



Anesthesiology

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Society for Obstetric Anesthesia and Perinatology



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- Jean-Marie Saissy, Georges Boussignac, Eric Cheptel, Bruno Rouvin, David Fontaine, Laurent Barges, Jean-Paul Levecque, Alain Michel, and Laurent Brochard*
- Continuous insufflation of oxygen can safely replace mechanical ventilation during cardiorespiratory arrest.

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- ◆ **Amniotic Fluid Removal during Cell Salvage in the Cesarean Section Patient** 1531

Jonathan H. Waters, Charles Biscotti, Paul S. Potter, and Eliot Phillipson

In this study, blood shed during cesarean section was collected, washed with cell-salvage equipment and filtered with a leukocyte reduction filter. Multiple assays were performed comparing this washed, filtered blood to a maternal, central venous blood sample.

- Intensive Care Utilization during Hospital Admission for Delivery: Prevalence, Risk Factors, and Outcomes in a Statewide Population** 1537

Sumedha Panchal, Amelia M. Arria, and Andrew P. Harris

Based on a review of a statewide database, the intensive care unit (ICU) use during hospital admission for delivery is low, and the ICU mortality rate for these patients is not as high as generally reported. These findings merit consideration when planning perinatal ICU facilities.

- Topography of Clonidine-induced Electroencephalographic Changes Evaluated by Principal Component Analysis** 1545

Petra Bischoff, Eckehard Scharein, Gunter N. Schmidt, Georg von Knobelsdorff, Burkhard Bromm, and Jochen Schulte am Esch

For the spatial evaluation of multichannel electroencephalographic recordings, principal component analysis resulted in spatial components representing cluster of electrodes positions, which are affected differently by clonidine.

- The Dose-Response of Intrathecal Sufentanil Added to Bupivacaine for Labor Analgesia** 1553

Cynthia A. Wong, Barbara M. Scavone, Mariann Loffredi, Warren Y. Wang, Alan M. Peaceman, and Jeanne N. Ganchiff

Sufentanil (2.5 μg) added to 2.5 mg bupivacaine for initiation of combined spinal-epidural labor analgesia provides satisfactory analgesia with fewer side effects than does higher doses.

- Pharmacokinetics of Human Cerebral Opioid Extraction: A Comparative Study on Sufentanil, Fentanyl, and Alfentanil in a Patient after Severe Head Injury** 1559

Christoph Metz, Lothar Göbel, Michael Gruber, Klaus H. Hoerauf, and Kai Taeger

For alfentanil, fentanyl, and sufentanil, the different time lags between changes in serum concentration after bolus application and drug effect are caused by the different time periods to blood-brain equilibration, which depends on the different capacities of the brain for tissue binding.

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Intraperitoneal and Retroperitoneal Carbon Dioxide Insufflation Evoke Different Effects on Caval Vein Pressure Gradients in Humans: Evidence for the Starling Resistor Concept of Abdominal Venous Return

1568

Reiner M. Giebler, Matthias Behrends, Thorsten Steffens, Martin K. Walz, Klaus Peitgen, and Jürgen Peters

Intraperitoneal carbon dioxide insufflation evokes a marked increase in venous pressure gradient along the inferior caval vein not observed during retroperitoneal carbon dioxide insufflation. These data support the Starling resistor concept of abdominal venous return.

The Influence of Drug-induced Low Plasma Cholinesterase Activity on the Pharmacokinetics and Pharmacodynamics of Mivacurium

1581

Doris Østergaard, Søren N. Rasmussen, Jørgen Viby-Mogensen, Niels A. Pedersen, and Rikke Boysen

Low plasma cholinesterase activity after administration of bambuterol (a prodrug to terbutalin) caused a reduction in clearance and a prolonged elimination of mivacurium. As a result, the duration of action of mivacurium was prolonged three- or fourfold.

Ropivacaine, 0.1%, Plus Sufentanil, 0.5 µg/ml, versus Bupivacaine, 0.1%, Plus Sufentanil, 0.5 µg/ml, Using Patient-controlled Epidural Analgesia for Labor: A Double-blind Comparison

1588

Catherine Fischer, Pierre Blanié, Envel Jaouën, Christophe Vayssiére, Ismaél Kaloul, and Jean-Claude Coltat

Ropivacaine, 0.1%, and sufentanil, 0.5 µg/ml, using patient-controlled epidural analgesia produces less motor block but less maternal satisfaction and greater need for supplemental boluses than bupivacaine and sufentanil at the same concentrations.

