Hello, I'm Jim Rathmell, Editor-in-Chief of *ANESTHESIOLOGY* here with the April 2024 podcast. This month, I'm excited to bring you several studies that will directly impact patient care. Our cover article is an original research article that examines whether current preoperative fasting guidelines are as effective for patients with diabetes as those without diabetes. Another of this month's studies explores whether intraoperative phenylephrine is associated with a higher incidence of postoperative delirium. A third study examines the impact of common vasoactive agents on cerebral blood flow during general anesthesia.

Also this month, a Clinical Focus Review suggests strategies to mitigate risks associated with blood transfusions during lung transplantation. And this month's review article provides an overview of the epidemiology and clinical presentation associated with sensory deafferentation, a phenomenon that is not uncommon in patients with chronic pain.

22-00961 and 23-01185

Let's start with this month's cover article which asks if the current preoperative fasting guidelines work as well for patients who have diabetes as for healthy patients. A full stomach at the time of anesthesia induction is a main risk factor for pulmonary aspiration, the most common cause for death in airway-related incidents. Patients with diabetes are typically considered at an increased risk due to the possibility of co-existing delayed gastric emptying. There is conflicting evidence concerning the risk of a full stomach in patients with diabetes who have fasted. Researchers led by Anahi Perlas hypothesized that patients with diabetes who followed standard fasting procedures prior to elective surgery would have a baseline gastric volume that is not higher than that in patients without diabetes. In this single-center, prospective, noninferiority, cross-sectional study, 84 patients with diabetes and 96 patients without diabetes followed the standard ASA preoperative fasting guidelines. A bedside gastric ultrasound was performed prior to surgery by an anesthesiologist who did not know the patient's diabetes status. The researchers found that the mean fasting gastric volume was not higher in patients with diabetes. In an accompanying editorial, Mark Warner remarks that these findings will be helpful for anesthesiologists in evaluating and caring for patients with diabetes preoperatively. The negligible impact of diabetes on preoperative stomach volume in patients who have followed standard preoperative fasting guidelines should be reassuring. Be sure to listen to the accompanying Author Podcast for additional insights.

23-00342, 23-00617, and 23-01255

Another common issue we face as anesthesiologists is delirium after surgery, which can be difficult and frightening for patients and their families. It leads to prolonged hospital length of stay, increased costs, and an increase in mortality. The treatment of intraoperative hypotension with phenylephrine may impair cerebral perfusion through vasoconstriction, which has been linked with postoperative delirium. Haoba Ma and colleagues tested whether intraoperative administration of phenylephrine for treating intraoperative hypotension was associated with an increased risk of postoperative delirium when compared to ephedrine. In this multicenter retrospective observational study, adult hospitalized patients who underwent general anesthesia for noncardiac, non-neurosurgical procedures who received either phenylephrine or ephedrine were compared. They found that intraoperative use of phenylephrine was associated with higher odds of postoperative delirium within 7 days after surgery. This suggests the need for future trials to explore the best treatment for intraoperative hypotension.

Maintaining adequate cerebral blood flow during surgery is critical to preserving brain function, but there are no direct measures available for clinical use. Mean arterial pressure is commonly used as an imperfect surrogate for cerebral blood flow. In a phase-contrast magnetic resonance imaging study, Johan Birnefeld and colleagues sought to quantify the blood flow response in 18 healthy volunteers to commonly used pharmacologic agents. Cerebral blood flow was measured at baseline and after raising and lowering mean arterial pressure using noradrenaline (better known to many as norepinephrine) and labetalol. They found that increasing blood pressure using the α- and β-adrenergic agonist norepinephrine produced a reduction in cerebral blood flow in healthy, awake volunteers. Lowering blood pressure using the α- and β-adrenergic antagonist labetalol did not change cerebral blood flow. These findings in healthy volunteers argue against the use of norepinephrine to raise blood pressure in efforts to increase cerebral blood flow.

These new observations suggest that clinicians need to be aware that a blood pressure target alone is not necessarily a reliable end point, but that the agents used to reach that target may also be important, write editorialists Amy Gaskell, Douglas Campbell and Arthur Lam. However, this research doesn't provide enough evidence to abandon the use of norepinephrine or phenylephrine or to guide clinical management during anesthesia. For a detailed discussion of this research, listen to the featured author podcast.

