ON THE COVER:
The 2014 American College of Cardiology Perioperative Guideline recommends risk stratifying patients scheduled to undergo noncardiac surgery using either the Revised Cardiac Index, the American College of Surgeons National Surgical Quality Improvement Program Surgical Risk Calculator, or the Myocardial Infarction or Cardiac Arrest calculator. In this issue of Anesthesiology, Glance et al. used a retrospective cohort of 10,000 patient records to determine how often these three risk-prediction tools agree on the classification of patients as low risk of major adverse cardiac event. They demonstrated wide variability in the predicted risk of cardiac complications using different risk-prediction tools. In an accompanying Editorial View, Fleisher, who served as chair of the Perioperative Guideline Committee, discusses the practical implications of using risk-prediction tools and the current lack of evidence that use of any one tool leads to superior patient outcomes.

- Fleisher: Preoperative Cardiac Evaluation before Noncardiac Surgery Reverend Bayes’s Risk Indices and Optimal Variables, p. 867

THIS MONTH IN ANESTHESIOLOGY

SCIENCE, MEDICINE, AND THE ANESTHESIOLOGIST

INFOGRAPHICS IN ANESTHESIOLOGY

EDITORIAL VIEWS

Postoperative Brain Function: Toward a Better Understanding and the American Society of Anesthesiologists Perioperative Brain Health Initiative
D. J. Cole and E. D. Kharasch

Workflow Eats Optimum Care for Lunch
W. S. Sandberg and S. J. Brull

Preoperative Cardiac Evaluation before Noncardiac Surgery: Reverend Bayes’s Risk Indices and Optimal Variables
L. A. Fleisher

Highways of the Brain, Traffic of the Mind
G. A. Mashour
SPECIAL ARTICLE

Recommendations for the Nomenclature of Cognitive Change Associated with Anaesthesia and Surgery—2018 872


Suggestions are made regarding definitions and criteria for cognitive disorders associated with anesthesia and surgery, to align with those in other disciplines including psychiatry, gerontology, and neurology.

PERIOPERATIVE MEDICINE

CLINICAL SCIENCE

Comparison of the TOFscan and the TOF-Watch SX during Recovery of Neuromuscular Function 880


A new generation of quantitative monitoring using three-dimensional acceleromyographic technology, the TOFscan (Drager Technologies, Canada), has been developed that requires minimal setup for intraoperative use. TOFscan measures the recovery of neuromuscular function with good agreement to an existing device, the TOF-Watch SX (Organon, Ireland), which requires preload application, calibration, and normalization.

Impact of the Choice of Risk Model for Identifying Low-risk Patients Using the 2014 American College of Cardiology/American Heart Association Perioperative Guidelines 889


Thirty percent of predictions regarding high versus low risk are discordant across the risk calculators. The choice of risk-prediction tool could have an impact on the calculated risk and subsequent clinical decisions.

Differences of Recovery from Rocuronium-induced Deep Paralysis in Response to Small Doses of Sugammadex between Elderly and Nonelderly Patients 901


The train-of-four ratio recovery rate after low-dose sugammadex administration was slower in elderly patients than it was in nonelderly patients. Recurarization after low-dose sugammadex administration occurred more frequently in elderly patients than in nonelderly patients. Slower spontaneous train-of-four ratio recovery and impaired renal function were most closely associated with the decreased train-of-four ratio change rate in response to low-dose sugammadex in multiple linear regression analysis.

Caffeine Accelerates Emergence from Isoflurane Anesthesia in Humans: A Randomized, Double-blind, Crossover Study 912

R. Fong, L. Wang, J. P. Zacny, S. Khokhar, J. L. Apfelbaum, A. P. Fox, and Z. Xie

The authors tested the hypothesis that caffeine speeds anesthetic emergence. Volunteers anesthetized with isoflurane were given caffeine (equivalent to 7.5 mg base) or placebo in a blinded crossover trial. When given caffeine, the volunteers emerged more quickly and at a higher isoflurane concentration.

Effect of Equipotent Doses of Propofol versus Sevoflurane Anesthesia on Regulatory T Cells after Breast Cancer Surgery 921


A total of 201 women having breast cancer surgery were randomly assigned to propofol or sevoflurane anesthesia. Cluster of differentiation 39 and 73 expression did not differ nor did any other evaluated immune functions. These results do not support the putative protective effect of propofol on cancer recurrence.
Propofol-based Total Intravenous Anesthesia Is Associated with Better Survival Than Desflurane Anesthesia in Colon Cancer Surgery


The authors conducted a propensity-matched retrospective analysis of 1,158 patients who had colon cancer surgery. Patients anesthetized with propofol had better overall survival.

