P1.15: ASSESSING THE CORRELATES OF ARTERIAL STRUCTURE AND FUNCTION IN HEALTHY ADOLESCENTS


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**P1.14**

**NON-INVASIVE ASSESSMENT OF CARDIAC HEMODYNAMIC IN COPD**

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Introduction: Chronic obstructive pulmonary disease (COPD) is a systemic disease associated with impaired cardiac function. A reduction in stroke volume and cardiac output can be present even with normal ejection fraction in these patients. The non-invasive cardiac output measurement (NICOM) is a simple tool to measure stroke volume (SV) and cardiac output (CO). The aim of this study is to examine the reproducibility of the NICOM in 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 with no previous CVD were recruited and underwent height and weight measurements before SV and CO. A bio-reactance technique was used to measure CO and SV. These were repeated after mean (range) 7(1) days.

Results: Mean ±SD age of patients was 67±7 years, height 165±9.9 cm, weight 74.8±18.2 kg and BMI 27.2±4.7 Kg/m2. Mean SV was 83.6±20.6 ml and 81.6±20.3 ml at visit 1 and 2 and CO was 5.7±1.1 was 5.7±1.1 L/min respectively. Repeated measures ANOVA showed no significant difference between subject measurements (Both p-values >0.05). The interclass correlation coefficients (ICC’s) were 0.93 and 0.99 respectively. The Bland and Altman plot shows no systematic bias with slight random error in both measures (Figure 1 & 2).

Conclusion: These data indicate that CO and SV are reproducible measured using the NICOM device in patients with COPD and maybe appropriate to assess cardiac function in clinical practice.

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**Figure 1** Bland and Altman plot for CO.

**Figure 2** Bland and Altman plot for SV.

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**Table 1**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean±SD</th>
<th>CIMT</th>
<th>FMD</th>
<th>Aortic PWV</th>
<th>Central PWV</th>
<th>DCaao</th>
<th>DCcca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>57F:56M</td>
<td>0.431±0.046 mm</td>
<td>7.4±3.1 %</td>
<td>5.0±0.9 mm/s</td>
<td>4.5±1.1 mm/s</td>
<td>35±11 10⁻³ mmHg⁻¹</td>
<td>439±107 10⁻³ mmHg⁻¹</td>
</tr>
<tr>
<td>Age</td>
<td>14.4±2.1 yrs</td>
<td>0.07, p=0.49</td>
<td>0.08, p=0.43</td>
<td>0.51, p=0.001</td>
<td>0.22, p=0.02</td>
<td>0.28, p&lt;0.001</td>
<td>0.34, p&lt;0.001</td>
</tr>
<tr>
<td>BSA</td>
<td>1.58±0.25 m²</td>
<td>0.25, p&lt;0.01</td>
<td>0.04, p=0.69</td>
<td>0.45, p&lt;0.001</td>
<td>0.32, p&lt;0.001</td>
<td>0.31, p&lt;0.001</td>
<td>0.32, p&lt;0.001</td>
</tr>
<tr>
<td>HR</td>
<td>69±13 bpm</td>
<td>0.11, p=0.27</td>
<td>0.03, p=0.77</td>
<td>0.16, p=0.11</td>
<td>0.24, p=0.01</td>
<td>0.06, p=0.54</td>
<td>0.08, p=0.31</td>
</tr>
<tr>
<td>SBP</td>
<td>109±10 mmHg</td>
<td>0.14, p=0.15</td>
<td>0.20, p=0.04</td>
<td>0.36, p&lt;0.001</td>
<td>0.23, p=0.02</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**P1.15**

**ASSESSING THE CORRELATES OF ARTERIAL STRUCTURE AND FUNCTION IN HEALTHY ADOLESCENTS**

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Background: Abnormal measures of arterial structure and function are increasingly used in adolescent disease populations to predict cardiovascular risk. Limited information is available in healthy adolescents of the correlates of these measures when obtained by different non-invasive methods on the same occasion.

Methods: In 113 healthy adolescents (57 females, aged 10-18 years), carotid intima-media thickness (CIMT), flow-mediated dilatation (FMD), aortic pulse wave velocity (PWV) by applanation tonometry, central PWV by echo-Doppler and distension coefficients of the ascending aorta (DCaao) and common carotid artery (DCcca) were measured. Sample characteristics were assessed against a standard normal distribution. Relationships were tested with gender, age, body surface area (BSA), brachial systolic blood pressure (SBP) and heart rate (HR) using Pearson’s correlations. Statistical significance was considered at p<0.05. Reproducibility studies (n=20), for intra-, inter-observer and test-retest coefficients of variation were respectively for CIMT 3.0, 7.4 and 4.6%, FMD baseline 1.4, 2.9 and 5.1%, and PWV 5.1, 6.0 and 8.8%.

Results: All vascular measures were normally distributed. Significant positive correlations (see Table) were found for: CIMT with BSA; aortic PWV with age, BSA and SBP; central PWV with age, BSA, HR and SBP; and DCaao with male gender. Significant negative correlations were found for: FMD with SBP; and DCaao and DCcca with age and BSA.

