



Anesthesiology



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■ CLINICAL INVESTIGATIONS

- ◇ **Malignant Hyperthermia in North America: Genetic Screening of the Three Hot Spots in the Type I Ryanodine Receptor Gene** **824**

Yoshitatsu Sei, Nyamkhishig N. Sambuughin, Edward J. Davis, Daniel Sachs, Phil B. Cuenca, Barbara W. Brandom, Timothy Tautz, Henry Rosenberg, Thomas E. Nelson, and Sheila M. Muldoon

Mutations in the type I ryanodine receptor 1 gene are associated with susceptibility to malignant hyperthermia. Using the current screening strategy, the detection rate of mutations in the malignant hyperthermia-susceptible population is 23% in North America. Approximately 70% of the mutations originate in the central malignant hyperthermia/central core disease 2 region. The results of this study suggest that the central region serves as the primary target for the initial genetic screening for malignant hyperthermia in North America.

- Information Loss over Time Defines the Memory Defect of Propofol: A Comparative Response with Thiopental and Dexmedetomidine** **831**

Robert A. Veselis, Ruth A. Reinsel, Vladimir A. Feshchenko, and Ray Johnson, Jr.

A characteristic of drug-induced amnesia by propofol is the lack of retention of material in long-term memory after successful acquisition during drug administration. This effect seems distinct from sedation, which impairs the initial acquisition of stimuli.

- Teaching Residents Pediatric Fiberoptic Intubation of the Trachea: Traditional Fiberscope with an Eyepiece *versus* a Video-assisted Technique Using a Fiberscope with an Integrated Camera** **842**

Melissa Wheeler, Andrew G. Roth, Richard M. Dsida, Bronwyn Rae, Roopa Seshadri, Christine L. Sullivan, Corri L. Heffner, and Charles J. Coté

A video-assisted technique speeds resident skill acquisition for flexible fiberoptic oral tracheal intubation of children (aged 1-6 yr) compared with a traditional fiberscope with eyepiece. The authors believe this is because the attending anesthesiologist can provide targeted instruction when sharing the view of the airway as the resident attempts intubation.



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Application of Bispectral Index[®] and Narcotrend[®] Index to the Measurement of the Electroencephalographic Effects of Isoflurane with and without Burst Suppression 847

Sascha Kreuer, Jürgen Bruhn, Reinhard Larsen, Ulrich Grundmann, Steven L. Shafer, and Wolfram Wilhelm

The Narcotrend[®] (MonitorTechnik, Bad Bramstedt, Germany), an electroencephalogram monitor designed to measure the depth of anesthesia, was compared to the Bispectral Index[®] monitor (Aspect Medical Systems, Natick, MA) during isoflurane anesthesia. The Narcotrend[®] index detected differences in electroencephalographic dynamics with efficacy comparable to that of the Bispectral Index[®].

◇ Apolipoprotein E Genotype and Cognitive Dysfunction after Noncardiac Surgery 855

Hanne Abildstrom, Michael Christiansen, Volkert D. Siersma, and Lars S. Rasmussen, for the ISPOCD2 Investigators

In a multicenter study of 976 surgery patients, no significant association between apolipoprotein E genotype and postoperative cognitive dysfunction was found, but statistical power was limited because of a lower incidence of cognitive dysfunction than expected.

Effects of Cardiopulmonary Bypass on Sufentanil Pharmacokinetics in Patients Undergoing Coronary Artery Bypass Surgery 862

Robert J. Hudson, Ian R. Thomson, and Rajive Jassal

Population pharmacokinetic modelling was used to assess the effects of cardiopulmonary bypass on sufentanil pharmacokinetics. Models that allowed for step-changes in parameters at the start or end of cardiopulmonary bypass (or both) did not significantly improve overall predictive ability, compared to a simple, three-compartment model that was not adjusted for cardiopulmonary bypass.

Do Indomethacin and Propofol Cause Cerebral Ischemic Damage?: Diffusion-weighted Magnetic Resonance Imaging in Patients Undergoing Craniotomy for Brain Tumors 872

Mads Rasmussen, Leif Østergaard, Niels Juul, Carsten Gyldensted, Peter V. Poulsen, and Georg E. Cold

Administration of indomethacin and propofol is not associated with evidence of cerebral ischemic brain damage as evaluated with diffusion-weighted magnetic resonance imaging.

