



Anesthesiology

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Society for Obstetric Anesthesia and Perinatology



SOAP
Society for Obstetric Anesthesia and Perinatology

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■ SPECIAL ANNOUNCEMENT

In Memory of Shih-hsun Ngai, M.D. (1920-1999) 310

Robert M. Epstein, with Members of the Ngai Family

A memorial to the late Dr. S. H. Ngai, past editor of ANESTHESIOLOGY.

■ CLINICAL INVESTIGATIONS

◆ Lumbar Epidural Morphine in Humans and Supraspinal Analgesia to Experimental Heat Pain 312

Martin S. Angst, Bhamini Ramaswamy, Ed T. Riley, and Donald R. Stanski

Lumbar epidural injection of morphine attenuated cutaneous heat pain up to the trigeminal dermatome during a 24-h observation period. In a clinical context, this implies that some types of pain may be attenuated up to the supraspinal level after lumbar epidural administration of morphine.

◆ A Direct Search Procedure to Optimize Combinations of Epidural Bupivacaine, Fentanyl, and Clonidine for Postoperative Analgesia 325

Michele Curatolo, Thomas W. Schnider, Steen Petersen-Felix, Susanne Weiss, Christoph Signer, Pasquale Scaramozzino, and Alex M. Zbinden

A stepwise optimization model was applied to the combination of bupivacaine dose, fentanyl dose, clonidine dose, and infusion rate for postoperative epidural analgesia. The optimization procedure led to a reduction in the incidence of side effects and in the mean pain scores.

◆ Pharmacokinetics of Dopamine in Healthy Male Subjects 338

Drew A. MacGregor, Timothy E. Smith, Richard C. Prielipp, John F. Butterworth, Robert L. James, and Phillip E. Scuderi

Despite weight-based dosing of dopamine infusions, plasma concentrations vary 10- to 75-fold in healthy male subjects.

Efficacy of Neurolytic Celiac Plexus Block in Varying Locations of Pancreatic Cancer: Influence on Pain Relief 347

Jan J. Rykowski and Maciej Hilgier

Varying locations of pancreatic cancer are connected with different pain relief effects of neurolytic celiac plexus block and also with differences in survival time of the patients.



Preemptive Intravenous Morphine-6-glucuronide Is Ineffective for Postoperative Pain Relief 355

Cyrus Motamed, Xavier Mazoit, Khaldoun Ghanouchi, Frédéric Guirimand, Kou Abhay, Thomas Lieutaud, Said Bensaid, Christine Fernandez, and Philippe Duvaldestin

Intravenous morphine-6-glucuronide seems to be ineffective in the treatment of acute postoperative pain in patients undergoing open knee surgery.

Low-dose Clonidine and Neostigmine Prolong the Duration of Intrathecal Bupivacaine-Fentanyl for Labor Analgesia 361

Medge D. Owen, Özer Özserağ, Şükran Şahin, Nesimi Uçkunkaya, Nuray Kaplan, and Ihsan Mağunaci

Clonidine and neostigmine increase the duration of labor analgesia from intrathecal bupivacaine-fentanyl, but nausea may limit the usefulness of neostigmine.

Bedside Assessment of Cerebral Blood Flow by Double-indicator Dilution Technique 367

Götz J. K. Wietasch, Frank Mielck, Martin Scholz, Tilman von Spiegel, Heidrun Stephan, and Andreas Hoeft

A new approach for bedside measurement of global cerebral blood flow was developed and validated in a clinical setting in comparison to the Kety-Schmidt inert-gas technique.

Pharmacokinetics of Rapacuronium in Infants and Children with Intravenous and Intramuscular Administration 376

Lynne M. Reynolds, Andrew Infosino, Ronald Brown, Jim Hsu, and Dennis M. Fisher

The plasma clearance of rapacuronium in children, $4.77 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1} + 8.48 \text{ ml/min}$, is smaller than that in adults; bioavailability with intramuscular absorption is 56%.

