve that becomes steeper at higher pressures. Such P-V 'curving' actually transforms volume variations with increasing amplitude (3 values are shown), but having the same mean value, into corresponding pressure variations with mean value that increases for greater BP variability. Real arteries frequently display exponential dependence of P on V with exponent called 'stiffness index'. Expressing BP variability by the standard deviation (SD), a mathematical model shows that the BP variance (SD^2) is proportional to the deviation of the average BP from a reference value. The proportionality constant includes both the arterial stiffness at the reference point and the 'stiffness index', both known to depend on age and condition. This result can be shown to predict the well-established linear relationship between repeatedly measured SBP and DBP and expresses the SBP-on-DBP slope by the ratio between systolic to diastolic stiffness. Furthermore, the product ($SD_{sbp} - SD_{dbp}$) SD_{dbp} is predicted to vary linearly with the pulse pressure (PP). This predicted correlation was tested by applying multi-linear regression to 24h ABPM data of 2517 patients ($R = 0.53$) and the result is presented graphically in figure B (adjusted to age, SBP-DBP correlation coefficient and PP dipping). In conclusion, the present model provides testable analytic expressions for the interrelationship between average BP, BP variability and risk-related mechanical properties of an artery.



PP.38.502 **RELATIONSHIP BETWEEN WORK PLACE BLOOD PRESSURE LEVEL AND PSYCHOLOGICAL STATUS IN PATIENTS WITH ARTERIAL HYPERTENSION**

G. Andreeva¹, O. Isaikina¹, D. Liysin², V. Gorbunov¹, O. Lerman¹, A. Malysheva¹, ¹National Research Centre for Preventive Medicine, Moscow, Russia, ²Institute of Psychology of Russian Academy of Sciences, Moscow, Russia

Objective: The aim of our study was to determine relationship between psychological status (PS), emotional intelligence (EI) and mean ambulatory blood pressure monitoring (ABPM) level in work place in untreated patients with arterial hypertension (AH).

Design and Methods: We analyzed 307 ambulatory blood pressure monitoring (ABPM) data of AH patients without serious concomitant diseases. ABPM monitor (Spacelabs 90207) was applied after the washout period. We defined daytime period as 8.00–22.00, nighttime 0.00–6.00. BP in work place was assessed as mean BP during 11.00–19.00 period (BPw). After ABPM session patients completed the PS and EI questionnaire: Minnesota Multiphase Personality Inventory (MMPI) and EmIn Questionnaire by Lyusin D. We analyzed following EmIn scale scores: 1) emotion self-awareness; 2) management of one's own emotions; 3) control of emotional expression; 4) understanding others' emotions; 5) management of others' emotions (MOE). We used Spearman Partial Coefficient for correlation analysis adjusted for age, sex and duration of AH.

Results: The mean daytime systolic BP (SBP) was 140.1 ± 14.5 ; diastolic (DBP) - 88.1 ± 9.9 mm Hg (M $\pm$ SD). We found negative correlations ($p > 0.05$) between: 1) 2, 7 (MMPI) scale scores and mean systolic BPw; 2) 7 (MMPI) scale scores and diastolic BPw level. MOE (EmIn) scale scores were positively correlated with SBPw level. Thus, work place SBP level was related with management of others' emotions (MOE scale) level. In contrast, asthenia behavioral type characterized by social conform, compassion, leadership traits absence e. t. c. (2, 7 scale) was negatively associated with BP level in work period.

Conclusions: Higher social conform, compassion, leadership traits absence was associated with lower BP level in work place. In contrast, higher behavioral interpersonal management was combined with higher SBP level during working period.

Table. Correlations between MMPI, EmIn scale scores and mean ABPM level in work place

BP scores	DPBw	SBPw
For MMPI scale scores		
2	Ns	-0.22
7	-0.17	-0.26
For EmIn scale scores		
MOE	ns	0.42

ns – no significant correlations

PP.38.503 CHRONOLOGY OF THE ARTERIAL HYPERTENSION ASSOCIATED WITH GROWTH FACTOR RECEPTOR INHIBITING TREATMENTS DERIVED FROM VASCULAR ENDOTHELIUM IN PATIENTS WITH CANCER

J. Fuentes Pradera¹, A. Grilo Reina², A. Lopez Ladron¹, E. Fernandez Parra¹, R. Bernabe Caro¹, M. Rodriguez Borbolla¹, I. Gallego Jimenez¹, J. Salvador Bofill¹. ¹Hospital Virgen De Valme. Oncology, Seville, Spain, ²Hospital Virgen De Valme. Internal Medicine, Seville, Spain

Purpose: Angiogenesis plays a major role in cancer. Drugs blocking the growth factor receptor in the vascular endothelium constitute a fundamental treatment in several cancers. Hypertension (HBP) associated with these treatments is frequent and presents in an oscillating and irregular way and is generally controlled by scarcely reliable means.