Reliability of the Heparin Management Test for Monitoring High Levels of Unfractionated Heparin: *In Vitro* Findings in Volunteers versus *In Vivo* Findings during Cardiopulmonary Bypass


1594

Fritz Mertzlufft, Andreas Koster, Roland Hansen, Anne Risch, Herrmann Kuppe, Bernhard Kübel, and George J. Crystal

The heparin management test provided reliable values for unfractionated heparin during variations in hematocrit, platelet concentration, and storage time in normal blood from volunteers *in vitro*, and in blood obtained from patients undergoing relatively simple (≥ 90 min) and complex cardiopulmonary bypass (> 180 min); however, it was less reliable if used for patients undergoing complex cardiopulmonary bypass and treated with coumadin.



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Response Surface Model for Anesthetic Drug Interactions **1603**
Charles F. Minto, Thomas W. Schnider, Timothy G. Short, Keith M. Gregg, Andrea Gentilini, and Steven L. Shafer
 A novel model for drug interactions is proposed using response-surface methodology. The model is derived from conventional concentration-response relations for single drugs, rather than from multiple logistic regression. The model describes the full relation between the concentrations of two or three drugs and drug effect. Representative data from an interaction study with three drugs shows the usefulness of this model.
- ◇ **Multiport Epidural Catheters: Does the Air Test Work?** **1617**
Barbara L. Leighton, William G. Topkis, Jeffrey B. Gross, Valerie A. Arkoosh, Sung-Hee R. Lee, H. Jane Huffnagle, and Suzanne L. Huffnagle
 In 300 patients, blood aspiration and the air test detected 91 and 82%, respectively, of clinically evident intravascularly placed multiport epidural catheters. The air test may be less effective at detecting intravascular multiorifice than single-orifice epidural catheters.
- Pressure Support Ventilation *versus* Continuous Positive Airway Pressure with the Laryngeal Mask Airway: A Randomized Crossover Study of Anesthetized Adult Patients** **1621**
Joseph Brimacombe, Christian Keller, and Christoph Hörmann
 Pressure support ventilation provides more effective gas exchange than does unassisted ventilation with continuous positive airway pressure during laryngeal mask anesthesia.
- ◇ **Preemptive Analgesia by Intravenous Low-dose Ketamine and Epidural Morphine in Gastrectomy: A Randomized Double-blind Study** **1624**
Sumihisa Aida, Tomohiro Yamakura, Hiroshi Baba, Kiichiro Taga, Satoru Fukuda, and Koki Shimoji
 In gastrectomy, preemptive analgesia with epidural morphine or intravenous low-dose ketamine was significantly effective but not definitive. Combination of epidural morphine and intravenous low-dose ketamine produced more definitive preemptive analgesia.
- The Fiberscopic Findings of the Epidural Space in Pregnant Women** **1631**
Takashi Igarashi, Yoshihiro Hirabayashi, Reiju Shimizu, Kazuhiko Saitoh, Hirokazu Fukuda, and Hideo Suzuki
 The epidural structure changes during pregnancy.

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Port-access Minimally Invasive Cardiac Surgery Increases Surgical Complexity, Increases Operating Room Time, and Facilitates Early Postoperative Hospital Discharge

1637

Mark A. Chaney, Ramón A. Durazo-Arvizu, Elaine M. Fluder, Kristina J. Sawicki, Mihail P. Nikolov, Bradford P. Blakeman, and Mamdouh Bakhos

This retrospective analysis compared patients undergoing port-access cardiac surgery and patients undergoing conventional cardiac surgery. The port-access technique increased surgical complexity, increased operating room time, and allowed earlier postoperative hospital discharge.

◇ Acute Severe Isovolemic Anemia Impairs Cognitive Function and Memory in Humans

1646

Richard B. Weiskopf, Joel H. Kramer, Maurene Viele, Mireille Neumann, John R. Feiner, Jessica J. Watson, Harriet W. Hopf, and Pearl Toy

Acute isovolemic reduction of hemoglobin concentration to 6 or 5 g/dl results in mild, reversible decrements in the speed of human information processing and in memory. This model can be used to test the efficacy of erythrocytes, oxygen therapeutics, or other treatments for acute anemia.

Pain Relief in Complex Regional Pain Syndrome due to Spinal Cord Stimulation Does Not Depend on Vasodilation

1653

Marius A. Kemler, Gerard A. M. Barendse, Maarten van Kleef, and Mirjam G. A. oude Egbrink

Cutaneous vasodilation that is normally found after spinal cord stimulation is absent in patients with complex regional pain syndrome.

