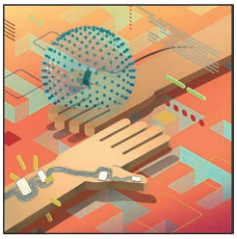
THIS MONTH IN
ANESTHESIOLOGY



597 Ipsilateral and Simultaneous Comparison of Responses from Acceleromyography- and Electromyography-based Neuromuscular Monitors

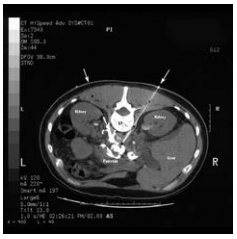
Quantitative intraoperative neuromuscular function monitoring decreases the incidence of residual neuromuscular blockade. The commercially available quantitative neuromuscular monitors are acceleromyography- and electromyography-based monitors, the latter of which addresses practical limitations of the former. The hypothesis that an electromyography monitor would indicate slower recovery from neuromuscular block than an acceleromyography monitor was tested by measuring contractions and muscle action potentials from the same adductor pollicis muscle simultaneously with acceleromyography- and electromyography-based neuromuscular monitors, respectively, in 48 patients undergoing surgery requiring muscle relaxation. Both acceleromyography and electromyography recordings had a train-of-four ratio greater than or equal to 80% in 2,236 (75.1%) of 2,977 data pairs with at least one train-of-four ratio greater than or equal to 80%. In 693 (23.3%) of the data pairs, the acceleromyography-measured train-of-four ratio was greater than or equal to 80% while the electromyography train-of-four ratio was less than 80%. In the remaining 48 (1.6%) data pairs, the electromyography-measured train-of-four ratio was greater than or equal to 80% while the acceleromyography train-of-four ratio was less than 80%. *See the accompanying Editorial on* ***page 558****. (Summary: M. J. Avram. Image: A. Johnson, Vivo Visuals.)*

612 Smart Glasses for Radial Arterial Catheterization in Pediatric Patients: A Randomized Clinical Trial

Smart glasses are head-mounted displays that project the ultrasound screen in front of an operator's eyes, thereby allowing someone using ultrasonography to facilitate acquisition of vascular access to coordinate the ultrasound screen, ultrasound probe, and catheter needle without head movement. The hypothesis that use of smart glasses would increase the first-attempt radial artery catheterization success rate in small pediatric patients compared to conventional ultrasound-guided catheterization was tested in a randomized controlled trial of 116 patients less than 2 yr old scheduled for elective surgery and requiring invasive arterial blood pressure monitoring or blood sampling. The first-attempt radial artery catheterization success rate was 88% (51 of 58) in the smart glasses group and 72% (42 of 58) in the control group, for an absolute risk reduction (95% CI) of −16% (−30 to −13%). The overall complication rate in the smart glasses group was 5% (3 of 58), whereas that in the control group was 29% (17 of 58), for an absolute risk reduction (95% CI) of 24% (11 to 37%). *See the accompanying Editorial on* ***page 562****. (Summary: M. J. Avram. Image: Adobe Stock.)*

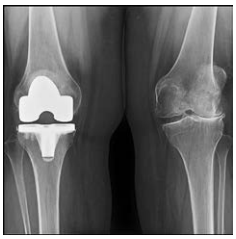
621 Perioperative Normal Saline Administration and Delayed Graft Function in Patients Undergoing Kidney Transplantation: A Retrospective Cohort Study

Delayed graft function in patients undergoing kidney transplantation is associated with a higher risk of acute rejection and poorer long-term graft survival. The hypothesis that perioperative crystalloid solution affects the risk of delayed graft function was tested by determining the association between percentages of total perioperative crystalloid volume represented by normal saline and delayed graft function in a retrospective study of 2,515 patients undergoing kidney transplantation. The incidences of delayed graft function, defined as the need for dialysis within 1 week after transplantation, in the low normal saline group (30% of total crystalloid volume or less), intermediate normal saline group (more than 30% of total volume but less than 80%), and high normal saline group (80% of total volume or more) were 15.8% (61 of 385), 17.5% (113 of 646), and 21.0% (311 of 1,484), respectively. The adjusted odds ratios (95% CI) of delayed graft function were 1.24 (0.85 to 1.81) for the intermediate normal saline group and 1.55 (1.09 to 2.19) for the high normal saline group compared to the low normal saline group. *See the accompanying Editorial on* ***page 564****. (Summary: M. J. Avram. Image: J. P. Rathmell.)*



686 Neurolytic Splanchnic Nerve Block and Pain Relief, Survival, and Quality of Life in Unresectable Pancreatic Cancer: A Randomized Controlled Trial

Neurolytic celiac plexus block and splanchnic nerve block are used to manage pancreatic cancer pain. The hypothesis that neurolytic splanchnic nerve block would improve pain relief compared with systemic analgesic therapy alone in patients with unresectable pancreatic cancer was tested in a randomized controlled trial of 96 patients with moderate to severe pain related to advanced pancreatic cancer who would not receive anticancer treatments. The largest pain relief effect of neurolysis compared to control treatment was a mean difference (95% CI) in visual analog scale (0 to 10) pain scores of 0.7 (0.3 to 1.0) at the first month visit; this treatment effect gradually declined to similar levels in the two groups at the fourth month (mean difference [95% CI], 0.4 [0.1 to 0.6]). The daily oral morphine milligram equivalents dose was less in the neurolytic splanchnic nerve block group through 5 months, but quality of life did not differ between groups at any time. The median survival was 102 days in the neurolysis group and 151 days in the control group. *See the accompanying Editorial on* ***page 573****. (Summary: M. J. Avram. Image: J. P. Rathmell.)*

