



Artery Research

ISSN (Online): 1876-4401

ISSN (Print): 1872-9312

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

P14.09: PERIPHERAL ARTERIAL STIFFNESS ASSESSMENT FOR VASCULAR DISEASED PATIENTS: FEASIBILITY OF METHODS AND COMPARISON WITH CENTRAL PULSE WAVE VELOCITY

V. Lacroix, M. Willemet, E. Marchandise, R. Verhelst

To cite this article: V. Lacroix, M. Willemet, E. Marchandise, R. Verhelst (2010) P14.09: PERIPHERAL ARTERIAL STIFFNESS ASSESSMENT FOR VASCULAR DISEASED PATIENTS: FEASIBILITY OF METHODS AND COMPARISON WITH CENTRAL PULSE WAVE VELOCITY, Artery Research 4:4, 187–188, DOI: <https://doi.org/10.1016/j.artres.2010.10.150>

To link to this article: <https://doi.org/10.1016/j.artres.2010.10.150>

Published online: 21 December 2019

Western countries. Using a pilot case-control study, we assessed the effectiveness of a non-invasive approach for the discrimination of South Asians with and without premature CAD (≤ 55 yrs) using indices of vascular aging (peripheral augmentation index (pAIX) and central BP).

Methods: CAD patients (n=27) and age-, gender-, matched healthy controls (31) were recruited at Guru Teg Bahadur (GTB) Hospital (Delhi, India). Patients and controls were assessed for (i) pAIX and central blood pressure by arterial waveform analysis using PulseCor (Auckland, New Zealand), (ii) medical history and (iii) CVD risk factors during routine outpatient clinics.

Results: Both groups were comparable for age, gender, BMI and systolic blood pressure. Smoking was more common in CAD patients ($P=0.016$), who were also more centrally obese ($P=0.019$) than controls. Though higher amongst CAD patients, no significant difference was observed for median pAIX or central blood pressure, and other conventional CAD risk factors were comparable between groups. On multivariate logistic regression, premature CAD status was associated with history of smoking ($P=0.002$), BMI ($P=0.013$) and pAIX ($P=0.022$).

Risk Factors	Case (n=27)	Control (n=31)	P value
Age (years)	44.8 (7.3)	42.5 (7.1)	0.227
% Smoking	70.4 (19)	39.7 (12)	0.016
Waist to hip ratio	0.98 (0.07)	0.94 (0.06)	0.019
LDL to HDL ratio	2.99 (1.43)	2.54 (1.09)	0.276
Systolic BP (mmHg)	122.4 (21.7)	117.7 (10.8)	0.314
Central Sys' BP(mmHg)	110.0 (99.0-120.3)	111.0 (104.7-122.0)	0.84
pAIX (%)*	67.7 (35.0-96.7)	52.3 (40.0-74.17)	0.113

Data are mean (SD) or *median (IQR)

Discussion: Further research is warranted to investigate the utility of vascular aging indices for the stratification of CAD risk within this high-risk population.

P14.06

ACUTE MORNING STRESS IN ARTERIAL SYSTEM: ACCURATE AUTOMATIC ASSESSMENT FROM AMBULATORY BLOOD PRESSURE DATA

S. Pekarskiy¹, V. Mordovin¹, G. Semke¹, M. Kolodina²

¹Research Institute of Cardiology, Tomsk, Russian Federation

²Ochapovsky Regional Clinical Hospital, Krasnodar, Russian Federation

Morning change from supine sleep to upright activity causes acute stress in arterial system, which may be measured from ABPM data as morning BP surge. High level of such stress according to Kario and co-authors independently increases risk of stroke. However, its current measurement from ABPM data is not accurate because highly variable time of individual arising is only approximately estimated from patient diary.

Objective: To create a method of accurate automatic assessment of acute morning stress in arterial system by ABPM.

Methods: Cumulative sum of HR values after subtraction of 24-h HR average was computed that gradually increases during daytime (when $HR > 24$ -hr average), decreases during nighttime and increases again during next morning forming distinct minimum at the time of individual arising and thereby allowing accurate assessment of related BP change.

This technique was implemented as combination of functions on MS Excel worksheet. Absolute difference between hourly BP averages before and after arising are automatically computed to measure morning BP surge when ABPM data are 'copy-pasted' in predefined area of worksheet.

ABPM during 48 hours were performed in 15 men, 10 women aged 36-60 to compare reproducibility and thereby accuracy of new method to the proven method of Kario. The first-second day agreement was better for new method (Bland-Altman SD of the differences: 14,03 vs 17,01 respectively).

Conclusions: Acute morning stress in arterial system may be automatically and accurately measured from ABPM data by simple technique implemented as easy as combination of functions on MS Excel worksheet.

P14.07

QTc INTERVAL DURATION IS ASSOCIATED WITH VASCULAR CALCIFICATION IN RENAL TRANSPLANT CANDIDATES

K. Claes¹, D. Mesotten², S. Heye³, B. Bammens¹, P. Evenepoel¹

¹Dpt of Nephrology, Leuven, Belgium

²Dpt of Cardiology, Leuven, Belgium

³Dpt of Radiology, Leuven, Belgium

Abstract: Approximately 60% of all cardiac deaths in patients on dialysis are due to sudden death. Prolonged QT interval and arterial calcification have been associated with morbidity and mortality in different patient

populations including patients with renal failure. Limited data exist on the presence of an association of QT duration and arterial calcification.

