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This article provides a definition of qualitative research, compares and contrasts qualitative and quantitative research, and proposes a step-wise approach for appraising and conducting qualitative research in medical education.

 **Quantitative Research Methods in Medical Education**

*J. T. Ratelle, A. P. Sawatsky, T. J. Beckman* ..... 23

This article provides a review of quantitative research in medical education for clinicians to understand and appraise articles in this field.

**Perioperative Medicine**

**CLINICAL SCIENCE**

◆ ◆ **Midazolam Sedation Induces Upper Limb Coordination Deficits That Are Reversed by Flumazenil in Patients with Eloquent Area Gliomas**



*N. Lin, R. Han, X. Hui, K. Zhang, A. W. Gelb* ..... 36

When induced with midazolam, these deficits can be reversed by flumazenil, suggesting a  $\gamma$ -aminobutyric acid-mediated mechanism.

◆ ◆ **Oxygenation Impairment during Anesthesia: Influence of Age and Body Weight**



*G. Hedenstierna, L. Tokics, G. Scaramuzza, H. U. Rothen, L. Edmark, J. Öhrvik* ..... 46

Pooled data were examined from 80 patients studied with multiple inert gas elimination technique and computed tomography. Oxygenation was impaired by anesthesia, more so with greater age or body mass index. The key contributors were low ventilation/perfusion ratio (likely airway closure) in the elderly and shunt (atelectasis) in the obese.

◆ ◆ **Airway Closure during Surgical Pneumoperitoneum in Obese Patients**



*D. L. Grieco, G. M. Anzellotti, A. Russo, F. Bongiovanni, B. Costantini, M. D'Indinosante, F. Varone, F. Cavallaro, L. Tortorella, L. Polidori, B. Romanò, V. Gallotta, A. M. Dell'Anna, L. Sollazzi, G. Scambia, G. Conti, M. Antonelli* ..... 58

Airway closure affects a relevant proportion of obese patients undergoing general anesthesia in supine position, with a variable degree of airway opening pressure. With Trendelenburg pneumoperitoneum, airway opening pressure increases consistently with esophageal pressure and pneumoperitoneum insufflation pressure: consequently, transalveolar pressure, lung volumes, and alveolar recruitment do not vary. Airway closure yields bedside misinterpretation of respiratory mechanics and underestimation of actual alveolar pressure in the intraoperative setting. It is an occult phenomenon that generates an airway pressure threshold, whereby inspiratory gas does not inflate the lung unless the airway opening pressure is exceeded.

◇ Refers to This Month in ANESTHESIOLOGY

◆ Refers to Editorial Views

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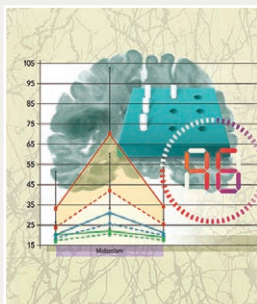
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 Part of the Letheron writing competition

 This article has a Visual Abstract

 Readers' Toolbox



**ON THE COVER:** Midazolam has been found to exacerbate or unmask limb motor dysfunction in patients with brain tumors. In this issue of ANESTHESIOLOGY, Lin *et al.* demonstrate that in patients with eloquent area gliomas, mild sedation with midazolam induced motor coordination deficits in upper limbs. In an accompanying Editorial View, Vlisides and Mashour consider how a pharmacologic sedation strategy might serve as a neurologic stress test; just as a treadmill can strip away cardiac reserve to reveal subclinical heart vulnerability, so might sedatives strip away neural reserve to reveal subclinical brain vulnerability. Cover illustration: A. Johnson, C.M.I., Vivo Visuals.

- Lin *et al.*: Midazolam Sedation Induces Upper Limb Coordination Deficits That Are Reversed by Flumazenil in Patients with Eloquent Area Gliomas, p. 36
- Vlisides and Mashour: Pharmacologic Unmasking of Neurologic Deficits: A Stress Test for the Brain, p. 5

-   **Automated Ambulatory Blood Pressure Measurements and Intraoperative Hypotension in Patients Having Noncardiac Surgery with General Anesthesia: A Prospective Observational Study**  
*B. Saugel, P. C. Reese, D. I. Sessler, C. Burfeindt, J. Y. Nicklas, H. O. Pinnschmidt, D. A. Reuter, S. Südfeld* .....74

There is a poor correlation between preinduction blood pressure and the usual blood pressure over 24 h. In two thirds of patients, the lowest postinduction and intraoperative pressures were lower than the lowest nighttime blood pressure.

