



# Anesthesiology



*The Journal of the American Society of Anesthesiologists, Inc.*

*American Society of Critical Care Anesthesiologists*

*Society for Obstetric Anesthesia and Perinatology*



## CONTENTS

◇ THIS MONTH IN ANESTHESIOLOGY	5A
Myocardial Ischemia in Young Patients with Hemorrhagic Shock	
Does Response to Preoperative Burn Injury Predict Postoperative Pain Intensity?	
Is Epidural Analgesia Linked to Increased Risk of Cesarean Deliveries?	
◆ EDITORIAL VIEWS	
The Times Are A-Changin': Should We Hang Up the Stethoscope?	1
Rolf D. Hubmayr	
The Case for Pediatric Drug Development in Clinical Pain Research	2
Margaret Wood	
Is There Any Reason To Withhold $\beta$ Blockers from High-risk Patients with Coronary Artery Disease during Surgery?	4
Miklos D. Kertai, Jeroen J. Bax, Jan Klein, and Don Poldermans	
■ SPECIAL ANNOUNCEMENT	
Journal-sponsored Activities at the 2004 Annual Meeting: A Call for Abstracts	8

- ◇ Refers to This Month in Anesthesiology
- ◆ Refers to Editorial Views
- See Web Site enhancement



## CONTENTS

### ■ CLINICAL INVESTIGATIONS

- ◆ **Comparative Diagnostic Performances of Auscultation, Chest Radiography, and Lung Ultrasonography in Acute Respiratory Distress Syndrome** 9

*Daniel Lichtenstein, Ivan Goldstein, Eric Mourgeon, Philippe Cluzel, Philippe Grenier, and Jean-Jacques Rouby*

Bedside lung ultrasonography is highly sensitive and specific for diagnosing the main lung pathologic entities in patients with acute respiratory distress syndrome and seems to be an attractive alternative to bedside chest radiography and thoracic computed tomography.

- Noninvasive Positive Pressure Ventilation Using a Helmet in Patients with Acute Exacerbation of Chronic Obstructive Pulmonary Disease: A Feasibility Study** 16

*Massimo Antonelli, Mariano Alberto Pennisi, Paolo Pelosi, Cesare Gregoretti, Vincenzo Squadrone, Monica Rocco, Luca Cecchini, Davide Chiumello, Paolo Severgnini, Rodolfo Proietti, Paolo Navalesi, and Giorgio Conti*

Helmet noninvasive positive pressure ventilation is feasible and can be used to treat chronic obstructive pulmonary disease patients with acute exacerbation, but it does not improve carbon dioxide elimination as efficiently as does facemask noninvasive positive pressure ventilation.

- Gum Elastic Bougie-guided Insertion of the *ProSeal*<sup>TM</sup> Laryngeal Mask Airway Is Superior to the Digital and Introducer Tool Techniques** 25

*Joseph Brimacombe, Christian Keller, and Dana Vosoba Judd*

Gum elastic bougie-guided insertion of the *ProSeal*<sup>TM</sup> laryngeal mask airway is more frequently successful than the digital or introducer tool insertion techniques. The authors suggest that the gum elastic bougie-guided technique may be a useful backup technique for when the digital and introducer tool insertion techniques fail.

- ◆ **High Incidence of Myocardial Ischemia during Postpartum Hemorrhage** 30

*Peter C. J. Karpati, Mathias Rossignol, Marcus Pirot, Bernard Cholley, Eric Vicaut, Patrick Henry, Jean-Philippe Kévorkian, Patrick Schurando, Jacqueline Peynet, Denis Jacob, Didier Payen, and Alexandre Mebazaa*

Severe postpartum hemorrhage is a leading cause of maternal morbidity and death in the world, even in developed countries. This study showed a high incidence of myocardial injury (51% of the parturients) that was positively correlated with the severity of hemorrhagic shock.



## CONTENTS

### Nefopam, a Nonsedative Benzoxazocine Analgesic, Selectively Reduces the Shivering Threshold in Unanesthetized Subjects 37

*Pascal Alfonsi, Frederic Adam, Andrea Passard, Bruno Guignard,  
Daniel I. Sessler, and Marcel Chauvin*

Most drugs with thermoregulatory actions—including anesthetics, sedatives, and opioids—synchronously reduce the vasoconstriction and shivering thresholds. However, nefopam reduces the shivering threshold without affecting the sweating or vasoconstriction thresholds.

### Monitoring of Immobility to Noxious Stimulation during Sevoflurane Anesthesia Using the Spinal H-reflex 44

*Benno Rehberg, Matthias Grünewald, Jan Baars, Katja Fuegener,  
Bernd W. Urban, and Wolfgang J. Kox*

During sevoflurane anesthesia, the H-reflex predicts movements to noxious electrical stimulation better than the Bispectral Index or spectral edge frequency (SEF<sub>95</sub>) of the electroencephalogram does.

