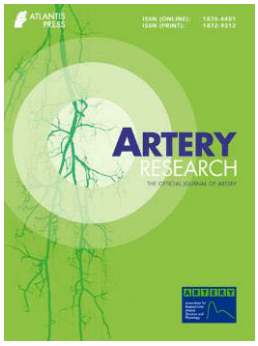

Artery Research

ISSN (Online): 1876-4401 **ISSN (Print): 1872-9312**
Journal Home Page: https://www.atlantis-press.com/journals/artres

P.100: INVASIVE VALIDATIONS OF A USER INDEPENDENT OSCILLOMETRIC DEVICE (ARTERIOGRAPH) FOR MEASURING AUGMENTATION INDEX AND AORTIC PULSE WAVE VELOCITY

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To cite this article: I. Horvath, L. Papp, L. Papp, M. Illyes (2007) P.100: INVASIVE VALIDATIONS OF A USER INDEPENDENT OSCILLOMETRIC DEVICE (ARTERIOGRAPH) FOR MEASURING AUGMENTATION INDEX AND AORTIC PULSE WAVE VELOCITY, Artery Research 1:2, 75–76, DOI: https://doi.org/10.1016/j.artres.2007.07.034

To link to this article: https://doi.org/10.1016/j.artres.2007.07.034

Published online: 21 December 2019

decrease arginase II protein expression as compared to both low and oscillatory flow conditions. Immunohistochemisty analysis confirmed a pronounced expression of arginase II on SMCs and macrophages on in the atherosclerotic plaques formed by oscillatory and low shear stress *in vivo*.
Conclusions: The present study demonstrates that arginase expression is modulated by shear stress patterns in carotid arteries perfused *ex vivo*. Similar findings are also observed in a model of shear stress-induced atherogenesis *in vivo*. Histopathological analysis of carotid lesions in ApoE-/- mice exposed to shear stress and chronically treated with arginase inhibitors may further elucidate the role of arginases in modulating both plaque size and vulnerability.

P.097
ADRENALECTOMY IS MORE EFFECTIVE THAN SPIRONOLACTONE IN REDUCING ARTERIAL STIFFNESS IN PRIMARY ALDOSTERONISM☆

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Objective: The study was aimed at assessment of the effects of specific treatment of primary aldosteronism (PA) on the arterial stiffness.
Design and Methods: 28 patients with confirmed PA (14 with aldosterone-producing adenoma treated by unilateral laparoscopic adrenalectomy, 14 with idiopathic hyperaldosteronism (treated with spironolactone) were investigated by Sphygmocor applanation tonometer using measurement of pulse wave velocity (PWV) and augmentation index (AI) at the time of the diagnosis and then again 1 year after the specific treatment.
Results: The mean 24h-BP levels decreased from 149 ± 18/92 ± 11mmHg to 128 ± 15/81 ± 10mmHg ($p<0,01$) after adrenalectomy ($p<0,01$), and from 155 ± 16/94 ± 12 to 140 ± 18/88 ± 8mmHg ($p<0,05$; n.s.). on spironolactone. The PWV significantly decreased after surgery from 9,3 ± 3 na 7,6 ± 2,1 m/s ($p=0,002$), also the AI decreased significantly from 25 ± 9 na 17 ± 8% $p=0,006$. However, no significant improvement of the arterial stiffness indices was found in the patients treated with spironolactone (PWV before 9,3 ± 1,6, after 8,9 ± 1,3 m/s, n.s.; AI 24 ± 9…25 ± 8%, n.s.). After correction for differences in 24-h BP fall stays the AI fall more significant ($p<0,01$) in the surgically treated than spironolactone treated patients.
Conclusions: The causal surgical treatment of PA is significantly more effective in improving arterial stiffness than conservative treatment with spironolactone, also after correction for 24-h BP difference. This could indicate a possibility, that the aldosterone receptor blockade by spironolactone doesn't fully prevent arterial wall damage mediated by aldosterone, and that nongenomic aldosterone effects could possibly play a role in patophysiology of arterial wall damage.

☆ Supported by the Grant NR/8155-5 provided by IGA of the Czech Ministry of Health.

