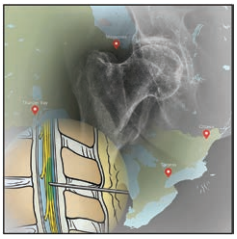
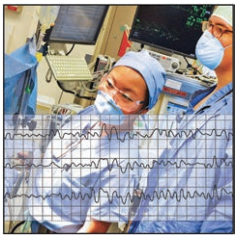
THIS MONTH IN

ANESTHESIOLOGY



480 Association of Hospital-level Neuraxial Anesthesia Use for Hip Fracture Surgery with Outcomes: A Population-based Cohort Study

Major postoperative complications occur in more than 20% of hip fracture surgery patients, and more than one third of hip fracture patients die within 6 months of their injury. The hypothesis that patients who underwent emergency hip fracture surgery in hospitals that used a higher proportion of neuraxial anesthesia would have improved postoperative survival, shorter length of hospital stay, and lower overall costs of care in the 30 days after surgery was tested in a population cohort study of 107,317 patients who underwent surgery between 2002 and 2014. A higher proportion of hospital-level neuraxial anesthesia use was associated with improved 30-day postoperative survival, independent of the type of anesthesia the individual patient received and other confounders. This effect was most pronounced in hospitals with low levels of neuraxial anesthesia use. The proportion of hospital-level neuraxial anesthesia utilization was not associated with differences in length of stay or hospital costs. *See the accompanying Editorial View on* **page 429**. *(Summary: M. J. Avram. Illustration: S. Jarret, C.M.I.)*

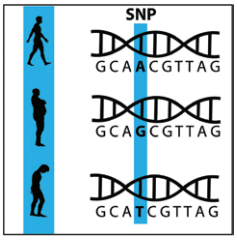


492 Prediction of Bispectral Index during Target-controlled Infusion of Propofol and Remifentanil: A Deep Learning Approach

The combined effects of propofol and remifentanil on the bispectral index have been characterized using isobole and response surface models. The hypothesis that deep learning could better interpret the dose-response relationship of anesthetic drugs represented in clinical data than a traditional pharmacokinetic–pharmacodynamic model was tested using 101, 30, and 100 cases assigned to training, validation, and testing groups, respectively. Deep learning is a kind of machine learning based on a set of algorithms to model high-level abstractions in data using multiple linear and nonlinear transformations. An empirical model was developed from propofol and remifentanil dosing histories and demographic data to predict bispectral index during total intravenous anesthesia target-controlled infusions using a deep learning approach. The deep learning model had less error in predicting bispectral index during anesthesia induction, maintenance, and recovery periods than the response surface model. The generalizability of the deep learning model depends on the training data set. *See the accompanying Editorial View on* **page 431**. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

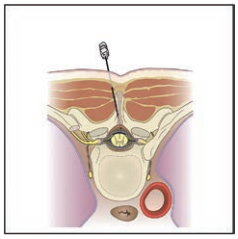
502 Temporal Trends in Difficult and Failed Tracheal Intubation in a Regional Community Anesthetic Practice

Recent changes to standard clinical practice when a difficult intubation is anticipated include guidance from expert consensus algorithms and availability of various advanced airway devices. The rates of difficult and failed tracheal intubations over time were determined using data from a perioperative quality assurance database reflecting anesthesia practice patterns at a large urban community hospital and 15 affiliated sites from 2002 to 2015. There were steady declines in the reported rates of both difficult and failed intubations at the large hospital, reflecting approximately 75% reductions between the first half of the study (2002 through 2008) and the second half (2009 to 2015). Similar declines were also evident at the network of 15 smaller hospitals and outpatient surgery centers. While the rates of difficult and failed tracheal intubations were approximately stable before 2006, the largest annual reductions occurred between 2006 and 2010 and more gradual declines occurred after that. *See the accompanying Editorial View on* **page 434**. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



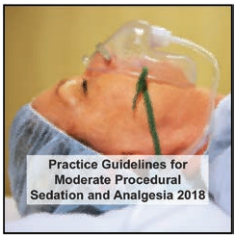
587 Targeted Genotyping Identifies Susceptibility Locus in Brain-derived Neurotrophic Factor Gene for Chronic Postsurgical Pain

Although peripheral nerve injury, severe acute postoperative pain, and psychosocial factors are thought to increase the risk for chronic postsurgical pain, considerable efforts have been made to identify genetic determinants of pain. The hypothesis that genetic variations are associated with the development of chronic postsurgical pain was tested by analyzing the association of 638 single-nucleotide polymorphisms (SNPs) located in 54 pain-related genes with chronic postsurgical pain in the first 1,873 patients enrolled in the Persistent Pain after Surgery Study. After rigorous screening, SNP rs6265 in the brain-derived neurotrophic factor (BDNF) gene was found to be associated with chronic postsurgical pain in both discovery and validation cohorts. To determine the functional role of rs6265, mechanical allodynia was measured in mice expressing the corresponding amino acid alteration in BDNF. Consistent with the human data, mechanical allodynia was significantly less in BDNF knockout mice compared with BDNF wild-type mice. *(Summary: M. J. Avram. Illustration: J. P. Rathmell.)*



