



## ON THE COVER:

This issue of ANESTHESIOLOGY features a number of articles from the field of pediatric anesthesiology. Topics include examining the neurodevelopment effects of early childhood anesthesia exposure, regional anesthesia for cleft palate repair, preoperative sedation and emergence agitation, transthoracic ultrasound for assessing atelectasis in children, and airway management in a child with a giant encephalocele. (Photo Illustration by A. Johnson, Vivo Visuals; Images by Thinkstock [infant] and J.P. Rathmell [pediatric anesthesiologists].)

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◆ Refers to This Month in Anesthesiology  
 ◆ Refers to Editorial Views  
 BA Best Abstract article originally presented at ANESTHESIOLOGY 2013

🌐 See Supplemental Digital Content  
CME CME Article

## ■ PERIOPERATIVE MEDICINE

## CLINICAL SCIENCE

- BA ◆ ◆ **Comparative Analysis of Outcome Measures Used in Examining Neurodevelopmental Effects of Early Childhood Anesthesia Exposure** 1319  
*C.H. Ing, C.J. DiMaggio, E. Malacova, A.J. Whitehouse, M.K. Hegarty, T. Feng, J.E. Brady, B.S. von Ungern-Sternberg, A.J. Davidson, M.M. Wall, A.J.J. Wood, G. Li, and L.S. Sun*  
 Of the three outcome measures used, neuropsychological testing and International Classification of Diseases, 9th Revision, Clinical Modification–coded clinical outcomes found deficits associated with anesthesia exposure in children while academic achievement tests did not. The variation of the results in published studies assessing the association between anesthetic exposure and cognitive deficits may be dependent on the outcome measure used.
- ◆ **Cost-effectiveness Analysis of Stocking Dantrolene in Ambulatory Surgery Centers for the Treatment of Malignant Hyperthermia** 1333  
*T. Aderibigbe, B.H. Lang, H. Rosenberg, Q. Chen, and G. Li*  
 Storing 36 vials of dantrolene at every ambulatory surgery center in the United States would save 33 lives per year at an incremental cost-effectiveness ratio of approximately \$200,000 (in 2010 dollars) per life saved, indicating that the recommended guideline is cost-effective.
- ◆ ◆ **Effect of a Cognitive Aid on Adherence to Perioperative Assessment and Management Guidelines for the Cardiac Evaluation of Noncardiac Surgical Patients** 1339  
*W.R. Hand, K.H. Bridges, M.P. Stiegler, R.M. Schell, A.N. DiLorenzo, J.M. Ehrenfeld, P.J. Nietert, and M.D. McEvoy*  
 The investigators conducted a randomized trial of an electronic decision support tool among residents at four training programs. Use of the tool markedly improved adherence to the guidelines compared to memory alone.
- ◆ **Comparison of the Effects of 0.03 and 0.05 mg/kg Midazolam with Placebo on Prevention of Emergence Agitation in Children Having Strabismus Surgery** 1354  
*E.J. Cho, S.Z. Yoon, J.E. Cho, and H.W. Lee*  
 Both midazolam groups significantly and comparably reduced the risk of emergence agitation, and the 0.03 mg/kg dose did so without prolonging emergence time.
- ◆ **Bilateral Suprazygomatic Maxillary Nerve Block for Cleft Palate Repair in Children: A Prospective, Randomized, Double-blind Study versus Placebo** 1362  
*J. Chiono, O. Raux, S. Bringuier, C. Sola, M. Bigorre, X. Capdevila, and C. Dadure*  
 The results of this randomized blinded study show that the suprazygomatic approach to maxillary nerve block substantially reduces morphine requirements during the first 48 h. By reducing opioid requirements, use of suprazygomatic maxillary nerve blocks may reduce the likelihood of oxygen desaturation from occurring.
- Accuracy of Transthoracic Lung Ultrasound for Diagnosing Anesthesia-induced Atelectasis in Children** 1370  
*C.M. Acosta, G.A. Maidana, D. Jacovitti, A. Belaunzarán, S. Cereceda, E. Rae, A. Molina, S. Gonorazky, S.H. Bohm, and G. Tusman*  
 Using magnetic resonance imaging as the standard, bedside ultrasound had a positive predictive value of 71%, a negative predicted value of 96%, a sensitivity of 88%, and specificity of 89% for the diagnosis of anesthesia-induced atelectasis.
- ◆ **Effect of Using a Safety Checklist on Patient Complications after Surgery: A Systematic Review and Meta-analysis** 1380  
*B.M. Gillespie, W. Chaboyer, L. Thalib, M. John, N. Fairweather, and K. Slater*  
 The investigators conducted a meta-analysis that included seven nonrandomized checklist studies with a total of 37,339 patients. Use of a checklist significantly reduced complications, wound infections, and blood loss, but not mortality.