P.098
INCREASED ARTERIAL STIFFNESS AND ARTERIAL WAVE REFLECTIONS ARE ASSOCIATED WITH IMPAIRED FUNCTIONAL STATUS IN PATIENTS WITH NORMAL EJECTION FRACTION

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Introduction: In asymptomatic men, arterial stiffness and wave reflections have been linked with cardiorespiratory fitness. We previously reported a relationship between arterial properties and objective measures of systolic and diastolic function in patients with preserved ejection fraction (EF). In this study, we investigated the association between symptomatic status and arterial elastic properties in the same patient group.
Methods: In 336 patients undergoing coronary angiography, we assessed pulse wave velocity (PWV) invasively, and arterial wave reflections (Augmentation Index — AIx) non-invasively using radial applanation tonometry and a validated transfer function (SphygmoCor system). Functional status, mainly exertional dyspnea, was judged by one single investigator.
Results: Patients suffering from exertional dyspnea more often were women, and they had higher blood levels of brain natriuretic peptides and higher left ventricular enddiastolic pressures, as compared to asymptomatic controls. Brachial as well as aortic blood pressures did not differ significantly between the groups. In symptomatic patients, we observed increased PWV (9.4 +/- 2.3 m/sec vs 8.7 +/- 2.6 m/sec in asymptomatic patients, $p=0.01$), and increased AIx (31.1 +/- 9.7 vs 28.0 +/- 10.8 in asymptomatic patients, $p=0.008$). In a logistic regression model, female gender, use of nitrates, and higher PWV were independently associated with functional impairment, whereas higher AIx and higher body mass index were of borderline significance.
Conclusion: Exertional dyspnea is associated with increased arterial stiffness and increased/premature arterial wave reflections in patients with normal EF.

P.099
PREDICTIVE VALUE OF AORTIC PULSE WAVE VELOCITY IN ASYMPTOMATIC PATIENTS FOR CAROTID ATHEROSCLEROSIS

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Background: It's widely accepted that carotid ultrasonography can help to identify asymptomatic patients at risk of heart attack and stroke as it's capable of providing direct evidence for the presence and extent of atherosclerosis. Due to limited accessibility of carotid scan the measurement of arterial stiffness is seemed to be suitable functional screening test to select patients who need morphological imaging of arterial tree (eg. carotid scan, multislice-CT or coronarography). However the predictive value of aortic pulse wave velocity for detecting carotid atherosclerosis has been poorly studied.
Method and patients: Authors examined 122 consecutive asymptomatic patients (mean age was 60 ± 9,8 years, 78 female, 44 male) in which arterial stiffness parameters (augmentation index: Aix and aortic pulse wave velocity: PWVao) were measured by an oscillometric device (TensioMed arteriograph). Carotid ultrasonography was performed in all individuals by a blinded investigator (who was unaware of the measured stiffness values).
Results: Mean blood pressure and heart rate was 137/83 mmHg and 72/min. The average Aix was −2,61% and PWV was 10,43 m/s. Carotid atherosclerosis (presence of local plaque in carotid arteries) was confirmed in 72 patients (C+ group) while the arterial wall was intact in 50 patients (C- group). If the upper limit of normal of PWV was drawn at 9,7 m/s, elevated PWVao was measured in 91 of 122 pts (74,5%). Sensitivity of PWVao was 89% (64 pts had high PWV in C+ group), while specificity was 46% (23 pts had low PWV in C- group). Positive predictive value of PWV was 67% (61 pts of 91 with high PWV value were C+) while negative predictive value was 75% (22 pts of 29 with normal PWV was C-).
Conclusions: Elevated aortic pulse wave velocity was strongly associated with the presence of carotid plaques. Measuring arterial stiffness with arteriograph seems to be suitable as a screening method of preclinical atherosclerosis according to its high negative and positive predictive values. Screening of all asymptomatic men over 45 and women over 55 (or at younger age) would be reasonable approach to identify atherosclerosis in early and probably reversible phase if these correlations were confirmed in further large prospective study.

