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Severinghaus and the author developed as physician–scientists from initially addressing concrete goals to realizing failures, establishing networks, and finally asking questions more about *why* rather than *how*. This memorial lecture highlights this progression and their contributions to science.

Perioperative Medicine

CLINICAL SCIENCE

◆ ◆ Quantitative Neuromuscular Monitoring in Clinical Practice: A Professional Practice Change Initiative

◆ ◆ *W. A. Weigel, B. L. Williams, N. A. Hanson, C. C. Blackmore, R. L. Johnson, G. M. Nissen, A. B. James, W. M. Strodtbeck*901

A departmental professional practice initiative began with the goal of documenting a train-of-four ratio greater than or equal to 0.90 for all patients given a nondepolarizing neuromuscular blocking drug. This retrospective assessment of the implementation of documenting train-of-four ratios greater than or equal to 0.9 before extubation improved from 1% (2 of 172) of cases in November 2016 to 93% (250 of 269) of cases in December 2020. Attaining this endpoint required not only placing a quantitative monitor in each anesthetizing location but also ongoing educational efforts and follow-up. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

◆ ◆ Amiodarone with or without *N*-Acetylcysteine for the Prevention of Atrial Fibrillation after Thoracic Surgery: A Double-blind, Randomized Trial

◆ ◆ *D. Amar, H. Zhang, M. K. Chung, K. S. Tan, D. Desiderio, B. J. Park, A. Pedoto, N. Roistacher, J. M. Isbell, D. Molena, G. L. Milne, B. F. Meyers, G. W. Fischer, V. W. Rusch, D. R. Jones*916

This double-blinded randomized trial of noncardiac thoracic surgery patients was done to test the hypothesis that the addition of *N*-acetylcysteine to concurrent amiodarone administration would reduce the incidence of postoperative atrial fibrillation when compared with placebo being concurrently administered with amiodarone. The study was halted midway for futility, as there was no difference in postoperative atrial fibrillation in the patients who received *N*-acetylcysteine plus amiodarone versus the patients who received placebo plus amiodarone.

◆ Refers to This Month in ANESTHESIOLOGY

◆ Refers to Editorial

◆ This article has an Audio Podcast

◆ See Supplemental Digital Content

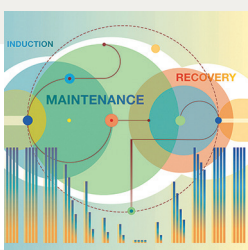
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ON THE COVER: Residual neuromuscular blockade can be avoided with quantitative neuromuscular monitoring. In this issue of ANESTHESIOLOGY, Weigel *et al.* detail a professional practice initiative they conducted to attain documented train-of-four ratios greater than or equal to 0.90 in all patients to improve patient outcomes through reducing residual paralysis. In an accompanying editorial, Lane-Fall tells us how this new article demonstrates much about what anesthesiology has to learn from implementation science and quality improvement. Cover Illustration: A. Johnson, Vivo Visuals Studio.

- Weigel *et al.*: Quantitative Neuromuscular Monitoring in Clinical Practice: A Professional Practice Change Initiative, p. 901
- Lane-Fall: What Anesthesiology Has to Learn from Implementation Science and Quality Improvement, p. 875



-   **Intraoperative Hypotension and Acute Kidney Injury, Stroke, and Mortality during and outside Cardiopulmonary Bypass: A Retrospective Observational Cohort Study**
M. A. de la Hoz, V. Rangasamy, A. B. Bastos, X. Xu, V. Novack, B. Saugel, B. Subramaniam.....927

Among 4,984 patients undergoing cardiac surgery at a single tertiary care center between 2008 and 2016, 256 (5.1%) experienced the primary outcome of stroke (66, 1.3%), acute kidney injury (125, 2.5%), or mortality (109, 2.2%). Each 10 min of hypotension (mean arterial pressure less than 65 mmHg) during, before, or after cardiopulmonary bypass was associated with an increased odds ratio of 1.06 (95% CI, 1.03 to 1.10; $P = 0.001$). Intraoperative hypotension, even if it occurs outside of cardiopulmonary bypass, is independently associated with stroke, acute kidney injury, or death after cardiac surgery. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

