



◇ THIS MONTH IN ANESTHESIOLOGY 5A

◆ EDITORIAL VIEWS

- CME **Implications of Preoperative Heart Failure: The Next Frontier in Perioperative Medicine?** 551  
*Lee A. Fleisher*

- Nitrous Oxide in Neuroanesthesia: Tried and True or Toxin?** 553  
*Deborah J. Culley and Gregory Crosby*

- Advancing the Multidisciplinary Approach to Spinal Cord Injury Risk Reduction in Thoracoabdominal Aortic Aneurysm Repair** 555  
*Tod B. Sloan*

- Ultrasound Guidance May Reduce but Not Eliminate Complications of Peripheral Nerve Blocks** 557  
*Admir Hadzic, Xavier Sala-Blanch, and Daquan Xu*

■ CLINICAL INVESTIGATIONS

- CME **Impact of Heart Failure on Patients Undergoing Major Noncardiac Surgery** 559  
*Bradley G. Hammill, Lesley H. Curtis, Elliott Bennett-Guerrero, Christopher M. O'Connor, James G. Jollis, Kevin A. Schulman, and Adrian F. Hernandez*

From 2000 through 2004, elderly patients with heart failure who underwent major surgical procedures had substantially higher risks of operative mortality and hospital readmission than other patients, including those with coronary disease, admitted for the same procedures.

- ◆ **Effect of Nitrous Oxide on Neurologic and Neuropsychological Function after Intracranial Aneurysm Surgery** 568

*Diana G. McGregor, William L. Lanier, Jeffrey J. Pasternak, Deborah A. Rusy, Kirk Hogan, Satwant Samra, Bradley Hindman, Michael M. Todd, Darrell R. Schroeder, Emine Ozgur Bayman, William Clarke, James Torner, and Julie Weeks, on Behalf of the Intraoperative Hypothermia for Aneurysm Surgery Trial Investigators*

Use of nitrous oxide during cerebral aneurysm clipping did not seem to affect long-term gross neurologic function or neuropsychological function. Further, the incidence of delayed ischemic neurologic deficits was not influenced by nitrous oxide use.

- ◆ **Motor and Somatosensory Evoked Potentials: Their Role in Predicting Spinal Cord Ischemia in Patients Undergoing Thoracoabdominal Aortic Aneurysm Repair with Regional Lumbar Epidural Cooling** 580

*Timothy S. J. Shine, Barry A. Harrison, Martin L. De Ruyter, Julia E. Crook, Michael Heckman, Jasper R. Daube, Wolf H. Stapelfeldt, Kenneth J. Cherry, Peter Głowiczki, Thomas C. Bower, and Michael J. Murray*

The predictive value of evoked potentials in patients undergoing thoracoabdominal aortic aneurysm surgery using regional lumbar epidural cooling was studied. Evoked potentials have potential as a useful monitor in patients undergoing thoracoabdominal aortic aneurysm surgery.

*Continued on page 10A*

◇ Refers to This Month in Anesthesiology

◆ Refers to Editorial Views

🌐 See Web Site enhancement

CME CME Article

**Young Age as a Risk Factor for Impaired Cerebral Autoregulation after Moderate to Severe Pediatric Traumatic Brain Injury**

588

*Serena S. Freeman, Yuthana Udomphorn, William M. Armstead, Dana M. Fisk, and Monica S. Vavilala*

Age less than 4 yr is a risk factor for impaired cerebral autoregulation after pediatric traumatic brain injury, independent of traumatic brain injury severity.