Methods: We started a prospective study with the execution of pre- and post-treatment 24 h-ambulatory blood pressure monitoring (ABPM) and selfmeasured of BP every 12 hours at home, in patients with cancer under treatment with either bevacizumab or sunitinib with a view to identifying the variations in ABPM and the onset of HBP at an early stage so as to optimize treatment. For ABPM, a validated recording device was used; a recording was made prior to the start of the anti-angiogenic treatment and 20 days (at least) after the first dose. An OMRON M6 tensiometer validated by the European HBP Society was used, with the ambulatory BP figures being collected at home as per standards. The primary goal is to find differences of at least 16 mmHg in the mean BP between the two ABPM readings.

Results: N = 20. Seventeen patients received bevacizumab and three sunitinib. Mean age 57.0 years (26–79). Three patients was known to be hypertensive. There is a mean interval of 31 days between the two ABPM readings. Differences of 4.3 and 3.2 mmHg were found between the mean systolic and diastolic BPs before and after treatment. For daytime systolic and diastolic BPs, the differences in the means were 3.2 and 2.4 mmHg while for nocturnal values they were 6 and 3.5 mmHg. A total of 1,040 pressure determinations were effected at home with a mean early-morning BP of 124.45/82.13 mmHg and 119.94/79.22 mmHg in the evening.

Conclusions: Treatment with anti-angiogenics in patients with cancer increases BP early on as measured by ABPM. The data point to a greater increase in nocturnal BP suggesting a non-dipper pattern. Recruitment continues.

PP.38.504 24-HOURS ABPM-CTR STUDY: DIABETIC HYPERTENSIVE PATIENTS PRELIMINARY DATA

E. Greco¹, R. Greco², P. Tricarico Rosano¹. ¹Institute Ninetta Rosano-Clinica Tricarico, Belvedere M.mo (CS), Italy, ²Scientific Institute-Ospedale San Raffaele, Milano, Italy

Background and Aims: The aim of this study was to quantify the data of the 24-h ABPM obtained from the hypertensive patients that were hospitalized at the Department of Internal Medicine of our medical center from year 2007 to year 2009.

Methods: From January 2007 to December 2009 the 24-h ABPM was taken to all hypertensive patients that were hospitalized at the Department of Internal Medicine of our medical center; Day Phase= 06.00 to 21.59 – Night Phase= 22.00 To 05.59; Minimal number of measurements successful= 60.

Patients.

- Hypertensive male and female patients aged >18 years
- were not receiving antihypertensive drugs or that were receiving one, two, three or more antihypertensive drugs
- with or without cardiovascular Risk Factors or Diabetes Mellitus or Metabolic Syndrome or Cardiovascular or Renal Disease.

Results: These data are reported to 51 Diabetic patients (39.2%) of 130 examined hypertensive patients (P) of 800.

BLOOD PRESSURE

Normal BP 21 (41.1%)

High-Normal BP 16 (31.4%)

Grade 1 Hypertension 8 (15.7%)

Grade 2 Hypertension 0 (0.0%)

Grade 3 Hypertension 0 (0.0%)

Isolated Systolic Hypertension 1° 6 (11.8%)

BP DIPPING STATUS

Extreme-dippers 5 (9.8%)

Dippers 4 (7.8%)

Non-dippers 31 (60.8%)

Reverse-dippers 11 (21.6%)

ANTIHYPERTENSIVE DRUGS

0 D 4 (7.8%)

1 D 11 (21.6%)

2 D 19 (37.2%)

3 D 11 (21.6%)

4 D 6 (11.8%)

CLASS OF DRUG

ACEI 11 (21.6%)

ARBS 29 (56.9%)

DIUR 32 (62.8%)

CCB 15 (29.4%)

BB 16 (31.4%)

αB 1 (2.0%)

RISK FACTORS / ASSOCIATED CLINICAL CONDITIONS

Dyslipidaemia 36 (70.6%)

