General anesthesia

- Continuous Intravenous Nimodipine Infusion With Ethanol as Carrier in Aneurysmal Subarachnoid Hemorrhage Does Not Result in Measurable Cerebral Ethanol Levels
- Novel Device for Intraoperative Quantitative Measurements of Extraocular Muscle Tensile Strength
- Awake Sciatic Nerve Neurolysis after Injection Injury - An Innovative Technique and Our Experience
- Anesthetic and perioperative management of pregnant patients undergoing neurosurgery: a case series from a single center in Morocco (2017-2024)
- Fasting and nutrition in neuroanesthesia and neurocritical care patients
- Unconsciousness reshapes the oscillatory topography of the subthalamic nucleus: A comparative study
- Effectiveness of subdural evacuating port system (SEPS) and middle meningeal artery embolization (MMAE) for chronic subdural hematomas - a multicenter experience
- Effect of regional nerve block on tourniquet-related injury in pediatric patients undergoing lower limb surgery: a randomized controlled study

General anesthesia is a medically induced coma and loss of protective reflexes resulting from the administration of one or more general anaesthetic agents. A variety of medications may be administered, with the overall aim of ensuring sleep, amnesia, analgesia, relaxation of skeletal muscles, and loss of control of reflexes of the autonomic nervous system. The optimal combination of these agents for any given patient and procedure is typically selected by an anaesthesiologist or another provider such as an anaesthesiologist assistant.

Huhndorf M, Eimer C, Becher T, Ahmeti H, Jansen O, Synowitz M, Helle M, Ulmer S, Lindner T. Effect of General Anesthesia on Cerebral Blood Flow Measured by Arterial Spin Labeling: A Retrospective Study. J Magn Reson Imaging. 2022 Nov 16. doi: 10.1002/jmri.28507. Epub ahead of print. PMID: 36382662.

General anesthesia seemed to be associated with adverse clinical outcome after Endovascular Treatment (EVT). However, its efficacy was not demonstrated in randomized controlled trials (RCTs). Successful recanalization did not differ according to anesthesia type. Studies using individual patient data based on further RCTs are necessary to elucidate anesthesia effect on procedural and clinical outcomes [1].

Risk factors for all peri-operative complications were similar for paediatric and adult anaesthesia. However, the incidence of specific complications differed between both age categories [2].

In designing the anaesthetic plan for patients undergoing surgery, the choice of anaesthetic agent may often appear irrelevant and the best results obtained by the use of a technique or a drug with which the anaesthesia care provider is familiar. Nevertheless, in those surgical procedures

(cardiopulmonary bypass, carotid surgery and cerebral aneurysm surgery) and clinical situations (subarachnoid haemorrhage, stroke, brain trauma and post-cardiac arrest resuscitation) where protecting the CNS is a priority, the choice of anaesthetic drug assumes a fundamental role. Treating patients with a neuroprotective agent may be a consideration in improving overall neurological outcome. Therefore, a clear understanding of the relative degree of protection provided by various agents becomes essential in deciding on the most appropriate anaesthetic treatment geared to these objectives.

A systematic search was performed in the MEDLINE, Cumulative Index to Nursing and Allied Health Literature (CINHAL®) and Cochrane Library databases using the following keywords: 'brain' (with the limits 'newborn' or 'infant' or 'child' or 'neonate' or 'neonatal' or 'animals') AND 'neurodegeneration' or 'apoptosis' or 'toxicity' or 'neuroprotection' in combination with individual drug names ('halothane', 'isoflurane', 'desflurane', 'sevoflurane', 'nitrous oxide', 'xenon', 'barbiturates', 'thiopental', 'propofol', 'ketamine'). Over 600 abstracts for articles published from January 1980 to April 2010, including studies in animals, humans and in vitro, were examined, but just over 100 of them were considered and reviewed for quality. Taken as a whole, the available data appear to indicate that anaesthetic drugs such as barbiturates, propofol, xenon and most volatile anaesthetics (halothane, isoflurane, desflurane, sevoflurane) show neuroprotective effects that protect cerebral tissue from adverse events–such as apoptosis, degeneration, inflammation and energy failure–caused by chronic neurodegenerative diseases, ischaemia, stroke or nervous system trauma. Nevertheless, in several studies, the administration of gaseous, volatile and intravenous anaesthetics (especially isoflurane and ketamine) was also associated with dose-dependent and exposure time-dependent neurodegenerative effects in the developing animal brain.

At present, available experimental data do not support the selection of any one anaesthetic agent over the others. Furthermore, the relative benefit of one anaesthetic versus another, with regard to neuroprotective potential, is unlikely to form a rational basis for choice. Each drug has some undesirable adverse effects that, together with the patient's medical and surgical history, appear to be decisive in choosing the most suitable anaesthetic agent for a specific situation. Moreover, it is important to highlight that many of the studies in the literature have been conducted in animals or in vitro; hence, results and conclusions of most of them may not be directly applied to the clinical setting. For these reasons, and given the serious implications for public health, Schifilliti et al believe that further investigation–geared mainly to clarifying the complex interactions between anaesthetic drug actions and specific mechanisms involved in brain injury, within a setting as close as possible to the clinical situation–is imperative [3)].

The association between exposure to general anesthesia and dementia risk has been inconsistently reported across epidemiological studies. To better understand the association, Jiang et al. conducted a metaanalysis of epidemiological studies. PubMed and Embase were searched through April 2017. Random-effects models were used to pool association estimates. They further evaluated potential dose-response relationship. Based on literature search, seven prospective/cohort studies, 11 case-control studies, and a pooled analysis of six case-control studies were identified. Sixteen of these studies were with high quality. After pooling available risk estimates, overall no significant association between exposure to general anesthesia (yes versus no) and dementia risk was detected (odds ratio (OR) = 1.03, 95% confidence interval (CI) 0.90-1.19, p for heterogeneity < 0.001). The null association persisted in the majority of subgroup analyses, although a significant positive association was detected in studies collecting anesthesia exposure using records (OR = 1.22, 95% CI 1.01-1.47, p for heterogeneity < 0.001), a method that is less prone to bias compared with interview or questionnaire using proxy reporters. Based on the dose-response analysis of three studies, a

significant nonlinear relationship between times of exposure to general anesthesia and increased risk of dementia was suggested ($p < 0.0001$). Overall, this meta-analysis suggests that overall the evidence from epidemiological studies supporting a link between general anesthesia exposure and an increased dementia risk is not very strong, while an association was suggested in the studies collecting anesthesia exposure using records and those providing anesthesia exposure frequency data. Further well-designed studies are warranted to better characterize the relationship of interest [4].

References

1)

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