◇ **Postoperative Bleeding in Cardiac Surgery: The Role of Tranexamic Acid in Patients Homozygous for the 5G Polymorphism of the Plasminogen Activator Inhibitor-1 Gene**

596

*Jose L. Iribarren, Juan J. Jimenez, Domingo Hernández, Maitane Brouard, Debora Riverol, Leonardo Lorente, Ramiro de La Llana, Ibrahim Nassar, Rosalia Perez, Rafael Martinez, and Maria L. Mora*

Polymorphisms of the plasminogen activator inhibitor-1 (PAI-1) gene are associated with varying PAI-1 levels. This secondary analysis of a clinical trial investigated whether PAI-1 genotype affects the efficacy of tranexamic acid (TA) in reducing postoperative chest tube blood loss after cardiopulmonary bypass. Patients with the PAI-1 5G/5G homozygous genotype who did not receive TA showed significantly greater postoperative bleeding than patients with other PAI-1 genotypes. 5G/5G homozygotes who received TA showed the greatest blood-sparing benefit.

🌐 **Cardiac Arrests and Deaths Associated with Malignant Hyperthermia in North America from 1987 to 2006: A Report from The North American Malignant Hyperthermia Registry of the Malignant Hyperthermia Association of the United States**

603

*Marilyn Green Larach, Barbara W. Brandom, Gregory C. Allen, Gerald A. Gronert, and Erik B. Lehman*

Muscular build and disseminated intravascular coagulation increased the likelihood of cardiac arrest ( $n = 8$ ) during Canadian and US malignant hyperthermia events ( $n = 291$ ). Longer time between induction and maximum end-tidal carbon dioxide was associated with cardiac arrest ( $P = 0.003$ ).

**Age-related Attenuation of Isoflurane Preconditioning in Human Atrial Cardiomyocytes: Roles for Mitochondrial Respiration and Sarcolemmal Adenosine Triphosphate-sensitive Potassium Channel Activity**

612

*Yasushi Mio, Martin W. Bienengraeber, Jasna Marinovic, David D. Gutterman, Mladen Rakic, Zeljko J. Bosnjak, and Anna Stadnicka*

Effectiveness of isoflurane preconditioning is attenuated in aged human atrial cardiomyocytes. The mechanism involves the age-related modification of mitochondrial respiration and decreased activity of sarcolemmal adenosine triphosphate-sensitive potassium channel.

**Success of Tracheal Intubation with Intubating Laryngeal Mask Airways: A Randomized Trial of the LMA Fastrach™ and LMA CTrach™**

621

*Eugene H. Liu, Raymond W. Goy, Yvonne Lim, and Fun-Gee Chen*

The ability to visualize the glottis with the LMA CTrach™ (The Laryngeal Mask Company, Singapore) results in a higher first-attempt tracheal intubation success rate compared with the LMA Fastrach™ (The Laryngeal Mask Company, Singapore).

**Remifentanil Inhibits Rapid Eye Movement Sleep but Not the Nocturnal Melatonin Surge in Humans**

627

*Christopher P. Bonafide, Natalie Aucutt-Walter, Nicole Divittore, Tonya King, Edward O. Bixler, and Arthur J. Cronin*

In normal volunteers, a constant infusion of remifentanil inhibited nocturnal rapid eye movement sleep. Remifentanil did not suppress the normal nighttime increase in the circadian hormone, melatonin, nor did administration of exogenous melatonin prevent remifentanil inhibition of sleep.