P.100
INVASIVE VALIDATIONS OF A USER INDEPENDENT OSCILLOMETRIC DEVICE (ARTERIOGRAPH) FOR MEASURING AUGMENTATION INDEX AND AORTIC PULSE WAVE VELOCITY

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Objective: To validate invasively a new apparatus (Arteriograph), which can measure augmentation index (Aix) and aortic pulse wave velocity (PWVao) simultaneously, within 2-3 minutes. According to the available literature data not any non-invasive device for measuring PWVao was validated with invasive method.
Design and Method: Our comparative study was performed on 36 patients who underwent routine coronarograpy for diagnostic purposes. In 10 cases we measured the brachial Aix with intrabrachial catheter and with Arteriograph, furthermore in 13 cases the intraaortic Aix was compared with brachial Aix on identical pulses. In 25 cases the invasively and non-invasively measured PWVao was compared. In 11 cases we used 2

catheters (inserted from radial and femoral artery) positioned to the aortic root and to the aortic bifurcation and the transit time of the pulse wave was measured on identical heart cycles. In the remnant cases the PWVao was determined with one catheter with pull back from the aortic root to the bifurcation and the transit time was measured using ECG gating. All of the invasively measured transit time was determined by intersecting tangent algorithm on the pulse waves recorded in the aortic root and bifurcation. The aortic root-bifurcation distance was measured by marking the cannula in the aortic root and after its pull back to the bifurcation, and was compared to the non-invasively measured sternal notch-pubic bone distance.

Results: The R values (Pearson's correlation) between invasively and Arteriograph measured Aix-brachial/brachial, Aix-aortic/brachial and PWVao were 0,92 ($p<0,001$), 0,90 ($p<0,001$) and 0,9 ($p<0,001$) respectively. With Bland-Altman plots the differences were within 2SD in all of the compared parameters and no significant deviation from the zero line was found in different ranges of the measured values. The aortic root-bifurcation and sternal notch-pubic bone distance strongly correlated to each other ($R = 0,75$, $p<0,001$) and the difference (0,4 cm) between their means did not prove to be significant ($p=0,36$).

Conclusions: The new oscillometric Arteriograph device can measure accurately the central (aortic) and peripheral (brachial) Aix and aortic PWV. The simplicity (due to the oscillometric principle) of the use of this new method to determine stiffness parameters may help to spread more widely, even in primary care the measurement of the arterial stiffness parameters, of which importance is gaining ground rapidly nowadays in the detection of asymptomatic arterial disease.

Atherosclerosis according to its high negative and positive predictive values. Screening of all asymptomatic men over 45 and women over 55 (or at younger age) would be reasonable approach to identify atherosclerosis in early and probably reversible phase if these correlations were confirmed in further large prospective study.

P.101
PULSATILE ARTERIAL PRESSURE IS PREDOMINANTLY DETERMINED BY THE CENTRAL RESERVOIR, WHICH CAN BE DETERMINED NON-INVASIVELY FROM PERIPHERAL MEASUREMENT SITES

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Introduction: There is a large variation in the pulse pressure waveform in systole throughout the arterial system. However, at these corresponding sites, the diastolic phase appears almost identical. We hypothesise that this is because diastolic pressure is predominately determined by the reservoir properties of the central elastic arteries, despite large differences in wave reflection and local compliance of peripheral arteries themselves. We assessed the contribution of the central reservoir to the peripheral pulse pressure waveform.

Method and Results: Pressure and flow velocity were measured non-invasively at right common carotid and radial arteries in 14 healthy volunteers (49 ± 11 years) using tonometry, calibrated to brachial blood pressure, and Doppler ultrasound. We calculated the reservoir pressure and compliance (local pulse wave velocity). The time constant of diastolic decay (τ) was calculated from the exponential rate of decline in pressure during diastole. Reservoir pressure was the largest overall contributor to pulse pressure in the carotid (28.0 ± 4.8mmHg; $53 \pm 6\%$), and radial (32.0 ± 6.2mmHg; $48 \pm 4\%$). τ was similar in each artery (carotid: 427 ± 281ms versus radial: 427 ± 320ms ($p>0.99$) despite large differences in local pulse wave velocity (carotid: $7.2 \pm 2.6 ms^{-1}$ versus radial: $10.9 \pm 5.0 ms^{-1}$, $p<0.05$).

Conclusion: The reservoir is the largest determinant of pulse pressure and is similar in central and peripheral arterial sites, despite significant variation in local compliance. Estimation of reservoir pressure in the radial artery may be a simple and useful indicator of the properties of the aorta and large elastic arteries.