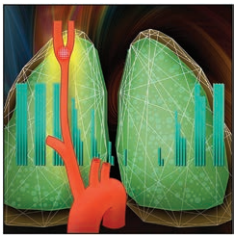
THIS MONTH IN
ANESTHESIOLOGY

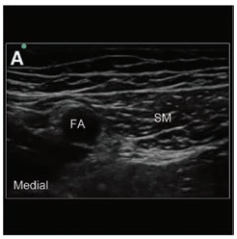


467 Reversal of Partial Neuromuscular Block and the Ventilatory Response to Hypoxia: A Randomized Controlled Trial in Healthy Volunteers

Nondepolarizing neuromuscular blocking agents can affect ventilatory control by acting at the chemoreceptors of the carotid body, which are important sensors involved in maintaining respiratory homeostasis. The effects of three strategies for reversal of a partial neuromuscular block on ventilatory control were studied in 34 healthy male volunteers. Participants were randomized to receive placebo, 1 mg neostigmine (with 0.5 mg atropine), or 2 mg · kg^{-1} sugammadex after a continuous rocuronium infusion for 90 to 120 min aimed at a train-of-four ratio of 0.7 measured by electromyography at the adductor pollicis muscle. The hypoxic ventilatory response was decreased from 0.55 ± 0.22 to 0.31 ± 0.21 l · min^{-1} · $\%^{-1}$ by rocuronium. Despite full reversal of the partial neuromuscular block, there was residual blunting of the hypoxic ventilatory response (0.45 ± 0.16 l · min^{-1} · $\%^{-1}$). *See the accompanying Editorial View on* **page 453.** *(Summary: M. J. Avram. Image: A. Johnson, Vivo Visuals.)*

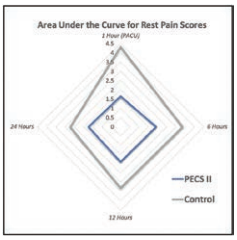
477 Postoperative Delirium and Postoperative Cognitive Dysfunction: Overlap and Divergence

Perioperative disturbances of cognition may occur acutely, as postoperative delirium, or after hospital discharge, as postoperative cognitive dysfunction. Delirium is associated with long-term cognitive decline, suggesting a possible role for postoperative delirium in the pathogenesis of postoperative cognitive dysfunction. The hypothesis that delirium is an independent risk factor for postoperative cognitive dysfunction was tested using data from an observational study of cognitive outcomes of 560 patients aged 70 yr and older after major noncardiac surgery. Delirium occurred in 24% (95% CI, 21 to 28%) of patients while hospitalized. The International Study of Postoperative Cognitive Dysfunction–defined threshold for postoperative cognitive dysfunction was met at 1 month by 47% (95% CI, 43 to 51%) of patients, and this proportion decreased to 23% (95% CI, 19 to 26%) at 2 months and to 16% (95% CI, 13 to 19%) at 6 months. The relative risk for postoperative cognitive dysfunction for patients with a history of postoperative delirium at 1 month was 1.34 (95% CI, 1.07 to 1.67) while it was 1.08 (95% CI, 0.72 to 1.63) at 2 months and 1.21 (95% CI, 0.70 to 2.09) at 6 months. *See the accompanying Editorial View on* **page 456.** *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



619 Opioid- and Motor-sparing with Proximal, Mid-, and Distal Locations for Adductor Canal Block in Anterior Cruciate Ligament Reconstruction: A Randomized Clinical Trial

The opioid- and motor-sparing effects of the adductor canal block have made it an important component of multimodal analgesia for patients undergoing knee surgery. While randomized controlled trials have reported a proximal adductor canal injection location may confer superior analgesia, recent cadaveric and volunteer studies propose that a distal injection location should be superior. This randomized controlled trial tested the hypotheses that a distal adductor canal injection location provides superior opioid-sparing effect and preserves quadriceps motor strength compared to a proximal or mid injection location for adductor canal block in 108 patients undergoing ambulatory anterior cruciate ligament reconstruction. Patients having a proximal block used 30 mg (95% CI, 18 to 42 mg) and 32 mg (95% CI, 23 to 41 mg) less morphine than those having blocks at mid- and distal locations, respectively. There were no differences among the blocks in the percentage decrease of the maximal voluntary isometric contraction measurement of quadriceps strength from baseline at 30 min postblock or at any other times. *(Summary: M. J. Avram. Image: From original article.)*



630 Pectoralis-II Myofascial Block and Analgesia in Breast Cancer Surgery: A Systematic Review and Meta-analysis

Thoracic paravertebral block has been described as the gold standard analgesic modality for breast cancer surgery, but it is considered an invasive block requiring advanced skill and deep needling in close vicinity to the pleura, neuraxis, and intercostal neurovascular bundles with associated risks of pneumothorax, neuraxial spread, and systemic local anesthetic toxicity. The pectoralis-II fascial block may be a simple, superficial, and safe alternative to anesthetize the hemithorax. A systematic review and meta-analysis of 14 randomized controlled trials including 887 patients was conducted to identify the potential clinical role of the pectoralis-II fascial block. The pectoralis-II fascial block was superior to systemic analgesia for analgesic consumption and the area under the curve of weighted pooled rest pain scores during the first 24 h postoperatively by clinically important differences and was noninferior and not clinically worse than paravertebral block for analgesic consumption and the area under the curve of rest pain. *(Summary: M. J. Avram. Image: From original article.)*

