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The Incidence of Cerebral Desaturation Events in the Intensive Care Unit (ICU) Following Cardiac Surgery

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INTRODUCTION:

We hypothesize that there is a high incidence of cerebral desaturation events (CDE- an absolute decrease in SctO₂ to less than 60% for ≥ 15 seconds) during the first 6 hours of ICU admission following cardiac surgery. A recent trial suggested worse outcomes during aortic surgery when cerebral oxygen saturations were < 60%.^[1] Studies have validated transcranial cerebral oximetry, a noninvasive tool that uses near-infrared spectroscopy to measure cerebral oxygen saturation, as a way to detect cerebral ischemia.^[2] Cerebral oximetry is frequently used in the intraoperative setting, but rarely utilized postoperatively. We attempted to identify if CDEs occur in the ICU.

METHODS:

This IRB approved, prospective, observational study captures the CDE incidence from 50 ASA IV patients in the ICU period following elective cardiac surgery. Exclusion criteria were: age < 18, patients presenting for emergency surgery, and patients undergoing off-pump procedures. The FORE-SIGHT (CAS Medical Systems, Branford, CT, USA) absolute cerebral oximeter monitor remained on patients for the first 6 hours in the ICU. All patients were managed according to the usual ICU standard of care. During the study period, a portable computer was attached to the cerebral oximeter, bedside physiologic monitor and mechanical ventilator, which recorded all data at 1 minute intervals and allowed data to be stored on a computer database.

RESULTS:

Complete data were collected on 50 high risk patients: Median age of patients = 74 (36-87), Median duration of intubation (hrs) = 16 (6-240), and Median duration of ICU stay (days) = 2 (1-20). A high incidence, **25/50 (50%)**, of CDEs was observed in our study cohort, with some episodes exceeding 1 hour. A higher incidence of postoperative nausea/vomiting (PONV) was observed in patients with CDEs (3/25 vs. 0/25).

CONCLUSION:

This observational trial is the first to demonstrate a high incidence of CDEs in the immediate postoperative period (50%) among cardiac surgical patients. These CDEs appeared to be associated with PONV in some patients. Our ongoing observational study attempts to correlate these CDEs with physiologic parameters, care patterns and outcomes.

REFERENCES:

1. Fischer GW, Lin HM, Krol M, et al. Noninvasive cerebral oxygenation may predict outcome in patients undergoing aortic arch surgery. *J Thorac Cardiovasc Surg* 2011;141(3): 815-21.
2. Fischer GW. Recent advances in application of cerebral oximetry in adult cardiovascular surgery. *Semin Cardiothorac Vasc Anesth* 2008;12(1): 60-9.

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