The OXICAB Trial: Cerebral Oximetry in Adult Cardiac Surgical Patients

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INTRODUCTION

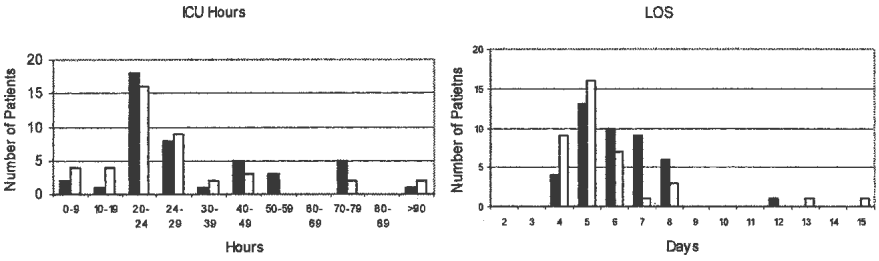
Decreased cerebral oxygenation has been demonstrated to be associated with adverse outcomes after surgery. Observational studies have demonstrated advantages in continually monitoring cerebral oxygenation with near infra-red spectroscopy with respect to incidence of stroke, intensive care and hospital stays. We are evaluating the influence of continuous cerebral oximetry to guide interventions to determine the effect on clinical endpoints in a prospective randomized study.

METHODS

Patients undergoing coronary artery bypass graft (CABG) surgery were invited to participate in this study (approved Flinders Clinical Research Ethics Committee). We present an interim report of 87 patients (final sample 300 patients). Patients were stratified for surgeon and diabetic status, then randomly assigned to either a control arm (n = 45, cerebral oximetry (INVOS-4100) recorded, but operating room blinded to output) or an intervention arm (n = 42, active measures taken to increase regional cerebral oxygen saturation (rSO2) if either a fall from baseline of greater than 20% or rSO_2 of less than 50%). Intervention consisted of a combination of increased; FiO_2 (if <100%), perfusion pressure, flow, CO_2 (if $<pCO_2 < 35$) and Hct (if <21%).

RESULTS

Intervention patients had shorter intubation times (12.2 hours (5–75) vs. 14.4 hours (6–140), p = 0.12, Wilcoxon Rank Sums), ICU stays (22.9 hours (4–101) vs. 25.3 hours (6–191), $p < 0.05$) and hospital stay (5 (4–15) vs. 6 (4–12), p = 0.057). There were no differences in combined clinical endpoint (19% vs. 22.2%, p = 0.7).



Control ■, Intervention □

CONCLUSION

These results support previous data suggesting a benefit associated for CABG surgery patients with cerebral oximetry

Perioperative Temperature and Cardiac Surgery

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Perioperative thermoregulation encompasses a very broad field in anesthesia and surgery. This review focuses principally on issues surrounding intraoperative temperature management, with particular emphasis on cardiopulmonary bypass (CPB) temperature issues. The implications of temperature during the postoperative period and its relationship to outcome after cardiac surgery will also be addressed. Temperature in the setting of cardiac surgery has been a major research focus for a number of decades. The judicious use of hypothermia remains a mainstay of perioperative management in the cardiac surgical patient with its putative, though far from definitively proven, global organ protective effects having led to its continued use. Although it has effects on most organ systems, this review will principally focus on the effects of temperature on the brain.

Although hypothermia has a defined and measurable effect of suppressing cerebral metabolism (approximately 6%–7% decline per °C) (1), it is likely that its other neuroprotective effect(s) may be mediated by non-metabolic actions. In the ischemic