Area under the Plasma Concentration-Time Curve of Inorganic Fluoride following Sevoflurane Anesthesia Correlates with CYP2E1 mRNA Level in Mononuclear Cells

1661

Ichiro Hase, Susumu Imaoka, Yutaka Oda, Toyoko Hiroi, Tatsuo Nakamoto, Akira Asada, and Yoshihiko Funae

Levels of cytochrome P450 2E1 mRNA in mononuclear cells in peripheral blood were measured by competitive reverse transcription polymerase chain reaction. Levels of cytochrome P450 2E1 mRNA were significantly correlated with the area under the plasma concentration-time curve (AUC) of inorganic fluoride after sevoflurane anesthesia.

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- Differential Block of Fast and Slow Inactivating Tetrodotoxin-sensitive Sodium Channels by Droperidol in Spinal Dorsal Horn Neurons** **1667**

Andrea Olschewski, Michael E. Bräu, Gunter Hempelmann, Werner Vogel, and Boris V. Safronov

The method of "entire soma isolation" was used to study the sensitivity of two components of the Na^+ current in spinal dorsal horn neurons to droperidol. Droperidol selectively suppressed the fast inactivating component of Na^+ current, whereas the slow inactivating Na^+ current was almost insensitive.

- Morphine Inhibits NF- κ B Nuclear Binding in Human Neutrophils and Monocytes by a Nitric Oxide-dependent Mechanism** **1677**

Ingeborg D. Welters, Axel Menzebach, Yannick Goumon, Patrick Cadet, Thilo Menges, Thomas K. Hughes, Gunter Hempelmann, and George B. Stefano

In a flow cytometric assay, morphine inhibited NF- κ B nuclear binding in lipopolysaccharide-activated human blood neutrophils and monocytes. This effect was mediated by nitric oxide and was abolished by nitric oxide inhibitors.

- Intravenous Lidocaine Inhibits Visceral Nociceptive Reflexes and Spinal Neurons in the Rat** **1685**

Timothy J. Ness

Intravenous lidocaine produced dose-dependent inhibition of reflex and neuronal responses to noxious colorectal distension. This suggests the potential utility of sodium channel blockers in the treatment of visceral pain.

- Isoflurane, but not Halothane, Induces Protection of Human Myocardium *via* Adenosine A_1 Receptors and Adenosine Triphosphate-sensitive Potassium Channels** **1692**

Amy K. Roscoe, Jared D. Christensen, and Carl Lynch III

Isoflurane-induced cardioprotection is demonstrated in a human model of ischemia in contrast to observed inhibition of cardioprotection by halothane. The mechanism of isoflurane effects is proposed to involve adenosine A_1 receptors and adenosine triphosphate-sensitive potassium channels.

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Jörg Weimann, Roman Ullrich, Jonathan Hromi, Yuji Fujino, Martin W. H. Clark, Kenneth D. Bloch, and Warren M. Zapol
 Sildenafil dilates the pulmonary vasculature in awake lambs with experimental pulmonary hypertension via a nitric oxide-dependent mechanism.
- Multiple Agents Potentiate α_1 -Adrenoceptor-induced Conduction Depression in Canine Cardiac Purkinje Fibers** **1713**
Alexander H. Kulier, Lawrence A. Turner, Sanja Vodanovic, Stephen Contney, David A. Lathrop, and Zeljko J Bosnjak
 Thiopental and propofol enhance α_1 -adrenoceptor-induced conduction depression in Purkinje fibers just like halothane.
- Volatile Anesthetics Activate the Human Tandem Pore Domain Baseline K^+ Channel KCNK5** **1722**
Andrew T. Gray, Byron B. Zhao, Christoph H. Kindler, Bruce D. Winegar, Matthew J. Mazurek, Jie Xu, Raymond A. Chavez, John R. Forsayeth, and C. Spencer Yost
 Enhancement of baseline potassium channel currents by volatile anesthetics may contribute to neuronal depression during anesthesia. Currents passed by a human baseline K^+ channel (KCNK5) are found to be potentiated by volatile anesthetics.
- Sarcolemmal and Mitochondrial Adenosine Triphosphate-dependent Potassium Channels: Mechanism of Desflurane-induced Cardioprotection** **1731**
Wolfgang G. Toller, Eric R. Gross, Judy R. Kersten, Paul S. Pagel, Garrett J. Gross, and David C. Warltier
 Desflurane reduces myocardial infarct size in vivo, and the results further suggest that both sarcolemmal and mitochondrial adenosine triphosphate-dependent potassium channels could be involved.
- The Mechanical Antihyperalgesic Effect of Intrathecally Administered MPV-2426, a Novel α_2 -Adrenoceptor Agonist, in a Rat Model of Postoperative Pain** **1740**
Tiina Onttonen and Antti Pertovaara
 After intrathecal administration postoperatively, a novel α_2 -adrenoceptor agonist, MPV-2426, significantly attenuated mechanical hyperalgesia in a rat model of postoperative pain. Preemptive treatment with MPV-2426 did not prevent the development of postoperative hyperalgesia.

