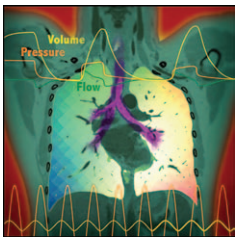
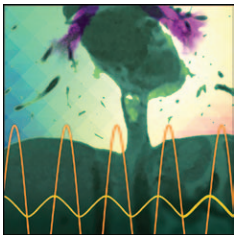
THIS MONTH IN

ANESTHESIOLOGY



832 A Randomized Controlled Trial of Adaptive Support Ventilation Mode to Wean Patients after Fast-track Cardiac Valvular Surgery

Adaptive support ventilation (ASV) is a closed-loop ventilation mode for which the ventilator adjusts inspiratory pressure to achieve a tidal volume that minimizes the work of breathing. Sixty-one patients undergoing elective fast-track cardiac valvular surgery were randomly assigned to receive and be weaned using ASV or be ventilated and weaned as directed by duty physicians (control group). ASV reduced the duration of mechanical ventilation in the intensive care unit by more than 2 h, from a median of 342 min in the control group to 205 min in the ASV group. ASV also reduced the number of manual ventilator setting changes and the number of ventilator alarms. *(Summary: M.J. Avram. Image: J.P. Rathmell/A. Johnson, Vivo Visuals.)*

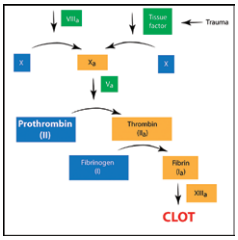


841 High-frequency Ventilation Does Not Provide Mortality Benefit in Comparison with Conventional Lung-protective Ventilation in Acute Respiratory Distress Syndrome: A Meta-analysis of the Randomized Controlled Trials

Mortality from acute respiratory distress syndrome (ARDS) is high despite use of a conventional small tidal volume lung-protective ventilation strategy. High-frequency oscillatory ventilation (HFOV) is an alternate technique in which very small tidal volumes are delivered at very high frequencies while mean airway pressure is held constant. A meta-analysis of seven prospective randomized controlled trials including 1,759 patients compared outcomes of adult ARDS patients ventilated with a conventional lung-protective strategy or HFOV. HFOV did not confer any in-hospital/30-day mortality benefit and was associated with a longer duration of mechanical ventilation but consistently improved oxygenation parameters. The primary outcome, mortality, was significantly influenced by the results of two recent large multicenter studies. *(Summary: M.J. Avram. Photo: J.P. Rathmell/A. Johnson, Vivo Visuals.)*

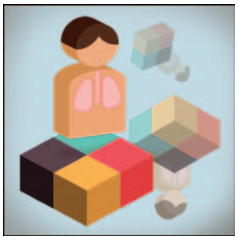
736 Randomized Double-blinded Comparison of Norepinephrine and Phenylephrine for Maintenance of Blood Pressure during Spinal Anesthesia for Cesarean Delivery

Phenylephrine is used to treat decreased systemic vascular resistance in response to spinal anesthesia in parturients but can decrease heart rate and cardiac output, which may adversely affect uteroplacental perfusion. Norepinephrine may be a better alternative because it has direct positive chronotropic and reflexive negative chronotropic effects. One hundred and four healthy patients having cesarean delivery under spinal anesthesia were randomly assigned to have their systolic blood pressure maintained with a computer-controlled infusion of phenylephrine or norepinephrine. Cardiac output was measured using suprasternal Doppler. Phenylephrine and norepinephrine were similarly efficacious in maintaining blood pressure from induction until uterine incision but norepinephrine maintained higher maternal heart rate and cardiac output. *See the accompanying Editorial View on* ***page 728****.* *(Summary: M.J. Avram. Photo: © iStock.)*



923 Prothrombin Complex Concentrates in Trauma and Perioperative Bleeding (Clinical Concepts and Commentary)

Prothrombin complex concentrates (PCCs) contain three or four coagulation factors (factors II, IX, and X, with or without factor VII) that can rapidly replace factors for urgent reversal of vitamin K antagonists. PCCs may also promote hemostasis in trauma and perioperative bleeding by increasing thrombin generation but carry a risk of thromboembolic complications. Retrospective and observational clinical studies showing PCC can attenuate bleeding and reduce exposure to allogenic blood products are reviewed. The need for prospective, randomized controlled trials to enable recommendations with robust efficacy and safety evidence is emphasized as is the need for a suitable point-of-care test to confirm the need to administer PCCs and monitor their effects. *(Summary: M.J. Avram. Illustration: J.P. Rathmell.)*

