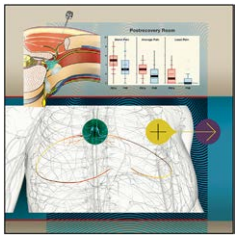
THIS MONTH IN
ANESTHESIOLOGY®



1039 Paravertebral *versus* Pectoralis-II (Interpectoral and Pectoserratus) Nerve Blocks for Postoperative Analgesia after Nonmastectomy Breast Surgery: A Randomized, Controlled, Observer-masked Noninferiority Trial

The pectoralis-II block is a fascial plane nerve block that is easier to apply than the paravertebral block and is reported to produce analgesia and opioid sparing similar to that of paravertebral blocks in patients undergoing mastectomy. The hypothesis that pectoralis-II blocks would provide analgesia that was noninferior to that provided by paravertebral blocks was tested in a randomized study comparing single-injection blocks in 119 patients undergoing nonmastectomy breast surgery. Dual primary endpoints were pain scores in the recovery room and opioid consumption in both the operating and recovery rooms. Compared to pectoralis-II blocks, paravertebral blocks provided superior analgesia, with a concurrent decrease in opioid requirements. In the recovery room, the paravertebral block group had improved analgesia with clinically relevant lower least, average, and maximum pain scores. Both groups received similar fentanyl doses for block administration and intravenous morphine equivalents during surgery, but in the recovery room, the paravertebral block group required a median of 0 mg additional intravenous morphine milligram equivalents and the pectoralis-II block group required an additional median 5.8 intravenous morphine milligram equivalents. *(Summary: M. J. Avram. Image: A. Johnson, Vivo Visuals Studio. Injection anatomy art by G. Nelson, modified from Rathmell JP: Complications in Regional Anesthesia and Pain Medicine, 2nd edition. Lippincott Williams & Wilkins, 2012.)*

1051 Factor Eight Inhibitor Bypass Activity Use in Cardiac Surgery: A Propensity-matched Analysis of Safety Outcomes

The estimated incidence of massive hemorrhage during cardiac surgery is 2 to 10%. Bleeding during cardiac surgery that is refractory to standard interventions has been treated with off-label use of factor eight inhibitor bypass activity (FEIBA), the primary factor of which is VIIa. The anticoagulant factor content in FEIBA has been proposed to reduce thromboembolic risk compared with that of recombinant activated factor VII (rFVIIa). The safety of FEIBA administration to patients who underwent cardiac surgery on cardiopulmonary bypass at a single institution from 2018 to 2023 was evaluated in a retrospective cohort study comparing outcomes of 352 patients who received FEIBA with those of 352 patients who did not with whom they were matched by propensity scores to control for potential confounders. The exposure was administration and dose of FEIBA during and within 24 h of surgery and the primary outcomes were postoperative thromboembolic complications occurring from the time of intensive care unit admission until hospital discharge. Low-dose FEIBA did not increase the risk of thromboembolic complications or mortality, but relatively higher doses of FEIBA were associated with postoperative acute renal failure and transfusion despite controlling for risk factors. *(Summary: M. J. Avram. Image: Adobe Stock.)*

1086 Biodemography of Human Aging (Gompertz–Makeham Law) Applied to Surgical Mortality Modeling: A Retrospective National Cohort Study

The Gompertz–Makeham law describes a characteristic pattern of mortality in human populations in which the death rate between ages 18 and 30 yr is nearly constant (Makeham law) and rises exponentially beyond 30 yr of age (Gompertz law). This retrospective national cohort study sought to determine whether the Gompertz–Makeham law applies to the risk of postoperative mortality and the conditions under which it may apply using data for 5,615,100 patients having surgery between 2007 and 2016 at New Zealand hospitals accounting for more than 99% of surgical procedures performed with an anesthesiologist present. The primary outcome of 1-month postoperative all-cause mortality occurred in 114,782 (2%) patients. The Gompertz–Makeham law applied in this cohort. The inflection point for increased 1-month risk occurred at age 30 yr, above which age there was a linear relationship between the logarithm of postoperative 1-month mortality risk and increasing age. Although the Gompertz law applied to these data, the age-related increase in risk was lowest in patients who had cancer, underwent major surgery, and were ASA Physical Status IV to V due to the interactions between age, postoperative mortality, and each of these risk factors. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

