Anesthesiology
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◇ THIS MONTH IN ANESTHESIOLOGY 9A

◆ EDITORIAL VIEWS

Long-term Cognitive Decline: Is There a Link to Surgery and Anesthesia? 931
Jacqueline M. Leung and Laura P. Sands

Lung Water: What You See (with Computed Tomography) and What You Get (with a Bedside Device) 933
Eduardo L. V. Costa and Marcos F. Vidal Melo

Science Marches Forward: A New Tool to Study the Progress of Labor 936
Dennis M. Fisher and James C. Eisenach

"Above All, Do No Harm": Hippocrates 938
Peter Gerner

■ SPECIAL ARTICLES

Perioperative Strokes and β-Blockade 940
Don Poldermans, Olaf Schouten, Felix van Lier, Sanne E. Hoeks, Louis van de Ven, Robert Jan Stolker, and Lee A. Fleisher

Perioperative β-blocker therapy is associated with an increased incidence in postoperative strokes. However, if several aspects are addressed, the risk of stroke seems to be similar to that of patients not on β-blockers.

Hemoglobin-based Oxygen Carriers: Current Status and Future Directions 946
Toby A. Silverman and Richard B. Weiskopf, for the Planning Committee and the Speakers

Similarity of toxicities for molecularly dissimilar hemoglobin-based oxygen carriers and mitigation strategies were discussed at a National Institutes of Health/Food and Drug Administration–sponsored workshop. Finding appropriate clinical balance of risk:benefit remains challenging.

■ PERIOPERATIVE MEDICINE

◇◆**Long-term Cognitive Decline in Older Subjects Was Not Attributable to Noncardiac Surgery or Major Illness** 964
Michael S. Avidan, Adam C. Searleman, Martha Storandt, Kara Barnett, Andrea Vannucci, Leif Saager, Chengjie Xiong, Elizabeth A. Grant, Dagmar Kaiser, John C. Morris, and Alex S. Evers

Neither demented nor nondemented participants in the Washington University Alzheimer's Disease Research Center had accelerated long-term cognitive decline attributable to surgery or major illness. Surgery and illness were not independently associated with progression to dementia.

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Patterns of Communication during the Preanesthesia Visit 971
Raymond A. Zollo, Stephen J. Lurie, Ronald Epstein, and Denham S. Ward

Using standardized patients is feasible to study preanesthesia discussions. Preanesthesia discussions are modified with different patient types but may not be patient-centered.

Prevention of Atelectasis in Morbidly Obese Patients during General Anesthesia and Paralysis: A Computerized Tomography Study 979
Henrik Reinius, Lennart Jonsson, Sven Gustafsson, Magnus Sundbom, Olov Duvernoy, Paolo Pelosi, Göran Hedenstierna, and Filip Fredén

After induction of anesthesia and paralysis, three different ventilatory strategies to recruit atelectasis and improve pulmonary function were investigated. A recruitment maneuver followed by positive end-expiratory pressure effectively reduced atelectasis and improved oxygenation and respiratory compliance.

Metoprolol Reduces Cerebral Tissue Oxygen Tension after Acute Hemodilution in Rats 988
Tenille E. Ragoonanan, W. Scott Beattie, C. David Mazer, Albert K. Y. Tsui, Howard Leong-Poi, David F. Wilson, Gordon Tait, Julie Yu, Elaine Liu, Melissa Noronha, Neil D. Dattani, Nicholas Mitsakakis, and Gregory M. T. Hare

Perioperative β-blockade and anemia are associated with increased stroke and mortality. This study suggests that the mechanism may involve β-blocker–mediated inhibition of cardiac responsiveness to acute hemodilution resulting in inadequate cerebral perfusion.

Halothane-induced Hypnosis Is Not Accompanied by Inactivation of Orexinergic Output in Rodents 1001
Heinrich Gompf, Jingqiu Chen, Yi Sun, Masashi Yanagisawa, Gary Aston-Jones, and Max B. Kelz

Diversity in neuronal mechanisms of anesthetic action is demonstrated by showing that halothane-induced hypnosis does not depend on inhibition of hypothalamic orexinergic neurons nor of pontine noradrenergic neurons in the locus coeruleus.

Anesthesia Prevents Auditory Perceptual Learning 1010
Kristoffer C. Aberg, Eric Albrecht, Elisa M. Tartaglia, Alain Farron, Patrice Soom, and Michael H. Herzog

Implicit learning during anesthesia was investigated using a perceptual learning paradigm. No perceptual learning was found.

