THIS MONTH IN
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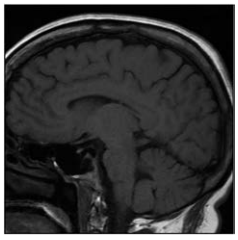
648 Baseline Gastric Volume in Fasting Diabetic Patients Is Not Higher than That in Nondiabetic Patients: A Cross-sectional Noninferiority Study

Diabetic patients may be at increased risk for pulmonary aspiration at the time of induction of anesthesia due to potentially delayed gastric emptying related to autonomic dysfunction. The hypothesis that diabetic patients who have followed standard fasting instructions before elective surgery have a baseline gastric volume that is not higher than that in nondiabetic patients was tested in a prospective cross-sectional study of 84 diabetic and 96 nondiabetic patients scheduled for elective surgery. Baseline gastric volume was measured using gastric ultrasound. The mean ± SD fasting gastric volume in diabetic patients, 0.81 ± 0.61 ml/kg, was not higher than that in nondiabetic controls, 0.87 ± 0.53 ml/kg. This suggests that current fasting guidelines are as effective in preventing a full stomach in diabetic patients before elective surgery as they are in nondiabetic patients. The authors noted that enrollment in this study was completed before introduction of glucagon-like peptide-1 receptor agonists, a class of drugs indicated for diabetes and weight loss that delay gastric emptying. *See the accompanying Editorial on* ***page 639****. (Summary: M. J. Avram. Image: Photograph, J. P. Rathmell; illustration, A. Johnson, Vivo Visuals Studio.)*

657 Intraoperative Use of Phenylephrine *versus* Ephedrine and Postoperative Delirium: A Multicenter Retrospective Cohort Study

Phenylephrine can effectively treat intraoperative hypotension, but it impairs cerebral circulation. In contrast, ephedrine can treat hypotension while maintaining cerebral blood flow and tissue oxygenation. Although the etiology of postoperative delirium is multifactorial, cerebral hypoperfusion and impaired oxygenation may be important contributing factors. The hypothesis that intraoperative administration of phenylephrine to treat hypotension is associated with increased risk of postoperative delirium compared to ephedrine was tested in a retrospective cohort study of adult patients who underwent noncardiac, non-neurosurgical procedures under general anesthesia and received either phenylephrine or ephedrine intraoperatively between 2008 and 2020. The primary outcome, delirium within 7 days after surgery, developed in 685 of 78,982 patients (0.9%) who received phenylephrine and in 85 of 24,112 patients (0.4%) who received ephedrine. In a multivariable logistic regression analysis adjusted for *a priori* defined confounding variables, intraoperative phenylephrine administration was associated with higher odds of developing postoperative delirium within 7 days compared to the use of ephedrine (adjusted odds ratio, 1.35; 95% CI, 1.06 to 1.71). *See the accompanying Editorial on* ***page 642****. (Summary: M. J. Avram. Image: Adobe Stock.)*



669 Cerebral Blood Flow Assessed with Phase-contrast Magnetic Resonance Imaging during Blood Pressure Changes with Noradrenaline and Labetalol: A Trial in Healthy Volunteers

Maintaining adequate cerebral blood flow during general anesthesia is important, but there are no reliable methods to assess cerebral blood flow at the bedside, so mean arterial pressure (MAP) is often used as a surrogate indicator of cerebral blood flow. The changes in cerebral blood flow and cardiac output produced by commonly used pharmacologic agents that increase or decrease MAP were determined in 18 healthy, normotensive, awake volunteers with intact cerebrovascular autoregulation using phase-contrast magnetic resonance imaging. Norepinephrine was first infused to achieve a 20% increase in MAP from baseline and, after MAP had returned to baseline, labetalol was administered to achieve a 15% decrease in MAP. Baseline median (interquartile range) cerebral blood flow and cardiac output were 772 (674 to 871) ml/min and 5,874 (5,199 to 6,355) ml/min, respectively. During norepinephrine infusion, cerebral blood flow and cardiac output decreased to 705 (606 to 748) ml/min and 4,995 (4,705 to 5,635) ml/min, respectively. After labetalol boluses, cerebral blood flow was unchanged at 769 (734 to 900) ml/min and cardiac output increased to 6,413 (6,056 to 7,464) ml/min. The authors concluded these data do not support using norepinephrine to increase MAP to increase cerebral blood flow when cerebrovascular autoregulation is thought to be intact. *See the accompanying Editorial on* ***page 642****. (Summary: M. J. Avram. Image: J. P. Rathmell.)*

679 Opioid-free Anesthesia Protocol on the Early Quality of Recovery after Major Surgery (SOFA Trial): A Randomized Clinical Trial

Opioid-free anesthesia aims to mitigate both short-term and long-term side effects of opioids while providing adequate pain control by using a multimodal regimen of nonopioid agents. An earlier randomized controlled trial comparing balanced opioid-free anesthesia with dexmedetomidine with an anesthetic regimen using remifentanil was stopped prematurely because the dexmedetomidine group had a higher incidence of serious adverse events. The hypothesis that an opioid-free anesthesia protocol would improve the quality of recovery (QoR-15 score) at 24 h after surgery compared to a standard opioid-based anesthesia protocol was tested in this randomized controlled trial of 133 adults undergoing major elective surgeries. Patients in the opioid-free anesthesia group received at least two of the following drugs: ketamine, lidocaine, clonidine, and magnesium sulfate. Acute pain experienced in the postanesthesia care unit was treated using opioid titration in both groups. The mean ± SD QoR-15 score at 24 h was 114.9 ± 15.2 in the opioid-free anesthesia group and 108.7 ± 18.1 in the standard anesthesia group (difference, 6.2; 95% CI, 0.4 to 12.0). Given the minimal clinically important difference of 6, this difference was not clinically significant. *See the accompanying Editorial on* ***page 646****. (Summary: M. J. Avram. Image: Adobe Stock.)*

