Welcome to the February 2024 Anesthesiology podcast. I'm Jim Rathmell, Editor-in-Chief, here with highlights from the latest issue of Anesthesiology. I'm recording this podcast in Boston with New Year's Day just a few days away. The operating rooms and ICUs have been a bit less busy this week, giving us all a little extra time. I've been thinking about the year ahead and the many coming changes to the Journal that will make it even more accessible and useful to you as practicing anesthesiologists. I'll describe many of these new features in future podcasts. January will have arrived by the time you are listening to this podcast, so I want to remind you about the call for nominations for the awards sponsored by the Journal: the 2024 Excellence in Research Award and the 2024 James E. Cottrell Presidential Scholar Award. Look for the formal call for nominations in your ASA email in coming weeks or you go to the Journal website for a complete description of the qualifications for each award and instructions for submitting nominations. Today, we're going to discuss a few studies related to COVID-19, including one on hypoxemia in ARDS patients. We'll also look at a study focusing on racial disparities–that asks the specific question, are black patients less likely to receive regional anesthesia than white patients? This month's clinical focus review examines low urine output following surgery, and our review article looks at how anesthetics alter consciousness.

Let's get started with our first studies on COVID-19.

23-00616 and 23-01016

Over the past few years, researchers have tried to determine the different mechanisms of hypoxemia in COVID-19 ARDS, particularly the relationship between ventilation alternations and the distribution of air, tissue, and blood within the lung. Mattia Busana from University Medical Center of Gottingen, Germany, studied 10 patients with COVID-19 ARDS who had been intubated for more than 7 days. They performed the multiple inert gas elimination technique (better known as MIGET) and a dual-energy computed tomography, analyzing both tests for tissue and blood volume. Their study found that the main cause of hypoxemia in COVID-19 respiratory failure is shunt, along with ventilation-perfusion mismatch. Their findings suggest that dual-energy computed tomography can be useful as a tool in ARDS. In an accompanying editorial, Marcos Vidal-Melo and Kathleen Capaccione write that this knowledge can help clinicians better understand and manage ARDS in COVID-19 patients and potentially design more effective treatments. Listen to the featured author podcast with Drs. Busana and Vidal-Melo for a more in-depth analysis of the research or check out the visual abstract for a quick overview of the study's key points.

23-00154 and 23-01156

In another COVID-19 related study, researchers found that patients who have tested positive prior to elective surgery were at increased risk of perioperative mortality and pulmonary complications. In this retrospective study, Michael Aziz from Oregon Health Sciences University and his colleagues compared 30-day hospital mortality and postoperative complications of surgical patients who had a prior COVID-19 infection to a matched cohort without known COVID-19. Surgery performed within 2 weeks of a positive test was associated with an increased risk of mortality but this effect didn't extend beyond 2 weeks. Editorialist Paul Myles writes that these findings offer valuable information for current day practice. He adds that it is safe to proceed with most elective surgeries 2 weeks post-COVID-19 infection, ultimately concluding that "It's time to get back to business." A featured author podcast with Drs. Aziz and Myles is available for additional insights.

23-00723

Our next study also focuses on surgery: specifically, the use of remimazolam with opioids. Remimazolam, a short-acting benzodiazepine, is administered in repeated bolus doses for procedural sedation or as continuous infusion for general anesthesia in adults. Remco Vellinga from the University of Groningen in the Netherlands and colleagues performed a dose-ranging trial using target-controlled infusions to evaluate appropriate target concentrations and their correlation with observer sedation scores and BIS values, finding that remimazolam-induced sedation is prone to development of tolerance. Of course, the clinical implications of this tolerance are limited in situations where remimazolam is titrated to effect, as opposed to the target-controlled infusion devices used in this study.

