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Perioperative Medicine

CLINICAL SCIENCE

CME ◆ ◆ Total Intravenous Anesthesia versus Inhalation Anesthesia for Breast Cancer Surgery: A Retrospective Cohort Study S. Yoo, H.-B. Lee, W. Han, D.-Y. Noh, S.-K. Park, W. H. Kim, and J.-T. Kim	31
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In a large propensity-matched retrospective cohort analysis, the authors compared total IV and volatile anesthesia for breast cancer surgery. Recurrence hazard was similar with each approach. Selection of IV or volatile anesthesia should be based on factors other than cancer recurrence.

◆ Succinylcholine Use and Dantrolene Availability for Malignant Hyperthermia Treatment: Database Analyses and Systematic Review

M. G. Larach, T. T. Klumpner, B. W. Brandom, M. T. Vaughn, K. G. Belani, A. Herlich, T. W. Kim, J. Limoncelli, S. Riazi, E. L. Sivak, J. Capacchione, D. Mashman, and S. Kheterpal, on behalf of the Multicenter Perioperative Outcomes Group..... 41

The authors performed an analysis of data from three databases and a systematic literature review. Providers frequently use succinylcholine, including during difficult mask ventilation. Succinylcholine given without volatile anesthetics triggered 24 malignant hyperthermia events, 13 of which were treated with dantrolene. Fourteen patients experienced substantial complications, and one died. Delayed dantrolene treatment worsened patient outcomes. **SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT**

◆ Norepinephrine Infusion for Preventing Postspinal Anesthesia Hypotension during Cesarean Delivery: A Randomized Dose-finding Trial

A. M. Hasanin, S. M. Amin, N. A. Agiza, M. K. Elsayed, S. Refaat, H. A. Hussein, T. I. Rouk, M. Alrahmany, M. E. Elsayad, K. A. Elshafaei, and A. Refaie..... 55



This randomized, double-blinded trial compared prophylactic norepinephrine infusions of 0.025, 0.050, or 0.075 $\mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$, started after bupivacaine spinal anesthesia, in full-term parturients having elective cesarean delivery. The primary outcome, maternal hypotension (systolic blood pressure less than 80% of baseline), occurred less frequently after both 0.050 and 0.075 $\mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ compared 0.025 $\mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ norepinephrine.



◆ Cognitive Effects of Perioperative Pregabalin: Secondary Exploratory Analysis of a Randomized Placebo-controlled Study

M. Myhre, H. B. Jacobsen, S. Andersson, and A. Stubhaug..... 63

This secondary analysis of data demonstrating that perioperative administration of pregabalin was associated with a reduction in opioid requirements and incisional hyperalgesia suggests that these benefits may be compromised by an increased risk of developing impaired postoperative cognitive performance.

◇ Refers to This Month in Anesthesiology
◆ Refers to Editorial Views

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 Part of the Letheon writing competition
 This article has a Visual Abstract



ON THE COVER: The association between type of anesthesia and recurrence of cancer remains controversial. In this issue of ANESTHESIOLOGY, Yoo *et al.* examine the association of type of anesthesia with recurrence-free survival after breast cancer surgery. In an accompanying Editorial View, Sessler and Riedel review the broader scientific literature regarding the association between choice of anesthesia and cancer recurrence and places this new report in perspective. Illustration by Annemarie Johnson, Vivo Visuals.

- Yoo *et al.*: Total Intravenous Anesthesia versus Inhalation Anesthesia for Breast Cancer Surgery: A Retrospective Cohort Study, p. 31
- Sessler and Riedel: Anesthesia and Cancer Recurrence: Context for Divergent Study Outcomes, p. 3



Triple-low Alerts Do Not Reduce Mortality: A Real-time Randomized Trial

D. I. Sessler, A. Turan, W. H. Stapelfeldt, E. J. Mascha, D. Yang, E. Farag, J. Cywinski, C. Vlah, T. Kopyeva, A. L. Keebler, M. Perilla, M. Ramachandran, S. Drahuschak, K. Kaple, and A. Kurz72

A randomized electronic alert of triple-low events to treating clinicians did not reduce 90-day mortality. The alerts minimally influenced clinician responses, assessed as vasopressor administration or reduction in end-tidal volatile anesthetic partial pressure, and there was no association between response to alerts and mortality. Triple-low events predict mortality but do not appear to be causally related.

Major Adverse Cardiac Events and Mortality Associated with Electroconvulsive Therapy: A Systematic Review and Meta-analysis

A. Duma, M. Maleczek, B. Panjikaran, H. Herkner, T. Garrison, and P. Nagele83

Major adverse cardiac events and death after electroconvulsive therapy are infrequent and occur in about 1 of 50 patients and after about 1 of 200 to 500 electroconvulsive therapy treatments. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Blood Pressure and End-tidal Carbon Dioxide Ranges during Aneurysm Occlusion and Neurologic Outcome after an Aneurysmal Subarachnoid Hemorrhage

A. Akkermans, J. A. van Waes, L. M. Peelen, G. J. Rinkel, and W. A. van Klei92

The investigators retrospectively evaluated 1,099 patients who had endovascular coiling or surgical clipping for subarachnoid hemorrhages. There were no clinically important or statistical significant associations between either end-tidal carbon dioxide or mean arterial pressure thresholds and Glasgow Outcome Scale at discharge or three months. Other prognostic factors are more important than carbon dioxide and blood pressure, at least within the observed clinical ranges. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

BASIC SCIENCE

Activation of Parabrachial Nucleus Glutamatergic Neurons Accelerates Reanimation from Sevoflurane Anesthesia in Mice

T.-X. Wang, B. Xiong, W. Xu, H.-H. Wei, W.-M. Qu, Z.-Y. Hong, and Z.-L. Huang106

Using chemogenetic techniques, activation of parabrachial nucleus glutamatergic neurons prolonged anesthetic induction and hastened emergence in mice. Inhibition of these neurons provided opposite effects. Modulating the activity of arousal centers may provide an approach to controlling the duration of general anesthesia.

Critical Care Medicine

BASIC SCIENCE

Positive End-expiratory Pressure and Mechanical Power



F. Collino, F. Rapetti, F. Vasques, G. Maiolo, T. Tonetti, F. Romitti, J. Niewenhuys, T. Behnemann, L. Camporota, G. Hahn, V. Reupke, K. Holke, P. Herrmann, E. Duscio, F. Cipulli, O. Moerer, J. J. Marini, M. Quintel, and L. Gattinoni119

This *in vivo* study (36 pigs mechanically ventilated in the prone position) suggests that low levels of positive end-expiratory pressure reduce injury associated with atelectasis, and above a threshold level of power, positive end-expiratory pressure causes lung injury and adverse hemodynamics. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Pain Medicine

CLINICAL SCIENCE

Analgesic Effects of Hydromorphone versus Buprenorphine in Buprenorphine-maintained Individuals



A. S. Huhn, E. C. Strain, G. E. Bigelow, M. T. Smith, R. R. Edwards, and D. A. Tompkins131

Large doses of intravenous hydromorphone can provide analgesia in buprenorphine-maintained individuals. However, the use of hydromorphone for analgesia in buprenorphine-maintained individuals confers greater abuse liability and side effects than does supplemental intravenous buprenorphine.

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Despite the widespread application of incentive systems in health care to enhance physician productivity and quality, they have not been well studied and often do not produce the desired results.

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