



## ON THE COVER:

The cover features *Sir Humphry Davy, Bart.* from Lady Davy. This one-fourth life-size oil portrait was donated to the Wood Library-Museum by its Honorary Curator, George Bause, a distant Davy relative who now edits “Anesthesiology Reflections.” Painted by Sir Thomas Lawrence in 1821, the original three-fourths life-size oil hangs in The Royal Society in London.

- Riegels and Richards: Humphry Davy: His Life, Works, and Contribution to Anesthesiology, p. 1282

## THIS MONTH IN ANESTHESIOLOGY

9A

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1280

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## SPECIAL ARTICLES

### Humphry Davy: His Life, Works, and Contribution to Anesthesiology

1282

*Nicholas Riegels and Michael J. Richards*

The authors present the life and extensive scientific works of Humphry Davy and explain why his contribution demonstrates him to be a pioneer in the field of anesthesiology.

◇ Refers to This Month in Anesthesiology

◆ Refers to Editorial Views

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**CME** CME Article

## ■ PERIOPERATIVE MEDICINE

- ◆ CME **Perioperative Stroke and Associated Mortality after Noncardiac, Nonneurologic Surgery** 1289  
*George A. Mashour, Amy M. Shanks, and Sachin Kheterpal*  
 The authors derived and validated a risk model for perioperative stroke after noncardiac, nonneurologic surgery. They observed that perioperative stroke is associated with an 8-fold increase in mortality.
- ◆ **Preexisting Cognitive Impairment and Mild Cognitive Impairment in Subjects Presenting for Total Hip Joint Replacement** 1297  
*Lisbeth A. Evered, Brendan S. Silbert, David A. Scott, Paul Maruff, David Ames, and Peter F. Choong*  
 The prevalence of amnesic mild cognitive impairment before surgery differs from preexisting cognitive impairment, and identification of this construct may help identify conversion to Alzheimer disease in susceptible subjects.
- ◆ ◆ 🌐 **Expansion of the Surgical Apgar Score across All Surgical Subspecialties as a Means to Predict Postoperative Mortality** 1305  
*Paul Q. Reynolds, Neal W. Sanders, Jonathan S. Schildcrout, Nathaniel D. Mercaldo, and Paul J. St. Jacques*  
 An intraoperative surgical Apgar scoring system has been developed to assess postoperative risk. This study expanded the scoring system by collecting intraoperative and postoperative data from 123,864 procedures and many surgical subspecialties. Logistic regression models were created in which mortality within 7, 30, and 90 days were regressed on the Apgar Score. Lower surgical Apgar Scores were associated with an increased risk of death; the magnitude of this association varied by subspecialty. For most surgeries, the association between the Apgar Score and mortality decreased as the time since surgery increased, suggesting the predictive ability diminishes over time. After adjusting for the patient's American Society of Anesthesiologists classification, Apgar Scores remained associated with death among most of the subspecialties. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*
- ◆ **Inspiratory Oxygen Fraction and Postoperative Complications in Obese Patients: A Subgroup Analysis of the PROXI Trial** 1313  
*Anne K. Stæhr, Christian S. Meyhoff, Lars S. Rasmussen, the PROXI Trial Group*  
 The authors found no significant difference in the frequency of postoperative complications in obese patients when 80% oxygen was given during and for 2 h after abdominal surgery compared with 30% oxygen.
- ◆ **Eyes in the Needle: Novel Epidural Needle with Embedded High-frequency Ultrasound Transducer—Epidural Access in Porcine Model** 1320  
*Huihua K. Chiang, Qifa Zhou, M. Susan Mandell, Mei-Yung Tsou, Shih-Pin Lin, K. Kirk Shung, and Chien-Kun Ting*  
 Surface ultrasound is used to guide epidural needle placement. However, difficulty in seeing tissue planes causes failures. The image was improved with the insertion of a high-frequency ultrasound probe into an epidural needle.
- ◆ **Spinal Anesthesia in Infant Rats: Development of a Model and Assessment of Neurologic Outcomes** 1325  
*Barak Yahalom, Umeshkumar Athiraman, Sulpicio G. Soriano, David Zurakowski, Elizabeth A. Carpino, Gabriel Corfas, and Charles B. Berde*  
 An infant rat model was developed to address emerging concerns about neurodevelopmental toxicities of general anesthesia. Spinal anesthesia proved feasible in infant rats and comparatively benign in terms of neuroapoptotic, histologic, and neuromotor effects.
- ◆ 🌐 **Development and Validation of a Risk Quantification Index for 30-Day Postoperative Mortality and Morbidity in Noncardiac Surgical Patients** 1336  
*Jarrod E. Dalton, Andrea Kurz, Alparslan Turan, Edward J. Mascha, Daniel I. Sessler, and Leif Saager*  
 Optimal risk adjustment is a prerequisite for objective interpretation of public reports on hospital outcomes. The authors developed simple risk-adjustment models, based on readily obtained clinical variables, that allow for objective quality-of-care monitoring among hospitals. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

