



ON THE COVER:

Transfers of patient care and responsibility among caregivers, “handovers,” are common. Whether handovers worsen patient outcome remains unclear. An article in this issue of ANESTHESIOLOGY presents evidence that intraoperative anesthesia care transitions are strongly associated with worse outcomes, with a similar effect size for attendings, residents, and nurse anesthetists. (Cover photo: J.P. Rathmell; illustration: A. Johnson, Vivo Visuals.)

- Dutton: Seamless Anesthesia Care: The Handover Process, p. 673
- Saager *et al.*: Intraoperative Transitions of Anesthesia Care and Postoperative Adverse Outcomes, p. 695

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◆ Refers to This Month in Anesthesiology

◆ Refers to Editorial Views

BA Best Abstract article originally presented at ANESTHESIOLOGY 2013

See Supplemental Digital Content

CME CME Article

■ PERIOPERATIVE MEDICINE

CLINICAL SCIENCE

◆ ◆ **Intraoperative Transitions of Anesthesia Care and Postoperative Adverse Outcomes** 695

L. Saager, B.D. Hesler, J. You, A. Turan, E.J. Mascha, D.I. Sessler, and A. Kurz

Each anesthetic handover increased the risk of any major in-hospital morbidity or mortality by 8%. The adverse effects of handovers were similar for attending anesthesiologists and medically directed residents and certified registered nurse anesthetists. The adverse effects of handovers were virtually identical for residents and certified registered nurse anesthetists.

CME ◆ ● **A Matched Cohort Study of Postoperative Outcomes in Obstructive Sleep Apnea: Could Preoperative Diagnosis and Treatment Prevent Complications?** 707

T.C. Mutter, D. Chateau, M. Moffatt, C. Ramsey, L.L. Roos, and M. Kryger

Respiratory complications were twice as likely in obstructive sleep apnea patients, whether diagnosed before or after surgery, compared to controls. Patients with a preoperative diagnosis of obstructive sleep apnea and prescription for continuous positive airway pressure were less than half as likely to experience cardiovascular complications as those diagnosed after surgery. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

● **Interatrial Septum Motion but Not Doppler Assessment Predicts Elevated Pulmonary Capillary Wedge Pressure in Patients Undergoing Cardiac Surgery** 719

D.L. Hajji, M.M. Ali, A. Royse, D.J. Canty, S. Clarke, and C.F. Royse

Doppler assessment of pulmonary capillary wedge pressure (PCWP) was neither sensitive nor specific enough to be clinically useful in anesthetized and mechanically ventilated patients requiring cardiac surgery. The fixed curve pattern of the interatrial septum was the best predictor of raised PCWP only when the PCWP ≥ 17 mmHg. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

◆ **Effect of Hydroxyethyl Starch on Postoperative Kidney Function in Patients Having Noncardiac Surgery** 730

B.K. Kashy, A. Podolyak, N. Makarova, J.E. Dalton, D.I. Sessler, and A. Kurz

Using a large database (44,176 adults patients undergoing noncardiac surgery), a dose-dependent renal toxicity of Hextend (high-molecular weight hydroxyethyl starch) was observed: odds ratio to develop a more serious level of acute kidney injury than crystalloids was 21% (95% CI, 6 to 38%, $P < 0.001$).

Alterations in the Functional Connectivity of Frontal Lobe Networks Preceding Emergence Delirium in Children 740

J.C. Martin, D.T.J. Liley, A.S. Harvey, L. Kuhlmann, J.W. Sleight, and A.J. Davidson

In children without emergence delirium, an electroencephalogram pattern of sleep or drowsy states was observed before peaceful awakening. In children with emergence delirium, arousal with clinical delirium occurred before observation of electroencephalogram patterns of sleep. Frontal regional functional connectivity was significantly elevated in emergence delirium compared with that of matched controls shortly after discontinuation of anesthesia.

