



# Anesthesiology



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*American Society of Critical Care Anesthesiologists*  
*Society for Obstetric Anesthesia and Perinatology*



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- ◆ **Dexmedetomidine Pharmacodynamics: Part I: Crossover Comparison of the Respiratory Effects of Dexmedetomidine and Remifentanyl in Healthy Volunteers** **1066**

*Yung-Wei Hsu, Luis I. Cortinez, Kerri M. Robertson, John C. Keifer, Sam T. Sum-Ping, Eugene W. Moretti, Christopher C. Young, David R. Wright, David B. MacLeod, and Jacques Somma*

Compared with remifentanyl, dexmedetomidine infusions did not result in significant respiratory depression. The hypercapnic arousal phenomena that were observed during dexmedetomidine infusion are similar to what has been described during natural sleep.

- ◆ **Dexmedetomidine Pharmacodynamics: Part II: Crossover Comparison of the Analgesic Effect of Dexmedetomidine and Remifentanyl in Healthy Volunteers** **1077**

*Luis I. Cortinez, Yung-Wei Hsu, Sam T. Sum-Ping, Christopher Young, John C. Keifer, David MacLeod, Kerri M. Robertson, David R. Wright, Eugene W. Moretti, and Jacques Somma*

As expected, the analgesic property of dexmedetomidine is not as effective as that of the opioid remifentanyl. The difference in the quality of analgesia produced by dexmedetomidine (decreased Hill coefficient  $\gamma$ ) may be a reflection of a different mechanism of action or a consequence of the sedative effect of dexmedetomidine.

- ◆ **Acute Care Skills in Anesthesia Practice: A Simulation-based Resident Performance Assessment** **1084**

*David J. Murray, John R. Boulet, Joseph F. Kras, Julie A. Woodhouse, Thomas Cox, and John D. McAllister*

Simulation-based exercises can be used to assess the acute care skills of anesthesia residents.

- Impact of Bispectral Index Monitoring on Stress Response and Propofol Consumption in Patients Undergoing Coronary Artery Bypass Surgery** **1096**

*Michael Bauer, Wolfram Wilhelm, Thomas Kraemer, Sascha Kreuer, Andreas Brandt, Hans Anton Adams, Gudrun Hoff, and Reinhard Larsen*

Total intravenous anesthesia with propofol-remifentanyl effectively blunts the stress response to coronary artery bypass surgery, even if propofol infusion rates are decreased according to Bispectral Index value.

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### Narcotrend<sup>®</sup> Does Not Adequately Detect the Transition between Awareness and Unconsciousness in Surgical Patients 1105

*Gerhard Schneider, Eberhard F. Kochs, Bettina Horn, Matthias Kreuzer, and Michael Ningler*

In the current study, the Narcotrend<sup>®</sup> index (MonitorTechnik, Bad Bramstedt, Germany) was calculated from electroencephalograms that had been recorded in 40 patients undergoing surgery during general anesthesia with a period of awareness reaction. Prediction probability was calculated to assess the ability of the Narcotrend<sup>®</sup> index to differentiate between awareness and unconsciousness.

### ◇ Induction Speed Is Not a Determinant of Propofol Pharmacodynamics 1112

*Anthony G. Doufas, Maryam Bakhshandeh, Andrew R. Bjorksten, Steven L. Shafer, and Daniel I. Sessler*

The authors used individual pharmacodynamic modeling to demonstrate that different sedation endpoints occur at the same effect site propofol concentration, independent of the infusion rate of propofol.

### Comparison of Cisatracurium and Vecuronium by Infusion in Neonates and Small Infants after Congenital Heart Surgery 1122

*David L. Reich, Ingrid Hollinger, Donna J. Harrington, Howard S. Seiden, Scephali Chakravorti, and D. Ryan Cook*

Spontaneous neuromuscular recovery after termination of cisatracurium infusions was significantly faster than that after vecuronium. Decreased clearance of vecuronium and the accumulation of 3-OH vecuronium may contribute to this observation.

### Isoflurane Alters the Amount of Dopamine Transporter Expressed on the Plasma Membrane in Humans 1128

*John R. Votaw, Michael G. Byas-Smith, Ronald Voll, Raghu Halkar, and Mark M. Goodman*

Experiments in humans show that isoflurane alters plasma membrane dopamine transporter expression in a dose-dependent manner.

