Abstract

Background: Transcutaneous electrical diaphragmatic stimulation (TEDS) has been used to improve respiratory muscle strength in patients with respiratory muscle weakness. However, this physical therapy resource has not been studied in chronic obstructive pulmonary disease (COPD). Objective: To evaluate the respiratory pattern during one session of TEDS in COPD patients. Method: Fifteen COPD patients participated in one TEDS session for plethysmographic analysis and assessment of peripheral oxygen saturation (SpO₂) and heart rate (HR). After the session, patients were divided into two groups: Responder (R; n=9) and Non-Responder (NR; n=6) to TEDS. Statistic analysis was performed using the Shapiro-Wilk normality test and two-way ANOVA. For the parameters that showed interaction, the Student t test was used (P<0.05). Results: R group consisted mainly of men, with lower SpO₂ and higher HR than NR group. When time (before and during) and groups (R and NR) were compared (interaction), there were differences in the parameters minute ventilation (Vent), inspiratory tidal volume (ViVol), expiratory tidal volume (VeVol), and respiratory rate (Br/M). In the intergroup comparison, differences were observed in the parameters Vent, ViVol, and VeVol. A significant effect was also observed for time in change in end-expiratory lung volume level (qDEEL), phase relation during inspiration (PhRIB); phase relation during expiration (PhREB); phase relation of entire breath (PhRTB), and phase angle (PhAng). During TEDS, there was an increase in SpO₂ and a reduction in HR in both groups. Conclusions: The most hypoxemic group with greater HR responded to TEDS and there was interaction between group and time of analysis for the pulmonary volumes. The time factor had an influence on the two groups with an increase in thoracoabdominal asynchrony.

Keywords

Chronic obstructive pulmonary disease; diaphragm; electrical stimulation; pulmonary rehabilitation. Clinical Trial Registration number: NCT01300442.