




## ON THE COVER:

The Perioperative Surgical Home has been conceived as a new patient-centered model designed to improve health and the delivery of health care while reducing cost through shared decision making and seamless continuity of care for the surgical patient. In this issue of ANESTHESIOLOGY, numerous articles present original data derived from clinical trials aimed at evaluating the utility of this new treatment paradigm.

◆ THIS MONTH IN ANESTHESIOLOGY	1A
■ SCIENCE, MEDICINE, AND THE ANESTHESIOLOGIST	19A
■ INFOGRAPHICS IN ANESTHESIOLOGY	21A
◆ EDITORIAL VIEWS	
<b>Science, Medicine, and the Anesthesiologist: Two Pages to Keep You Abreast of Key Papers from Outside the Specialty and Relevant to Your Practice</b> <i>J. Mantz, J. P. Rathmell, and J. C. Eisenach</i>	1
<b>A Shared Decision-making Intervention: Success or Failure?</b> <i>M. J. Barry</i>	5
<b>Prehabilitation for Prevention of Postoperative Cognitive Dysfunction?</b> <i>D. J. Culley and G. Crosby</i>	7
<b>Learning: Behavior Grounded in Experiences</b> <i>S. A. Black and A. J. Schwartz</i>	10
<b><span style="color: red;">CME</span> Apply Protective Mechanical Ventilation in the Operating Room in an Individualized Approach to Perioperative Respiratory Care</b> <i>M. Eikermann and T. Kurth</i>	12
<b>Postoperative Apnea in Former Preterm Infants: General Anesthesia or Spinal Anesthesia—Do We Have an Answer?</b> <i>C. D. Kurth and C. J. Coté</i>	15

◆ Refers to This Month in Anesthesiology  
 ◆ Refers to Editorial Views  
BA Best Abstract article originally presented at ANESTHESIOLOGY 2014