**Anesthetic Ketamine Impairs Rats' Recall of Previous Information: The Nitric Oxide Synthase Inhibitor *N*-Nitro-*L*-arginine Methyl ester Antagonizes This Ketamine-induced Recognition Memory Deficit**

1345

*Antonios Boultsadakis and Nikolaos Pitsikas*

The current results demonstrate that anesthetic ketamine impairs rats' recall of previous information. The nitric oxide synthase inhibitor, L-NAME, antagonized this anesthetic ketamine-induced recognition memory deficit.

**Noninvasive Ventilation and Alveolar Recruitment Maneuver Improve Respiratory Function during and after Intubation of Morbidly Obese Patients: A Randomized Controlled Study**

1354

*Emmanuel Futier, Jean-Michel Constantin, Paolo Pelosi, Gerald Chanques, Alexandre Massone, Antoine Petit, Fabrice Kwiatkowski, Jean-Etienne Bazin, and Samir Jaber*

Morbid obesity predisposes patients to lung collapse and hypoxemia during induction of anesthesia. Noninvasive positive pressure ventilation combined with early recruitment maneuver is more effective than noninvasive positive pressure ventilation alone at improving respiratory function after endotracheal intubation.

**Diabetes Blockade of Sevoflurane Postconditioning Is Not Restored by Insulin in the Rat Heart: Phosphorylated Signal Transducer and Activator of Transcription 3- and Phosphatidylinositol 3-Kinase-mediated Inhibition**

1364

*Benjamin Drenger, Israel A. Ostrovsky, Michal Barak, Yael Nechemia-Arbely, Ehud Ziv, and Jonathan H. Axelrod*

In diabetic rats, sevoflurane postconditioning cardioprotection was inhibited and not restored by insulin therapy, a defect that might be attributed to diabetes mellitus-induced signal transducer and activator of transcription 3-mediated inhibition of phosphatidylinositol 3-kinase signaling.

**Myocardial Blood Flow during General Anesthesia with Xenon in Humans: A Positron Emission Tomography Study**

1373

*Wolfgang Schaefer, Philipp T. Meyer, Rolf Rossaint, Jan H. Baumert, Mark Coburn, Michael Fries, and Steffen Rex*

In healthy volunteers, xenon anesthesia has only minimal effects on coronary flow dynamics, most probably reflecting the decrease in myocardial oxygen consumption induced by the effects of general anesthesia on cardiac work.

■ CRITICAL CARE MEDICINE

◆ **Propofol Enhances Memory Formation *via* an Interaction with the Endocannabinoid System**

1380

*Daniela Hauer, Patrizia Ratano, Maria Morena, Sergio Scaccianoce, Isabel Briegel, Maura Palmery, Vincenzo Cuomo, Benno Roozendaal, Gustav Schelling, and Patrizia Campolongo*

In contrast to benzodiazepines or barbiturates, propofol enhances memory consolidation when administered to rats after aversive training. This unique propofol effect is attributable to an interaction with the endocannabinoid system.

