

FEASIBILITY OF CARDIOPULMONARY EXERCISE TESTING IN IDIOPATHIC PULMONARY FIBROSIS

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Introduction: Idiopathic pulmonary fibrosis (IPF) is a chronic, progressive interstitial lung disease of irreversible declining lung function. Reductions in forced vital capacity (FVC) and diffusion capacity for carbon monoxide (DL_{CO}) are the common clinical endpoints for prognostic monitoring and assessing treatment outcomes. The use of cardiopulmonary exercise testing (CPET) in IPF remains largely unexplored.

Objectives: To explore the feasibility of CPET as a clinical measure in IPF and identify associations with established clinical variables.

Methods: Seventeen patients with IPF were approached, and fifteen (88%) were recruited (13 male, 68.1 ± 7.5 years). Incremental exercise testing to exhaustion was undertaken via electronically braked cycle ergometer. Variables included: peak oxygen consumption (VO_{2peak}), peak work rate (WR_{peak}), nadir SpO₂, ventilatory drive (V_E/VCO₂), alongside standard clinical pulmonary function tests of FVC and DL_{CO}. Pearson's correlation coefficients established relationships between variables.

Results: One participant was excluded (high baseline systolic blood pressure). Eight out of fourteen (57%) participants reached volitional exhaustion. Five CPETs were terminated early due to desaturation (SpO₂ < 88%) and one to an exercise-induced right bundle branch block (recovery within minutes of ceasing exercise). Mean (± SD) pulmonary and exercise results were: FVC, 84.9 ± 17.0 %; DL_{CO}, 56.5 ± 11.4 %;

VO_{2peak} , $1.4 \pm 0.4 \text{ L}\cdot\text{min}^{-1}$, $16.5 \pm 5.5 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$; WR_{peak} , $104 \pm 42 \text{ W}$; SpO_2 , $90 \pm 3 \%$; V_E/VCO_2 , 27.1 ± 6.4 . Significant correlations were identified between: FVC and SpO_2 ($r = 0.58$, $p = 0.032$), DL_{CO} and V_E/VCO_2 ($r = 0.81$, $p < 0.001$) and WR_{peak} ($r = 0.58$, $p = 0.03$). Body-mass relative VO_{2peak} held moderate, but not significant relationships with FVC ($r = 0.44$, $p = 0.11$) and DL_{CO} ($r = 0.53$, $p = 0.51$).

Conclusions: Initial findings from this study have found CPET to be acceptable to patients with IPF and potentially feasible as a testing measure. Preliminary results identified common exercise desaturation, suggesting less conservative SpO_2 termination criteria (e.g. 80% cut-off) could be considered. Although exercise parameters held limited relationships with FVC and DL_{CO} , results from VO_{2peak} identifies potential additional and dynamic prognostic information and warrants further investigation.