BASIC SCIENCE

Fibrinogen Concentrate Does Not Suppress Endogenous Fibrinogen Synthesis in a 24-hour Porcine Trauma Model 753

C. Zentai, T. Braunschweig, J. Schnabel, M. Rose, R. Rossaint, and O. Grottko

Administration of human fibrinogen concentrates did not down-regulate endogenous porcine fibrinogen biosynthesis in this animal model.

Thoracic Epidural Anesthesia with Ropivacaine Does Not Compromise the Tolerance of Acute Normovolemic Anemia in Pigs 765

A. Pape, C.F. Weber, M. Laout, M. Steche, S. Kutschker, O. Horn, B. Zwissler, and O. Habler

Thoracic epidural anesthesia does not decrease the tolerance to acute normovolemic anemia in healthy pigs. The hemodynamic compensation of acute anemia is fully preserved, despite sympathetic block.

- BA** **Amantadine Alleviates Postoperative Cognitive Dysfunction Possibly by Increasing Glial Cell Line-derived Neurotrophic Factor in Rats** 773
J. Zhang, H. Tan, W. Jiang, and Z. Zuo

Cognitive function was adversely affected by anesthesia and surgery 8 days later. This adverse effect was attenuated by the systemic administration of amantadine. Amantadine increased glial cell line-derived neurotrophic factor (GDNF) levels in glia, and intracerebroventricular administration of anti-GDNF also ameliorated behavioral abnormalities. Amantadine can reduce postoperative cognitive dysfunction by increasing GDNF production and reducing surgery-induced cerebral inflammation.

- Down-regulation of MicroRNA-21 Is Involved in the Propofol-induced Neurotoxicity Observed in Human Stem Cell-derived Neurons** 786
D.M. Twaroski, Y. Yan, J.M. Olson, Z.J. Bosnjak, and X. Bai

Propofol induced apoptosis of human embryonic stem cell-derived neurons and reduced expression of miR-21. Overexpression of miR-21 reduced this toxicity. Neurons derived from human embryonic stem cell represent a useful model for the study of anesthetic neurotoxicity in humans. miR-21 plays a role in propofol-induced toxicity, and manipulation of miR-21 may serve as a therapeutic approach for prevention of toxicity.

■ CRITICAL CARE MEDICINE

CLINICAL SCIENCE

- ◆ **Effects of Dexmedetomidine on Sleep Quality in Critically Ill Patients: A Pilot Study** 801
C. Alexopoulou, E. Kondili, E. Diamantaki, C. Psarologakis, S. Kokkini, M. Bolaki, and D. Georgopoulos

In selected critically ill patients, dexmedetomidine infusions at night to achieve light levels of sedation increases sleep efficiency and modifies 24-h sleep patterns by shifting sleep to nights. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

- ◆ **Impact of the Anesthetic Conserving Device on Respiratory Parameters and Work of Breathing in Critically Ill Patients under Light Sedation with Sevoflurane** 808
R. Chabanne, S. Perbet, E. Futier, N.A.B. Said, S. Jaber, J.-E. Bazin, B. Pereira, and J.-M. Constantin

In intensive care unit patients, Anesthetic Conserving Device (ACD) (AnaConDa[®]; Sedana Medical AB, Uppsala, Sweden) increases the work of breathing and worsens ventilatory parameters. Sevoflurane use *via* the ACD with a light-sedation target normalizes respiratory parameters, and may provide an alternative method for sedation, at least, for weaning patients from mechanical ventilation.

BASIC SCIENCE

- Plasma Volume Expansion with 5% Albumin Compared to Ringer's Acetate during Normal and Increased Microvascular Permeability in the Rat** 817
P. Bansch, S. Statkevicius, and P. Bentzer

One group of animals was subjected to an 11% hemorrhage and then given either 5% albumin in a volume equal to the shed blood volume or Ringer's acetate at 4.5 times that volume. Another group of animals was subjected to abdominal sepsis and at 3 h, measured plasma volume loss was replaced with either 5% albumin or with Ringer's acetate in 4.5 times the measured loss. Plasma volume expansion with albumin relative to Ringer's acetate did not differ between the two groups despite different etiologies for the decrease in plasma volume.

