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■ SPECIAL ARTICLES

- 🌐 **Practice Advisory for the Prevention, Diagnosis, and Management of Infectious Complications Associated with Neuraxial Techniques: A Report by the American Society of Anesthesiologists Task Force on Infectious Complications Associated with Neuraxial Techniques** 530
The American Society of Anesthesiologists Task Force on Infectious Complications Associated with Neuraxial Techniques presents a Practice Advisory addressing the prevention, diagnosis, and management of infectious complications associated with neuraxial techniques. This Advisory is intended to identify or describe patients at increased risk of infectious complications, describe techniques for reducing infectious risk, and describe interventions to improve outcomes after the occurrence of infectious complications. SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

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- ◆ **Volatile Anesthetics Rapidly Increase Dendritic Spine Density in the Rat Medial Prefrontal Cortex during Synaptogenesis** 546
 Adrian Briner, Mathias De Roo, Alexandre Dayer, Dominique Muller, Walid Habre, and Laszlo Vutskits
Exposure of rat pups to volatile anesthetics can rapidly induce dendritic spinogenesis during the peak synaptogenic period.
- ◆ **Relation between Preoperative and Intraoperative New Wall Motion Abnormalities in Vascular Surgery Patients: A Transesophageal Echocardiographic Study** 557
 Wael Galal, Sanne E. Hoeks, Willem Jan Flu, Jan Peter van Kuijk, Dustin Goei, Tjebbe Galema, Corstiaan den Uil, Yvette R. B. M. van Gestel, Jeroen J. Bax, Hence J. M. Verhagen, and Don Poldermans
Predicting the location of vulnerable myocardial segments can indicate the importance of prophylactic focused therapy. In this study, the authors showed a poor correlation between segments that showed ischemia in preoperative testing and those that were affected intraoperatively.
- ◆ **Bumetanide Alleviates Epileptogenic and Neurotoxic Effects of Sevoflurane in Neonatal Rat Brain** 567
 David A. Edwards, Hina P. Shah, Wengang Cao, Nikolaus Gravenstein, Christoph N. Seubert, and Anatoly E. Martynuk
Sevoflurane has been reported to cause epileptiform electroencephalographic activity and seizure-like movements. Because of concerns for neonatal anesthetic toxicity, the authors tested the hypothesis that sevoflurane induced seizures and neurotoxicity may be diminished by the $\text{Na}^+ - \text{K}^+ - 2\text{Cl}^-$ cotransporter 1 inhibitor, bumetanide. During anesthesia maintenance with sevoflurane, the electroencephalography exhibited distinctive episodes of epileptic seizures in 40% of rats from postnatal days 4 through 8. Bumetanide decreased seizures in these rats. These results support the possibility that excitatory output of sevoflurane-potentiated γ -aminobutyric acid type A/glycine systems may contribute to epileptogenic and neurotoxic effects in early postnatal rats.
- Hyperglycemia Adversely Modulates Endothelial Nitric Oxide Synthase during Anesthetic Preconditioning through Tetrahydrobiopterin- and Heat Shock Protein 90-mediated Mechanisms** 576
 Julien Amour, Anna K. Brzezinska, Zachary Jager, Corbin Sullivan, Dorothee Weihrauch, Jianhai Du, Nikolina Vladoic, Yang Shi, David C. Wartier, Phillip F. Pratt, Jr., and Judy R. Kersten
Anesthetic preconditioning enhances endothelial nitric oxide production through a pathway involving tetrahydrobiopterin and heat shock protein 90. Hyperglycemia blocks cardioprotection by decreasing tetrahydrobiopterin and heat shock protein 90-endothelial nitric oxide interactions.
- ◆ **Endothelial Dysfunction Enhances Vasoconstriction Due to Scavenging of Nitric Oxide by a Hemoglobin-based Oxygen Carrier** 586
 Binglan Yu, Mohd Shahid, Elena M. Egorina, Mikhail A. Sovershaev, Michael J. Raher, Chong Lei, Mei X. Wu, Kenneth D. Bloch, and Warren M. Zapol
Nitric oxide scavenging by PolyHeme (Northfield Laboratories, Evanston, IL) or tetrameric hemoglobin in animals with endothelial dysfunction sensitizes them to the vasoconstrictor effect.
- Diabetes-associated Alterations in Volatile Anesthetic Actions on Contractile Response to Norepinephrine in Isolated Mesenteric Resistance Arteries** 595
 Jun Yoshino, Takashi Akata, Kazuhiro Shirozu, Kaoru Izumi, and Sumio Hoka
In diabetes, vascular responses to acetylcholine, norepinephrine, and volatile anesthetics are altered in mesenteric resistance arteries, presumably reflecting impaired endothelial function and possibly underlying circulatory instability observed during the administration of volatile anesthetics.
- Preoperative C-reactive Protein Predicts Long-term Mortality and Hospital Length of Stay after Primary, Nonemergent Coronary Artery Bypass Grafting** 607
 Tjörvi E. Perry, Jochen D. Muehlschlegel, Kuang-Yu Liu, Amanda A. Fox, Charles D. Collard, Simon C. Body, and Stanton K. Sherman; for the CABG Genomics Investigators
Preoperative C-reactive protein risk categories is shown to predict adverse cardiovascular outcomes in nonsurgical population-based cohorts. It also predicts long-term mortality and extended hospital length of stay in patients undergoing coronary artery bypass graft surgery.

