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P2.14 NON-INVASIVE DETERMINATION OF AORTIC COMPLIANCE DISTRIBUTION IN THE HUMAN

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Total arterial compliance is a main determinant of pulse pressure. For most part it resides in the aorta, where also major changes take place, which may differ locally. To follow local changes in aortic compliance, as in aging, noninvasive determination (area change deltaA) and flow were determined at 6 aortic locations. Simultaneously brachial blood pressure (BP) was measured with cuff. Aortic arch pressure AAP was calculated using distastio diastolic and mean pressures equal [1]. Regional aortic pressures were estimated from AAP using (averaged) literature data on aortic pressure transfer [2,3]. Regional aortic compliance was then calculated in two ways, the pulse pressure method [4] and local area compliance (deltaA/deltaAP) times segment length.

Results: Studies were carried out in 7 healthy volunteers. The PPM of the AA includes head vessels while the area method does not, thus allowing compliance calculation of head vessels. Of the total arterial compliance, ascending to distal arch contributes (segments 1-3) 40%, descending aorta (segments 4&5) 25%, head/arms 15%, legs 20%.

Regional aortic compliance can be obtained non-invasively and thus allows following changes in local compliance (e.g., age effects). Compliance from local Pulse Wave Velocity should be compared but requires diameter information.


P2.15 VALIDATION OF CENTRON CBP301 VERSUS SPHYGMOCOR WITH A MODIFIED ESH-IP 2010 PROTOCOL

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Centron cbP301 (Centron Diagnostics, UK) is a new cuff-based central blood pressure meter.

It estimates central systolic pressure (cSBP) from the oscillometric brachial cuff waveforms with a specific generalization transfer function [1]. To date, there is no specific international protocol to validate non-invasive central pressure measurements. So we modified the internationally recognized ESH-IP2010 protocol for electronic arm cuff-based device to validate the Centron cbP301[2]. We used SphygmoCor (AtCor medical) as a reference.

Radial tonometric SphygmoCor measurements were done 4 times alternated with 3 Centron cbP301 measurements. Each Centron recordings were compared with the most favorable SphygmoCor recordings done immediately before or after and calibrated with Centron peripheral SBP and DBP measurements.

Conclusions: We report slightly higher single-visit variability compared to previous studies (CoV-2.8%-Hickson-2009, 2.67%-Everett-2012), possibly a reflexion of our older population. Nonetheless, Centron PWV estimates are precise (low CoV, high ICC), and cfPWV (range:5.15-8.60) shows good visit-to-visit reproducibility (narrow limits of agreement -1.5m/s). Despite higher precision/lower variability, cfPWV was less reproducible, having wider limits of agreement. Further studies are warranted to establish validity, reliability and clinical applicability of Vicorder-PWV measurements in different populations.

P2.16 PRECISION AND REPRODUCIBILITY OF VICORDER-ESTIMATED PULSE WAVE VELOCITY IN HEALTHY VOLUNTEERS

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Background: Arterial stiffness is a risk factor for cardiovascular disease. Carotid-femoral pulse wave velocity (cfPWV), the ‘gold standard’ measurement, is traditionally assessed using anaplanation tomometry. The Vicorder is a novel apparatus that estimates PWV, using non-invasive oscillogometric assessment of the pulse waveform, at two arterial sites simultaneously. There is limited data on precision, and no data on visit-to-visit reproducibility of Vicorder-assessed PWV.

Methods: We measured precision (intravisit within-subject variability) quantified using coefficient of variation (CoV) and intraclass correlation coefficient (IC), and reproducibility (visit-to-visit differences assessed by Bland-Altman method). Both parameters were estimated in triplicate by a single investigator, using a standardised Vicorder protocol. Twelve volunteers had repeat assessment at 7±2 days.

Results: In 48 volunteers (age:62±8), single visit variability was smaller for cfPWV versus cfPWV (CoV 3.1% and 8.9%; ICC 0.99 and 0.84, respectively), and comparable with heart rate variability (CoV 2.57, ICC 0.99). In 11 volunteers with repeat measurements (age:54±10), the mean difference (limits of agreement) between visits was low for cfPWV and cfPWV [0.1 (-0.06 to 0.84), and 0.3 (-2.38 to 2.98), respectively].

Conclusions: We report slightly higher single-visit variability compared to previous studies (CoV 2.2%, Hickson-2009, 2.67%-Everett-2012), possibly a reflection of our older population. Nonetheless, Vicorder PWV estimates are precise (low CoV, high ICC), and cfPWV (range:5.15-8.60) shows good visit-to-visit reproducibility (narrow limits of agreement -1.5m/s). Despite higher precision/lower variability, cfPWV was less reproducible, having wider limits of agreement. Further studies are warranted to establish validity, reliability and clinical applicability of Vicorder-PWV measurements in different populations.

P2.17 THE REPRODUCIBILITY OF ARTERIAL STIFFNESS IN COPD

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Introduction: Chronic obstructive pulmonary disease (COPD) is a risk factor for cardiovascular disease (CVD). Increased arterial stiffness is one proposed mechanism linking COPD to CVD. Carotid-femoral pulse wave velocity (cf-PWV) is a non-invasive measure for assessing arterial stiffness. However, its reliability has not been established in COPD. We aimed to assess the between day reproducibility of cf-PWV in stable patients with COPD.

Method: The Assessment of Risk in Chronic Airways Disease Evaluation (ARCADe) is a longitudinal study of up to 1500 patients with COPD confirmed with spirometry. Thirty patients free from CVD underwent height and weight measurements before assessing the arterial stiffness using the SphygmoCor device (AtCor medical). This was repeated after a further 7±1 days.

Results: Carotid-femoral PWV was measured on two visits. Mean ± SD age was 67.8±8 years, BMI 27.2±4.7 kg/m2. Mean cf-PWV at visit 1 was 9.7±2.2 m/s and 9.7±2.2 m/s on the second visit. Repeated measures ANOVA showed no significant difference between subject measurements (F=1.00 and p=0.326). The interclass correlation coefficient (ICC) was 0.93. The Bland and Altman plot showed a mean difference of 0.01 m/s and an upper limit of 1.62 m/s and a lower limit of -1.62 m/s. The plot revealed no systematic bias with slight random error and two clear outliers. (Figure1)