

VALIDITY AND REPRODUCIBILITY OF CARDIOPULMONARY EXERCISE TESTING IN INTERSTITIAL LUNG DISEASE

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Introduction: Cardiopulmonary exercise testing (CPET) is shown to be feasible in patients with interstitial lung disease (ILD), highlighting its prospective use as an outcome measure for prognostic monitoring. However, validity and reproducibility, in terms of eliciting maximal exercise and identifying significant changes over time remain unknown.

Objectives: To identify the validity and reproducibility of CPET in patients with ILD, with particular reference to peak oxygen consumption (VO_{2peak}).

Methods: Eight males with ILD (68.6 ± 8.2 years) performed two CPETs, 3 months apart on a cycle ergometer. A 'maximal' effort was determined if responses met at least one of the criteria established by ATS/ACCP guidelines: plateau in VO_2 , achieving predicted VO_{2peak} , peak work rate or predicted peak heart rate, and a respiratory exchange ratio > 1.15 . Pearson's correlation and paired samples *t*-test established the relationship, and difference, between VO_{2peak} values from each CPET. Reproducibility of VO_{2peak} was characterised by means of absolute typical error (TE) and typical error as a percentage of the coefficient of variation ($TE_{CV\%}$).

Results: Mean time between CPETs was 14 ± 1 weeks. Reasons for termination included exhaustion ($n = 11$), desaturation ($n = 4$) and poor ECG signal ($n = 1$). All CPETs satisfied at least one of the required ATS/ACCP criteria, with 10/16 satisfying two criteria. The most common criteria was $RER > 1.15$, being satisfied in 15/16 CPETs. Mean VO_{2peak} at the first CPET was 1.38 ± 0.39 L·min⁻¹, and 1.25 ± 0.25 L·min⁻¹ at the second. The mean change of -0.13 ± 0.14 L·min⁻¹ was not statistically

significant ($p = 0.14$). VO_{2peak} data from both CPETs were highly correlated ($r = 0.85$, $p = 0.008$). TE of VO_{2peak} over this period was $0.16 \text{ L}\cdot\text{min}^{-1}$, with $TE_{CV\%}$ being 11.8%.

Conclusions: This analysis has shown that CPET is valid and reliable in ILD. Maximal efforts can be identified through use of ATS/ACCP criteria and repeatability over 3 months is ~12%. Any change in VO_{2peak} beyond this value implies a significant change in function, which can in turn affect clinical decisions regarding prognosis and treatment.

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