

## 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<sub>CO</sub>) 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<sub>2peak</sub>), peak work rate (WR<sub>peak</sub>), nadir SpO<sub>2</sub>, ventilatory drive (V<sub>E</sub>/VCO<sub>2</sub>), alongside standard clinical pulmonary function tests of FVC and DL<sub>CO</sub>. 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 (SpO<sub>2</sub> < 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<sub>CO</sub>, 56.5 ± 11.4 %;

$VO_{2peak}$ ,  $1.4 \pm 0.4 \text{ L}\cdot\text{min}^{-1}$ ,  $16.5 \pm 5.5 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ ;  $WR_{peak}$ ,  $104 \pm 42 \text{ W}$ ;  $SpO_2$ ,  $90 \pm 3 \%$ ;  $V_E/VCO_2$ ,  $27.1 \pm 6.4$ . 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.