## ■ LABORATORY INVESTIGATIONS

### Albumin and Hydroxyethyl Starch Modulate Oxidative Inflammatory Injury to Vascular Endothelium 51

*John D. Lang, Jr., Mario Figueroa, Phillip Chumley, Mutay Aslan,  
John Hurt, Margaret M. Tarpey, Beatriz Alvarez,  
Rafael Radi, and Bruce A. Freeman*

In an *in vitro* vascular endothelial model, clinical preparations of human serum albumin did not show proinflammatory properties. In contrast, hydroxyethyl starch amplified vascular endothelial polymorphonuclear neutrophil binding and myeloperoxidase activity.

### Differential Activation of Mitogen-activated Protein Kinases in Ischemic and Anesthetic Preconditioning 59

*Rafaela da Silva, Thomas Grampp, Thomas Pasch,  
Marcus C. Schaub, and Michael Zaugg*

Ischemic but not anesthetic preconditioning is abolished by PD98059 and SB203580, specific blockers of the extracellular signal-regulated protein kinase and p38 mitogen-activated protein kinase signaling pathways, respectively. However, both types of preconditioning exhibit enhanced postischemic extracellular signal-regulated protein kinase activity, which is dependent on protein kinase C and mitochondrial adenosine triphosphate-sensitive potassium channel activation and closely parallels postischemic functional recovery.

---

## CONTENTS

---



### Hyperoxic Ventilation Reduces 6-Hour Mortality at the Critical Hemoglobin Concentration 70

*Jens Meier, Gregor I. Kemming, Hille Kisch-Wedel, Stefan Wölkhammer, and Oliver P. Habler*

Hyperoxic ventilation initiated at the critical hemoglobin concentration reduces 6-hour mortality.

### Surfactants Attenuate Gas Embolism-induced Thrombin Production 77

*David M. Eckmann and Scott L. Diamond*

Thrombin production in blood was measured under various conditions of shear exposure with and without microbubble gas embolism and with and without one of three surfactants present. The surfactants significantly attenuated thrombin production under all conditions of gas embolism.

### Sodium Bisulfite: Scapegoat for Chloroprocaine Neurotoxicity? 85

*Masahiko Taniguchi, Andrew W. Bollen, and Kenneth Drasner*

The coadministration of sodium bisulfite decreased sensory deficits and histologic damage induced by intrathecal administration of chloroprocaine.

## ■ PAIN AND REGIONAL ANESTHESIA

---

### ◆ Developmental Regulation of Codeine Analgesia in the Rat 92

*D. Glyn Williams, Anthony Dickenson, Maria Fitzgerald, and Richard F. Howard*

Codeine analgesia is influenced by both developmental age and strain in the rat.

### Chronic Pain Management: American Society of Anesthesiologists Closed Claims Project 98

*Dermot R. Fitzgibbon, Karen L. Posner, Karen B. Domino, Robert A. Caplan, Lorri A. Lee, and Frederick W. Cheney*

The proportion of claims and the size of payments related to chronic pain management by anesthesiologists in the Closed Claims Project database increased in the 1990s. Although nerve injury and pneumothorax were the most common injuries, severe injuries involving brain damage and death occurred with epidural steroid injections and maintenance of implantable devices.

*Continued on page 16A*



## CONTENTS

### Influence of Lumbosacral Cerebrospinal Fluid Density, Velocity, and Volume on Extent and Duration of Plain Bupivacaine Spinal Anesthesia **106**

*Hideyuki Higuchi, Jyun-ichi Hirata, Yushi Adachi, and Tomiei Kazama*

Lumbosacral cerebrospinal fluid volume correlated with peak sensory block level, onset time of complete motor block, and the regression to L1 and L2 for plain bupivacaine spinal anesthesia.

### ◇ Prediction of Postoperative Pain by Preoperative Nociceptive Responses to Heat Stimulation **115**

*Mads U. Werner, Preben Duun, and Henrik Kehlet*

This study investigated the potential of a preoperatively induced heat injury to predict subsequent postoperative pain ratings in patients undergoing knee surgery. The results suggest that a preoperative heat injury may be a useful research tool in predicting the intensity of postoperative pain and, therefore, may have important implications to identify patients at risk for development of chronic pain.

### Pharmacokinetic-Pharmacodynamic Modeling of Morphine-6-glucuronide-induced Analgesia in Healthy Volunteers: Absence of Sex Differences **120**

*Raymonda Romberg, Erik Olofsen, Elise Sarton, Jan den Hartigh, Peter E. M. Taschner, and Albert Dahan*

A cumulative dose of 0.3 mg/kg morphine-6-glucuronide given over 1 h produces long-term analgesia with equal dynamics (potency and speed of onset–offset) in men and women. In comparison to morphine, morphine-6-glucuronide produces 12–22 times less potent analgesia.