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■ LABORATORY INVESTIGATIONS

- A Brief Regional Ischemic-reperfusion Enhances Propofol-induced Depression in Left Ventricular Function of *in situ* Rat Hearts** **879**

Naoya Kuzumoto, Yutaka Kitagawa, Koichi Uemura, Takashi Ueyama, Ken-ichi Yoshida, Hitoshi Furuya, and Miyako Takaki

Lower concentrations of propofol after a brief regional ischemia and reperfusion caused the greater inhibitory effect on left ventricular systolic function in *in situ* rat hearts mediated *via* a protein kinase C-dependent pathway.

- Comparative Effects of Bupivacaine and Ropivacaine on Intracellular Calcium Transients and Tension in Ferret Ventricular Muscle** **888**

Yasushi Mio, Norio Fukuda, Yoichiro Kusakari, Yoshikiyo Amaki, Yasumasa Tanifuji, and Satoshi Kurihara

The cardiodepressant effect of ropivacaine is approximately twofold less than that of bupivacaine in ferret ventricular muscle. Bupivacaine suppresses Ca²⁺ transients more markedly than ropivacaine and also reduces myofibrillar activation, giving rise to its greater cardiodepressant effect.

- Isoflurane Reduces the Carbachol-evoked Ca²⁺ Influx in Neuronal Cells** **895**

Alexandra Corrales, Fang Xu, Zayra V. Garavito-Aguilar, Thomas J. J. Blanck, and Esperanza Recio-Pinto

Isoflurane attenuates the carbachol-evoked Ca²⁺ entry through the plasma membrane. Isoflurane sensitive Ca²⁺ entry involves a cationic channel different from the L- or N-type voltage-dependent Ca²⁺ channels.

- Local Anesthetics Reduce Mortality and Protect against Renal and Hepatic Dysfunction in Murine Septic Peritonitis** **902**

George Gallos, Dean R. Jones, Samih H. Nasr, Charles W. Emala, and H. Thomas Lee

The authors show that local anesthetic infusions protect mice from septic peritonitis by attenuating the hyperacute inflammatory response. This suppression resulted in improved mortality and less progression to acute kidney and liver injury and dysfunction.

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- ◇ **Influence of Propofol on Neuronal Damage and Apoptotic Factors after Incomplete Cerebral Ischemia and Reperfusion in Rats: A Long-term Observation** **912**
Kristin Engelhard, Christian Werner, Eva Eberspächer, Monika Pape, Uta Stegemann, Kristine Kellermann, Regina Hollweck, Peter Hutzler, and Eberhard Kochs
 Over a long-term observation period, propofol inhibits neuronal damage and favorably influences apoptosis-related proteins.
- ◇ **Remifentanil Preconditioning Protects against Ischemic Injury in the Intact Rat Heart** **918**
Ye Zhang, Michael G. Irwin, and Tak Ming Wong
 Remifentanil preconditions the intact rat heart *via* all three opioid receptors. Part of the protective effect of remifentanil may be produced by μ -agonist activity outside the heart.
- Influence of GABA_A Receptor γ_2 Splice Variants on Receptor Kinetics and Isoflurane Modulation** **924**
Claudia Benkwitz, Matthew I. Banks, and Robert A. Pearce
 Effects of isoflurane on recombinant GABA_A receptors depended on subunit composition and splice variants. This may contribute to the diverse electrophysiologic and behavioral effects of this agent.
- Effect of Bupivacaine on the Isolated Rabbit Heart: Developmental Aspect on Ventricular Conduction and Contractility** **937**
Lionel Simon, Nobutaka Kariya, Alain Edouard, Dan Benhamou, and Jean-Xavier Mazoit
 The effect of bupivacaine was measured on newborn and adult isolated rabbit hearts. Ventricular conduction was similar in both groups, but contractility was three times more impaired in newborn as compared with adult rabbits.
- Topical Humidified Carbon Dioxide to Keep the Open Surgical Wound Warm: The Greenhouse Effect Revisited** **945**
Mikael Persson, Håkan Elmqvist, and Jan van der Linden
 The creation of a local carbon dioxide atmosphere reduced heat loss from an open surgical wound model. The warming effect was enhanced by the radiative heat from operation lamps and by humidifying the insufflated carbon dioxide.

