



Artery Research

ISSN (Online): 1876-4401

ISSN (Print): 1872-9312

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

P14.05: VASCULAR AGING INDICES IN THE DISCRIMINATION OF PREMATURE CORONARY ARTERY DISEASE IN SOUTH ASIANS

J.V. Patel, P. Nikomanis, G. Dwivedi, E.A. Hughes, G.Y.H. Lip, S. Dwivedi, P.S. Gill

To cite this article: J.V. Patel, P. Nikomanis, G. Dwivedi, E.A. Hughes, G.Y.H. Lip, S. Dwivedi, P.S. Gill (2010) P14.05: VASCULAR AGING INDICES IN THE DISCRIMINATION OF PREMATURE CORONARY ARTERY DISEASE IN SOUTH ASIANS, Artery Research 4:4, 186–187, DOI: <https://doi.org/10.1016/j.artres.2010.10.146>

To link to this article: <https://doi.org/10.1016/j.artres.2010.10.146>

Published online: 21 December 2019

aPWVdes (m/s) was higher in SA (7.2 ± 0.3) than AfC (6.2 ± 0.3) or Europeans (6.1 ± 0.3) after adjusting for age and SBP ($R^2=0.42$). aPWVarch (m/s) did not differ significantly; AfC: 8.3 ± 0.5 , SA 7.8 ± 0.5 and Europeans: 7.3 ± 0.5 , in a similar regression model. Substituting central BPs did not alter these results. Central systolic and pulse pressures (mmHg) were not significantly different in AfC (127 ± 4 , 45 ± 2), SA (128 ± 5 , 47 ± 3) and Europeans (125 ± 4 , 45 ± 2), respectively adjusting for age and HR.

Conclusions: aPWVdes described cross-ethnic CHD risk differences better than LVMI and central pressures. aPWVarch, although not significantly different here, may predict stroke risk best in larger samples.

Pathophysiology 8

P14.01

ARTERIAL STIFFNESS IN HEALTHY YOUNG PEOPLE: INFLUENCE OF AGE, GENDER, BLOOD PRESSURE AND ANTHROPOMETRIC PARAMETERS

A. Yagensky¹, V. Yagensky², S. Indyka¹, I. Savchuk¹, H. Yagenska²

¹Lutsk City Hospital, Lutsk, Ukraine

²Lutsk Gymnasium 21, Lutsk, Ukraine

Increased arterial stiffness assessed using pulse wave velocity (PWV) measurements is a predictor of cardiovascular risk in adults. There are limited data on PWV and its determinants in young people.

Objective: To compare PWV and its association with gender, blood pressure (BP) and anthropometric parameters in healthy high school and university students.

Methods: First group - 42 high school students (22 males) 14-15 years (14.8 ± 0.3 years), the second group - 38 university students (18 males) aged 17-21 years (18.8 ± 1.1 years). To study velocities in elastic (Ve) and muscular (Vm) arteries sphygmomanometry was performed on carotid, femoral and radial arteries.

Results: Older students had higher BMI 22.2 ± 2.8 vs 20.06 ± 2.05 kg/m²; $p=0.002$ and trend to higher systolic BP (126.2 ± 16.6 vs 119.6 ± 10.2 mm Hg; $p=0.07$) No difference between groups in Vm was found (7.28 ± 1.18 m/s in 1st group; 7.09 ± 1.14 m/s in 2nd). Ve was higher in older group (6.24 ± 1.06 vs 5.57 ± 0.67 m/s in younger group; $p=0.001$). No gender difference was found in Ve or Vm in either group. Correlation analysis performed jointly in both groups revealed that Ve significantly correlated with age ($r=0.26$), body mass index (BMI) ($r=0.34$), systolic ($r=0.29$), diastolic ($r=0.30$) and mean BP ($r=0.33$). Vm correlated only with height ($r=0.28$). Pulse BP did not correlated with Ve no Vm. Multiple regression found only BMI as independent factor associated with Ve ($\beta=0.27$; $p=0.04$).

Conclusions: Elastic type arteries stiffness is increased with age in young people with no gender difference. It depends on BP levels and BMI. The main determinant of Ve is BMI.

P14.02

SLOW BREATHING AND FINGER ARTERY COMPLIANCE

N. Potocnik, K. Cankar, Z. Melik, V. Starc

Institute of Physiology, Medical faculty, University of Ljubljana, Ljubljana, Slovenia

It is known that 0,1Hz paced breathing reduces blood pressure, but the mechanisms involved in this phenomenon are not completely clear. The aim of our study was to evaluate the changes of finger artery compliance associated with this breathing pattern.

We measured ECG, arterial pressure and finger artery compliance in 21 young adults at rest and during slow breathing. Values obtained were compared by paired t-test. The finger artery compliance measurements based on the comparison of two oscilometric signals, one from Finapres and another from the cuff attached to the middle finger of the same hand, measuring the finger volume changes. A spectral analysis of R-R intervals was done by autoregression method to determine the changes of autonomic tone during slow breathing. We determined the area under the power spectrum curves over high frequency (HF) band (0.15-0.4 Hz), low frequency (LF) band (0.04-0.15 Hz) and very low frequency (VLF) band (<0.04 Hz).