Atrial Fibrillation 4 (7.8%)

Left Ventricular Hypertrophy 39 (76.5%)

Renal Disease 4 (7.8%)

Peripheral Vascular Disease

-Carotid Arteries 34 (66.6%)

-Peripheral Arteries 16 (31.4%)

Stroke/TIA 7 (13.7%)

Myocardial Infarction/Angina/Heart Failure 5 (9.8%)

Discussion/Conclusion: These preliminary data indicate that many of our diabetic hypertensive patients (72.5%) had normal or high-normal blood pressure, Non-dippers pattern (60.8%), heart rate 70–89 bpm (66.6%), were receiving two antihypertensive drugs (37.2%) (ARBS 56.9% / Diuretics 62.8%), presented Dyslipidaemia (70.6%), LVH (76.5%), Peripheral Vascular Disease (Carotid Arteries 66.6% / Peripheral Arteries 31.4%).

We attend the definitive data for a best evaluation of the diabetic hypertensive patients.

PP.38.505 ALISKIREN WITH OR WITHOUT HYDROCHLOROTHIAZIDE LOWERS BLOOD PRESSURE EFFECTIVELY IN PATIENTS WITH STAGE 2 HYPERTENSION AND METABOLIC SYNDROME

F. Zieve¹, A. Yadao², C. Yurkovic², S. Kandala³, G. Ledesma⁴. ¹McGuire Veterans Affairs Medical Center, Richmond, USA, ²Novartis Pharmaceuticals Corporation, East Hanover, USA, ³Novartis Healthcare Pvt., Hyderabad, India, ⁴Arlington Family Research Center, Arlington, USA

Objectives: More than one-third of patients with hypertension have metabolic syndrome, a condition characterized by the co-occurrence of inter-related metabolic abnormalities that increase the risk of cardiovascular disease. These patients typically require treatment with two or more anti-hypertensive agents to achieve blood pressure (BP) control. This 8-week, double-blind study assessed the efficacy and safety of the direct renin inhibitor aliskiren, alone and in combination with the diuretic hydrochlorothiazide (HCT), in patients with stage 2 systolic hypertension (baseline mean sitting systolic BP [msSBP] 160–<200 mmHg) and metabolic syndrome (as defined by NCEP ATP III criteria).

Methods: After an initial washout (1–4 weeks), 532 patients were randomized to once-daily aliskiren/HCT 150/12.5 mg or aliskiren 150 mg for 1 week. Doses were then doubled and treatment continued for another 7 weeks. Changes from baseline in msSBP and mean sitting diastolic BP (msDBP) were evaluated using ANCOVA with treatment and region as factors, and baseline BP as a covariate. The proportion of patients achieving BP goal (msSBP/DBP <140/90 mmHg) was also assessed.

Results: Overall baseline BP was 165.9/95.6 mmHg. Both aliskiren/HCT and aliskiren provided large BP reductions from baseline at week 8 endpoint (Table). The BP reductions differed significantly between treatments, with least-squares mean differences of –10.2 mmHg (95% CI: –12.9, –7.5; $p < 0.0001$) for msSBP and –4.4 mmHg (95% CI: –6.0, –2.8; $p < 0.0001$) for msDBP. A significantly greater proportion of patients treated with aliskiren/HCT achieved BP goal at week 8 endpoint than with aliskiren alone (58.7% vs 34.5%; $p < 0.0001$). Both treatments were generally well tolerated.

Conclusion: Aliskiren monotherapy provided large SBP reductions (–20 mmHg) in patients with stage 2 hypertension and metabolic syndrome. Aliskiren/HCT provided even greater SBP reductions (–30 mmHg) and brought more patients to BP goal. Aliskiren, alone or in combination with

HCT, is a highly effective treatment option for patients with stage 2 hypertension and metabolic syndrome.

	Aliskiren 300 mg (n = 265)	Aliskiren/HCT 300/25 mg (n = 267)
Mean baseline BP, mmHg	165.5/95.5	166.3/95.6
<i>Change from baseline at week 8 endpoint, mmHg^a</i>		
msSBP	–20.2 ± 1.0	–30.4 ± 1.0*
msDBP	–6.9 ± 0.6	–11.3 ± 0.6*
Proportion of patients at BP goal ^a	34.5%	58.7%*

* $p < 0.0001$ vs aliskiren alone. Changes from baseline are least-squares mean ± SEM.