### Effects of Perioperative Oral Amantadine on Postoperative Pain and Morphine Consumption in Patients after Radical Prostatectomy: Results of a Preliminary Study **134**

*Dirk G. Snijdelaar, Gideon Koren, and Joel Katz*

The use of perioperative oral amantadine reduces postoperative opioid consumption.

### ◇ Labor Analgesia and Cesarean Delivery: An Individual Patient Meta-analysis of Nulliparous Women **142**

*Shiv K. Sharma, Donald D. McIntire, Jackie Wiley, and Kenneth J. Leveno*

Epidural analgesia is not associated with increased cesarean deliveries when compared to intravenous meperidine analgesia during labor.

## CONTENTS



### Mobilization of Opioid-containing Polymorphonuclear Cells by Hematopoietic Growth Factors and Influence on Inflammatory Pain

149

*Alexander Brack, Heike L. Rittner, Halina Machelska, Karin Beschmann, Nicolle Sitte, Michael Schäfer, and Christoph Stein*

Mobilization of circulating opioid-containing leukocytes by the hematopoietic growth factors granulocyte colony-stimulating factor and stem cell factor has minor effects on migration to subcutaneous inflammation and does not alter opioid-mediated analgesia.

## ■ REVIEW ARTICLE

### Diplopia: A Complication of Dural Puncture

158

*Isuta Nishio, Brian A. Williams, and John P. Williams*

Diplopia can occur after dural puncture, although it is not widely recognized. This review summarizes previous case reports and discusses the presentation of diplopia and its clinical implications.

## ■ SPECIAL ARTICLE

### Approach to Painful Disorders by Şerefeddin Sabuncuoğlu in the Fifteenth Century Ottoman Period

165

*Suleyman Ganidagli, Mustafa Cengiz, Sahin Aksoy, and Ayhan Verit*

Şerefeddin Sabuncuoğlu (1385–1470?) was the author of the first illustrated surgical textbook *Cerrahiyyet'ul Haniyye (Imperial Surgery)* and the first experimental textbook *Mücerrebname (The Book of Experience)* in the Turkish-Islamic medical literature. This review describes some of the highlights from these books and reprints some of Sabuncuoğlu's illustrations and comments about pain management.

## ■ CLINICAL CONCEPTS AND COMMENTARY

### ◆ Perioperative $\beta$ -Adrenergic Receptor Blockade: Physiologic Foundations and Clinical Controversies

170

*Martin J. London, Michael Zaugg, Marcus C. Schaub, and Donat R. Spahn*

$\beta$  Blockade is an integral component of perioperative sympathectomy, with well-documented cardioprotective effects. However, many physiologic and practical clinical logistical issues remain controversial.

## ■ CLASSIC PAPERS REVISITED

### 🌐 Concerning Neurologic Sequelae of Spinal Anesthesia

176

*Leroy D. Vandam*

This article is a revisiting of original material published as follows: Dripps RD, Vandam LD: Long-term follow-up of patients who received 10,098 spinal anesthetics: Failure to discover major neurological sequelae. JAMA 1954; 156: 1486–91.

*Continued on page 18A*



## CONTENTS

### ■ CASE REPORTS

- 
**Low Bispectral Index Values in Awake Volunteers Receiving a Combination of Propofol and Midazolam** **179**

*Jaap Vuyk, Bart Jan Lichtenbelt, Jenny Vieveen, Albert Dahan, Frank H. M. Engbers, and Anton G. L. Burm*

- Transient Cardiovascular Toxicity with Unintentional Intravascular Injection of 3% 2-Chloroprocaine in a 2-month-old Infant** **181**

*Franklyn P. Cladis and Ronald S. Litman*

- Anesthesia Management of Orthotopic Liver Transplantation in a Patient with Mustard Repair of Transposition of Great Arteries and Superior Vena Caval Obstruction** **183**

*Charles Boucek, Prema Krishnamurthy, James Wallis Marsh, and Jennifer Lee*

- Bulk Liquid Oxygen Supply Failure** **186**

*Shawn D. Schumacher, Russell C. Brockwell, J. Jeffrey Andrews, and Duane Ogles*

### ■ CORRESPONDENCE

- Combined Infraclavicular Plexus Block with Suprascapular Nerve Block for Humeral Head Surgery in a Patient with Respiratory Failure: Is an Alternative Approach Really the Best Option for the Lungs?** **190**

*Stephan Blumenthal, Marco Nadig, and Alain Borgeat*

- In Reply** *Julia Martínez, Xavier Sala-Blanch, Isabel Ramos, and Carmen Gomar* **190**