Our results show that finger artery compliance decreased (from 1.04 ± 0.12 to 0.50 ± 0.06), HF component of HRV decreased (from 58.62 ± 5.31 to 26.59 ± 3.81) and percent of LF component increased (from 38.15 ± 4.23 to 69.58 ± 3.43) during slow breathing. All differences were statistically significant ($p<0.001$). Our results unexpectedly showed that sympathetic tone increased during slow breathing. This could be the reason for diminished finger artery compliance in our experimental settings. We suspect that paced breathing acted as stressor agent on persons not familiar with such breathing. Further investigation should be done to clarify this question.

P14.03

IS THERE A SHIFT OF THE REFLECTION POINT FROM PERIPHERAL TO CENTRAL ARTERIES WITH AGE IN HYPERTENSIVE PATIENTS?

P. Forcada¹, D. Olano², S. Gonzalez¹, S. Obregon¹, J. Chivavut Svane¹, C. Castelaró¹, E. Cavanagh², F. Inserra², C. Kotliar¹

¹Hospital Universitario Austral, Pilar, Argentina

²Universidad Austral, Pilar, Argentina

Introduction: Stiffening of arteries with age has been extensively described but this process has not been fully characterized at different levels of the arterial tree.

Aim: To evaluate the behavior of arterial function parameters according to age.

Methods: We screened 3277 p. derived for non-invasive vascular evaluation (NIVE) (Dec 2006/Dec 2009). NIVE comprised: IMT; PWV and FMD; atherosclerotic plaque (AP) characterization; Aortic and Peripheral pulse pressure (CPP and PPP) and Augmentation indexes (CAix and PAix). After applying exclusion criteria (age >65 ; diabetes mellitus, secondary HTN, previous CV events/secondary prevention) and the availability of data of PWV, CAix and PAix 1503 p. were included and analyzed according age (from 20 to 80 years old in deciles).

Results: We observed a progressive increase of all the arterial parameters with age (from 20 to 80 y.o.): PWV (8.8 ± 2 to 14 ± 4 m/sec), CPP (from 43 ± 15 to 59 ± 17 mmHg), PPP (from 49 ± 12 to 58 ± 13 mmHg), CAix (from 12 to 36%) and PAix (from -40% to 13%).

In the 50th decade a cross of values of PP (Central $>$ Peripheral) and increase of PAix was observed suggesting a shift of the reflection point from peripheral to central arteries.

Conclusions: The stiffening of central arteries with age is associated with a progressive shift of the reflection point from peripheral to the central arteries and the loss of the pulse amplification in peripheral arteries.

P14.04

THE ENDOTHELIAL FUNCTION AND THE INTIMAL-MEDIAL THICKNESS IN PATIENTS WITH CORONARY ARTERY DISEASE WITH THE METABOLIC SYNDROME

K. Yanovska

Institute of Cardiology, Kyiv, Ukraine

Aims: To learn endothelial function and intimal-medial thickness in patients with coronary artery disease and metabolic syndrome depending on the presence of the diabetes. 100 patients with CAD, MS, which made two clinical groups: 1-st group (n=47) from CAD, MS and DT II; 2-nd group (n=53) from CAD, MS without type II diabetes were examined. All patients were determined: anthropometric data, levels of glucose, lipids profile, measuring of IMT carotid artery, endothelial function of brachial artery. As a result complex intimal-medial and endothelial function in patients with CAD, MS and diabetes the IMT were higher than in the groups of patients with CAD, MS without diabetes. The positive correlation between descriptions of IMT and levels of cholesterol ($r=0.68$, $p<0.001$), LDL-cholesterol ($r=0.69$, $p<0.001$) in patients at the 1-st group was found, in this group there was negative correlation between the lipid profile and endothelial function (cholesterol $r=-0.53$, $p<0.001$, LDL-cholesterol $r=-0.55$, $p<0.001$). In patients with CAD, MS without diabetes the faint direct correlation between the levels of cholesterol ($r=-0.14$, $p<0.001$), LDL-cholesterol ($r=0.17$, $p<0.001$) and IMT. In this group found the negative correlation between the endothelial function and levels of cholesterol ($r=-0.77$, $p<0.001$), LDL-cholesterol ($r=-0.74$, $p<0.001$). The diabetes in patients with CAD and MS associate with the increase IMT, which have close positive connection with the level of cholesterol and LDL-cholesterol. Functional changes of endothelial function have negative correlation with the lipid profile.

P14.05

VASCULAR AGING INDICES IN THE DISCRIMINATION OF PREMATURE CORONARY ARTERY DISEASE IN SOUTH ASIANS

J. V. Patel^{1,2}, P. Nikomanis¹, G. Dwivedi^{1,2}, E. A. Hughes^{1,2},

G. Y. H. Lip^{1,2}, S. Dwivedi³, P. S. Gill¹

¹University of Birmingham, Birmingham, United Kingdom

²Sandwell and West Birmingham Hospitals NHS Trust, Sandwell, United Kingdom

³University of Delhi, Delhi, India

South Asian populations have a greater prevalence and earlier presentation of coronary artery disease (CAD) than populations from most other countries. The CAD risk profile common to South Asians (particularly those with early CAD) is devoid of many factors common to White populations of

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.