^aPatients with data at baseline and at least one post-baseline observation (aliskiren, n = 261; aliskiren/HCT, n = 264).

PP.38.506 THE REDUCE OF BLOOD PRESSURE UNDER MEDICAL TREATMENT OF VARENICLINE AND BEHAVIOURAL INTERVENTION IN LONG-TERM SMOKERS

D. Hecht Von Saldern¹, H. Schunkert², J. Weil³. ¹University Hospital, Department of Cardiology, Lübeck, Germany, ²University Hospital, Department of Cardiology, Lübeck, Germany, ³University Hospital, Department of Cardiology, Lübeck, Germany

The substances in tobacco smoke can promote hypertension and a lot of diseases. Cigarette smokers at risk should therefore receive comprehensive treatment interventions including pharmacotherapy. Varenicline, a partial nicotinic acetylcholine receptor agonist, is an effective drug to endorse smoking cessation.

Objectives: The objectives of the present study are to describe core elements of this anti-smoker program and present data concerning its reach and effectiveness.

Program Description: The goal was to increase the number of individuals who are abstinent from smoking after 12 months. Program included: global assessment of cardiovascular risk (ESC Euro score Germany), documentation of smoking status at baseline; inclusion of cessation intervention on patient care maps; individualized counselling by a psychologist; the appropriate and timely use of varenicline therapy; referral to outpatient cessation resources. Program reach and effectiveness were measured over a one-year period. Furthermore, the outcome was assessed by carbon monoxide (CO) level in the breath before and after the program.

Results: (mean±SEM) Between May 2008 and November 2009, 64 smokers were identified (59% male, mean age 41±1.7 years) in public announced patient/ physician seminars on smoking cessation. At twelve-month follow-up, 82% were smoke-free. The CO level dropped from 44±2.4 ppm at baseline to 3±0.2 ppm after 12 month ($p < 0.05$). In patients who quit smoking, there was a significant reduction in blood pressure (149/88±3/1 vs. 129/81±2/1 mmHg; $p < 0.01$), total cholesterol (6.2±0.2 vs. 5.2±0.1 mmol/l; $p < 0.01$) and no increase in body weight (81±2 vs. 82±2 kg). These changes led to a significant decrease in overall cardiovascular risk (score 4.2±1 vs. 0.8±0.2 after 12 month, $p < 0.01$).

Conclusions: Abstinence in our program was high in comparison with other studies. The reduction in blood pressure was significant maybe also assigned to lifestyle modification. Our results demonstrate the promise of integrated smoking cessation therapy and indicate the need to pursue implementation and evaluation of this type of therapy on a larger scale.

PLENARY SESSION

PLENARY SESSION 3

PS3 - June 21, 2010 - 17:00/18:30 - Room B3/B4

LATE BREAKING, CLINICAL TRIALS AND POSTER PRIZES

PS.3.01 EFFECTS OF INTENSIVE BLOOD PRESSURE CONTROL ON CARDIOVASCULAR EVENTS IN TYPE 2 DIABETES MELLITUS: THE ACTION TO CONTROL CARDIOVASCULAR RISK IN DIABETES (ACCORD) BLOOD PRESSURE TRIAL

R. Grimm¹, for the Action to Control, Cardiovascular Risk in, Diabetes study group².
¹University of Minnesota, Minneapolis, USA, ²Minneapolis, USA

Background: Evidence from randomized clinical trials does not support treating systolic blood pressure below 135–140 mm Hg in participants with type 2 diabetes mellitus. We investigated whether therapy targeting normal systolic pressure (<120 mm Hg) reduces major cardiovascular events in participants with type 2 diabetes and cardiovascular disease or additional risk factors.

Methods: 4,733 participants with type 2 diabetes (median duration 10 years), age 40–88 years (mean 62), 34% with existing cardiovascular disease, and systolic pressure 130–180 mm Hg (mean 139), were randomly assigned to intensive or standard therapy targeting systolic pressure <120 mm Hg or <140 mm Hg. The primary composite outcome was nonfatal myocardial infarction, nonfatal stroke, or cardiovascular death during 4–8 years' treatment.

