



ON THE COVER:

The cover image captures ideas presented in Jung *et al.*, which show that activation of hypothalamic-pituitary-adrenal axis is an important aspect of the psycho-neuro-immunological adaptation that helps survival during septic shock:

- Eikermann and Schmidt: Does Adrenal Size Matter?, p. 223
- Jung *et al.*: R2: The Absence of Adrenal Gland Enlargement during Septic Shock Predicts Mortality—A Computed Tomography Study of 239 Patients, p. 334

THIS MONTH IN ANESTHESIOLOGY

9A

EDITORIAL VIEWS

Does Adrenal Size Matter?

Matthias Eikermann and Ulrich Schmidt

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From Local to Global: Lipid Emulsion (Intralipid) Makes a Move

Yoshitaka Kawaraguchi, David M. Roth, and Hemal H. Patel

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CME Assessment of Fluid Responsiveness: Insights in a “Gray Zone”

Stefan G. De Hert

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PERIOPERATIVE MEDICINE

CME ◆ Assessing the Diagnostic Accuracy of Pulse Pressure Variations for the Prediction of Fluid Responsiveness: A “Gray Zone” Approach

Maxime Cannesson, Yannick Le Manach, Christoph K. Hofer, Jean Pierre Goarin, Jean-Jacques Lehot, Benoît Vallet, and Benoît Tavernier

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The gray zone approach applied to pulse pressure variations identifies a range of values, between 9% and 13%, for which fluid responsiveness cannot be predicted. This value is observed in 25% of patients during anesthesia.

◆ Phosphorylation of GSK-3 β Mediates Intralipid-induced Cardioprotection against Ischemia/Reperfusion Injury

Siamak Rahman, Jingyuan Li, Jean Chrisostome Bopassa, Soban Umar, Andrea Iorga, Parisa Partownavid, and Mansoureh Eghbali

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Postischemic administration of Intralipid inhibits the opening of the mitochondrial permeability transition pore. Phosphorylation of glycogen synthase kinase 3 β (GSK-3 β), which has emerged as a new target for cardioprotection, is involved in the cardioprotective action of Intralipid against ischemia/reperfusion injury.

◇ Refers to This Month in Anesthesiology

◆ Refers to Editorial Views

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CME CME Article

Human Subthalamic Neuron Spiking Exhibits Subtle Responses to Sedatives 254

M. Bruce MacIver, Helen M. Bronte-Stewart, Jaimie M. Henderson, Richard A. Jaffe, and John G. Brock-Utne

Study results indicate that sedatives produce only minor effects on subthalamic neuron discharge activity, and that sedation could be used in patients with electrode implants to decrease anxiety levels and help maintain hemodynamic stability.

◆ **A Cost-Benefit Analysis of the ENIGMA Trial** 265

Alison M. Graham, Paul S. Myles, Kate Leslie, Matthew T.V. Chan, Michael J. Paech, Philip Peyton, and Abdelazeem A. El. Dawlatly

The inclusion of nitrous oxide for general anesthesia in patients having major surgery is associated with significant additional costs because of added risk of postoperative complications. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Effect of Head Elevation on Passive Upper Airway Collapsibility in Normal Subjects during Propofol Anesthesia 273

Masato Kobayashi, Takao Ayuse, Yuko Hoshino, Shinji Kurata, Shunji Moromugi, Hartmut Schneider, Jason P. Kirkness, Alan R. Schwartz, and Kumiko Oi

The main finding of this study was that the most effective position for optimizing upper airway patency during propofol anesthesia of normal individuals may be approximately 6 cm of head elevation with jaw closure.

Developmental Stage-dependent Persistent Impact of Propofol Anesthesia on Dendritic Spines in the Rat Medial Prefrontal Cortex 282

Adrian Briner, Irina Nikonenko, Mathias De Roo, Alexandre Dayer, Dominique Muller, and Laszlo Vutskits

Exposure of rat pups to propofol induces developmental stage-dependent persistent structural changes in neural circuitry.

Diagnostic Performance and Therapeutic Consequence of Thromboelastometry Activated by Kaolin *versus* a Panel of Specific Reagents 294

Ole Halfdan Larsen, Christian Fenger-Eriksen, Kirsten Christiansen, Jørgen Ingerslev, and Benny Sørensen

Thromboelastometric monoanalysis with kaolin failed to distinguish coagulopathies caused by dilution from that of thrombocytopenia. Diagnostic algorithms based on the use of kaolin may lead to unnecessary transfusion with platelets.

Performance of Anesthetic Depth Indexes in Rabbits under Propofol Anesthesia: Prediction Probabilities and Concentration-effect Relations 303

Aura Silva, Sónia Campos, Joaquim Monteiro, Carlos Venâncio, Bertinho Costa, Paula Guedes de Pinho, and Luis Antunes

The performance of contemporary electroencephalogram-derived anesthetic depth indexes in reflecting clinical signs and plasma concentrations of propofol was analyzed in a rabbit model. Single-scale and multiscale permutation entropy showed higher potential for future applications.

