



## ARTICLE OF THE MONTH

### Intravenous Propofol Versus Volatile Anesthetics for Stroke Endovascular Thrombectomy

*Diprose W, Wang M, Campbell D, et al.*

*Journal of Neurosurgical Anesthesiology: January 2021 - Volume 33 - Issue 1 - p 39-43*

Welcome to another session of Article of the Month, June 2021. This month we discuss Intravenous Propofol Versus Volatile Anesthetics for Stroke Endovascular Thrombectomy, commentary by Dr. Rafi Avitsian.

As always, readers are welcome to join us for further discussion and feedback on the SNACC [Twitter](#) feed, or on [Facebook](#).

- Shilpa Rao MD, Amie Hoefnagel, MD, Oana Maties, MD, and Nina Schloemerkerper, MD

#### **Rafi Avitsian, MD, FASA - Biographical Sketch**

Rafi Avitsian, MD, FASA is a professor of anesthesiology in the Department of General Anesthesiology at the Cleveland Clinic. He also serves as the Secretary of Medical Staff Office of Cleveland Clinic, is the program director of Neuroanesthesiology Fellowship, and is one of the founders of International Council for Perioperative Neuroscience Training (ICPNT).

He is the past president of Society for Neuroscience in Anesthesiology and Critical Care (SNACC) and an American Board of Anesthesiologists applied senior examiner, as well as a member of the Association of University Anesthesiologists and a recipient of ASA-SEA Distinguished Education Award. His academic interest is mostly in brain tumors, anesthetic methods for seizure surgery, brain protection, and outcomes of spine surgery as well as difficult airway management. His clinical studies are mostly directed to finding ways to improve the outcome of surgery after neurosurgical procedures. He is also interested in medical innovation and has already filed and published patents. Dr. Avitsian is on the executive board of International Center for Professional Development (ICPD) in Armenia.

More than 45 published peer reviewed manuscripts, two book chapters and many abstract presentations also highlight his academic achievements. Dr. Avitsian is on the editorial board for the *Journal of Neurosurgical Anesthesiology* and is an ad hoc reviewer for *Anesthesiology*, *Anesthesia & Analgesia* and the *World Neurosurgery Journal*.

# Commentary

**Rafi Avitsian, MD, FASA**

*Professor of Anesthesiology in the Department of General Anesthesiology  
Cleveland Clinic, Cleveland, Ohio*

When I see a topic being repeated again and again, I believe it shows that we still have a lot to learn about it. In the last eight months, three article reviews in the “Article of the Month” section were about outcomes after acute ischemic stroke (AIS) therapy. At first, I thought I should choose another topic, but then I realized we should not ignore what we don’t know and decided that this topic merits further discussion.

The article that I have chosen is the result of a study by our colleagues in New Zealand which focuses on the anesthetic method for stroke endovascular thrombectomy. When discussing general anesthesia vs sedation for intravascular treatment of AIS, several questions can come up: For example: what is sedation and what is general anesthesia, what medications do you use and in what dose, what are the set parameters for the blood pressure and end tidal CO<sub>2</sub>, to name just a few. Dr. Diprose and his colleagues have addressed one of these questions by comparing outcomes in patients undergoing endovascular thrombectomy under general anesthesia who were treated with propofol or volatile agents.

To date it remains unclear if the choice of anesthetic agent influences clinical outcomes after thrombectomy. The investigators in this trial looked at the two types of anesthetic agents that are used most commonly in these cases: propofol and volatile anesthetics. Other reasons for looking at propofol and volatile anesthetics in this context include:

1. Different effects on cerebral hemodynamics: Since propofol and volatiles have different effects on cerebral hemodynamics, they may have different effects on the ischemic brain tissue through redistribution of CBF and they may impact the outcomes in endovascular thrombectomy differently.
2. There were already two groups of studies that showed different results in outcomes comparing conscious sedation vs. general anesthesia
3. The anesthetics used in these two groups were different (SIESTA & GOLIATH had used propofol and AnStroke had used volatile anesthesia).

This is a retrospective analysis based on a prospectively collected registry of consecutive stroke patients who received either propofol or a volatile agent (sevoflurane or desflurane) for general anesthesia during thrombectomy in a tertiary center. Patients who received a combination of propofol and volatile anesthetic for maintenance of anesthesia were excluded. Hemodynamic data were collected by noninvasive blood pressure measurement every 2.5 minutes until invasive blood pressure measurements were available. The electronic medical record logged invasive blood pressure measurements and end tidal CO<sub>2</sub> measurements every 30 seconds. General anesthesia was protocolized for airway management, ventilation strategy to normocarbida, blood pressure management, normothermia and normoglycemia. The primary outcome was defined as the proportion of patients achieving functional independence at 3 months. Secondary endpoints included the rate of successful reperfusion defined by a modified Thrombolysis in Cerebral Infarction (mTICI) grade 2b to 3. The study included 313 patients, 254 of which had received an inhalational anesthetic agents. The statistically significant differences between the two groups include a higher proportion of coronary artery disease, a higher first NIHSS score, more basilar artery occlusions, and lower rates of IV thrombolysis in the propofol group. The results of the study show higher odds of achieving functional independence in 3 months in the propofol group, as well as a nonsignificant trend toward a decreased three-month mortality. The subgroup analysis limited to patients with anterior circulation strokes demonstrated similar trends in three-month functional independence and mortality. There were no differences in successful reperfusion and intracerebral hemorrhage in the two groups.

The result of this retrospective study suggests that different anesthetic agents commonly used to provide general anesthesia in thrombectomies for acute ischemic stroke could affect patient outcome. The authors speculate that these results may be due to the differential effects of propofol and volatile anesthetic agents on cerebral hemodynamics. The investigators comment that their findings are in keeping with the GOLIATH, SIESTA, and AnStroke trials and suggest that propofol but not volatile anesthetics may improve outcomes in endovascular thrombectomy. They also note that propofol was used for sedation and general anesthesia in GOLIATH and SIESTA studies but at different doses and therefore this could be a dose dependent protection or a factor independent of propofol showing a better outcome in general anesthesia.

Some of the shortcomings of the study include but are not limited to a single center, retrospective design with a modest sample size and observational nature that precludes an inference of causality.

The conclusion of this study was that using intravenous propofol general anesthesia during thrombectomy for AIS could improve the odds of functional independence at three months. The authors state that the findings of this study are too preliminary to change clinical practice but should be considered hypothesis generating and tested in future randomized clinical trials.