Results: After 1 year, systolic pressures averaged 119.3 mm Hg and 133.5 mm Hg in intensive and standard groups. Primary outcomes occurred in 208 intensive and 237 standard participants (hazard ratio [HR]=0.88, 95% confidence interval [CI], 0.73 to 1.06; $p=0.20$). Stroke, a prespecified secondary outcome, occurred in 36 intensive and 62 standard participants (HR=0.59, 95% CI 0.39 to 0.89, $p=0.01$). Serious adverse events attributed to antihypertensive treatment occurred in 77 (3.3%) intensive and 30 (1.3%) standard participants ($p<0.0001$).

Conclusions: These results provide no conclusive evidence that targeting normal systolic pressure compared with a standard goal reduces a composite of major cardiovascular events in high-risk patients with type 2 diabetes. Despite increased risk of serious adverse events, results for stroke suggest patients like those in ACCORD may benefit from a systolic goal of 120 mm Hg.

PS.3.02 HETEROGENEITY IN DISCONTINUATION OF ANTIHYPERTENSIVE TREATMENT BETWEEN DRUGS FROM THE SAME CLASS

G. Mancini¹, A. Parodi², L. Merlino³, G. Corrao², ¹Department of Clinical Medicine and Prevention, University of Milano-Bicocca, Milan, Italy, ²Department of Statistics, Unit of Biostatistics and Epidemiology, University of Milano-Bicocca, Milan, Italy, ³Operative Unit of Territorial Health Services, Region Lombardia, Milan, Italy

Objectives: Discontinuation of initial antihypertensive treatment is known to be different for different classes of antihypertensive drugs. No information is available, however, on whether this phenomenon differs for drugs belonging to the same class. This is clinically relevant because treatment discontinuation is majorly responsible for poor blood pressure control in the antihypertensive population and has a relationship with cardiovascular risk.

Methods: We studied a large ($n=131,472$) cohort of patients aged 40 to 80 years who lived in Lombardy (Italy) and received their first blood-pressure lowering drug prescription during 2005. Discontinuation was defined by the absence of any blood pressure lowering prescription during a 90-day period following the end of the latest prescription. Class- and drug-specific discontinuation rates were standardized according with the demographic and therapeutic structure of the entire cohort and expressed as number of discontinuation events every 100 person-months.

Results: Standardized rates of discontinuation ranged from 6.2 to 24.4 events every 100 person-months for patients who started their monotherapy with an angiotensin receptor antagonist and a diuretic, respectively. However, there was a significant heterogeneity between rates of discontinuation within each class. The heterogeneity was more marked within some classes than within others. The highest discontinuation rate was 13.9 fold larger than the lowest one for calcium antagonists, but only 1.7 fold for angiotensin receptor antagonists. Within this class losartan showed a discontinuation rate significantly greater than that of the other angiotensin receptor antagonists whose discontinuation rate was similar. A significant heterogeneity in the discontinuation rate also characterized initial treatment with fixed dose combinations of different ACE inhibitors or angiotensin receptor antagonists with a diuretic.

Conclusion: Comparison of treatment discontinuation between antihypertensive drug classes masks the fact that this phenomenon is heterogeneous with any given class. This is relevant to calculations of cost-benefit of treatment which thus should be drug- rather than class-based.

PS.3.03 IMPROVING CARDIOVASCULAR HEALTH AT THE POPULATION LEVEL: A 39 COMMUNITY CLUSTER-RANDOMISED TRIAL OF THE CARDIOVASCULAR HEALTH AWARENESS PROGRAM (CHAP)

J. Kaczorowski¹, L.W. Chambers², L. Dolovich³, B. Farrell², B. McDonough⁴, R. Sebaldt⁵, T. Lehana⁶, K. Tu⁵, B. Zagorski⁷, R. Goeree⁸, J.M. Paterson⁹, C. Levitt³, W. Hogg⁶, T. Karwalajtys³, T. Gierman⁶, S. Laryea⁶, M. Carter⁶, D. Cross⁷. ¹University of British Columbia, Vancouver, Canada, ²Elisabeth Bruyère Research Institute, Ottawa, Canada, ³Monaster University, Hamilton, Canada, ⁴City of Hamilton Public Health Services, Hamilton, Canada, ⁵Institute for Clinical Evaluative Sciences, Toronto, Canada, ⁶University of Ottawa, Ottawa, Canada, ⁷Academic Health Council - Champlain Region, Ottawa, Canada

Objective: Cardiovascular disease (CVD) is a major cause of death and disability. Effective population-based strategies to reduce CVD morbidity and mortality are needed. We conducted a community cluster-randomized trial to evaluate the effectiveness of a pharmacy-based Cardiovascular Health Awareness Program (CHAP) on cardiovascular disease morbidity.