*Continued on page 12A*

## ■ LABORATORY INVESTIGATIONS

- ◇ **Simvastatin Restores Ischemic Preconditioning in the Presence of Hyperglycemia through a Nitric Oxide-mediated Mechanism** 634  
*Weidong Gu, Franz Kehl, John G. Krolikowski, Paul S. Pagel, David C. Wartier, and Judy R. Kersten*  
 Hyperglycemia blocks the cardioprotective effects of ischemic preconditioning against myocardial infarction, but pretreatment with a statin restored protection during hyperglycemia. Statins are known to enhance nitric oxide, and a nitric oxide synthase inhibitor abolished statin-induced protection.
- Isoflurane Preconditioning Reduces the Rat NR8383 Macrophage Injury Induced by Lipopolysaccharide and Interferon  $\gamma$**  643  
*Xuebing Xu, Jifeng Feng, and Zhiyi Zuo*  
 Lipopolysaccharide plus interferon  $\gamma$  induced an inducible nitric oxide synthase-dependent macrophage injury. Preexposure to 2% isoflurane for 1 h at 30 min before lipopolysaccharide plus interferon- $\gamma$  application reduced macrophage injury, suggesting that isoflurane can precondition macrophages.
- Alteration of the Piglet Diaphragm Contractility *In Vivo* and Its Recovery after Acute Hypercapnia** 651  
*Samir Jaber, Boris Jung, Mustapha Sebbane, Michèle Ramonatxo, Xavier Capdevila, Jacques Mercier, Jean-Jacques Eledjam, and Stefan Matecki*  
 In an anesthetized piglet model, a short exposure to acute respiratory acidosis altered diaphragmatic contractility proportionally to the degree of hypercapnia. This alteration was only partially reversed at 60 min after return to normocapnia.
- Inhaled Hydrogen Sulfide: A Rapidly Reversible Inhibitor of Cardiac and Metabolic Function in the Mouse** 659  
*Gian Paolo Volpato, Robert Searles, Binglan Yu, Marielle Scherrer-Crosbie, Kenneth D. Bloch, Fumito Ichinose, and Warren M. Zapol*  
 Inhalation of hydrogen sulfide reversibly depresses cardiovascular function without changing mean arterial pressure in mice. Breathing hydrogen sulfide induces a reversible reduction of metabolic rate independent of core body temperature.
- Additive Interaction of the Cannabinoid Receptor I Agonist Arachidonyl-2-chloroethylamide with Etomidate in a Sedation Model in Mice** 669  
*Patrick Meybohm, Philipp-Alexander Brand, Mike Ufer, Florian Thiemann, Markus Steinfath, Andrea Paris, Jens Scholz, and Berthold Bein*  
 Etomidate-induced sedation was increased and prolonged by activation of the cannabinoid<sub>1</sub> receptor, but not of the cannabinoid<sub>2</sub> receptor, in mice. However, this interaction was only additive.
- Isoflurane Differentially Modulates Inhibitory and Excitatory Synaptic Transmission to the Solitary Tract Nucleus** 675  
*James H. Peters, Stuart J. McDougall, David Mendelowitz, Dennis R. Koop, and Michael C. Andresen*  
 In neurons of the solitary tract nucleus receiving direct visceral afferent inputs, isoflurane enhanced  $\gamma$ -aminobutyric acid-mediated inhibitory synaptic currents *via* a postsynaptic mechanism and attenuated glutamate-mediated excitatory synaptic currents by presynaptic actions.

**Adverse Effects of Methylene Blue on the Central Nervous System** 684

*Laszlo Vutskits, Adrian Briner, Paul Klauser, Eduardo Gascon, Alexandre G. Dayer, Jozsef Z. Kiss, Dominique Muller, Marc J. Licker, and Denis R. Morel*

Using *in vivo* and *in vitro* experimental approaches, the authors demonstrate that methylene blue induces dose-dependent adverse effects on the central nervous system. These results raise questions on the safety of use of this drug.

**Effects of Ropivacaine on Action Potential Configuration and Ion Currents in Isolated Canine Ventricular Cardiomyocytes** 693

*Adrienn Szabó, Norbert Szentandrassy, Péter Birinyi, Balázs Horváth, Gergely Szabó, Tamás Bányász, Ildikó Márton, János Magyar, and Péter P. Nánási*

Ropivacaine evokes concentration- and frequency-dependent changes in action potential configuration and blocks several underlying ion currents in canine ventricular cardiomyocytes, which may cause cardiac arrhythmias in susceptible patients in cases of overdose.

■ **PAIN AND REGIONAL ANESTHESIA**

◇ **Ambulatory Continuous Femoral Nerve Blocks Decrease Time to Discharge Readiness after Tricompartment Total Knee Arthroplasty: A Randomized, Triple-masked, Placebo-controlled Study** 703

*Brian M. Ilfeld, Linda T. Le, R. Scott Meyer, Edward R. Mariano, Krista Vandeborne, Pamela W. Duncan, Daniel I. Sessler, F. Kayser Enneking, Jonathan J. Shuster, Douglas W. Theriaque, Linda F. Berry, Eugene H. Spadoni, and Peter F. Gearen*

This investigation provides evidence that, compared with an overnight continuous femoral nerve block, a 4-day ambulatory continuous femoral nerve block decreases the time to reach three important discharge criteria by 53% after tricompartment knee arthroplasty.

