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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 ± 10 years, height 165 ± 7 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)

Conclusions: 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.

<table>
<thead>
<tr>
<th>Variable</th>
<th>mean±SD</th>
<th>CIMT 0.43±0.046 mm</th>
<th>FMD 7.4±3.1 %</th>
<th>Aortic PWV 5.0±0.9 m/s</th>
<th>Central PWV 4.5±1.1 m/s</th>
<th>DCAao 35±113 10⁻³ mmHg⁻¹</th>
<th>DCcca 439±107 10⁻³ mmHg⁻¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td>r = -0.03, p = 0.73</td>
<td>r = -0.17, p = 0.09</td>
<td>r = -0.07, p = 0.46</td>
<td>r = -0.09, p = 0.35</td>
<td>r = -0.22, p = 0.02</td>
<td>r = -0.10, p = 0.29</td>
</tr>
<tr>
<td>57F:56M</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Age 14.4±2.1 yrs</td>
<td>r = 0.07, p = 0.49</td>
<td>r = -0.08, p = 0.43</td>
<td>r = 0.51, p &lt; 0.001</td>
<td>r = 0.22, p = 0.02</td>
<td>r = -0.28, p &lt; 0.001</td>
<td>r = -0.34, p &lt; 0.001</td>
<td></td>
</tr>
<tr>
<td>BSA 1.18±0.25 m²</td>
<td>r = 0.25, p &lt; 0.01</td>
<td>r = -0.04, p = 0.69</td>
<td>r = 0.45, p &lt; 0.001</td>
<td>r = 0.32, p &lt; 0.001</td>
<td>r = -0.31, p &lt; 0.001</td>
<td>r = -0.32, p &lt; 0.001</td>
<td></td>
</tr>
<tr>
<td>HR 69.13 bpm</td>
<td>r = 0.11, p = 0.27</td>
<td>r = 0.03, p = 0.77</td>
<td>r = 0.16, p = 0.11</td>
<td>r = 0.24, p = 0.01</td>
<td>r = -0.06, p = 0.54</td>
<td>r = -0.08, p = 0.31</td>
<td></td>
</tr>
<tr>
<td>SBP 109±10 mmHg</td>
<td>r = 0.14, p = 0.15</td>
<td>r = -0.20, p = 0.04</td>
<td>r = 0.36, p &lt; 0.001</td>
<td>r = 0.23, p = 0.02</td>
<td></td>
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</tbody>
</table>

Figure 1  Bland and Altman plot for CO.

Figure 2  Bland and Altman plot for SV.

P1.15
ASSESSING THE CORRELATES OF ARTERIAL STRUCTURE AND FUNCTION IN HEALTHY ADOLESCENTS
The Hospital For Sick Children, Toronto, Canada

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.