TRACHEAL GAS INSUFFLATION (TGI) DURING LATE EXHALATION REDUCES PaCO2 WHILE SPARING TGI GAS – AIRWAY EXPOSURE TIME.

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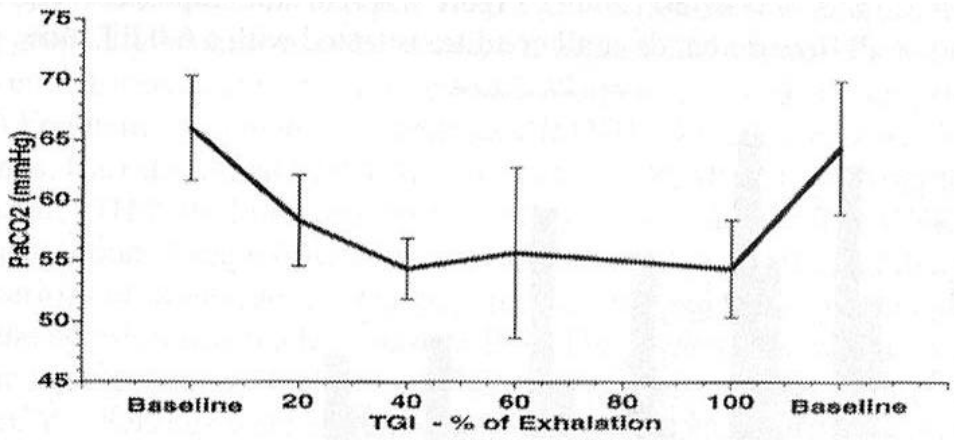
TGI reduces PaCO2 by flushing the potentially re-breathable alveolar gas from mechanical and anatomical deadspace regions during exhalation. Therefore, during inspiration and early expiration TGI is not effective and unnecessarily exposes the airways to gas that may be dry and cool. Carefully controlled late expiratory TGI (leTGI) may flush CO2 effectively while reducing TGI gas -- airway exposure time.

Methods: Six normal pigs were instrumented and anesthetized in an oleic acid lung injury (OAI) protocol. PaCO2 was monitored continuously with an indwelling ABG catheter system (Paratrend 7+, Diametrics). After OAI was established, volume control ventilation was set at f = 12, I:E =1:2 and a tidal volume producing PaCO2 levels between 60-75 mmHg. Expiratory TGI flow at 5 L/min was delivered via one channel of a Mallinckrodt #7 Hi-Lo tube positioned 2.5 cm above the carina. Using a phasic controller for TGI, ventilator airflow was tracked and TGI delivery was gated for either 20, 40, 60, or 100% (in random order) of the latter portion of expiration.

Results: The figure displays mean PaCO2 ± s.d. for baseline settings and the tested leTGI. PaCO2 reduction from baseline was significant at leTGI of 40% and 100% ($p<.01$). Of note was the PaCO2 reduction, although not statistically significant, at only 20% leTGI.



Conclusions: Selective leTGI caused reductions in PaCO2 in this model of lung injury. While the leTGI% causing a maximal CO2 elimination may vary with the patient's impedance condition and ventilator settings in use, leTGI spares the possible drying and cooling effects of TGI gas during inspiration and portions of exhalation. The use of leTGI should also lessen concern about TGI delivery causing pressure generation beyond a tube narrowing or occlusion.