

TABLE OF CONTENTS

ANESTHESIOLOGY

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◆ This Month in ANESTHESIOLOGY	1A
Science, Medicine, and the Anesthesiologist.....	13A
Infographics in Anesthesiology	17A

◆ Editorials

Uncertainty and Certainty

E. D. Kharasch 1

Goal-directed Therapy: Why Benefit Remains Uncertain

K. Maheshwari, D. I. Sessler 5

“Nonroutine Events” as a Nonroutine Outcome for Perioperative Systems Research

M. B. Lane-Fall, E. J. Bass 8

Anesthesia as Decoupling?

A. E. Hudson 11

Ketamine for Chronic Pain: Old Drug New Trick?

J. D. Clark 13

Balancing Supply and Demand for Blood during the COVID-19 Pandemic

E. A. Gehrie, S. M. Frank, S. M. Goobie 16

■ Readers' Toolbox

Manipulating Neural Circuits in Anesthesia Research

E. D. Melonakos, O. A. Moody, K. Nikolaeva, R. Kato,
C. J. Nehs, K. Solt 19

Perioperative Medicine

CLINICAL SCIENCE

◆ ◆ Individualized Fluid Management Using the Pleth Variability Index:

◆ A Randomized Clinical Trial



M.-O. Fischer, S. Lemoine, B. Tavernier, C.-E. Bouchakour, V. Colas,
M. Houard, W. Greub, G. Daccache, C. Hulet, V. Compère, D. Taing,
E. Lorne, J.-J. Parienti, J.-L. Hanouz, for the Optimization using the Pleth
Variability Index (OPVI) Trial Group 31

The investigators randomized 447 moderate-risk major arthroplasty patients to plethysmographic-guided *versus* routine fluid management. Fitness for discharge and actual hospital durations were essentially identical in each group. Complications were rare and similar in each group. Plethysmographic-guided fluid management did not reduce the duration of hospitalization or complications in moderate-risk surgery patients. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

◆ ◆ Incidence and Classification of Nonroutine Events during

◆ Anesthesia Care



J. S. Liberman, J. M. Slagle, G. Whitney, M. S. Shotwell,
A. Lorinc, E. Porterfield, M. B. Weinger 41

Video recordings of 511 cases from 1998 to 2004 were viewed to identify nonroutine events, which occurred in 22% of cases, and some cases had multiple events. One in fifteen patients had events associated with some degree of patient injury. The most common contributory factors were related to provider, patient, or teaching/supervision. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

◆ Refers to This Month in ANESTHESIOLOGY

◆ Refers to Editorials

This article has an Audio Podcast

See Supplemental Digital Content

CME Article

This article has a Video Abstract

Part of the Letheon writing competition

This article has a Visual Abstract

Readers' Toolbox



ON THE COVER: Ketamine is often used for the management of refractory chronic pain, yet there are few trials exploring its analgesic after intravenous administration or in association with magnesium. In this issue of ANESTHESIOLOGY, Pickering *et al.* report negligible effect of ketamine with or without magnesium 5 weeks after intravenous infusion. In an accompanying Editorial, Clark calls for de-emphasizing use of infused ketamine until and unless we can determine how to use the drug to benefit patients. Cover Illustration: S. M. Jarret, M.F.A., C.M.I. Photo: J. P. Rathmell.

- Pickering *et al.*: Ketamine and Magnesium for Refractory Neuropathic Pain: A Randomized, Double-blind, Crossover Trial, p. 154
- Clark: Ketamine for Chronic Pain: Old Drug New Trick? p. 13

- ◇ **Subcutaneous Nitroglycerin for Radial Arterial Catheterization in Pediatric Patients: A Randomized Controlled Trial**
Y.-E. Jang, S.-H. Ji, E.-H. Kim, J.-H. Lee, H.-S. Kim,
E. B. Mossad, J.-T. Kim53

In children less than 2 yr of age, infiltration around the radial artery with 5 mcg/kg of nitroglycerin in 0.5 ml of saline increased the first success rate of arterial cannulation.

- Magnesium and Bladder Discomfort after Transurethral Resection of Bladder Tumor: A Randomized, Double-blind, Placebo-controlled Study**
J.-Y. Park, J. H. Hong, D.-H. Kim, J. Yu, J.-H. Hwang, Y.-K. Kim64

In a randomized trial of 120 patients recovering from transurethral resection of bladder tumor, intravenous magnesium substantially reduced discomfort with a number needed to treat of only 2. Intravenous magnesium is a simple and inexpensive way to reduce bladder discomfort.