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- ◇ **Effects of Different Catecholamines on the Dynamics of Volume Expansion of Crystalloid Infusion** **1136**  
*Luiz A. Vane, Donald S. Prough, Michael A. Kinsky, Chad A. Williams, James J. Grady, and George C. Kramer*  
 Infusion of catecholamines alters the intravascular volume expansion of intravenous fluid therapy.  $\beta$  Receptor (isoproterenol) stimulation augmented blood volume expansion, whereas  $\alpha$  (phenylephrine) stimulation reduced blood volume expansion. Combined dopaminergic,  $\beta$ , and possibly  $\alpha$  stimulation with dopamine augmented blood volume expansion and cardiac output while inducing diuresis.
- Interaction of Halogenated Anesthetics with  $\alpha$ - and  $\beta$ -Adrenoceptor Stimulations in Diabetic Rat Myocardium** **1145**  
*Julien Amour, Jean-Stéphane David, Benoît Vivien, Pierre Coriat, and Bruno Riou*  
 The potentiation of the positive inotropic effect of  $\alpha$ -adrenoceptor stimulation by halogenated anesthetics is abolished in diabetic rats. In contrast, the potentiation of the positive inotropic effect of  $\beta$ -adrenoceptor stimulation is preserved with isoflurane and sevoflurane but not with halothane, probably because of its deleterious effect on sarcoplasmic reticulum.
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*Julia Rivo, Evelyne Zeira, Eithan Galun, and Idit Matot*  
 $A_3$  adenosine receptor agonist confers a powerful protection against reperfusion lung injury. This effect is mediated by a nitric oxide synthase-independent pathway and involves opening of adenosine triphosphate-sensitive potassium channels.
- ◇ **Intravenous Emulsified Halogenated Anesthetics Produce Acute and Delayed Preconditioning against Myocardial Infarction in Rabbits** **1160**  
*Pascal C. Chiari, Paul S. Pagel, Katsuya Tanaka, John G. Krolkowski, Lynda M. Ludwig, Raul A. Trillo, Jr., Navneet Puri, Judy R. Kersten, and David C. Wartier*  
 Intravenous administration of a new emulsified formulation of isoflurane, enflurane, or sevoflurane 1 h or sevoflurane 24 h before prolonged coronary artery occlusion and reperfusion reduced myocardial infarct size independent of hemodynamic effects in rabbits.

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### Propofol and Sevoflurane Depress Spinal Neurons *In Vitro* *via* Different Molecular Targets 1167

*Christian Grasshoff and Bernd Antkowiak*

Propofol and sevoflurane act *via* different molecular targets on spinal neurons. The capacity of propofol to depress spinal neurons is limited.

#### ■ PAIN AND REGIONAL ANESTHESIA

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### Selective Postsynaptic Inhibition of Tonic-firing Neurons in Substantia Gelatinosa by $\mu$ -Opioid Agonist 1177

*Sónia F. A. Santos, Igor V. Melnick, and Boris V. Safronov*

$\mu$ -Opioid agonist selectively inhibits tonic-firing spinal sensory neurons from substantia gelatinosa.

### Mitochondrial Injury and Caspase Activation by the Local Anesthetic Lidocaine 1184

*Michael E. Johnson, Cindy B. Uhl, Karl-Heinz Spittler, Hongxun Wang,  
and Gregory J. Gores*

In a neuronal cell line, lidocaine at concentrations injected during spinal anesthesia caused early mitochondrial dysfunction, with subsequent activation of apoptotic pathways of cell death.

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*Manfred Greher, Lukas Kirchmair, Birgit Enna, Peter Kovacs,  
Burkhard Gustorff, Stephan Kapral, and Bernhard Moriggl*

Computed tomography scans confirm high accuracy of ultrasound-guided lumbar facet nerve blocks in a cadaver study.

### Simultaneous Measurement and Integrated Analysis of Analgesia and Respiration after an Intravenous Morphine Infusion 1201

*Albert Dahan, Raymonda Romberg, Luc Teppema, Elise Sarton,  
Hans Bijl, and Erik Olofsen*

The analgesic and respiratory depressant effects of morphine (0.13 and 0.2 mg/kg intravenous) were assessed simultaneously in healthy volunteers and analyzed using an integrated pharmacokinetic-pharmacodynamic modeling approach.  $C_{50}$  values and onset and offset times of analgesia and respiration were not significantly different, indicating similar morphine potency and duration of action for these two distinct effects parameters.

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*Sunil Eappen, Hugh Flanagan, and Neil Bhattacharyya*

The authors evaluated operating time and anesthesia-controlled times in the operating room during three distinct periods during the first year of anesthesia residency training with variable levels of trainee experience. Although statistically significant differences were revealed, no clinically or financially meaningful differences were evident for this aspect of operating room efficiency.

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*Scott S. Reuben*

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*Camille Sandorfy*

A significant fact about general anesthetics is the great diversity of their chemical structure. As the mechanism of general anesthesia goes through perturbation of intermolecular interactions, a variety of the latter can be involved. They must be weak, so that anesthesia is reversible. Such weak bonds are weak hydrogen bonds or associations by van der Waals forces. These could be temporarily and reversibly replaced by anesthetics.

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