



Artery Research

ISSN (Online): 1876-4401

ISSN (Print): 1872-9312

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

P6.10: COMPARISON OF SPHYGMOCOR AND VICORDER DEVICES FOR CAROTID-FEMORAL PWV MEASUREMENT IN THE SECOND TRIMESTER OF PREGNANCY

T.R. Everett, A. Mahendru, C.M. McEniery, C.C. Lees, I.B. Wilkinson

To cite this article: T.R. Everett, A. Mahendru, C.M. McEniery, C.C. Lees, I.B. Wilkinson (2011) P6.10: COMPARISON OF SPHYGMOCOR AND VICORDER DEVICES FOR CAROTID-FEMORAL PWV MEASUREMENT IN THE SECOND TRIMESTER OF PREGNANCY, Artery Research 5:4, 173–174, DOI: <https://doi.org/10.1016/j.artres.2011.10.095>

To link to this article: <https://doi.org/10.1016/j.artres.2011.10.095>

Published online: 14 December 2019

P6.07

POPScore: A NEW INDEX TO EVALUATE ARTERIAL AGEING INDEPENDENTLY OF ARTERIAL BLOOD PRESSURE

M. Hallab, J. M. Boin, M. Trambly, P. Chevalet
CHU de Nantes, Nantes, France

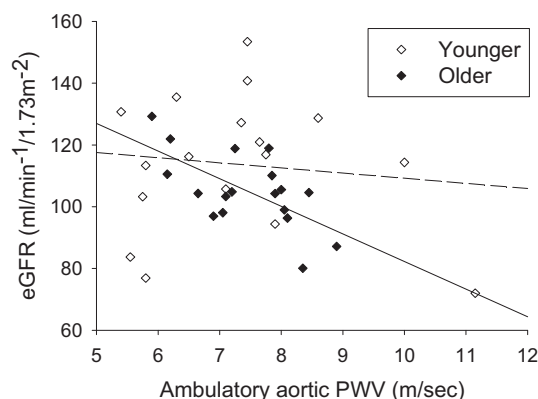
Hypothesis: PWV don't correlate with age in the upper limb but in the aorta and lower limb.

Aim: To study the relationship between ageing and indices based on pulse wave transit time (PWTT) between the toe and the finger.

Material and methods: measurements were performed in 300 patients in primary care and occupational practice, after 5 minutes of supine rest using a new device (pOpmètre® - Axelife SAS - France) which measures the toe and finger PWTT relative to R-ECG wave. Difference of PWTT between the toe and finger (DTF) was computed and, using a chart based on body height, we calculated the PWVtf [PWVtf = k *subject's height / DTF] and the pOpscore® (toePWV / fingerPWV) indices.

Results: Of the tested 300 patients, 147 (93 men and 54 women aged 45yrs ± 2 vs. 40yrs ± 2, p=0.048 respectively) with 0 or only 1 conventional risk factor and without known POAD or Vasodilator therapy.

determine the physiology and clinical relevance of raised AaPWV are warranted.



	Sex anova (F; p)	Age (years) (r ² ; p)	Weight (Kg) (r ² ; p)	Height (cm) (r ² ; p)	SBP (mmHg) (r ² ; p)	DBP (mmHg) (r ² ; p)	MBP (mmHg) (r ² ; p)	BMI (Kg/m ²) (r ² ; p)
DTF (sec)	0.01;ns	0.69;10 ⁻⁴	0.001;ns	0.02;0.08	0.29;10 ⁻⁴	0.07;10 ⁻³	0.18; 10 ⁻⁴	0.04;0.01
PWVtf (m/s)	0.10;ns	0.69;10 ⁻⁴	0.003;ns	0.01;ns	0.22;10 ⁻⁴	0.03;0.02	0.12; 10 ⁻⁴	0.014; ns
pOpscore®	0.04;ns	0.60;10 ⁻⁴	0.008;ns	0.01;ns	0.23;10 ⁻⁴	0.07;10 ⁻³	0.15; 10 ⁻⁴	0.02;0.04

Using stepwise regression analysis, (variables to enter: Age, BMI, SBP, DBP, MBP), 1) DTF was dependent with age (p <0.0001) and SBP (p <0.01); 2) PWVtf with age (p <0.0001), SBP (p <0.01) and DBP (p <0.05); 3) pOpscore® was dependent only with age (p <0.0001) not with SBP (p > 0.07).