Conclusions: This normative dataset can now be used to determine abnormal arterial structure and function in adolescent disease populations. Of these vascular measures, aortic PWV appears to be the most dependent on increasing age, BSA, and SBP during adolescence.
P1.16 CLINICOPATHOLOGICAL FACTORS ASSOCIATED TO CENTRAL AORTIC PRESSURE PARAMETERS IN PATIENTS WITH HYPERTENSION
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Aim: To investigate association of central aortic pressure (CAP) parameters – augmentation index (Alx), augmentation index, normalized for heart rate 75/min (Alx75), augmentation pressure (AP), central systolic (SPa) and pulse pressure (PPa) with some clinical, laboratory and hemodynamic characteristics of patients with hypertension.

Material-Methods: 100 hypertension patients at the age of 22–73 years (mean age 54±10.8) were examined, 43% men. Investigation included electrocardiography, echocardiography, determination of serum lipids, creatinine, creatinine clearance (CrCl) calculation, CAP registration using SphygmoCor device.

Results: Alx, Alx75, AP, PPa in women were higher than in men (30% vs. 20%; 28% vs. 17%; 14.5 vs. 8.7mmHg (p<0.001); 46.7 vs. 40.6mmHg (p<0.05), respectively), increased with older age (r=0.28; r=0.23; r=0.36; r=0.33 respectively; p<0.05), negatively correlated with CrCl (r=-0.55; r=-0.56; r=-0.53; r=-0.34 respectively; p<0.05). Alx, Alx75, AP negatively correlated with height and waist circumference (r<0.05 respectively; p<0.05). SPa had positive correlation with ratio between early and late ventricular filling velocity (r=0.34 respectively; p<0.05). SPa had positive correlation with IMT (r=0.33 respectively; p<0.05). AIx, AIx75, AP negatively correlated with 24h systolic pressure (r=-0.23; r=-0.24 respectively; p<0.05), AIx, AIx75, AP, PPa negatively correlated with heart rate (HR) (r<0.05). SPa had positive correlation with 24h heart rate (HR) (r=0.41 and r=-0.32; r=-0.36; r=-0.21 respectively; p<0.05), positively - with LDL cholesterol (r=0.22; r=0.22; r=0.24 respectively; p<0.05). AIx, Alx75, AP, SPa correlated positively with left ventricular filling velocity (r=0.23; r=0.29; r=-0.26; r=-0.27 respectively; p<0.05). SPa correlated positively with myocardial mass (r=0.24; p<0.05), interventricular septum and posterior wall thickness (r=0.36 and r=0.34 respectively; p<0.05), negatively – with ratio between early and late ventricular filling velocity (r=-0.28; p<0.05). AIx and Alx75 negatively correlated with BMI, waist circumference (r<0.05), respectively; p<0.05), positively correlated with 24h diastolic pressure (r=0.22; r=0.29 respectively; p<0.05), negatively with ratio between early and late ventricular filling velocity (r=-0.29; r=-0.28 respectively; p<0.05), positively correlated with BMI, waist circumference (r=0.22; r=0.29 respectively; p<0.05), negatively with ratio between early and late ventricular filling velocity (r=-0.29; r=-0.28 respectively; p<0.05), positively correlated with BMI, waist circumference (r=0.22; r=0.29 respectively; p<0.05), negatively with ratio between early and late ventricular filling velocity (r=-0.29; r=-0.28 respectively; p<0.05).

Conclusions: As a result, parameters of CAP were associated with gender, age, anthropometric characteristics, renal disease, dyslipoproteinemia, LV hypertrophy and diastolic dysfunction.

P1.17 ARTERIAL STIFFNESS PARAMETERS AND AMBULATORY BLOOD PRESSURE MONITORING IN PATIENTS WITH HYPERTENSION
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Aim: To investigate correlation between ambulatory blood pressure monitoring (ABPM) parameters and central aortic pressure (CAP) parameters (which are the main indicators of arterial stiffness), such as: augmentation index (Alx); augmentation index, normalized for heart rate 75/min (Alx75); augmentation pressure (AP); central systolic (SPa) and pulse pressure (PPa) in patients with hypertension.

Material-Methods: 100 hypertension patients at the age of 22–73 years (mean age 54±10.8) were examined, 57% women. Investigation included electrocardiography, echocardiography, ABPM, determination of serum lipids and creatinine. CAP was measured with anplatoometry tonometer of radial artery using Sphygmocor device.

Results: Mean levels of Alx, SPa, PPa positively correlated with 24h systolic BP (SBP) (r=0.23; r=0.63; r=0.5 respectively; p<0.05), 24h PP (r=0.35; r=0.52; r=0.66 respectively; p<0.05), daytime and nighttime SBP (r=0.21; r=-0.67; r=-0.5 and r=-0.19; r=-0.5; r=-0.44 respectively; p<0.05), high BP load (Hxld) and area under curve (Hpt) of SBP (r=0.19; r=0.6; r=0.47 and r=0.23; r=0.61; r=0.48 respectively; p<0.05). Alx, AP, PPa negatively correlated with heart rate (HR) (r=-0.22; p<0.05). Alx, Alx75, AP, SPa correlated positively with the diurnal variability (SD) of SBP (r=0.19; r=0.24; r=0.25; r=0.31 respectively; p<0.05). SPa had positive correlation with 24h diastolic BP (DBP) (r=0.44; p<0.05), daytime and nighttime DBP (r=-0.48 and r=0.37 respectively; p<0.05). Hxld and Hpt of DBP (r=-0.42 and r=-0.45 respectively; p<0.05), SD of DBP (r=0.24; p<0.05).

Conclusions: According to our study results, parameters of CAP positively correlates with all parameters of ABPM, except HR. Arterial wall stiffness increases in response to lower HR and/or higher BP during 24h.