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Title: Differences in symptoms and cardiopulmonary responses to treadmill and cycle cardiopulmonary exercise testing (CPET) in ILD and comparison with the 6MWT.

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Aims: Cardiopulmonary exercise testing (CPET) is used for diagnostic and prognostic reasons in Interstitial Lung Disease (ILD). Our aims were to compare symptoms and cardiopulmonary responses between a) cycle and treadmill walking and b) between CPET and the 6MWT.

Methods: 18 ILD patients (6 IPF; 12M), mean (SD) age 65.4 (12.6), FVC% pred. 72.7 (20.7), DLCO% pred. 42.2 (13.4) underwent CPET by cycle ergometry (C-CPET) and treadmill walking (T-CPET) in random order, with 30-45 min rest between tests, on a single session. On a second session 3-7 days apart, patients performed the 6MWT. Oxygen saturation (SpO₂), heart rate (HR), breathlessness (BORG score) and leg fatigue/exertion (RPE scale) were recorded at rest, peak and at each minute of the 3-min recovery. We used the sign rank test with the null hypothesis of no difference between responses to the 3 tests of multiple CPET and symptom parameters.

Results: Data were consistent with no differences between C-CPET and T-CPET in cardiopulmonary parameters (PeakVO₂ p value=0.4, AT_VO₂ p= 0.5, Peak VE/VCO₂ p= 0.5, Peak VE/VO₂ = 0.8). Desaturation (Δ SpO₂) was similar between T- CPET and C-CPET (p= 0.4) or 6MWT (0.7) but differed between C-CPET and 6MWT (p=0.03). The 3-minute SpO₂ recovery was slower in T-CPET than the other tests. Change in HR (Δ HR) and 3-min recovery was similar between CPET modes (p=0.1) but statistically lower in the 6MWT (p= 0.001). Breathlessness was greater in T-CPET than C-CPET (Δ BORG p= 0.04) and recovery slower than the other two tests. Patients with CTD-ILD reported a preference for T-CPET.

Summary/Conclusions: Cardiopulmonary parameters can be derived accurately from both types of CPET. The drop in oxygen saturation at the 6MWT was similar to that of the maximal

T-CPET so, it can be used in ILD patients to estimate level of desaturation, even though the 6MWT underestimates the delay in SpO₂ recovery.

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