Should Anesthesia Groups Advocate Funding of Clinics and Scheduling Systems to Increase Operating Room Workload? 1016
Liam O'Neill, Franklin Dexter, and Ruth E. Wachtel

In a multispecialty group, anesthesia workload was not determined by referrals from primary and specialty care providers. Furthermore, patients averaged only one to three clinic visits with the surgeon before surgery.

◇ **Etomidate Targets α_5 γ-Aminobutyric Acid Subtype A Receptors to Regulate Synaptic Plasticity and Memory Blockade** 1025
Loren J. Martin, Gabriel H. T. Oh, and Beverley A. Orser

The mechanisms underlying the memory-blocking properties of anesthetics remain unknown. The authors show that enhanced activity of α_5 γ-aminobutyric acid subtype A receptors underlies the blockade of synaptic plasticity and hippocampus-dependent memory by etomidate.

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Aprotinin Abolishes Sevoflurane Postconditioning by Inhibiting Nitric Oxide Production and Phosphorylation of Protein Kinase C-δ and Glycogen Synthase Kinase 3β 1036
Yoshitaka Inamura, Masami Miyamae, Shingo Sugioka, Kazuhiro Kaneda, Chika Okusa, Anna Onishi, Naochika Domae, Junichiro Kotani, and Vincent M. Figueredo

Aprotinin abolishes sevoflurane postconditioning, inhibiting nitric oxide production and phosphorylating protein kinase C-δ, Akt, and glycogen synthase kinase 3β. These data suggest a potential mechanism by which aprotinin could be detrimental during cardiac surgery.

Mechanisms of Impaired Glucose Tolerance and Insulin Secretion during Isoflurane Anesthesia 1044
Katsuya Tanaka, Takashi Kawano, Takehito Tomino, Hiroaki Kawano, Tsuyoshi Okada, Shuzo Oshita, Akira Takahashi, and Yutaka Nakaya

Isoflurane impairs insulin secretion and glucose utilization. The mechanism of action responsible for these effects may involve a decrease in glucose-induced inhibition of adenosine triphosphate–sensitive potassium channel activity in pancreatic β cells.

Age-associated Changes in Cardiac Gene Expression after Preconditioning 1052
Lixin Liu, Jiang Zhu, Peter S. A. Glass, Peter R. Brink, Ira J. Rampil, and Mario J. Rebecchi

Ischemic preconditioning and anesthetic preconditioning are attenuated in the senescent myocardium. The authors show that ischemic preconditioning–regulated gene expression is defective and this could be one underlying reason for loss of preconditioning in the senescent myocardium.

CRITICAL CARE MEDICINE

Redistribution of Pulmonary Blood Flow Impacts Thermodilution-based Extravascular Lung Water Measurements in a Model of Acute Lung Injury 1065
R. Blaine Easley, Daniel G. Mulreany, Christopher T. Lancaster, Jason W. Custer, Ana Fernandez-Bustamante, Elizabeth Colantuoni, and Brett A. Simon

Computed tomographic imaging of lung volume and perfusion demonstrate that acute changes in pulmonary blood flow distribution alter the measurement of extravascular lung water by transpulmonary thermodilution in canine acute lung injury.

Prevalence of Delirium with Dexmedetomidine Compared with Morphine Based Therapy after Cardiac Surgery: A Randomized Controlled Trial (DEXmedetomidine COmpared to Morphine-DEXCOM Study) 1075
Yahya Shehabi, Peter Grant, Hugh Wolfenden, Naomi Hammond, Frances Bass, Michelle Campbell, and Jack Chen

Dexmedetomidine significantly reduced the duration but not the incidence of delirium after cardiac surgery. Patients were likely to be extubated earlier and experienced less systolic hypotension, lower vasopressor requirement, and more bradycardia compared with morphine regimen.

Pulmonary Capillary Blood Flow and Cardiac Output Measurement by Partial Carbon Dioxide Rebreathing in Patients with Acute Respiratory Distress Syndrome Receiving Lung Protective Ventilation 1085
Jérôme Allardet-Servent, Jean-Marie Forel, Antoine Roch, Laurent Chiche, Christophe Guervilly, Fouad Bouzana, Agnès Vincent, Marc Gainnier, Anderson Loundou, and Laurent Papazian

In acute respiratory distress syndrome patients, cardic output or pulmonary capillary blood flow measurements by partial rebreathing are close to being clinically relevant but cannot yet replace thermodilution.