Design and Method: Thirty-nine mid-sized communities in Ontario, Canada were stratified by location and population size and were randomized to receive CHAP ($n=20$) or no intervention ($n=19$). In CHAP communities, residents 65 years of age or older were invited to attend volunteer-run cardiovascular risk assessment and education sessions held in community-based pharmacies over a 10-week period. Automated blood pressure readings and self-reported risk factor data were collected and shared with session participants and their family physicians and pharmacists. The primary trial endpoint was a composite of hospital admissions for acute myocardial infarction, stroke and congestive heart failure among all community residents aged 65 years and older. Analysis was by intention to treat. The study was registered at controlled-trials.com, number ISRCTN50550004.

Results: All 20 intervention communities successfully implemented CHAP. A total of 1 265 3-hour long sessions were held in 90% (129/145) of pharmacies during the 10-week campaign. A total of 27 358 CVD assessments were performed on 15 889 unique participants with the assistance of 577 peer-volunteers. Adjusting for hospital admission rates in the year prior to intervention, CHAP was associated with a 9% relative reduction in our composite endpoint (rate ratio 0.91 [95% CI 0.86–0.97], $p=0.002$). There were statistically significant reductions favouring the intervention communities in hospital admissions for acute myocardial infarction (rate ratio 0.87 [95% CI 0.79–0.97], $p=0.008$) and congestive heart failure (rate ratio 0.90 [95% CI 0.81–0.99], $p=0.029$), but not for stroke (rate ratio 0.99 [95% CI 0.88–1.12], $p=0.89$).

Conclusions: A collaborative, multipronged community-based health promotion and prevention program targeted at older adults can reduce cardiovascular morbidity at the population level.

PS.3.04 CHANGES IN ALBUMINURIA PREDICT MORTALITY AND MORBIDITY IN PATIENTS WITH VASCULAR DISEASE

R. Schmieder¹, J.F.E. Mann², H. Schumacher³, P. Gao⁴, G. Mancini⁵, M.A. Weber⁶, M. McQueen⁷, K.K. Teo⁸, S. Yusuf¹. ¹Department Nephrology and Hypertension, University Hospital, Friedrich-Alexander-University Erlangen-Nürnberg, Erlangen, Germany, ²Schwabing General Hospital, and KfH Kidney Center, Ludwig-Maximilians-University Munich, Munich, Germany, ³Boehringer Ingelheim, Ingelheim, Germany, ⁴Population Health Research Institute, McMaster University, Hamilton, Canada, ⁵Clinica Medica, University of Milan-Bicocca, S. Gerardo Hospital, Monza, Italy, ⁶Cardiology Division, State University of New York Downstate College of Medicine, New York, USA

Background: Albuminuria is a powerful, independent, predictor of progression of renal disease, cardiovascular disease and death in people with renal disease, hypertension, diabetes, vascular disease, and in the general population. However, it is not known whether changes in albuminuria are predictive of cardiovascular outcome and mortality.

Methods: In 23480 patients with vascular disease or complicated diabetes changes in albuminuria (at least doubling or halving) in spot urine from baseline to 2 years, measured in a central laboratory, were related to the incidence of cardiovascular and renal outcomes and total mortality over the subsequent 32 months.

Results: An increase in albuminuria from baseline to 2 years (doubling or more), found in 28%, was associated with increased mortality [HR 1.47, 95% CI 1.31–1.65, $p<0.0001$], and a decrease in albuminuria (at least halving), noted in 21%, with reduced mortality [HR 0.85, 95% CI 0.74–0.98, $p=0.025$] compared to those with lesser minor changes in albumin excretion, after adjustment for baseline albuminuria, initial blood pressure and its changes and other confounding factors. Changes in albuminuria were also significantly associated with cardiovascular death, composite cardiovascular outcomes (cardiovascular death, myocardial infarction, stroke and hospitalization for heart failure) and renal outcomes (dialysis or doubling of serum creatinine). Overall, all cause mortality increased by 19% and composite cardiovascular outcomes by 39% in patients with an increase in albuminuria (doubling or more) compared to those with minor changes in albuminuria.

Conclusions: In patients with vascular disease, changes in albuminuria predict cardiovascular and renal outcomes, and mortality independent of baseline albuminuria. Thus, monitoring of albuminuria is a useful strategy for predicting cardiovascular risk.