 See Supplemental Digital Content  
CME CME Article

## ■ PERIOPERATIVE MEDICINE

## CLINICAL SCIENCE

- ◆◆ **Decision Aid for Cigarette Smokers Scheduled for Elective Surgery** 18  
*D. O. Warner, A. LeBlanc, S. Kadimpati, K. S. Vickers, Y. Shi, and V. M. Montori*
- In a randomized trial of 130 surgical patients, use of a decision aid consisting of laminated cards with pros and cons of continuing smoking, attempting temporary abstinence, or attempting to quit smoking improved measures of decisional quality but did not change perioperative tobacco use behavior.
- ◆ **Behavioral Modification of Intraoperative Hyperglycemia Management with a Novel Real-time Audiovisual Monitor** 29  
*S. Sathishkumar, M. Lai, P. Picton, S. Kheterpal, M. Morris, A. Shanks, and S. K. Ramachandran*
- Real-time audiovisual notification is associated with a significant increase in desirable intraoperative glycemic management behavior and may help achieve tighter intraoperative glycemic control.
- ◆◆ **Apnea after Awake Regional and General Anesthesia in Infants: The General Anesthesia Compared to Spinal Anesthesia Study—Comparing Apnea and Neurodevelopmental Outcomes, a Randomized Controlled Trial** 38  
*A. J. Davidson, N. S. Morton, S. J. Arnup, J. C. de Graaff, N. Disma, D. E. Withington, G. Frawley, R. W. Hunt, P. Hardy, M. Khotcholava, B. S. von Ungern Sternberg, N. Wilton, P. Tuo, I. Salvo, G. Ormond, R. Stargatt, B. G. Locatelli, M. E. McCann, and the General Anesthesia compared to Spinal anesthesia (GAS) Consortium*
- In a secondary analysis of more than 700 infants more than 60 weeks postmenstrual age randomized to regional or general anesthesia for inguinal herniorrhaphy, there was no difference in the incidence apnea in the first 12 postoperative hours (primary outcome measure), although early apnea in the first 30 min was less with regional.
- ◆ **Predictors of Failure of Awake Regional Anesthesia for Neonatal Hernia Repair: Data from the General Anesthesia Compared to Spinal Anesthesia Study—Comparing Apnea and Neurodevelopmental Outcomes** 55  
*G. Frawley, G. Bell, N. Disma, D. E. Withington, J. C. de Graaff, N. Morton, M. E. McCann, S. J. Arnup, O. Bagshaw, A. Wolfler, D. Bellinger, A. J. Davidson, and the General Anesthesia compared to Spinal anesthesia (GAS) Consortium*
- In a secondary analysis of the General Anesthesia compared to Spinal anesthesia study, data from 339 infants younger than 60 weeks postmenstrual age receiving spinal or caudal anesthesia for herniorrhaphy were examined. Failure of regional anesthesia requiring general anesthesia occurred in 10% of cases, and its only predictor was bloody tap on the first attempt at lumbar puncture.
- ◆ **Protective versus Conventional Ventilation for Surgery: A Systematic Review and Individual Patient Data Meta-analysis** 66  
*A. Serpa Neto, S. N. T. Hemmes, C. S. V. Barbas, M. Beiderlinden, M. Biehl, J. M. Binnekade, J. Canet, A. Fernandez-Bustamante, E. Futier, O. Gajic, G. Hedenstierna, M. W. Hollmann, S. Jaber, A. Kozian, M. Licker, W.-Q. Lin, A. D. Maslow, S. G. Memtsoudis, D. Reis Miranda, P. Moine, T. Ng, D. Paparella, C. Putensen, M. Ranieri, F. Scavonetto, T. Schilling, W. Schmid, G. Selmo, P. Severgnini, J. Sprung, S. Sundar, D. Talmor, T. Treschan, C. Unzueta, T. N. Weingarten, E. K. Wolthuis, H. Wrigge, M. Gama de Abreu, P. Pelosi, and M. J. Schultz; for the PROVE Network Investigators*
- This individual patient meta-analysis of 2,127 patients ventilated under general anesthesia for surgery from 15 randomized controlled trials shows that intraoperative ventilation with low tidal volume protects against postoperative pulmonary complications, but further trials are necessary to define the role of intraoperative higher positive end-expiratory pressure to prevent postoperative pulmonary complications after major abdominal surgery.

## **Intraoperative Mean Arterial Pressure Variability and 30-day Mortality in Patients Having Noncardiac Surgery** 79

*E. J. Mascha, D. Yang, S. Weiss, and D. I. Sessler*

Average mean arterial pressure and mean pressure variability were nonlinearly related to 30-day mortality in noncardiac surgical patients. After adjusting for time-weighted average mean arterial pressure and other important covariables, low blood pressure variability as measured by an improved formula was still associated with higher 30-day mortality, but the differences were not clinically important. Anesthesiologists might thus pay more attention to overall trends in the mean blood pressure for a case than in the minute-to-minute variation.

## ◇ **A Randomized, Double-blinded Trial of a “Rule of Threes” Algorithm *versus* Continuous Infusion of Oxytocin during Elective Cesarean Delivery** 92

*V. P. Kovacheva, M. A. Soens, and L. C. Tsen*

In 60 women randomized to treatment at cesarean delivery, a single intravenous bolus of 3 IU at delivery was as effective as continuous, wide-open infusion of oxytocin, 30 IU/500 ml despite less total oxytocin delivered. Groups did not differ in side effects associated with oxytocin.

## ◇ **Assessing and Comparing Anesthesiologists’ Performance on Mandated Metrics Using a Bayesian Approach** 101

*E. O. Bayman, F. Dexter, and M. M. Todd*

Noncompliance with simple blood pressure and oxyhemoglobin saturation metrics defined by the Joint Commission in the United States in approximately 70,000 cases at the University of Iowa (Iowa City, Iowa) was present in up to 43 and 70% of anesthesiologists, respectively, using frequentist statistics compared with 2.4 and 0% using a Bayesian approach. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

## ◇ **Compliance with Surgical Care Improvement Project for Body Temperature Management (SCIP Inf-10) Is Associated with Improved Clinical Outcomes** 116

*A. V. Scott, J. L. Stonemetz, J. O. Wasey, D. J. Johnson, R. J. Rivers, C. G. Koch, and S. M. Frank*

Data from 45,304 noncardiac surgical patients at a single academic medical center found that 1,240 were noncompliant (body temperature < 36°C or no use of active warming). Noncompliant patients had an increased risk of infection, ischemic events, and mortality, supporting maintenance of normothermia as a useful perioperative quality measure.

