

TABLE OF CONTENTS

ANESTHESIOLOGY

Volume 138

Issue 4

April 2023

This Month in ANESTHESIOLOGYA1
Science, Medicine, and the Anesthesiologist.....A13
Infographics in AnesthesiologyA17
Editorial

**Nitrous Oxide and Postoperative Pulmonary Complications:
Conflicting Evidence**

M. Gama de Abreu, D. I. Sessler345

**Modulating the Cardiac Autonomic Nervous System: Stay Close to My
Heart or Keep Your Distance?**

K. Bartels, A. A. Fox348

**Respiratory Rate as a Factor in Lung Injury—Not Just What You Set,
but How You Set**

K. Uchida351

Perioperative Medicine

CLINICAL SCIENCE

◆◆ Postoperative Pulmonary Complications in the ENIGMA II Trial: A *Post Hoc* Analysis

P. J. Peyton, G. Liskaser, A. Ho, H. Marsh, C. Etherington, F. Torlot, M. Desai, G. Perrett, B. Chee, K. Leslie, P. S. Myles354

This study reanalyzed the ENIGMA II data from 10 Australian centers (approximately 33% of the total multinational cohort) to compare the incidence of atelectasis in the two treatment groups. In contrast to the original ENIGMA trial, there was a lower incidence of atelectasis with use of nitrous oxide. There was no effect of nitrous oxide on the secondary outcomes of pneumonia, combined pulmonary complications, or hospital length of stay.

◆ Immediate Hypersensitivity to Chlorhexidine: Experience from an Allergy Center in China

H. Xiao, H. Zhang, Q. Jia, F. Xu, J. Meng364

In a study from China, most allergic reactions to chlorhexidine were due to skin disinfectant for vascular cannulation and occurred repeatedly in most patients before it was recognized. This report further emphasizes the need for awareness of the potential allergenicity of chlorhexidine in a perioperative setting or after vascular cannulation.

BASIC SCIENCE

◆◆ GABAergic Signaling during Spinal Cord Stimulation Reduces Cardiac Arrhythmias in a Porcine Model

K. Howard-Quijano, Y. Kuwabara, T. Yamaguchi, K. Roman, S. Salavatian, B. Taylor, A. Mahajan372

This study of Yorkshire pigs found that spinal cord stimulation reduces myocardial ischemia–reperfusion–induced myocardial sympathetic excitation and ventricular arrhythmias through γ -aminobutyric acid–mediated pathways in the thoracic spinal cord.

◆◆ Intergenerational Perioperative Neurocognitive Disorder in Young Adult Male Rats with Traumatic Brain Injury

L.-S. Ju, J. Zhu, J. O. Brant, T. E. Morey, N. Gravenstein, C. N. Seubert, T. Vasilopoulos, B. Setlow, A. E. Martynuk388

Repeated exposures to sevoflurane induced a statistically significant increase in neuroinflammation and stress response alongside decreased neurocognitive performance in 2-month-old male rats with moderate traumatic brain injury when compared to nontraumatized counterparts. Comparable abnormalities were observed in unexposed male but not female offspring of sevoflurane-exposed male rats with traumatic brain injury. These laboratory observations suggest that traumatic brain injury

◆ Refers to This Month in ANESTHESIOLOGY

◆ Refers to Editorial

◆ This article has an Audio Podcast

◆ See Supplemental Digital Content

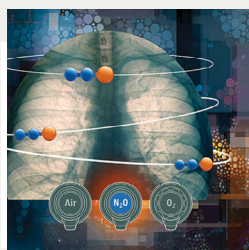
◆ CME Article

◆ This article has a Video Abstract

◆ Readers' Toolbox

◆ This article has a Visual Abstract

OPEN This article is Open Access



ON THE COVER: Nitrous oxide (N_2O) promotes absorption atelectasis in poorly ventilated lung segments at high inspired concentrations. The original ENIGMA Trial found a higher incidence of postoperative pulmonary complications and wound sepsis with N_2O anesthesia in major surgery compared with FiO_2 0.8 without N_2O . In this issue of ANESTHESIOLOGY, Peyton *et al.* collected post hoc data to determine whether the incidences of atelectasis and pneumonia were higher with in patients receiving N_2O who were recruited to the Australian cohort of the ENIGMA II trial. In an accompanying editorial, Gama de Abreu and Sessler discuss the conflicting evidence on nitrous oxide and postoperative pulmonary complications. Cover illustration: A. Johnson, Vivo Visuals Studio.

