THIS MONTH IN

ANESTHESIOLOGY

280 Preoperative Evaluation Clinic Visit Is Associated with Decreased Risk of In-hospital Postoperative Mortality

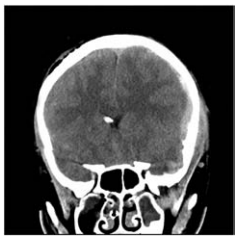
Anesthesiologist-led preoperative evaluation clinics (PECs) decrease costs, improve operating room efficiency, and increase patient satisfaction. The hypothesis that patient outcomes are better after anesthesiologist-directed, standardized evaluation in a PEC was tested by comparing the incidence of in-hospital postoperative mortality in patients who were evaluated before elective surgery in a PEC to that in patients who had elective surgery without being seen in the PEC in a retrospective review of an administrative database. After propensity score matching, there were 13,964 patients within each cohort. There were 11 deaths (0.08%) among patients seen in PECs and 23 deaths (0.16%) among patients not seen in PECs. A visit to a PEC was associated with a reduction in mortality (odds ratio, 0.48; 95% CI, 0.22 to 0.96) by comparison of the matched cohorts using univariate logistic regression. *(Summary: M. J. Avram. Photo: ©Thinkstock.)*

272 A Population-based Study Evaluating the Association between Surgery in Early Life and Child Development at Primary School Entry

It has been hypothesized that children have an increased risk of adverse developmental outcomes when exposed to anesthesia and surgery during the period of increased neurodevelevelopment. A population-based study was conducted to determine whether anesthesia and surgery in early childhood are associated with adverse effects on child development as measured at primary school entry using the Early Development Instrument in a matched cohort of 28,366 children who underwent surgery before Early Development Instrument completion and 55,910 children who did not undergo surgery. The proportion of children with early developmental vulnerability in the exposed group was 25.6% while that in the unexposed group was 25.0% (adjusted odds ratio, 1.05; 95% CI, 1.01 to 1.08). Although children who underwent surgery before primary school age were at a statistically increased risk of early developmental vulnerability, the difference between exposed and unexposed children was small. *See the accompanying Editorial View on* **page 263.** *(Summary: M. J. Avram. Photo: ©Thinkstock.)*

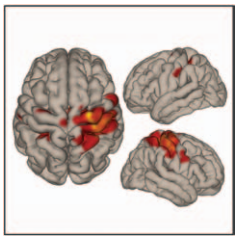
295 Emergency Cricothyrotomy Performed by Surgical Airway–naive Medical Personnel: A Randomized Crossover Study in Cadavers Comparing Three Commonly Used Techniques

In truly emergent cannot intubate, cannot ventilate situations, airway access can be provided by cricothyrotomy. It is unclear what method should be taught to physicians with limited or no experience with cricothyrotomy. The aim of this study was to assess the efficiency and safety of three commonly used techniques/sets for cricothyrotomy—the surgical technique, the Melker set, and the QuickTrach II set—when performed in cadavers by surgical airway–naive medical personnel. Twenty medical students without prior knowledge of surgical airway performed the three cricothyrotomy techniques in a randomized order after a 2-h training session. Ninety-five percent (19/20) of the surgical techniques were successful, compared to 55% (11/20) for the QuickTrach II and 50% (10/20) for the Melker. Most failures were due to cannula misplacement, rather than time, except for the Melker set. *See the accompanying Editorial View on* **page 269.** *(Summary: M. J. Avram. Photo: ©Thinkstock.)*



346 Transcranial Doppler to Predict Neurologic Outcome after Mild to Moderate Traumatic Brain Injury

Five to twenty percent of patients admitted to the emergency department with mild to moderate traumatic brain injury (TBI) develop secondary neurologic deterioration (SND) within the first posttraumatic week. Triage of patients with minor to moderate TBI and minor lesions on computed tomography scan is challenging. The present prospective observational study evaluated transcranial Doppler (TCD) thresholds of greater than or equal to 1.25 for pulsatility index and less than or equal to 25 cm/sec for diastolic flow velocity for SND prediction after mild to moderate TBI and minor lesions on computed tomography scan in 356 patients across 17 sites between 2011 and 2013. Sixteen of 20 patients who suffered SND (80%) had an abnormal TCD pattern on admission as did 71 of 336 patients who did not suffer SND (21%). Therefore, TCD thresholds had 80% sensitivity and 79% specificity. While negative predictive value was 98%, positive predictive value was 18%. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

