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### **P14: REFERENCE VALUES OF THE WEST SPANISH POPULATION OF THE HEMODYNAMIC INDICES EVALUATED WITH A NEW WRIST WORN DEVICE**

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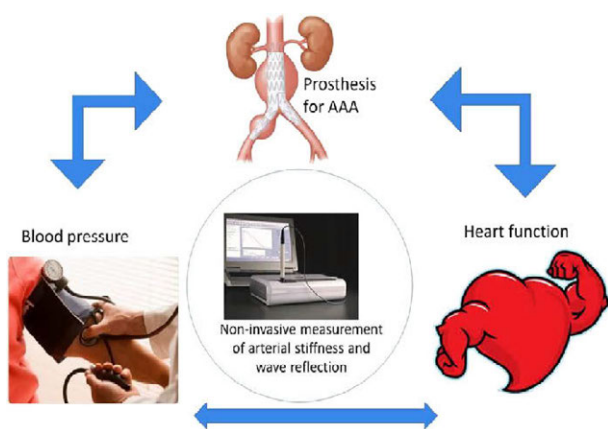
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**Methods:** Non-invasive and invasive waveform recordings and CP- and stiffness-calculations were performed simultaneously before and after EVAR. Non-invasive radial artery waveforms were recorded, from which CP was estimated by SphymoCor (Atcor Medical, Sydney, Australia). Invasive pressure measurements were performed with a fluid-filled catheter in the infrarenal aorta. A generalized ascending-to-abdominal aorta transfer function (GTFAA) was used to estimate CP from the invasively measured abdominal aorta pressure-waveform, which served as reference for the non-invasively estimated CP. From the CP waves, systolic pressure and AIX were computed.

**Results:** The difference between the invasive and non-invasive peak CP showed a bias of 23.9 mmHg (limits-of-agreement: -37.2:85.0) before and a bias of 0.4 (-32.6:33.4) after implant. Mean AIX (SD) was -30.7(11.2) and -38.9(31.2) before and after implant, respectively.

**Conclusion:** Synthesizing CP with non-invasive measurements in combination with the use of a GTF in patients with AAA is feasible especially after EVAR. Differences in CP and AIX could be explained by differences in AAA-morphology or an error in phase unwrapping, which are currently investigated in-vitro and in-vivo (NCT01220245).



### P13 VASCULAR AND MUSCLE DETERIORATION IN OLDER OUTPATIENTS

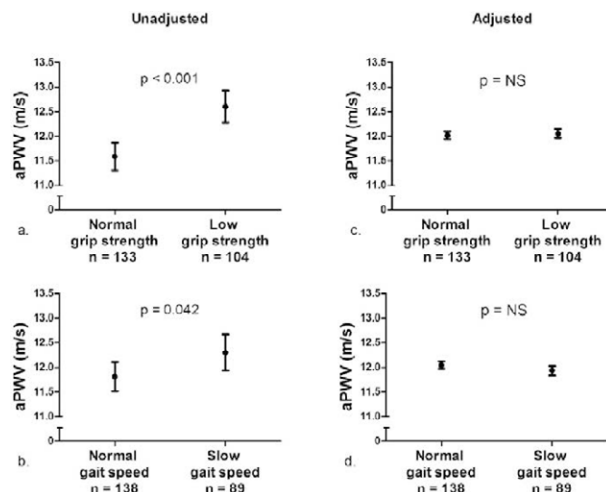
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**Background:** Vascular and muscle deterioration are age-related processes, which both have a major impact on health and might share common predisposing factors and mechanisms. We investigated the possible association between aortic stiffness and physical performance in older outpatients.

**Methods:** Aortic stiffness was non-invasively measured as aortic pulse wave velocity (aPWV) by the Mobil-o-Graph. Physical performance was assessed by the (a) hand grip strength and (b) usual gait speed on 5-meter course. Low grip strength was  $<20$  kg for women and  $<30$  kg for men. Slow gait speed was defined as  $\leq 0.8$  m/s. Mean values of aPWV were investigated in patients according to their physical performance.

