



220 Establishing Obstetric Anesthesiology Practice Guidelines in the Republic of Armenia: A Global Health Collaboration

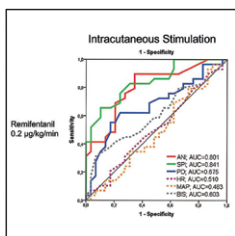
High-income countries have promoted a culture of patient safety in part through development of clinical practice guidelines that may not be applicable to low- and middle-income countries' settings due to differences in provider availability, training, infrastructure, and resources. Anesthesia care in low- and middle-income countries is associated with higher-than-expected perioperative mortality rates, especially with general anesthesia and intubation, in both obstetric and nonobstetric procedures. General anesthesia was the most commonly used anesthetic for cesarean delivery in the Republic of Armenia before an obstetric anesthesia training program. Over the course of a multiyear educational collaboration with an invited multinational team of physicians, Armenian anesthesiologists increased the use of neuraxial anesthesia for cesarean delivery, both within and outside the capital city of Yerevan, increased the use of epidural labor analgesia within the capital city, and established national obstetric anesthesia practice guidelines. (Summary: M. J. Avram. Illustration: A. Johnson, *Vivo Visuals*.)



241 Left Lateral Table Tilt for Elective Cesarean Delivery under Spinal Anesthesia Has No Effect on Neonatal Acid–base Status: A Randomized Controlled Trial

Current recommendations for full-term women undergoing cesarean delivery include maintenance of left lateral tilt for uterine displacement until delivery, which is based on the premise that the supine position will cause aortocaval compression, maternal hypotension, and fetal compromise. The hypothesis tested was that maternal position would not affect neonatal acid–base status during elective cesarean delivery under spinal anesthesia with a phenylephrine infusion to maintain baseline systolic blood pressure. One hundred women were randomized to 15° left table tilt or supine horizontal position. There was no difference between groups in the primary outcome, mean umbilical artery base excess. There were also no differences between groups in umbilical artery pH, umbilical vein base excess or pH, or Apgar scores.

Current recommendations on maternal positioning during cesarean delivery under spinal anesthesia may not be necessary when maternal systolic blood pressure is maintained with a phenylephrine infusion. See the accompanying Editorial View on [page 212](#). (Summary: M. J. Avram. Image: F. Hage/J. P. Rathmell.)



272 Validation of Innovative Techniques for Monitoring Nociception during General Anesthesia: A Clinical Study Using Tetanic and Intracutaneous Electrical Stimulation

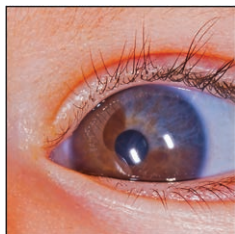
Intraoperative opioid dose is titrated in response to nociceptive movements and clinical signs of stress-induced activation of the sympathetic nervous system. The nociceptive response to standardized tetanic and intracutaneous electrical stimulations measured by three different analgesia monitoring systems, Analgesia Nociception Index (heart rate variability), Surgical Pleth Index (photoplethysmography), and pupillary dilatation, were compared to those measured by heart rate, mean arterial blood pressure, nocifensive movements, and Bispectral Index under standardized conditions at increasing remifentanyl concentrations. The Analgesia Nociception Index, Surgical Pleth Index, and pupillary dilatation

were better at detecting strictly standardized painful stimuli in 37 male patients sedated with propofol at all analgesic levels than were clinical signs and Bispectral Index. The nociceptive responses measured by Analgesia Nociception Index, Surgical Pleth Index, and pupillary dilatation as well as heart rate and mean arterial pressure correlated with opioid infusion rate. (Summary: M. J. Avram. Illustration: *Original to article*.)



338 Extubation Success Prediction in a Multicentric Cohort of Patients with Severe Brain Injury

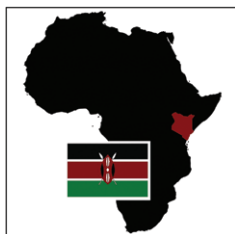
The extubation decision process is challenging in patients with severe brain injury because both extubation failure and delayed extubation are common in these patients, increasing morbidity and mortality. In a prospective observational cohort study conducted to develop a clinical score predicting successful extubation in brain injury patients, 338 (77.3%) of 437 consecutive patients with primary brain injury whose duration of mechanical ventilation had been at least 48 h were successfully extubated. The rate of extubation success after passing a spontaneous breathing trial was high in patients with brain injury who met at least three criteria on the VISAGE (visual pursuit, swallowing, age, Glasgow for extubation) score: age less than 40 yr, presence of visual pursuit, swallowing attempts, and Glasgow coma score more than 10. The area under the receiver operating characteristic curve was 0.75 (95% CI, 0.69 to 0.81). See the accompanying Editorial View on [page 217](#). (Summary: M. J. Avram. Image: J. P. Rathmell.)