1075 Short-term Outcomes in Infants after General Anesthesia with Low-dose Sevoflurane/Dexmedetomidine/Remifentanil *versus* Standard-dose Sevoflurane (the TREX Trial)

This study is a secondary analysis of the phase III randomized, active-controlled TREX (Trial Remifentanil DEXmedetomidine) trial performed in Australia, Italy, and the United States between 2017 and 2023, the primary neurodevelopmental outcome of which will be presented when the data are available. In the TREX trial children less than 2 yr old having anesthesia expected to last 2 h or longer were randomly assigned to receive low-dose sevoflurane/dexmedetomidine/remifentanil anesthesia or standard-dose sevoflurane anesthesia. The objectives of this analysis were to present and compare the short-term perioperative outcomes of 428 children from the TREX trial including the incidence of intraoperative hypotension, bradycardia, and light anesthesia events as well as postoperative pain scores, time to recovery, and morbidity and mortality outcomes at 5 days postoperatively. There was less hypotension and more bradycardia and more patients with episodes of light anesthesia in the low-dose sevoflurane/dexmedetomidine/remifentanil anesthesia arm compared to the standard sevoflurane anesthesia arm, but the authors concluded that the two techniques were broadly clinically similar, with no clear evidence to support choosing one over the other. *(Summary: M. J. Avram. Image: Adobe Stock.)*

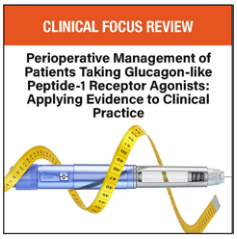
 DOI: 10.1097/ALN.0000000000005270

1065 Effects of Serratus Anterior Plane Block on Early Recovery from Thoracoscopic Lung Resection: A Randomized, Blinded, Placebo-controlled Trial

The current paradigm for treatment of chest wall pain after thoracoscopic lung resection is a multimodal approach that includes regional and neuraxial techniques. The serratus anterior plane block involves injecting local anesthetic into a fascial plane adjacent to the serratus anterior muscle. The hypothesis that the serratus anterior plane block would be associated with lower acute postoperative opioid requirements and improved measures of early recovery after minimally invasive anatomic lung resection was tested in a randomized, placebo-controlled trial of 92 patients undergoing unilateral thoracoscopic lung resection at a single center. Randomization was stratified by segmentectomy or lobectomy and by video-assisted thoracoscopic surgery or robotic-assisted thoracoscopic surgery. The trial was conducted in the context of an established enhanced recovery pathway that included surgeon-administered intercostal nerve blocks and multimodal analgesia. The primary outcome, cumulative intravenous morphine milligram equivalents during the first 24 h after arrival to the postanesthesia care unit, did not differ between the groups after adjustment for stratification factors. Pain scores at rest or with cough did not differ between groups at any time. *(Summary: M. J. Avram. Image: Adobe Stock.)*

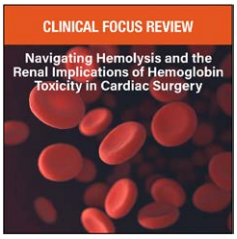
1105 Cardiovascular Effects of Increasing Positive End-expiratory Pressure in a Model of Left Ventricular Cardiogenic Shock in Female Pigs

