

Effects of nasal high flow on ventilation in volunteers, COPD and idiopathic pulmonary fibrosis patients.

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Abstract

Background: A high flow of air applied by large bore nasal cannulae has been suggested to improve symptoms of chronic respiratory insufficiency. In pediatric patients, nasal high-flow (nHF) ventilation was similarly effective compared to noninvasive ventilation with a face mask.

Objectives: The aim of this study was to describe changes in respiratory parameters.

Methods: We measured pressure amplitudes during the respiratory cycle and mean pressures in patients with idiopathic pulmonary fibrosis (IPF) and COPD. In order to achieve tidal volume and minute volume measurements, we used a polysomnography device. Capillary blood was taken for blood gas analysis before and after nHF breathing (8 h).

Results: nHF led to an increase in pressure amplitude and mean pressure in healthy volunteers and in patients with COPD and IPF in comparison with spontaneous breathing. In COPD, nHF increased tidal volume, while no difference in tidal volume was observed in patients with IPF. Interestingly, tidal volume decreased in healthy volunteers. Breathing rates and minute volumes were reduced in all groups. Capillary pCO₂ decreased in patients with IPF and COPD.

Conclusions: nHF resulted in significant effects on respiratory parameters in patients with obstructive and restrictive pulmonary diseases. The rise in pressure amplitude and mean pressure and the decrease in breathing rate and minute volume will support inspiratory efforts, helps to increase effectiveness of ventilation and will contribute to a reduction in the work of breathing. A CO₂ wash-out effect in the upper airway part of the anatomical dead space may contribute to the beneficial effects of the nHF instrument.