511 Effect of Thoracic Epidural Ropivacaine *versus* Bupivacaine on Lower Urinary Tract Function: A Randomized Clinical Trial

Thoracic epidural analgesia (TEA) with bupivacaine alone or with either fentanyl or fentanyl and epinephrine significantly inhibits detrusor function that, in turn, results in clinically relevant postvoid residual urine volume (PVR), which requires monitoring or catheterization. The hypothesis that TEA with ropivacaine would have less effect on bladder function, assessed by PVR and urodynamic investigations, was tested in a randomized, double-blind, parallel-group interventional superiority study of 36 patients undergoing open renal surgery randomly allocated to TEA with either bupivacaine 0.125% or ropivacaine 0.2%. Although segmental blockade from around T4 to T12 with both drugs was associated with impaired voiding function, the median 300 ml postoperative change in PVR from baseline during TEA in the bupivacaine group represents a clinically relevant impairment in voiding function that is associated with an increased risk of complications. *(Summary: M. J. Avram. Illustration: G. Nelson.)*

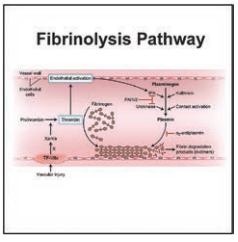


437 Practice Guidelines for Moderate Procedural Sedation and Analgesia 2018: A Report by the American Society of Anesthesiologists Task Force on Moderate Procedural Sedation and Analgesia, the American Association of Oral and Maxillofacial Surgeons, American College of Radiology, American Dental Association, American Society of Dentist Anesthesiologists, and Society of Interventional Radiology

These guidelines replace the "Practice Guidelines for Sedation and Analgesia by Nonanesthesiologists: An Updated Report by the American Society of Anesthesiologists (ASA) Task Force on Sedation and Analgesia by Nonanesthesiologists," adopted in 2001 and published in 2002. Their purposes are: to allow clinicians to optimize the benefits of moderate procedural sedation regardless of site of service; to guide practitioners in appropriate patient selection; to decrease the risk of adverse patient outcomes; to encourage sedation education, training, and research; and to offer evidence-based data to promote cross-specialty consistency for moderate sedation practice. Recommendations are made for patient evaluation, preprocedure patient preparation, patient monitoring, supplemental oxygen, and emergency support. They are also made for sedative or analgesic medications not intended for general anesthesia as well as for those intended for general anesthesia, reversal agents, recovery care, and creation and implementation of patient safety processes. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

650 Use of Uncrossmatched Erythrocytes in Emergency Bleeding Situations (Clinical Focus Review)

Blood is typed for major ABO group compatibility and screened for red blood cell antigens and crossmatched between recipient and donor to avoid hemolytic transfusion reactions. Crossmatching takes approximately 1 h. In emergencies, uncrossmatched erythrocytes are given to avoid outcomes worse than hemolytic reactions. Group O erythrocytes are safe to administer when the ABO group is unknown; type-specific, but uncrossmatched blood, can be issued when the ABO group is determined but the antibody screen is incomplete. Intravascular hemolysis from incompatible ABO transfusions can be severe. In patients with unexpected antibodies, extravascular hemolysis can occur, but is rarely life-threatening. This review discusses blood banking pretransfusion testing practices including electronic crossmatching, use of uncrossmatched blood in urgent settings, safety of current blood banking practices, and emerging developments in the types of blood products, such as whole blood, used in trauma patients. *(Summary: B. J. Sweitzer. Image: J. P. Rathmell.)*



657 Antifibrinolytic Therapy and Perioperative Considerations (Review Article)

Excessive fibrinolysis may contribute to coagulopathy, bleeding, and inflammation. Antifibrinolytic therapy may improve outcomes in patients after major trauma or surgery. Tranexamic and epsilon-aminocaproic acid are the most frequently used antifibrinolytic agents. As lysine analogues, they inhibit fibrinolysis by displacing plasminogen from fibrin. While transfusion of allogeneic blood products may be reduced, the effect of antifibronolytic agents on outcome is less clear. In cardiac surgery, high-dose tranexamic acid has been associated with clinical seizures; however, the impact on neurologic outcomes is not well defined. Transfusion requirements are decreased with antifibrinolytic agents in orthopedic and liver surgery without increased incidence of thrombosis. On the other hand, all-cause mortality or hysterectomy rates in patients with postpartum hemorrhage and adverse outcomes in trauma surgery are not consistently reduced with tranexamic acid. *(Summary: N. Skubas. Illustration: Modified from original article.)*