## A Response Surface Model Approach for Continuous Measures of Hypnotic and Analgesic Effect during Sevoflurane–Remifentanyl Interaction: Quantifying the Pharmacodynamic Shift Evoked by Stimulation

1390

B. Heyse, J.H. Proost, L.N. Hannivoort, D.J. Eleveld, M. Luginbühl, M.M.R.F. Struys, and H.E.M. Vereecke

The opioid effect on electroencephalography-derived variables was very weak. The effects of sevoflurane and remifentanyl on the hypnotic effect measured by bispectral index or entropy were additive but they acted synergistically on Composite Variability Index. Painful stimulation increased the C50 of sevoflurane without changing the structural models for bispectral index and entropy; a more complex parameter shift was found for Composite Variability Index.

### BASIC SCIENCE

#### Direct Negative Chronotropic Action of Desflurane on Sinoatrial Node Pacemaker Activity in the Guinea Pig Heart

1400

A. Kojima, Y. Ito, H. Kitagawa, H. Matsuura, and S. Nosaka

Desflurane produces a direct inhibitory action on sinoatrial node pacemaker activity by depressing diastolic depolarization. However, sympathetic activation during desflurane inhalation counteracts the direct inhibitory action of desflurane on the sinoatrial node. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

#### Endothelial Barrier Protection by Local Anesthetics: Ropivacaine and Lidocaine Block Tumor Necrosis Factor- $\alpha$ -induced Endothelial Cell Src Activation

1414

T. Piegeler, E.G. Votta-Velis, F.R. Bakhshi, M. Mao, G. Carnegie, M.G. Bonini, D.E. Schwartz, A. Borgeat, B. Beck-Schimmer, and R.D. Minshall

Using human lung microvascular endothelial cells, it was shown that ropivacaine and lidocaine attenuated tumor necrosis factor- $\alpha$ -induced neutrophil adhesion and endothelial hyperpermeability *via* a reduction of Akt, endothelial nitric oxide synthase, and Src activation.

### CRITICAL CARE MEDICINE

### BASIC SCIENCE

#### Reversal of Dabigatran-induced Bleeding by Coagulation Factor Concentrates in a Rat-tail Bleeding Model and Lack of Effect on Assays of Coagulation

1429

J. van Ryn, J. Schurer, M. Kink-Eiband, and A. Clemens

Administration of high-dose dabigatran etexilate to rats resulted in an increase in bleeding time which could be reduced by subsequent administration of coagulation factor concentrates. Routine coagulation assays did not predict the effect of coagulation factor concentrates to reduce bleeding from dabigatran. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

#### Spontaneous Breathing with Biphasic Positive Airway Pressure Attenuates Lung Injury in Hydrochloric Acid-induced Acute Respiratory Distress Syndrome

1441

J. Xia, H. Zhang, B. Sun, R. Yang, H. He, and Q. Zhan

Anesthetized rabbits with hydrochloric acid-induced lung injury subjected to spontaneous breathing had improved lung injury and improved respiratory function compared with controls who did not spontaneously breathe.

