



## ON THE COVER:

In this issue of *ANESTHESIOLOGY*, Farag and colleagues report the results of a randomized, blinded comparison of three techniques for ultrasound-guided femoral nerve catheter insertion. In this controlled study of nearly 450 patients, electrical stimulation through the needle or needle and catheter was noninferior to ultrasound guidance alone in terms of pain score and IV opioid requirements; the use of ultrasound alone was both faster and less expensive. (Cover photography/ultrasonography: J.P. Rathmell; cover illustration: A. Johnson, Vivo Visuals.)

- Farag *et al.*: Comparison of Three Techniques for Ultrasound-guided Femoral Nerve Catheter Insertion: A Randomized, Blinded Trial, p. 239

## ◆ THIS MONTH IN ANESTHESIOLOGY

3A

## ■ SCIENCE, MEDICINE, AND THE ANESTHESIOLOGIST

19A

## ■ INFOGRAPHICS IN ANESTHESIOLOGY

21A

## ◆ EDITORIAL VIEWS

### Replication to Advance Science: Changes in *ANESTHESIOLOGY*

209

*J.C. Eisenach and T.T. Houle*

### Closing the Pore on Reperfusion Injury: Myocardial Protection with Cyclosporine

212

*J.D. Muehlschlegel*

### Postoperative Delirium: Disconnecting the Network?

214

*G.A. Mashour and M.S. Avidan*

### Serotonin, Morphine, and Neuropathic Pain: Not a Simple Story

217

*K. Byrne and B. Tsui*

## ■ PERIOPERATIVE MEDICINE

### CLINICAL SCIENCE

#### ◆◆◆ Prospective External Validation of a Predictive Score for Postoperative Pulmonary Complications

219

*V. Mazo, S. Sabaté, J. Canet, L. Gallart, M. Gama de Abreu, J. Belda, O. Langeron, A. Hoeft, and P. Pelosi*

The ARISCAT risk assessment tool was replicated and externally validated in over 5,000 patients across Europe. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

#### ◆◆◆ Cyclosporine Protects the Heart during Aortic Valve Surgery

232

*P. Chiari, D. Angoulvant, N. Mewton, O. Desebbe, J.-F. Obadia, J. Robin, F. Farhat, O. Jegaden, O. Bastien, J.-J. Lehot, and M. Ovize*

Cyclosporine administration at the time of reperfusion protects against reperfusion injury in patients undergoing aortic valve surgery as demonstrated by a significant reduction in cardiac troponin I compared with the control group.

◆ Refers to This Month in Anesthesiology

◆ Refers to Editorial Views

◆ See Supplemental Digital Content

◆ CME Article

◇ **Comparison of Three Techniques for Ultrasound-guided Femoral Nerve Catheter Insertion: A Randomized, Blinded Trial** 239

*E. Farag, A. Atim, R. Ghosh, M. Bauer, T. Sreenivasalu, M. Kot, A. Kurz, J.E. Dalton, E.J. Mascha, L. Mounir-Soliman, S. Zaky, W.A.S. Esa, B.L. Udeh, W. Barsoum, and D.I. Sessler*

In a controlled study of approximately 450 patients, electrical stimulation through the needle or needle and catheter was noninferior to ultrasound guidance alone in terms of pain score and IV opioid requirement. Additionally, the use of ultrasound alone was both faster and less expensive.

**Limb Remote Ischemic Preconditioning Attenuates Lung Injury after Pulmonary Resection under Propofol–Remifentanyl Anesthesia: A Randomized Controlled Study** 249

*C. Li, M. Xu, Y. Wu, Y.-S. Li, W.-Q. Huang, and K.-X. Liu*

In a randomized, prospective, parallel, controlled trial of patients who were undergoing lung resection procedures with one-lung ventilation, one group of the randomized patients received limb ischemia in three cycles of 5 min of ischemia with 5 min of reperfusion. The patients receiving limb ischemia had a significant decrease in acute lung injury.