Conclusion: In this study,

- All variables were correlated to age and blood pressure.
- pOpscore® is related only to ageing independently from blood pressure.
- pOpmètre® is a promising technique for the routine determination of vascular ageing in primary care medicine.

P6.08

'AMBULATORY' AORTIC PULSE WAVE VELOCITY IS HIGHLY REPRODUCIBLE AND INDEPENDENTLY CORRELATES WITH KIDNEY FUNCTION IN OLDER MEN

L. J. Keith, M. A. Keske, S. Rattigan, J. E. Sharman
Menzies Research Institute Tasmania, Hobart, Australia

Introduction: Aortic pulse wave velocity (PWV) independently predicts end-organ damage and mortality. However, these relationships have only been assessed at rest. Considering light exercise ('ambulatory') conditions better represent chronic BP exposure, we developed a technique to approximate ambulatory aortic PWV (AaPWV). This study aimed to determine the reproducibility of the technique and relation of AaPWV to end-organ damage.

Methods: Carefully screened healthy younger (n=17, 30±8 years) and older (n=18, 54±8 years) untreated men underwent comprehensive cardiovascular assessment at rest and whilst 'ambulatory' (during low intensity semi-recumbent cycling). Applanation tonometry was used to assess AaPWV (carotid-to-femoral arterial sites) and central BP. All participants underwent 24-hour ambulatory BP (24-ABP). Kidney function was assessed by estimated glomerular filtration rate (eGFR). Fifteen participants had testing repeated within 30±19 days.

Results: AaPWV had excellent reproducibility (mean difference=-0.35±0.61 m/s, ICC=0.874, p<0.001). For all participants, AaPWV was 23±17% higher than resting aortic PWV (6.0±1.0 vs. 7.4±1.2 m/s, p<0.001). In younger men, eGFR (114±23 ml/min/1.73 m²) was not correlated to resting aortic PWV (r=-0.031, p=0.906) or AaPWV (r=-0.117, p=0.655). Similarly, in older men, eGFR (105±12 ml/min/1.73 m²) was not related to resting aortic PWV (r=-0.400, p=0.100). However, AaPWV was significantly correlated with eGFR on univariate analysis in older men (see figure, r=-0.633, p=0.005), and this was maintained after correction for age, BMI and 24-ABP (β=-0.606, p=0.017).

Conclusions: AaPWV is highly reproducible and independently associated with kidney function in apparently healthy older men. Further studies to

P6.09

WAITING A FEW EXTRA MINUTES BEFORE MEASURING CENTRAL BLOOD PRESSURE POTENTIALLY HAS IMPORTANT CLINICAL AND RESEARCH RAMIFICATIONS

S. B. Nikolic¹, J. E. Sharman¹, W. P. Abhayaratna²

¹Menzies Research Institute Tasmania, University of Tasmania, Hobart, Australia

²Australian National University, Canberra, Australia

Background: Clinic brachial BP averaged over 10 minutes correlates more strongly with out-of-office BP compared with BP recorded after the recommended 5 minutes rest. Central BP is a stronger predictor of mortality than brachial BP. However, the clinical value of measuring central BP after 5 compared with 10 minutes rest has never been assessed and was the aim of this study.

Methods: Clinic brachial and central BP, 7 day home BP and left ventricular mass index (LVMI) were measured in 250 patients with treated hypertension (aged 64±8 years). Clinic seated BP was measured at two time points; time 1) after 5 minutes, as per recommendations, and time 2) after 10 minutes. **Results:** Brachial and central BP's were significantly lower at time 2 compared to time 1 (p<0.001 for all). Time 1 brachial SBP was significantly higher than 7 day SBP (131.3±14.9 vs. 127.6±12.3 mmHg; p<0.001). However, time 2 brachial SBP was almost identical to 7 day SBP (127.1±13.5 mmHg; mean difference 0.6±13.7 mmHg; p=0.511). Moreover, time 2 brachial and central pulse pressures significantly correlated with LVMI (r=0.171, p=0.006 and r=0.139, p=0.027, respectively), whereas there were no significant correlations with time 1 brachial or central pulse pressures (r=0.115, p=0.068 and r=0.084, p=0.185, respectively).

Conclusion: Clinic brachial BP recorded after 10 minutes is closely representative of out-of-office BP, and the corresponding central BP values are more clinically relevant than those acquired after the conventional 5 minutes rest. These findings have relevance to appropriate diagnosis of hypertension and design of clinical trials.

