Abstract

Objectives: To assess whether there is a correlation between oxygen uptake (VO2) and heart rate (HR) on-kinetics in the constant-load cycle-ergometer test (CLT) and the BODE index and its isolated variables in patients with chronic obstructive pulmonary disease (COPD). Method: Fourteen male patients between 55 and 78 years of age with moderate to severe COPD were evaluated. Each patient underwent spirometry, the six-minute walk test (6MWT), the cycle-ergometer incremental test (IT) and CLT on alternate days. The exhaled gases were collected, and the VO2 and HR on-kinetics were analyzed. The BODE index was calculated. Results: It was noted that the VO2 tau (τ) and mean response time (MRT) were significantly higher than HR τ and MRT. Moderate and strong correlations between τ and MRT of the VO2 and HR and the BODE index was noted (r=0.75 and r=0.78; r=0.62 and r=0.63, respectively), and there were correlations between the VO2 τ and MRT and the forced expiratory volume in one second (FEV1) (r=–0.60; r=–0.53) and the distance traveled at 6MWT (DT-6MWT) (r=–0.61; r=–0.44) and DT-6MWT % predicted (r=–0.62; r=–0.46). The HR τ and MRT were correlated with DT-6MWT (r=–0.59; r=–0.58) and DT-6MWT % predicted (r=–0.62; r=–0.62). Conclusion: The slowing of cycle-ergometer VO2, and especially of HR on-kinetics, may be key markers of disease severity. Furthermore, airflow obstruction and reduced exercise capacity are associated with the slowing of patients’ VO2 and HR on-kinetics.

Keywords

COPD, oxygen uptake, kinetics, heart rate, physical therapy, disease severity index.