Walking with Labor Epidural Analgesia: The Impact of Bupivacaine Concentration and a Lidocaine-Epinephrine Test Dose 387

Sheila E. Cohen, Julie Y. Yeh, Edward T. Riley, and Tracey M. Vogel

A lidocaine-epinephrine test dose impaired ambulation after labor epidural analgesia initiated with 0.125% bupivacaine with sufentanil. A 0.125% bupivacaine bolus resulted in better analgesia than did 0.0625% bupivacaine, which proved to be inadequate, necessitating additional local anesthetic, which affected ambulation adversely.

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The Pharmacodynamic Effect of a Remifentanyl Bolus on Ventilatory Control

393

H. Daniel Babenco, Pattilyn F. Conard, and Jeffrey B. Gross

The time course of ventilatory depression after a remifentanyl bolus is used to determine the effect-site pharmacodynamics for this ultra-short-acting opioid.

Comparison of Plasma Compartment *versus* Two Methods for Effect Compartment-controlled Target-controlled Infusion for Propofol

399

Michel M. R. F. Struys, Tom De Smet, Birgit Depoorter, Linda F. M. Versichelen, Eric P. Mortier, Frank J. E. Dumortier, Steven L. Shafer, and Georges Rolly

Effect compartment-controlled TCI can be safely and adequately applied in clinical practice using a time-to-peak-effect model combined with a three-compartment pharmacokinetic model.

◇ Critical Oxygen Delivery in Conscious Humans Is Less Than $7.3 \text{ ml O}_2 \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$

407

Jeremy A. Lieberman, Richard B. Weiskopf, Scott D. Kelley, John Feiner, Mariam Noorani, Jacqueline Leung, Pearl Toy, and Maurene Viele

Reduction of oxygen delivery in conscious, healthy, resting young adults to $7.3 \text{ ml O}_2 \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$, by isovolemic reduction of hemoglobin concentration to 4.8 g/dl and with an infusion of a β -adrenergic antagonist, does not produce evidence of inadequate systemic oxygenation.

Female Gender Associates with Increased Duration of Intubation and Length of Stay after Coronary Artery Surgery

414

John Butterworth, Robert James, Richard Prielipp, Julie Cerase, Jean Livingston, David Burnett, and the CABG Clinical Benchmarking Database Participants

Even after adjustment for pertinent preoperative factors, female sex is associated with increased duration of intubation, duration of stay in intensive care, and postoperative duration of hospital stay after elective coronary artery surgery.

◇ Risk of Surgery and Anesthesia for Ischemic Stroke

425

Gilbert Y. Wong, David O. Warner, Darrell R. Schroeder, Kenneth P. Offord, Mark A. Warner, Pamela M. Maxson, and Jack P. Whisnant

There is an increased risk of ischemic stroke in the 30 days after surgery and anesthesia. This risk remains elevated even after excluding surgeries (cardiac, neurologic, and vascular surgeries) considered to be high risk for ischemic stroke.

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Comparison of Intravenous or Epidural Patient-controlled Analgesia in the Elderly after Major Abdominal Surgery 433

Claude Mann, Yvan Pouzeratte, Gilles Boccaro, Christophe Peccoux, Christine Vergne, Georges Brunat, Jacques Domergue, Bertrand Millat, and Pascal Colson

After major abdominal surgery, patient-controlled analgesia, regardless of the route (epidural or parenteral), is effective in elderly people. However, the epidural route using local anesthetics and an opioid provides better pain relief and improves mental status and bowel activity.

Hypoxic Brain Tissue following Subarachnoid Hemorrhage 442

William E. Hoffman, Peggy Wheeler, Guy Edelman, Fady T. Charbel, Norman J. Torres, and James I. Ausman

Patients with subarachnoid hemorrhage show a higher incidence of brain tissue hypoxia compared with controls. Tissue carbon dioxide pressure was increased by 9% desflurane.

Efficacy of Two Methods for Reducing Postbypass Afterdrop 447

Angela Rajek, Rainer Lenhardt, Daniel I. Sessler, Gabriele Brunner, Markus Haisjackl, Johannes Kastner, and Günther Laufer

Cutaneous warming during and after rewarming decreases afterdrop magnitude. In contrast, nitroprusside administration during the rewarming phase of cardiopulmonary bypass does not produce a clinically important reduction in afterdrop magnitude in patients cooled to approximately 32°C and slowly rewarmed to 37°C.