◇ **Intubation Biomechanics: Laryngoscope Force and Cervical Spine Motion during Intubation with Macintosh and Airtraq Laryngoscopes** 260

*B.J. Hindman, B.G. Santoni, C.M. Puttlitz, R.P. From, and M.M. Todd*

This randomized cross-over study simultaneously measured laryngoscope force and cervical spine motion during tracheal intubations with Macintosh and Airtraq laryngoscopes in anesthetized and paralyzed adult persons. The relationship between the force and motion was nonlinear and differed between the intubation devices. Notably, “low force” does not necessarily imply less cervical motion.

🌐 **Diagnostic Value of Histamine and Tryptase Concentrations in Severe Anaphylaxis with Shock or Cardiac Arrest during Anesthesia** 272

*D. Laroche, P. Gomis, E. Gallimidi, J.-M. Malinovsky, and P.M. Mertes*

A retrospective review of blood histamine and tryptase concentrations from 75 patients having life-threatening allergic reactions under anesthesia and 25 patients resuscitated from cardiac or other types of shock showed significantly higher concentrations of histamine and tryptase in the patients with allergic reactions and no effect of resuscitation procedures. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

## BASIC SCIENCE

**Emulsified Isoflurane Enhances Thermal Transient Receptor Potential Vanilloid-1 Channel Activation–mediated Sensory/Nociceptive Blockade by QX-314** 280

*C. Zhou, P. Liang, J. Liu, W. Zhang, D. Liao, Y. Chen, X. Chen, and T. Li*

In rats, local heat and emulsified isoflurane enhanced peripheral nerve block from locally applied QX-314, and the combination of moderate warmth plus isoflurane was as great as noxious heat.

**Analogues of Etomidate: Modifications around Etomidate’s Chiral Carbon and the Impact on *In Vitro* and *In Vivo* Pharmacology** 290

*E. Pejo, P. Santer, S. Jeffrey, H. Gallin, S.S. Husain, and D.E. Raines*

The *R*-enantiomer of etomidate is a more potent suppressor of adrenocortical steroid biosynthesis than the *S*-enantiomer. Two achiral etomidate analogues had lower hypnotic and adrenocortical suppression potencies than the *R*-enantiomer of etomidate. Modification of the chiral center of etomidate may be part of a strategy to produce analogues that cause less adrenocortical suppression.

**Isoflurane Impairs Learning and Hippocampal Long-term Potentiation *via* the Saturation of Synaptic Plasticity** 302

*K. Uchimoto, T. Miyazaki, Y. Kamiya, T. Mihara, Y. Koyama, M. Taguri, G. Inagawa, T. Takahashi, and T. Goto*

Using a combination of electrophysiological, behavioral, and biochemical tasks in young adult rats, the authors confirmed and extended that isoflurane induced long-lasting deficits in hippocampal learning and modulated synaptic plasticity. Synaptic increment of GluA1 and the reduction of its ubiquitination may contribute to this impairment.

## ◇ **Electrical Stimulation of the Ventral Tegmental Area Induces Reanimation from General Anesthesia**

311

*K. Solt, C.J. Van Dort, J.J. Chemali, N.E. Taylor, J.D. Kenny, and E.N. Brown*

Electrical stimulation of the ventral tegmental area, but not of the substantia nigra, restored righting and activated the electroencephalogram during isoflurane or propofol anesthesia. Selective activation of the ventral tegmental area pathway resembled pharmacological activation of dopamine receptors in evoking arousal from anesthesia.

