

Diminished Cardiopulmonary Capacity During Post-Exertional Malaise

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Reduced functional capacity and post-exertional malaise following physical activity are hallmark symptoms of Chronic Fatigue Syndrome (CFS). That these symptoms are often delayed may explain the equivocal results for clinical cardiopulmonary exercise testing with CFS patients. The reproducibility of VO₂max in healthy subjects is well documented. This may not be the case with CFS due to delayed recovery symptoms.

Purpose: To compare results from repeated exercise tests as indicators of post-exertional malaise in CFS.

Methods: Peak oxygen consumption (VO₂ peak), percentage of predicted peak heart rate (HR%), and VO₂ at anaerobic threshold (AT), were compared between six CFS patients and six control subjects for two maximal exercise tests separated by 24 hours.

Results: Multivariate analysis showed no significant differences between control and CFS, respectively, for test 1: VO₂ peak (28.4 ± 7.2 ml/kg/min; 26.2 ± 4.9 ml/kg/min), AT (17.5 ± 4.8 ml/kg/min; 15.0 ± 4.9 ml/kg/min) or HR% ($87.0 \pm 25.4\%$; $94.8 \pm 8.8\%$). However, for test 2 the CFS patients achieved significantly lower values for both VO₂peak (28.9 ± 8.0 ml/kg/min; 20.5 ± 1.8 ml/kg/min, $p = 0.031$) and AT (18.0 ± 5.2 ml/kg/min; 11.0 ± 3.4 ml/kg/min, $p = 0.021$). HR% was not significantly different ($97.6 \pm 27.2\%$; $87.8 \pm 9.3\%$, $p = 0.07$). A follow-up classification analysis differentiated between CFS patients and controls with an overall accuracy of 92%.

Conclusion: In the absence of a second exercise test, the lack of any significant differences for the first test would appear to suggest no functional impairment in CFS patients. However, the results from the second test indicate the presence of a CFS related post-exertional malaise. It might be concluded then that a single exercise test is insufficient to demonstrate functional impairment in CFS patients. A second test may be necessary to document the atypical recovery response and protracted malaise unique to CFS.

Keywords: Serial exercise testing, functional impairment, differential diagnosis