23-00193 and 23-01282

Our next study explores the ongoing opioid crisis. In response to this crisis, there has been a growing movement toward use of opioid-free anesthesia. However, data are lacking regarding the effectiveness of the opioid-free approach on postoperative recovery following major surgery. Maxime Léger and colleagues hypothesized that opioid-free anesthesia would enhance the quality of recovery for patients undergoing scheduled major surgery. This randomized, double blind controlled trial included patients undergoing major surgery who typically require opioids for postoperative pain management. Patients in the intervention group received a combination of at least two drugs from among ketamine, lidocaine, clonidine, and magnesium sulfate without opioids. The standard group received either sufentanil or remifentanil as well as ketamine. Quality of recovery was measured in the early postoperative period, and at 48 and 72 hours after surgery. An opioid-free anesthetic protocol improved the postoperative quality of recovery for up to 72 hours following surgery compared to standard anesthesia with intraoperative opioid use. There was no difference in chronic pain or quality of life in patients up to three months after surgery. This trial provides an important step toward understanding the impact of intraoperative technique on patient-centered outcomes, say editorialists Karim Ladha and Patricia Lavand'homme. But until personalization of anesthetics is better understood, opioids remain an important tool for anesthesiologists. Many additional questions need to be answered to fully understand the best way to improve patient outcomes and where opioid-free techniques are best used.

23-00662

In the next article, researchers investigate an alternative to propofol for use in general anesthesia. Propofol is used intravenously for induction due to its quick onset and fact recovery. Propofol has drawbacks, including a narrow therapeutic window, injection-site pain, and respiratory depression. Prior studies have demonstrated that HSK3486, also named ciprofol, an injectable emulsion that is a 2,6-disubstituted phenol derivative with fast onset and quick, stable recovery is a safe and effective anesthetic with less injection pain than propofol. In a new clinical trial, Tong J. Gan and colleagues sought to demonstrate ciprofol's noninferiority compared with propofol for successful induction of general anesthesia in adults undergoing elective surgery. In this multicenter, double-blind trial, 255 participants were randomized 2:1 to either ciprofol or propofol. General anesthesia was successfully induced in 97.0% versus 97.6% of participants with ciprofol and propofol, respectively, demonstrating the ciprofol was noninferior to propofol. Eighteen percent of patients receiving ciprofol injection-site pain compared to 77% in those who received propofol.

23-00947

Atelectasis is common during general anesthesia with neuromuscular blockade and is associated with perioperative hypoxemia and postoperative complications. Lower FiO_2 during general anesthesia can reduce lung atelectasis. Bruno M. Ribeiro and colleagues tested the effect of two different fractional inspired oxygen concentrations (0.4 and 1.0) during low PEEP ventilation on lung perfusion distribution, volume, and regional ventilation. In this exploratory study, 10 healthy female piglets underwent mechanical ventilation in two atelectasis models – bilateral gravitational atelectasis and unilateral atelectasis. Measurements were conducted after 10 minutes in each step, assessing respiratory mechanics, oxygenation, and hemodynamics; lung ventilation and perfusion were assessed using electrical impedance tomography; and lung aeration and perfusion by computed tomography. In this model of bilateral atelectasis induced by the absence of PEEP during general anesthesia, lung collapse on chest computed tomography was more important when applying high (1) versus low (0.4) FiO2. Despite the effects on lung atelectasis, the application of low versus high FiO2 did not produce significant changes in respiratory system compliance, regional lung ventilation, and perfusion. These findings question the importance of recommending the use of low FiO2 intraoperatively.

23-00769

I'd like to turn now to one of this month's Clinical Focus Reviews, which examines transfusion during lung transplantation. Patients undergoing lung transplantation have a substantial risk of experiencing blood loss and requiring allogeneic blood product transfusion. Transfusion during lung transplantation surgery is correlated with early allograft injury and primary graft dysfunction. Massive transfusion has an incidence of approximately

18 to 27% in this patient population and is associated with a higher 90-day mortality. Brandi Bottiger, Jacob Klapper, Julien Fessler, Beth Shaz and Jerry Levy discuss transfusion-related complications as well as patient and procedural risk factors for bleeding and suggest strategies to reduce allogeneic blood product transfusion in this high-risk population. They also identify many related areas requiring additional research.

23-01120

Finally, this month's review article looks at pain that accompanies deafferentation, a mysterious and poorly understood medical condition associated with poor quality of life and higher mortality rates. There is no widely accepted definition of deafferentation pain, but it is typically described as pain associated with loss of sensory input to the central nervous system. Examples include pain after strokes involving the somatosensory system, brachial plexus avulsions, spinal cord injury, and limb amputation. Functional imaging and psychophysical tests may provide clues, but the diagnosis is made by the synthesis of clinical information and supplemental tests. In this review, Steven Cohen and colleagues synthesize the existing information and highlight areas where there are divergent perspectives. The authors provide overviews on the epidemiology, mechanisms, clinical presentation, treatment, and avenues for future research for the most common conditions associated with sensory deafferentation. They conclude that treatment should be guided by clinical studies for individual conditions.

I want to thank you for listening this month. Please join me again next month for highlights from the May 2024 issue.