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### **P7.18: VALIDATION TESTING FOR THE NON-INVASIVE MEASUREMENT OF AORTIC RESERVOIR CHARACTERISTICS FROM BRACHIAL CUFF OSCILLOMERIC PRESSURE WAVEFORMS**

Xiaoqing Peng\*, Martin Schultz, Justin Davies, Dean Picone, Andrew Black, Nathan Dwyer, Phil Roberts-Thomson, James Sharman

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$p=0.242$ ). On the other hand, XSP significantly increased from the aorta to the brachial and radial arteries ( $21\pm 8$ ,  $41\pm 15$ ,  $58\pm 19$  mmHg respectively,  $p<0.001$ ). However, neither RP or XSP (either measured by peak or integral) were significantly associated with either systolic BP or pulse pressure at any arterial location ( $p>0.05$  all).

**Conclusion:** RP is relatively constant between the aorta and radial arteries, whereas XSP increases significantly. Neither indices are related to BP, thus supporting the independent pathophysiological relevance of aortic reservoir characteristics.

#### P7.18

##### VALIDATION TESTING FOR THE NON-INVASIVE MEASUREMENT OF AORTIC RESERVOIR CHARACTERISTICS FROM BRACHIAL CUFF OSCILLOMERIC PRESSURE WAVEFORMS

Xiaoqing Peng<sup>1,\*</sup>, Martin Schultz<sup>1</sup>, Justin Davies<sup>2</sup>, Dean Picone<sup>1</sup>, Andrew Black<sup>3</sup>, Nathan Dwyer<sup>3</sup>, Phil Roberts-Thomson<sup>3</sup>, James Sharman<sup>1</sup>  
<sup>1</sup>Menzies Institute for Medical Research, University of Tasmania, Hobart, TAS, Australia

<sup>2</sup>International Centre for Circulatory Health, Imperial College, London, W2 1LA, UK

<sup>3</sup>Royal Hobart Hospital, Hobart, TAS, Australia

**Background:** Aortic reservoir pressure (RP) and excess pressure (XSP) derived non-invasively from radial tonometry independently predict cardiovascular events and mortality. However, whether RP and XSP can be derived non-invasively from brachial oscillometric cuff pressure waveforms has never been undertaken. This study sought to determine the validity of measuring aortic reservoir characteristics from non-invasive oscillometric cuff waveforms.

**Methods:** 97 participants (aged  $62\pm 11$  years, 67% male) undergoing coronary angiography had simultaneous measurement ( $n=247$ ) of ascending aortic pressure (via fluid-filled catheter) and oscillometric brachial cuff pressure (via SphygmoCor XCEL). RP and XSP derived non-invasively from cuff waveforms were compared with invasive measures.

**Results:** There were small mean differences between non-invasive and invasive methods for both RP ( $1.42\pm 18.16$  mmHg) and XSP ( $-1.45\pm 25.52$  mmHg), with significant correlations observed between methods ( $p<0.001$  both).

**Conclusion:** Aortic reservoir characteristics of RP and XSP can be derived non-invasively from oscillometric brachial pressure waveforms, thus providing a mean for widespread research and clinical use.

#### P7.19

##### ARTERIAL STIFFNESS AND DISEASE-RELATED ORGAN DAMAGE IN SYSTEMIC LUPUS ERYTHEMATOSUS

Giacomo Pucci<sup>1,2,\*</sup>, Francesca Battista<sup>1,2</sup>, Elena Bartoloni Bocci<sup>2,3</sup>, Fabio Anastasio<sup>1,2</sup>, Mariano Crapa<sup>1,2</sup>, Leandro Sanesi<sup>1,2</sup>, Roberto Gerli<sup>2,3</sup>, Giuseppe Schillaci<sup>1,2</sup>

<sup>1</sup>Unit of Internal Medicine, Terni University Hospital, Terni, Italy

<sup>2</sup>Department of Medicine, University of Perugia, Perugia, Italy

<sup>3</sup>Rheumatology Unit, Perugia Hospital, Perugia, Italy

**Hypothesis:** increased arterial stiffness has been reported in subjects with systemic lupus erythematosus (SLE) compared with healthy controls. In SLE, indexes of organ damage are related to a poor clinical status and worse prognosis independently from the activity of the disease. Data are controversial about the association between SLE-related organ damage and arterial stiffness.

**Methods:** 40 subjects with history of SLE (mean age  $45\pm 12$  years, 90% women) and a median disease duration of 12 years (IQR 5-19), underwent assessment of carotid-femoral pulse wave velocity (cf-PWV) by means of applanation tonometry (SphygmoCor). A comprehensive clinical, metabolic and immunological assessment was performed. Irreversible organ damage, not related to active inflammation, was assessed through the Systemic Lupus International Collaborating Clinics (SLICC) damage index.

**Results:** mean BP was  $128/75\pm 16/10$  mmHg. 9 subjects (23%) were on anti-hypertensive treatment, 4 (10%) had had previous cardiovascular events, 17 (42%) were treated with steroids, 29 (71%) with hydroxychloroquine, 15 (37%) with other immunosuppressants. Median SLICC index was 2 (IQR 1-3), average cf-PWV was  $7.5\pm 1.9$  m/s. cf-PWV significantly increased across SLICC damage index categories ( $F=3.141$ ,  $p<0.019$ ). The association between cf-PWV and SLICC index persisted after adjustment for age, sex, mean arterial pressure, height, heart rate, disease duration, anti-hypertensive treatment, number of drugs for SLE therapy, C-reactive protein and previous cardiovascular events ( $p=0.031$ ).

