TITLE : **FLOWS AND BLOOD GASES DURING LARYNGOSCOPY WITH HFJV : influence of frequency**

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The purpose of the study was to determine if there was an optimal frequency during HFJV for laryngoscopy taking into account respiratory mechanics and blood gases data.

After consent of the hospital ethics committee, 24 patients (45.75 ± 20.7 year old) were studied : 13 had low compliance (C) 55 ± 7 ml.cm.H_2O^{-1}, 7 of them had high resistances (R) 10.52 ± 3.48 cm $H_2O.l^{-1}.s^{-1}$. 11 patients had normal C 80 ± 8 ml.cm H_2O^{-1} . 2 of them had high R 6.36 ± .95 cm $H_2O.l^{-1}.s^{-1}$. The method for anaesthesia and HFJV has already been described[1]. Pressures were measured and recorded[(1)] both at the level of the carina (Paw) and of the glottis (Pg) in order to determine if there is any inspiratory entrainment (Pg < 0) or backflow (Pg > 0). Three F were randomly used (100.mn^{-1}.150 mn^{-1}.200 mn^{-1}) the other ventilatory settings being kept constant, FIO_2 was 50%. Blood gases were measured after steady state was obtained at each F. Data were compared using student paired t test. Linear regression was used to test the degree of correlation between variation in $PaCO_2$ ($\Delta PaCO_2$) and C or R. Inspiratory Paw decreased significantly (P < 0.01) when F increased (9.5 ± 3.6.cmH_2O, 8.8 ± 3.6 cm H_2O, 8.1 ± 3.4 cm H_2O respectivly). Expiratory Paw returned to zero except a slight "Peep effect" (Paw ≤ 2 cmH_2O) in 9 patients at a frequency of 200 mn^{-1}. No entrainment occured during inspiration (Pg ≥ 0) whereas an immediate backflow happened in most cases (Pg > 0). Neither PaO_2 nor $PaCO_2$ changed with F. PaO_2 (139.6 ± 66.6 Torr, 128.3 ± 59.4 Torr, 131.3 ± 60.9 Torr) $PaCO_2$ (26.2 ± 8.4 Torr, 26.7 ± 8.5 Torr, 28.5 ± 9.9 Torr). No correlation was found between $\Delta PaCO_2$ and C or R. Our results did not agree with experimental[(2)] and clinical[(3)] results. During laryngeal surgery the gas is injected directly into the trachea through a catheter. Therefore owing to the position of the catheter the jet flow is injected, in most cases, not in the middle of the trachea but against the tracheal wall producing some of the gas spilling out of the trachea[(4)] during inspiration. As the backflow increases with time, the shorter the inspiratory time the lower the spilt volume is[(4)]. This could explain the lack of variation in blood gases whereas Paw decreases.

In conclusion, when HFJV is delivered through a catheter during laryngoscopy **1)** varying F does not produce any significant variation in blood gases whatever the respiratory mechanics **2)** owing to the position of the catheter, no entrainment occurs and backflow happens in most cases whatever the frequency.

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TITLE: USEFULNESS OF SOMATOSENSORY EVOKED POTENTIAL (SEP) MONITORING TO DETERMINE THE APPROPRIATE LEVEL OF HYPOTHERMIA.

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Electrocerebral silence (ECS), assessed by intraoperative EEG monitoring has been used to determine the appropriate level of hypothermia before institution of circulatory arrest (CA). We investigated intraoperative median nerve SEP monitoring as a means of determining cold induced ECS.

After induction with Na pentobarbital, 14 dogs mechanically ventilated with 100% O2, were placed on cardiopulmonary bypass using alpha stat regulation of pH and moderate hemodilution. Rectal and esophageal temps were monitored. Starting at 37°C, and continuously during cooling, a stimulus 50% higher than motor threshold was delivered at a rate of 5.9/s on the volar surface of a foreleg. Recording needle electrodes were placed in the scalp over the contralateral somatosensory cortex and subcutaneously over the second cervical spinous process (C2) both referenced to the front (Fpz). The SEP was generated from 500 stimuli by a QSI 9000 signal averager. Linear regression analysis of latency and amplitude of the first negative peak at C2 (N1), of the first negative peak at the scalp (N2), and the central conduction time (N2-N1)(CCT) were plotted.

At 37°C mean latencies and amplitudes were: N1 9.31 ms (SD±0.57),-0.45 mA (SD±0.18); N2 19.89ms (SD±1.24),-0.66 mA (SD±0.22); CCT 10.5 (SD±1.07); Amplitudes decreased with cooling: N1 r=0.417; N2 r=0.402 (p<0.001). Latencies correlated inversely with temp decreases: N1 r= -0.807; N2 r=-0.767; CCT r=-0.605 (p<0.001). Cortical SEP (N2) was no longer recordable below a mean temp of 24.4°C (SD±4.7, range 17-30°C). Cervical SEP (N1) was lost at 14.0°C (SD±2.3, range 10-22°C).

Body temp was not predictive of ECS. There was a wide variation in temps when ECS occurred. Furthermore, we found divergence of cortical and subcortical ECS suggesting that ECS may occurr at higher temps in the cortex than in lower structures of the neuroaxis. Therefore, body temp monitoring may not adequately reflect the metabolic activity in the entire brain at deep levels of hypothermia. We conclude that SEP monitoring objectively identifies cold induced ECS in different cerebral structures, however, it still remains unclear whether cortical or cervical ECS should be used to determine the appropriate level of hypothermia before CA.