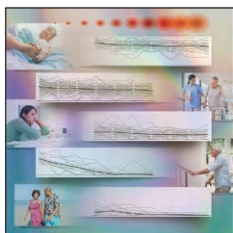


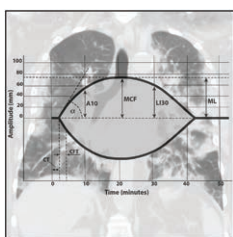
THIS MONTH IN ANESTHESIOLOGY



421 Patient and Procedural Determinants of Postoperative Pain Trajectories

Increased acute postoperative pain intensity is associated with development of persistent postoperative pain. A better understanding of determinants of postoperative pain trajectories may facilitate personalization of postoperative analgesia based on anticipated temporal profiles of acute and persistent postoperative pain. The hypothesis that more than two groups of pain trajectories could be identified was tested using group-based trajectory modeling to characterize unique groups of postoperative pain trajectories for postoperative days 1 through 7 in 360 patients from a mixed surgical cohort. Five distinct pain trajectory groups were identified. Four identified patients with low (7%), moderate-low (24%), moderate-high (46%), and high (17%) pain over time while one identified patients with drastically decreasing postoperative pain (6%). Females and younger patients were more likely to be in the moderate-high and high pain groups. Patients in the high pain group also had higher anxiety and depression and greater pain behaviors and pain catastrophizing preoperatively. Patients in the moderate-high and high pain groups required more postoperative opioids. *See the accompanying Editorial on page 363.*

(Summary: M. J. Avram. Image: A. Johnson, Vivo Visuals.)



457 Greater Fibrinolysis Resistance but No Greater Platelet Aggregation in Critically Ill COVID-19 Patients

Excessive coagulation activation in COVID-19-infected patients has prognostic relevance for hospital mortality and the need for intensive care. The hypothesis that coagulation alterations may be assessed by point-of-care diagnostic tools was tested in 27 patients admitted to the intensive care unit (ICU) with moderate to severe acute respiratory distress syndrome due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. All patients were mechanically ventilated and 14 (52%) received renal replacement therapy due to acute renal failure. Compared to 12 healthy volunteers without any known preexisting conditions, patients with COVID-19 infection had greater fibrinolysis resistance as reflected by thromboelastometry but no greater platelet

aggregability based on impedance aggregometric testing. Assessment of coagulation factors and conventional coagulation parameters found increased D-dimer concentrations as well as activated partial thromboplastin time (PTT) within normal ranges, more von Willebrand factor (vWF) antigen, factor VIII, and factor IX and lesser protein S, indicative of complement pathway activation, acute phase response, and an association with a procoagulant state. *See the accompanying Editorial on page 366.* (Summary: M. J. Avram. Image: J. P. Rathmell.)



370 Restrictive Transfusion Strategy after Cardiac Surgery: Role of Central Venous Oxygen Saturation Trigger: A Randomized Controlled Trial

Hemoglobin concentration alone may not be the best criteria for triggering erythrocyte transfusion. The fundamental issue of transfusion is not to get hemoglobin concentration to a predefined range, but to ensure transfusion helps match the metabolic demand. The hypothesis that use of central venous oxygen saturation, which is related to the balance between tissue oxygen delivery and consumption, together with hemoglobin concentration to guide transfusion will reduce the incidence of transfusion was tested in a prospective randomized controlled study of 100 patients who developed postoperative anemia without active bleeding during their intensive care unit (ICU) stay. Patients in the control group were transfused with erythrocytes if their hemoglobin concentration was

less than 9 g/dl while those in the central venous oxygen saturation group were transfused if their hemoglobin concentration was less than 9 g/dl and their central venous oxygen saturation was less than or equal to 65%. Thirty-four (68%) patients in the central venous oxygen saturation group were transfused in the ICU but all patients (100%, n = 50) in the control group were transfused. *See the accompanying Editorial on page 359.* (Summary: M. J. Avram. Image: J. P. Rathmell.)



381 Intravenous versus Volatile Anesthetic Effects on Postoperative Cognition in Elderly Patients Undergoing Laparoscopic Abdominal Surgery: A Multicenter, Randomized Trial

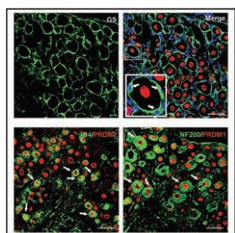
Delayed neurocognitive recovery 7 days after noncardiac surgeries has been reported to be as high as 41% in patients 60 yr of age and older. The hypothesis that patients 60 yr of age and older having laparoscopic abdominal operations under propofol-based anesthesia will have a lower incidence of delayed neurocognitive recovery than patients under sevoflurane-based anesthesia was tested in a randomized, double-blind, controlled study of 447 patients. On the day before and 5 to 7 days after surgery patients underwent a battery of neuropsychologic tests that were used to evaluate them for delayed neurocognitive recovery. One hundred and eighty-

four control subjects who were not exposed to anesthesia and surgery were studied to facilitate adjustment of the practice effect of repeated neuropsychologic tests. Forty-six patients (20.8%) in the sevoflurane group and 38 patients (16.8%) in the propofol group met the criteria for delayed neurocognitive recovery (odds ratio 0.77; 95% CI, 0.48 to 1.24), suggesting anesthetic choice is not a modifiable risk factor for delayed neurocognitive recovery. (Summary: M. J. Avram. Image: Getty Images.)



