



ARTICLE OF THE MONTH

Site of Occlusion May Influence Decision to Perform Thrombectomy Under General Anesthesia or Conscious Sedation

Steinberg JA, Somal J, Brandel MG, et al.

J Neurosurg Anesthesiol 2021; 33: 147-153. doi:10.1097/ANA.0000000000000642

Happy Spring and welcome to the April 2021 SNACC Article of the Month. This month we are highlighting an article that advances the consideration for anaesthetic choice in patients undergoing thrombectomy for stroke. Our commentary is courtesy of Dr. Ib Adedugbe and Dr. Martin Smith from the University College in London, UK.

Dr. Ib Adedugbe is a Consultant Neuroanaesthetist at the National Hospital for Neurology and Neurosurgery, University College Hospitals, London, UK. Her research interest is in neurovascular and neurological conditions in pregnancy. She has been a reviewer for the *BMC Anaesthesiology Journal*. She is currently the departmental education lead and a faculty member of the local ICPNT committee. She is a member of the communications committee of SNACC and co-leads the joint JNA-SNACC Twitter Journal Club.

Dr. Martin Smith is Editor-in-Chief of the *Journal of Neurosurgical Anaesthesiology* and Honorary Professor at University College London, UK. His interests are in monitoring and managing the acutely injured brain and promoting scholarship in perioperative neuroscience. Dr. Smith is Past President of the Society for Neuroscience in Anaesthesiology and Critical Care, and Past President of the Neuroanaesthesia and Critical Care Society of Great Britain & Ireland.

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

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Commentary

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Mechanical thrombectomy has become the standard of care for large-vessel ischemic stroke, but the choice of anesthetic technique remains controversial and the impact of anesthesia on outcomes inconclusive. In the landmark SIESTA and GOLIATH trials, secondary clinical outcomes favored general anesthesia (GA), whereas the AnStroke trial found no difference in 3-month neurological outcome between conscious sedation (CS) or GA. Many factors impact the choice of anesthetic technique for mechanical thrombectomy; hence, guidelines from the Society for Neuroscience in Anesthesiology & Critical Care recommend that anesthesia management for the endovascular treatment of acute ischemic stroke should be individualized [1]. Aphasia and consequent inability to effectively communicate with care providers may increase patient agitation or apparent uncooperativeness. As cortical regions responsible for language are typically supplied by the middle cerebral artery (MCA) in the dominant hemisphere, and most people are left-side dominant, the authors of this study hypothesized that left-MCA (L-MCA) occlusion would increase the likelihood of patients undergoing mechanical thrombectomy with GA and intubation.

One hundred twelve consecutive patients who underwent mechanical thrombectomy of the MCA between April 2014 and July 2017 were included in this retrospective, single center study. Per unit policy, thrombectomy was performed with CS unless there was a clinical indication for GA and intubation (obtunded patient needing airway control, severe agitation, or excessive movements) or the patient was already intubated. Participants were grouped according to laterality of MCA occlusion. The primary outcome was use of GA, and secondary outcomes included successful reperfusion (thrombolysis in cerebral infarction scale score $\geq 2b$), intraprocedural change in mean arterial blood pressure (MAP), unfavourable clinical outcome at 90 days (modified Rankin scale [mRS] score >2) and 90-day mortality. Patient characteristics, procedural factors, and outcomes were assessed using multivariate regression analyses; mediation analysis was used to investigate the effect of MCA stroke laterality on GA use.

Sixty-two (55%) of the 112 participants (mean age 67.7 ± 16.2 years) had L-MCA occlusion. Patients with L-MCA occlusion presented with aphasia more frequently than those with R-MCA occlusion (90.3% vs. 32.0%, respectively; $P < 0.001$). Except for higher NIH Stroke Scale (NIHSS) aphasia scores in patients with L-MCA occlusion (2.4 ± 0.9 vs. 0.6 ± 1.1 ; $P < 0.001$), baseline characteristics, including presenting NIHSS score (17.5 ± 7.4 vs. 15.3 ± 6.4 ; $P = 0.11$), were similar between patients with L-MCA and R-MCA occlusion. Thirty-eight patients received GA which was used more frequently in patients with L-MCA occlusion (45.2%) compared to those with R-MCA occlusion (20.0%; $P = 0.005$). The proportion of patients with aphasia was higher in the GA (84.2%) than in the CS cohort (15.8%; $P = 0.002$). Compared with CS, GA was associated with longer door to recanalization time (102.8 vs. 182.2 min, respectively; $P = 0.005$) and longer groin puncture to recanalization time (37.3 vs. 51.7 min, respectively; $P = 0.01$). Reperfusion outcomes were similar between groups ($P = 0.49$). Differences between maximum and minimum MAP during thrombectomy were significantly greater for GA than for CS patients (53.1 ± 30.8 vs. 35.9 ± 20.2 mmHg, respectively; $P = 0.007$). GA patients were more likely to have adverse discharge outcomes (79.0% vs. 51.4%, $P = 0.005$), but there were no differences in 90-day mRS ≥ 3 or 90-day mortality between GA and CS cohorts (16.7% vs. 17.5%; $P = 0.92$ and 23% vs. 20%; $P = 0.75$, respectively). On multivariate analysis, neither NIHSS aphasia score nor MCA occlusion laterality was significantly associated with anesthesia type. However, GA was associated with an adjusted 106.4% (95% CI, 24.1- 243.4%; $P = 0.006$) increase in door-to-groin puncture time, a significantly higher incidence of intraprocedural change in MAP (odds ratio 33.1%; 95% CI, 1.9%-80.5%; $P = 0.07$), and increased odds of adverse discharge outcome (odds ratio 4.2; 95% CI, 1.3-13.8, $P = 0.02$). On mediation analysis, 91.3% of the effect of MCA stroke laterality on the use of GA was mediated by aphasia score ($P < 0.01$).

The novel finding of this study is that patients with L-MCA occlusion required GA more often than those with R-MCA occlusion, possibly related to the higher incidence of aphasia in the L-MCA cohort. Although the preferential use of GA in stroke patients with L-MCA occlusion could reduce the risks associated with emergent conversion from CS to GA, GA was associated with greater intraprocedural changes in MAP with known potential for worsened outcomes because of risk of cerebral ischemia during periods of hypotension prior to reperfusion [2]. GA was also associated with longer times to recanalization; some patients were intubated during the procedure (after groin puncture) which likely contributed to

the increased groin puncture to recanalization time in the GA cohort. Almost half of intubations were performed in the Emergency Room or outside the stroke center. All patients who were already intubated received GA by default, but data on sedative agent use or monitoring prior to thrombectomy were not available. Other limitations of the study include lack of data on baseline infarct volume and incomplete outcome data; 90-day mortality and mRS were available only for 75% and 61% of participants, respectively.

Overall, this study suggests that, in addition to other relevant factors, MCA stroke laterality and presence of aphasia should be taken into account when making decisions about whether to perform mechanical thrombectomy with CS or GA.

References

1. Talke PO, Sharma D, Heyer EJ, et al. Society for Neuroscience in Anesthesiology and Critical Care Expert consensus statement: anesthetic management of endovascular treatment for acute ischemic stroke: endorsed by the Society of NeuroInterventional Surgery and the Neurocritical Care Society. *J Neurosurg Anesthesiol* 2014, 26:95-108
2. Hindman BJ, Dexter F. Anesthetic Management of Emergency Endovascular Thrombectomy for Acute Ischemic Stroke, Part 2: Integrating and Applying Observational Reports and Randomized Clinical Trials. *Anesth Analg* 2019, 128:706-717