## 🌐 **A Clinical Trial to Detect Subclinical Transfusion-induced Lung Injury during Surgery** 126

*J. R. Feiner, M. A. Gropper, P. Toy, J. Lieberman, J. Twiford, and R. B. Weiskopf*

In this study, transfused erythrocytes in surgical patients did not impair gas exchange as assessed by  $P_{aO_2}/F_{iO_2}$ . *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

## **Propensity Score–matched Comparison of Postoperative Adverse Outcomes between Geriatric Patients Given a General or a Neuraxial Anesthetic for Hip Surgery: A Population-based Study** 136

*C.-C. Chu, S.-F. Weng, K.-T. Chen, C.-C. Chien, J.-P. Shieh, J.-Y. Chen, and J.-J. Wang*

Using Taiwan’s in-patient claims database, the effect of anesthetic technique on in-hospital outcomes was assessed. Neuraxial techniques were found to have lower rates of in-hospital adverse outcomes of several types including mortality, stroke, and others.

## ◇ **Effects of an Innovative Psychotherapy Program for Surgical Patients: Bridging Intervention in Anesthesiology—A Randomized Controlled Trial** 148

*L. F. Kerper, C. D. Spies, A.-L. Salz, E. Weiß-Gerlach, F. Balzer, T. Neumann, S. Tafelski, A. Lau, B. Neuner, N. Romanczuk-Seiferth, H. Glaesmer, K.-D. Wernecke, E. Brähler, and H. Krampe*

In 220 surgical patients with comorbid mental disorders (primarily mood, anxiety and adjustment disorders, or alcohol or tobacco abuse), those randomized to psychotherapy sessions perioperatively and up to 3 months postoperatively were more likely to participate in psychosocial mental health care 6 months after surgery than those randomized to brief written advice only.

## CONTENTS

### BASIC SCIENCE

- ◆  **Impact of Preoperative Environmental Enrichment on Prevention of Development of Cognitive Impairment following Abdominal Surgery in a Rat Model** 160

*T. Kawano, S. Eguchi, H. Iwata, T. Tamura, N. Kumagai, and M. Yokoyama*

Anesthesia and surgery were associated with memory deficits, microglial activation, and elaboration of inflammatory cytokines in aged, but not young, animals. Preoperative environmental enrichment attenuated cognitive deficits and cytokine production in the brain. The data suggest that preoperative environmental enrichment can mitigate the adverse effects of anesthesia and surgery on postoperative cognitive function. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

- BA **Critical Changes in Cortical Neuronal Interactions in Anesthetized and Awake Rats** 171

*A. G. Hudetz, J. A. Vizuetz, S. Pillay, and K. M. Ropella*

Neuronal interactions increase during stepwise emergence from desflurane anesthesia and were enhanced by visual stimulation to the greatest extent during the return of righting reflex. Critical changes in neuronal interaction correlate with depth of anesthesia and an experimental index of the return of consciousness.

### CRITICAL CARE MEDICINE

### CLINICAL SCIENCE

-  **Assisted Ventilation in Patients with Acute Respiratory Distress Syndrome: Lung-distending Pressure and Patient–Ventilator Interaction** 181

*J. Doorduyn, C. A. Sinderby, J. Beck, J. G. van der Hoeven, and L. M. A. Heunks*

Twelve patients with mild-to-moderate acute respiratory distress syndrome were ventilated in a randomized order with three ventilation modes: pressure control ventilation, pressure support ventilation, and neurally adjusted ventilatory assist. Lung-protective ventilation was maintained to a similar degree in all study arms; the results are hypothesis generating for using assisted ventilation in patients with acute respiratory distress syndrome after the first 48 h of therapy, which might include paralysis. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

