[N-66] The Effect of Total Intravenous Anesthesia Versus Sevoflurane on Intraoperative Blood Loss For Pediatric Craniosynostosis Surgery

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Craniosynostosis surgery is performed early in life and commonly requires blood transfusion due to an average loss of 25-83% of a child's estimated blood volume (EBV) depending on how many cranial sutures are involved (1). Blood transfusion requirements can be high and are associated with various risks of morbidity and mortality.

Volatile anesthetics and total intravenous anesthesia (TIVA) are considered safe and are routinely used methods to maintain anesthesia in this patient population. There is literature to support decreased blood loss with use of TIVA in pediatric sinus surgery and adult spine surgery (2,3). However, to our knowledge, no study has assessed the effect of volatile anesthesia versus TIVA on intraoperative blood loss in pediatric craniosynostosis surgery.

We conducted a retrospective analysis of estimated blood loss in all craniosynostosis surgery performed over a 28-month period at our institution from October 2010 through January 2013. Blood loss was calculated by estimated blood volume lost (EBVlost- using weight, pre and postoperative hematocrit, and the amount of blood transfused) which has previously been described for this patient population and surgery(4). We hypothesized that there would be no significant difference in blood loss between the two anesthetic maintenance techniques.

Results included a total of 59 surgical cases containing 31 patients who received volatile maintenance anesthetic and 28 who received TIVA. There was no significant difference observed in perioperative EBVlost between the groups who received either volatile or intravenous anesthesia (38 vs 44 ml/kg). Since there was large variation of EBVlost between patients in each group, subanalysis was attempted to determine differences observed within higher risk groups. Blood loss appears to be lower using volatile anesthesia in children younger than one year of age (40 ml/kg sevoflurane vs 61 ml/kg TIVA) but higher in older children (55 ml/kg sevoflurane vs 18 ml/kg TIVA). Other subgroups that seemed to favor sevoflurane included patients less than 10 kg and procedures involving more than one suture. Surgical duration less than two hours trended toward less blood loss with TIVA use, while greater than two hours showed no apparent difference. Limitations in this study are those inherent of retrospective analysis but notably include non-standardization of anesthetic techniques, monitoring, hemodynamics, and patient sub-populations.

In conclusion, our retrospective analysis showed no difference in blood loss for craniosynostosis surgery when comparing volatile and intravenous anesthetic maintenance techniques. There are some patient populations identified in this analysis, however, in which blood loss may be affected by anesthetic technique.

References:
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