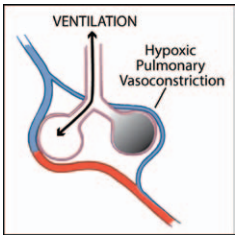


884 Analgesic Effect of Perioperative Escitalopram in High Pain Catastrophizing Patients after Total Knee Arthroplasty: A Randomized, Double-blind, Placebo-controlled Trial

High pain catastrophizing patients have higher postoperative pain responses and may benefit from targeted interventions, such as selective serotonin reuptake inhibitors like escitalopram. One hundred fourteen high pain catastrophizing patients, identified as such by the pain catastrophizing scale, undergoing total knee arthroplasty were randomly assigned to oral escitalopram 10 mg or placebo daily for 7 days beginning on the day of surgery. There were no between-group differences for the primary outcome, pain upon ambulation 24 h after surgery. Nonetheless, exploratory secondary analyses of pain upon ambulation and at rest from days 2 through 6 after surgery suggest future studies on effect, optimal timing of initiation, dose, and duration of selective serotonin reuptake inhibitor treatment are warranted. *See the accompanying Editorial View on* **page 731**. *(Summary: M.J. Avram. Image: A. Johnson, Vivo Visuals.)*

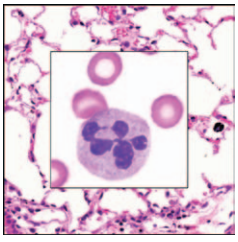
895 Individual Differences in Acute Pain-induced Endogenous Analgesia Predict Time to Resolution of Postoperative Pain in the Rat

The strength of preoperative acute pain-induced endogenous analgesia, conditioned pain modulation (CPM), predicts the likelihood of chronic postsurgical pain in patients. A rodent postoperative pain model with a nerve injury component was used to examine the relationship between preoperative CPM and time course of recovery from surgery. There was an individual association between preoperative CPM strength and speed of recovery from pain or hypersensitivity after surgery in rats as there is in humans. CPM depended at least in part on descending noradrenergic inhibition, and the time course of recovery from acute and sustained pain after surgery depended on the ability to engage this pathway. *See the accompanying Editorial View on* **page 734**. *(Summary: M.J. Avram. Photo: Henry Knowles Beecher [1904–1976], anesthesiologist and early clinical investigator on analgesics and the placebo effect. Courtesy of The Massachusetts General Hospital.)*



932 Hypoxic Pulmonary Vasoconstriction: Physiology and Anesthetic Implications (Review Article)

Hypoxic pulmonary vasoconstriction (HPV) is a reflex contraction of vascular smooth muscle in the pulmonary circulation in response to low regional partial pressure of oxygen that helps match regional ventilation to perfusion in adults. Features of the HPV reflex, physiological factors affecting it, and mechanisms of HPV are reviewed. The physiological role of HPV in the fetal and neonatal circulation and the matching of regional ventilation and perfusion in normal lungs and in respiratory disease are discussed. Drugs augmenting and those attenuating HPV are presented as are effects of anesthetic drugs. Consideration is then given to HPV during general anesthesia and its role in one-lung ventilation as well as effects of epidural analgesia on HPV. *(Summary: M.J. Avram. Illustration: J.P. Rathmell.)*



864 Mechanical Ventilation Induces Neutrophil Extracellular Trap Formation

Neutrophil infiltration and various inflammatory mediators and processes are associated with ventilator-induced lung injury (VILI). Neutrophil extracellular traps (NETs) are antimicrobial structures composed of neutrophil genomic DNA coated with granule proteins and have been associated with tissue damage. A two-hit mouse model consisting of pulmonary lipopolysaccharide instillation to recruit neutrophils to the lung and high tidal volumes without positive end-expiratory pressure to injure the lung was used to determine whether NETs contribute to VILI. Lipopolysaccharide induced neutrophil recruitment to airspaces and increased cytokines associated with lung injury and NETosis but markers of NET formation in bronchoalveolar lavage fluid were increased only by both lipopolysaccharide and injurious ventilation. DNase eliminated NETs and improved lung compliance but did not prevent airway inflammation. *See the accompanying Editorial View on* **page 725**. *(Summary: M.J. Avram. Image: Lung photomicrograph, Fraunhofer Institute for Toxicology and Experimental Medicine, with permission; neutrophil photomicrograph, Wadsworth Center, New York State Department of Health [public domain].)*