## ■ CRITICAL CARE MEDICINE

### CLINICAL SCIENCE

## **Lung Ultrasound Predicts Well Extravascular Lung Water but Is of Limited Usefulness in the Prediction of Wedge Pressure**

320

*G. Volpicelli, S. Skurzak, E. Boero, G. Carpinteri, M. Tengattini, V. Stefanone, L. Luberto, A. Anile, E. Cerutti, G. Radeschi, and M.F. Frascisco*

A multicenter, prospective observational investigation of 73 critically ill patients admitted to four Italian University hospitals had patients examined with transthoracic ultrasound 10 min before invasive (pulmonary artery catheters or PiCCO systems) hemodynamic measurements were made. This study confirmed that there was not always an association between the elevation of the pulmonary artery occlusion pressure and finding of B-pattern in the lungs, but there was a better specificity between the detection of B-pattern by ultrasound and detecting elevated extravascular lung water by PiCCO.

## ◆◆ **Decreased Functional Connectivity and Disturbed Directionality of Information Flow in the Electroencephalography of Intensive Care Unit Patients with Delirium after Cardiac Surgery**

328

*E. van Dellen, A.W. van der Kooi, T. Numan, H.L. Koek, F.A.M. Klijn, M.P. Buijsrogge, C.J. Stam, and A.J.C. Slooter*

Using sophisticated quantitative electroencephalography analysis, postcardiac surgery patients show loss of  $\alpha$  band connectivity, but increased  $\delta$  band connectivity directed to frontal regions. Similar to what occurs in other conditions where cognitive function is adversely affected (such as schizophrenia and Alzheimer disease), delirium may be thought of as a syndrome of disconnection of brain regions. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

### BASIC SCIENCE

## **Transient Receptor Potential Melastatin 2 Protects Mice against Polymicrobial Sepsis by Enhancing Bacterial Clearance**

336

*X. Qian, T. Numata, K. Zhang, C. Li, J. Hou, Y. Mori, and X. Fang*

Mice with transient receptor potential melastatin 2 (TRPM2) enetically eliminated who were exposed to polymicrobial sepsis had increased mortality with increased bacterial burden, organ injury, and systemic inflammation. Similarly, patients who had lower monocytic TRPM2 levels had worse outcomes compared with patients with normal monocytic TRPM2 levels.

## ■ PAIN MEDICINE

### CLINICAL SCIENCE

## **Intraperitoneal Local Anesthetics Have Predominant Local Analgesic Effect: A Randomized, Double-blind Study**

352

*A. Perniola, A. Magnuson, K. Axelsson, and A. Gupta*

In 60 patients undergoing open abdominal hysterectomy, morphine consumption was lower in women receiving lidocaine intraperitoneally than intravenously, indicating a peripheral action.

### BASIC SCIENCE

## ◆ **Peripheral Nerve Injury Reduces Analgesic Effects of Systemic Morphine via Spinal 5-Hydroxytryptamine 3 Receptors**

362

*M. Kimura, H. Obata, and S. Saito*

Using a rat spinal nerve ligation model, the authors observed that neuropathic rats were less sensitive to morphine than were normal animals. The enhanced spinal release of serotonin acting through 5-hydroxytryptamine 3 receptors may be responsible for the reduced effects of morphine.

## Phosphodiesterase 2A Localized in the Spinal Cord Contributes to Inflammatory Pain Processing

372

*W. Kallenborn-Gerhardt, R. Lu, A. Bothe, D. Thomas, J. Schlaudraff, J.E. Lorenz, N. Lippold, C.I. Real, N. Ferreirós, G. Geisslinger, D. Del Turco, and A. Schmidtke*

Phosphodiesterase 2A expression was increased in the dorsal horn of mice after paw inflammation. Inhibition of phosphodiesterase 2A exacerbated nociceptive behavior with inflammatory but not with neuropathic pain. Inhibitors of phosphodiesterases, which are being developed for treatment of neuropsychiatric diseases, may increase pain perception.