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- Competitive Inhibition at the Glycine Site of the *N*-Methyl-D-Aspartate Receptor Mediates Xenon Neuroprotection against Hypoxia–Ischemia** 614
 Paul Banks, Nicholas P. Franks, and Robert Dickinson
Neuroprotection by the general anesthetic xenon is mediated by inhibition at the N-methyl-D-aspartate receptor glycine site.
- Noble Gas Xenon Is a Novel Adenosine Triphosphate-sensitive Potassium Channel Opener** 623
 Carsten Bantel, Mervyn Maze, and Stefan Trapp
Xenon is a novel adenosine triphosphate-sensitive potassium channel opener that acts on the pore-forming Kir6.2 subunit rather than the sulfonylurea subunit. Xenon reduces adenosine triphosphate sensitivity of the channel and thus causes channel disinhibition in intact cells.
- Use of Serotonergic Antidepressants and Bleeding Risk in Orthopedic Patients** 631
 Ingrid M. M. van Haelst, Toine C. G. Egberts, Hieronymus J. Doodeman, Han S. Traast, Bart J. Burger, Cor J. Kalkman, and Wilton A. van Klei
Patients undergoing total hip arthroplasty who continue the use of serotonergic antidepressants show a significantly higher, but clinically unimportant, intraoperative blood loss without an increase in perioperative transfusion requirements.
- 🌐 **Carboetomidate: A Pyrrole Analog of Etomidate Designed Not to Suppress Adrenocortical Function** 637
 Joseph F. Cotten, Stuart A. Forman, Joydev K. Laha, Gregory D. Cuny, S. Shaukat Husain, Keith W. Miller, Hieu H. Nguyen, Elizabeth W. Kelly, Deirdre Stewart, Aiping Liu, and Douglas E. Raines
Carboetomidate is an etomidate analog that enhances γ -aminobutyric acid type A receptors, produces hypnosis, is a three orders of magnitude less-potent inhibitor of in vitro cortisol synthesis, and does not suppress in vivo adrenocortical function. SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT
- BIS-Vista™ Occipital Montage in Patients Undergoing Neurosurgical Procedures during Propofol–Remifentanyl Anesthesia** 645
 Ashraf A. Dahaba, Ji Xiu Xue, Guo Guang Zhao, Qing Hai Liu, Guo Xun Xu, Helmar Bornemann, Peter H. Rehak, and Helfried Metzler
We demonstrated that not only the regional limits of agreement are too wide to allow data of the occipital and frontal BIS-Vista montages to be used interchangeably but also the variation is a function of anesthetic depth.
- ◇ **Use of Manometry for Laryngeal Mask Airway Reduces Postoperative Pharyngolaryngeal Adverse Events: A Prospective, Randomized Trial** 652
 Edwin Seet, Farhanah Yousaf, Smita Gupta, Rajeev Subramanyam, David T. Wong, and Frances Chung
Use of manometry to limit the intracuff pressure of laryngeal mask airway classic (Vitaaid Ltd., Toronto, Ontario, Canada) reduces pharyngolaryngeal adverse events by 70%. Routine use of manometers should be recommended as a best practice and standard of care.