- ◇ **Accuracy and Feasibility of Clinically Applied Frailty Instruments before Surgery: A Systematic Review and Meta-analysis**
S. D. Aucoin, M. Hao, R. Sohi, J. Shaw, I. Bentov,
D. Walker, D. I. McIsaac78

This meta-analysis of 45 articles identified that specific frailty scales may be better predictors for some adverse outcomes when compared to others. The Clinical Frailty Scale was most strongly associated with mortality and discharge not to home. The Edmonton Frail Scale was a better predictor of complications. The Frailty phenotype was most strongly associated with postoperative delirium. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

- ◇ **Risk Factors for Failure to Rescue in Myocardial Infarction after Noncardiac Surgery: A Cohort Study**
S. Mazzarello, D. I. McIsaac, W. S. Beattie, D. A. Fergusson,
M. M. Lalu96

In a multinational cohort of 8,923 patients experiencing perioperative myocardial infarction after intermediate to high-risk noncardiac surgery, one in five died within 30 days. Patients age 85 yr or older, and those with advanced systemic disease, underweight body mass index, ascites, disseminated cancer, sepsis, or dyspnea at rest were at highest risk. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

- An Effective and Efficient Testing Protocol for Diagnosing Iron-deficiency Anemia Preoperatively**
O. Okocha, H. Dand, M. J. Avram, B.J. Sweitzer109

The investigators implemented a novel screening system in which anemia automatically triggered evaluation for iron deficiency using previously collected blood. The automated system identified iron-deficiency anemia far better than clinicians using normal procedures.

- Association between Use of Angiotensin-converting Enzyme Inhibitors or Angiotensin Receptor Blockers and Postoperative Delirium**
E. Farag, C. Liang, E. J. Mascha, M. Y. Argalious, J. Ezell,
K. Maheshwari, W. A. S. Esa, C. A. Troianos, D. I. Sessler119

In a single-center cohort study of adults admitted to a surgical intensive care unit, preoperative use of angiotensin-converting enzyme inhibitors or angiotensin receptor blockers was not associated with reduced postoperative delirium. However, rapidly starting angiotensin-converting enzyme inhibitors or angiotensin receptor blockers postoperatively was associated with reduced delirium.

BASIC SCIENCE

- ◇ **Collapse of Global Neuronal States in *Caenorhabditis elegans* under Isoflurane Anesthesia**
M. R. Awal, G. S. Wirak, C. V. Gabel, C. W. Connor133

In vivo imaging of neuronal network activity with single cell resolution in *Caenorhabditis elegans* reveals that although neurons display highly correlated activity in awake animals, this system-wide organization in neuronal activity is lost under isoflurane anesthesia. These observations at the single cell level in a complex neuronal network confirm previous electrophysiologic works suggesting functional disintegration of neuronal circuitry as a mechanism of anesthetic-induced unconsciousness. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Critical Care Medicine


CLINICAL SCIENCE

- ◇ **Mechanical Ventilation Guided by Uncalibrated Esophageal Pressure May Be Potentially Harmful**
G. Cammarota, G. Lauro, E. Santangelo, I. Squazzotti, R. Perucca,
F. Verdina, E. Boniolo, R. Tarquini, E. Bignami, S. Mongodi, E. Arisi,
A. Orlando, F. Della Corte, R. Vaschetto, F. Mojoli145

This study enrolled patients undergoing pelvic robotic surgery and found that esophageal balloon calibration significantly improved assessment of esophageal pressure when compared with the conventional uncalibrated approach to measuring esophageal pressure. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*


Pain Medicine

CLINICAL SCIENCE


-  **Ketamine and Magnesium for Refractory Neuropathic Pain: A Randomized, Double-blind, Crossover Trial**
G. Pickering, B. Pereira, V. Morel, A. Corrigan, F. Giron, F. Marcaillou, A. Bidar-Beauvallon, E. Chandeze, C. Lambert, L. Bernard, N. Delage154

Using a triple-crossover paradigm, saline, ketamine, and ketamine + magnesium infusions were given to a group of 20 patients with chronic neuropathic pain. No effect of either the ketamine or ketamine + magnesium in terms of pain relief over the 35 days after infusions was identified. Additional secondary health-related, emotional, sleep, and quality of life measures were also unchanged by the drug infusions. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

BASIC SCIENCE

-  **Distinct Function of Estrogen Receptors in the Rodent Anterior Cingulate Cortex in Pain-related Aversion**
K.-K. Zang, X. Xiao, L.-Q. Chen, Y. Yang, Q.-L. Cao, Y.-L. Tang, S.-S. Lv, H. Cao, L. Zhang, Y.-Q. Zhang165


Blockade of the estrogen receptor- β but not the estrogen receptor- α reduced pain-related aversion in rats, a model of the affective components of pain. Administration of an estrogen receptor- β agonist to the rostral anterior cingulate cortex caused conditioned place aversion without altering mechanical or thermal sensitivity. Estrogen receptor- β may be a key receptor controlling the affective components of pain-related behaviors in laboratory models. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

-  **Neural Selective Cryoneurolysis with Ice Slurry Injection in a Rat Model**
L. Garibyan, S. M. Tuchayi, Y. Wang, A. Khodorova, A. Stemmer-Rachamimov, M. Purschke, S. Osseiran, C. L. Evans, J. Mao, G. Strichartz, R. R. Anderson185

