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Characterisation of lung disease with imaging and physiology

P134 AN EVALUATION OF A NEW LUNG FUNCTION TEST: TLNO IN HEALTHY SUBJECTS

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Background and Aims TLNO, transfer factor for nitric oxide, is a pulmonary function test of gas transfer. The test, in combination with carbon monoxide, allows for calculation of the alveolar membrane diffusing capacity and red blood cell conductance. This allows physicians to recognise physiologically where issues with gas transfer arise. Currently, there are very few papers looking at TLNO reproducibility in healthy subjects and none aiming with a target of 5% repeatability between efforts. This study attempts to look at the reproducibility of TLNO over 10 sessions (7 weeks total) with an intra-session repeatability of 5%. In addition, comparison of TLCO measurements between 10 and 5 s breath holds are made.

Methods 14 normal subjects were recruited and a baseline spirometry was taken and height, weight, age and sex were recorded. Subjects were asked to perform a TLCO test with 10 s breath hold followed by 10 repeated sessions of the TLNO test on different days. Measurements within 5% of each other were considered acceptable repeated Results in one session. A Bland-Altman plot and regression line were constructed to compare TLCO measures between different breath hold times. One-way repeated measures ANOVA, measurement error values, intra and inter-session variability were calculated for TLNO and TLCO recordings obtained over the 10 repeated sessions.

Results Bland-Altman plot revealed no statistically significant ($p=0.783$, $p\geq 0.05$) difference between TLCO breath hold times. Coefficient of determination from the regression line, $r^2=0.860$. Repeated measures ANOVA revealed no significant difference for TLNO and TLCO measurements over time at $p=0.374$ and $p=0.842$ ($p\geq 0.05$) respectively. Intra-session and inter-session variability for TLNO were calculated as 15.02 ml/min/mmHg and 16.12 ml/min/mmHg respectively. TLCO intra-session and inter-session variability were 4.30 ml/min/mmHg and 3.70 ml/min/mmHg. We have shown that TLCO values recorded with the shorter 5 s breath hold agree with the conventional 10 s technique. Over a 7 week period TLNO and TLCO do not change significantly and calculated session variability is consistent with ERS/ATS guidelines.

Conclusion TLNO is a highly reproducible test over a 7 week period and a shortened breath hold in healthy people provides the same values as the traditional 10 s breath hold for TLCO.

P135 THE PREVALENCE OF UNDIAGNOSED COPD IN PATIENTS WITH AN ABDOMINAL AORTIC ANEURYSM AND ITS IMPACT ON CARDIOPULMONARY EXERCISE TESTS

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Introduction Cigarette smoking is a known contributing factor to the development of chronic obstructive pulmonary disease (COPD), and to the formation of an aneurysm. In addition COPD is the most important risk factor associated with abdominal aortic aneurysms (AAA). Studies¹ have observed the relationship of COPD and AAA, demonstrating a prevalence in COPD patients of 3.7% and a 1.22–1.78 fold increased risk of AAA when compared to those without COPD.²

Aims Our aim was to identify the prevalence of undiagnosed airflow obstruction in patients attending for CPET for preoperative assessment for AAA.

Methods Data from 122 patients (108 male), median age 75 years (range 65–90) with an AAA of 5 cm or more, attending between September 2014 and May 2016 were included. Spirometry, CPET, smoking history, BMI and current medication were all analysed. The patient's clinical records were reviewed to establish any previous respiratory diagnosis.

Results 17/122 (14%) patients had a known diagnosis of COPD however 32/122 (26%) had airflow obstruction on spirometry, with only 12 of these having a diagnosis of COPD. 5 patients with a diagnosis of COPD did not demonstrate airflow obstruction. There were significant differences between those with airflow obstruction and those without for breathing reserve 20.8 versus 37.95% ($p=0.0002$), anaerobic threshold 11.0 versus 12.30 ml/min/kg ($p=0.0073$), Peak VO₂ 15.1 versus 16.8 ml/min/kg ($p=0.0018$), smoking history 49 versus 30 pack years ($p=0.0069$) and BMI 26.0 versus 28.1 kg/m² ($p=0.0024$); respectively.

Conclusion The Results confirmed that a significant proportion of our patients had previously undiagnosed/unrecognised airflow obstruction. As would be expected, patients with airflow obstruction had an increased pack year smoking history and a decreased BMI when compared to those without. Airflow obstruction also resulted in a decreased peak VO₂ and a worsening of ventilatory limitation which has the potential to influence surgical decision making.

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P136 NON-INVASIVE ASSESSMENT OF DIAPHRAGM CONTRACTILITY USING SURFACE MECHANOMYOGRAPHY IN HEALTHY SUBJECTS

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