



ON THE COVER:

The cover highlights two analyses conducted by the ASA Closed Claims Study Group that appear in this issue of the Journal demonstrating that permanent injuries to the cervical spinal cord occur with alarming frequency during the conduct of general anesthesia and during pain interventions done at the cervical level. The MRI that appears in the background demonstrates a high T2-weighted signal within the cervical spinal cord after a direct injection into the cervical spinal cord that occurred during a cervical epidural injection performed under deep sedation:

- Lanier and Warner: New Perioperative Cervical Injury: Medical and Legal Implications for Patients and Anesthesia Providers, pp. 729
- Hindman *et al.*: Cervical Spinal Cord, Root, and Bony Spine Injuries: A Closed Claims Analysis, pp. 782
- Rathmell *et al.*: Injury and Liability Associated with Cervical Procedures for Chronic Pain, pp. 918

The cover also features photographs of Kevin K. Tremper, Ph.D., M.D., and Warren M. Zapol, M.D., who presented the Rovenstine Lecture and the Severinghaus Lecture, respectively, at the 2010 ASA Annual Meeting:

- Tremper: Anesthesiology: From Patient Safety to Population Outcomes—The 49th Annual Rovenstine Lecture, pp. 755
- Zapol: Life at the Frontier: The Third Annual John W. Severinghaus Lecture on Translational Science, pp. 771

THIS MONTH IN ANESTHESIOLOGY

9A

EDITORIAL VIEWS

New Perioperative Cervical Injury: Medical and Legal Implications for Patients and Anesthesia Providers

729

William L. Lanier and Mark A. Warner

If a Troponin Falls in a Forest but No One Measures It, Does It Really Matter?

732

Jochen D. Muehlschlegel

Perioperative Smoking Risk

734

Rita Katznelson and W. Scott Beattie

Tranexamic Acid in Elective Craniostomosis Surgery: It Works, but How?

737

John B. Holcomb

The Seven Bridges of Königsberg

739

Kane O. Pryor and Jamie Sleight

SPECIAL ARTICLES

- 
Practice Advisory for the Prevention of Perioperative Peripheral Neuropathies: An Updated Report by the American Society of Anesthesiologists Task Force on Prevention of Perioperative Peripheral Neuropathies
741

The American Society of Anesthesiologists Task Force on Prevention of Perioperative Peripheral Neuropathies presents an updated report of the Practice Advisory for the Prevention of Perioperative Peripheral Neuropathies.

SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

◇ Refers to This Month in Anesthesiology

◆ Refers to Editorial Views

MA Meeting Article

🌐 See Supplemental Digital Content

CME CME Article

CONTENTS

- MA** **Anesthesiology: From Patient Safety to Population Outcomes—The 49th Annual Rovenstine Lecture** 755
Kevin K. Tremper

This article will address the past, present, and future applications of monitoring and information technology for the improvement of patient safety, not only in anesthesiology but potentially in other related medical fields.

- MA** **Life at the Frontier: The Third Annual John W. Severinghaus Lecture on Translational Science** 771
Warren M. Zapol

This manuscript describes Warren M. Zapol's life in translational medical research. Encompassing building teams to improve therapy of respiratory failure with membrane oxygenators and developing inhaled nitric oxide, and includes Antarctic Weddell seal studies.

■ PERIOPERATIVE MEDICINE

- MA** **◆ Cervical Spinal Cord, Root, and Bony Spine Injuries: A Closed Claims Analysis** 782
Bradley J. Hindman, John P. Palecek, Karen L. Posner, Vincent C. Traynelis, Lorri A. Lee, Paul D. Sawin, Trent L. Tredway, Michael M. Todd, and Karen B. Domino

In the American Society of Anesthesiologists Closed Claims database, cervical spinal cord injuries occurred most often in the absence of trauma, instability, and airway difficulty. Cervical spine degenerative disease was a common factor associated with cord injury.

- ◆ Prognostic Value of Troponin and Creatine Kinase Muscle and Brain Isoenzyme Measurement after Noncardiac Surgery: A Systematic Review and Meta-analysis** 796
Michael Levy, Diane Heels-Ansdell, Rajesh Hiralal, Mohit Bhandari, Gordon Guyatt, Salim Yusuf, Deborah Cook, Juan Carlos Villar, Matthew McQueen, Edward McFalls, Miodrag Filipovic, Holger Schünemann, John Sear, Pierre Foex, Wendy Lim, Giora Landesberg, Gilles Godet, Don Poldermans, Francesca Bursi, Miklos D. Kertai, Neera Bhatnagar, and P.J. Devereaux

An elevated troponin measurement after surgery independently predicts mortality, particularly within the first year; limited data suggest an elevated creatine kinase muscle and brain isoenzyme measurement also predicts mortality. Monitoring perioperative troponins may enhance risk stratification.