■ LABORATORY INVESTIGATIONS

◆ Relative Importance of Flow *versus* Pressure in Splanchnic Perfusion during Cardiopulmonary Bypass in Rabbits 457

Olivier Bastien, Vincent Piriou, Abdellah Aouifi, Claire Flamens, Rhys Evans, and Jean Jacques Lehot

Splanchnic perfusion during cardiopulmonary bypass (CPB) was measured during a random-order factorial experimental block design (pressure versus flow). Laser Doppler flow was significantly lower than pre-CPB value but was better preserved when CPB flow was high, whatever the pressure.

◆ Long-lasting Hyperalgesia Induced by Fentanyl in Rats: Preventive Effect of Ketamine 465

Evelyne Célèrier, Cyril Rivat, Yan Jun, Jean-Paul Laulin, Agnès Larcher, Patrick Reynier, and Guy Simonnet

Fentanyl-induced analgesia in the rat is followed by a delayed hyperalgesia for several days, which was prevented by the N-methyl-D-aspartate receptor antagonist ketamine.

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Norepinephrine Facilitates Inhibitory Transmission in Substantia Gelatinosa of Adult Rat Spinal Cord (Part 1): Effects on Axon Terminals of GABAergic and Glycinergic Neurons

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Hiroshi Baba, Koki Shimoji, and Megumu Yoshimura

Norepinephrine facilitates quantal release of γ -aminobutyric acid and glycine from presynaptic terminals of inhibitory interneurons in the dorsal horn. These effects are mediated by α_1 receptors located on axon terminals.

Norepinephrine Facilitates Inhibitory Transmission in Substantia Gelatinosa of Adult Rat Spinal Cord (Part 2): Effects on Somatodendritic Sites of GABAergic Neurons

485

Hiroshi Baba, Peter A. Goldstein, Manabu Okamoto, Tatsuro Kohno, Toyofumi Ataka, Megumu Yoshimura, and Koki Shimoji

Norepinephrine excites GABAergic interneurons in the dorsal horn. These effects are mediated by α_1 receptors. Activation of α_1 receptors also suppresses the activity of deep dorsal horn neurons.

Intrathecaly Administered cGMP-dependent Protein Kinase $I\alpha$ Inhibitor Significantly Reduced the Threshold for Isoflurane Anesthesia: Implication for a Novel Role of cGMP-dependent Protein Kinase $I\alpha$

493

Yuan-Xiang Tao, Aalya Hassan, and Roger A. Johns

Intrathecaly administered PKGI α inhibitor not only markedly reduces MAC for isoflurane, but also completely blocks the NO-induced increase in isoflurane MAC, which is not accompanied by change in either blood pressure or heart rate.

Synergistic Effect between Intrathecal Non-NMDA Antagonist and Gabapentin on Allodynia Induced by Spinal Nerve Ligation in Rats

500

Shao-Rui Chen, James C. Eisenach, Patrick P. McCaslin, and Hui-Lin Pan

Intrathecal treatment with the non-NMDA receptor antagonist, CNQX, or gabapentin dose-dependently attenuates the allodynia induced by spinal nerve ligation in rats. Furthermore, intrathecal coadministration of CNQX and gabapentin produces a synergistic antiallodynic effect in a rat model of neuropathic pain.

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Actions of Midazolam on GABAergic Transmission in Substantia Gelatinosa Neurons of Adult Rat Spinal Cord Slices

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Tatsuro Kohno, Eiichi Kumamoto, Hiroshi Baba, Toyofumi Ataka, Manabu Okamoto, Koki Shimoji, and Megumu Yoshimura

Midazolam potentiates electrically evoked and miniature inhibitory postsynaptic currents in duration, and a GABA-induced current in amplitude, each of which is mediated by the GABA_A-benzodiazepine receptor in dorsal horn neurons.

