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POSTER SESSION V

A284

TITLE: LOW AND HIGH FLOW TRACHEAL INSUFFLATION OF O_2 (TRIO) SUPPORTS OXYGENATION IN APNEIC DOGS AFTER TTX POISONING

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Introduction For field resuscitation of apneic mass casualties simple equipment, and limitations in O_2 supplies are vital concerns.[1] TRIO is a simple technique that is advocated for field management of mass casualties.[2] We compared high (2L/min) and low (90 ml/min) flow TRIO and examined survival when TRIO was given after cardiac and respiratory depression were produced by tetrodotoxin (TTX), an antipersonnel chemical.

Methods Ten beagles 8-13 Kg were anesthetized and intubated with a TRIO catheter (1.5 mm ID placed within 1 cm of carina) outside a cuffed tube for conventional ventilation (CMV). We used pulmonary and femoral artery catheters to measure vascular pressures, cardiac output (thermodilution) and sample blood gases. After a slow IV infusion of TTX (9.3 µg/hr) produced apnea, measurements were repeated every 10 min for 30 min, then every 15 min during TRIO. Measurements continued provided systolic blood pressure (BP) did not fall below 40 mm Hg, when CMV was reinstituted. The animals were awakened when able to breathe spontaneously and neurologically examined. Bonferroni t-test was used for comparisons.

Results All high flow TRIO animals (n=5) survived 4 hours and were neurologically normal. All low flow TRIO animals (n=5) survived at least 40 min before BP fell below 40 mm Hg. Low flow animals were hyperflexic, had sluggish eye reflexes and inactive hind legs for 2-3 days. All were recovered and considered normal within one week. After 30 min PaO_2 was above 140 mm Hg in all low flow TRIO animals (mean 215 ± SE 18.9) and above 220 mm Hg with all high flow (mean 390 ± SE 40.7) ($p<0.05$). After 30 min $PaCO_2$ rose to 145 ± 6.6 mm Hg with low flow and 93 ± 7.1 mm Hg with high flow TRIO ($p<0.05$). (See Fig) Cardiac index was 2.1 to 3.2 L/min/M^2 during low flow TRIO and 3.1 to 4.5 L/min/M^2 during high flow ($p<0.05$ at 30 min between high and low flow). Mean BP after 30 min was 39 ± 2.3 mm Hg with low flow and 77 ± 8.5 mm Hg with high flow TRIO ($p<0.05$).

Conclusions Hypercarbia and hypotension associated with low flow TRIO caused lower cardiac index and delayed neurological recovery. However, all animals were adequately resuscitated with CMV. High flow TRIO was efficacious in supporting life for 4 hours until spontaneous respirations returned, no neurological dysfunction occurred and no CMV was required.

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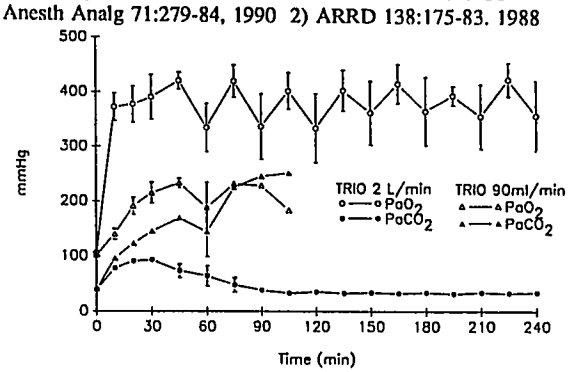
1) Anesth Analg 71:279-84, 1990 2) ARRD 138:175-83. 1988



$P<0.05$ both TRIO PaO_2 different from time = 0 CMV room air. $p<0.05$ both TRIO $PaCO_2$ different from time = 0 until 45 min. Slight spontaneous respiration began 45-60 min in TRIO 2L/min animals. No respirations occurred in TRIO 90 ml/min animals.

A285

TITLE: NEUTROPHIL SUPPRESSION WITH HALOTHANE AND ISOFLURANCE USING FLOW CYTOMETRY

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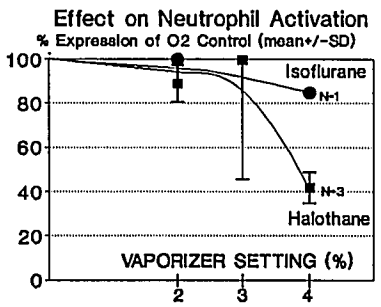
Several studies have suggested that anesthetic agents may promote immune suppression in humans.[1] The effect of anesthetic agents on cell mediated immunity and neutrophil function has been an area of particular interest. Studies of humans and mice exposed to varying concentrations of inhalational agents have demonstrated variable suppression of some PMN functions and enhancement of others.[2] These studies are limited however to whole population methodologies.

We have recently demonstrated a subpopulation of PMNs in patients using flow cytometry. We believe this subpopulation represents an activated form of the PMN and is a sensitive marker of PMN function.[3]

PMNs were separated from blood obtained from healthy donors with the approval of the Baystate Medical Center Research Review Committee. Oxygen was passed through a Drager vaporizer at 4 L/minute and the resulting vapor was bubbled through phosphate buffered saline for 30 minutes. The PMNs were then added to the buffer and stimulated with phorbol myristate acetate (PMA). Changes in neutrophil forward and right angle light scatter were analyzed on an EPICS C Flow Cytometer.

Results show a 20-40% reduction in activated PMN expression at higher anesthetic concentrations (See Figure). Trypan blue exclusion after anesthetic exposure showed 100% viability.

Our study suggests that even brief exposures to halothane and isoflurane can suppress PMN activation. Further studies on length of exposure and duration of suppression are currently being done.



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2.Stevenson,GW. Anesthesiology(1990)72:542-552.
3.Goolishian,W. CCM (1990),18(4)S279