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Perioperative Brain Health After Stroke: What Are We Missing?

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Stroke is a national and global issue – compounded by an aging patient population with progressive comorbidities such as hypertension, diabetes mellitus, heart disease, and cardiac arrhythmias. Almost 800,000 people suffer acute stroke each year in the United States (*Circulation* 2023;147:e93-621). Many of these patients will require anesthetic care for interventional and diagnostic procedures related or unrelated to this stroke event. As experts in perioperative medicine and patient safety, it is our

responsibility to understand the physiologic aberrations that occur during anesthesia that leave our patients vulnerable to further injury. In this short update, we will describe the current epidemiologic state of stroke, what neurologic risks these patients may incur during the perioperative period, and practices that may optimize this population's brain health.

For reference, stroke refers to the cerebrovascular disease of acute malperfusion to the central nervous system. There are several types and etiologies of cerebral stroke,

but we will mostly be referencing ischemic stroke for the purposes of this update.

What are the neurologic implications of stroke within the perioperative environment?

Recurrent stroke: Of the 795,000 people who suffer an acute stroke in the U.S. each year, 185,000 are recurrent (*Circulation* 2023;147:e93-621). Prognosis of disability, physical and intellectual morbidity, and mortality rates are higher with recurrent stroke (*Stroke* 1999;30:338-49). In a



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Rising Rates of Congenital Syphilis

Dibash Kumar Das, PhD Steven L. Shafer, MD, FASA
Editor-in-Chief

Which of the following statements about syphilis are true?

1. It is not the first topic that you expected to find in the *ASA Monitor*
2. It is often called “the great masquerader”

3. It was likely brought by Columbus and his crew from the Americas to Europe
4. It is named after a fictional shepherd, Syphilus, who angered the god Apollo

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ASA Commercial Conversion Factor Survey Results – 2024

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The ASA Committee on Economics is pleased to present the results of the 2024 commercial conversion factor (CF) survey. Each spring, ASA members are solicited to submit the CFs from their group practice's five largest commercial contracts. Last year, both the survey methodology and reporting format were simplified with the objective of enhancing participation. The CF and demographic data below represent the national

and regional results reported as being in effect during the 2023 calendar year.

Summary

Based on the 2024 ASA commercial CF survey results, the national average commercial CF was \$80.70, and the national median was \$74.59 (Figure 1, Table 1). The mean and median figures for the past 10 surveys are presented in Table 2. The

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Guest Editor: Sandra Sacks, MD, MEd

Your Patient's Brain: Perioperative Brain Health After Stroke

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large meta-analysis that included 14,455 patients, predictors of recurrent stroke within one year of initial stroke are: hypertension, diabetes mellitus, atrial fibrillation, and coronary artery disease (*J Clin Neurosci* 2019;60:24-30). Optimization and secondary treatment and prevention of these comorbidities should be prioritized in patients undergoing elective surgery.

In perioperative patients, the risk of stroke can be difficult to predict. Overall, the risk of acute ischemic stroke after noncardiac, non-neurologic surgery does not appear high, ranging between 0.2%-1.9% (*Anesthesiology* 2009;110:231-8). However, the risk of silent cerebral infarcts may be underrepresented in this data. In the NeuroVISION study of 1,114 patients undergoing noncardiac surgery with preoperative and postoperative magnetic resonance imaging, 78 (approximately 7%) had new covert acute brain infarcts without any clinical symptoms (*Lancet* 2019;394:1022-9). Of those patients, 29 (42%) suffered cognitive decline within one year of surgery. Moreover, the presence of a covert stroke was associated with a higher risk of delirium and overt stroke or transient ischemic attack within one year. While these findings have not necessarily been translated to our patient population globally, the risk of new or recurrent stroke in the perioperative period should not be underestimated.

Withholding anticoagulation is an important determination in this patient population. Often these patients are on antiplatelet agents to prevent in-stent thrombosis or recurrent cerebrovascular thrombotic events. In nonoperative patients with atrial fibrillation, the risk of stroke increases with age, and continuing anticoagulants in patients who are older (>66 years) may need to be prioritized,

though this has not been studied in the surgical population.

