THE EFFECT OF SEVOFLURANE ON CEREBRAL VENOUS OXYGEN SATURATION DURING CARDIOPULMONARY BYPASS: A COMPARATIVE STUDY WITH ISOFLURANE

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Background: Neurological injury is a significant complication of cardiac procedure; it may arise from inadequate cerebral perfusion, oxygenation, or cerebral emboli. Measurement of jugular venous bulb oxygen saturation, cerebral metabolic rate of oxygen (CMRO₂) and cerebral blood flow are important parameters for detection of impending global cerebral hypoxia or ischemia during several phases of normothermic and hypothermic cardiopulmonary bypass. Isoflurane is commonly used for open heart surgery but the effects of Sevoflurane on human cerebral blood flow, cerebral oxygenation, and CMRO₂ have not been fully evaluated during cardiac cardiopulmonary bypass.

Objective: The effects of Isoflurane and Sevoflurane were compared on cerebral oxygenation parameters during hypothermic CPB and rewarming phase for cardiac valves replacement.

Methodology: This prospective randomized blind study was conducted on forty patients subjected to elective prosthetic valve replacement. General anaesthesia was induced by midazolam, fentanyl, and pipecuronium. Retrograde jugular bulb catheter was inserted. Patients were divided into two groups: Isoflurane group {n=20}: Anaesthesia was maintained with isoflurane, fentanyl, and midazolam. Sevoflurane group {n=20}: Anaesthesia was maintained with sevoflurane, fentanyl, and midazolam. Haemodynamics and jugular venous oxygen variables were recorded in both groups at certain intervals.

Results: There was no significant difference between the studied groups as regard to the demographic data, aortic cross clamp time, the CPB time, extubation time, and ICU stay. The perioperative HR, MAP, SaO₂, SjO₂ showed no significant difference in both groups. Also, cerebral extraction ratio of oxygen (CEO₂) and cerebral blood flow were insignificant in both groups. The cerebral metabolic rate of oxygen (CMRO₂) was significantly lower in sevoflurane group than isoflurane group in post induction and postoperative values. The spontaneous resumption of the cardiac rhythm, need for DC shocks, and doses of inotropes ± vasodilators showed no significant differences between both groups.

Conclusion: Sevoflurane and isoflurane similarly have no significant differences on the cerebral oxygenation and cerebral blood flow, although sevoflurane reduced CMRO₂ more than isoflurane during open heart surgery for elective prosthetic valve replacement.
**Limitations:** long term follow up of cognitive function is needed. Calculated cerebral oxygen parameters used in this study still have a debate about its accuracy, it is hoped to use a practical, non expensive tool for monitoring of cerebral oxygenation for more accuracy.