- Mechanisms of Hypotension and Bradycardia during Regional Anesthesia in the Sitting Position** **191**

*Gregory A. Liguori, Richard L. Kahn, Michael A. Gordon, and Michael K. Urban*

- In Reply** *Jason A. Campagna and Christopher Carter* **192**

*Continued on page 21A*

---

## CONTENTS

---



Erythrocyte Transfusion and Postsurgical Morbidity in Cardiac Surgery Patients: Is It the Storage Time or the Number of Transfused Concentrates that Really Matters?	193
<i>Manuel Muñoz, Aurelio Gómez-Luque, Enrique Naveira-Abeigón, and Gemma Ramírez</i>	
In Reply <i>Santiago Ramón Leal-Noval, Irene Jara-López, and Ana Marín-Niebla</i>	194
Bispectral Index Monitoring and Fast Tracking after Ambulatory Surgery: An Unexpected Finding?	194
<i>Paul F. White and Dajun Song</i>	
In Reply <i>Shireen Ahmad, Meltem Yilmaz, R-Jay Marcus, Silas Glisson, and Annette Kinsella</i>	195
Sub-Tenon Techniques Should Be One Option among Many	196
<i>Steven Gayer and Gary D. Cass</i>	
Topical Anesthesia Is the Technique of Choice for Routine Cataract Surgery	197
<i>Mitchel B. Sosis</i>	
In Reply <i>Philip A. Guise</i>	197
Combination of Morphine with Ketamine for Patient-controlled Analgesia: Is Ketamine Plasma Concentration Adequate?	197
<i>Alain C. Van Elstraete, Khadija Delanoue, and Valérie Fuzier</i>	
In Reply <i>Gorazd Svetcic, Urs Eichenberger, and Michele Curatolo</i>	198
Spinal Cord Temperature	198
<i>Barry A. Harrison, Timothy S. J. Shine, Martin L. De Ruyter, and Michael J. Murray</i>	
In Reply <i>Eva Kottenberg-Assenmacher and Jürgen Peters</i>	199
Catastrophic Failure of Aestiva 3000 Absorber Manifold	199
<i>Joel B. Gunter, Troy Myers, Sean Than Win, and John Ball</i>	
In Reply <i>Michael Mitton</i>	200
Potential Eye Injury due to Protective Face Shields	201
<i>Anthony M-H. Ho, Geoffrey C. S. Lam, and Manoj K. Karmakar</i>	





## CONTENTS

■ REVIEWS OF EDUCATIONAL MATERIAL	202
■ ANNOUNCEMENTS	204
■ ERRATUM	206

### INSTRUCTIONS FOR AUTHORS

The most recently updated version of the Instructions for Authors is available at [www.anesthesiology.org](http://www.anesthesiology.org). Please refer to the Instructions for the preparation of any material for submission to ANESTHESIOLOGY.

### WEB SITE ANNOUNCEMENT

Full-text articles are now available on-line at [www.anesthesiology.org](http://www.anesthesiology.org)

*ANESAV is a code word ("coden") used by the Chemical Abstract Service to identify the journal.*

Manuscripts submitted for consideration for publication must be submitted in electronic format. The preferred method is via the Journal's Web site (<http://www.anesthesiology.org>). Manuscripts may also be submitted via computer disk and mailed to the Editorial Office or via e-mail ([anesthesiology@uiowa.edu](mailto:anesthesiology@uiowa.edu)). Detailed directions for submissions and the most recent version of the Instructions for Authors can be found on the Web site (<http://www.anesthesiology.org>). A print version of the Instruction for Authors appears in the January and July issues. Books and educational materials should be mailed to David O. Warner, M.D., Department of Anesthesia, Mayo Clinic, 200 First Street SW, Rochester, MN 55905. Requests for permission to duplicate materials published in ANESTHESIOLOGY should be submitted in electronic format, to the Editorial Office ([anesthesiology@uiowa.edu](mailto:anesthesiology@uiowa.edu)). All articles accepted for publication are done so with the understanding that they are contributed exclusively to this Journal and become the property of the American Society of Anesthesiologists, Inc. Statements or opinions expressed in the Journal reflect the views of the author(s) and do not represent official policy of the American Society of Anesthesiologists unless so stated. Advertising and related correspondence should be addressed to Advertising Manager, ANESTHESIOLOGY, Lippincott Williams & Wilkins, 530 Walnut Street, Philadelphia, Pennsylvania 19106 (Web site: <http://www.lww.com/advertisingratecards/>). Publication of an advertisement in ANESTHESIOLOGY does not constitute endorsement by the Society or Lippincott Williams & Wilkins, Inc. of the product or service described therein or of any representations made by the advertiser with respect to the product or service.