

## **Nasal highflow eliminates CO<sub>2</sub> from lower airways.**

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### **Abstract**

**Introduction:** Nasal highflow (NHF) has a growing evidence in treatment of hypoxemic respiratory failure. There are preliminary data available about use in acute and chronic type-II-respiratory failure. Unfortunately underlying mechanisms of NHF are not well understood. Increase in airway pressure seems too small to explain the observed reduction in hypercapnia. Most interesting effects are wash-out of upper airways and reduction of functional dead space. There are no data available about a wash-out of lower airways.

**Methods:** We established a sheep lung model to evaluate CO<sub>2</sub>-wash-out in lower airways. Therefore we placed measuring and insufflation catheter in maximal expanded lung. The lung was not ventilated in order to minimize influence of CO<sub>2</sub> rebreathing and increase in airway pressure. Airway pressure and CO<sub>2</sub> values were measured in lower airways and in tracheal space.

**Results:** CO<sub>2</sub> was decreased by NHF in lower airways and in tracheal space. Changes in CO<sub>2</sub> were flow dependent. There was also an increase in airway pressure in these settings.

**Conclusions:** NHF is able to decrease CO<sub>2</sub> in lower airways in a flow-dependent manner. This effect is independent of an increase in airway pressure and CO<sub>2</sub>-rebreathing. So wash-out is an important reason for efficiency of NHF in decreasing hypercapnia.