Left ventricular (LV) dysfunction increases in left ventricular cardiogenic shock (LV-CS) due to its inability to overcome afterload and elevated preload, increasing myocardial mechanical work and creating a mismatch between myocardial oxygen consumption (MvO_2) and supply. The hypothesis that higher positive end-expiratory pressure (PEEP) during mechanical ventilation in LV-CS will reduce the pressure–volume area (PVA), which represents the total mechanical energy during one cardiac cycle and is linearly correlated with MvO_2, without compromising cardiac output was tested a female pig model of LV-CS. LV-CS was induced by repeated injections of polyvinyl alcohol microspheres in the left main coronary artery. The hemodynamic effects of increasing PEEP were studied in the healthy state as well as 5 min and 60 min after the onset of LV-CS. PVA decreased with increasing PEEP after 60 min of CS, reaching a mean ± SD relative reduction of 10 ± 1% at 10 cm H_2O and 18 ± 1% at 15 cm H_2O. Key measures of LV preload and afterload decreased with increased PEEP. Cardiac output did not change but mean arterial pressure decreased by 7 ± 4 mmHg and 9 ± 4 mmHg at PEEP 10 cm H_2O and 15 cm H_2O, respectively. The effects of PEEP were easily titratable. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



1141 Perioperative Management of Patients Taking Glucagon-like Peptide-1 Receptor Agonists: Applying Evidence to Clinical Practice (Clinical Focus Review)

Glucagon-like peptide-1 (GLP-1) receptor agonists reduce glycemia in patients with type 2 diabetes mellitus by multiple mechanisms including slowing gastric emptying. Their ability to slow gastric emptying has led to concerns about increased risks of perioperative aspiration. To address this, the American Society of Anesthesiologists has published a consensus-based guidance suggesting that short-acting GLP-1 receptor agonist preparations be discontinued for 1 day and long-acting preparations be discontinued for 1 week before the procedure, while observing the current fasting guidelines. This Clinical Focus Review discusses emerging data that point to limitations of this guidance and proposes a framework for periprocedural management of patients taking GLP-1 receptor agonists. Interrupting GLP-1 receptor agonists as suggested may not offer much benefit because a longer washout time is needed to resolve the effects on gastric emptying. Prolonged fasting time for solid foods beyond current recommendations may more effectively prevent patients from presenting on the day of procedures with residual gastric contents. For symptomatic patients or those who have not been on clear liquids for 24 h, a gastric ultrasound may help guide decisions about proceeding with the planned anesthetic. *See the accompanying Editorial on* ***page 1031****.* *(Summary: M. J. Avram. Image: Adobe Stock.)*



1162 Navigating Hemolysis and the Renal Implications of Hemoglobin Toxicity in Cardiac Surgery (Clinical Focus Review)

Acute kidney injury (AKI) occurs in 20 to 30% of patients undergoing cardiac surgery with cardiopulmonary bypass (CPB). Its pathophysiology is multifactorial, with CPB-induced hemolysis playing a role. Hemolysis creates a constant flux of cell-free hemoglobin (CFHb), heme, and iron. After tissue translocation, the pathophysiologic effects of hemolysis are mediated by CFHb-catalyzed oxidative reactions and heme-ligation of cellular signaling molecules. CFHb translocated into interstitial spaces surrounding vascular smooth muscle cells interacts with endothelium-derived nitric oxide (NO), leading to vasoconstriction, hypertension, enhanced cardiac load, and, potentially, hypoperfusion of critical organs such as the kidney. CFHb enhances lipid peroxidation and oxidative stress. Labile iron has also been linked to oxidative stress and AKI in CPB. Strategies to neutralize CFHb include scavenging it, administering NO, and using antioxidants. Haptoglobin sequesters CFHb in a large protein complex that cannot cross tissue barriers. Inhaled NO oxidizes plasma oxy-hemoglobin, limiting the scavenging of endothelial-derived NO in peripheral tissues. Plasma ascorbic acid mitigates oxidation of CFHb as does acetaminophen at therapeutic concentrations. *(Summary: M. J. Avram. Image: Adobe Stock.)*