



ON THE COVER:

In this issue of ANESTHESIOLOGY, two original research articles and three editorial views examine the use of data in clinical decision making.

- Kheterpal *et al.*: Impact of a Novel Multiparameter Decision Support System on Intraoperative Processes of Care and Postoperative Outcomes, p. 272
- Liu *et al.*: Defining the Intrinsic Cardiac Risks of Operations to Improve Preoperative Cardiac Risk Assessments, p. 283
- Sessler: Decision Support Alerts: Importance of Validation, p. 241
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■ SPECIAL ARTICLE

An Anesthesiologist's Perspective on the History of Basic Airway Management: The "Progressive" Era, 1904 to 1960

254

A. A. Matioc

This third installment of the history of basic airway management discusses the transitional—"progressive"—years of anesthesia (1904 to 1960). Basic airway management continued to be central to this period of emerging modern anesthesia and positive pressure ventilation.

■ PERIOPERATIVE MEDICINE

CLINICAL SCIENCE



Impact of a Novel Multiparameter Decision Support System on Intraoperative Processes of Care and Postoperative Outcomes

272

S. Kheterpal, A. Shanks, and K. K. Tremper

Most improvements were time-dependent. Decision support was associated with improved process-of-care measures compared to contemporaneous control patients, but not with improved clinical outcomes. Decision support systems should be formally evaluated because the extent to which they will enhance patient care is not obvious.

SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT



Defining the Intrinsic Cardiac Risks of Operations to Improve Preoperative Cardiac Risk Assessments

283

J. B. Liu, Y. Liu, M. E. Cohen, C. Y. Ko, and B. J. Sweitzer

An analysis of 3 million surgeries in the American College of Surgeons National Surgical Quality Improvement Program registry demonstrated a broad range of procedure-specific cardiac adverse event risk for 200 commonly performed procedures. These data may advance our patient-specific risk/benefit analyses and medical decision-making.

SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT



Incidence of Artifacts and Deviating Values in Research Data Obtained from an Anesthesia Information Management System in Children

293

A. J. Hoorweg, W. Pasma, L. van Wolfswinkel, and J. C. de Graaff

In the particular anesthesia information management system used by the authors, the amount of artifacts was low for heart rate and oxygen saturation and higher for noninvasive and invasive blood pressure and end-tidal carbon dioxide. Values outside the normal range have a higher amount of artifacts than values within the normal range. The amount of artifacts varies with anesthetic technique and phase of anesthesia.



Propofol-induced Changes in α - β Sensorimotor Cortical Connectivity

305

M. Malekmohammadi, N. AuYong, C. M. Price, E. Tsolaki, A. E. Hudson, and N. Pouratian

Although propofol administration led to a local power increase in oscillations in both the sensory and motor cortices, the coupling between these two regions was significantly reduced. The results support the premise that propofol induces a functional disconnection between cortical areas even though local activity in these areas may increase.

SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT



Period-dependent Associations between Hypotension during and for Four Days after Noncardiac Surgery and a Composite of Myocardial Infarction and Death: A Substudy of the POISE-2 Trial

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D. I. Sessler, C. S. Meyhoff, N. M. Zimmerman, G. Mao, K. Leslie, S. M. Vásquez, P. Balaji, J. Alvarez-Garcia, A. B. Cavalcanti, J. L. Parlow, P. V. Rahate, M. D. Seeberger, B. Gossetti, S. A. Walker, R. K. Premchand, R. M. Dahl, E. Duceppe, R. Rodseth, F. Botto, and P. J. Devereaux

This study determined the association between hypotension and a composite of 30-day myocardial infarction and death over three periods: (1) intraoperative, (2) remaining day of surgery, and (3) during the initial four postoperative days. Clinically important hypotension was significantly associated with a composite of myocardial infarction and death during each of three perioperative periods, even after adjustment for previous hypotension. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

- ◇ **Cost-effectiveness Analysis of Intraoperative Cell Salvage for Obstetric Hemorrhage** 328
 👁 *G. Lim, V. Melnyk, F. L. Facco, J. H. Waters, and K. J. Smith*

The use of cell salvage for cases at high risk for obstetric hemorrhage is economically reasonable; routine cell salvage use for all cesarean deliveries is not. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

BASIC SCIENCE

- Alphaxalone Binds in Inner Transmembrane $\beta^+-\alpha^-$ Interfaces of $\alpha 1\beta 3\gamma 2$ γ -Aminobutyric Acid Type A Receptors** 338
A. M. Ziemba, A. Szabo, D. W. Pierce, M. Haburcak, A. T. Stern, A. Nourmahnad, E. S. Halpin, and S. A. Forman

Alphaxalone contacts were identified in the inner transmembrane $\beta^+-\alpha^-$ intersubunit clefts of γ -aminobutyric acid type A (GABA_A) receptors. These sites are adjacent to the outer transmembrane sites where etomidate and propofol act. The results suggest that large portions of the transmembrane intersubunit clefts of GABA_A receptors are allosterically coupled to ion channel gating. These clefts form a number of distinct binding sites for pharmacologic agents that include neurosteroids and currently used intravenous anesthetics.

■ CRITICAL CARE MEDICINE

CLINICAL SCIENCE

- ◇ **Microvascular Permeability after an Acute and Chronic Salt Load in Healthy Subjects: A Randomized Open-label Crossover Intervention Study** 352
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Twelve healthy males followed both a low-sodium diet and a high-sodium diet for eight days each in a randomized crossover study and received intravenous hypertonic saline infusion over the course of 30 min after the low-sodium diet. Despite similar increases in plasma sodium, chloride, and osmolality, chronic dietary sodium loading did not affect microvascular permeability, but hypertonic saline infusion increased it. Increased microvascular permeability after saline infusion coincided with decreased urinary glycosaminoglycan excretion, indicating damage to the endothelial surface layer.

BASIC SCIENCE

- ◇ ◆ 🌐 **Vasculotide, an Angiopoietin-1 Mimetic, Restores Microcirculatory Perfusion and Microvascular Leakage and Decreases Fluid Resuscitation Requirements in Hemorrhagic Shock** 361
M. Trieu, M. van Meurs, A. L. I. van Leeuwen, P. Van Slyke, V. Hoang, L. M. G. Geeraedts, Jr., C. Boer, and C. E. van den Brom

Hemorrhagic shock in rats activated the angiopoietin/Tie2 system and was associated with vascular leakage and fewer perfused capillaries. These effects were attenuated by pretreatment and posttreatment with a new angiopoietin-1 mimetic, vasculotide. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

- 🌐 **A Comparison of Red Cell Rejuvenation *versus* Mechanical Washing for the Prevention of Transfusion-associated Organ Injury in Swine** 375
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In a porcine model, red blood cell washing along with an inosine rejuvenation solution restored red cell energy stores, reduced inflammatory responses, and reduced transfusion-associated organ injury in swine in 14-day-old stored blood. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

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◇ **Argatroban and Bivalirudin for Perioperative Anticoagulation in Cardiac Surgery** 390

A. Koster, D. Faraoni, and J. H. Levy

Argatroban and bivalirudin are used as replacement anticoagulants for heparin. The authors review clinical studies for these drugs in the perioperative setting of cardiac surgical patients including extracorporeal management and mechanical support therapy.

REVIEW ARTICLE

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M. Smith

Multimodality monitoring allows individually tailored approaches to the management of traumatic brain injury in which treatment decisions are guided by monitored changes in physiologic variables.

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