P6.10

COMPARISON OF SPHYGMOCOR AND VICORDER DEVICES FOR CAROTID-FEMORAL PWV MEASUREMENT IN THE SECOND TRIMESTER OF PREGNANCY

T. R. Everett¹, A. Mahendru¹, C. M. McEnery², C. C. Lees¹, I. B. Wilkinson²

¹Dept of Fetal Medicine, Box 228, Addenbrooke's Hospital, Cambridge University Hospitals NHS Trust, Cambridge, United Kingdom

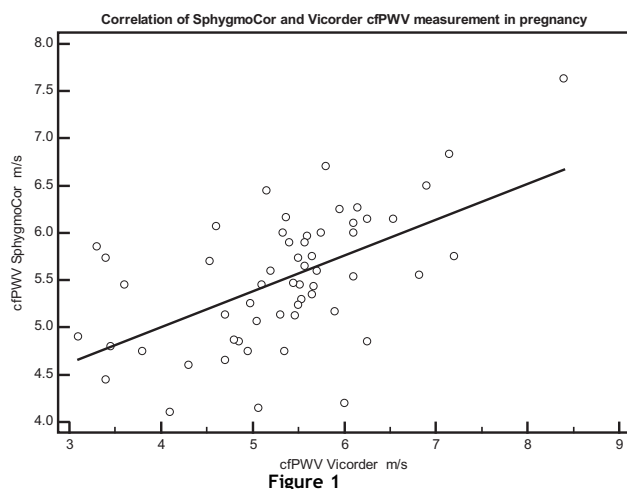
²Clinical Pharmacology Unit, University of Cambridge, Addenbrooke's Hospital, Cambridge, United Kingdom

Objectives: Carotid-femoral pulse wave velocity (cfPWV) is considered the gold standard measurement for assessment of aortic stiffness. cfPWV is increased in women at risk of developing, and those with, preeclampsia. We aimed to compare measurements obtained by SphygmoCor and Vicorder devices that use ECG/tonometry and compression techniques, respectively.

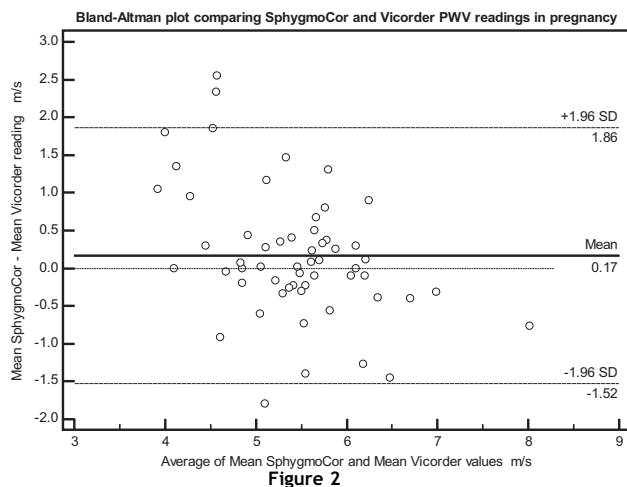
Methods: 57 consecutive women were recruited from the high risk obstetric ultrasound clinic. Smokers were excluded. Age:19-42yrs (Mean: 32.6yrs), Gestation: 24⁰-30⁶ (Mean: 26⁺⁶ weeks). Women were rested supine for 10 minutes in 30° left lateral position. SphygmoCor readings were performed first followed, within 5 minutes, by Vicorder readings. Left side femoral and carotid were used for all readings. All readings were performed three times and a mean value calculated. In order to avoid false prolongation of path length, calipers were used to measure distances.

Results: Mean SphygmoCor cfPWV: 5.51m/s (95%CI:5.32-5.70m/s). Mean Vicorder PWV: 5.34m/s (95%CI:5.06-5.61m/s). There was significant inter-device correlation ($r=0.56$, $P<0.0001$) (Fig.1). Bland-Altman analysis showed a mean difference of 0.17m/s (95% limits of agreement: -1.52 to 1.86m/s) (Fig.2)

Conclusions: In the second trimester of pregnancy, both devices produce similar readings and the mean difference is unlikely to be of clinical significance. SphygmoCor measurements require a skilled operator, application of ECG leads and palpation of the femoral pulse. The Vicorder device requires less skill and is less intrusive to the subject. These are important considerations for regular use in a clinical setting. Notably the cfPWV in our study is lower than the general population and agreement at <4.5m/s appears unreliable.



