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Metabolic Requirements during Six Minutes Walking Tests in Patients Affected by Chronic Obstructive Pulmonary Disease in Different Stages

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ABSTRACT

Backgrounds: In Chronic Obstructive Pulmonary Disease (COPD) a multi factorial effort limitation becomes pro- gressively relevant as the disease progresses in the consecutive stages. It is measured by both six minutes walking test (6MWT) and maximal cardiopulmonary incremental test (CPET). Aim: It is important to assess in each stage of dis-ease the metabolic load during 6MWT referring to the outcome of CPET and to ascertain whether there is a significant rela- tionship between the measures obtained by CPET and 6MWT. Methods: Four group of fifteen patients affected by COPD in stage I to IV underwent 6MWT and maximal CPET in the same day and results were compared to a group of healthy people. Airflow obstruction was measured by whole body plethysmography, blood gases by gas analysis, maxi- mal oxygen consumption and metabolic parameters by ergometer, lactic acid levels by analyzer. Results: Maximal oxygen consumption (V ' O2max) and 6MWT are progressively impaired and related (V ' O2max = 1.25 ? 0.26, 1.152 ? 0.4, 1.03 ? 0.44, .85 ? 0.2 l/m; 6MWD = 452 ? 84, 446 ? 82, 381 ? 165, 200 ? 100 respectively in GOLD I to IV stage). Oxygen consumption (V ' O2) during 6MWT becomes stable after 3 - 4 minutes and reached at the end of the test close to those measured at de-compensated metabolic acidosis anaerobic threshold (TDMA) (85 ± 0.4 l/m vs. 9 ? 0.4 l/m) in stage I to III, while in COPD there is no difference between V ' O2max and V ' O2 during 6MWT (0.85 ? 0.2 vs. 0.8 ? 0.23 l/m). 6MWT is more suitable to determine oxygen desaturation than CPET (dSaO2 ?4 ± 2% vs. ?2 ± 1%). 6MWD, the workload performed in 6MWT and V ' O2max are significantly related. Conclusion: 6MWT looks as a suitable sub maximal test related CPET. Metabolic requirements under 6MWT are close to TDMA and are obtained in a suitable, self paced, usual exercise, close to everyday experience and thus related to activity daily levels. As the disease worsens the differences between V ' O2 during 6MWT and V ' O2max wane.

KEYWORDS

COPD; 6MWT; CPET; AT; TDMA

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