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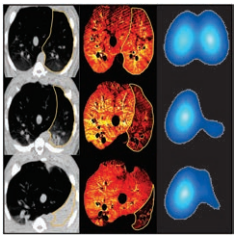
690 Comparison of the Efficacy of HSK3486 and Propofol for Induction of General Anesthesia in Adults: A Multicenter, Randomized, Double-blind, Controlled, Phase 3 Noninferiority Trial

HSK3486 (ciprofol) is a propofol analog that has been reported to be an effective hypnotic, with a safety profile similar to that of propofol but with less injection-site pain and fewer respiratory-related adverse events. The noninferiority of HSK3486 compared with propofol for successful induction of general anesthesia (Modified Observer's Assessment of Alertness/Sedation Score of 1 or lower) was assessed in a randomized, double-blind, controlled, phase 3 clinical trial of 251 adults undergoing elective surgery. Induction success rate was 97.0% for patients administered HSK3486 and 97.6% for those administered propofol; because the lower bound of the 95% CI for the difference in success rate did not cross the noninferiority boundary of –8%, HSK3486 was deemed noninferior to propofol for successful induction of anesthesia. The incidence of injection-site pain was 18.0% in patients who received HSK3486 and 77.1% in those who received propofol. The incidence of treatment-emergent adverse events related to study drug was 17.9% for patients administered HSK3486 and 14.5% for those administered propofol when injection-site pain was excluded. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*



752 Influence of Fractional Inspired Oxygen Tension on Lung Perfusion Distribution, Regional Ventilation, and Lung Volume during Mechanical Ventilation of Supine Healthy Swine

During intraoperative mechanical ventilation, high positive end-expiratory pressure (PEEP) and low fraction of inspired oxygen (F_{IO_2}) reduce atelectasis while low PEEP promotes atelectasis and hypoxic pulmonary vasoconstriction decreases perfusion in dorsal lung regions. This exploratory study in 10 mechanically ventilated female piglets compared the effect of the interaction of low F_{IO_2} ($F_{IO_2} = 0.4$) and high F_{IO_2} ($F_{IO_2} = 1$) with low PEEP on regional lung perfusion. Clinical conditions were simulated using two atelectasis models, bilateral gravitational atelectasis produced by PEEP reduction to zero (N = 6) and left lung atelectasis produced by left lung occlusion (N = 5). After bilateral gravitational atelectasis was induced by zero PEEP, low F_{IO_2} did not produce changes in respiratory system compliance, regional lung ventilation, and regional perfusion compared to high F_{IO_2}, despite lower lung collapse with low F_{IO_2}. After left bronchial occlusion, the low lung volume produced by deaeration of the left lung with high F_{IO_2} enhanced hypoxic pulmonary vasoconstriction compared with the partially aerated left lung ($F_{IO_2} = 0.21$), resulting in lower shunt fraction and lower perfusion of the left lung. *(Summary: M. J. Avram. Image: From original article.)*

808 Examining Bleeding Risk, Transfusion-related Complications, and Strategies to Reduce Transfusions in Lung Transplantation (Clinical Focus Review)

Patients undergoing lung transplantation have a substantial risk of experiencing blood loss and requiring allogeneic blood product transfusion. Transfusion during lung transplantation surgery is correlated with early allograft injury and primary graft dysfunction. Massive transfusion has an incidence of approximately 18 to 27% in this patient population and is associated with a higher 90-day mortality. Developing strategies to reduce perioperative blood loss and the resulting transfusion for these patients is an opportunity to reduce primary graft dysfunction and improve outcomes after lung transplantation. It is important to understand recipient risk and the implications of transfusion to the recipient to optimize strategies aimed at reducing bleeding and the need for transfusion. To that end, this Clinical Focus Review examines transfusion-related complications as well as patient and procedural risk factors for bleeding and suggests strategies to reduce allogeneic blood product transfusion in this high-risk population. It also identifies the many areas requiring additional research to improve the care of these patients. *(Summary: M. J. Avram. Image: J. P. Rathmell.)*

824 Pain in the Context of Sensory Deafferentation (Review Article)

Deafferentation pain is one of the most poorly understood entities in medicine and is associated with low response rates and poor quality of life. There is no widely accepted definition of deafferentation pain, which may include not only pain that is caused by sensory loss but also pain referred from a sensate to an insensate body part. The challenges of distinguishing pain caused by or related to deafferentation from pain coinciding with but independent of deafferentation leads to ambiguity regarding whether deafferentation is a mechanism or a clinical condition. Thus, the epidemiology of deafferentation pain is largely unknown because of inherent difficulties in identifying mechanisms. This narrative review provides overviews of the epidemiology, mechanisms, clinical presentation, treatment, and avenues for future research for the most common pain conditions associated with sensory deafferentation, highlighting areas in which there are divergent perspectives and lack of knowledge. In addition to summarizing systematic reviews and randomized trials evaluating pharmacologic and noninvasive treatments for these conditions, this review provides a summary of treatment recommendations with an assessment of the level of evidence for each. *(Summary: M. J. Avram. Image: From original article.)*