



## Artery Research

ISSN (Online): 1876-4401

ISSN (Print): 1872-9312

Journal Home Page: <https://www.atlantis-press.com/journals/artres>

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### **P129: SHORT-TERM REPEATABILITY OF NON-INVASIVE AORTIC PULSE WAVE VELOCITY MEASURES**

Andrea Grillo, Paolo Salvi, Sandrine Millasseau, Matteo Rovina, Corrado Baldi, Francesco Moretti, Lucia Salvi, Andrea Faini, Renzo Carretta, Filippo Scalise, Gianfranco Parati

**To cite this article:** Andrea Grillo, Paolo Salvi, Sandrine Millasseau, Matteo Rovina, Corrado Baldi, Francesco Moretti, Lucia Salvi, Andrea Faini, Renzo Carretta, Filippo Scalise, Gianfranco Parati (2017) P129: SHORT-TERM REPEATABILITY OF NON-INVASIVE AORTIC PULSE WAVE VELOCITY MEASURES, Artery Research 20:C, 81–82, DOI: <https://doi.org/10.1016/j.artres.2017.10.111>

**To link to this article:** <https://doi.org/10.1016/j.artres.2017.10.111>

Published online: 7 December 2019

(continued)

	Univariate analysis of aortic dilation		Multivariate analysis of aortic dilation			
	Odds Ratio	P-value	Root morphotype		Ascending morphotype	
			Odds Ratio	P-value	Odds Ratio	P-value
Displacement	2.46	0.002				
IRF	1.01	0.007				
SFRR (%)	1.20	0.001			1.2	<0.001
WSS <sub>axial</sub>	1.21	0.05				
WSS <sub>Cireumf</sub>	2.43	0.02			2.23	0.037
Dist IRF	1.01	0.026			1.10	0.026
WSS <sub>Cireumf</sub>	1.49	0.05				
SFRR (%)	1.10	0.005				