- Peyton *et al.*: Postoperative Pulmonary Complications in the ENIGMA II Trial: A *Post Hoc* Analysis, p. 354
- Gama de Abreu and Sessler: Nitrous Oxide and Postoperative Pulmonary Complications: Conflicting Evidence, p. 345

may be a risk factor for developing perioperative neurocognitive disorder and raise the possibility of a sex-specific intergenerational effect of this pathology.

◇ **Mouse Model of Spinal Cord Hypoperfusion with Immediate Paralysis Caused by Endovascular Repair of Thoracic Aortic Aneurysm**

H. Kelani, K. Corps, S. Mikula, L. C. Fisher, M. T. Shalaan, S. Sturgill, M. T. Ziolo, M. Abdel-Rasoul, D. M. Basso, H. Awad.....403

In mice, double ligation of three pairs alongside single ligation of two pairs of intercostal arteries led to reproducible spinal cord hypoperfusion and to an immediate paralysis of variable severity below the ligation level. The variable degree of deficit and the gradual improvement throughout a 2-week follow-up period in mice mimics the recovery process in humans presenting with spinal cord ischemia after endovascular repair of thoracic aortic aneurysm.

Critical Care Medicine

BASIC SCIENCE

◆ **Lung Injury Is Induced by Abrupt Increase in Respiratory Rate but Prevented by Recruitment Maneuver in Mild Acute Respiratory Distress Syndrome in Rats**

P. H. Xavier, A. C. F. Fonseca, L. A. Gonçalves, G. C. de Sousa, M. C. da Silva, R. F. de M. Sacramento, C. dos S. Samary, M. Medeiros, F. F. Cruz, V. L. Capelozzi, N. S. Felix, P. Pelosi, J. J. Marini, P. R. M. Rocco, P. L. Silva.....420

A rat model of mild acute lung injury, incorporating either a gradual or an abrupt increase in respiratory rate (with a preceding recruitment maneuver) greater than two different adaptation periods, evaluated postmortem histologic alveolar damage along with markers of lung inflammation, endothelial cell damage, and gene expression. A gradual increase in respiratory rate resulted in evidence of less lung damage. Biomarkers were higher with abrupt increases as well, although a preceding recruitment maneuver ameliorated this increase.

Education

CLASSIC PAPER REVISITED

◇ **Luck, an Inquisitive Mind, and Opportunities: Lessons Learned: A Blinded Study of Pulse Oximetry before It Became a Standard of Care**
C. J. Coté.....436

IMAGES IN ANESTHESIOLOGY

Segmental Tracheomalacia in a Patient with a Persistent Air Leak
S. W. Powers, J. Metry, K. S. Kutlu.....441

MIND TO MIND

Alarm Fatigue
J. Dryden.....442

Life in a Moment
N. J. Brown.....444

CORRESPONDENCE

Updates in Prevention of Surgical Site Infection: Comment
T. Mundangeppufu, J. W. Nadler446

Updates in Prevention of Surgical Site Infection: Reply
D. R. Long, J. C. Alverdy, M. S. Vavilala.....447

Selection Bias in the Hypotension Prediction Index: Comment
E. Giustiniano, F. Nisi447

Selection Bias in the Hypotension Prediction Index: Reply
J. Enevoldsen, H. L. Hovgaard, S. T. Vistisen.....450

Authors and Editors Must Consider Appropriate Use of Acronyms and Initialisms, or Text Will Be DOA (Dead on Arrival)
A. J. Schwartz.....452

Reviews of Educational Material

Managing Long COVID Syndrome
B. C. Flynn.....453

Errata 455

Anesthesiology Reflections from the Wood Library-Museum

Dr. Silas Weir Mitchell: The Nightmare of War and the Death of Pain
J. S. Moon.....387

Careers & Events.....A19

INSTRUCTIONS FOR AUTHORS

The most recently updated version of the Instructions for Authors is available at www.anesthesiology.org. Please refer to the Instructions for the preparation of any material for submission to ANESTHESIOLOGY.

