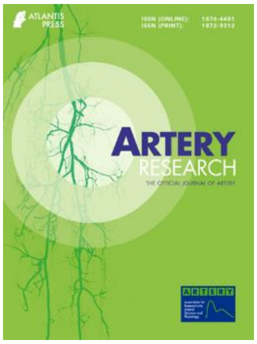

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9.11: VASCULAR PHENOTYPING BY MEANS OF VERY HIGH-RESOLUTION ULTRASOUND IMAGING: A FEASIBILITY ANALYSIS

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carotid remodeling, independently of age and BP, suggests that it corresponds to the muscular transition of an elastic artery [1]. The association of TS with circular collagen stiffness suggests that TS has subtle but measurable mechanical consequences.

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9.11

VASCULAR PHENOTYPING BY MEANS OF VERY HIGH-RESOLUTION ULTRASOUND IMAGING: A FEASIBILITY ANALYSIS

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Background: The study of medium and small-size arteries might be useful in the characterization of vascular adaptation, remodeling and wall ultrastructure modifications occurring with aging and in the presence of cardiovascular risk factors. However, to date, these districts have not been extensively explored non-invasively, due to limited spatial resolution power of standard ultrasound (US) machines.
Methods: High-frequency US examination by Vevo MD (FUJIFILM, VisualSonics, Toronto, Canada) was performed in 5 healthy volunteers (2 men, mean age: 26.4±3.3 years). Images were obtained at the carotid, brachial and radial artery level, using the 48 MHz (for carotid and brachial) and 70 MHz (for radial) US probes. Mean diameter, relative distension and intima-media thickness (IMT) were obtained using edge detection and contour tracking techniques. Texture analysis was performed on carotid, brachial and radial US images. Contrast, correlation, energy and homogeneity were evaluated from the grey-level co-occurrence matrix calculated on the pixels belonging to the IMT.
Results: IMT and relative distension, as well as texture analysis, could be successfully assessed in all the arterial districts evaluated. Correspondent results are reported in Table 1.
Conclusions: The multidistrict assessment of wall ultrastructure and mechanics in medium- and small-size arteries is highly feasible in healthy individuals. This kind of analysis might provide novel insight on the development of vascular alterations in previously neglected arterial districts, as well as their clinical significance.

	Carotid artery	Brachial Artery	Radial Artery
Mean Diameter (mm)	5.9±0.74	3.22±0.65	2.03±0.24
IMT (mm)	0.42±0.05	0.14±0.02	0.12±0.01
Relative distension (%)	10.6±1.8	4±1.7	7.4±2.5
Contrast	0.05±0.008	0.04±0.01	0.05±0.01
Correlation	0.99±0.001	0.99±0.003	0.99±0.001
Energy	0.19±0.05	0.33±0.17	0.23±0.07
Homogeneity	0.97±0.004	0.97±0.005	0.97±0.005

10.1

OPTIMAL AUTOMATED UNOBSERVED OFFICE BLOOD PRESSURE PROTOCOL: ONLY 6-MINUTES AND TWO READINGS MAY BE NEEDED

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Background: Automated office blood pressure (AutoBP) involving repeated, unobserved blood pressure (BP) readings during one clinic visit provides a practical alternative to daytime ambulatory blood pressure (ABP). However, the number of reading taken and measurement duration have varied across previously used AutoBP protocols. Therefore, the optimal AutoBP protocol taken in the least amount of time with the fewest BP readings is yet to be determined and was the aim of this study.
Methods: 117 patients (mean age 61.5±12.5 years) referred to a specialist BP clinic underwent AutoBP in a quiet room alone. Eight BP measurements were taken at 2-minute intervals immediately after sitting. The optimal AutoBP protocol with the highest concordance to daytime ABP was defined by smallest mean difference and highest intra-class correlation coefficient (ICC). The same BP device (Mobil-o-graph, IEM) was used for both AutoBP and daytime ABP.
Results: Average 15-minute AutoBP and daytime ABP were 138.4±18.1/84.8±12.2 mmHg and 140.9±15.2/86.2±10.6 mmHg, respectively. The AutoBP protocol with the highest concordance to daytime ABP was the average of two measures taken between two and six minutes of seated rest (systolic BP: mean difference = 0.3 (95%CI -3.0,2.4) mmHg, p=0.84; ICC=0.80; diastolic BP: mean difference = -0.42 (95%CI -2.0,1.1) mmHg, p=0.60; ICC=0.85). Daytime ABP tended to be overestimated by individual and the average of more than one AutoBP recorded before six minutes, however daytime ABP was underestimated after this time.
Conclusion: Only six minutes and two AutoBP readings may be needed to be comparable with daytime ABP.

10.2

EFFECTS OF INTER-ARM DIFFERENCES OF BRACHIAL SYSTOLIC BLOOD PRESSURE ON THE DERIVATION OF AORTIC SYSTOLIC PRESSURE

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Background: Inter-arm differences in brachial systolic blood pressure (SBP) should not theoretically translate to differences in calculated aortic SBP, there being only a single value of aortic blood pressure (BP) at any time.
Methods: This study assessed seated brachial and derived aortic SBP in 79 subjects (36±16 years, 40 male) using oscillometric brachial BP measurement and cuff volumetric displacement waveform recording. Measurements were taken simultaneously in left and right arm using identical SphygmoCor XCEL units (AtCor Medical, Sydney). Measurements were taken four times in each subject, swapping BP devices between arms.
Results: Brachial SBP was significantly higher in 11 subjects (average difference 5.4±0.7 mmHg) and in 18 subjects for aortic SBP (average difference 3.1±0.6 mmHg). Across all subjects, absolute inter-arm brachial difference in SBP, irrespective of direction, was 3.2±0.3 mmHg (p<0.001) and inter-arm aortic SBP difference 2.1±0.3 mmHg (p<0.001). Inter-arm SBP differences for brachial and aortic sites were correlated (r^2=0.74, p<0.001). Arm dominance accounted for 1.1±0.5 mmHg of inter-arm brachial SBP difference (p=0.032) but did not account for inter-arm aortic SBP difference (p=0.163). Average left arm SBP was not different to average right arm SBP for the whole cohort for brachial (p=0.083) or aortic (p=0.789) measurement.
Conclusions: The inter-arm absolute difference in brachial SBP translates to a significant but small (2.1 mmHg) difference in derived aortic SBP. Further studies are required to establish if this artefactual difference in derived aortic SBP is predominantly due to arm dominance or other factors associated with left/right difference in vascular properties.

10.3

USE OF MICROLIFE BP WATCH IS A FEASIBLE APPROACH TO DETERMINE INTER-ARM BLOOD PRESSURE DIFFERENCES IN A CLINICAL SETTING

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Aim: The aim of this study is to evaluate the feasibility of Microlife Watch BP for measuring bilateral blood pressure (BP) in a clinical setting.
Method: 339 patients (85% diabetic) scheduled for ambulatory blood pressure monitoring at the outpatient clinic for endocrinology, Silkeborg Regional Hospital, were examined with simultaneously bilateral BP measurements. A fully automatic, oscillometric device was used and two successive measurements were made.
Results: 9,1% of the patients had a clinically significant inter-arm blood pressure difference (IAD) of ≥10mmHg in the first set of measurements. Mean IAD in the first measurement was -0,3mmHg 6.6. Twenty-three patients had a normal IAD in the first set of measurements but IAD ≥10mmHg in the second set of measurements. Only one of the patients with an IAD ≥10mmHg had a change in the arm with the highest blood pressure. The