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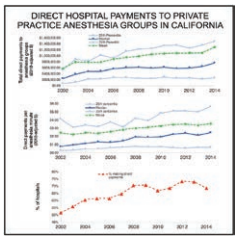
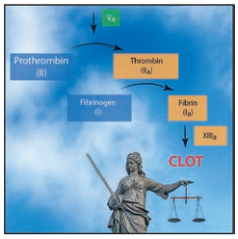


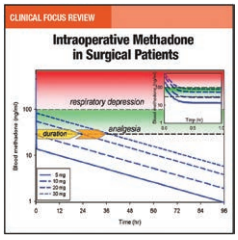
534 Trends in Direct Hospital Payments to Anesthesia Groups: A Retrospective Cohort Study of Nonacademic Hospitals in California

Although anesthesia groups in the United States derive revenue primarily from payments for the services they provide, another potentially large source of revenue consists of additional payments, also known as "direct payments" or "institutional support," from the hospitals at which anesthesia groups provide services. A unique dataset consisting of publicly available financial reports for nonacademic hospitals in the State of California between 2002 and 2014 was used to expand on existing knowledge of direct payments to anesthesia groups. In 2002, 52% (76 of 147) of private hospitals in California reported making a direct payment in their financial disclosure reports; by 2014, this value had risen to 69% (124 of 180). The median payment (valued in 2018 dollars) increased over the study period from $242,352 (interquartile range, $72,753 to $523,861) to $765,128 (interquartile range, $267,006 to $1,503,163). The percent of anesthesia revenue coming from public payers was significantly associated with both the probability of receiving a direct hospital payment and the magnitude of that payment. *(Summary: M. J. Avram. Image: From original article.)*



543 Prothrombin Complex Concentrate-induced Disseminated Intravascular Coagulation Can Be Prevented by Coadministering Antithrombin in a Porcine Trauma Model

Preclinical studies of the administration of prothrombin complex concentrate to reduce blood loss from trauma have reported a possible risk of thromboembolic complications and disseminated intravascular coagulation associated with its use. A porcine trauma model was used to test the hypothesis that coadministration of antithrombin with prothrombin complex concentrate can modulate its prothrombotic effects and prevent adverse events, such as disseminated intravascular coagulation. Treatment with 50 IU/kg prothrombin complex concentrate monotherapy reduced total blood loss and increased survival compared to control in this animal model of trauma-associated coagulopathy, but led to a disseminated intravascular coagulation-like syndrome with low fibrinogen concentrations and reduced clot strength. The hypercoagulable state after prothrombin complex concentrate therapy was mitigated by coadministration of 50 IU/kg antithrombin without impairing treatment efficacy. *See the accompanying Editorial View on* **page 459.** *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



678 Intraoperative Methadone in Surgical Patients: A Review of Clinical Investigations (Clinical Focus Review)

Methadone is a potent μ-opioid receptor agonist and *N*-methyl-D-aspartate receptor antagonist with an elimination half-life of 24 to 36 h. It has a rapid onset of effect when administered intravenously and the duration of its effect at doses of 20 mg or more closely parallels its long elimination half-life. Randomized controlled trials in patients undergoing a variety of surgical procedures have documented that a single intraoperative dose of methadone produces analgesia that can persist though postoperative days 1 through 3. Not only were postoperative analgesic requirements reduced in patients receiving methadone compared to those administered shorter-acting opioids, but also the risk of opioid-related side effects was not increased in the methadone groups. This Clinical Focus Review concludes with a consideration of questions regarding intraoperative methadone use that remain to be addressed, including optimal dosing regimens in various surgical procedures, its appropriate use in high-risk patient populations, and the risk of postoperative respiratory depression compared to that of shorter-acting opioids. *(Summary: M. J. Avram. Image: From original article.)*

693 Transfusion-related Acute Lung Injury in the Perioperative Patient (Review Article)

Perioperative transfusion-related acute lung injury causes considerable morbidity and mortality. It has an estimated incidence of 0.02 to 1.12% per transfused blood product. The classic definition of transfusion-related acute lung injury requires onset of acute lung injury within 6 h of transfusion of blood products in the absence of preexisting acute lung injury, acute lung injury risk factors, or left atrial hypertension. Development of transfusion-related acute lung injury is generally considered to work through a two-hit model. The first hit, mediated by preexisting patient risk factors, recruits primed neutrophils into the lungs where they only elicit full-blown transfusion-related acute lung injury by damaging barrier integrity resulting in pulmonary edema formation when combined with a second hit, which is transfusion of either pathogenic antibodies or biologic response modifiers from blood products. The diagnosis of transfusion-related acute lung injury is established by a combination of physical examination, history, imaging, and laboratory findings. This review provides an overview of transfusion-related acute lung injury and recommendations for its detection, prevention, and management in the perioperative patient. *(Summary: M. J. Avram. Image: From original article.)*

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