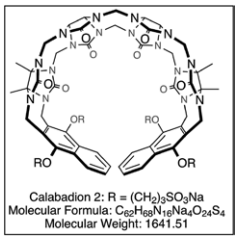


368 Changes in Brain Resting-state Functional Connectivity Associated with Peripheral Nerve Block: A Pilot Study

"Plasticity" refers to changes in brain activity and organization in response to injury or perceived injury, such as experimental deafferentation. *In vivo* functional plasticity was determined using resting-state functional connectivity (RSFC) associated with temporary functional deafferentation through supraclavicular peripheral nerve block (PNB) in 10 volunteers. Each participant underwent functional connectivity magnetic resonance imaging during three RSFC experimental conditions: before PNB, during active PNB, and during PNB recovery. PNB caused transient disruption of *inter*hemispheric RSFC of the left- and right-manual motor regions, but *intra*hemispheric RSFC of these regions was preserved. There was also increased RSFC between the left motor region of interest and *bilateral* higher order visual cortex regions after behavioral PNB recovery. PNB has features consistent with other models of deafferentation, making it a potentially useful approach to study interhemispheric plasticity. *(Summary: M. J. Avram. Image: reproduced from original article in this issue.)*

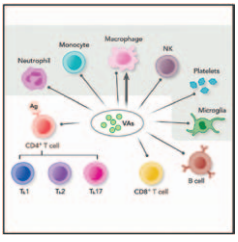
313 Which Anesthesia Regimen Is Best to Reduce Morbidity and Mortality in Lung Surgery? A Multicenter Randomized Controlled Trial

One-lung ventilation is associated with hypoxia and ischemia in the nonventilated lung, reoxygenation of which triggers hypoxia–reoxygenation injury. Volatile anesthetics protect organs from ischemia–reperfusion-induced tissue injury. A randomized controlled trial of 460 patients undergoing elective lung resection surgery requiring one-lung ventilation tested the hypothesis that conditioning with desflurane leads to fewer major complications during hospitalization and during the 6 months after surgery. Thirteen percent of patients anesthetized with desflurane and 16.5% of those anesthetized with propofol experienced at least one major complication during hospitalization (adjusted hazard ratio, 0.75; 95% CI 0.46 to 1.22). Major complications within 6 months after surgery were 40.4% in the propofol group and 39.6% in the desflurane group (adjusted hazard ratio, 0.95; 95% CI 0.71 to 1.28). Organ protection by desflurane was not significant enough to affect measurable clinical outcomes. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



333 A Novel Strategy to Reverse General Anesthesia by Scavenging with the Acyclic Cucurbit[n]uril-type Molecular Container Calabadion 2

The effects of anesthetic agents are generally terminated by passive processes governed by their pharmacokinetics. The γ-cyclodextrin sugammadex reverses the neuromuscular blocking effects of rocuronium by encapsulation, as a result of which the drug is unable to bind to the acetylcholine receptor. The acyclic cucurbit[n]uril molecular container calabadion 2 is a new drug-encapsulating agent. Its ability to reverse general anesthesia with etomidate and ketamine was studied in rats. Calabadion 2 dose-dependently decreased effects of ketamine and etomidate on electroencephalographic predictors of depth of anesthesia by encapsulation at nontoxic concentrations. At doses sufficient to reverse neuromuscular blockade, calabadion 2 had minimal effects on anesthetic depth or duration. The effects of propofol and isoflurane were not reversed by calabadion 2. *(Summary: M. J. Avram. Image: molecular structure of calabadion 2.)*



399 Immune Modulation by Volatile Anesthetics (Review Article)

All forms of anesthesia have been reported to modulate the immune system. Direct immune modulations by volatile anesthetics affect innate and adaptive immunity, in which the majority of effector immune cells are natural killer cells, dendritic cells, neutrophils, macrophages, and lymphocytes. In addition to the direct effects, volatile anesthetics also affect the neuroendocrine response from the hypothalamic–pituitary–adrenal axis, thereby indirectly influencing the immune response through the secretions of immunomodulator hormones, such as catecholamines and glucocorticoids. This review provides a balanced perspective on the anesthetic modulation of innate and adaptive immune responses as well as indirect effectors of immunity. Potential mechanisms of immunomodulation by volatile anesthetics are also discussed. The review ends with a consideration of the effect of volatile anesthetics on cancer recurrence and their antiischemic and antiinflammatory effects. *(Summary: M. J. Avram. Illustration: A. Johnson, Vivo Visuals.)*