

EFFECT OF HIGH NASAL GAS FLOW ON UPPER AIRWAY PRESSURE.

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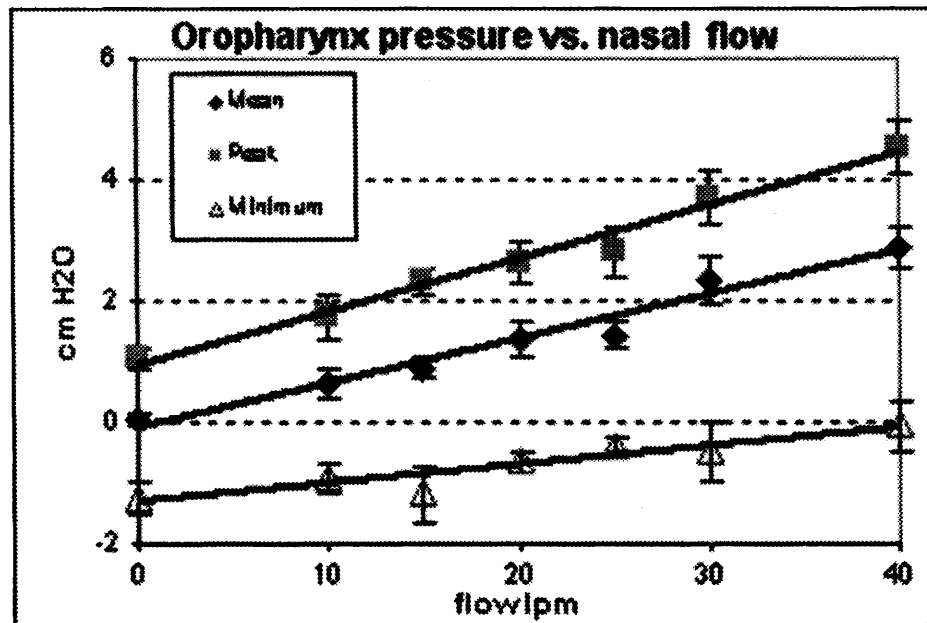
Background: at BTPS, high-flow breathing gas administered by nasal cannula is well tolerated. Oxygen at up to 40 lpm can be given nasally rather than by mask, with reported improvement in patient oxygenation and comfort. Although clinical experience has been positive, the effects of high nasal flows on airway conditions are not well understood. This study measured changes in upper airway pressures at nasal cannula air flows up to 40 lpm.

Methods: 6 healthy adult subjects were studied. Oropharyngeal pressure was recorded via an air-filled 1/16" i.d. vinyl tube held in the closed mouth, and connected to a pressure transducer (Abbott). The transducer output was amplified (Grass Instruments) and displayed and digitized (Windaq). Room air at BTPS (Vapotherm 2000i) flowed through a nasal cannula (Vapotherm MA1700) at between 0 and 40 lpm. Respiratory pressure waveforms were monitored to confirm valid data. Mean values for mean, peak expiratory and minimum inspiratory airway pressures were calculated for periods of steady breathing for each subject at each flow rate.

Results: pressures in the oropharynx increased linearly with nasal flow rate. Correlation coefficients were highly significant ($r=0.92-0.99$; $p<0.001$). However, the absolute increases were small. At 40 lpm the mean peak expiratory pressure was 4.5 cm H₂O, vs. 1.1 cm at zero flow. The Figure shows mean \pm SEM for peak expiratory, mean, and minimum inspiratory pressures.

Conclusions: High nasal flow through a non-occluding cannula induced a small but consistent absolute increase in oropharyngeal pressure during all phases of the respiratory cycle. The increase was statistically highly correlated with flow rate.

Speculation: The change in inspiratory minimum pressure suggests a reduction in the nasal resistance component of inspiratory work of breathing as flow increases.



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