**Results:** We included 240 consecutive outpatients. Mean age was 77.6 ( $\pm 7.1$ ) years, mean aPWV was 12.0 ( $\pm 1.7$ ) m/s. Low hand grip strength was found in 43.3%, slow gait speed in 37.1%. Compared to the normal physical performance group, patients with low grip strength were 5.3 years older ( $p < 0.001$ ) and patients with slow gait speed were 2.9 years older ( $p = 0.002$ ). Patients with normal grip strength had lower aPWV than patients with low grip strength (11.58 vs 12.6,  $p < 0.001$ ). Patients with normal gait speed had lower aPWV than patients with slow gait speed (11.81 vs 12.3,  $p = 0.042$ ). After adjustments for age, sex and mean arterial pressure, no differences were found in aPWV between patients with a normal and low physical performance.

**Conclusion:** Higher aortic stiffness is associated with lower physical performance in older outpatients. However, age plays a crucial role in this relationship.



### P14 REFERENCE VALUES OF THE WEST SPANISH POPULATION OF THE HEMODYNAMIC INDICES EVALUATED WITH A NEW WRIST WORN DEVICE

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**Objective:** To describe the reference value of arterial stiffness parameter measurement by wrist worn device (Microsoft) in west Spanish population.

**Methods:** Cross-sectional study. Study population: From the population assigned to the participating healthcare centres, a cluster random sampling stratified by age and gender was performed to obtain 501 participants aged between 35 and 75, 100 per decade, (50% women) without cardio or cerebrovascular disease. Measurements: Central (CAIx) and peripheral (PAIx) augmentation index, Heart rate (HR) and heart rate variability (HRV) by a new wrist worn device developed by Microsoft.

**Results:** Mean age was: 55.9  $\pm$  14.2y. Mean PAIx was 91.22  $\pm$  16.05, in women 95.34  $\pm$  16.17 and in men 87.08  $\pm$  14.86 ( $p < 0.05$ ). The PAIx and CAIx increased with each decade, (PAIx was 79.85 in born in 1981 and 99.68 in born in 1941, and CAIx 19.25 in born in 1981 to 35.11 in born in 1941), and HRV decrease with each decade (3.31 in born in 1981 and 2.52 in born in 1941). No differences were found in heart rate. This data is the same in men and women. Correlation of age with PAIx was  $r = 0.424$ , CAIx  $r = 0.323$ , HRV  $r = -0.364$  ( $p > 0.01$  for all) and HR 0.51 ( $p > 0.05$ ).  
**Conclusion:** The PAIx and CAIx were higher in women than men. PAIx and CAIx increase with aging while the HRV decreases.

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augmentation index estimated by a novel wrist-worn tonometer. *Journal of hypertension* 2018 [Epub ahead of print].

## P15

### EFFECT OF UPRIGHT POSTURE ON CENTRAL WAVE REFLECTION IN 637 VOLUNTEERS NOT USING MEDICATIONS WITH DIRECT CARDIOVASCULAR INFLUENCES: DESCRIPTION OF DIFFERENT PHENOTYPES

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**Background:** The effect of upright posture on the level of augmentation index (Alx) remains controversial [1–3]. Phenotypic differences in Alx responses to upright posture are unknown.

**Methods:** Altogether 323 women and 315 men without cardiovascular disease and medications with direct cardiovascular influences were subjected to passive head-up tilt (5-min supine, 5-min upright). Haemodynamics were recorded using continuous tonometric pulse wave analysis and whole-body impedance cardiography.

**Results:** Mean (SD) age was 45.6 (1.2) years, BMI 26.8 (4.4) kg/m<sup>2</sup>, and average blood count, plasma lipids and creatinine were normal. Alx decreased from supine 22.7% (11.9) to upright 13.8% (12.2) ( $p < 0.001$ ), while heart rate related Alx@75 decreased from 17.9% (11.8) to 13.9% (11.0) ( $p < 0.001$ ), respectively. In stepwise linear regression analyses, the explanatory variables for upright reduction in Alx were changes in ejection duration ( $\beta = 0.744$ ), aortic reflection time ( $\beta = -0.491$ ), and stroke volume ( $\beta = 0.117$ ); and supine ejection duration ( $\beta = 0.312$ ), systemic vascular resistance (SVR) ( $\beta = -0.271$ ), pulse wave velocity (PWV) ( $\beta = -0.203$ ), and systolic blood pressure ( $\beta = 0.081$ ) ( $p < 0.001$  for all). When divided to quartiles according to the supine-to-upright change in Alx 1) the quartile with lowest supine Alx had highest upright Alx, lowest supine SVR and PWV, and lowest upright heart rate; 2) the quartile with highest supine Alx had lowest upright Alx, highest supine SVR and PWV, and highest upright heart rate.

