

A Comprehensive Review of Cerebral Oximetry in Cardiac Surgery

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Abstract

Background: Patients who undergo cardiac surgery are at increased risk of stroke, postoperative cognitive decline, and delirium. These neurocognitive complications have led to increased costs, intensive care unit stays, morbidity, and mortality. As a result, there is a significant push to mitigate any neurological complications in cardiac surgery patients. Near-infrared spectroscopy to measure regional cerebral oxygen saturations has gained consideration due to its non-invasive, user-friendly, and relatively inexpensive nature. **Aim of Study:** To provide a comprehensive summary of cerebral oximetry in cardiac surgery. The review interrogates multiple systematic reviews assessing different outcomes in cardiac surgery to assess if cerebral oximetry is effective. Further, the review analyzes all available interventions for an acute desaturation to determine the efficacy of individual interventions. **Methods:** A narrative review of randomized controlled trials, observational studies, and systematic reviews with meta-analyses were performed through August 2021. **Results:** There is significant heterogeneity amongst studies regarding the definition of a clinically significant cerebral desaturation. In addition, the assessment of neurocognitive outcomes has large variability, making meta-analysis challenging. To date, cerebral oximetry use during cardiac surgery has not been associated with improvements in neurocognitive outcomes, morbidity, or mortality. The evidence to support particular interventions for an acute desaturation is equivocal. **Conclusions:** Future research is needed to quantify a clinically significant cerebral desaturation and to determine which interventions for an acute desaturation effectively improve clinical outcomes.

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