

The Journal of the American Society of Anesthesiologists, Inc. American Society of Critical Care Anesthesiologists Society for Obstetric Anesthesia and Perinatology



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5A Accuracy of Cardiac Output Monitoring Methods Compared Computer Model Evaluates Partial Rebreathing as Pulmonary Blood Flow Measurement Technique Exploring Mechanisms of Rapacuronium-induced Fatal Bronchospasm Is Increased Analgesic Requirement Associated with Dysfunctional Labor? EDITORIAL VIEWS Procrustes, the Traumatic Penumbra, and Perfusion Pressure Targets in Closed Head Injury 805 David K. Menon Getting Older Is Not Necessarily Getting Better 807 Harvey G. Klein CLINICAL INVESTIGATIONS Assessment of the Lower Limit for Cerebral Perfusion Pressure in Severe Head Injuries by Bedside Monitoring of Regional Energy Metabolism 809 Carl-Henrik Nordström, Peter Reinstrup, Wangbin Xu, Anna Gärdenfors, and Urban Ungerstedt Regional cerebral energy metabolism was monitored bedside using multiple microdialysis probes and was related to cerebral perfusion pressure (CPP) after evacuation of focal traumatic brain lesions in 50 patients. A biochemical

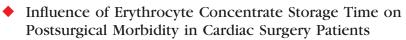
perturbation indicating insufficient oxygenation was observed in more-injured

Refers to This Month in Anesthesiology

("worse") parts of the brain at CPP less than 50 mmHg.

THIS MONTH IN ANESTHESIOLOGY

- Refers to Editorial Views
- See Web Site enhancement



815



Santiago R. Leal-Noval, Irene Jara-López, José L. García-Garmendia, Ana Marín-Niebla, Angel Herruzo-Avilés, Pedro Camacho-Laraña, and Jesús Loscertales

Prolonged storage of erythrocytes does not seem to be associated with duration of intensive care unit stay, mechanical ventilation time, and perioperative myocardial infarction rate. However, it could be a risk factor for the development of nosocomial pneumonia.

The Importance of Prior Stroke for the Adjusted Risk of Neurologic Injury after Cardiac Surgery for Women and Men

823

Charles W. Hogue, Jr., Charl J. De Wet, Kenneth B. Schechtman, and Victor G. Dávila-Román

Prior stroke is independently associated with susceptibility for perioperative stroke, particularly for men compared with women, but other risk factors do not appear to be influenced by patient gender.

Noninvasive Cardiac Output Measurement Using Partial Carbon Dioxide Rebreathing Is Less Accurate at Settings of Reduced Minute Ventilation and when Spontaneous Breathing Is Present

830

Kazuya Tachibana, Hideaki Imanaka, Muneyuki Takeuchi, Yuji Takauchi, Hiroshi Miyano, and Masaji Nishimura

During controlled mechanical ventilation, minute ventilation rather than tidal volume affected the accuracy of cardiac output measurement using the partial carbon dioxide rebreathing technique. When spontaneous breathing is present, evaluation using the partial carbon dioxide rebreathing system is less accurate, and both tidal volume and respiratory rate increase during carbon dioxide rebreathing.

The Effects of Hydration on Core Temperature in Pediatric Surgical Patients

838

Tiberiu Ezri, Peter Szmuk, Marian Weisenberg, Francis Serour, Arcadi Gorenstein, and Daniel I. Sessler

Conservative fluid management, which decreased body weight by only 1%, prevented intraoperative hypothermia, presumably by reducing dissipation of metabolic heat from the core thermal compartment to peripheral tissues.



Local Anesthetics Impair Human Granulocyte Phagocytosis Activity, Oxidative Burst, and CD11b Expression in Response to *Staphylococcus aureus*

842

Ralph-Thomas Kiefer, Annette Ploppa, Wolfgang A. Krueger, Michael Plank, Boris Nohé, Helene A. Haeberle, Klaus Unertl, and Hans-Jürgen Dieterich

Local anesthetics inhibit inflammatory and immunologic functions of human granulocytes *in vitro* in a structure- and concentration-dependent manner. Whereas lidocaine and bupivacaine induced pronounced effects, ropivacaine showed less interference.