- MA** **Increased Peak Postoperative B-type Natriuretic Peptide Predicts Decreased Longer-term Physical Function after Primary Coronary Artery Bypass Graft Surgery** 807
Amanda A. Fox, Edward R. Marcantonio, Charles D. Collard, Mathis Thoma, Tjorvi E. Perry, Stanton K. Shernan, Jochen D. Muehlschlegel, and Simon C. Body

Increased postoperative B-type natriuretic peptide (peak measurement from postoperative days 1–5) significantly predicts lower Short Form-36 questionnaire physical function domain scores, assessed 6 months through 2 yr after isolated primary coronary artery bypass graft surgery.

- MA** **◆ Chronic β Blockade Is Associated with a Better Outcome after Elective Noncardiac Surgery than Acute β Blockade: A Single-center Propensity-matched Cohort Study** 817
Christoph Ellenberger, Gordon Tait, and W. Scott Beattie

In this observational study, acute β blockade, administered within 48 h of surgery, does not appear to possess the magnitude of cardioprotective effects evident in patients who present for surgery while undergoing chronic β blockade.

- MA** **Perioperative β -Blockade: Atenolol Is Associated with Reduced Mortality When Compared to Metoprolol** 824
Arthur W. Wallace, Selwyn Au, and Brian A. Cason

Patients treated with perioperative atenolol have a lower associated mortality than those treated with metoprolol.

- ◆ **Smoking and Perioperative Outcomes** 837
Alparslan Turan, Edward J. Mascha, Dmitry Roberman, Patricia L. Turner, Jing You, Andrea Kurz, Daniel I. Sessler, and Leif Saager
 We investigated the effect of smoking on 30-day postoperative outcomes in noncardiac surgical patients. Our analysis indicates that smoking is clearly associated with a higher likelihood of 30-day mortality and serious postoperative complications. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*
- Clinician-delivered Intervention to Facilitate Tobacco Quitline Use by Surgical Patients** 847
David O. Warner, Robert C. Klesges, Lowell C. Dale, Kenneth P. Offord, Darrell R. Schroeder, Yu Shi, Kristin S. Vickers, and David R. Danielson
 Although telephone quitlines can help smokers quit, they are underused. This study shows that a brief clinician-delivered quitline facilitation intervention increases the rate of quitline use by surgical patients, with one in five patients taking advantage of telephone counseling.
- MA ◆ **Intraoperative Tranexamic Acid Reduces Blood Transfusion in Children Undergoing Craniosynostosis Surgery: A Randomized Double-blind Study** 856
Christophe Dadure, Magali Sauter, Sophie Bringuier, Michelle Bigorre, Olivier Raux, Alain Rochette, Nancy Canaud, and Xavier Capdevila
 Intraoperative tranexamic acid associated with preoperative erythropoietin is an effective treatment to reduce blood transfusion in children undergoing craniosynostosis surgery.
- MA ◆ **Efficacy of Tranexamic Acid in Pediatric Craniosynostosis Surgery: A Double-blind, Placebo-controlled Trial** 862
Susan M. Goobie, Petra M. Meier, Luis M. Pereira, Francis X. McGowan, Randy P. Prescilla, Laurie A. Scharp, Gary F. Rogers, Mark R. Proctor, John G. Meara, Sulpicio G. Soriano, David Zurakowski, and Navil F. Sethna
 This randomized, double-blind, placebo-controlled trial showed that tranexamic acid reduced blood loss and transfusion in pediatric craniosynostosis reconstruction surgery. Plasma tranexamic acid concentrations remained above the level that is presumed to inhibit fibrinolysis *in vitro*.
- MA ◆ **Dissociable Network Properties of Anesthetic State Transitions** 872
UnCheol Lee, Markus Müller, Gyu-Jeong Noh, ByungMoon Choi, and George A. Mashour
 Here we show that there are both continuous and discrete brain network changes during induction and emergence, with parietal networks more affected than frontal networks. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*
- MA ◆ **Preoperative Dexamethasone Enhances Quality of Recovery after Laparoscopic Cholecystectomy: Effect on In-hospital and Postdischarge Recovery Outcomes** 882
Glenn S. Murphy, Joseph W. Szokol, Steven B. Greenberg, Michael J. Avram, Jeffery S. Vender, Margarita Nisman, and Jessica Vaughn
 The use of dexamethasone significantly enhanced quality of recovery on postoperative day 1 in outpatient laparoscopic cholecystectomy patients. Furthermore, small-dose steroid therapy reduced postoperative nausea, pain, and fatigue in addition to decreasing hospital length of stay.
- Heat Shock Protein 72 Overexpression Prevents Early Postoperative Memory Decline after Orthopedic Surgery under General Anesthesia in Mice** 891
Marcela P. Vizcaychipi, Lijun Xu, George E. Barreto, Daqing Ma, Mervyn Maze, and Rona G. Giffard
 Heat shock protein 72 overexpression prevents postoperative hippocampal-dependent and -independent memory deficit induced by anesthesia and/or surgery in adult mice.

CONTENTS

■ CRITICAL CARE MEDICINE

- MA** **Delaying Blood Transfusion in Experimental Acute Anemia with a Perfluorocarbon Emulsion** 901

Pedro Cabrales and Juan Carlos Briceño

A perfluorocarbon oxygen carrier sustained oxygen consumption and organ function after multistep normovolemic hemodilution to 6% hematocrit in a hamster model. Perfluorocarbon oxygen carriers could be used to decrease the transfusion trigger.