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Halothane and Isoflurane Augment Depolarization-induced Cytosolic Ca^{2+} Transients and Attenuate Carbachol-stimulated Ca^{2+} Transients

1746

Fang Xu, Jin Zhang, Esperanza Recio-Pinto, and Thomas J. J. Blanck

The direction and magnitude of the volatile anesthetic action on the stimulated Ca^{2+} responses were dependent on the type of stimulation and on the Ca^{2+} content within the intracellular Ca^{2+} stores. Volatile anesthetic enhanced the K^{+} -evoked cytosolic Ca^{2+} transient whether intracellular Ca^{2+} stores were full or partially depleted. In contrast, volatile anesthetic attenuated the carbachol-evoked cytosolic Ca^{2+} transient when the intracellular Ca^{2+} stores were full but had no effect when they were partially depleted.

Isoflurane Alters the Recirculatory Pharmacokinetics of Physiologic Markers

1757

Michael J. Avram, Tom C. Krejcie, Claus U. Niemann, Cheri Enders-Klein, Colin A. Shanks, and Thomas K. Henthorn

Isoflurane anesthesia causes a significant increase in the area under the blood drug concentration versus time curve in the critical first minutes after physiologic marker administration due to both a decrease in cardiac output and an increase in the apparent peripheral blood flow not involved in marker distribution.

Single-beat Estimation of Ventricular End-systolic Elastance-Effective Arterial Elastance as an Index of Ventricular Mechanoenergetic Performance

1769

Kazuko Hayashi, Kenji Shigemori, Toshiaki Shishido, Masaru Sugimachi, and Kenji Sunagawa

A novel method to estimate ventricular end-systolic elastance/effective arterial elastance without volumetry or loading manipulation has been developed.

Malignant Hyperthermia Phenotype: Hypotension Induced by Succinylcholine in Susceptible Swine

1777

Daniel C. Sigg and Paul A. Izzo

Succinylcholine causes a severe arterial hypotension in swine susceptible to malignant hyperthermia by inducing cardiac depression. This cardiovascular response can be prevented by pretreatment with high-dose vecuronium but not by dantrolene.

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Acute Ethanol Treatment Modulates δ Opioid Receptors in N18TG2 Cells

1789

Ivone Gomes, Nino Trapaidze, Herman Turndorf, Lakshmi Arehole Devi, and Mylarao Bansinath

Acute ethanol modifies the binding, agonist-mediated functional coupling and receptor/ligand internalization in N18TG2 cells expressing Flag-tagged δ opioid receptors.

Hypersensitivity of Malignant Hyperthermia-susceptible Swine Skeletal Muscle to Caffeine Is Mediated by High Resting Myoplasmic $[Ca^{2+}]$

1799

Jose R. López, Jaime Contreras, Nancy Linares, and Paul D. Allen

Increased muscle caffeine sensitivity is the basis for the most widely used diagnostic test for malignant hyperthermia (MH). Our data demonstrate that by increasing muscle intracellular $[Ca^{2+}]$ in MH nonsusceptible individuals also increases muscle caffeine sensitivity. The authors conclude that the increased caffeine sensitivity in MH-susceptible individuals is a nonspecific response to increased intracellular free Ca^{2+} in muscle fibers

Pentobarbital, but not Propofol, Suppresses Vasopressin-stimulated Heat Shock Protein 27 Induction in Aortic Smooth Muscle Cells

1807

Osamu Kozawa, Kumiko Tanabe, Hiroyuki Matsuno, Masayuki Niwa, Takuji Yamamoto, Shigeru Akamatsu, Kanefusa Kato, Shuji Dohi, and Toshihiko Uematsu

Pentobarbital, but not propofol, reduces vasopressin-stimulated HSP27 induction in vascular smooth muscle cells.

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1814

Laurence Landow

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Use of Inhaled Nitric Oxide Perioperatively and in Intensive Care Patients

1821

Elie Haddad, Stuart M. Lowson, Roger A. Johns, and George F. Rich

Inhaled nitric oxide (NO) may decrease pulmonary vascular resistance selectively and increase oxygenation in the perioperative period and in intensive care patients. The long-term benefit of inhaled NO has been limited to the decreased need for extracorporeal membrane oxygenation.

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