**Cutaneous Amitriptyline in Human Volunteers: Differential Effects on the Components of Sensory Information** 714

*Christian Dualé, Julie Daveau, Jean-Michel Cardot, Anne Boyer-Grand, Pierre Schoeffler, and Claude Dubray*

Transcutaneous amitriptyline in healthy human volunteers was shown to induce a mild mechanical anesthesia, a decrease in sensitivity to cold, and an increase in sensitivity to heat.

**Spinal Microglial and Perivascular Cell Cannabinoid Receptor Type 2 Activation Reduces Behavioral Hypersensitivity without Tolerance after Peripheral Nerve Injury** 722

*Alfonso Romero-Sandoval, Nancy Natile-McMenemy, and Joyce A. DeLeo*

Spinal microglia and perivascular cell cannabinoid receptor type 2 reduces neuropathic pain and microglial CR3/CD11b expression without analgesic tolerance.

■ **REVIEW ARTICLE**

**Venous Function and Central Venous Pressure: A Physiologic Story** 735

*Simon Gelman*

The article discusses venous function, mainly focusing on its function as a blood volume reservoir. Dynamic variables reflecting venous return and cardiac pump function are more helpful than central venous pressure in diagnosis of cardiovascular disturbances.

*Continued on page 15A*

## ■ CLINICAL CONCEPTS AND COMMENTARY

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### **Management of In-flight Medical Emergencies** 749

*Keith J. Ruskin, Keith A. Hernandez, and Paul G. Barash*

Airline travel imposes physiologic challenges to passengers with coexisting illnesses. Anesthesiologists may be uniquely qualified to care for a fellow passenger who becomes sick while flying.

## ■ CLASSIC PAPERS REVISITED

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### 🌐 **Contributions of Anesthesiology to the Surgical Treatment of Cerebrovascular Disease: The Role of Arthur S. Keats, M.D.** 756

*Charles D. Collard, James M. Anton, John R. Cooper, Jr., and N. Martin Giesecke*

This article is a revisiting of original material published as: Wells BA, Keats AS, Cooley DA: Increased tolerance to cerebral ischemia produced by general anesthesia during temporary carotid occlusion. *Surgery* 1963; 54:216-23.

## ■ CASE REPORTS

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### ◆ **Complication during Ultrasound-guided Regional Block: Accidental Intravascular Injection of Local Anesthetic** 759

*Christian Loubert, Stephan R. Williams, François Hélie, and Geneviève Arcand*

### ◆ **Ultrasound Guidance for Axillary Plexus Block Does Not Prevent Intravascular Injection** 761

*Paul J. Zetlaoui, Jean-Philippe Labbe, and Dan Benhamou*

## ■ CORRESPONDENCE

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### **Quotation from Article about Anesthesia Providers' Activities during Ophthalmology Cases** 762

*Franklin Dexter*

### **Anesthesia for Ophthalmologic Surgery**

*Denis L. Bourke*

**In Reply** *Mary Ann Vann and Girish Joshi*

### **Backup Failure of an Adjuvant Battery in an Evita 4<sup>®</sup> Ventilator** 763

*Sumio Amagasa, Ayuko Igarashi, Noriko Yokoo, and Masayoshi Sato*

### **Green Plasma—Revisited** 764

*Nabil M. Elkassabany, GERALYN M. MENY, RAFAEL R. DORIA, and Catherine Marcucci*

■ REVIEWS OF EDUCATIONAL MATERIAL	766
■ CORRECTION	767
■ ANESTHESIOLOGY CME PROGRAM	769
■ CLASSIFIED ADS	A31

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