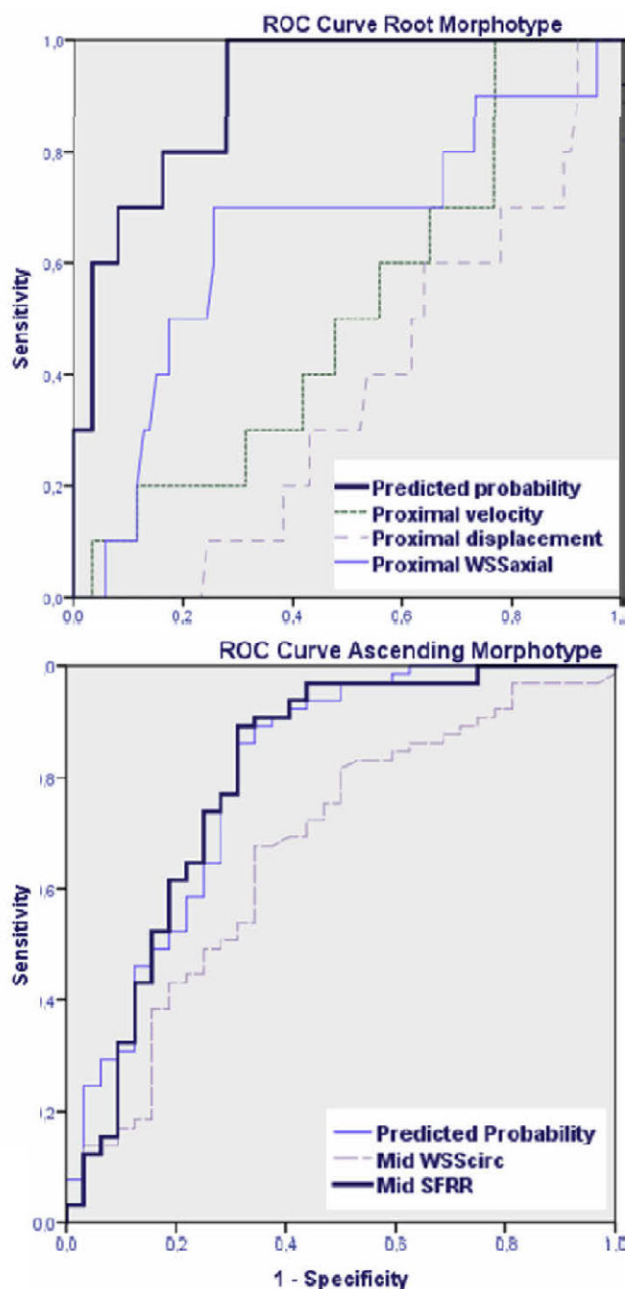


Figure. ROC curves showing flow variables related to aortic dilation morphotypes.

**Conclusions:** Different altered flow parameters are related to root and ascending morphotypes in BAV. Further longitudinal studies are warranted to evaluate the impact of these flow parameters in determining the risk for aortopathy.

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**P128**  
**COMPARISON OF AUGMENTATION INDEX OBTAINED FROM HEM-9000AI AND MOBIL-O-GRAPH IN JAPANESE NORMOTENSIVE INDIVIDUALS**

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**Background:** HEM-9000AI (HEM) is an established device for measurement of radial augmentation index (rAlx) used by applanation tonometry in Japan. Mobil-O-Graph (MOG) is a cuff-based oscillometric device for assessment of central aortic Alx (cAlx) and the usefulness to Europeans has been reported. We compared the Alx between HEM and MOG in Japanese normotensive subjects.

**Methods:** We enrolled 106 normotensive volunteers (47 male, 21 to 79 years). The left radial arterial waveform was recorded with the HEM. MOG were taken on the left arms, which arm circumferences (ACs) were measured to allow the correct choice of cuff (two sizes available; 20–24 and 24–32 cm). We performed multiple regressions for Alx and key variables in HEM and MOG.

**Results:** The ACs in M and F were 25.7 ± 1.9 (mean ± SD) cm and 23.5 ± 2.1 cm, respectively. Both rAlx (70.5 ± 15.3% vs 83.6 ± 11.9%, p < 0.001) and cAlx (17.2 ± 7.3% vs 29.7 ± 9.8%, p < 0.001) in M were smaller than those in F. Multiple regression analysis revealed that cAlx in M (R<sup>2</sup> = 0.5176) was significantly associated with age (β = 0.17, p = 0.004) and cuff size (p = 0.001). cAlx obtained using the smaller cuff was significantly increased compared to the larger cuff (25.1 ± 5.9% vs 14.8 ± 5.9%). In F, cAlx (R<sup>2</sup> = 0.2245) tended to be associated with age (β = 0.16, p = 0.072) and was significantly associated with height (β = -0.62, p = 0.007) and heart rate (β = -0.26, p = 0.0029).

**Conclusions:** The brachial cuff-based waveform recordings are useful for Japanese normotensive individuals. However, the mean AC is close to the bound of two cuff sizes and the measurement of lower cAlx using the larger cuff is less sensitive.

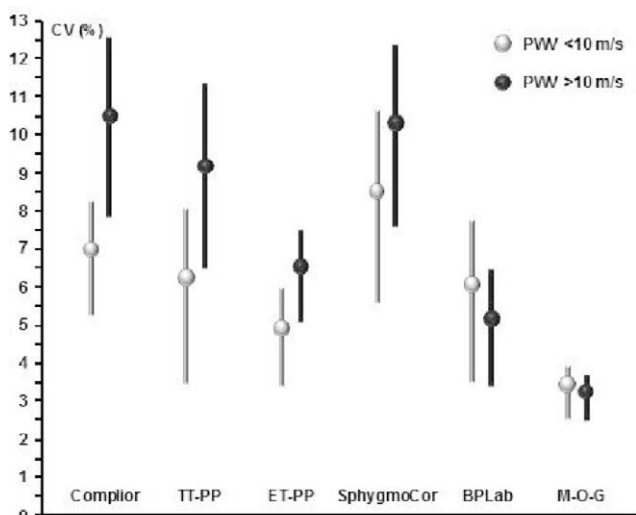
**P129**  
**SHORT-TERM REPEATABILITY OF NON-INVASIVE AORTIC PULSE WAVE VELOCITY MEASURES**

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**Objective:** To compare the short-term repeatability of aortic pulse wave velocity (PWV) measures obtained with non-invasive devices.

