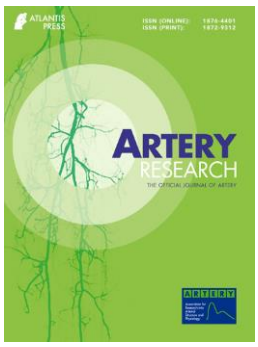

Artery Research

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

P.070: NON-INVASIVE QUANTITATIVE EVALUATION OF SYSTOLIC CARDIOVASCULAR INTERACTION BY CAROTID ARTERY ULTRASONOGRAPHY

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To cite this article: K.D. Reesink*, E. Hermeling, M.C. Hoeberigs, A.P.G. Hoeks (2006) P.070: NON-INVASIVE QUANTITATIVE EVALUATION OF SYSTOLIC CARDIOVASCULAR INTERACTION BY CAROTID ARTERY ULTRASONOGRAPHY, Artery Research 1:S1, S44–S44, DOI: https://doi.org/10.1016/S1872-9312(07)70093-5

To link to this article: https://doi.org/10.1016/S1872-9312(07)70093-5

Published online: 21 December 2019

values (CI = 0.57±0.07 for group A and CI = 1.23±0.19 for group B) and differed statistically significant as at rest ($p < 0.05$, t-test).
These differences suggests that young healthy adults of group A could have increased sympathetic tonus compared to group B or there are changes in other peripheral mechanisms governing the small vascular behavior between both groups.

P.070
NON-INVASIVE QUANTITATIVE EVALUATION OF SYSTOLIC CARDIOVASCULAR INTERACTION BY CAROTID ARTERY ULTRASONOGRAPHY

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Introduction: We investigated non-invasive quantification of the systolic interaction between left ventricle and central arterial system by carotid artery distension waveform analysis.
Methods: ECG, finger-cuff pressure, and common carotid artery distension waveforms (M-mode ultrasound) were obtained in 14 young healthy volunteers in supine and sitting position.
Results: Distension waveform analysis enabled determination of isovolumic contraction period (ICP), ejection period (EP), aorta-carotid (TTa-c) and aorta-femoral (TTa-f) transit times with a precision of 3.2, 4.5, 3.1, and 7.9 ms, respectively. From supine to sitting position, diastolic arterial pressure (DAP) increased by 7±4 mmHg ($p < 0.001$, paired t-test) and the R-R interval decreased by 70±87 ms ($p < 0.05$) due to the baroreflex response. The decrease in carotid transmural pressure in sitting position was reflected by an increase in TTa-c of 15±9 ms ($p < 0.001$). ICP increased from 42±7 to 49±5 ms ($p < 0.001$) while DAP/ICP, a load-independent measure of left ventricular contractility, decreased by 7% ($p = 0.058$). This implies that the cardiac response to the postural intervention is predominantly based on an increase in heart rate. EP decreased from 303±18 to 267±19 ms ($p < 0.001$) as a result of the earlier arrival of the lower body reflection wave (TTa-f decreased by 57±25 ms, $p < 0.001$). The ejection period and the peripheral transit time exhibited a clear correlation ($R^2 = 0.66$).
Conclusions: Modest postural changes affect systolic cardiovascular interaction through changes in arterial transmural pressure and the baroreflex but leave left ventricular contractility unaltered. Carotid artery ultrasonography enables precise quantitative evaluation of systolic cardiovascular interaction. The application of this non-invasive method in patients appears promising.

P.071
ANGIOTENSIN RECEPTOR ANTAGONISM WITH VALSARTAN DECREASES ARTERIAL STIFFNESS IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME

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Background: Angiotensin II (AT II) plays a key role in the development of vascular disease. Arterial stiffness is an important, independent predictor of cardiovascular risk. We investigated the long-term effects of selective AT_1receptor blockade with valsartan on arterial stiffness in patients with hypertension and metabolic syndrome (MS).
Study design and Methods: We have examined 30 patients (16 males and 14 females, aged 47±1 years, BMI 29–46 kg/m^2) with the MS and mild essential hypertension in the double blind, placebo controlled study. We measured brachial blood pressure (BD, mmHg), brachial-ankle pulse wave velocity (baPWV, cm/s) and the augmentation index (Aix, %) by using tonometry, volume-plethysmography and Doppler ultrasonography before and after 20 weeks of treatment with valsartan (40 to 160 mg/day). Statistical significance was assessed by t-test or two-way ANOVA of the dose responses curves.
Results: After 20 weeks of treatment with valsartan, baPWV and Aix were reduced: mean delta systolic BP 12±1.6 mmHg ($P = 0.02$ *vs.* baseline), diastolic BP 5.1±1.8 mmHg ($P < 0.0001$ *vs.* baseline), mean BP 7.5±2.7 mmHg ($P = 0.003$ *vs.* baseline), baPWV 2.4±0.03 cm/s ($P = 0.02$ *vs.* baseline), Aix 23±8% ($P = 0.002$ *vs.* baseline). Delta baPWV was significantly higher in the group of female patients with the MS (F/M: 2.9±0.02 cm/s *vs.* 2.1±0.05 cm/s, $P = 0.003$).
Conclusion: AT_1receptor antagonism reduced the arterial stiffness in hypertensive patients with MS, and may provide new therapeutic strategies for cardiovascular risk reduction.