Xenon Does Not Alter Cardiac Function or Major Cation Currents in Isolated Guinea Pig Hearts or Myocytes

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David F. Stowe, Georg C. Rehmert, Wai-Meng Kwok, Henry U. Weigt, Michael Georgieff, and Zeljko J. Bosnjak

Xenon, at 0.5 and 1 minimum alveolar concentration, alters neither Na⁺, L-type Ca²⁺, or K⁺_{ir} currents in isolated myocytes, nor contractility or metabolism in isolated hearts of guinea pigs.

Bupivacaine Inhibits Acylcarnitine Exchange in Cardiac Mitochondria

523

Guy L. Weinberg, June W. Palmer, Timothy R. VadeBoncouer, Mikko B. Zuechner, Guy Edelman, and Charles L. Hoppel

Bupivacaine inhibits cardiac respiration dependent on lipid substrates. The main effect appears to be inhibition of carnitine-acylcarnitine translocase.

Differential Effects of Anesthetic and Nonanesthetic Cyclobutanes on Neuronal Voltage-gated Sodium Channels

529

Lingamaneni Ratnakumari, Tatyana N. Vysotskaya, Daniel S. Duch, and Hugh C. Hemmings, Jr.

The anesthetic cyclobutane F3 (1-chloro-1,2,2-trifluorocyclobutane) inhibited sodium (Na⁺) channel-dependent glutamate release and Na⁺ currents with a potency comparable to that of conventional volatile anesthetics. In contrast, the structurally similar nonanesthetic F6 (1,2-dichlorohexafluorocyclobutane) was relatively ineffective at concentrations predicted to produce anesthesia. These differential effects of structurally related anesthetic and nonanesthetic compounds support neuronal Na⁺ channels as a possible target for general anesthetics.

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Propofol-induced Modifications of Cardiomyocyte Calcium Transient and Sarcoplasmic Reticulum Function in Rats

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Thierry Guenoun, Olivier Montagne, Monique Laplace, and Bertrand Crozatier

For doses more than 10^{-5} M, propofol induces a sarcoplasmic reticulum Ca^{2+} uptake capacity impairment and a slowing of the cellular Ca^{2+} transient decrease. These diastolic modifications may participate in the slight negative inotropic effect of the drug.

Primate Pleuroesophageal Tissue Barrier Frequency Response and Esophageal Pressure Waveform Bandwidth in Health and Acute Lung Injury

550

Craig G. Hartford, Johan M. van Schalkwyk, Geoffrey G. Rogers, and Martin J. Turner

The pleuroesophageal tissue barrier resonates at high frequency, is pressure amplitude dependent, and is altered by acute lung injury. Maximum dynamic esophageal pressure bandwidth during conventional mechanical ventilation is 8.5 Hz.

Isoflurane Action in the Spinal Cord Blunts Electroencephalographic and Thalamic-Reticular Formation Responses to Noxious Stimulation in Goats

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Joseph F. Antognini, Xiao Wei Wang, and E. Carstens

Isoflurane selectively delivered to the spinal cord blunted the electroencephalographic and thalamic-reticular formation response to noxious stimulation.

Midazolam Selectively Potentiates the $\text{A}_{2\text{A}}$ - but not A_1 -receptor-mediated Effects of Adenosine: Role of Nucleoside Transport Inhibition and Clinical Implications

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Christoph N. Seubert, Timothy E. Morey, Anatoly E. Martynuk, Roy F. Cucchiara, and Donn M. Dennis

Midazolam augments the effects of both exogenous and endogenous adenosine on $\text{A}_{2\text{A}}$ -receptor-mediated coronary vasodilatation but not on A_1 -receptor-mediated negative dromotropy in guinea pig isolated heart by inhibiting nucleoside transporter.

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Perioperative Heat Balance

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Daniel I. Sessler

This review summarizes the changes in body heat content and distribution during general and regional anesthesia and during cardiopulmonary bypass.

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GUIDE FOR AUTHORS

The Guide for Authors is published in the January, April, July, and October issues. Please refer to the Guide for the preparation of any material for submission to *ANESTHESIOLOGY*.

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