23-00618 and 23-01070

Thrombin inhibitors such as argatroban are used to treat thrombotic heparin induced thrombocytopenia in order to reduce thrombin overload. Bleeding is one of the most common complications of argatroban therapy, meaning that precise dosing and monitoring is important. Lars Heubner from Technische Universitat in Dresden and colleagues compared monitoring tests for argatroban. In this single-center prospective study, 22 patients who had ARDS due to COVID-19 were treated with argatroban. They provided blood samples for analysis, which were monitored by three available tests for anticoagulant therapy. The study found that activated partial thromboplastin time may not provide optimal monitoring in critically ill patients, and direct thrombin time was more accurate in predicting a correct plasma concentration. Editorialists Gabor Erdoes, Andreas Koster, and Jerry Levy reiterate that a larger study or registry is needed and, for now, guiding therapy with additional assays may be helpful.

23-00187

We are learning more and more about race-related disparities in health care. In the June 2023 issue, a study reported that Black versus White patient race was associated with less antiemetic administration, even after controlling for all accepted postoperative nausea and vomiting risk factors. In this issue, investigators ask if black patients less likely than white patients to receive regional anesthesia? And if there are disparities, is this related to race or other factors? According to national performance measures, use of regional anesthesia for total knee arthroplasty is a high priority. Regional anesthesia is associated with improved postoperative analgesia and decreased opioid use as well as fewer complications. From prior studies, we know that black patients receive lower quality pain treatment after surgery and report worse outcomes. Anjali Dixit from Stanford University and colleagues reviewed Medicare fee-for-service claims in patients over 65 who underwent primary total knee arthroplasty between 2011 and 2016. They found Black patients did not have a statistically different probability of receiving a regional anesthetic compared to White patients. Variation in use of regional anesthesia was largely attributable the hospital where the surgery was performed.

23-00337 and 23-00975

In another pain-related study, Edita Navratilova from the University of Arizona and colleagues explored whether the efficiency of pain modulation is controlled by cortical opioid circuits. They evaluated the effects of mu opioid receptor activation in the anterior cingulate cortex on descending control of nociception. Ultimately, they found that descending control of nociception was diminished in the ipsilateral hind paw of rats with spinal nerve ligation, suggesting that anterior cingulate cortex activation diminishes the descending control of nociception. However, it can be restored by activating mu opioid receptors. The new findings call for further study in patients with chronic pain to determine if similar pain modulation occurs. In an accompanying editorial, QiLiang Chen and David Clark write that this study helps advance the understanding of how higher brain areas exert "top-down" controls of pain sensitivity and could pave the way for new diagnostic and therapeutic approaches for treating pain.

23-00499

This month's clinical focus review discusses urine output, which is routinely monitored in patients undergoing surgery and in the ICU after surgery. The authors detail the determinants and consequences of low urine output, helping guide physicians' decision-making from the OR to the ICU. They talk about factors regulating urine output, propose an approach to managing urine output during and after surgery, and describe how searching for perioperative complications should be a priority when facing a patient with persistent low urine output.

23-00448

And finally, this month's review article from Yandong Jiang and Jamie Sleigh discusses the concept of consciousness and how anesthetics alter consciousness. Over 300 million surgical procedures are performed annually, and the majority are performed under general anesthesia. Sleigh and Jiang discuss the concept of consciousness, how it is altered by anesthetics, the challenges for assessing consciousness, currently used technologies for assessing depth of anesthesia and future research directions. They tell us that "wakefulness is marked by: a subjective experience of existence (consciousness) and perception of input from the body or the environment (connectedness). Anesthetic drugs may selectively impair some of these components without complete extinction of the subjective experience of existence. They propose that a state of disconnected consciousness is the optimal level of anesthesia, as it likely avoids both awareness and the possible dangers of oversedation. But at present we don't have reliably tested indices that can discriminate between connected consciousness, disconnected consciousness, and complete unconsciousness.

Thanks for listening. Please don't forget to submit your nominations for the 2024 Excellence in Research and James E. Cottrell Presidential Scholar Awards. I'll be back next month with highlights from the March 2024 issue.