P.072
THE DIFFERENTIATION IN THE CONTRIBUTION OF VASCULAR AND CEREBRAL SEGMENTS TO BRS

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Background: The baroreflex pathway is composed of vascular and cerebral segments, which are individually affected by variations in blood pressure. Baroreceptor sensitivity (BRS) is conventionally derived from spectral relationship between changes in peripheral blood pressure and heart-rate (R-R), and recently from carotid artery (CA) diameter and R-R, within the spectral frequency band of 0.05–0.15 Hz.
Objective: To discriminate the contribution of distinct segments to the overall BRS value calculated, in response to blood pressure variations induced by posture changes.
Methods: The common CA was visualised in B/M-mode with an ultrasound system. Processing of received signal resulted in beat to beat changes in diameter characteristics as a function of time, over 10min. To reveal the segmental response to local changes in transmural pressure, the BRS mean amplitudes were computed for 20 young subjects in supine and upright-seated postures.
Results: Correlation analysis revealed variation in the transfer function of the cerebral segment, has a dominant contribution to the overall BRS value. Paired t-test revealed that the pressure-based BRS value is significantly lower in sitting than supine position ($p < 0.01$), while the strain-based BRS value did not change.
Conclusions: Shifting to an upright posture results in a lower CA transmural pressure, causing a larger change in diameter for a given blood pressure stimulus, thus enhancing the pressure-based BRS. The arterial pressure to CA diameter transfer function has the largest contribution to the change in the pressure-based BRS value, in response to the variation in pressure by posture.

P.073
INTEGRATED ARTERIAL SYSTEM ANALYSIS IN A POPULATION OF HEALTHY MIDDLE-AGED MEN AND WOMEN: AUGMENTATION INDEX VERSUS WAVE REFLECTION INDICES

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Background: Age-induced alterations in arterial impedance and wave reflection contribute to elevated systolic and pulse pressure. Surrogate indices such as the augmentation index (AIx), suggest increased susceptibility for wave reflection in women.
Methods and Results: Carotid pressure and central flow waveforms were acquired non-invasively in 2132 apparently healthy subjects (1093 F/1039 M), aged between 35 and 55 at inclusion (a subgroup of the 'Asklepios' population). Input impedance, reflection coefficient $|\Gamma_1|$ and the ratio of backward-to-forward pressure amplitude, P_b/P_f, both direct measures of wave reflection, were derived. AIx was assessed using (automated) identification of characteristic points on the pressure waveform, and the effective length of the arterial tree, L_{eff}, was calculated from the timing of the reflected wave and pulse wave velocity. In addition, we calculated AIx* and L_{eff}* where information from pressure *and* flow was used to obtain the timing of the reflected wave (through wave separation analysis). Both $|\Gamma_1|$ (from 0.4143±0.0033 at age 38 to 0.4618±0.0048 at 54; mean±SEM) and P_b/P_f (0.4491±0.0033 to 0.5038±0.0044) increased with age ($P < 0.001$) without gender differences. AIx also increased with age, but was persistently higher in women ($P < 0.001$), while L_{eff} spuriously increased with age. Interestingly, while still increasing with age, there was virtually no gender difference in AIx* and L_{eff}* demonstrated the anticipated shift of reflection sites towards the heart.
Conclusion: With ageing, wave reflection increases to a similar degree in middle-aged healthy men and women. Analysis of wave reflection, using a modified AIx*, appears to yield more consistent results than conventional AIx.

P.074
VASCULAR STRUCTURAL AND FUNCTIONAL CHANGES IN PATIENTS WITH HEART FAILURE

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Purpose: Heart failure (HF) is increasing in prevalence and a common cause of morbidity and mortality. We evaluated vascular structure and function in patients with HF.