Methods: We evaluated the association of vascular calcification with corrected QT and JT interval duration in renal transplant candidates in a single center cross-sectional study at time of renal transplantation. Patients taking QT-prolonging agents or with conduction abnormalities were excluded. Aortic calcifications were evaluated by means of a previously validated scoring system on lumbar X-ray. 193 patients (118 men, 52 years old) were included in the final analysis.

Results: We found that 26% of patients had a prolonged QT-interval. Multivariate analyses showed that QTc and JTc interval duration significantly correlated with the extent of aortic calcifications ($p=0.0004$; $p=0.005$ respectively). In the female patient population the presence of a prolonged QTc and JTc interval was a predictor of arterial calcification.

Conclusion: The presence of a prolonged QT duration is associated with aortic calcification independent of age, gender, cardiovascular history, electrolytes and parameters of mineral metabolism.

P14.08

THE OXYGEN CONSUMPTION-ON KINETICS IN THE SUB ANAEROBIC THRESHOLD CONSTANT LOAD EXERCISES FOR ENDOTHELIUM-DEPENDENT VASODILATATION EVALUATING IN THE MUSCLE MICROCIRCULATION

D. Maione¹, S. Bacchelli¹, E. Cosentino¹, D. Degli Esposti¹, M. Rosticci¹, R. Senaldi², E. Ambrosioni¹, C. Borghi¹

¹Internal Medicine University of Bologna, Bologna, Italy

²Sports Medicine Institute of Bologna, Bologna, Italy

Vasodilatation in the muscle microcircle was evaluated using VO_{2on} kinetics in constant load cycle ergometer exercise, at load less of 10% than that corresponding to anaerobic threshold in previous incremental test identified. At onset of this constant load exercise, VO_2 increases early and fast [first phase (ϕ_I)]; it follows a slower increase [second phase (ϕ_{II})], which appears with variable delay, and reaches in about 3 minutes steady-state [third phase (ϕ_{III})] by single exponential function. We excluded ϕ_I from our measurements because invalidated by many fakes. Ψ_{II} was attributed to O_2 decreased content in active muscles blood, where this undergoes a gas exchange. Ψ_{II} time constant (τ) can be decreased by exercise training so as heart disease therapy, whereas heart diseases prolong τ owing to inadequate vasodilatation in muscle microcirculation due especially to NO defect and circulating vasoconstrictors increase. Therefore, τ can be considered an indirect endothelial function and dysfunction marker. We tested, by original method, healthy subjects and patients with ischemic-hypertensive cardiopathy, IIa and IIb NYHA class, in treatment according to ESC-ESH guidelines, and subjects with cardiovascular (CV) risk factors and CV damage present, mild or absent, assessing drugs effects, as β_1 blockers, doxazosin and tadalafil, on endothelial function, and as a guide to therapy CV in order to normalise or significantly improve τ and therefore endothelial function.

P14.09

PERIPHERAL ARTERIAL STIFFNESS ASSESSMENT FOR VASCULAR DISEASED PATIENTS: FEASIBILITY OF METHODS AND COMPARISON WITH CENTRAL PULSE WAVE VELOCITY

V. Lacroix¹, M. Willemet², E. Marchandise², R. Verhelst¹

¹Cliniques Universitaires Saint Luc, Brussels, Belgium

²Institute of Mechanics, Materials and Civil Engineering, Louvain-La-Neuve, Belgium

Carotid-femoral Pulse Wave Velocity (PWV) is the standard method of assessing the central arterial stiffness.

Peripheral arterial stiffness has been studied in healthy subjects with a significant correlation with the central measure. A positive correlation has also been set with coronary disease [1].

The goal of our study is to analyse the stiffness of peripheral diseased networks, compare the data to the central stiffness and propose the more appropriate methodology for its assessment.

In 30 vascular diseased patients, we recorded the carotid-femoral, carotid-radial, carotid-tibial and femoral-tibial PWV with both Complior and Doppler ultrasound techniques. We have distinguished two categories (moderate and severe) of vascular disease depending on the Framingham and brachial-ankle index scores.

The Doppler ultrasound method appeared more appropriate than Complior for peripheral stiffness assessment because the absence of palpable tibial artery pulses in the severely diseased patients couldn't provide a sufficient signal for Complior analysis. We showed a good correlation between the two methods for data available with the Complior device.

When analysing the Doppler ultrasound measurements, we observed that the femoral-tibial and carotid-tibial PWV were statistically (two-sample T-test) higher for the severely diseased group compared to the moderate one. No difference was noticed for the carotid-femoral and carotid-radial PWV between the two groups.

In conclusion, peripheral arterial stiffness measurement for vascular diseased patients needed an appropriate technique. Severely diseased patients presented no different central PWV but a higher peripheral PWV than moderately diseased patients.

1. Tillin. Measurement of pulse wave velocity: sites matter. *J Hypertens* 2007.