■ CRITICAL CARE MEDICINE

- Mild Endotoxemia during Mechanical Ventilation Produces Spatially Heterogeneous Pulmonary Neutrophilic Inflammation in Sheep** 658
 Eduardo L. V. Costa, Guido Musch, Tilo Winkler, Tobias Schroeder, R. Scott Harris, Hazel A. Jones, Jose G. Venegas, and Marcos F. Vidal Melo
Mild short-term endotoxemia combined with heterogeneous lung aeration and mechanical ventilation with plateau pressures within clinically acceptable limits produces spatially heterogeneous pulmonary neutrophilic inflammation.

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🌐 **Neurally Adjusted Ventilatory Assist Increases Respiratory Variability and Complexity in Acute Respiratory Failure** 670

Matthieu Schmidt, Alexandre Demoule, Christophe Cracco, Alexandre Gharbi, Marie-Noëlle Fiamma, Christian Straus, Alexandre Duguet, Stewart B. Gottfried, and Thomas Similowski

Respiratory variability might be associated with clinical outcomes. Compared with pressure support ventilation, neurally adjusted ventilatory assist, which provides an assistance that is proportional to diaphragmatic electrical activity, does increase the breathing pattern variability and complexity.

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CME **Lung Ventilation and Perfusion in Prone and Supine Postures with Reference to Anesthetized and Mechanically Ventilated Healthy Volunteers** 682

Sven Nyrén, Peter Radell, Sten G. E. Lindahl, Margareta Mure, Johan Petersson, Stig A. Larsson, Hans Jacobsson, and Alejandro Sánchez-Crespo

In anesthetized and mechanically ventilated volunteers, ventilation was dependent in supine position and nondependent in prone position. Lung perfusion was dependent in the supine position and uniformly distributed in different lung regions in the prone position.

■ **PAIN MEDICINE**

🌐 **An Analysis of Patient Variables That Influence Intravenous Patient-controlled Analgesic Use of Morphine with Quantile Regression** 688

Chia-Rong Yen, Mei-Yung Tsou, Mercedes Susan Mandell, Chia-Tai Chan, Kwok-Hon Chan, Tony Hsiu-Hsi Chen, and Kuang-Yi Chang

Quantile regression analysis shows that patient demographic variables behave differently in the higher and lower percentiles of narcotics used for postoperative pain control. This study shows that current protocols for postoperative narcotic administration may not be predictive. SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

Spinal 5-HT₇ Receptors Play an Important Role in the Antinociceptive and Antihyperalgesic Effects of Tramadol and Its Metabolite, O-Desmethyltramadol, via Activation of Descending Serotonergic Pathways 696

Omer Yanarates, Ahmet Dogrul, Vedat Yildirim, Altan Sahin, Ali Sizlan, Melik Seyrek, Özgür Akgül, Orhan Kozak, Ercan Kurt, and Ulku Aypar

The descending serotonergic pathways and the spinal 5-HT₇ receptors play a crucial role in the antinociceptive and antihyperalgesic effects of tramadol and its major active metabolite O-desmethyltramadol.

Incidence and Root Cause Analysis of Wrong-site Pain Management Procedures: A Multicenter Study 711

Steven P. Cohen, Salim M. Hayek, Sukdeb Datta, Zahid H. Bajwa, Thomas M. Larkin, Scott Griffith, Greg Hobelmann, Paul J. Christo, and Ronald White

In this multicenter study, a rough estimate of the prevalence rate of wrong-site pain management procedures was found to be 0.03%.

■ **REVIEW ARTICLES**

Ultrasound Imaging for Regional Anesthesia in Infants, Children, and Adolescents: A Review of Current Literature and Its Application in the Practice of Neuraxial Blocks 719

Ban C. H. Tsui and Santhanam Suresh

This review presents a summary of relevant anatomy, techniques used, and outcomes (based on controlled or comparative studies) as described in current published literature on ultrasound guidance of neuraxial blocks.

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Role of Transient Receptor Potential and Acid-sensing Ion Channels in Peripheral Inflammatory Pain

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John P. M. White, Mario Cibelli, Antonio Rei Fidalgo, Cleoper C. Paule, Faruq Noormohamed, Laszlo Urban, Mervyn Maze, and Istvan Nagy

This article reviews the role of transient receptor potential and acid-sensing ion channels in mediating peripheral inflammatory pain.

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Family-centered Pediatric Perioperative Care

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Jill MacLaren Chorney and Zeev N. Kain

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