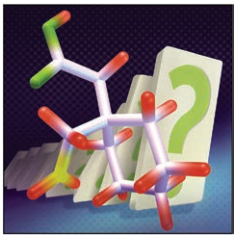
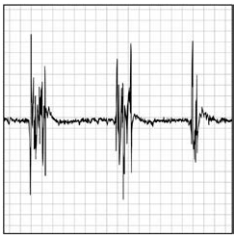
THIS MONTH IN
ANESTHESIOLOGY



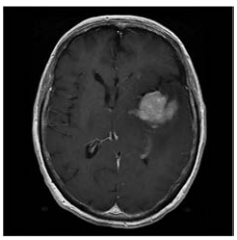
265 Perioperative Use of Gabapentinoids for the Management of Postoperative Acute Pain: A Systematic Review and Meta-analysis

Gabapentinoids are routinely used for the management of postoperative analgesia to decrease pain and opioid use. This systematic review with meta-analysis of 281 randomized controlled trials (N = 24,682 participants) was performed to evaluate the analgesic and adverse effects of perioperative use of gabapentinoids in adult surgical patients. The coprimary outcomes were postoperative acute pain at 6, 12, 24, 48, and 72 h after surgery measured by any quantitative pain scale. Pain intensity scores were collected using or converted to a scale from 0 (no pain) to 100 (worst pain imaginable) points. The minimal clinically important difference between groups for acute pain intensity is 10 points on a 100-point scale and is independent of pain severity. Gabapentinoids were associated with less (mean difference [95% CI]) postoperative pain intensity of –10 [–12 to –9] at 6 h, –9 [–10 to –7] at 12 h, –7 [–8 to –6] at 24 h, –3 [–5 to –1] at 48 h, and –2 [–4 to 0] at 72 h. This effect was not clinically significant. *See the accompanying Editorial on* **page 251.** *(Summary: M. J. Avram. Image: A. Johnson, Vivo Visuals.)*



280 Electroencephalogram Burst-suppression during Cardiopulmonary Bypass in Elderly Patients Mediates Postoperative Delirium

The hypotheses that pre-existing cognitive impairment accounts for electroencephalogram burst-suppression during cardiopulmonary bypass (CPB) and that electroencephalogram burst-suppression during CPB mediates the effect of cognitive impairment on delirium were tested using a two-step multivariable logistic regression approach. Data from 159 patients over 60 yr old undergoing cardiac surgery were used in a prespecified retrospective observational substudy of the ongoing Minimizing Intensive Care Unit Neurological Dysfunction with Dexmedetomidine-induced Sleep (MINDDS) trial. After backward elimination, physical function (odds ratio [95% CI]: 0.96 [0.91 to 0.99]), lowest CPB temperature (odds ratio [95% CI]: 0.73 [0.58 to 0.88]), and electroencephalogram alpha power (odds ratio [95% CI]: 0.61 [0.47 to 0.76]) were retained as predictors in the burst-suppression multivariable model. After backward elimination, burst-suppression (odds ratio [95% CI]: 4.1 [1.5 to 13.7]) and age (odds ratio [95% CI]: 1.07 [0.99 to 1.15]) were retained as predictors in the delirium multivariable model. A causal model consistent with the results of these analyses is that burst-suppression during CPB mediates the effects of physical function, lowest temperature during CPB, and alpha power on delirium. *See the accompanying Editorial on* **page 255.** *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



304 Ephedrine *versus* Phenylephrine Effect on Cerebral Blood Flow and Oxygen Consumption in Anesthetized Brain Tumor Patients: A Randomized Clinical Trial

Adequate cerebral perfusion pressure needs to be maintained during brain tumor surgery to ensure sufficient cerebral blood flow to meet metabolic demands. Vasopressors increase vascular resistance and cerebral perfusion pressure, but they may impair oxygen extraction from blood by disturbing capillary flow patterns. The hypothesis that phenylephrine reduces the cerebral metabolic rate of oxygen in both peritumoral and contralateral brain tissue compared to ephedrine was tested in a randomized clinical trial of 24 patients undergoing elective craniotomy for supratentorial tumors. The cerebral metabolic rate of oxygen was measured using positron emission tomography. Peritumoral mean (± SD) cerebral metabolic rate of oxygen values before and after vasopressor (ephedrine, 67.0 ± 11.3 and 67.8 ± 25.7 μmol · 100 g^{-1} · min^{-1}; phenylephrine, 68.2 ± 15.2 and 67.6 ± 18.0 μmol · 100 g^{-1} · min^{-1}) did not differ between groups (difference [95% CI], 1.5 [–13.3 to 16.3] μmol · 100 g^{-1} · min^{-1}). There were no corresponding intergroup differences in contralateral hemisphere cerebral metabolic rate of oxygen values. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

342 Substance Use Disorder in Physicians after Completion of Training in Anesthesiology in the United States from 1977 to 2013

