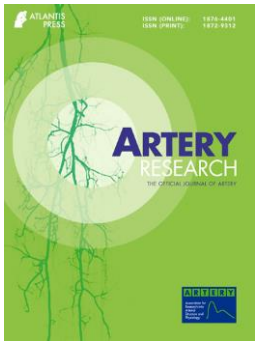

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P1.13: COMPARISON OF TWO NON-INVASIVE DEVICES (SPHYGMOCOR® VS. A-PULSE®) FOR MEASUREMENT OF CENTgRAL HAEMODYNMAICS WITH INVASIVE MEASUREMENT DURING CARDIAC CATHETERIZATION

C. Ott, S. Haetinger, M. Pauschinger, R.E. Schmieder

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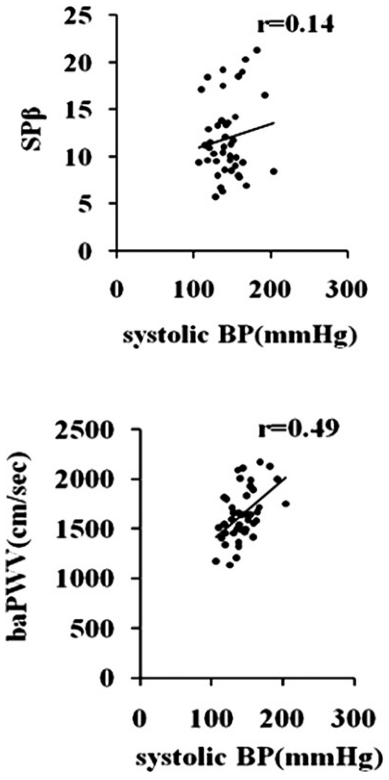
Recently, SPβ, an index of vascular elasticity, become easy to measure. SPβ is adjusted by BP, thus it is less affected by occasional BP. In this study, we examined differences between SPβ and baPWV.
Methods: SPβ and PWV were measured in 26 HD and 16 non-HD patients. SPβ was calculated from BP and the diameter of common carotid artery measured by ultrasound examination.
Results: Nevertheless age, gender and BP were matched in two groups, SPβ in HD patients was significantly higher ($p=0.004$). Also in this study, there was no correlation between SPβ and systolic BP.
Conclusions: These results suggest that SPβ reflects elastic properties of arteries without influence of occasional BP, and that arteriosclerotic change is accelerated in HD population.



P1.13
COMPARISON OF TWO NON-INVASIVE DEVICES (SPHYGMOCOR® VS. A-PULSE®) FOR MEASUREMENT OF CENTRAL HAEMODYNMAICS WITH INVASIVE MEASUREMENT DURING CARDIAC CATHETERIZATION

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Objective: The estimation of central haemodynamics is discussed to assess more preciously the pressure load on the cardiovascular system in hypertension. In addition to SphygmoCor® (Atcor Medical, Sydney Australia), a new device for non-invasive assessment of central haemodynamics (BPro® device with A-Pulse®, HealthSTATS, Singapore) was approved by FDA.
Design and Method: Patients (N=52) undergoing invasive elective cardiac evaluation were tagged prior to the cardiac catheterization with a standard oscillometric blood pressure device and the BPro® device at the same arm. Immediately after the invasive measurement of central haemodynamics, radial artery waveforms were sampled by two non-invasive techniques, the B-Pro® with A-Pulse® and with the SphygmoCor® System. Thereafter, central haemodynamics was measured invasively for a second time.
Results: There was a high agreement between the invasively recorded central systolic blood pressure (cSBP) (137±27mmHg) and both non-invasively assessed cSBP by B-Pro® (136±21mmHg, $p=0.627$ vs. invasive cSBP) and by SphygmoCor® (136±23mmHg, $p=0.694$ vs. invasive cSBP). Moreover, there was a high correlation of cSBP between invasively recorded and both non-invasively assessed cSBP by B-Pro® ($r=0.893$, $p<0.001$) and by SphygmoCor® ($r=0.860$, $p<0.001$). Given in absolute values, cSBP differed only in 0.1±6mmHg ($p=0.913$) between the two non-invasive devices. However, only SphygmoCor® showed an acceptable assessment of heart rate. Conclusions: Both non-invasive devices showed an accurate agreement in cSBP compared with invasively measured cSBP. However, only SphygmoCor® showed an acceptable assessment of heart rate in contrast to B-Pro® compared to invasive recording.

Methodology and Pathophysiology

P2.01
CONTINUOUS NONINVASIVE ESTIMATION OF BLOOD PRESSURE IN THE COMMON CAROTID ARTERY USING MEASUREMENTS IN THE FINGER ARTERY

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Myocardial infarction and stroke are two leading causes of mortality. The primary trigger for these clinical events is destabilization of atherosclerotic plaques. Plaques can be identified based on their elastic properties, derived from stress and strain in the plaque. Strain can be measured noninvasively using ultrasound [1] and the corresponding stress can be derived from the blood pressure waveform.
In 7 healthy subjects we measured the pressure waveform in the right common carotid artery using two methods. The pressure waveform obtained by applanation tonometry was scaled directly to brachial blood pressure. The carotid artery diameter waveform obtained using ultrasound echotracking was scaled to pressure based on the diastolic and mean blood pressure continuously measured in the finger artery (Finapress®). The resulting pressure waveforms were characterized by their systolic, diastolic and pulse pressure.
The shape of the pressure waveforms obtained by the two methods correlated well (Pearson correlation: 0.87-0.99, $p<0.05$). There was a significant bias in the systolic (mean±se: 15.6±2.3 mmHg) and diastolic pressure (12.6±1.7 mmHg) between the two methods (Bland-Altman, $p<0.05$). The pulse pressure did not have a significant bias (3.0±1.6 mmHg).
These results suggest that the pressure waveform derived from the diameter waveform and finger blood pressure systematically underestimates mean pressure but appropriately describes pressure changes over time. Consequently ultrasound data can be used for simultaneous estimation of stress and strain in the carotid artery, which makes it possible to determine the elastic properties of plaques.
1. Hansen HHG, *et al.* IEEE Trans Med Imaging 2009.

P2.02
PREDICTION OF CARDIOVASCULAR EVENTS: A COMPARISON OF BRACHIAL-ANKLE PULSE WAVE VELOCITY AND CARDIO-ANKLE VASCULAR INDEX

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The cardio-ankle vascular index (CAVI) has been recently reported as a new index of aortic stiffness, which is less influenced by blood pressure than the previous standard, brachial-ankle pulse wave velocity (baPWV). Recent studies have shown that CAVI is a more accurate predictor of the current severity of atherosclerotic disease than baPWV. The AIM of this study was to establish which of the two parameters (baPWV or CAVI) has a higher predictive value for major adverse cardiovascular events (MACE) in men with Coronary Artery Disease (CAD). METHODS AND RESULTS: baPWV and CAVI measurement were performed on 224 men with CAD (mean age 56.2±8.9). The examination measured body mass index, blood pressure, blood glucose and total cholesterol. During the 3.5-year follow-up period 38 patients experienced MACE (acute myocardial infarction, coronary intervention, or cardiac death). A receiver operating characteristic curve demonstrated that the best cut-off point for baPWV to predict MACE was 14.0 m/s (AUC=0.69, $p<0.001$) whereas for CAVI the value is 8.1 (AUC=0.61, p=0,027). Univariate Cox analyses demonstrated that baPWV had a significant risk ratio (RR) for MACE (RR=4.59, CI95%=2.43-8.67,