Relationship between six-minute walking test and pulmonary function and ventilatory drive in patients with air-flow limitation

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摘要

Abstract

BACKGROUND: We studied the correlation between exercise tolerance and pulmonary function, arterial blood gases, and ventilatory drive in patients with airflow limitation (AFL). METHODS: Forty-one patients (36 men, 5 women, mean age 63.6 +/- 10.3 years) with forced expiratory volume in one second (FEV1) < 75% and FEV1/forced vital capacity (FVC) < 75% were enrolled. All patients were clinically stable with no impairment of the lower extremities. On the first day of the study, pulmonary function test (PF), including FVC, FEV1, diffusion capacity (DLCO), and residual volume (RV)/total lung capacity (TLC) was measured by plethysmography. On the next day, ventilatory drive P0.1 were measured before drawing blood gases. Then, a 6-minute walking test with pulse-oxymetry and end tidal CO2 monitoring was performed. Ventilation efficiency (O2SATp & ETCO2) was recorded every 6 seconds during exercise. RESULTS: The walking distance (WD) was significantly correlated to PF: FVC%, FEV1%, DLCO%, and RV/TLC. There was also a significant correlation between resting arterial blood gases (PaO2, PaCO2, SatO2) and PF (FVC%, FEV1%, DLCO% and RV/TLC). The SatO2 at the end of exercise was highly correlated to PF (FVC%, FEV1%, DLCO% and RV/TLC). Gas exchange parameters: PaO2, PaCO2, O2SATa, O2SATp at rest, and O2SATp at the end of exercise were also significantly related to WD. CONCLUSION: The magnitude of exercise intolerance in patients with AFL was not only significantly correlated to the impairment of pulmonary function, but also closely related to gas exchange during exercise. Therefore, limitation of ventilation could be identified earlier using an exercise test