Impact of Bispectral Index Monitoring on Fast Tracking of Gynecologic Patients Undergoing Laparoscopic Surgery

849

Shireen Ahmad, Meltem Yilmaz, R-Jay Marcus, Silas Glisson, and Annette Kinsella

This study demonstrates that when using a standardized anesthetic regimen and strict discharge scoring system, Bispectral Index monitoring does not have a significant effect on the ability to fast track outpatients.

Simultaneous Assessment of Drug Interactions with Low- and High-Extraction Opioids: Application to Parecoxib Effects on the Pharmacokinetics and Pharmacodynamics of Fentanyl and Alfentanil

853

Andra E. Ibrahim, Jennifer Feldman, Aziz Karim, and Evan D. Kharasch

A cassette dosing or "cocktail" strategy was used to assess clinical opioid drug interactions. Parecoxib, a cyclooxygenase-2 inhibitor, did not alter fentanyl or alfentanil disposition or clinical effects and did not cause significant hepatic cytochrome P450 3A4 (CYP3A) drug interactions. The CYP3A inhibitor troleandomycin decreased the clearance of alfentanil more than fentanyl, confirming that extraction ratio determines the consequence of altered hepatic opioid metabolism.

LABORATORY INVESTIGATIONS

Neuraxial Morphine May Trigger Transient Motor Dysfunction after a Noninjurious Interval of Spinal Cord Ischemia: A Clinical and Experimental Study

862

Manabu Kakinohana, Martin Marsala, Christopher Carter, J. Kenneth Davison, and Tony L. Yaksh

Neuraxial morphine administration may trigger motor dysfunction after a transient noninjurious interval of spinal ischemia in humans and rats.



Dual Effects of Hexanol and Halothane on the Regulation
of Calcium Sensitivity in Airway Smooth Muscle

871

Hayashi Yoshimura, Keith A. Jones, William J. Perkins, and David O. Warner

In the presence of muscarinic receptor stimulation, hexanol, like halothane, decreases calcium sensitivity in airway smooth muscle. However, in the absence of muscarinic receptor stimulation, hexanol and halothane increase calcium sensitivity by a G-protein-mediated process not sensitive to pertussis toxin.

Sources of Error in Noninvasive Pulmonary Blood Flow Measurements by Partial Rebreathing: A Computer Model Study

881

Johnny S. Yem, Yongquan Tang, Martin J. Turner, and A. Barry Baker

This study examines the systematic errors produced by the partial rebreathing technique using a comprehensive mathematical model of the cardiorespiratory system of a healthy, 70-kg adult male.

Optimal Adrenergic Support in Septic Shock Due to Peritonitis

888

Qinghua Sun, Zizhi Tu, Suzana Lobo, George Dimopoulos, Nathalie Nagy, Peter Rogiers, Daniel De Backer, and Jean-Louis Vincent

In a hyperdynamic septic shock model, the combination of norepinephrine with either dopamine or dobutamine is more efficient than norepinephrine alone in reversing hemodynamic abnormalities, alleviating histologic injury in the major organs, and prolonging survival. In particular, the combination of norepinephrine with dobutamine can limit the increase in arterial lactate concentration and partial pressure of carbon dioxide gap and attenuate anatomic damage to the lung, liver, and small intestine.

Halothane Depresses Glutamatergic Neurotransmission to Brain Stem Inspiratory Premotor Neurons in a Decerebrate Dog Model

897

Astrid G. Stucke, Edward J. Zuperku, Viseslav Tonkovic-Capin, Mislav Tonkovic-Capin, Francis A. Hopp, John P. Kampine, and Eckehard A. E. Stuth

A decerebrate dog model shows that halothane depresses the activity of inspiratory premotor neurons in the ventral respiratory group via reduction of postsynaptic glutamatergic excitation, while overall γ -aminobutyric acid-mediated inhibition remains unaltered.