Manuscripts submitted for consideration for publication must be submitted in electronic format via Editorial Manager (<https://www.editorialmanager.com/aln>). Detailed directions for submission and the most recent version of the Instructions for Authors can be found on the Journal's Web site (<http://www.anesthesiology.org>). Books and educational materials for review should be sent to Alan Jay Schwartz, M.D., M.S.Ed., Director of Education, Department of Anesthesiology and Critical Care Medicine, The Children's Hospital of Philadelphia,

34th Street and Civic Center Blvd., Room 9327, Philadelphia, Pennsylvania 19104-4399. Article-specific permission requests are managed with Copyright Clearance Center's Rightslink service. Information can be accessed directly from articles on the journal Web site. More information is available at <http://anesthesiology.pubs.asahq.org/public/rightsandpermissions.aspx>. For questions about the Rightslink service, e-mail customer-care@copyright.com or call 877-622-5543 (U.S. only) or 978-777-9929. Advertising and related correspondence should be addressed to Advertising Manager, ANESTHESIOLOGY, Wolters Kluwer Health, Inc., Two Commerce Square, 2001 Market Street, Philadelphia, Pennsylvania 19103 (Web site: <http://www.wkand-center.com/>). Publication of an advertisement in an ASA publication or on an ASA website does not constitute endorsement or evaluation by ASA or by ASA's publishing partners of the product or service described therein or of any representations or claims made by the advertiser with respect to the product or service.

ANESTHESIOLOGY (ISSN 0003-3022) is published monthly by Wolters Kluwer Health, Inc., 1800 Dual Highway, Suite 201, Hagerstown, MD 21740-6636. Business office: Two Commerce Square, 2001 Market Street, Philadelphia, PA 19103. Periodicals postage paid at Hagerstown, MD, and at additional mailing offices. Copyright © 2023, the American Society of Anesthesiologists. All Rights Reserved.

Annual Subscription Rates: *United States*—\$1175 Individual, \$2990 Institution, \$461 In-training. *Rest of World*—\$1238 Individual, \$3320 Institution, \$461 In-training. Single copy rate \$312. Subscriptions outside of North America must add \$58 for airfreight delivery. Add state sales tax, where applicable. The GST tax of 7% must be added to all orders shipped to Canada (Wolters Kluwer Health, Inc.'s GST Identification #895524239, Publications Mail Agreement #1119672). Indicate in-training status and name of institution. Institution rates apply to libraries, hospitals, corporations, and partnerships of three or more individuals. Subscription prices outside the United States must be prepaid. Prices subject to change without notice. Subscriptions will begin with currently available issue unless otherwise requested. Visit us online at www.lww.com.

Individual and in-training subscription rates include print and access to the online version. Online-only subscriptions for individuals (\$389) and persons in training (\$389) are available to nonmembers and may be ordered by downloading a copy of the Online Subscription FAXback Form from the Web site, completing the information requested, and faxing the completed form to 301-223-2400. Institutional rates are for print only; online subscriptions are available via Ovid. Institutions can choose to purchase a print and online subscription together for a discounted rate. Institutions that wish to purchase a print subscription, please contact Wolters Kluwer Health,

Inc., 1800 Dual Highway, Suite 201, Hagerstown, MD 21740-6636; phone: 800-638-3030; fax: 301-223-2400. Institutions that wish to purchase an online subscription or online with print, please contact the Ovid Regional Sales Office near you or visit www.ovid.com/site/index.jsp and select Contact and Locations.

Address for non-member subscription information, orders, or change of address: Wolters Kluwer Health, Inc., 1800 Dual Highway, Suite 201, Hagerstown, MD 21740-6636; phone: 800-638-3030; fax: 301-223-2400.

Address for member subscription information, orders, or change of address: Members of the American Society of Anesthesiologists receive the print and online journal with their membership. To become a member or provide a change of address, please contact the American Society of Anesthesiologists, 1061 American Lane, Schaumburg, Illinois 60173-4973; phone: 847-825-5586; fax: 847-825-1692; e-mail: membership@ASAhq.org. For all other membership inquiries, contact Wolters Kluwer Health, Inc., Customer Service Department, P.O. Box 1610, Hagerstown, MD 21740; phone: 800-638-3030; fax: 301-223-2400.

Postmaster: Send address changes to ANESTHESIOLOGY, P.O. BOX 1610, Hagerstown, MD 21740.

Advertising: Please contact Kelle Gray, National Account Manager, Health Learning, Research & Practice, Medical Journals, Wolters Kluwer Health, Inc.; phone: 843-261-4221; e-mail: Kelle.Gray@wolterskluwer.com. For classified advertising: Dave Wiegand, Recruitment Advertising Representative, Wolters Kluwer Health, Inc.; phone: 847-361-6128; e-mail: Dave.Wiegand@wolterskluwer.com.