- ◇ **Aquaporin 5 Gene Promoter – 1364A/C Polymorphism Associated with 30-day Survival in Severe Sepsis** 912

Michael Adamzik, Ulrich H. Frey, Stephan Möhlenkamp, André Scherag, Christian Waydhas, Günther Marggraf, Marc Dammann, Jörg Steinmann, Winfried Siffert, and Jürgen Peters

The aquaporin (AQP) 5 protein mediates key mechanisms for inflammation such as cell migration and proliferation, activity of the renin–angiotensin–aldosterone system, and the transport of water across biological membranes. Because genetic variations may play a role in determining patient outcomes for severe sepsis, this prospective study compared outcomes of patients (N = 154) with severe sepsis with the AQP5 promoter-1364A/C polymorphisms. Patients with the AQP5-1364 AC/CC (83%) genotypes demonstrated significantly improved 30-day survival compared with AA (57%; $P = 0.001$). The AQP5-1364A/C polymorphism was an independent prognostic factor for 30-day survival.

■ PAIN MEDICINE

- Injury and Liability Associated with Cervical Procedures for Chronic Pain** 918

James P. Rathmell, Edward Michna, Dermot R. Fitzgibbon, Linda S. Stephens, Karen L. Posner, and Karen B. Domino

Injuries related to cervical interventional pain treatments are often severe and related to direct needle trauma to the spinal cord. Traumatic spinal cord injury is more common in patients who are not responsive during the procedure.

- MA** **β₂-Adrenergic Receptor Genotype and Other Variables that Contribute to Labor Pain and Progress** 927

Elena Reitman, Jessamyn Conell-Price, Jennifer Evansmith, Luke Olson, Sofia Drosinos, Nancy Jasper, Paula Randolph, Richard M. Smiley, Steven Shafer, and Pamela Flood

Genotype at the β₂-adrenergic receptor is predictive of term labor progress. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

- MA** **Regular Exercise Reverses Sensory Hypersensitivity in a Rat Neuropathic Pain Model: Role of Endogenous Opioids** 940

Nicola J. Stagg, Heriberto P. Mata, Mohab M. Ibrahim, Erik J. Henriksen, Frank Porreca, Todd W. Vanderah, and T. Philip Malan, Jr.

Regular exercise training reverses sensory hypersensitivity in the spinal nerve ligation model of neuropathic pain by an opioid-mediated mechanism, including increased expression of endogenous opioids in the rostral ventromedial medulla and mid-brain periaqueductal gray area.

■ EDUCATION

CASE SCENARIO

- Cesarean Section Complicated by Rheumatic Mitral Stenosis** 949

Menachem M. Weiner, Torsten P. Vahl, and Ronald A. Kahn

IMAGES IN ANESTHESIOLOGY

- Scrub the Hub! Catheter Needleless Port Decontamination** 958

Justin L. Lockman, Eugenie S. Heitmiller, Judith A. Ascenzi, and Ivor Berkowitz

ANESTHESIA LITERATURE REVIEW

959

CONTENTS

CLINICAL CONCEPTS AND COMMENTARY

Cardiopulmonary Bypass–associated Acute Kidney Injury 964

Avinash B. Kumar and Manish Suneja

This review addresses the pathophysiology, risk factors, management strategies and emerging concepts in acute kidney injury associated with cardiopulmonary bypass.

REVIEW ARTICLE

CME Magnesium—Essentials for Anesthesiologists 971

Susanne Herroeder, Marianne E. Schönherr, Stefan G. De Hert, and Markus W. Hollmann

Magnesium plays a key role in numerous physiologic processes and has long been used in clinical practice. Current knowledge about its physiology, proposed indications, and clinical recommendations for its use are reviewed.

MIND TO MIND

Going Under 994

Lizabeth A. Netzel

CASE REPORT

Accidental Intrathecal Injection of Aminophylline in Spinal Anesthesia 998

Muhammad Ajmal

CORRESPONDENCE

Muscle Relaxants and Electroencephalogram 1001

Arthur E. Schwartz

In Reply

Hiroshi Ueyama and Satoshi Hagihira

Ethics and Human Experimentation 1001

John F. Butterworth IV

In Reply

Susan K. Palmer

Anesthesiologists as Genetic Counselors? 1003

Henry Rosenberg, Georgirene D. Vladutiu, and Marilyn Green Larach

In Reply

Frank H. Lee and Srinivasa N. Raja

The Discovery of Chloroform: Has David Waldie’s Role Been Exaggerated? 1004

Ray J. Defalque and Amos J. Wright

ANESTHESIOLOGY REFLECTIONS

Morton in *McClure’s Magazine* 890

George S. Bause

The Milton Apparatus for Anesthetizing. . . and Awakening 917

George S. Bause

“Old Ironsides” through the Holmes Stereoscope 957

George S. Bause

CONTENTS

■ REVIEWS OF EDUCATIONAL MATERIAL	1006
■ ANNOUNCEMENTS	1008
■ CLASSIFIED ADS	35A

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