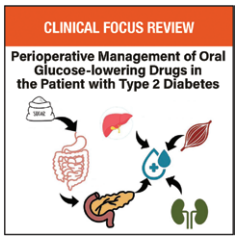
The incidence of substance use disorders among anesthesiology residents in the United States between 1975 and 2009 was reported to be 2.16 per 1,000 resident-years. The incidence and outcomes of substance use disorders that resulted in either a report to the American Board of Anesthesiology or death was determined for a cohort of 44,736 physicians after they completed training in a U.S. anesthesiology residency program from 1977 to 2013. A total of 601 individuals (1.3%) developed substance use disorders after residency training and before December 31, 2013; the overall incidence of substance use disorders was 0.75 (95% CI, 0.70 to 0.80) per 1,000 physician-years. The cumulative percentage expected to develop substance use disorders within 30 yr after the completion of training estimated by Kaplan-Meier analysis was 1.6% (95% CI, 1.4 to 1.7%). One hundred fourteen (19%) of those who developed substance use disorders after training died from a cause related to it. Of the 487 individuals who survived their initial episode, 158 (32%) relapsed at least once. *(Summary: M. J. Avram. Image: Adobe Stock.)*

350 Enhanced Recovery after Lumbar Spine Fusion: A Randomized Controlled Trial to Assess the Quality of Patient Recovery

Enhanced recovery pathways are frameworks through which evidence-based, standardized care can be organized and delivered at the individual and health system levels. The hypothesis that patients undergoing 1- and 2-level open lumbar spinal fusion randomized to enhanced recovery pathway care would have better quality of recovery, assessed by the Quality of Recovery 40 score at postoperative day 3, than those randomized to usual care was tested in 51 patients. The Quality of Recovery 40 is a 40-item questionnaire that assesses five dimensions of recovery after surgery and anesthesia and has a maximum score of 200 points. The mean Quality of Recovery 40 score difference at postoperative day 3 was 9 points (95% CI, 0.4 to 18 points), with higher scores (mean ± SD) reported by patients in the enhanced recovery group (179 ± 14 points) than by those in the usual care group (170 ± 16 points). This 9-point difference in Quality of Recovery 40 scores failed to reach the prespecified minimum clinically important difference of 12 points. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

408 Dorsal Root Ganglion Stimulation Alleviates Pain-related Behaviors in Rats with Nerve Injury and Osteoarthritis

Dorsal root ganglion stimulation has proven effective for treating chronic neuropathic and nonneuropathic pain. The hypothesis that ganglion stimulation should be effective on all pain conditions with peripheral pathologic origins if the ganglia innervate the painful area was tested in a rat neuropathic pain (tibia nerve injury) model and a rat monosodium iodoacetate-induced osteoarthritis pain model. In rats with nerve injury, multilevel ganglion stimulation decreased hypersensitivity to noxious mechanical stimulation more than single-level ganglion stimulation. Spontaneous pain-like behavior, evaluated by conditioned place preference, responded to both single-level and multilevel ganglion stimulation. In rats with osteoarthritis, multilevel ganglion stimulation reduced sensitivity to knee motion more than single-level stimulation. Both single-level and multilevel ganglion stimulation during osteoarthritis provided effective analgesia in the conditioned place preference paradigm. Ganglion stimulation was equally effective in female and male rats. This well-characterized rat model of ganglion stimulation is suitable for exploring indications and mechanisms of ganglion stimulation. *See the accompanying Editorial on* **page 262.** *(Summary: M. J. Avram. Image: Adobe Stock.)*



430 Perioperative Management of Oral Glucose-lowering Drugs in the Patient with Type 2 Diabetes (Clinical Focus Review)

The risk of postoperative complications is higher in type 2 diabetes patients than it is in nondiabetic patients. Proper perioperative management of oral glucose-lowering treatment in type 2 diabetic patients is necessary to prevent dysglycemia and thereby improve outcomes. Preoperative discontinuation of some oral glucose-lowering drugs may worsen glycemic control whereas continuation of other drugs may induce hypoglycemia or ketoacidosis, either of which could increase complication rates. The decision to discontinue or continue these drugs before elective surgery should be based, at least in part, on their mechanisms of action. Oral glucose-lowering drugs can lower blood glucose by increasing insulin release, increasing insulin action, reducing glucose absorption, or increasing urinary glucose elimination. The present Clinical Focus Review discusses the mechanisms of action of oral-glucose lowering drugs and provides guidelines on whether to continue dosing on the morning of elective surgery or to discontinue dosing and, if it is discontinued, when to restart it based on their mechanism of action, the type and time of surgery, and duration of fasting. *(Summary: M. J. Avram. Image: From original article.)*

439 Mineralocorticoid Dysfunction during Critical Illness: A Review of the Evidence (Review Article)

There has been renewed interest in the role of the mineralocorticoid axis in critical illness. The present narrative review summarizes current insights into the pathophysiologic mechanisms and clinical implications of the renin-angiotensin-aldosterone system in critical illness, beginning with adrenal steroid biosynthesis, regulation of aldosterone secretion, and the mode of action and cellular effects of aldosterone. The causes of hypoaldosteronism and its clinical implications are then considered, focusing on hyporeninemic hypoaldosteronism, the most common cause of secondary mineralocorticoid insufficiency. The evidence that inappropriately low plasma aldosterone concentrations may occur despite high plasma renin activity is then reviewed as part of a discussion of mineralocorticoid dysfunction during critical illness that also provides an overview of the role of mineralocorticoid supplementation during critical illness. The review concludes with considerations of both the challenges associated with the diagnosis of mineralocorticoid insufficiency in critical illness and novel therapeutic options for the management of catecholamine resistant shock. *(Summary: M. J. Avram. Image: From original article.)*

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