**Conclusions:** in subjects with SLE under active treatment, SLICC damage index had a significant independent association with cf-PWV. Further studies are needed to explore the role of arterial stiffness as a predictor of disease-related organ damage in SLE.

#### P7.20

##### THE IMPACT OF OBSTRUCTIVE SLEEP APNEA ON ARTERIAL STIFFNESS IS INDEPENDENT OF GENDER IN PATIENTS WITH HYPERTENSION

Raimundo Jenner, Luiz Bortolotto<sup>\*</sup>, Valéria Costa-Hong, Silvia Souza, Sandra Teixeira, Heno Lopes, Geraldo Lorenzi, Eduardo Krieger, Luciano Drager

Unity of Hypertension, Heart Institute (InCor), São Paulo, São Paulo, Brazil

**Introduction:** In men with hypertension, obstructive sleep apnea (OSA) is associated with increased arterial stiffness. However, it is not clear if the impact of OSA on patients with hypertension is similar in women.

**Methods:** We recruited consecutive patients with established diagnosis of hypertension under a standardized antihypertensive treatment (hydrochlorothiazide plus enalapril or losartan). All patients were submitted to full polysomnography and carotid-femoral pulse wave velocity (PWV). We performed analysis according to the presence of OSA (defined by an apnea-hypopnea index  $\geq 15$  events/hour of sleep) and by gender (male and females).

**Results:** Ninety-five patients were studied (14 males without OSA; 28 males with OSA, 29 females without OSA and 24 females with OSA). OSA frequency was 66% in males group versus 45% in females group ( $p=0.02$ ). The age of female with OSA ( $59\pm 10$  yrs) was significantly higher than female without OSA ( $52\pm 10$  yrs), while the age did not differ between the male with ( $58\pm 10$  yrs) or without OSA ( $56\pm 8$  yrs). The BMI was also significantly greater in female with OSA ( $32.8\pm 5$  vs.  $28.7\pm 5$  kg/m<sup>2</sup>), while was similar in male with ( $30.5\pm 4.5$ ) or without OSA ( $29.5\pm 2.5$ ). The blood pressure was not different in the patients with or without OSA. PWV was significantly higher in both male ( $12.7$  m/s) and female ( $13.2$  m/s) with OSA than the counterparts without OSA (male- $11$  m/s, female- $11.7$  m/s) even after adjustments by age. The multivariate linear regression showed that OSA was independently associated with PWV ( $p=0.008$ ).

**Conclusions:** In patients with hypertension, the presence of OSA is associated with higher PWV regardless of gender.

#### P8.1

##### CENTRAL HEMODYNAMICS IN SYSTEMIC SCLEROSIS: A CASE-CONTROL STUDY

Francesca Battista<sup>1,2,\*</sup>, Giacomo Pucci<sup>1,2</sup>, Elena Bartoloni Bocci<sup>1,3</sup>, Francesca Cannarile<sup>1,3</sup>, Alessia Alunno<sup>1,3</sup>, Fabio Anastasio<sup>1,2</sup>, Roberto Gerli<sup>1,3</sup>, Giuseppe Schillaci<sup>1,2</sup>

<sup>1</sup>Department of Medicine University of Perugia, Perugia, Italy

<sup>2</sup>Unit of Internal Medicine Terni University Hospital, Terni, Italy

<sup>3</sup>Unit of Rheumatology Perugia University Hospital, Perugia, Italy

**Background:** Although a few studies have suggested an alteration in aortic stiffness in patients with systemic sclerosis (SS), a disease characterized by immunological and microvascular changes and by tissue fibrosis, the functional properties of the large arteries have been understudied in SS.

**Methods:** 34 women with SS [age  $60\pm 14$  years, BP  $123/70\pm 17/10$  mmHg] and 34 healthy age- and BP-matched women underwent determination of carotid-femoral pulse wave velocity (PWV, a direct measure of aortic stiffness) and aortic augmentation (SphygmoCor, AtCor). All participants also underwent determination of carotid-radial PWV, as a measure of stiffness of upper-limb arteries. We excluded participants with overt cardiovascular disease and concomitant important disease.

**Results:** Age and brachial BP were nearly identical in the 2 groups. Patients and controls did not differ by carotid-femoral PWV ( $9.2\pm 3$  vs  $9.1\pm 2$  m/s,  $p=0.91$ ) or carotid-radial PWV. Aortic augmentation, was higher in women with SS; unadjusted:  $16.1\pm 8$  vs  $11.5\pm 7$ ,  $p=0.014$ ; adjusted for pulse pressure and heart rate (Alx@75):  $30.9\pm 16$  vs  $22.2\pm 12$ ,  $p=0.012$ . SS independently predicted Alx@75 in a multivariate analysis. Among patients with SS, age, brachial mean BP and serum C-reactive protein all predicted carotid-femoral PWV. Age and mean BP were the only predictors of Alx@75. Organ damage scores had no significant correlation with central hemodynamics parameters.

**Conclusions:** SS is associated with an increase in aortic augmentation (as a measure of the contribution of reflected wave to central waveform), but not in aortic or upper-limb arterial stiffness. Microvascular involvement might occur earlier than stiffening of the large arteries in SS.