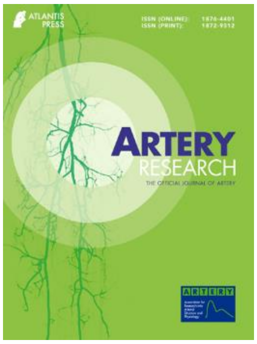

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P6.15: EFFECT OF BODY POSITION ON THE MEASUREMENTS OF CENTRAL HEMODYNAMIC PARAMETERS: “PLEASE HAVE A SIT?” OR “PLEASE LIE DOWN?”

A.D. Protogerou, T.G. Papaioannou, E. Nasothimiou, A. Konstantopoulou, N. Skliros, C. Stefanadis, J. Blacher, M.E. Safar, D. Papadogiannis, A. Achimastos, G.S. Stergiou

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Variable	Baseline			After six months		
	CH (N=33)	UH (N=33)	RH (N=42)	CH	UH	RH
SBP	122 [118;125]	142 [138;150]	138 [132;147]	126 [117;135]	133 [123;143]	136 [126;143]
PP	52 [45;56]	65 [58;68]	66 [62;70]	55 [43;63]	57 [49;62]	64 [57;70]
PWV	8.3 [7.3;10.6]	9.6 [8.3;11.1]	10.9 [8.4;12.8]	8.8 [7.3;10.1]	8.9 [8;10]	10.3 [8.4;12.8]

P6.15

EFFECT OF BODY POSITION ON THE MEASUREMENTS OF CENTRAL HEMODYNAMIC PARAMETERS: "PLEASE HAVE A SIT?" OR "PLEASE LIE DOWN?"

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Background: Estimation of aortic pressure waveform provides clinical information regarding BP cardiovascular risk additional to the brachial blood pressure (BP). The effect of body position on central haemodynamics (BP, pulse pressure (PP) amplification (amp), augmentation index (AIx), augmentation pressure (AP), subendocardial viability ratio (SVR) have never been investigated. Aim/design: to investigate in a randomized cross over study changes in both the peripheral and central haemodynamics in supine and sitting position. Methods: Sixty one subjects referred for BP assessment were examined (36 males, mean age 50±12 yrs). Brachial and aortic waveforms were assessed in sitting and supine position. In each position: triplicate brachial BP measurements were performed; then 2 consecutive aortic pressure waveforms were estimated by applanation tonometry of the radial artery - pulse wave analysis and the use of transfer functions (Sphygmocor). The average of the last 2 brachial BP recordings was used in statistical analysis and for peripheral waveforms calibration. Results: Mean arterial BP did not differ significantly between the sitting and supine position (table). Brachial and aortic SBP, PP, AP, AIx were significantly higher in the supine position whereas DBP and PP amplification (ratio: brachial/aortic PP) significantly smaller. Moreover, significant alterations were observed in heart rate, ejection duration and SVR. Conclusions: Mean BP remained unchanged but the pulsatile BP component was higher in the supine position. This was more pronounced in the aorta, as shown by PP amplification, in part due to alterations in heart rate, wave reflections leading to alterations in coronary perfusion.

Parameter	Sitting position	Supine position	p-value
Mean BP (mmHg)	110.8 ± 13.7	110.9 ± 14.9	0.945
Brachial SBP (mmHg)	140.1 ± 17.4	142.7 ± 18.5	0.022
Brachial DBP (mmHg)	94.2 ± 14.4	90.1 ± 14.4	<0.001
Brachial PP (mmHg)	45.9 ± 16.0	52.6 ± 15.6	<0.001
Aortic SBP (mmHg)	131.7 ± 16.9	134.4 ± 18.6	<0.001
Aortic DBP (mmHg)	95.0 ± 14.4	91.3 ± 14.5	<0.001
Aortic PP (mmHg)	36.7 ± 15.2	43.1 ± 13.9	<0.001
AP (mmHg)	10.8 ± 7.7	13.9 ± 7.3	<0.001
AIx (%)	26.9 ± 11.9	31.1 ± 10.2	<0.001
PP amplification (ratio)	1.3 ± 0.2	1.2 ± 0.1	<0.001
Heart rate (bpm)	67.2 ± 8.7	64.5 ± 7.4	<0.001
Ejection duration (msec)	297.2 ± 22.7	327.6 ± 17.6	<0.001
SVR	179.6 ± 25.7	161.2 ± 25.8	<0.001

P6.16

DETERMINATION OF CAROTID AND FEMORAL WAVE SPEED AND DISTENSIBILITY IN A HEALTHY POPULATION USING A NEW NON-INVASIVE TECHNIQUE

A. Borlotti [1], S. Vermeersch [2], E. Rietzschel [3], P. Segers [2], A. W. Khir [1]
[1]*Brunel University, Brunel Institute for Bioengineering, Uxbridge, London, United Kingdom*
[2]*Ghent University, IBiTech-bioMMeda, Gent, Belgium*
[3]*Ghent University Hospital, Gent, Belgium Local wave speed (c) is a predictor of cardiovascular diseases because is related to arterial distensibility*

In this work, carotid and femoral distensibility were assessed in the Asklepios study population. Local wave speed was determined with a new non-invasive technique based on velocity (U) and diameter (D) measurements (lnDU-loop) [1]. Distensibility was calculated using c and the Bramwell-Hill equation, and changes were studied with respect to age and gender.
Figure 1 shows changes in carotid and femoral wave speed (a) and distensibility (b) with age and gender. Carotid wave speed increases and distensibility decreases with age (a part from male aged 40-45 and 45-50) and there is no difference between males and females. In the femoral artery, these parameters do not change with age and wave speed is lower and distensibility is higher in females.
The mechanical properties of elastic (carotid) and muscular (femoral) arteries change differently with age, which is in line with results of other investigators. The new technique provides a means for the determination of arterial distensibility using non-invasive measurements of D and U, which can potentially be clinically useful as they could be taken using Doppler ultrasound.

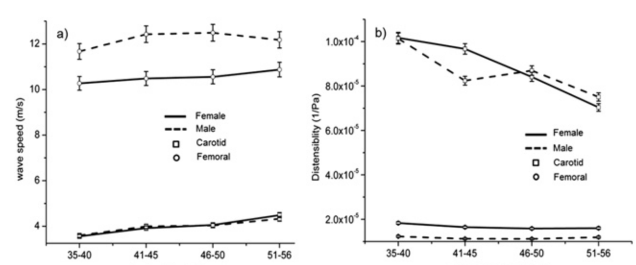

Figure 1 wave speed (a) and distensibility (b) in carotid and femoral arteries

1. Feng and Khir Determination of wave speed and wave separation in the arteries using diameter and velocity. J.Biomech. 43: 3: 455-462, 2010.

P6.17

CAROTID ARTERY CROSS-SECTIONAL AREA AND STIFFNESS NON-LINEARITY AS MARKERS OF VASCULAR AGEING

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Background: Artery wall ageing involves elastic fibre loss and increased fibrosis, leading to dilatation and increased artery wall stiffness. Notably, the associated gradual transfer of tensile stresses from elastic to stiffer components in the wall will likely increase non-linear elastic behaviour of the vessel wall. We investigated whether age is indeed a determinant of carotid artery cross-sectional area (CSA) and stiffness non-linearity; the latter being quantified as the difference between systolic and diastolic pulse wave velocity: ΔPWV, in m/s (Figure).