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■ PAIN AND REGIONAL ANESTHESIA

- ◆ **Severe Neurological Complications after Central Neuraxial Blockades in Sweden 1990 -1999** **950**

Vibeke Moen, Nils Dahlgren, and Lars Irestedt

The rare complications after spinal blockade were mostly independent of patient characteristics. Complications after epidural blockade were often influenced by patient characteristics, and incidences therefore varied greatly between different patient groups.

- ◆ **Functional Magnetic Resonance Imaging Studies of Pain: An Investigation of Signal Decay during and across Sessions** **960**

James W. Ibinson, Robert H. Small, Antonio Algaze, Cynthia J. Roberts, David L. Clark, and Petra Schmalbrock

The attenuation in activation intensity mentioned in several functional brain imaging studies of pain was investigated both within and across experimental sessions. It was determined that the activation intensity decreases with each painful stimulation but levels are restored with a rest period of 4 min between stimulations.

- Popliteal Sciatic Perineural Local Anesthetic Infusion: A Comparison of Three Dosing Regimens for Postoperative Analgesia** **970**

Brian M. Ilfeld, Lisa J. Thannikary, Timothy E. Morey, Robert A. Vander Griend, and F. Kayser Enneking

This randomized, double-blind study demonstrates that when providing analgesia with 0.2% ropivacaine *via* a popliteal sciatic perineural catheter after moderately painful surgery of the foot or ankle, a continuous infusion is required to optimize infusion benefits. Furthermore, adding patient-controlled bolus doses allows for a lower continuous basal rate and decreased local anesthetic consumption and thereby increases the duration of infusion benefits when in an ambulatory environment with a limited local anesthetic reservoir.

- Chronopharmacology of Intrathecal Sufentanil for Labor Analgesia: Daily Variations in Duration of Action** **978**

Richard Debon, Emmanuel Boselli, Romain Guyot, Bernard Allaouchiche, Bjorn Lemmer, and Dominique Chassard

Sufentanil exhibited a temporal pattern of analgesia when administered intrathecally, with a longer duration of action when administered at noon and midnight. The time of administration should be taken into account in comparative studies to avoid statistical bias.



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Masaki Toriyabe, Keiichi Omote, Tomoyuki Kawamata, and Akiyoshi Namiki

Peripherally released nitric oxide activates cyclooxygenase-1 and up-regulates cyclooxygenase-2 expression, resulting in facilitation of producing prostaglandin E₂ and prostaglandin I₂ in carrageenan-induced inflammation.

■ **ECONOMICS**

Influence of the Type of Anesthesia Provider on Costs of Labor Analgesia to the Texas Medicaid Program **991**

Amr E. Abouleish, Donald S. Prough, and Rakesh B. Vadhera

Costs of labor analgesia billed to the Texas Medicaid Program were 19% to 26% less per patient when provided by anesthesiologists rather than by certified registered nurse anesthetists (without medical direction by an anesthesiologist), despite reimbursement of nurse anesthetists at 85% of physician rates. The explanation is that nurse anesthetists bill for significantly more face-to-face time per epidural than anesthesiologists.

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Excitation-contraction Coupling in the Heart and the Negative Inotropic Action of Volatile Anesthetics **999**

Peter J. Hanley, Henk E. D. J. ter Keurs, and Mark B. Cannell

Volatile anesthetics directly inhibit cardiac myocyte contraction. This review discusses the mechanisms underlying this negative inotropic action.

■ **CLASSIC PAPERS REVISITED**

🌐 **From Continuous Positive-pressure Breathing to Ventilator-induced Lung Injury** **1015**

Henning Pontoppidan

This article is a revisiting of original material published as Kumar A, Falke KJ, Geffin B, Aldredge CF, Laver MB, Lowenstein E, Pontoppidan H: Continuous positive-pressure ventilation in acute respiratory failure. *N Engl J Med* 1970; 283:1430-6.

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