-   **Referral Indications for Malignant Hyperthermia Susceptibility Diagnostics in Patients without Adverse Anesthetic Events in the Era of Next-generation Sequencing**
L. R. van den Bersselaar, A. Hellblom, M. Gashi, E.-J. Kamsteeg, N. C. Voermans, H. Jungbluth, J. de Puydt, L. Heytens, S. Riazi, M. M. J. Snoeck.....940

The hypothesis that there is an increased referral to malignant hyperthermia units of patients without a personal or family history of adverse anesthetic events suspected to be malignant hyperthermia was tested in a retrospective multicenter cohort study. The proportion of patients referred without a personal or family history of adverse anesthetic events increased from 28.4% (61 of 215) between 2010 and 2014 to 43.6% (133 of 305) between 2015 and 2019. Patients with a personal or family history of adverse anesthetic events were more frequently diagnosed as malignant hyperthermia-susceptible (133 of 220; 60.5%) than those without (47 of 120; 39.2%). *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*



BASIC SCIENCE

-   **Midazolam at Low Nanomolar Concentrations Affects Long-term Potentiation and Synaptic Transmission Predominantly via the α_1 - γ -Aminobutyric Acid Type A Receptor Subunit in Mice**
X. Puig-Bosch, S. Bielezki, H. U. Zeilhofer, U. Rudolph, B. Antkowiak, G. Rammes.....954

Using a combination of γ -aminobutyric acid type A (GABA_A) α -receptor subunit knock-in mice revealed that low concentrations (10 nM) of midazolam blocked long-term potentiation in the hippocampal slice preparation predominantly via α_1 -GABA_A receptors. Electrophysiologic recordings in neocortical slice cultures imply a dominant role for the α_1 subtype in governing inhibitory postsynaptic current kinetics at nanomolar concentrations of midazolam. These observations suggest that, at low concentrations, midazolam enhances synaptic transmission of GABA_A receptors via targeting α_1 subtypes and provides mechanistic explanation for the drug's sedative and amnestic action. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Pain Medicine

CLINICAL SCIENCE

-   **Basal Infusion versus Automated Boluses and a Delayed Start Timer for “Continuous” Sciatic Nerve Blocks after Ambulatory Foot and Ankle Surgery: A Randomized Clinical Trial**
J. J. Finneran IV, E. T. Said, B. P. Curran, M. W. Swisher, J. R. Black, R. A. Gabriel, J. F. Sztain, W. B. Abramson, B. Alexander, M. C. Donohue, A. Schaar, B. M. Ilfeld.....970


Patients undergoing foot or ankle surgery received popliteal-sciatic catheter-reservoir systems delivering ropivacaine by continuous infusion or by a bolus of anesthetic every 2 h. Those patients receiving bolus anesthetic experienced better pain control and effects of longer duration than those receiving continuous infusions.

Education

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- Labeled Surgical Caps: A Tool to Improve Perioperative Communication**
B. J. Wong, A. K. Nassar, S. N. Goldhaber-Fiebert.....983

CLINICAL FOCUS REVIEW

-   **End-tidal Anesthetic Concentration: Monitoring, Interpretation, and Clinical Application**
J. F. A. Hendrickx, A. M. De Wolf.....985

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REVIEW ARTICLE

- Historical and Modern Evidence for the Role of Reward Circuitry in Emergence**
M. Heshmati, M. R. Bruchas.....997

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-  **Advances in Neuroimaging and Monitoring to Defend Cerebral Perfusion in Noncardiac Surgery**
J. P. Fanning, S. F. Huth, C. Robba, S. M. Grieve, D. Highton.....1015

The authors present an introduction to the emerging roles of neuromonitoring in optimizing perioperative care through guiding intraoperative hemodynamic management, improving surgical risk stratification, and enhancing diagnosis of postoperative neurologic sequelae.

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