$r=0.56$, $P=0.0001$



P6.11

RETINAL PULSE WAVE VELOCITY IN YOUNG NORMOTENSIVE AND MILDLY HYPERTENSIVE SUBJECTS

K. Kotliar¹, H. Hanssen^{2,3}, K. Eberhardt¹, M. Halle², U. Heemann¹, M. Baumann¹

¹Department of Nephrology, Technische Universität München, Munich, Germany

²Department of Prevention and Sports Medicine, Technische Universität München, Munich, Germany

³Division of Sports Medicine, Institute of Exercise and Health Sciences (ISSW), University of Basel, Basel, Switzerland

Hypertension is characterized by microvascular remodeling resulting in an increased wall/lumen ratio. Increased microvascular stiffness contributes to an increase in wall/lumen ratio. We aimed to investigate the possibility to transform the measurement of macrovascular stiffness into a microvascular environment. We assessed retinal pulse wave velocity (rPWV) non-invasively in 65 male normoalbuminuric normotensive to mildly hypertensive subjects (age: 28.7±6.0 years). Time dependent alterations of retinal arterial diameter were measured by the Dynamic Vessel Analyzer. The data was filtered and evaluated by methods of signal analysis and rPWV was computed using three different methods. 'Method1' used filtration at heart rate (HR), 'Method2' filtered at higher HR multiples and 'Method3' used additionally linear fit for data averaging. Besides, office blood pressure (BP) and urinary albumine/creatinine ratio were assessed. 'Method1' was not associated with BP, while both methods applying filtration at high HR multiples showed a strong association with systolic BP throughout the cohort ($r=0.49$, $r=0.63$ $P<0.001$). Based on the highest association, 'Method3' was proposed to characterize rPWV. As the cohort was divided according to BP, mildly hypertensive patients showed significantly higher rPWV (1243±694 units/second) than subjects with high-normal BP (786±486 units/second, $P<0.01$) or normotensive subjects (442±148 units/second, $P<0.001$). Applying methodological principles for aortic PWV we consider rPWV as a non-invasive measure of microvascular stiffness. Our data suggests that filtration at higher HR multiples and linear fit result in strong association with BP. As our study was performed in normoalbuminuric subjects, rPWV may add detailed insights to early microvascular pathophysiology, potentially beyond microalbuminuria.

P6.12

CORRELATION OF PULSE WAVE VELOCITY AND ANGIOGRAPHICALLY PROVED CORONARY ARTERY STENOSIS

M. Berzina^{1,2}, A. Krallisa^{1,2}, G. Latkovskis^{1,2}, M. Zabunova^{1,2}, I. Mintale^{1,2}, A. Erglis^{1,2}

¹Paul Stradins Clinical University Hospital, Riga, Latvia

²University of Latvia, Riga, Latvia

Background: Carotid-femoral pulse wave velocity (PWV), a direct measure of aortic stiffness, has become increasingly important for total cardiovascular risk estimation. The aim of our study was to evaluate the correlation of PWV among the other cardiovascular risk factors with significance of the angiographically proved coronary artery disease (CAD).

Methods: The group of 66 patients referred for scheduled coronary angiography at Paul Stradins Clinical University Hospital Latvian Centre of Cardiology was analyzed. The mean age of patients was 62.1±11.7 years, 47% of them were male. The data about case history, cardiovascular risk factors, previous and concomitant therapy were collected. The applanation tonometry with SphygmoCor device, including radial pulse wave analysis (PWA), carotid PWA, carotid-femoral PWV, was done. Coronary angiography was done for determination of presence and degree of coronary artery stenosis (CAS). The CAS of ≥ 50% was defined as significant.

Results: PWV was significantly higher in the patients with significant CAS (12.7±2.8 m/s vs. 11.0±2.2 m/s, $p=0.013$). In binary logistic regression model, including age, gender, smoking habit, presence of arterial hypertension, diabetes, hypercholesterolemia, PWV, aortal augmentation, central augmentation index, only PWV correlated significantly with presence of significant CAS with odds ratio 1.30 ($p=0.022$). After adjustment for statins, β-blockers, angiotensin converting enzyme inhibitors, calcium channel blockers and nitrates PWV still correlated significantly with presence of significant CAS with odds ratio 1.33 ($p=0.024$).