Using a rat sciatic nerve block model, an injectable biocompatible ice slurry preparation was shown to provide analgesic effects for at least 60 days. Disruption of myelin sheaths recovered by 112 days after injections, suggesting that the slurry-induced cryoneurolysis is reversible. Providing sustained analgesia using injected ice slurries may be possible. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Education

IMAGES IN ANESTHESIOLOGY

-  **Bronchus Intermedius Compression from Idiopathic Thoracic Scoliosis**
M. Atteri, C. Allphin, M. Mahmoud, M. S. Ok195
SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

Bloody Cerebrospinal Fluid Drainage

A. J. Maurer, J. Kedrowski, R. Wardhan196

Management of the Traumatic Airway Obstructed by Foreign Body

M. M. Hollon, M. Hunter, R. Johnson197

ORIGINAL INVESTIGATION IN EDUCATION

Stress Management Training Improves Overall Performance during Critical Simulated Situations: A Prospective Randomized Controlled Trial


F. Sigwalt, G. Petit, J.-N. Evain, D. Clavierie, M. Bui, A. Guinet-Lebreton, M. Trousselard, F. Canini, D. Chassard, A. Duclos, J.-J. Lehot, T. Rimmelé, M. Lilot198

Stress management training may improve performance among trainees subjected to a stressful simulated clinical environment.

CLINICAL FOCUS REVIEW

-  **Patient Blood Management: Effectiveness and Future Potential**
D. R. Spahn, M. Muñoz, A. A. Klein, J. H. Levy, K. Zacharowski212

Patient blood management is a highly successful and cost-effective concept that improves patient outcome by correction of anemia with hematinic medication and reduction of blood loss perioperatively by meticulous surgical techniques and individualized coagulation management.

-  **Assessing and Reversing the Effect of Direct Oral Anticoagulants on Coagulation**
A. Langer, J. M. Connors223

This article presents a focused review of the available tests to assess the effect of direct oral anticoagulants on coagulation and the use of reversal agents in the perioperative setting for practicing anesthesiologists.

MIND TO MIND

-  **An ER Doctor Finds His Daughter in Critical Condition**
J. Nicely233

- Flying with a Compass: Goals of Care in the Perioperative Setting**
T. Cushman, M. M. Treggiari235

Correspondence

- Analysis of Laryngoscopy Attempts in Infants: Comment**
B. Horvath237

- Analysis of Laryngoscopy Attempts in Infants: Reply**
J. A. Gálvez, S. Acquah, L. Ahumada, L. Cai, M. Polanski, L. Wu, A. F. Simpaio, J. M. Tan, J. Wasey, J. E. Fiadjoe237

- Priming Cardiopulmonary Bypass in Pediatric Surgery: Comment**
P. Van Der Linden, A. Blanche, D. Schmartz238

Priming Cardiopulmonary Bypass in Pediatric Surgery: Reply	
<i>A. Dieu, M. Momeni</i>	239

Practice Guidelines for Central Venous Access: Comment	
<i>G. S. Shrestha</i>	241

Practice Guidelines for Central Venous Access: Reply	
<i>J. L. Apfelbaum, S. M. Rupp, A. Tung, R. T. Connis,</i> <i>on behalf of the American Society of Anesthesiologists Task</i> <i>Force on Central Venous Access</i>	242

Perioperative Neurocognitive Disorder: Comment	
<i>G. Giordano, F. Pugliese, F. Bilotta</i>	243

Perioperative Neurocognitive Disorder: Reply	
<i>R. G. Eckenhoff, M. F. Eckenhoff</i>	243

Setup of a Dedicated Coronavirus Intensive Care Unit: Logistical Aspects	
<i>F. Mojoli, S. Mongodi, G. Grugnetti, A. Muzzi, F. Baldanti,</i> <i>R. Bruno, A. Triarico, G. A. Iotti</i>	244

Emergency Open-source Three-dimensional Printable Ventilator Circuit Splitter and Flow Regulator during the COVID-19 Pandemic	
--	--

<i>B. K. Lai, J. L. Erian, S. H. Pew, M. S. Eckmann</i>	246
---	-----

Rapid COVID-19-related Clinical Adaptations and Unanticipated Risks	
<i>C. R. Schrock, M. C. Montana</i>	248

Retraction	249
-------------------------	-----

Erratum	250
----------------------	-----

Anesthesiology Reflections from the Wood Library-Museum

The Surgeon As "Swindler": A Corny Use of Chloroform	
<i>Jane S. Moon and George S. Bause</i>	40

Shadowing the Abbot: Wood Library-Museum Graphic Illustrators Bill and Janet Lyle	
<i>George S. Bause</i>	63

Aftershocks for Quake-rattled Frueh: Dan "Wood's Local Anaesthetic" Levels Its Namesake	
<i>Melissa L. Coleman and George S. Bause</i>	95

Byline Backstory No. 6: Ethereal Inspirations in Scotland— Particular Then General	
<i>George S. Bause</i>	184

Careers & Events	19A
-----------------------------------	-----

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