TITLE: THE EFFECT OF 1 MAC ISOFLURANE ON CEREBROVASCULAR RESPONSE TO INCREASED OR DECREASED CEREBRAL PERFUSION PRESSURE

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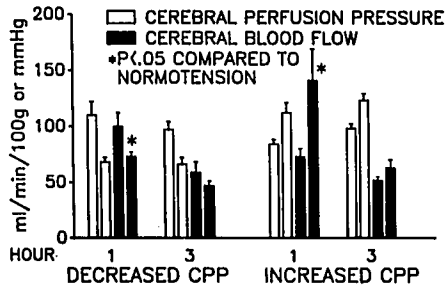
Previous studies suggest that isoflurane produces cerebral hyperemia which resolves over time. In the present study, we tested the hypothesis that cerebrovascular responsivity to changes in cerebral perfusion pressure (CPP) changes over time as cerebral blood flow (CBF) decreases.

METHODS: Eight mongrel dogs were prepared for measurement of mean arterial blood pressure (MABP), sagittal sinus pressure (Pss) and CBF (microsphere method) under 1.4% isoflurane anesthesia. Cerebral metabolic rate for oxygen ($CMRO_2$) was computed as hemispheric CBF times arterial to cerebrovenous oxygen content difference. In 4 animals, CPP (MABP-Pss) was increased by inflation of a balloon in the mid-thoracic aorta and in 4 animals CPP was decreased by rapid hemorrhage. CBF was measured before and 5 min after CPP change following 1 and 3 hrs of Isoflurane administration.

RESULTS: In all animals, PaO_2 was maintained >100 mmHg and $PaCO_2$ was maintained about 40 mmHg throughout the study. Fig. 1 shows changes in CPP and CBF. At hr 1 a decrease of CPP by 41 mmHg decreased CBF by 27 ml/min/100g (27%; P<.05) whereas at hour 3 a decrease in CPP of 32 mmHg did not alter CBF (59 ± 9 vs 47 ± 4 ml/min/100g. Increasing CPP by 29 mmHg at hr 1 increased CBF by 68 ml/min/100g (P<.05) whereas at hr 3 an increase in CPP of 25 mmHg did not increase CBF (52 ± 3 vs 63 ± 7 ml/min/100g. $CMRO_2$ was constant in both groups over the 3 hrs of study and was not altered by CPP alteration.

DISCUSSION: These data demonstrate that early during administration of 1 MAC isoflurane the cerebral vessels are not capable of maintaining CBF constant in the face of altered CPP. However, after 3 hr CBF is maintained constant despite changes in CPP.

Fig. 1



TITLE: COMPARISON OF EUROPEAN AND NORTH AMERICAN PROTOCOLS FOR DIAGNOSIS OF MALIGNANT HYPERTHERMIA (MH) WITH HALOTHANE

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Different MH *in vitro* halothane testing procedures have been used in the European MH Group Protocol (EMHGP)[1] and the North American MH Group Protocol (NAMHGP).[2] Four major differences exist. First, the EMHGP administers halothane in increasing concentrations (0.5, 1.0, 2.0% halothane in the gas phase), while the NAMHGP uses one concentration of halothane (3%). Second, the halothane concentration used for diagnosis is 2% by the EMHGP and 3% by the NAMHGP. Third, the magnitude of contracture used as the cutoff for the protocol is either fixed at 0.2 g (EMHGP), or is established by each laboratory based on their own controls, within a range of 0.2-0.7 g (NAMHGP). Fourth, the EMHGP tests two muscle strips to halothane and the NAMHGP tests three strips. The present study compared these two testing protocols in swine (Duroc/Yorkshire cross). Additionally, we tested whether successive concentrations of halothane (0.5-2.0%) would diminish the response of the preparations to halothane 3%. We used the standard EMHGP cutoff (0.2 g) and the NAMHGP cutoff for our laboratory (≥0.7 g) to determine MH susceptibility. If any one muscle strip meets the criteria, then the pig was considered MH susceptible.

RESULTS. There was one false positive (F+) and one false negative (F-) diagnosis by the EMHGP (Table). The only two muscle strips with F- results by the EMHGP were from the same MH pig. In contrast, there were no F+ or F- diagnoses by the NAMHGP in the present study (Table). While some strips from MH pigs were normal by both protocols (NAMHGP 38%; EMHGP 11%), diagnosis by the NAMHGP was unaffected. However, diagnosis by the EMHGP yielded a F-. The response to halothane 3% is reduced using the EMHGP (Table). Therefore, the magnitude of contracture cannot be directly compared at the same halothane concentration using these two different approaches. Increasing the number of strips tested in the EMHGP to three might increase sensitivity and specificity to that of the NAMHGP.

References

1 Br J Anaesth 56 1267 1984; 57 1038 1985

2 Anesth Analg 69 511 1989

This study supported in part by the Hahnemann Anesthesia Research Foundation.

TABLE. Outcome of halothane contracture testing using the EMHGP and NAMHGP.

	False diag	No. strips MH+/ total # tested	Response to halothane 3% (mean±SEM)
Control (n=4)			
EMHGP	1	1/8	0.1±0.1 g
NAMHGP	0	0/12	0.0±0.0 g
MH (n=10)			
EMHGP	1	18/20	0.7±0.1 g
NAMHGP	0	22/30	1.1±0.1 g*

*different from EMHGP (P<.001).