THIS MONTH IN ANESTHESIOLOGY

159 Compassionate and Clinical Behavior of Residents in a Simulated Informed Consent Encounter

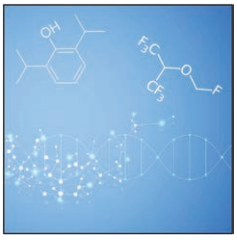
Compassionate behavior by clinicians involves seeking to understand patients' psychosocial, physical, and medical needs, attending to these needs in a timely manner, and involving patients as they desire. The compassionate behaviors of 49 first-year and 16 third-year anesthesia residents were observed as they performed a preoperative evaluation of a standardized patient in pain who was scheduled for an urgent laparotomy. In this simulated urgent preoperative evaluation, anesthesia residents had variable and, at times, flawed recognition of patient cues, responsiveness to cues, and pain management while obtaining informed consent. Mean responses to the pain and nausea cues coded by the validated Empathic Communication Coding System (0 equals less empathic to 6 equals more empathic) were lower for the nine residents who never ordered pain medication (mean, 1.2; 95% CI, 0.8 to 1.6) and similar for the 37 who ordered it before the informed consent form was signed (mean, 1.9; 95% CI, 1.6 to 2.1) and the 19 who ordered it after the form was signed (mean, 1.9; 95% CI, 1.6 to 2.0). *(Summary: M. J. Avram. Image: A. Johnson, Vivo Visuals.)*

82 Deficit Accumulation and Phenotype Assessments of Frailty Both Poorly Predict Duration of Hospitalization and Serious Complications after Noncardiac Surgery

Frailty, an increased vulnerability or a diminished capacity to cope with external stressors, is often attributed to reduced physiologic reserve and has been associated with adverse outcomes after a variety of surgical procedures. Two approaches to characterizing frailty are the deficit accumulation model and the phenotype model. A prospective observational cohort study of 1,042 patients compared the abilities of the Modified Frailty Index, a deficit accumulation model, and the Hopkins Frailty Score, a phenotype model, to predict prolonged hospitalization, measured as the difference between actual and expected surgery-specific postoperative length of stay. Two hundred thirty-four (23%) patients were classified as frail based on the Modified Frailty Index and 184 (18%) were classified as frail based on the Hopkins Frailty Score. The errors of Modified Frailty Index and Hopkins Frailty Score in predicting prolonged hospitalization were 2.5 (95% CI, 2.2 to 2.9) and 2.6 (95% CI, 2.2 to 3.0) days, respectively. The ratio of their prediction errors was 1.0 (95% CI, 1.0 to 1.0), indicating similarly poor predictions. *See the accompanying Editorial on* **page 1.** *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

95 Fresh Frozen Plasma *versus* Crystalloid Priming of Cardiopulmonary Bypass Circuit in Pediatric Surgery: A Randomized Clinical Trial

In congenital cardiac surgery the cardiopulmonary bypass (CPB) circuit is primed with fresh frozen plasma (FFP) to prevent coagulation abnormalities. A double-blind randomized trial tested the hypothesis that postoperative bleeding and the need for transfusion of allogeneic blood products would differ after CPB priming with crystalloids or FFP in 59 infants and small children weighing between 7 and 15 kg. Patients were randomized to CPB priming with either 15 ml/kg crystalloid or 15 ml/kg FFP in addition to a predefined amount of packed erythrocytes. Median postoperative blood loss was 7.1 (interquartile range, 5.1 to 9.4) ml/kg in the FFP group and 5.7 (interquartile range, 3.8 to 8.5) ml/kg in the crystalloid group; difference, 1.2 (95% CI, –0.7 to 3.2) ml/kg. The proportion of patients additionally transfused was 26.7% (8 of 30) and 37.9% (11 of 29) in the FFP and crystalloid groups, respectively; odds ratio, 1.7 (95% CI, 0.6 to 5.1). The median number of any blood products transfused in addition to priming was 0 in both groups. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



107 Propofol and Sevoflurane Differentially Impact MicroRNAs in Circulating Extracellular Vesicles during Colorectal Cancer Resection: A Pilot Study

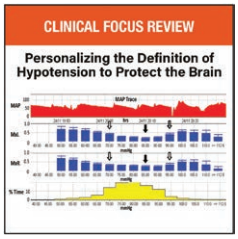
Although total intravenous anesthesia in combination with local-regional anesthesia during cancer resection may result in improved outcomes, potent volatile anesthetics may enhance tumor cell growth and metastasis. Sera taken from patients receiving propofol, but not from those receiving sevoflurane, induced a reduction in invasiveness, proliferation, and metastatic potential of cancer cells in addition to enhancing their apoptosis. Extracellular vesicles, which are nanosized, membrane-encapsulated information carriers secreted by all living cells that play crucial roles in intercellular communication, have been reported to play an important role in cancer progression and metastasis. This proof-of-concept study in colorectal cancer patients receiving either propofol (n = 8) or sevoflurane (n = 9) found 64 extracellular vesicle-associated miRNAs to be significantly regulated by total intravenous anesthesia and 33 to be significantly regulated by sevoflurane anesthesia. All microRNAs downregulated in response to anesthesia were anesthetic agent specific. Total intravenous anesthesia-regulated microRNAs might mediate inhibitory effects on signaling pathways involving cell proliferation, migration, and epithelial-mesenchymal transition of tumor cell line and enhance effects on apoptosis of carcinoma cell lines. *(Summary: M. J. Avram. Image: ©gettyimages/J. P. Rathmell.)*

