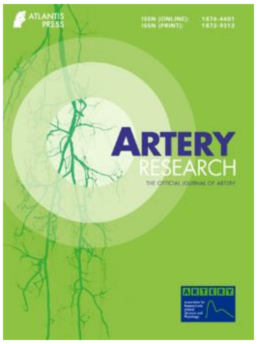

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P1.01: VALIDATION OF A BRACHIAL CUFF-BASED METHOD FOR ASSESSING CENTRAL BLOOD PRESSURE

T. Weber, S. Wassertheurer, C. Mayer, B. Hametner, J. Kropf, B. Eber

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Poster Presentation Abstracts

Methodology 1

P1.01
VALIDATION OF A BRACHIAL CUFF-BASED METHOD FOR ASSESSING CENTRAL BLOOD PRESSURE

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Background: The prognostic value of central blood pressure has been recently established, and the important role of cuff-based ambulatory blood pressure measurement has been clarified. An algorithm enabling conventional automated oscillatory upper-arm cuffs to assess central pressures in addition to brachial measurements could be of clinical value.
Methods: We compared central systolic blood pressure (cSBP), calculated with the ARCSolver method (Austrian Institute of Technology, Vienna, Austria) using waveforms recorded with a regular oscillatory brachial cuff suitable for ambulatory measurement (mobil-o-graph, IEM, Germany), with simultaneous high-fidelity invasive recordings using Millar catheters during routine coronary angiography, and with non-invasive estimations using a FDA-approved validated device (SphygmoCor, AtCor medical, Sydney, Australia).
Results: Both studies revealed a good agreement between the ARCSolver-based cSBP and the comparator. In the invasive study, comprising 18 patients, mean difference between cSBP (ARCSolver) and cSBP (invasive) was -0.3 mm Hg with a standard deviation of 4.5 mm Hg – Figure. In the non-invasive study, comprising 103 patients, mean difference between cSBP (ARCSolver) and cSBP (SphygmoCor) was -0.5 mm Hg with a standard deviation of 4.6 mm Hg. Both results pass the AAMI limits for blood pressure measurement devices.
Conclusion: The ARCSolver algorithm, using brachial cuff-based waveform recordings, is suited to provide a realistic estimation of cSBP.

P1.02
IN VIVO QUANTIFICATION OF CAROTID ARTERY WALL DIMENSIONS: 3.0 TESLA MRI VERSUS B-MODE ULTRASOUND IMAGING

R. Duivenvoorden [1], E. de Groot [1,3], B. M. Elsen [1], J. S. Lameris [2], R. J. van der Geest [4], E. S. G. Stroes [1], J. J. P. Kastelein [1], A. J. Nederveen [2]
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Background: We compared 3.0 Tesla MRI (3T MRI) common carotid Mean Wall Thickness (MWT) to B-mode ultrasound (US) common carotid intima-media thickness (CCIMT) measurements.
Methods and results: 3T MRI and B-mode US scans of the left and right common carotid arteries were performed three times in 15 healthy younger volunteers (aged 26±2.6 years), 15 healthy older volunteers (aged 57±3.2 years) and 15 subjects with CVD and carotid atherosclerosis (aged 63 ± 9.8 years). MWT was 0.711(SD 0.229) mm; CCIMT was 0.800 (SD0.206)mm. MWT and CCIMT were highly correlated ($r = 0.89$, $p<0.001$). ICC's for inter-scan and inter- and intraobserver agreements of MRI MWT measurements were >0.95 with small confidence intervals. Power calculations indicated that 89 subjects per group are required to detect 4% difference in MRI MWT, compared to 469 subjects per group for a similar CCIMT change.
Conclusion: Carotid MRI MWT and ultrasound CCIMT measurements showed strong agreements. MRI showed smaller variability that may allow sample sizes and potentially shorter study duration in cardiovascular prevention trials.

P1.03
BRACHIAL SYSTOLIC AND DIASTOLIC BLOOD PRESSURE AT DIFFERENT ARM HEIGHTS: A NOVEL INDEX OF ARTERIAL FUNCTION

G. Schillaci [1], G. Pucci [1], B. Gavish [2], R. Hijazi [1], L. Settimi [1], M. Pirro [1], E. Mannarino [1]
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Systolic and diastolic blood pressure (BP) changes over different mean pressure levels has been used to generate the (ambulatory) arterial stiffness index, and may reflect functional arterial properties. We hypothesized that pressure changes obtained by changing arm position may represent a tool to investigate arterial function at bedside.
In 56 healthy subjects (age 48±18 years, BP 125/71±18/10 mmHg), we measured carotid-radial pulse wave velocity (PWV) and sitting brachial BP (12 readings with the arm in 4 different positions, 3 readings per position). SBP-on-DBP slope, estimated by the ratio of their standard deviations, was defined as BPVR (BP variability ratio). Recent model expresses BPVR as the systolic-to-diastolic stiffness ratio. Diastolic stiffness was expressed by PWV^2 (Bramwell-Hill formula).
As expected from Stevin's law, mean pressure changed linearly with the cuff-heart vertical distance (-14 mmHg, -8 mmHg, and +9 mmHg, respectively, at +20, +10 and -15 cm; p for linear trend <0.001). Diastolic PWV^2 had a linear relationship with DBP ($r=0.40$, $p=0.005$). Also, calculated systolic stiffness (BPVR × diastolic PWV^2) had a direct relationship with SBP ($r=0.60$, $p<0.05$). BPVR had no relation with PWV^2 ($r=-0.18$, p=n.s.), and a strong one with age ($r=0.45$, $p<0.01$) and Framingham coronary risk ($r=0.60$, $p<0.001$).
In conclusion, SBP/DBP changes at different arm heights may provide a novel measure of arterial function. The resulting SBP-on-DBP slope had no correlation with diastolic arterial stiffness, and increased with increasing SBP, age and estimated coronary risk. Results support the theoretical expression of SBP-on-DBP slope as the ratio between systolic and diastolic stiffnesses.

P1.04
DETERMINATION OF BOTH NEAR AND FAR WALL BEHAVIOUR OF THE CAROTID ARTERY IN HYPERTENSIVE AND NORMOTENSIVE SUBJECTS

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Introduction: Although the Artlab® echotracking device (Artlab, Esaote) determines common carotid artery (CCA) far wall thickness (FW-IMT) with

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