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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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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.

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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 ± 4.8 mmHg; $53 \pm 6\%$), and radial (32.0 ± 6.2 mmHg; $48 \pm 4\%$). τ was similar in each artery (carotid: 427 ± 281 ms versus radial: 427 ± 320 ms ($p > 0.99$) despite large differences in local pulse wave velocity (carotid: 7.2 ± 2.6 ms⁻¹ versus radial: 10.9 ± 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.