**Pioglitazone Attenuates Acute Cocaine Toxicity in Rat Isolated Heart: Potential Protection by Metabolic Modulation**

1389

*Guy L. Weinberg, Richard Ripper, Sarah Bern, Bocheng Lin, Lucas Edelman, Guido DiGregorio, Mariann Piano, and Douglas L. Feinstein*

Cocaine inhibits lipid substrate transport in isolated cardiac mitochondria. Treatment with pioglitazone, an anti-diabetic drug that improves utilization of carbohydrate substrates, reduces adverse effects of cocaine on function of rat isolated heart.

◇ **Moderate-dose Vasopressin Therapy May Impair Gastric Mucosal Perfusion in Severe Sepsis: A Pilot Study**

1396

*Stefan Klinzing, Mark Simon, Konrad Reinhart, Andreas Meier-Hellmann, and Yasser Sakr*

Vasopressin at a dosage of  $0.04 \text{ IU} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$  in patients with severe sepsis may impair gastric mucosal perfusion with minimal global hemodynamic effects.

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### ■ PAIN MEDICINE

- ◆ **A Peripheral Adrenoceptor-mediated Sympathetic Mechanism Can Transform Stress-induced Analgesia into Hyperalgesia** 1403  
*John E. Donello, Yun Guan, Mingting Tian, Cynthia V. Cheevers, Miguel Alcantara, Sara Cabrera, Srinivasa N. Raja, and Daniel W. Gil*
- Sympathetic postganglionic nerves can enhance pain sensation *via* a peripheral  $\alpha$ -1-adrenoceptor mechanism when sympathetic outflow is disinhibited. Stress-induced hyperalgesia is unmasked after treatment with  $\alpha$ -2 receptor antagonists or in  $\alpha$ -2A receptor knockout mice.
- Carnitine Deficiency Increases Susceptibility to Bupivacaine-induced Cardiotoxicity in Rats** 1417  
*Gail K. Wong and Mark W. Crawford*
- Carnitine-deficient rats demonstrated increased sensitivity to bupivacaine-induced asystole, an effect reversed by acute L-carnitine repletion. These findings suggest that carnitine deficiency increases susceptibility to bupivacaine-induced cardiotoxicity and that L-carnitine may be protective against bupivacaine cardiotoxicity.
- The Quaternary Lidocaine Derivative, QX-314, Exerts Biphasic Effects on Transient Receptor Potential Vanilloid Subtype 1 Channels *In Vitro*** 1425  
*Ricardo E. Rivera-Acevedo, Stephan A. Pless, Christopher A. Ahern, and Stephan K. W. Schwarz*
- In this *in vitro* electrophysiologic study, QX-314 exerted biphasic effects on transient receptor potential vanilloid subtype 1 channels in *Xenopus laevis* oocytes, blocking capsaicin-evoked currents at micromolar concentrations and activating the channels at millimolar concentrations.
- Effect of Rifampicin on S-ketamine and S-norketamine Plasma Concentrations in Healthy Volunteers after Intravenous S-ketamine Administration** 1435  
*Ingeborg Noppers, Erik Olofson, Marieke Niesters, Leon Aarts, René Mooren, Albert Dahan, Evan Kharasch, and Elise Sarton*
- Rifampicin caused a large reduction in S-norketamine concentrations, suggesting that rifampicin induces the elimination of S-ketamine's metabolite, S-norketamine, probably *via* induction of the CYP3A4 and/or CYP2B6 enzymes.

### ■ EDUCATION

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*Priscilla J. Garcia, Oluyinka O. Olutoye, Richard T. Ivey, and Olutoyin A. Olutoye*

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- Ultrasonography of the Adult Thoracic and Lumbar Spine for Central Neuraxial Blockade** 1459  
*Ki Jinn Chin, Manoj Kumar Karmakar, and Phillip Peng*

This article describes the relevant anatomy and sonoanatomy of the adult thoracic and lumbar spine and proposes a systematic approach to ultrasound imaging in the performance of central neuraxial blockade.

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*James E. Paul and Lehana Thabane*

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*George S. Bause*

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## INSTRUCTIONS FOR AUTHORS

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