**Conclusions:** The level of Alx is decreased in the upright position. The phenotypic differences in the supine-to-upright change in Alx may explain why this variable has not predicted cardiovascular events in all endpoint studies.

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## P16

### PULSE WAVE VELOCITY AND ITS ASSOCIATION WITH FIRST CARDIOVASCULAR EVENTS IN A PORTUGUESE HYPERTENSIVE SAMPLE

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**Objective:** Pulse Wave Velocity (PWV) is considered a marker of cardiovascular (CV) risk prognosis. The objective was to evaluate the association of PWV, other features and CV events in a sample of hypertensive patients.

**Design and method:** We studied 314 hypertensive patients without previous CV events evaluated by PWV in a Portuguese average-size hospital, through its descriptive and survival analysis.

**Results:** Of the 314 patients (51% male) ageing 54.0 ± 14.2 years, 31.5% had resistant hypertension, 26.8% were diabetic, 66.6% had hyperlipidaemia, the average body mass index was 28.3 kg m<sup>-2</sup>, and 16.6% were active smoker.

Through a follow-up of 2.1 ± 2.2 years, 28 patients (8.9%) had a CV event. Comparison of the patients with PWV ≤ 10 ms<sup>-1</sup> and the patients with PWV > 10 ms<sup>-1</sup>, showed statistical significance for age (64.3 ± 10.5 vs 50.2 ± 13.4 years,  $p < 0.0001$ ), casual systolic blood pressure (137.4 ± 16.3 mmHg vs 154.4 ± 21.4 mmHg,  $p < 0.0001$ ), PWV (7.9 ± 1.2 ms<sup>-1</sup> vs 12.2 ± 1.9 ms<sup>-1</sup>,  $p < 0.0001$ ) left ventricular hypertrophy (193,3 ± 58.6 vs 235,8 ± 65.1,  $p < 0.01$ ) and left auricular volume (19,9 ± 3.9 vs 23.3 ± 5.8,  $p < 0.002$ ). Patients with PWV > 10 ms<sup>-1</sup>, 77,3% had left ventricular hypertrophy ( $p < 0.004$ ) and 70% had left auricular enlargement ( $p < 0.08$ ). In the survival analysis, the Kaplan Meier curve showed a worse prognosis for CV events with PWV > 10 ms<sup>-1</sup> (log rank 6.0,  $p < 0,014$ ).

**Conclusions:** Higher PWV indicating worse artery damage is associated with end organ damage like left ventricular hypertrophy and left auricular enlargement. In patients with no previous CV events, PWV > 10 ms<sup>-1</sup> is an indicator for worse prognosis for CV events.

## P17

### ARTERIAL STIFFNESS OF THE FOREARM IS ASSOCIATED WITH NAILFOLD CAPILLARY COUNT IN SYSTEMIC SCLEROSIS: A NOVEL MARKER OF EARLY VASCULOPATHY?

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**Background:** Microvascular disease, with rarefaction of nailfold capillaries, is the hallmark of systemic sclerosis (SSc). Obliteration of the ulnar and radial artery is regularly observed, implicating involvement of the forearm arteries. Pulse wave velocity (PWV) may serve as early biomarker of forearm artery involvement, before occurrence of irreversible arterial obliteration.

**Objectives:** The aim was to investigate arterial stiffness of the aorta and the upper extremities in SSc patients and to correlate these findings with nailfold capillary count and extent of disease.

**Methods:** Aortic PWV was defined as carotid-femoral (cf). Upper extremity PWV was measured as carotid-brachial (cb) and carotid-radial (cr), the ratio between cbPWV/crPWV was used as an indication of the relative PWV change in the forearm. Capillary count was the mean capillary count per 3 mm of 8 fingers. The number of SSc classification criteria was used as surrogate for extent of disease. [1]

**Results:** In total, 19 SSc patients (median age 51 years, 68% female) were included. CbPWV/crPWV ratio correlated strongly with capillary count ( $r = -0.55$ ,  $p = 0.022$ , figure 1) in SSc patients, with a trend in regards to its relation with the extent of disease ( $r = 0.48$ ,  $p = 0.053$ ).

**Conclusions:** Our findings demonstrate that arterial stiffness of the forearm has a relationship with nailfold capillary count and tends to be associated with the extent of disease in patients with SSc. These may suggest that vascular damage also occurs in larger arteries of the forearm, which potentially serves as novel tool for assessing early vascular involvement in SSc.

### Correlation between cbPWV/crPWV and capillary count