◆ **Epidural Analgesia Is Associated with Improved Health Outcomes of Surgical Patients with Chronic Obstructive Pulmonary Disease** 315

Felix van Lier, Patrick J. van der Geest, Sanne E. Hoeks, Yvette R. B. M. van Gestel, Jaap W. Hol, Don D. Sin, Robert Jan Stolker, and Don Poldermans

The results of this study suggest that epidural analgesia in addition to general anesthesia reduces the incidence of postoperative pneumonia in patients with chronic obstructive pulmonary disease who are undergoing major abdominal surgery.

Estimating Anesthesia Time Using the Medicare Claim: A Validation Study 322

Jeffrey H. Silber, Paul R. Rosenbaum, Orit Even-Shoshan, Lanyu Mi, Fabienne A. Kyle, Yun Teng, Dale W. Bratzler, and Lee A. Fleisher

Procedure length from charts was compared with minutes billed in 15,914 Medicare anesthesia claims from 47 hospitals. There was very good concordance between chart and claim, with a median absolute difference of only 5 min.

■ CRITICAL CARE MEDICINE

- ◆◆ **The Absence of Adrenal Gland Enlargement during Septic Shock Predicts Mortality—A Computed Tomography Study of 239 Patients** 334

Boris Jung, Stephanie Nougaret, Gérald Chanques, Gregoire Mercier, Moussa Cisse, Sophie Aufort, Benoit Gallix, Djillali Annane, and Samir Jaber

The current study used computed tomography to determine the prognostic value of adrenal gland volumes in patients with or without septic shock in determining mortality. Mortality was 32% at intensive care unit discharge in patients with septic shock. Adrenal volume less than 10 cm³ was associated with higher 28-day mortality in patients with septic shock. Adrenal volume larger than 10 cm³ was an independent predictor of intensive care unit survival. This study supports further investigation into the use of adrenal gland volume as a surrogate for adrenal gland function in patients with sepsis.

- 🌐 **An Evaluation of the Role of Gene Expression in the Prediction and Diagnosis of Ventilator-associated Pneumonia** 344

Julien Textoris, Béatrice Loriod, Laurent Benayoun, Pierre-Antoine Gourraud, Denis Puthier, Jacques Albanèse, Jean Mantz, Claude Martin, Catherine Nguyen, and Marc Leone

The SepsisChip project was designed to identify predictive and diagnostic markers of ventilator-associated pneumonia in trauma patients. Therefore, whole blood sample-derived transcriptome was analyzed by microarray analysis.

SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

- Activation of Opioid μ -Receptors in the Commissural Subdivision of the Nucleus Tractus Solitarius Abolishes the Ventilatory Response to Hypoxia in Anesthetized Rats** 353

Zhenxiong Zhang, Jianguo Zhuang, Cancan Zhang, and Fadi Xu

Study results suggest that the activation of μ -receptors in the commissural subnucleus of the nucleus tractus solitarius is able to eliminate the carotid body-mediated hypoxic ventilatory response.

■ PAIN MEDICINE

- Neural Correlates of Chronic Low Back Pain Measured by Arterial Spin Labeling** 364

Ajay D. Wasan, Marco L. Loggia, Li Q. Chen, Vitaly Napadow, Jian Kong, and Randy L. Gollub

Using the neuroimaging technique of arterial spin labeling, this controlled study shows that worsening of chronic low back pain is associated with changes in brain activity in key areas known to process pain.

- 🌐 **Anesthetic Block of Pain-related Cortical Activity in Patients with Peripheral Nerve Injury Measured by Magnetoencephalography** 375

Peter J. Theuvsenet, Jan C. de Munck, Maria J. Peters, Jan M. van Ree, Fernando L. Lopes da Silva, and Andrew C. N. Chen

Nerve injury may produce neuropathic pain and central functional changes. Nerve blocks modulated cortically evoked magnetic responses, which suggest altered cortical adaptations. In humans, this may present a model to study neuropathic pain. SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

- 🌐 **Modality-specific Somatosensory Changes in a Human Surrogate Model of Postoperative Pain** 387

Ina Fibmer, Thomas Klein, Walter Magerl, Rolf-Detlef Treede, Peter K. Zahn, and Esther M. Pogatzki-Zahn

Characterization of somatosensory changes after incision in humans suggests that sensitization of nociceptors to heat may not explain nonevoked pain and that nociceptors mediating ongoing pain and inducing central sensitization at least partly differ. SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

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Intranasal Application of Xenon Reduces Opioid Requirement and Postoperative Pain in Patients Undergoing Major Abdominal Surgery: A Randomized Controlled Trial 398

Thorsten Frederik Holsträter, Michael Georgjeff, Karl Josef Föhr, Werner Klingler, Miriam Elisabeth Uhl, Tobias Walker, Sarah Köster, Georg Grön, and Oliver Adolph

Intranasally applied xenon reduces opioid requirement for major abdominal surgery and relieves postoperative pain within a randomized double-blind placebo-controlled study design.

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A Review of Current and Emerging Approaches to Address Failure-to-Rescue 421

Andreas H. Taenzer, Joshua B. Pyke, and Susan P. McGrath

This article focuses on the problem of failure-to-rescue and includes a review of current and emerging approaches employed to address the problem with a discussion of opportunities for future research.

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