### PAIN MEDICINE

### BASIC SCIENCE

- Effect of 1.5% Topical Diclofenac on Clinical Neuropathic Pain** 191

*S. U. Ahmed, Y. Zhang, L. Chen, A. Cohen, K. St. Hillary, T. Vo, M. Houghton, and J. Mao*

Using a blinded, placebo-controlled, crossover trial design, lower pain scores were observed after treatment with topical diclofenac. Several secondary endpoints and functional status were unchanged. Topical diclofenac was not associated with complications within the timeframe of the study.

- Modulation of Nerve Injury–induced HDAC4 Cytoplasmic Retention Contributes to Neuropathic Pain in Rats** 199

*T.-B. Lin, M.-C. Hsieh, C.-Y. Lai, J.-K. Cheng, Y.-P. Chau, T. Ruan, G.-D. Chen, and H.-Y. Peng*

In a rat model of neuropathic pain, histone deacetylases 4 phosphorylation led to its cytoplasmic retention due to phosphorylation-dependent interaction with 14-3-3 $\beta$ . Inhibition of histone deacetylases phosphorylation reduced allodynia and prevented its cytoplasmic translocation, suggesting a novel therapeutic target for neuropathic pain.

### EDUCATION

### IMAGES IN ANESTHESIOLOGY

-  **Coexisting Aortic Stenosis and Left Ventricular Outflow Tract Obstruction** 213

*S. M. Haddy*

*SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

## CLINICAL CONCEPTS AND COMMENTARY

- ◇ **Antifibrinolytic Therapy for Cardiac Surgery: An Update** 214  
*A. Koster, D. Faraoni, and J. H. Levy*

Antifibrinolytic therapy reduces bleeding and chest tube drainage output in cardiac surgical patients but is associated with potential side effects. Two phase-II studies with new compounds were terminated prematurely. There is increasing evidence of adverse side effects with tranexamic acid.

## MIND TO MIND

- Perioperative Six-word Stories** 222

*R. Kiberenge, D. Hester, S. Harvey, and B. McNew*

- The Scarlet “A”** 224

*M. Udoji*

- Telling Him** 226

*W. E. Morrison*

## CORRESPONDENCE

- Postoperative Outcomes in Obstructive Sleep Apnea: Matched Cohort Study** 229

*R. Kaw*

**In Reply**

*T. C. Mutter, D. Chateau, M. Moffatt, C. Ramsey, L. L. Roos, and M. Kryger*

- Neostigmine: You Can’t Have It Both Ways** 231

*A. F. Kopman and M. Naguib*

**In Reply**

*M. J. Meyer, N. Sasaki, and M. Eikermann*

- Confounders *versus* Mediators: An Important Distinction** 234

*K. Raghunathan, T. E. Miller, and A. M. Rashid*

**High-molecular Hydroxyethyl Starch: Is More Data Still Needed?**

*C. Ertmer and H. Van Aken*

**In Reply**

*A. Kurz, N. Makarova, J. E. Dalton, and D. I. Sessler*

- Tracheal Tube Obstruction Assessed by Computed Tomography** 236

*M. J. Schultz*

- Can the Continuous Hemofiltration Control Ebola-induced Systemic Inflammatory Response Syndrome?** 237

*R. García-Hernández, M. A. Moguel-González, G. García-Benito, E. Calderón Seoane, and L. M. Torres Morera*

## ANESTHESIOLOGY REFLECTIONS FROM THE WOOD LIBRARY-MUSEUM

- Brown’s Household Panacea: Stealing Away Pain** 6

*George S. Bause*

- “Between Long and Morton”? C. W. Mayo Opines** 17

*George S. Bause*

## CONTENTS

### Laughing Gas for the “Pulpit Clown”?

George S. Bause

100

#### ■ REVIEWS OF EDUCATIONAL MATERIAL

239

#### ■ ANNOUNCEMENTS

240

#### ■ CAREERS & EVENTS

23A

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