284 Pupillometry-guided Intraoperative Remifentanyl Administration *versus* Standard Practice Influences Opioid Use: A Randomized Study

Pupillary diameter under general anesthesia reflects the balance between nociception and antinociception rather than opioid effect on the pupil per se. The hypothesis that remifentanyl administration guided by pupillary diameter measurement would result in a difference in total intraoperative remifentanyl consumption compared with that guided by standard practice was tested in a randomized trial of 55 women presenting for elective major gynecological surgery who were anesthetized by propofol and remifentanyl target-controlled infusions. The average intraoperative remifentanyl dose was $3.8 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$ in the pupillometry group and $7.9 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$ in the standard practice group (median difference, $4.2 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$; 95% CI, 3.0 to $5.3 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$). The reduced intraoperative remifentanyl dose in the

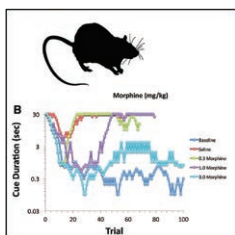
pupillometry group was associated with lower postoperative morphine requirements during the 12h after emergence. Pupillary diameter may be a relevant index to guide intraoperative analgesia. (Summary: M. J. Avram. Photo: J. P. Rathmell.)



250 Monitoring Anesthesia Care Delivery and Perioperative Mortality in Kenya Utilizing a Provider-driven Novel Data Collection Tool

Collection and reporting of perioperative outcome metrics are important first steps in the quality improvement cycle needed to help emerging health systems deliver safer surgery and anesthesia. A novel electronic data collection tool was designed and implemented to gather information on anesthesia, surgery, and perioperative outcomes in a prospective, near real-time manner at Africa Inland Church Kijabe Hospital, a 285-bed, rural teaching hospital in Kenya that serves a catchment area of 45 million people. Perioperative data were collected from 8,419 of 11,875 cases between January 2014 and September 2015; data capture rates improved to 93% in the final quarter. Emergency surgery was associated with a higher perioperative mortality rate than elec-

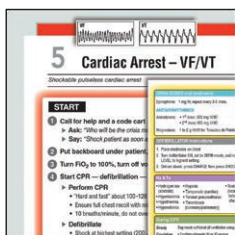
tive cases and the perioperative mortality rates in orthopedic, general surgery, and neurosurgical cases were higher than those in cesarean section, the most common procedure in low- and middle-income countries. See the accompanying Editorial View on [page 215](#). (Summary: M. J. Avram. Illustration: J. P. Rathmell.)



372 Assessment of Behavioral Disruption in Rats with Abdominal Inflammation Using Visual Cue Titration and the Five-choice Serial-reaction Time Task

Progress has been made in understanding both sensory-discriminative and affective-motivational components of pain, but similar understanding of the influence of experimental pain stimuli on cognitive functions is lacking. The ability of acute abdominal pain induced in rats by intraperitoneal injection of dilute lactic acid to disrupt attention was assessed using an assay of sustained visual attention. The effects of morphine and ketoprofen on lactic acid-induced impairment were then determined. The disruptive effects of the dissociative drug scopolamine on the assay alone and in conjunction with morphine and ketoprofen was assessed as a negative control for the relevance of pain. Acute abdominal inflammatory pain in rats induced cognitive disruptive effects on sustained visual attention that were

reversed by clinically useful analgesics. The non-pain-related disruption of sustained attention produced by scopolamine was not affected by either ketoprofen or morphine. (Summary: M. J. Avram. Illustration: Modified from article.)



384 Operating Room Crisis Checklists and Emergency Manuals (Clinical Concepts and Commentary)

Checklists and other cognitive aids have long been used by high-risk industries, such as aviation, as tools to aid in crisis management. This Clinical Concepts and Commentary begins with an examination of how crew/crisis resource management evolved in aviation and the military before going on to describe the history of operating room crisis resource management and its influence on the development of operating room crisis checklists and emergency manuals. The roles of checklists, emergency manuals, and other cognitive aids in operating room crisis management are then discussed. The authors conclude with consideration of future directions, unanswered questions, and current efforts for clinical implementation including formation by leaders of multiple efforts to develop and implement cognitive

aids of the Emergency Manuals Implementation Collaborative (EMIC) to publicly share resources and further research on effectiveness and how to best implement and use emergency manuals. (Summary: M. J. Avram. Illustration: Modified from article.)