Effects of high-flow transnasal insufflation compared with cPAP and spontaneous breathing on pressure amplitude and mean pressure in patients with IPF and COPD

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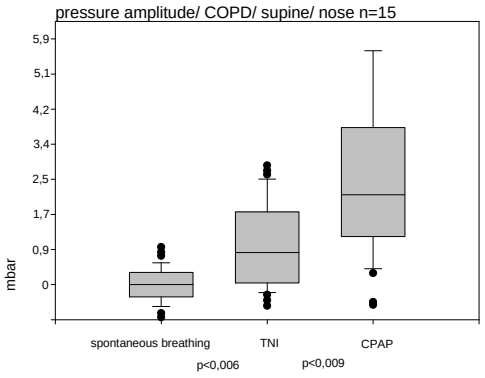
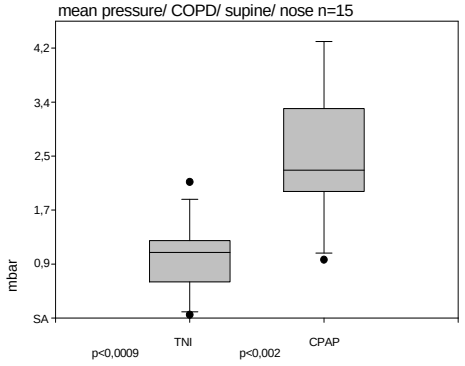
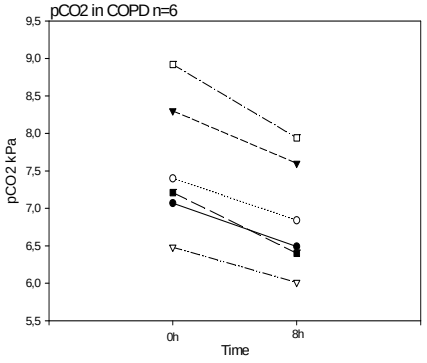
Introduction: Treatment with high flow transnasal insufflations (TNI©) is able to improve symptoms of chronic respiratory insufficiency. The method uses a warmed and humified high flow of air/ oxygen with 16-24 L per minute. In pediatric patients the device was similarly effective compared to non-invasive ventilation with a face mask. An increase in mean pressure in healthy volunteers has been described. The clinical effects in adults are unknown.[1-4]

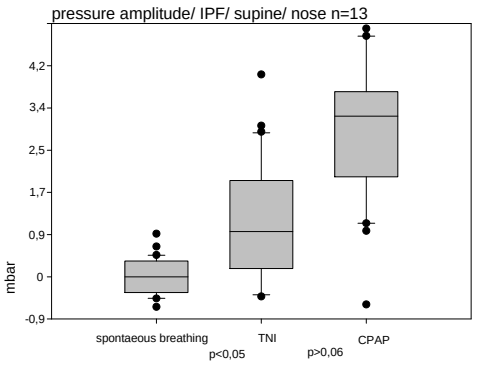
Methode: A water-filled tube connected to a sensitive pressure transducer was used as a sensor. The tube was placed in the nose, with the patient in supine and prone body positions. The signal was put out to an analog paper writer. We measured pressure amplitudes during the respiratory cycle and mean pressures in patients with IPF and COPD using TNI and nasal cPAP (4mbar) respectively. We compared the results with values measured during spontaneous breathing. The capillary blood gas analysis was taking from the hyperemic earlap.

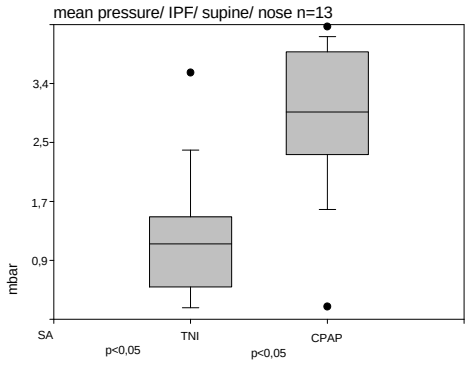
Results: TNI led to an increase in pressure amplitudes and mean pressure in healthy volunteers and patients with COPD or IPF in comparison with spontaneous breathing. CPAP alone showed a greater effect on mean pressure in all groups. In summary, transanasal insufflation resulted in an increase in pressure amplitude and mean pressure in healthy volunteers and in patients with COPD and IPF. Blood gas analysis revealed a decrease in pCO_2 in patients with IPF and COPD.

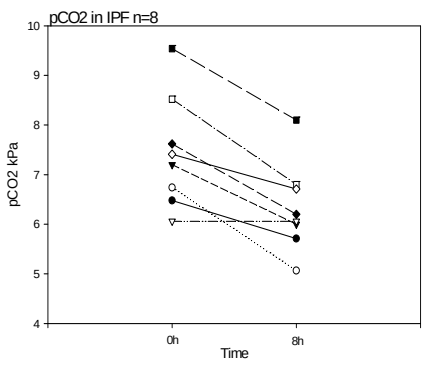












Discussion: Transnasal insufflation resulted in significant effects on respiratory parameters in patients with obstructive and restrictive pulmonary diseases. The rise in pressure amplitude and mean pressure will support inspiratory efforts, may increase ventiliation and will contribute to a reduction in the work of breathing. A CO2 wash-out of the upper airway part of the anatomical dead space may contribute to the beneficial effects of the TNI instrument.

1 McGinley et al. (2007): A nasal cannula can be used to treat obstructive sleep apnoe. 2 Chatila et al. (2004): The effects of High-flow vs. Low-Flow oxygen in exercise in advanced obstructive airway disease. 3 Sreenan et al. (2001): High-flow nasal cannulae in the management of apnea of prematurity: a comparison with conventional nasal continuous positive airway pressure. 4 Groves N, Tobin A. (2007): High flow nasal oxygen generates positive airway pressure in adult volunteers.