A Mechanism for Rapacuronium-induced Bronchospasm:
M2 Muscarinic Receptor Antagonism

906

Edmund Jooste, Farrah Klafter, Carol A. Hirshman, and Charles W. Emala

Rapacuronium exhibited a significantly higher affinity for M2 *versus* M3 muscarinic receptors within clinically relevant concentrations. These findings are consistent with a mechanism of M2 muscarinic receptor antagonism by rapacuronium, leading to enhanced acetylcholine release from parasympathetic nerves and thereby potentiating bronchoconstriction.

Dialysis Delivery of an Adenosine A₁ Receptor Agonist to the Pontine Reticular Formation Decreases Acetylcholine Release and Increases Anesthesia Recovery Time

912

Diana Tanase, Helen A. Baghdoyan, and Ralph Lydic

Pontine administration of an adenosine A_1 agonist delays emergence from halothane anesthesia and decreases acetylcholine release in the medial pontine reticular formation.

Spinal Carbonic Anhydrase Contributes to Nociceptive Reflex Enhancement by Midazolam, Pentobarbital, and Propofol

921

Bing Wang, Naaznin Samanani, Sheldon H. Roth, and David P. Archer

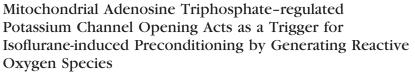
Systemic administration of sedative doses of pentobarbital, propofol, and midazolam reduces nociceptive withdrawal latency from noxious heat in both forelimbs and hind limbs to approximately 60% of control values. Lumbar intrathecal administration of the carbonic anhydrase inhibitors acetazolamide and ethoxyzolamide blocked reflex enhancement in the hind limbs but not the forelimbs. Spinal carbonic anhydrase is an important mediator of druginduced nociceptive hyperreflexia.

Deactivation of Norepinephrine by Peroxynitrite as a New Pathogenesis in the Hypotension of Septic Shock

928

Ko Takakura, Wen Xiaohong, Kenji Takeuchi, Yoshikazu Yasuda, and Satoru Fukuda

Peroxynitrite decreased the vasocontractile activity of norepinephrine on rat aorta. This deactivation may account for the hyporeactivities of vasocontraction to norepinephrine in septic shock.



935

Katsuya Tanaka, Dorothee Weihrauch, Lynda M. Ludwig, Judy R. Kersten, Paul S. Pagel, and David C. Warltier

The selective mitochondrial adenosine triphosphate–regulated potassium (K_{ATP}) channel blocker 5-hydroxydecanoate abolishes isoflurane-induced reductions in myocardial infarct size and generation of reactive oxygen species when administered before but not after exposure to the volatile anesthetic in rabbits. These data suggest that mitochondrial K_{ATP} channel opening acts as a trigger for isoflurane-induced preconditioning by generating reactive oxygen species.

In Vitro and *In Vivo* Effects of the Phosphodiesterase-III Inhibitor Enoximone on Malignant Hyperthermiasusceptible Swine

944

Marko Fiege, Frank Wappler, Ralf Weisshorn, Mark U. Gerbershagen, Kerstin Kolodzie, and Jochen Schulte am Esch

The phosphodiesterase III inhibitor enoximone induces marked contractures in the muscles of malignant hyperthermia-susceptible swine *in vitro*, but enoximone does not trigger malignant hypothermia in genetically determined swine *in vivo*.

PAIN AND REGIONAL ANESTHESIA

Parecoxib Sodium, a Parenteral Cyclooxygenase 2 Selective Inhibitor, Improves Morphine Analgesia and Is Opioid-sparing following Total Hip Arthroplasty

950

T. Philip Malan, Jr., Gregory Marsh, Sam I. Hakki, Evie Grossman, Louise Traylor, and Richard C. Hubbard

Patients who received the parenteral cyclooxygenase 2 selective inhibitor parecoxib sodium, 40 mg intravenously, in addition to postoperative morphine, required 40.5% less morphine over the initial 36 postoperative hours than patients who received morphine plus placebo. Parecoxib sodiumtreated patients also experienced significantly improved pain relief and reported a significantly better Global Evaluation rating of their study medication compared with placebo patients.

