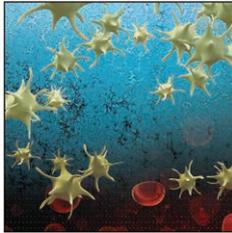


THIS MONTH IN ANESTHESIOLOGY



1173 A Pilot Trial of Platelets Stored Cold *versus* at Room Temperature for Complex Cardiothoracic Surgery

Platelets for transfusion are stored at room temperature for 4 to 7 days. *In vitro* and clinical studies suggest cold-stored platelets may be more hemostatically active in bleeding patients. A two-stage pilot trial tested the hypothesis that cold-stored platelets reduce postoperative bleeding compared to room temperature–stored platelets in patients who develop indications for platelet transfusion during complex cardiothoracic surgery. Stage I was a two-arm randomized trial that compared transfusion with platelet concentrates stored at room temperature and cold stored up to 7 days in 50 patients. An exploratory, single-arm prospective observational study of 15 patients, stage II, extended the duration of platelet cold storage to 8 to 14 days. The difference in median

(95% CI) postoperative blood loss measured as chest drain output between the room temperature–stored arm and the cold-stored up to 7 days arm was 75 (–220 to 425) ml, whereas that between the room-temperature arm and the nonconcurrent cold-stored 8 to 14 days arm was 30 (–1040 to 355) ml. See the accompanying Editorial on [page 1161](#). (Summary: M. J. Avram. Image: A. Johnson, Vivo Visuals.)



1214 Hypotension Prediction Index for Prevention of Hypotension during Moderate- to High-risk Noncardiac Surgery: A Pilot Randomized Trial

Anesthesia clinicians respond to blood pressure trends and treat hypotension as necessary during surgery, mostly when it occurs. The Hypotension Prediction Index algorithm uses arterial waveform features to predict hypotension, defined by mean arterial pressure (MAP) less than 65 mmHg for at least 1 min. The hypothesis that index guidance reduces the duration and severity of hypotension compared to routine care was tested in a pilot randomized trial of 214 patients having moderate- to high-risk noncardiac surgery. The primary outcome was time-weighted average MAP less than 65 mmHg; hypotension severity was also characterized as area under the curve mean arterial pressure (AUC MAP) less than 65 mmHg and minutes of MAP less than 65 mmHg. The estimated median

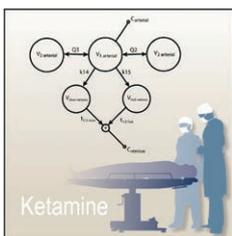
differences (95% CI) for the index-guided group minus the unguided group were: time-weighted average MAP less than 65 mmHg, 0 (–0.03 to 0.04) mmHg; AUC MAP less than 65 mmHg, –1.3 (–12 to 7) mmHg · min; and duration of MAP less than 65 mmHg, –1 (–3.3 to 1) min. Potential explanations include inadequacies of the index algorithm, trial design, and clinicians' responses to the alert. See the accompanying Editorial on [page 1170](#). (Summary: M. J. Avram. Image: J. P. Rathmell.)



1184 Brief Preoperative Screening for Frailty and Cognitive Impairment Predicts Delirium after Spine Surgery

Guidelines recommend that older surgical patients undergo preoperative screening for geriatric conditions associated with postoperative delirium and poor surgical outcomes. Nonetheless, preoperative screening for frailty and cognitive impairment are not typically performed before a surgical procedure in part because of the perception that such screening is unduly burdensome and time consuming. The hypothesis that frailty or cognitive screening using brief tools will identify patients at high risk for postoperative delirium was tested in a prospective study of 219 older patients scheduled for elective spine surgery screened preoperatively for frailty with the FRAIL scale (measuring fatigue, resistance, ambulation, illness, and weight loss) and for cognition with the

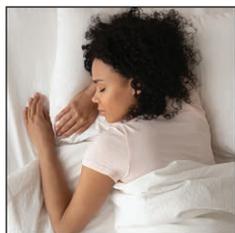
Mini-Cog and Animal Verbal Fluency tests. Postoperative delirium was identified by both chart review and the Confusion Assessment Method. Frailty was a strong independent predictor of postoperative delirium in the multivariable model (odds ratio 6.6). Naming fewer animals on the verbal fluency test was also associated with increased odds of postoperative delirium (odds ratio 1.08 for each point decrease in the number of animals named) as was more invasive surgery (odds ratio 2.69). See the accompanying Editorial on [page 1164](#). (Summary: M. J. Avram. Image: A. Johnson, Vivo Visuals.)



1192 Ketamine Pharmacokinetics: A Systematic Review of the Literature, Meta-analysis, and Population Analysis

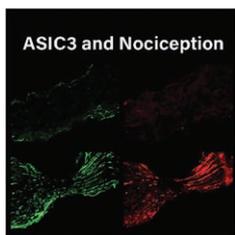
There has been a renewed interest in ketamine because of potentially new indications for its use. A broad range of models have been published to describe ketamine pharmacokinetics in different populations and after different methods of administration and blood sampling. A general pharmacokinetic model could greatly aid in the development of dosing schemes that maximize therapeutic effects while minimizing side effects. The present study first performed a systematic review of relevant studies to qualitatively and quantitatively evaluate existing pharmacokinetic models of ketamine. A meta-analysis was then performed on 18 studies that had conducted mixed-effects pharmacokinetic analyses, and a ketamine pharmacokinetic meta-analytical model was

constructed successfully despite large heterogeneity in study characteristics. A population pharmacokinetic analysis was subsequently performed on raw data sets obtained from 14 unique sources. Parameter estimates of the population pharmacokinetic analysis were comparable to those obtained in the meta-analysis of three-compartment pharmacokinetic models. See the accompanying Editorial on [page 1167](#). (Summary: M. J. Avram. Image: Adobe Stock/J. P. Rathmell.)