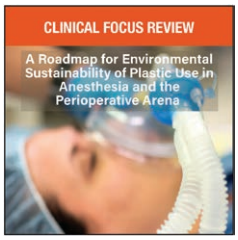


699 Anesthesia Method, Tourniquet Use, and Persistent Postsurgical Pain after Total Knee Arthroplasty: A Prespecified Secondary Analysis of a Randomized Trial

Moderate to severe persistent postsurgical pain is common after total knee arthroplasty. The hypothesis that the effects of spinal and general anesthesia as well as no-tourniquet *versus* tourniquet use on persistent postsurgical pain would not differ was tested in a secondary analysis of a randomized controlled trial of 387 patients. The primary outcome was change in average pain measured with Brief Pain Inventory–Short Form (numerical 0 to 10 rating scale) before and 1 yr after the operation. The mean ± SD change in average pain scores 1 yr postoperatively in the spinal anesthesia group, –2.6 ± 2.5, did not differ from that in the general anesthesia group, –2.3 ± 2.5; the mean difference (95% CI) was –0.4 (–0.9 to 0.1). Although the change in average pain scores 1 yr postoperatively in the no-tourniquet group, –2.1 ± 2.7, differed from those in the tourniquet group, –2.8 ± 2.3, this difference did not reach the predefined threshold (greater than or equal to 1) for clinical importance; the mean difference (95% CI) was 0.6 (0.1 to 1.1). *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

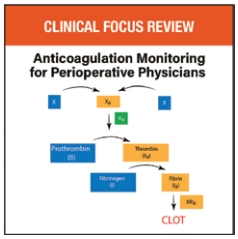
673 Reversing Rivaroxaban Anticoagulation as Part of a Multimodal Hemostatic Intervention in a Polytrauma Animal Model

Patients taking anticoagulation therapy are at increased risk of hemorrhage after an injury, potentially necessitating hemostatic therapy and anticoagulation reversal. Prothrombin complex concentrates (PCCs) can reverse the anticoagulant effects of factor Xa inhibitors such as rivaroxaban. The effectiveness of three doses of a four-factor PCC in treating trauma-related hemorrhage was tested in pigs that had received rivaroxaban, 1 mg/kg, before being subjected to multiple traumas to induce coagulopathy. Animals were resuscitated with Ringer's solution after onset of hemorrhagic shock. Therapy was begun 12 min after injury and blood loss was measured to 6 h. The mean ± SD blood losses in animals (8 per group) allocated to receive saline, 12.5 U/kg PCC, 25 U/kg PCC, or 50 U/kg PCC were 3,313 ± 634 ml, 2,671 ± 334 ml, 1,541 ± 269 ml, and 1,464 ± 108 ml, respectively. In the second part of the study, blood losses in animals (8 per group) allocated to receive 12.5 U/kg PCC and either tranexamic acid, 20 mg/kg, or tranexamic acid, 20 mg/kg, plus fibrinogen concentrate, 80 mg/kg, were 2,910 ± 856 ml and 1,836 ± 556 ml, respectively. *See the accompanying Editorial on* **page 570**. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



729 A Roadmap for Environmental Sustainability of Plastic Use in Anesthesia and the Perioperative Arena (Clinical Focus Review)

Anesthesia and perioperative care contribute significantly to the plastic healthcare waste burden. This Clinical Focus Review outlines a series of evidence-based reduce, reuse, and recycle recommendations toward building environmental sustainability for plastics in the operating room as well as rethink and research recommendations. The best way to decrease waste is to create less of it by eliminating waste (*e.g.*, discarding unused syringes after a procedure) altogether, which should be prioritized, or using reusable equipment, the environmental benefit of which depends on the source of energy (clean *vs.* dirty) available to manufacture and clean it. Even some medical devices labeled as single use by manufacturers but not by regulatory bodies can be cleaned and packaged for reuse. Although manufacturing goods from recycled plastics use one quarter to one third of the energy used in the production of new plastics, recycling should be considered only when reduce and reuse have been maximized. Moving forward, the transition to environmentally sustainable health care will depend on rethinking and research, examples of which are provided. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



738 Anticoagulation Monitoring for Perioperative Physicians (Clinical Focus Review)

Monitoring the effects of anticoagulant therapy is necessary in all phases of the perioperative period. Although warfarin and heparin have been the mainstay oral and parenteral anticoagulants, direct oral anticoagulants are now available to inhibit factor Xa (*e.g.*, apixaban, rivaroxaban, and edoxaban) or thrombin (*e.g.*, dabigatran). The effects of these agents on standard anticoagulation monitoring do not always reflect the degree of anticoagulation. Prolongation of time to fibrin formation of clot-based laboratory tests may reflect deficiencies of involved clotting factors or the presence of factor inhibitors. Chromogenic laboratory-based tests are less sensitive to low levels of other coagulation factors or the presence of certain nonspecific inhibitors. Point-of-care testing, such as activated clotting times and viscoelastic tests, is used when rapid turnaround times are required but the speed and simplicity of sample collection for these tests comes at the cost of introducing blood elements that can affect coagulation measurements. This Clinical Focus Review discusses the strengths and limitations of laboratory and point-of-care tests used most often to assess the level of patient anticoagulation. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

 DOI: 10.10.1097/ALN.0000000000003985