#### Heat-shock Response Increases Lung Injury Caused by *Pseudomonas aeruginosa* via an Interleukin-10-dependent Mechanism in Mice

1450

M. Carles, B.M. Wagener, M. Lafargue, J. Roux, K. Iles, D. Liu, C.A. Rodriguez, N. Anjum, J. Zmijewski, J.-E. Ricci, and J.-F. Pittet

The heat-shock response was activated 24 h before the experimental development of *Pseudomonas aeruginosa* pneumonia and led to worsened lung endothelial and epithelial permeability, decreased bacterial clearance, and increased mortality.

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## ■ PAIN MEDICINE

### BASIC SCIENCE

#### **Enhanced Excitability of Primary Sensory Neurons and Altered Gene Expression of Neuronal Ion Channels in Dorsal Root Ganglion in Paclitaxel-induced Peripheral Neuropathy** 1463

*H. Zhang and P.M. Dougherty*

In rats, the spontaneous activity of medium and large neurons was increased after paclitaxel treatment. Gene array studies demonstrated that the expression of several ion channels was altered by paclitaxel treatment potentially providing an explanation for the electrophysiological changes.

#### **Reversal of Monoarthritis-induced Affective Disorders by Diclofenac in Rats** 1476

*G. Borges, F. Neto, J.A. Mico, and E. Berrococo*

Using a rat model of arthritis, diclofenac reduced nociceptive sensitization and reduced additional behaviors suggesting anxiety- and depression-like changes in the animals. The activation of extracellular signaling-related kinase in several brain regions was implicated in these changes.

#### **Chemokine (C-C motif) Receptor 5 Is an Important Pathological Regulator in the Development and Maintenance of Neuropathic Pain** 1491

*K. Matsushita, H. Tozaki-Saitoh, C. Kojima, T. Masuda, M. Tsuda, K. Inoue, and S. Hoka*

In a spinal nerve ligation injury model, neutralization of the chemokine (C-C motif) ligand 3 or administration of an antagonist of its receptor chemokine (C-C motif) receptor 5 attenuated development of early- and late-phase tactile allodynia. Antagonists of chemokine (C-C motif) receptor 5 may be a novel therapeutic approach to the treatment of neuropathic pain. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

## ■ EDUCATION

### IMAGES IN ANESTHESIOLOGY

#### **Airway Management in an Infant with a Giant Occipital Encephalocele** 1504

*S.A. Black, J.A. Galvez, M.A. Rehman, and A.J. Schwartz*

### ORIGINAL INVESTIGATIONS IN EDUCATION

#### **Serious Complications Related to Obstetric Anesthesia: The Serious Complication Repository Project of the Society for Obstetric Anesthesia and Perinatology** 1505

*R. D'Angelo, R.M. Smiley, E.T. Riley, and S. Segal*

The Serious Complication Repository Project of the Society for Obstetric Anesthesia and Perinatology captured data on nearly 257,000 parturients administered neuraxial or general anesthesia at 30 institutions between 2004 and 2009. Serious anesthesia-related complications were reported for 85 (1/3,000) patients. The most common serious complications were high neuraxial block, respiratory arrest in labor suite, and unrecognized spinal catheter.

### CLINICAL CONCEPTS AND COMMENTARY

#### **Endovascular Ablation of Atrial Fibrillation** 1513

*V. Malladi, P.S. Naeini, M. Razavi, C.D. Collard, J.M. Anton, and D.A. Tolpin*

Atrial fibrillation is the most common arrhythmia. The anesthetic considerations of endovascular ablation for the treatment of atrial fibrillation are reviewed.

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#### **All in a Day's Work** 1520

*S.T. Adalsteinsson*

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*G.A. Mashour and E.E. Icaza*

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*K. Hirota*

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*L. Benzonana, H.R. Watts, and D. Ma*

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*George S. Bause*

**Kimmell's Nitrous Oxide near the Centennial Exposition** 1369  
*George S. Bause*

**Kimmell's Practice Devoted to Extracting Teeth Using Nitrous Oxide** 1490  
*George S. Bause*

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