1234 Oral Dexmedetomidine Promotes Non-rapid Eye Movement Stage 2 Sleep in Humans

Dexmedetomidine, an alpha-2 adrenergic agonist sedative, administered intravenously as a nighttime loading dose promotes non-rapid eye movement stage 3 sleep while a continuous infusion of dexmedetomidine promotes non-rapid eye movement stage 2 sleep. The hypothesis that a capsule-based solid oral dosage formulation of 700 µg dexmedetomidine would increase the duration of non-rapid eye movement stage 2 sleep was tested in a randomized, placebo-controlled, double-blind, cross-over polysomnography study in 15 American Society of Anesthesiologists Physical Status I volunteers. Sleep time (mean ± SD) after placebo was 523 ± 40 min, whereas that after dexmedetomidine was 544 ± 33 min (difference in the means [95% CI], -16 [-43 to 11] min). Dexmedetomidine increased the duration of non-rapid eye movement stage 2 sleep by a difference in the means of 63 (95% CI, 19 to 107) min and decreased the duration of rapid eye movement sleep by a difference in the means of 42 (95% CI, 5 to 78) min. (Summary: M. J. Avram. Image: Adobe Stock.)



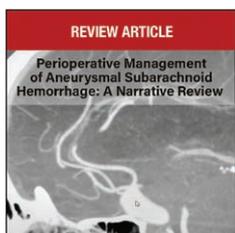
1244 Acid-sensing Ion Channel 3 Overexpression in Incisions Regulated by Nerve Growth Factor Participates in Postoperative Nociception in Rats

Lactate concentrations increase and pH decreases in incised tissues, corresponding to incisional nociception. Nociceptive afferent fibers innervating incised skin or muscle have enhanced chemosensitivity to lactic acid. Among the acid-sensing ion channels (ASICs) that could participate in this process, ASIC3 is the most sensitive to protons. The hypothesis that upregulation of ASIC3 in incised tissues is induced by nerve growth factor through the phosphoinositide 3-kinase/protein kinase B signaling pathway and participates in postoperative nociception was tested in the rat plantar incisional pain model and sham-incised rats. The primary experimental outcome was pain-related behavioral changes. Incision-induced mechanical hypersensitivity and pain-related guarding behavior were partially reversed by the ASIC3 blocker APETx2 and by ASIC3 knockout. The ASIC3 concentration was increased in incised skin and muscle. Bidirectional transport of ASIC3 between incised tissue and the dorsal root ganglia was observed after sciatic nerve ligation. ASIC3 overexpression at the incision site was regulated by nerve growth factor through the phosphoinositide 3-kinase/protein kinase B signaling pathway. (Summary: M. J. Avram. Image: Adapted from original article.)



1263 Platelet Function Testing in Patients on Antiplatelet Therapy before Cardiac Surgery (Clinical Focus Review)

Dual antiplatelet treatment, which is the combination of a platelet P2Y₁₂ adenosine diphosphate (ADP) receptor inhibitor and aspirin, is the first line treatment of acute coronary syndromes. Current guidelines recommend a uniform preoperative discontinuation period of at least 3 days for ticagrelor, 5 days for clopidogrel, and 7 days for prasugrel to reduce the risk of bleeding in patients on P2Y₁₂ receptor inhibitors presenting for nonemergent, elective, or urgent major surgery. However, preoperative platelet function testing in patients on dual antiplatelet therapy presenting for surgery may be warranted due to variability in on-treatment platelet reactivity and platelet function recovery timings. Such testing can identify patients with high platelet reactivity to ADP who are candidates to proceed to surgery without delay as well as those with low platelet reactivity who may benefit from longer than recommended waiting times or targeted intraoperative transfusion therapy for use during hemodynamic instability. Individualized preoperative waiting times and targeted intraoperative blood management may shorten the length of hospital stay, reduce costs, and improve patient outcomes. (Summary: M. J. Avram. Image: J. P. Rathmell.)



1283 Perioperative Management of Aneurysmal Subarachnoid Hemorrhage: A Narrative Review (Review Article)

Aneurysmal subarachnoid hemorrhage is an acute neurological emergency associated with significant extracranial sequela. Extracranial manifestations of aneurysmal subarachnoid hemorrhage include cardiac dysfunction, neurogenic pulmonary edema, fluid and electrolyte imbalances, and hyperglycemia. Early patient management after aneurysmal subarachnoid hemorrhage should be directed at stabilizing life-threatening conditions, minimizing neurological injury, optimizing physiology, and planning definitive care. After rapid stabilization, prompt definitive treatment of the aneurysm by craniotomy and clipping or endovascular intervention with coils and/or stents is needed to prevent rebleeding. Because there are few data on the effect of anesthesia on long-term neurological outcomes of aneurysmal subarachnoid hemorrhage, perioperative management should focus on optimizing systemic physiology, facilitating timely definitive treatment, and selecting an anesthetic technique based on patient characteristics, severity of aneurysmal subarachnoid hemorrhage, and the planned intervention and monitoring. Anesthesiologists should be familiar with evoked potential monitoring, electroencephalographic burst suppression, temporary clipping, management of external ventricular drains, adenosine-induced cardiac standstill, and rapid ventricular pacing to effectively care for these patients. (Summary: M. J. Avram. Image: J. P. Rathmell.)