

153215 - ASSOCIATION BETWEEN LOW BIS VALUES AND PATIENT OUTCOMES IN CARDIAC SURGERY

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INTRODUCTION

Recent observational trials in the non cardiac surgical setting have associated low processed EEG values with poor perioperative outcomes. However, this relationship has not been assessed in cardiac surgical patients where management of anaesthetic depth is uniquely challenged by patient co-morbidities, physiologic goals, and alterations in pharmacokinetics and pharmacodynamics seen with CPB. We sought to determine the association of intraoperative BIS values on important postoperative outcomes.

METHODS

Following institutional REB approval, a retrospective database review was undertaken. All patients undergoing major cardiac surgical procedures with CPB between July 1, 2012 and June 30, 2015 were included. Patients who underwent emergency surgery, hypothermic circulatory arrest, or had ketamine administered were excluded. Post anesthetic induction BIS values (processed with a resolution of 15 seconds) were extracted from archived electronic anesthesia records and individually linked with our institutional perioperative database. Logistic regression analyses were then performed to assess the association of average BIS value per case and delirium occurring in the ICU, length of ventilation, length of ICU stay and in-hospital mortality. For each outcome, we fitted a model that included other known baseline demographic and intra-operative predictors of outcome as shown in Table.

RESULTS

2372 patients were included in the analysis. Median ICU LOS was 1 day (0.9-2.7 IQR); 62 patients were diagnosed with delirium (3.5%) and 32 patients died in hospital (1.8%). Average BIS values per case were normally distributed with a per case mean of 40.0 ± 6.14 . On logistic regression BIS was an independent predictor of delirium occurring in the ICU ($p = 0.007$) but was not an independent predictor of length of ventilation, length of ICU stay or in-hospital mortality.

DISCUSSION

This is the first large scale study of the association of BIS values in cardiac surgical patients with post operative outcomes. Low BIS values are associated with an increased incidence of delirium but not other outcomes measured in this study. It remains to be seen whether there is a threshold value for BIS that is associated with poor outcomes in this patient population and whether intraoperative management of BIS values can alter these outcomes.

References:

1. Sessler DI, Sigl JC, Kelley SD, et al. Hospital stay and mortality are increased in patients having a "triple low" of low blood pressure, low bispectral index, and low minimum alveolar concentration of volatile anesthesia. *Anesthesiology*. Jun 2012;116(6):1195-1203.
2. Kertai MD, White WD, Gan TJ. Cumulative duration of "triple low" state of low blood pressure, low bispectral index, and low minimum alveolar concentration of volatile anesthesia is not associated with increased mortality. *Anesthesiology*. Jul 2014;121(1):18-28.
3. Whitlock EL, Torres BA, Lin N, et al. Postoperative delirium in a substudy of cardiothoracic surgical patients in the BAG-RECALL clinical trial. *Anesth Analg*. Apr 2014;118(4):809-817.
4. Kertai MD, Whitlock EL, Avidan MS. Brain monitoring with electroencephalography and the electroencephalogram-derived bispectral index during cardiac surgery. *Anesth Analg*. Mar 2012;114(3):533-546.
5. Villafranca A, Thomson IA, Grocott HP, Avidan MS, Kahn S, Jacobsohn E. The impact of bispectral index versus end-tidal anesthetic concentration-guided anesthesia on time to tracheal extubation in fast-track cardiac surgery. *Anesth Analg*. Mar 2013;116(3):541-548.
6. Vance JL, Shanks AM, Woodrum DT. Intraoperative bispectral index monitoring and time to extubation after cardiac surgery: secondary analysis of a randomized controlled trial. *BMC Anesthesiol*. 2014;14:79.