### ■ EDUCATION

#### CASE SCENARIO

##### ◇ Postoperative Brachial Plexopathy Associated with Infraclavicular Brachial Plexus Blockade: Localizing Postoperative Nerve Injury

383

*M.J. Barrington, W. Morrison, T. Sutherland, V.S. Tay, and J.C. Watson*

#### IMAGES IN ANESTHESIOLOGY

##### Localization of Cerebrospinal Fluid Leak in a Case of Spontaneous Intracranial Hypotension Using Dynamic Computed Tomography Myelography

388

*B.E. Harrington*

#### ORIGINAL INVESTIGATIONS IN EDUCATION

##### 🌐 Simulator-based Transesophageal Echocardiographic Training with Motion Analysis: A Curriculum-based Approach

389

*R. Matyal, J.D. Mitchell, P.E. Hess, B. Chaudary, R. Bose, J.S. Jainandunsing, V. Wong, and F. Mahmood*

A simulation-based transesophageal echocardiography curriculum can teach knowledge and technical skills to echo-naïve learners. Kinematic measures can objectively evaluate the progression of manual transesophageal echocardiography skills.

*SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

#### CLINICAL CONCEPTS AND COMMENTARY

##### 📺◇ Perioperative Positive Pressure Ventilation: An Integrated Approach to Improve Pulmonary Care

400

*E. Futier, E. Marret, and S. Jaber*

Postoperative pulmonary complications are a major cause of postoperative morbidity and mortality. The perioperative positive pressure ventilation bundle could help at further reducing postoperative pulmonary complications.

#### REVIEW ARTICLE

##### Noncoding RNAs: New Players in Chronic Pain

409

*B.M. Lutz, A. Bekker, and Y.-X. Tao*

This review highlights recent findings regarding the changes in noncoding RNAs in pain-related regions after persistent inflammation and nerve injury, and discusses how noncoding RNAs participate in the development and maintenance of chronic pain.

#### MIND TO MIND

##### Tiny Colored Lights

418

*A.L. Overmon*

## ■ CORRESPONDENCE

### **Double Trouble ... Less Often**

*J.R. Nielsen*

421

### **Difficult Face-mask Ventilation and Difficult Laryngoscopy**

*I. Calder*

### **In Reply**

*D. Healy, M. Aziz, and S. Kheterpal*

---

### **Gabapentinoids and Postsurgical Pain: Safe and Effective?**

*J.M. van Schalkwyk*

423

### **Emerging Perspectives in Perioperative Use of Gabapentinoids**

*V. Kachhwah and Z. Ahmad*

### **In Reply**

*P.C. Schmidt, G. Ruchelli, S.C. Mackey, and I.R. Carroll*

---

### **Academic Anesthesia: Innovate to Avoid Extinction**

*N.V. Kamdar and P. Scemama de Gialluly*

427

### **In Reply**

*M.M. Todd and L. Fleisher*

---

### **Simulator Training for Transesophageal Echocardiography**

*N. Fletcher and V. Sharma*

430

### **In Reply**

*P.A. Kumar, A.V. Bortsov, and H. Arora*

---

### **Corporate Interests Necessitate Conflict of Interest Declarations by All Authors**

*P.M. Kempen*

431

### **In Reply**

*J.P. Rathmell, C.A. Lien, and A. Harman*

### **In Reply**

*J.C. Eisenach*

---

### **Is Norepinephrine Infusion during Intraoperative Period Justified?**

*S. Gelman*

433

### **In Reply**

*P.Y. Wuethrich, F.C. Burkhard, and U.E. Studer*

## CONTENTS

### ■ ANESTHESIOLOGY REFLECTIONS FROM THE WOOD LIBRARY-MUSEUM

#### **Wine before Swine: Circe's Anticholinergic Potion**

259

*George S. Bause*

#### **Holy Moly: Hermes' Anticholinesterase Antidote**

371

*George S. Bause*

#### **Paul Meyer Wood and His Collectibles: Packing and Moving**

417

*George S. Bause*

### ■ REVIEWS OF EDUCATIONAL MATERIAL

436

### ■ CAREERS & EVENTS

438

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