Conclusions: The discrepancies between (F) and (P1), (P2) raise concerns about the validity of the implicit assumptions in pressure-only reservoir pressure separation at the radial artery. Differences in (P1) and (P2) indicate some sensitivity of derived parameters to the algorithm employed.

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RESERVOIR PRESSURE IS INDEPENDENTLY ASSOCIATED WITH 11—12 YEAR OLD'S KIDNEY FUNCTION: POPULATION-DERIVED STUDY

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Introduction: Reservoir pressure (RP) and excess pressure (XSP) independently predict cardiovascular events in adults, but have never been investigated as markers of cardiovascular risk among children. This study aimed to determine the association of RP and XSP with end-organ makers of cardiovascular risk related to kidney function and large artery pre-atherosclerosis.
Methods: Participants were 1874 11—12 year-old children (50% male) from the Longitudinal Study of Australian Children's Child Health CheckPoint study. Brachial blood pressure was measured by cuff oscillometric device (SphygmoCor XCEL, AtCor, Sydney). The same device was used to derive reservoir pressure (RP) and excess pressure (XSP) from the brachial pressure waveform. Kidney function was determined from estimated glomerular filtration rate (eGFR, $n = 926$) and large artery pre-atherosclerosis was determined from carotid intima media thickness (cIMT, $n = 1131$) using ultrasound.
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 $\beta = -0.079$, $p = 0.02$, partial $R^2 = 0.006$ and RP integral $\beta = -0.079$, $p = 0.02$, 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.

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VALIDITY AND RELIABILITY OF PULSE WAVE ANALYSIS ESTIMATED BY A NOVEL WRIST-WORN TONOMETER

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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.

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USE OF VASCULAR ADAPTATION IN RESPONSE TO MECHANICAL LOADING FACILITATES PERSONALISATION OF A ONE-DIMENSIONAL PULSE WAVE PROPAGATION MODEL

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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