Perioperative neurocognitive disorders (PND): At baseline, patients with recent stroke may be at higher risk for cognitive dysfunction and decline after their cerebral injury. Several studies have shown a high prevalence of cognitive dysfunction after initial stroke, and there are large, prospective studies ongoing to identify the determinants of cognitive decline after stroke (*Stroke* 2021;52:e499-516). Patients with clinical or subclinical cognitive dysfunction are at higher risk for PND, including postoperative delirium, and short- and long-term cognitive decline.

How should brain health research inform our practice?

Professional societies and brain health experts around the world have published several guidelines over the past decade. Recommendations from eight of these publications were summarized and compared in a recent scoping review (*J Neurosurg Anesthesiol* 2023;35:10-8). A few key considerations in the preoperative, intraoperative, and postoperative settings are highlighted below.

Preoperatively, we should begin by identifying patients who are at risk for stroke or perioperative neurocognitive disorders. A brief screening tool such as the Mini-Cog® can not only establish a baseline but also detect some cases of cognitive impairment that would otherwise go unnoticed. As part of the informed consent process, patients and their families should be counseled on their risk of stroke and PND. Providing a copy of the ASA's Perioperative Brain Health Initiative handout encourages them to take an active role in safeguarding their brain health (asamonitor.pub/47m8G18). For high-risk patients, it may be helpful to engage a multidisciplinary team before surgery and throughout the perioperative period.

Moreover, as recommended by the ASA Perioperative Brain Health Initiative, informed consent should be a pivotal part

of the preoperative workup (*Anesth Analg* 2018;127:1406-13). Patients with a history of stroke have a high risk of underlying cognitive dysfunction or decline. Patients at risk of cognitive dysfunction should be informed of the risk of postoperative neurodysfunction after surgery, specifically postoperative confusion, inattention, and memory problems.

In patients with a recent history of stroke, the risk of perioperative stroke decreases over time but will never return to the baseline risk of those without prior stroke. Current guidelines recommend postponing elective surgeries for nine months after a stroke, based on data from a 2014 Danish national cohort study (*J Neurosurg Anesthesiol* 2020;32:210-26; *JAMA* 2014;312:269-77). That study reported an odds ratio of 24 for patients with a stroke three to six months before surgery, but the inclusion of low-risk patients in the cohort may have overstated the magnitude of the elevated risk. A recent study of over 5 million Medicare patients reported an odds ratio of 8 for patients with a stroke within 30 days before surgery and reported that risk leveled off after three months (*JAMA Surg* 2022;157:e222236). These data have not yet been incorporated into guidelines, so clinicians must weigh the risks and benefits of delaying surgery.

Intraoperatively, routine use of high-risk medications such as benzodiazepines and anticholinergics should be avoided for patients at risk of PND. In terms of anesthetic technique, there is no clear advantage of regional anesthesia as compared to general anesthesia techniques. Some guidelines recommend the use of processed EEG monitors to titrate anesthetic drugs, but recent randomized controlled trials have had mixed results (*Anesth Analg* 2018;127:1406-13). With regard to stroke risk, normocapnia is preferred. In terms of hemodynamics, common sense would argue for the avoidance of hypotension. Studies to date have not identified precise blood pressure targets to



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decrease the risk of overt stroke, let alone covert stroke.

Best practices for the postoperative period begin with routine screening. For stroke, any new focal neurological deficits should prompt emergent brain imaging. For delirium, screening should be performed with a validated instrument such as the CAM-ICU (Confusion Assessment Method for the ICU) or the Nu-DESC (Nursing Delirium Screening Scale). When possible, hearing aids and glasses should be available to patients in the recovery room. Throughout the postoperative period, frequent orientation, early mobilization, adequate nutrition, and sleep hygiene are beneficial. Systems-based interventions such as the Hospital Elder Life Program (HELP) have a strong evidence base and may also improve outcomes beyond brain health (*Am J Geriatr Psychiatry* 2018;26:1015-33). ■

Disclosure:

Dr. Abcejo is a grant recipient of the Anesthesia Patient Safety Foundation and UpToDate.

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