

Title: Effects of Alfentanil on Intracranial Pressure in Children Undergoing Ventriculo-Peritoneal Shunt Revision
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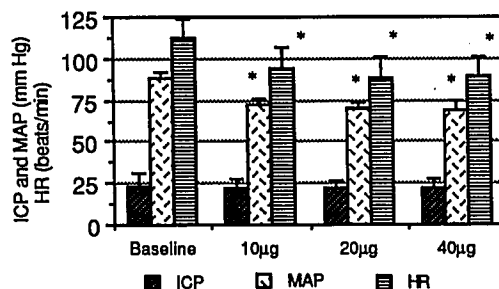
Fentanyl, while commonly used for neurosurgical procedures in patients with reduced intracranial compliance, may prolong emergence and recovery from such brief procedures as revision of an obstructed ventriculo-peritoneal shunt (VPS). Alfentanil, by virtue of a significantly shorter duration of action, would seem a logical alternative. The effects of alfentanil upon intracranial pressure (ICP) are less well known and contradictory results have been reported^{1,2,3}.

With institutional review board approval and informed consent, children over 1 year of age scheduled for VPS revision were anesthetized with thiopental, vecuronium, O₂ and N₂O (70%) with isoflurane. After tracheal intubation and skin incision, end-tidal CO₂ was maintained at 32-38 mm Hg and exhaled isoflurane concentration at 0.5%. ICP was monitored electronically via the new shunt and no CSF was drained until following the study period. Measured baseline variables every minute for three minutes included ICP (mm Hg), mean arterial pressure (MAP; mm Hg; by automatic oscillotonometer), and heart rate (HR; beats/min). Alfentanil, 10 µg/kg, IV over 15 seconds, was administered, followed by measurement of the above variables each minute for three minutes. After the third minute, 20 µg/kg, and after the sixth minute, 40 µg/kg of alfentanil was given. All statistical comparisons employ ANOVA for repeated measures at the 95% confidence level.

The results of baseline determinations and at the third minute after each alfentanil dose are illustrated in the figure below for 5 patients studied. No significant differences were observed for ICP and MAP

between one, two, or three minutes after each dose. HR and MAP decreased compared to baseline following alfentanil administration in these anesthetized patients with little surgical stimulation. ICP did not change following any dose of alfentanil. All patients awoke promptly at the end of surgery. No post-anesthetic complications were noted.

Alfentanil did not increase ICP in these children with hydrocephalus. The decline in MAP and therefore cerebral perfusion pressure was expected given the experimental schema; if administered by titration upon induction, it should present a logical alternative to fentanyl for short neurosurgical procedures.



ICP, HR, MAP at baseline (average of 3 minutes) and at 3rd minute after 3 doses of alfentanil (Mean ± SEM, n=5) * 95% confidence vs. baseline

References:

1. Jung, R., et al. *J Neurosurg Anesthesiol* 1: 136-7, 1989
2. Lutz, L., et al. *J Neurosurg Anesthesiol* 1: 169-70, 1989
3. Marz, W., et al. *Anesthesiology* 69: A627, 1988

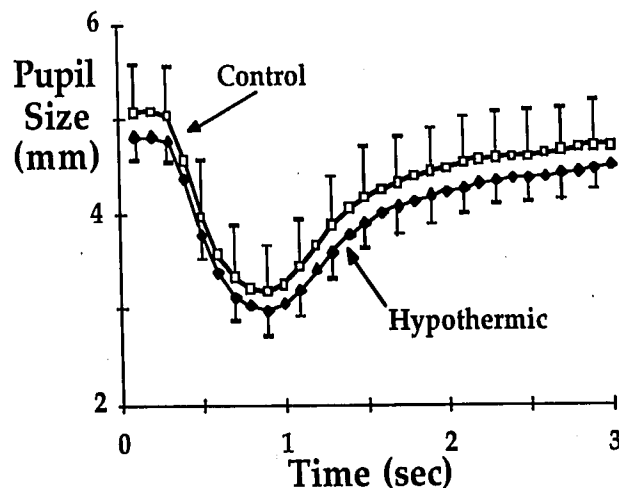
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TITLE: HUMAN PUPILLARY LIGHT REFLEX DURING HYPOTHERMIA

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The pupillary light reflex is widely used to test cranial nerve and midbrain function. We tested the hypothesis that pupillary responses are minimally impaired by mild hypothermia, commonly observed during recovery from general anesthesia. With approval of our IRB, hypothermia was induced in 4 volunteers by central venous infusion of ~4 L lactated Ringer's solution over 1 h. Pupillary size was recorded using an electronic scanner at 10 Hz for 3 sec following a brief flash of light during the control period, and at the lowest central temperature. Tympanic membrane temperature decreased $1.6 \pm 0.3^\circ\text{C}$. Pupillary size, maximum constriction velocity, and reflex amplitude did not differ significantly (paired t-test). Maximum redilation velocity was reduced 10% by hypothermia ($P < 0.05$). The minimal changes in pupillary reflexes we observed would not be detected using routine clinical techniques (e.g., a penlight). We conclude that 1.6°C central hypothermia minimally impairs pupillary responses.



Legend: Pupil size following a brief flash of light in four volunteers before and after reduction of central temperature by 1.6°C . Hypothermia only minimally impaired pupillary responses.

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