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PAIN MEDICINE

◇ ◆ 🌐 **Mathematical Modeling of the Pain and Progress of the First Stage of Nulliparous Labor** 1093
Jozef Debiec, Jessamyn Conell-Price, Jennifer Evansmith, Steven L. Shafer, and Pamela Flood

Mathematical models of the pain and progress of the first stage of labor can detect the effects of patient characteristics on labor progress and pain. SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

◆ **Perineural Dexmedetomidine Added to Ropivacaine Causes a Dose-dependent Increase in the Duration of Thermal Antinociception in Sciatic Nerve Block in Rat** 1111
Chad M. Brummett, Amrita K. Padda, Francesco S. Amodeo, Kathleen B. Welch, and Ralph Lydic

Dexmedetomidine (2.7, 11.7, 34.1, or 120.6 μM) added to ropivacaine increased the duration of sensory blockade in a dose-dependent fashion in sciatic nerve block in rats. Dexmedetomidine did not provide analgesia to the unblocked paw.

Age-dependent Bupivacaine-induced Muscle Toxicity during Continuous Peripheral Nerve Block in Rats 1120
Karine Nouette-Gaulain, Christophe Dadure, Didier Morau, Claire Pertuiset, Olivier Galbes, Maurice Hayot, Jacques Mercier, François Sztark, Rodrigue Rossignol, and Xavier Capdevila

In rat psoas muscle, bupivacaine-induced myotoxicity is associated with ultrastructural muscle damage and alterations in mitochondrial metabolism. Myotoxicity is more severe in young than in adult rats, suggesting the existence of higher mitochondrial sensitivity.

◇ **Differences in Quantitative Architecture of Sciatic Nerve May Explain Differences in Potential Vulnerability to Nerve Injury, Onset Time, and Minimum Effective Anesthetic Volume** 1128
Nizar Moayeri and Gerbrand J. Groen

In sciatic nerve (SN) blocks, differences are seen in risk of nerve damage, minimum effective anesthetic volume, and onset time. The authors examined the ratio of neural to nonneural tissue within the SN *in situ* in the upper leg of five cadavers. The amount of neural tissue inside the epineurium decreased significantly toward distal components of the SN. Outside SN, the adipose compartment increased significantly toward distal. This suggests a higher vulnerability for neurologic sequelae in proximal SN, and may explain differences in minimum effective anesthetic volume and onset time between proximal and distal SN blocks.

Ultrasound Evaluation of the Sacral Area and Comparison of Sacral Interspinous and Hiatal Approach for Caudal Block in Children 1135
Seo K. Shin, Jeong Yeon Hong, Won Oak Kim, Bon Nyeo Koo, Jee Eun Kim, and Hae Keum Kil

The S2–3 approach can be applied as a useful fallback method to the conventional approach in children, especially in those older than 36 months who present with difficult identification of the sacral hiatus.

CLINICAL CONCEPTS AND COMMENTARY

CME **Anaphylaxis and Anesthesia: Controversies and New Insights** 1141
Pascale Dewachter, Claudie Mouton-Faivre, and Charles W. Emala

Anaphylaxis may be a life-threatening clinical condition and is likely a result of drugs or substances used for anesthesia or surgery. The criteria for the diagnosis and clinical treatment are discussed.

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CASE REPORTS

Acquired Factor VIII Inhibitor 1151
Alexander Brack, Stephan Vögeler, Justus Hilpert, Gerd Berger, Heinz J. Buhr, and Jürgen Koscielny

Tube-in-tube Emergency Airway Management after a Bitten Endotracheal Tube Caused by Repetitive Transcranial Electrical Stimulation during Spinal Cord Surgery 1155
Andreas Duma, Klaus Novak, and Wolfgang Schramm

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Balancing the Force of Direct Laryngoscopy with Manual In-Line Stabilization
Randolph H. Hastings and Nathan Delson

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Professionalism Considerations 1161
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Role of p75 Neurotrophin Receptor in Isoflurane-mediated Neuronal Changes 1162
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Difficult Mask Ventilation and Neuromuscular Blockade 1164
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Anesthesia-related Mortality 1165
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