Basic Science

Resting-state Dynamics as a Cortical Signature of Anesthesia in Monkeys


When moving from wakefulness to anesthesia, the anatomical structure of connections between brain areas becomes the main driver of the repertoire of functional states. Subjects given anesthesia lose the ability to generate flexible functional brain states that transcend brain anatomy. High similarity between brain structure and function is a new general signature of anesthesia-induced loss of consciousness. SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

Etomidate and Etomidate Analog Binding and Positive Modulation of γ-Aminobutyric Acid Type A Receptors: Evidence for a State-dependent Cutoff Effect


γ-Aminobutyric acid type A (GABA<sub>A</sub>) receptor positive modulatory activities of phenyl ring–substituted etomidate analogs decreased with increasing substituent group volume, reflecting decreases in both potencies and efficacies of the analogs. Their GABA<sub>A</sub> receptor positive modulatory activities were strongly correlated with their affinities for the two β<sup>+</sup> – α transmembrane anesthetic binding sites of the GABA<sub>A</sub> receptor. Open-state binding affinity decreased progressively with increasing substituent group volume.

Preclinical Pharmacology in the Rhesus Monkey of CW 1759-50, a New Ultra-short Acting Nondepolarizing Neuromuscular Blocking Agent, Degraded and Antagonized by L-Cysteine


CW 1759-50 is a new nondepolarizing neuromuscular blocking agent that may have a clinical profile that is superior to that of gantacurium. Studies in rhesus monkeys comparing CW 1759-50 with gantacurium found both of them to be ultra-short acting because of their rapid degradation by L-cysteine adduction. The effects of CW 1759-50 on mean arterial pressure and heart rate were substantially less than those of gantacurium.

Ultrasound Elastography for Rapid, Real-time Detection of Localized Muscular Reaction in Malignant Hyperthermia–susceptible Pigs

S. Johannsen, I. Türkmeneli, S. Isbary, N. Roewer, and F. Schuster

In vivo ultrasound (shear-wave) elastography detected a temporary increase in local tissue stiffness soon after intramuscular injection of halothane and caffeine in malignant hyperthermia–susceptible pigs. Quantitative shear-wave elastography allowed earlier detection of reactions to halothane and caffeine than did measurement of local lactate concentrations in microdialysis fluids, although the responses were analogous.

Midazolam and Dexmedetomidine Affect Neuroglioma and Lung Carcinoma Cell Biology

In Vitro and In Vivo

C. Wang, T. Datoo, H. Zhao, L. Wu, A. Date, C. Jiang, R. D. Sanders, G. Wang, C. Bevan, and D. Ma

As expected, dexmedetomidine enhanced cancer cell proliferation and migration, primarily by the upregulation of antiapoptotic proteins. By contrast, midazolam suppressed cancer cell proliferation and migration, induced mitochondria mediated apoptosis, and enhanced free radical production. These anticancer effects of midazolam, mediated by its activity at the peripheral benzodiazepine receptor, were achieved at high concentrations only. The data suggest that commonly used agents in the perioperative period may impact tumor cell growth; these effects have been demonstrated in preclinical studies, and therefore their relevance to clinical management of patients undergoing cancer surgery remains to be determined. SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT
Brain Dynamics and Temporal Summation of Pain Predicts Neuropathic Pain Relief from Ketamine Infusion


The infusion of ketamine resulted in meaningful pain relief in about 50% of patients with chronic neuropathic pain. The magnitude of temporal summation of pain and the dynamic engagement of the descending pain modulatory circuit predicted treatment efficacy and point to mechanisms by which ketamine can relieve pain.

Early Identification of Tamponade Using Focused Cardiac Ultrasound

M. Sigakis and B. Fiza

SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT

Unstable Cervical Spine Fracture Triggered by a Congenital Neurodegenerative Disorder

R. Diaz Milian and M. R. Castresana

Extreme Trachea Dilatation after Prolonged Ventilation at High Tracheal Cuff Pressure

Y. Miao, Y. Liu, R. Wang, and J. Wang

False-positive Transesophageal Echocardiography after False-positive Computed Tomography Angiography in Suspected Type A Aortic Dissection

E. Gologorsky, Q. N. Zhang, and A. Gologorsky

Role of Network Science in the Study of Anesthetic State Transitions

U. Lee and G. A. Mashour

Network science is a necessary theoretical framework and method to understand multiscale mechanisms of anesthetic actions from molecular and neuronal levels to behavior and cognition.

To My Mother in Surgery

K. P. Holmes

Acceptance: A Letter to My Grieving Self

K. B. Hagan

Surrogates or Outcomes: What Should We Measure?

M. C. Kendall

In Reply

L. M. Löffel, M. P. Schneider, S. A. Girsberger, F. C. Burkhard, and P. Y. Wuethrich

Airway Management: The Less Popular Skill of Bag-mask Ventilation

G. P. Rosen, O. Viswanath, J. C. Wigley, and B. Kerner

In Reply

R. A. Schroeder, R. Pollard, and M. Stafford-Smith
The Trademarked Red “Elixir of Life,” Hall’s Coca Wine
George S. Bause
863

How Hertzler’s Local Anesthesia Saw More Than Local Military Action
George S. Bause
871

Not a Pipe Dream: Crescent Interest in Free’s Vegetable Anesthetic
George S. Bause
941

As for “Fresh Laughing Gas”—Get It Out of Jehl Free....
George S. Bause
958

Crying Foul on Chloroforming Fowl
George S. Bause
1014