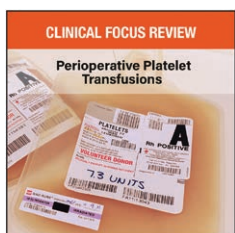
395 Bedside Allogeneic Erythrocyte Washing with a Cell Saver to Remove Cytokines, Chemokines, and Cell-derived Microvesicles: A Clinical Feasibility Study

Adverse reactions to transfusion of units of erythrocytes may be due to immune system activation by chemokines, cytokines, or microvesicles in the infused supernatant. Blood bank–based washing may be logistically difficult. The feasibility and effectiveness of on-demand, bedside erythrocyte washing with a cell saver to remove cytokines, chemokines, and erythrocyte-derived micro-particles from the supernatant was tested in 75 washed erythrocyte units given to cardiac surgery patients. Bedside erythrocyte washing was considered feasible, defined at the patient level if at least 75% of prescribed units were washed per protocol, in 80 of 81 patients receiving a transfusion on the operative day. Washing reduced soluble CD40 ligand (a leukocyte derived platelet proaggregatory protein), chemokine ligand 5 (a leukocyte derived proinflammatory chemokine), and microvesicle numbers, while cell-free hemoglobin concentration increased and there was no effect on neutral lipids (which are capable of neutrophil priming). (Summary: M. J. Avram. Image: J. P. Rathmell.)



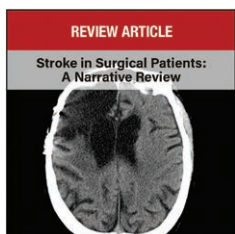
435 Positive Regulatory Domain I-binding Factor 1 Mediates Peripheral Nerve Injury-induced Nociception in Mice by Repressing Kv4.3 Channel Expression

The transcriptional repressor positive regulatory domain I-binding factor 1 (PRDM1), which is expressed in peripheral sensory neurons of the dorsal root ganglion of adult mice, regulates their formation and function. Peripheral nerve injury leads to sustained decreases in A-type voltage-gated K⁺ (Kv) channel expression, which may cause abnormal dorsal root ganglion neuron excitability and neuropathic pain. The hypotheses that PRDM1 in the dorsal root ganglion contributes to peripheral nerve injury-induced nociception regulation and that its mechanism involves Kv4.3 channel transcriptional repression was tested in mouse models of peripheral nerve injury-induced nociception. Peripheral nerve injury led to increased PRDM1 expression in injured dorsal root ganglion neurons that was associated with downregulation of Kv4.3 channel expression. Blocking the increase in PRDM1 restored Kv4.3 channel expression, reduced the hyperexcitability of injured dorsal root ganglion neurons, and attenuated peripheral nerve injury-induced nociception. Overexpression of PRDM1 in naïve mouse dorsal root ganglion neurons diminished Kv4.3 channel expression and induced hyperalgesia. (Summary: M. J. Avram. Image: From original article.)



471 Perioperative Platelet Transfusions (Clinical Focus Review)

Platelets are transfused perioperatively as either prophylaxis against bleeding or therapy to stop it. Although the value of platelet transfusion at extremes of thrombocytopenia, injury, and blood loss is not in doubt, anesthesiologists encounter situations in which the marginal utility of platelet transfusion is uncertain. Specific platelet triggers and goals vary with clinical circumstances, and there is no high-quality evidence to guide perioperative practice. This Clinical Focus Review discusses guidelines, physiologic evidence, and results of randomized controlled trials related to perioperative platelet therapy. It recommends that platelet therapy is best guided by predefined protocols incorporating laboratory testing. It reports that it is acceptable under most society guidelines for patients to undergo low-risk procedures with platelet counts of at least 20×10^3 cells/ μ l, high-risk percutaneous procedures and major surgery with platelet counts of at least 50×10^3 cells/ μ l, neuraxial anesthesia with platelet counts of at least 75 to 100×10^3 cells/ μ l, and neurologic or ophthalmologic surgery with platelet counts of at least 100×10^3 cells/ μ l. (Summary: M. J. Avram. Image: J. P. Rathmell.)



480 Stroke in Surgical Patients: A Narrative Review (Review Article)

Covert stroke risk in patients 65 yr old and older having operations requiring inpatient admission may reach 7% and overt perioperative stroke risk ranges from 0.1 to 2%, depending on risk factors. Perioperative stroke generally occurs due to major thromboembolic events in large-vessel territories within the first few postoperative days, although etiology is frequently unclassifiable. Prediction models have become available to characterize perioperative stroke risk as risk factors have been identified but there is no system for testing physiologic factors that may contribute to stroke risk. Risk reduction strategies include delaying elective surgery after recent stroke and optimizing preoperative medication (e.g., beta-blockers, anticoagulants). For general anesthesia, the choice of maintenance technique does not appear to affect stroke risk nor does the decision to choose general or regional anesthesia. Although intraoperative hypotension has been implicated as a contributor to perioperative stroke, there is no clearly defined threshold below which noncardiac surgery patients are at increased risk. The many resources available for stroke assessment and management in the perioperative setting are reviewed. (Summary: M. J. Avram. Image: J. P. Rathmell.)