

respiratory response to carbon dioxide stimulation during low flow supplemental oxygen therapy in chronic obstructive pulmonary disease

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摘要

Abstract

BACKGROUND AND PURPOSE: Oxygen supplementation is the treatment most commonly used to relieve dyspnea in chronic obstructive pulmonary disease (COPD). There is a lack of data, however, on the response of the respiratory drive to low flow oxygen in severe stable COPD. The purpose of this investigation was to evaluate the magnitude of chemoresponsiveness to low flow supplemental oxygen in patients with COPD of variable severity in terms of mouth occlusion pressure at 100 msec (P0.1), P0.1 and minute ventilation (MV) response to CO₂ stimulation, and blood gas tension.

METHODS: Twenty-six patients with stable COPD of variable severity were divided into two groups: those with mild airway obstruction and normocapnia (n = 14) and those with hyperinflation and hypercapnia (n = 12).

RESULTS: Arterial oxygen tension, oxygen saturation, and arterial CO₂ tension were significantly increased after oxygen therapy in COPD patients with or without hypercapnia (all p < 0.01). COPD patients with hypercapnia had a significantly higher P0.1 (0.7 +/- 0.07 kPa) than those with normocapnia (0.3 +/- 0.03 kPa, p < 0.01). Oxygen significantly decreased the P0.1 adjusted by end tidal CO₂ pressure (delta P0.1/PETCO₂) only in patients with hyperinflation and hypercapnia, from 0.2 +/- 0.05 to 0.1 +/- 0.03 kPa (p < 0.05). There was a weak correlation between P0.1/PETCO₂ and forced vital capacity (FVC; r = 0.41, p < 0.05) or forced expiratory volume in 1 second (FEV₁; r = 0.45, p < 0.05). In addition, the arterial CO₂ tension (PaCO₂) was inversely related to P0.1/PETCO₂ (r = -0.57, p < 0.01). The MV with 6% CO₂ (MVCO₂) was also significantly decreased in the hypercapnic group from 17.9 +/- 3.7 to 14.8 +/- 4.9 L after oxygen therapy (p < 0.01). The maximum inspiratory pressure did not change after oxygen usage in either group.

CONCLUSION: We conclude that short-term oxygen therapy

may blunt respiratory response to CO₂ in COPD with chronic hypercapnia. Cautious observation of respiratory response is needed during oxygen therapy in COPD patients with a higher magnitude of air-trapping and hypercapnia.