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Title: Effects of a high-flow nasal cannula system (nHF) on ventilation in healthy volunteers and patients with IPF

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Body: Introduction: Treatment with a nHF-system is able to improve symptoms of acute and chronic respiratory insufficiency. The method uses a warmed and humidified high flow of air/oxygen with 10-50 liter per minute (lpm). By using these devices an increase of mean pressure, pressure amplitude and a decrease in pCO₂ is observable. Method: Healthy volunteers and patients with IPF were included in this study. For detection of volume changes, frequency variations and I/E-ratios we used impedance measure bands. The bands were placed 10 cm below jugulum and 10 cm below xiphoid. The signal was relayed to a polysomnography device. Flows from 10 lpm up to 50 lpm with small, medium and large nasal prongs were tested. To compare the results with a closed ventilation support system, the measurements were also performed with CPAP 6 and 10 mbar and BiPAP 14/6 mbar. We compared the results with values measured during spontaneous breathing. Results: HFNC led to no changes in tidal volume in patients with IPF and a decrease in healthy volunteers. The breathing rates in healthy volunteers and patients with IPF in comparison with spontaneous breathing were decreased. The I/E-ratio results in no significant changes in healthy volunteers and patients with IPF. In both groups, the minute volume was decreased. In comparison with CPAP and BiPAP, the measuring results showed different effects like HFNC. Discussion: HFNC resulted in significant effects on respiratory parameters of healthy volunteers and in patients with restrictive pulmonary diseases. The changes in healthy volunteers and IPF will support respiratory efforts and will finally results in a reduction of breathing-related work.