-   **Days Alive and Out of Hospital: Validation of a Patient-centered Outcome for Perioperative Medicine**  
*A. Jerath, P. C. Austin, D. N. Wijeyesundera* .....84

Days alive and out of hospital was associated with patient-level factors including comorbidities, advanced age, and complications, but not less relevant hospital-level factors. It appears to be a useful measure of surgical impact.


## BASIC SCIENCE

- Isoflurane Modulates Hippocampal Cornu Ammonis Pyramidal Neuron Excitability by Inhibition of Both Transient and Persistent Sodium Currents in Mice**  
*W. Zhao, M. Zhang, J. Liu, P. Liang, R. Wang, H. C. Hemmings, C. Zhou* .....94

Electrophysiologic studies show that isoflurane, at clinically relevant concentrations, inhibits both transient and persistent sodium currents on mouse cornu ammonis hippocampal neurons *ex vivo*. The isoflurane-induced inhibition of sodium channels on excitatory neurons may contribute to the reduction of neuronal excitability and synaptic transmission.

## Critical Care Medicine


### BASIC SCIENCE

-  **Toll-like Receptor 7 Contributes to Inflammation, Organ Injury, and Mortality in Murine Sepsis**  
*W. Jian, L. Gu, B. Williams, Y. Feng, W. Chao, L. Zou* .....105

Using murine models of bacterial sepsis, knockout of the Toll-like receptor 7 resulted in lower mortality and cytokine levels and less end-organ injury. Therefore, Toll-like receptor 7, which mediates innate immune response, contributes to harm in experimental sepsis.



## Pain Medicine

### CLINICAL SCIENCE

-  **Prolonged Perioperative Use of Pregabalin and Ketamine to Prevent Persistent Pain after Cardiac Surgery**  
*S. Anwar, J. Cooper, J. Rahman, C. Sharma, R. Langford* .....119

The administration of pregabalin (14 days) with or without ketamine (2 days) postoperatively reduced the prevalence of pain at 3 and 6 months. Side effects from pregabalin and ketamine administration were generally mild.



### BASIC SCIENCE

-   **Mast Cell Degranulation and Fibroblast Activation in the Morphine-induced Spinal Mass: Role of Mas-related G Protein-coupled Receptor Signaling**  
*T. L. Yaksh, K. A. Eddinger, S. Kokubu, Z. Wang, A. DiNardo, R. Ramachandran, Y. Zhu, Y. He, F. Weren, D. Quang, S. A. Malkmus, K. Lansu, W. K. Kroeze, B. Eliceiri, J. J. Steinauer, P. W. Schiller, P. Gmeiner, L. M. Page, K. R. Hildebrand* .....132

Using a guinea pig model, masses formed around intrathecal catheters when morphine was infused, and this mass formation was not prevented by opioid receptor blockade. Non-opioid receptor mediated stimulation of Mas-related G protein-coupled receptor appeared to be mechanism responsible for mast cell degranulation, fibroblast proliferation and ultimately mass formation. Agents not activating Mas-related genes at analgesic doses did not produce masses.

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◇ **Driving Pressure and Transpulmonary Pressure: How Do We Guide Safe Mechanical Ventilation?**  
*E. C. Williams, G. C. Motta-Ribeiro, M. F. Vidal Melo*.....155

The physiologic concept, pathophysiologic implications, and clinical relevance and application of driving pressure and transpulmonary pressure to prevent ventilator-induced lung injury are discussed.

**REVIEW ARTICLES**

🌐 **Practicalities of Total Intravenous Anesthesia and Target-controlled Infusion in Children**  
*B. J. Anderson, O. Bagshaw* .....164

Propofol and remifentanyl are common drugs used for total intravenous anesthesia in both adults and children. Administration can be by infusion controlled manually by the physician or automated infusion that targets either plasma or effect site. Target-controlled infusion programs are based on pharmacokinetic parameter estimates, and the addition of an effect site equilibration constant allows effect site drug concentration prediction. This review looks at the background of total intravenous anesthesia/target-controlled infusion in children and provides a practical guide to administration.

◇ **Postresuscitation Care after Out-of-hospital Cardiac Arrest: Clinical Update and Focus on Targeted Temperature Management**  
*H. Kirkegaard, F. S. Taccone, M. Skrifvars, E. Soreide*.....186

At admission, unconscious out-of-hospital cardiac arrest patients always need airway control and frequently also hemodynamic support and percutaneous coronary intervention. Targeted temperature management is still the most important neuroprotective treatment. Delayed multimodal prognostication should be a key part of postresuscitation care.

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