POSTER DISCUSSIONS II

A1219

TITLE: THE EFFECT OF 1 MAC ISOFLOURANE 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 reactivity 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 CPP (microsphere method) under 1.4% isoflurane anesthesia. Cerebral metabolic rate for oxygen (CMRO2) was computed as hemispheric CPP 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. CPP was measured before and 5 min after CPP change following 1 and 3 hrs of isoflurane administration.

RESULTS: In all animals, Pco2 was maintained >100 mmHg and Pao2 was maintained about 40 mmHg throughout the study. Fig. 1 shows changes in CPP and CBF. At hr 1 a decrease in CPP by 41 mmHg decreased CBF by 27 ml/min/100g (27%; P<0.05) whereas at hr 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<0.05) whereas at hr 3 an increase in CPP of 25 mmHg did not increase CBF (52 ± 3 vs 63 ± 7 ml/min/100g). CMRO2 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 CPP is maintained constant despite changes in CPP.

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A1220

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 (EMHG)1 and the North American MH Group Protocol (NAMHGP).2 Four major differences exist. First, the EMHG 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 EMHG and 3% by the NAMHGP. Third, the magnitude of contracture used as the cutoff for the protocol is either fixed at 0.2 g (EMHG), or is established by each laboratory based on their own controls, within a range of 0.2-0.7 g (NAMHGP). Fourth, the EMHG tests 2 muscle strips to halothane and the NAMHGP tests 3 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 EMHG 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 (+) and one false negative (-) diagnosis by the EMHG (Table). The only two muscle strips with F- results by the EMHG 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 36%; EMHG 11%), diagnosis by the NAMHGP was unaffected. However, diagnosis by the EMHG yielded a F- the response to halothane 3% is reduced using the EMHG (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 EMHG 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 59 511 1989

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

<table>
<thead>
<tr>
<th>False No. strips MH/</th>
<th>Response to diag.</th>
<th>total # tested</th>
<th>halothane 3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (n=10)</td>
<td></td>
<td>(mean±SEM)</td>
<td></td>
</tr>
<tr>
<td>EMHG</td>
<td>1</td>
<td>1/8</td>
<td>0.1±0.1 g</td>
</tr>
<tr>
<td>NAMHGP</td>
<td>0/12</td>
<td>0.5±0.0 g</td>
<td></td>
</tr>
<tr>
<td>MH (n=10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMHG</td>
<td>1</td>
<td>18/20</td>
<td>0.7±0.1 g</td>
</tr>
<tr>
<td>NAMHGP</td>
<td>0</td>
<td>22/30</td>
<td>1.1±0.1 g*</td>
</tr>
</tbody>
</table>

*different from EMHG (P<.001).