Continued on page 19A

Local Anesthetic Requirements Are Greater in Dystocia Than in Normal Labor 957 Moeen K. Panni and Scott Segal Dystocia is a common contemporary indication for cesarean delivery in the United States. Using an up-down sequential allocation technique, the authors found a higher minimum local analgesic concentration and hence local anesthetic requirement in early labor in parturients who later require a cesarean section delivery for dystocia than in those who deliver vaginally. Sub-Tenon Anesthesia: A Prospective Study of 6,000 Blocks 964 Philip A. Guise In a prospective study of 6,000 cases, sub-Tenon block for eye surgery has been shown to be highly effective, with no sight-threatening complications occurring in this series. Nerve Stimulators Used for Peripheral Nerve Blocks Vary in Their Electrical Characteristics 969 Admir Hadzic, Jerry Vloka, Nihad Hadzic, Daniel M. Thys, and Alan C. Santos Peripheral nerve stimulators commonly used for regional anesthesia vary in their accuracy and characteristics of current output. REVIEW ARTICLE Mechanical Function of the Left Atrium: New Insights Based on Analysis of Pressure-Volume Relations and Doppler Echocardiography 975 Paul S. Pagel, Franz Kehl, Meir Gare, Douglas A. Hettrick, Judy R. Kersten, and David C. Warltier Analyses of left atrial pressure-volume relations and Doppler echocardiography have substantially advanced the understanding of left atrial function in the normal and diseased heart. This article reviews how the active and passive mechanical actions of the left atrium play critical roles in determining overall cardiovascular performance. SPECIAL ARTICLE

Norman Kornfield was a World War II combat physician-anesthetist who recorded his experiences in a photograph album and case ledger. Kornfield's documents contribute to the understanding of the effect of World War II on the development of the medical practice of anesthesiology.

Morman's War: Norman B. Kornfield, M.D., World War II

Physician-Anesthetist

David B. Waisel

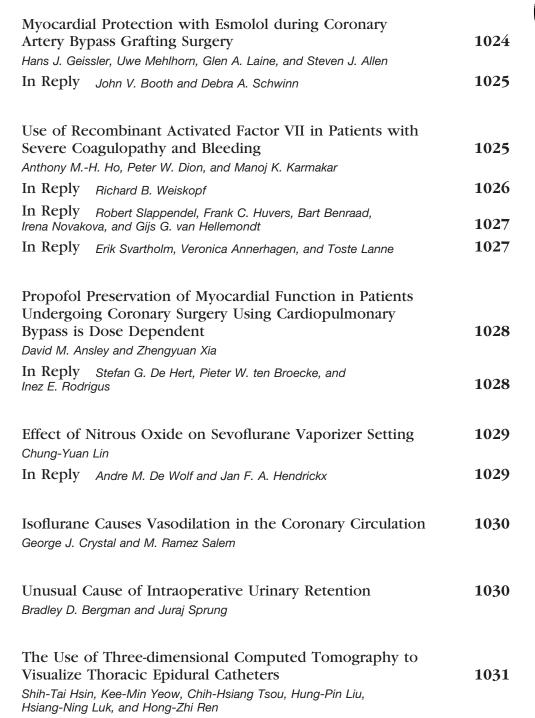


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Unilateral Presentation of a Large Epidural Hematoma Michael Zink, Manfred Rath, Andreas Waltensdorfer, Jörg Engler, Gudrun Rumpold-Seitlinger, Wolfgang Toller, and Frank Reinhardt



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INSTRUCTIONS FOR AUTHORS

The Instructions for Authors are published in the January and July issues and are available at www.anesthesiology.org. Please refer to the Instructions for the preparation of any material for submission to Anesthesiology.

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