Impact of Processed Electroencephalography in Cardiac Surgery: A Retrospective Analysis

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Objective: The use of brain function monitoring with processed electroencephalography (pEEG) during cardiac surgery is gaining interest for the optimization of hypnotic agent delivery during the maintenance of anesthesia. The authors sought to determine whether the routine use of pEEG-guided anesthesia is associated with a reduction of hemodynamic instability during cardiopulmonary bypass (CPB) separation and subsequently reduces vasoactive and inotropic requirements in the intensive care unit.

Design: This is a retrospective cohort study based on an existing database.

Setting: A single cardiac surgical center.

Participants: Three hundred patients undergoing cardiac surgery, under CPB, between December 2013 and March 2020.

Interventions: None.

Measurements and main results: One hundred and fifty patients had pEEG-guided anesthesia, and 150 patients did not have a pEEG-guided anesthesia. Multiple logistic regression demonstrated that pEEG-guided anesthesia was not associated with a successful CPB separation ($p = 0.12$). However, the use of pEEG-guided anesthesia reduced by 57% the odds of being in a higher category for vasoactive inotropic score compared to patients without pEEG (odds ratio = 0.43; 95% confidence interval: 0.26-0.73; $p = 0.002$). Duration of mechanical ventilation, fluid balance, and blood losses were also reduced in the pEEG anesthesia-guided group ($p < 0.003$), but there were no differences in organ dysfunction duration and mortality.

Conclusion: During cardiac surgery, pEEG-guided anesthesia allowed a reduction in the use of inotropic or vasoactive agents at arrival in the intensive care unit. However, it did not facilitate weaning from CPB compared to a group where pEEG was unavailable. A pEEG-guided anesthetic management could promote early vasopressor weaning after cardiac surgery.