131 Resuscitation with Hydroxyethyl Starch Maintains Hemodynamic Coherence in Ovine Hemorrhagic Shock

The assumption underlying mean arterial pressure-guided fluid resuscitation in acute hemorrhage is that stroke volume index and cardiac index will increase with increased mean arterial pressure and result in improved microcirculation. This study sought to determine whether hydroxyethyl starch and saline produce concordant improvements in macro- and microcirculation and thus maintain hemodynamic coherence. Ten female sheep were bled up to 30 ml/kg body weight, stopping at a mean arterial pressure of 30 mmHg, to establish hemorrhagic shock and then were randomly assigned to receive either 0.9% sodium chloride solution or 6% hydroxyethyl starch solution as resuscitation fluid. Animals in the saline group received a median total of 4,980 ml whereas those in the hydroxyethyl starch group received 610 ml. The mean arterial pressure at resuscitation as percentage of baseline was 88% (interquartile range, 79 to 91%) in the saline group and 95% (interquartile range, 94 to 96%) in the hydroxyethyl starch group. The percentage of perfused vessels improved with resuscitation to 80% (interquartile range, 75 to 90%) in the saline group and to 93% (interquartile range, 92 to 95%) in the hydroxyethyl starch group. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

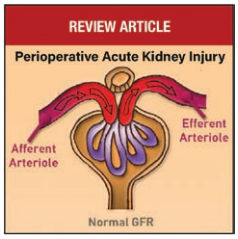
55 Perioperative Neurocognitive Disorder: State of the Preclinical Science (Special Article)

Impairments of cognitive ability, including postoperative delirium as well as deficits in executive function, memory, and other cognitive domains, are the most common complications experienced in the postoperative period by patients over 65 yr old. Despite consensus on the existence and character of perioperative neurocognitive disorders, whether anesthesia and surgery can be considered to be risk factors remains controversial. Preclinical studies have provided mechanistic insight into cognitive impairment after anesthesia and surgery, and several compelling hypotheses regarding neuroinflammation, inflammation resolution, and adverse anesthetic effects have emerged from them. This review summarizes how the different approaches, including both *in vitro* models and animal models, have contributed to the understanding of perioperative neurocognitive disorders, and it identifies knowledge gaps that need to be addressed by further research. It also makes recommendations aimed at optimizing study design, enhancing transparency, and encouraging "best practices" in experimental design and reporting to facilitate the translation of preclinical research results to humans. *(Summary: M. J. Avram. Image: ©gettyimages.)*



170 Personalizing the Definition of Hypotension to Protect the Brain (Clinical Focus Review)

Despite recognition of the relationship between intraoperative hypotension and adverse patient outcomes, there is no universally accepted definition of hypotension. The current approach to determining the intraoperative threshold as a relative decrease in systolic blood pressure from baseline is complicated by the challenge of determining true baseline blood pressure in an operative setting. Furthermore, defining hypotension on the basis of blood pressure cutoffs associated with adverse perioperative outcomes is tempered by the varying frequency of cardiovascular disease and other risk factors in any given patient. Studies monitoring cerebral blood flow autoregulation in patients undergoing cardiac and noncardiac operations support the notion that the definition of hypotension is an individual definition and cannot be accurately determined based on population data. The present Clinical Focus Review proposes a novel method for defining hypotension individually based on monitoring of cerebral blood flow autoregulation. Such monitoring requires a continuous measure of arterial blood pressure with a continuous measure of brain-blood flow, blood volume, or oxygenation. *(Summary: M. J. Avram. Image: From original article.)*



180 Perioperative Acute Kidney Injury (Review Article)

Among the different types of perioperative organ injury, acute kidney injury remains particularly prominent, occurring in 20 to 40% of high-risk patients. Acute kidney injury has important implications for the recovery and outcomes of surgical patients. Acute kidney injury occurs more frequently than previously thought and even small changes in kidney function are associated with high degrees of morbidity and mortality. Rapid diagnosis is important because it extends the opportunity for intervention, preventing the progression and development of subclinical injury to acute kidney injury. Perioperative acute kidney injury and the ways in which it develops is multifaceted and complex. Hypoperfusion, inflammation, and neuroendocrine response to surgery are the frequent mechanisms affecting renal perfusion. Many ongoing translational studies and clinical trials are aiming to provide a more acute understanding of the disease process and to establish diagnostic, preventive, or therapeutic options for acute kidney injury in perioperative patients. This review puts recent and ongoing studies into the context of established findings of perioperative acute kidney injury. *See the accompanying Editorial on* **page 5.** *(Summary: M. J. Avram. Image: From original article.)*

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