**Methods:** In 102 patients planned to undertake a cardiac catheterization ( $65 \pm 13$  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): Complior (AlamMedical), PulsePenETT, PulsePenET (DiaTecne), SphygmoCor (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]: Complior: 8.8 [7.3–10.1]; PulsePen ETT: 8.0 [6.2–9.5]; PulsePen ET: 5.8 [4.9–6.6]; SphygmoCor: 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 ( $R^2 = 0.005$ ) or heart rate variations ( $R^2 = 0.013$ ).



**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.

#### P130

##### TEST-RETEST RELIABILITY FOR PULSE WAVE VELOCITY AND CARDIO-ANKLE VASCULAR INDEX AMONG AFRO-CARIBBEAN YOUNG ADULTS

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**Background:** This study evaluated the test-retest reliability of carotid-femoral pulse wave velocity (PWV) and cardio-ankle vascular index (CAVI) among young adults in Jamaica.

**Methods:** We recruited participants from the Jamaica 1986 Birth Cohort Study. PWV was measured using the Arteriograph device™ (TensioMed, Budapest) and

CAVI with the VaSera™ device (Fukuda Denshi, Tokyo). Both measurements were done twice on the same day with a 1-hour interval between measurements. Test-retest reliability was estimated using the intra-class correlation coefficient (ICC) and Bland-Altman plots. Kappa statistic was used to assess agreement between repeated tests in classifying participants as high PWV or CAVI, defined as being in the upper tertile of measurements.

**Results:** Analyses included 89 participants (43 males; 46 females; mean age  $28.4 \pm 0.50$  years). Mean PWV for first and second readings were  $6.56$  cm/s and  $6.64$  cm/s, respectively (mean difference  $-0.08$  [95%CI  $-0.18, 0.03$ ,  $p = 0.142$ ]). Mean values for first and second CAVI were  $6.53$  and  $6.20$ , respectively, (mean difference  $0.34$  [95%CI  $0.18, 0.50$ ,  $p < 0.001$ ]). ICC for PWV was  $0.88$  (95%CI  $0.83, 0.92$ ) and for CAVI  $0.57$  (95%CI  $0.41, 0.69$ ). Bland-Altman plots indicated that measurements taken from both devices were highly reproducible, with most points (85/89 for PWV; 86/89 for CAVI) falling within 2 SD of the mean difference. Kappa statistic was  $0.76$  for PWV and  $0.56$  for CAVI.

**Conclusion:** PWV (Arteriograph™) and CAVI (VaSera™) have good test-retest reliability among Jamaican youth adults; however repeated CAVI values were marginally lower than the first measurement and the ICC and kappa estimates were lower.

#### P131

##### 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% hypertensive), 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 waveforms, 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 ( $P \leq 0.031$ ). Furthermore, EWD correlated independently and directly with left atrial and LV end-diastolic volumes ( $P \leq 0.015$ ) as well as peak early diastolic velocities of transmitral flow and mitral annulus movement ( $P \leq 0.025$ ).

**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.

#### Poster Session II – Pathophysiology P165

##### HIGHER BLOOD PRESSURE IN YOUTH IS ATTRIBUTABLE TO A COMBINATION OF HIGHER CARDIAC OUTPUT AND HIGHER TOTAL PERIPHERAL RESISTANCE

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**Background:** It has been proposed that high blood pressure (BP) in young people is due to high cardiac output (CO) with normal total peripheral resistance (TPR) – a hyperkinetic/hyperdynamic circulation. We investigated this in a large, population-based cohort of adolescents.