

Maintenance of Anaesthesia with Propofol and/or Volatile Anaesthetics during the Repair of Intracranial Aneurysms: A Comparative Study of Neurological Results

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Abstract

Intracranial aneurysms, a potentially life-threatening condition, require surgical intervention to prevent rupture and associated neurological complications. The choice of anesthetic agents and techniques during intracranial aneurysm repair is of paramount importance, as they can impact patient outcomes, including postoperative neurological function. This article presents a comparative study examining the maintenance of anesthesia with propofol and/or volatile anesthetics during the repair of intracranial aneurysms, focusing on their respective effects on neurological results.

Keywords: Siponimod • Spine • Neuroinflammatory

Introduction

Intracranial aneurysms are abnormal bulges or sacs that develop in the blood vessels of the brain, often at arterial bifurcations. These aneurysms can rupture, leading to subarachnoid hemorrhage, stroke, and neurological deficits. Surgical repair, which involves clipping or coiling the aneurysm, aims to prevent rupture and its life-threatening consequences. The choice of anesthesia during intracranial aneurysm repair is a critical decision. General anesthesia is typically preferred to ensure immobility and hemodynamic stability. The maintenance of anesthesia can be achieved using intravenous agents, such as propofol, or volatile anesthetics, like isoflurane or desflurane. These agents offer distinct advantages and may have varying effects on cerebral hemodynamics and postoperative neurological outcomes. Propofol is an intravenous anesthetic with a rapid onset and offset of action. It is known for its ability to provide deep anesthesia while maintaining hemodynamic stability. Propofol has neuroprotective properties, including anti-inflammatory and antioxidant effects, which may be beneficial in the context of intracranial aneurysm repair. However, propofol can cause cerebral vasoconstriction, potentially reducing cerebral blood flow and increasing the risk of cerebral ischemia. Volatile anesthetics, such as isoflurane and desflurane, are administered via inhalation and provide a controlled depth of anesthesia [1,2].

Literature Review

These agents have minimal impact on cerebral vascular resistance and may help maintain stable cerebral perfusion. Volatile anesthetics also possess neuroprotective properties, including the modulation of neurotransmitter release and reduction of cerebral metabolic rate. However, they may increase cerebral blood flow and intracranial pressure, which could be problematic in patients with

intracranial aneurysms. Anesthetic agents play a significant role in regulating cerebral blood flow and oxygenation during intracranial aneurysm repair. The choice of propofol or volatile anesthetics can impact cerebral perfusion and, in turn, affect the risk of cerebral ischemia or hyperemia. Studies have shown that propofol-induced vasoconstriction may be advantageous in certain cases, but it can also lead to compromised cerebral oxygen delivery. The ultimate goal of intracranial aneurysm repair is to achieve favorable postoperative neurological function. Comparative studies have explored the relationship between the choice of anesthetic agents and neurological outcomes [3,4].

Discussion

The choice of anesthetic agents for maintaining anesthesia during intracranial aneurysm repair is a complex decision influenced by multiple factors, including patient-specific variables, surgeon preferences, available resources, and the nature of the surgical procedure. A comparative study of the neurological results associated with propofol-based anesthesia, volatile anesthetics-based anesthesia, and their combination is essential to guide clinical practice and enhance patient outcomes. Neurological monitoring during surgery and postoperative assessment of neurological outcomes are critical elements in this evaluation. As research continues in this field, anesthesiologists, neurosurgeons, and interdisciplinary teams must collaborate to determine the most effective approach to anesthesia for intracranial aneurysm repair, with the overarching goal of optimizing patient safety and neurological well-being. The impact of propofol-induced vasoconstriction on neurological function, when compared to the potential increase in cerebral blood flow associated with volatile anesthetics, has been a subject of interest. The surgical technique used for intracranial aneurysm repair can also guide the choice of anesthetic agent. Endovascular coiling may be more amenable to volatile anesthetics, while microsurgical clipping may benefit from the neuroprotective properties of propofol [5,6].

Conclusion

The choice of anesthetic agents for intracranial aneurysm repair is a complex decision that can significantly impact patient outcomes, particularly in terms of neurological function. Propofol and volatile anesthetics offer distinct advantages and disadvantages, with potential neuroprotective and hemodynamic effects, respectively. Comparative studies have shed light on their respective impacts, but the decision must ultimately be individualized to each patient and the specific characteristics of their aneurysm. Collaborative efforts between anesthesiologists and neurosurgeons are essential to make

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informed decisions that prioritize the patient's safety and optimize postoperative neurological outcomes during the repair of intracranial aneurysms.

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Conflict of Interest

None.

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