■ PAIN MEDICINE

CLINICAL SCIENCE

- ◆ ◆ **OPRM1 A118G Gene Variant and Postoperative Opioid Requirement: A Systematic Review and Meta-analysis** 825
I.C. Hwang, J.-Y. Park, S.-K. Myung, H.Y. Ahn, K.-i. Fukuda, and Q. Liao

In a meta-analysis involving 18 studies and more than 4,600 patients, carriers of the G-allele were observed to exhibit higher opioid analgesic requirements. These genetic effects were strongest in Asian patients and those receiving surgery to a viscus.

***Lamiophlomis rotata*, an Orally Available Tibetan Herbal Painkiller, Specifically Reduces Pain Hypersensitivity States through the Activation of Spinal Glucagon-like Peptide-1 Receptors**

835

B. Zhu, N. Gong, H. Fan, C.-S. Peng, X.-J. Ding, Y. Jiang, and Y.-X. Wang

Aqueous extracts of *Lamiophlomis rotata* are effective in reducing pain-related behaviors in animal models of inflammatory, neuropathic, and cancer pain. Two components of *L. rotata* extracts, shanzhiside methylester (SM) and 8-*O*-acetyl-SM, are the principal active components. *L. rotata* extracts, and SM, and 8-*O*-acetyl-SM may work through spinal GLP-1 receptors to provide the analgesic effects.

BASIC SCIENCE

◆◆🌐 **Brain Neuroplastic Changes Accompany Anxiety and Memory Deficits in a Model of Complex Regional Pain Syndrome**

852

M. Tajerian, D. Leu, Y. Zou, P. Sahbaie, W. Li, H. Khan, V. Hsu, W. Kingery, T.T. Huang, L. Becerra, and J.D. Clark

In a model of complex regional pain syndrome (CRPS) in mice, the animals became hypersensitive to light touch, but also exhibited behaviors indicative of anxiety and diminished working memory in some tests. These changes were accompanied by structural changes in several brain regions, suggesting that CRPS can result in broad changes in the central nervous system as well as producing pain. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Characterization of a Computationally Designed Water-soluble Human μ -Opioid Receptor Variant Using Available Structural Information

866

X. Zhao, J.M. Perez-Aguilar, F. Matsunaga, M. Lerner, J. Xi, B. Selling, A.T.C. Johnson, Jr., J.G. Saven, and R. Liu

A water-soluble version of the human μ -receptor was developed by mutating specific residues of the molecule. This novel receptor variant has properties similar to those of the native receptor. The development of "safe mutations" in μ -receptor will significantly advance research into the biophysical aspects of μ -receptor activation and the resulting downstream signaling.

■ EDUCATION

IMAGES IN ANESTHESIOLOGY

Severe Unilateral Atelectasis during Induction of Anesthesia

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P.P. Kainkaryam, P. Prasanna, and D.A. Schwartz

🌐 **Chemosis Secondary to Anterograde Episcleral (Sub-Tenon) Spread of Local Anesthetic during Retrobulbar Eye Block**

877

H.D. Palte and S. Gayer

SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

ORIGINAL INVESTIGATIONS IN EDUCATION

The Psychological and Physiological Effects of Acute Occupational Stress in New Anesthesiology Residents: A Pilot Trial

878

J.H. Eisenach, J. Sprung, M.M. Clark, T.D. Shanafelt, B.D. Johnson, T.N. Kruse, D.P. Chantigian, J.R. Carter, and T.R. Long

In a pilot study of 18 individuals recruited to assess stress at the beginning of residency, 72% consented and participated in assessments of stress, anxiety, resilience, and wellness in addition to physiological biomarkers for stress. The results provide a detailed image of stress conditions during the first months of residency as well as variability data for power analyses for hypothesis testing investigations.

CLINICAL CONCEPTS AND COMMENTARY

◆ **Noise in the Operating Room**

894

J.D. Katz

Excessive noise in the operating room can have detrimental effects on the health and performance of operating room personnel. Many of the harmful effects of noise can be ameliorated by simple and inexpensive interventions.

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