P131: DETERMINANTS OF A NEW, NON-INVASIVE INDEX OF VENTRICULAR-ARTERIAL COUPLING AND MYOCARDIAL PERFORMANCE IN A GENERAL POPULATION SAMPLE

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Methods: In 102 patients planned to undertake a cardiac catheterization (65 ± 13 years, 70.6% males) duplicate non-invasive measures of PWV, 15-minutes apart, were obtained with 4 devices measuring two-points carotid-femoral PWV and the related pulse transit time (PTT): Compilor (AlamMedical), PulsePenETT, PulsePenET (Diatecne), SphygnoCor (AtCorMedical), and with 2 devices estimating PWV from the oscillometric cuff-derived brachial wave: BPLab (Petr Telegin), Mobil-O-Graph (IEM). PWV and carotid-femoral PTT measurements were compared using coefficients of variation (CV%) and their confidence intervals (CI).

Results: Devices evaluating carotid-femoral PWV showed a good repeatability (CV%[CI]: Compilor: 8.8 [7.3–10.1]; PulsePen ET: 8.0 [6.2–9.5]; PulsePen ET: 5.8 [4.9–6.6]; SphygnoCor: 9.5 [7.7–11.0]), whereas the repeatability of PWV estimated by cuff-based devices was for the BPLab: 5.5 [4.2–6.6] and for the Mobil-O-Graph = 3.4 [2.9–3.8]). A tendency toward a lower repeatability of carotid-femoral PWV was present for greater arterial stiffness, while repeatability of carotid-femoral PTT was not related to its mean values. Differences between repeated PWV measurements were not correlated with blood pressure (R² = 0.005) or heart rate variations (R² = 0.013).

Conclusions: Short-term repeatability of PWV measures was good, with some differences between different devices. A greater repeatability was observed in devices estimating PTT from a cuff-based measurement, compared to devices measuring carotid-femoral PTT, owing to the algorithm of calculation of PWV (Mobil-O-Graph) or to the procedure of correction which eliminates highly variable PWV values (BPLab).

Repeatability of PWV is not influenced by blood pressure or heart rate variations. For carotid-femoral PWV, the repeatability of measures is lower for higher PWV values.

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DETERMINANTS OF A NEW, NON-INVASIVE INDEX OF VENTRICULAR-ARTERIAL COUPLING AND MYOCARDIAL PERFORMANCE IN A GENERAL POPULATION SAMPLE
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Background: The interaction between the heart and arteries (i.e. ventricular-arterial coupling, VAC) is a key determinant of cardiovascular performance. As such, VAC indexes might reflect the interplay between arterial stiffness and left ventricular (LV) dysfunction. In a community-based sample, we assessed the determinants of a new, non-invasive VAC index reflecting myocardial performance.

Methods: In 364 subjects (45.1% women; mean age, 53.8 years; 46.7% hypertensives), we derived echocardiographic indexes of LV structure and function and tonometric measures of central haemodynamics and aortic stiffness. From two-dimensional LV strain curves and simultaneously recorded pressure waveform, we constructed the pressure-strain loop and calculated ejection work density (EWD), a myocardial performance index, as the area of the pressure-strain loop during LV ejection.

Results: In multivariable-adjusted analysis, EWD increased linearly with age (P < 0.0001). While adjusting for age, anthropometric measures and heart rate, EWD was significantly higher in women and patients with hypertension as compared to men and normotensives, respectively (P < 0.0001 for all). After full adjustment, EWD increased with higher augmentation pressure, central pulse pressure and carotid-femoral pulse wave velocity in both men and women (P < 0.031). Furthermore, EWD correlated independently and directly with left atrial and LV end-diastolic volumes (P = 0.015) as well as peak early diastolic velocities of transmirtal flow and mitral annulus movement (P < 0.025).

Conclusion: Higher age, female sex and hypertension were independent determinants of higher EWD. Being associated with indexes reflecting central haemodynamics, arterial stiffness and LV diastolic function, this myocardial performance index might reflect the interaction between LV performance and arterial properties.