



Welcome to the August 2023 Editor-in-Chief Podcast. I'm Jim Rathmell, Interim Co-Editor-in-Chief and I am here to highlight content published in the journal. This month's issue contains research exploring a potential solution to overprescribing of opioids following surgery. Research in this issue also addresses the increased costs of caring for patients with frailty after surgery and whether use cold storage of platelets impacts their clinical efficacy. Our review article this month compares spinal versus general anesthesia in older adults, and our clinical focus review addresses the off-label use of recombinant factor VII for

cardiac surgical bleeding.

We start this month with a study that focuses on overprescribing of opioids after surgery. Researchers led by Megan Rolfzen from the University of Nebraska Medical Center hypothesized that a decision-support tool might reduce opioids prescribed at discharge. This cluster randomized multiple crossover trial evaluated the use of a real-time, best practice alert in electronic health records. During alternating eight-week periods, an alert was displayed to clinicians when the proposed opioid prescription exceeded recommended amounts. The total post-discharge opioid prescription was a median of 75 oral morphine milligrams among 11,003 patients when the alerts were active, and 100 morphine milligrams in 10,686 patients when the alerts were inactive. This demonstrates that the alert tool didn't significantly impact the amount of opioids prescribed at discharge. In an accompanying editorial, Chad Michael Brummett and colleagues tell us how this study adds to the mixed evidence on the effectiveness of alerts in curbing excessive opioid prescribing. You can read this article for free or listen to the featured author podcast with the study author and editorialist online.

With an aging population, the number of patients with preoperative frailty is increasing. This more than doubles the risk of postoperative morbidity, mortality, and loss of independence. In a retrospective population-based cohort study, researchers led by Ryan McGinn from the University of Ottawa and colleagues sought to understand the healthcare costs attributable to frailty. They examined total health system costs in the year following surgery using a patient-level costing method that captured both direct and indirect costs. In a cohort of more than 170,000 patients, 13.5% were identified with preoperative frailty. Costs for patients with preoperative frailty having elective surgery was one and a half times greater in the year following major, elective non-cardiac surgery than those without frailty. Allocating these increasing costs of delivering care to frail patients will be critical in adapting our health system for the future. Please listen to the featured author podcast with the study author to learn more.

There have been conflicting reports regarding the risks and benefits of inotropic therapies in perioperative care following cardiac surgery, and the use of inotropes varies tremendously from patient to patient, anesthesiologist to anesthesiologist, and hospital to hospital. Michael Mathis from the University of Michigan and colleagues hypothesized that meaningful variation in inotrope use occurred at the clinician and institutional levels. In this multilevel observational cohort study, they reviewed non-emergent cardiac surgical procedures using cardiopulmonary bypass in adults over age 18. They found that half of patients received intraoperative inotrope infusions. Variations in inotrope use was explained by both variations in use from among clinicians and variations in use among institutions. Their findings highlight the need for future prospective trials of inotrope use to avoid unwarranted variation. You can also find this article available for free online.

The COVID-19 pandemic exposed vulnerabilities in blood inventories around the world; platelets are the blood component most vulnerable to shortages. Cold storage of platelets leads to shorter lifespan than room temperature storage. Nonetheless, the hemostatic properties of cold stored platelets has been favorable in some reports. Typically, platelets are stored at 20–24 degrees C with gentle agitation for up to 5–7 days and, if unused, are then discarded. Allan Klompas from the Mayo Clinic placed platelets in cold storage after expiration for as long as 9 additional days. They tested

the hypothesis that use of these so-called “delayed cold-storage platelets” in cardiac surgery would be associated with decreased postoperative platelet increments compared to room temperature platelets. This retrospective observational study reviewed all adults undergoing cardiac surgery with administration of at least 1 unit of platelets intraoperatively. More than 180 patients received delayed cold storage platelets, thus receiving platelets that would otherwise have been discarded. Postoperative transfusion utilization was higher and platelet counts were lower in patients receiving delayed cold storage platelets without differences in clinical outcomes. Thus, the use of delayed cold stored platelets that otherwise would be discarded may offer a viable alternative when facing critical platelet shortages but is not recommended as a primary approach to platelet transfusion.

Mechanomyography is the gold standard for measurement of muscle twitch amplitude during neuromuscular blockade; however, the mechanomyography devices used historically are no longer commercially available. To assess the performance of a new mechanomyography device, researchers used an archival mechanomyography system that employed a traditional Grass FT-10 force transducer. They constructed a new device using 3D-printed components and modern electronics. Researchers led by Kelly Michaelsen from University of Washington and colleagues hypothesized that the train-of-four ratios recorded by archival and their newly constructed mechanomyograph would be equivalent. The mechanomyographs were simultaneously affixed to opposite arms of patients undergoing surgery and the train-of-four ratio was measured during onset and recovery of neuromuscular blockade. The new mechanomyograph had better precision and measurement than the archival system but both resulted in similar train-of-four ratio measurements. The investigators nicely demonstrated that our gold standard measurement for neuromuscular blockade can be replicated with modern instrumentation.

Epinephrine is critical for organ resuscitation during severe refractory hypotension or after cardiac arrest. However, epinephrine may compromise microvascular perfusion and oxygen delivery to the brain. Dong Zhang from Duke University and fellow researchers hypothesized that epinephrine induces significant microvascular—but not macrovascular—constriction in the brain. After induction of anesthesia, mice were intubated and mechanically ventilated. Following baseline measurements of physiologic parameters and arterial blood gases, epinephrine was given intravenously as a single bolus or multiple bolus injection. Intravenous epinephrine induced marked cerebral microvascular constriction, intravascular hemoglobin de-saturation, and paradoxically, an increase in brain tissue oxygen levels. This study provides a step towards a better understanding of the cerebral hemodynamic response to epinephrine.

This month's Clinical Focus Review discusses the use of recombinant factor VII for cardiac surgical bleeding, a common, off-label use of this hemostatic agent. The first report of its off-label use was in 1999 when recombinant factor VII was administered to a bleeding soldier. Since then, numerous publications describing off-label use have appeared. In this review, Brigid Flynn, Marie Steiner and Michael Mazzeffi discuss the history and present day off-label use of recombinant factor VII. They review recent data and include current recommendations for use, concluding that after two decades of experience, use of recombinant factor VII for cardiac surgical bleeding likely does decrease nonsurgical bleeding. They caution us that an individualized risk-benefit assessment should be used for each patient prior to administration.

Finally, this month's Review Article provides a comparison of spinal versus general anesthesia in older adults as a focus of comparative effectiveness research. Written by Mark Neuman, Frederick Sieber and Derek Dillane, the review summarizes the available evidence from randomized studies in patients undergoing hip fracture surgery, elective knee and hip arthroplasty and vascular surgery. Randomized trials show that spinal and general anesthesia are equivalent in safety and acceptability and that the choice should be guided by patient preference.

That's all for this episode. Please join me again next month to hear highlights from the September 2023 issue.