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Results
The eGFR was significantly correlated with RP peak (r=-0.109, p=0.001), RP integral(r=-0.136, p<0.001), XSP peak (r=0.096, p=0.004) and XSP integral (r=0.102, p=0.002). The RP (whether expressed as peak or integral) was significantly associated with eGFR after adjusting for sex, waist-to-hip ratio, heart rate and brachial BP indices (RP peak β=-0.079, p=0.02, partial R^2=0.006 and RP integral β=- 0.079, p=0.02, partial R^2=0.007). XSP was not independently associated with eGFR after adjusting for the above variables. Neither RP nor XSP were significantly associated with cIMT.

Conclusion
Independent of conventional risk factors, RP was significantly associated with kidney function among a large population of Australian children. The non-invasive method to derive RP using an oscillometric cuff device could provide useful clinical information in children.

P124 Validity and reliability of Pulse Wave Analisys estimated by a novel wrist- worn tonometer

Garcia-Ortiz, Luis[1,2]; Recio-Rodriguez, Jose[3,4]; Agudo-Conde, Cristina[3]; Salvado, Rita[5]; Maderuelo-Fernandez, Jose[5]; Gonzalez-Sanchez, Jesus[6,7]; Rodriguez- Sanches, Emiliano[5,8]; Gómez-Marcos, Manuel[3,9]; EVA_Investigators, on behalf[10]

[1]Primary Health Care Research Unit, La Alamedilla Health Center. Health Service of Castilla y León (SACyL), Biomedical Research Institute of Salamanca (IBSAL), Salamanca, Spain., [2]Department of Biomedical and Diagnostic Sciences, University of Salamanca, Salamanca, Spain, [3]1. Primary Health Care Research Unit, La Alamedilla Health Center. Health Service of Castilla y León (SACyL), Biomedical Research Institute of Salamanca (IBSAL), Salamanca, Spain., [4]3. Department of Nurse and Physiotherapy, University of Salamanca, Salamanca, Spain, [5]1. Primary Health Care Research Unit, La Alamedilla Health Center. Health Service of Castilla y León (SACyL), Biomedical Research Institute of Salamanca (IBSAL), Salamanca, Spain, [6]Primary Care Research Unit, The Alamedilla Health Center. Castilla and León Health Service (SACYL), Biomedical Research Institute of Salamanca (IBSAL),
[7]Department of Nursing, University of Extremadura, Plasencia (Cáceres), Spain., [8]5. Department of Medicine, University of Salamanca, Salamanca, Spain, [9]5.
Department of Medicine, University of Salamanca, Salamanca, Spain., [10]Primary Care Research Unit, The Alamedilla Health Center. Castilla and León Health Service (SACYL), Biomedical Research Institute of Salamanca (IBSAL)

Objective
To analyze the reliability and validity of Pulse Wave Analysis determined with the new wrist-worn tonometry.

Methods
Cross sectional study including 254 subjects. Aged 51.9 ± 13.4, being women 53%. Main measurements: Peripheral AIx(PAIx) and Central AIx(CAIx) by wrist-worn tonometry and Sphygmocor. Carotid femoral(cf) pulse wave velocity(PWV) by Sphygmocor, Cardio Anckle Vascular index(CAVI), anckle brachial index(ABI) and brachial anckle(ba) PWV by Vasera device. Carotid intima media thickness (IMT) by ultrasonography.

Results

Intra-class correlation coefficient (ICC) intraobserver for the PAIx was 0.886 (95% CI 0.803 to 0.934) and for the CAIx 0.943 (0.901 to 0.968) with a Bland Almant agreement limit of -0.75 (-23.8 to 21.8) and 0.08 (-15.7 to 15.9) respectively. ICC interobserver for PAIx was 0.952 (95% CI 0.915 to 0.972) and CAIx 0.893 (0.811 to 0.939) with an agreement limit of -0.45 (-13.7 to 12.8) and 0.43 (-17.7 to 1835) respectively.

We found, compared with Sphygmocor, an ICC of 0.849 (0.798 to 0.887) for PAIx, and 0.783 (0.711 to 0.838) for CAIx. The agreement limit for PAIx was -1.03 (-22.73 to 20.67) and CAIx 2.14 (-20.50 to 24.79). We found positive correlation with PAIx, CAIx and CAIx HR75 by Aurora with age, CAVI, ABI, baPWV, cfPWV, IMT and cardiovascular risk and negative with glomerular filtration rate

Conclusions

The wrist-worn tonometry shows an adequate reliability intra and interobserver, and interdevice when compared to Sphygmocor, and an adequate validity when compared with other measures that evaluate arterial stiffness, target organ damage and cardiovascular risk.

P125 Use of vascular adaptation in response to mechanical loading facilitates personalisation of a one-dimensional pulse wave propagation model M

Heusinkveld, Maarten[1]; Reesink, Koen[1]; Arts, Theo[1]; Huberts, Wouter[1]; Delhaas, Tammo[1]

[1]Department of Biomedical Engineering, CARIM School for Cardiovascular Diseases, Maastricht University

Background

Mathematical modelling of pressure and flow waveforms in blood vessels using pulse wave propagation (PWP) models could support clinical decision-making. For a personalised model outcome, measurements of all modelled vessel radii and wall thicknesses are required. In clinical practice, however, datasets are often incomplete. To overcome this problem, we hypothesised that the adaptive capacity of blood vessels in response to mechanical load can be utilised to fill in the gaps of incomplete patient-specific datasets.

Methods

We implemented homeostatic feedback loops in a validated PWP model [1] to allow adaptation of vessel geometry to maintain wall stress and wall shear stress. To evaluate our approach, we utilised complete datasets of 10 patients scheduled for vascular access surgery. Datasets comprised of wall thicknesses and radii of 7 central and 11 arm arterial segments.

We simulated reference models (RefModel, n=10) using complete data and adapted models (AdaptModel, n=10) using data of one brachial artery segment only. The remaining AdaptModel geometries were estimated using adaptation. In both models, mean brachial pressure, brachial artery distensibility, heart rate and aortic inflow were prescribed. We evaluated agreement between RefModel and AdaptModel geometries, as well as between pressure and flow waveforms of both models.

Results

Limits of agreement (bias±1.96SD) between AdaptModel and RefModel radii and wall thicknesses were 0.029±1.3mm and 28±230μm, respectively. AdaptModel pressure and flow waveform characteristics across the proximal-to-distal arterial domain were within the uncertainty bounds of the RefModel (Figure 1).