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Volume 138

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Perioperative Medicine

CLINICAL SCIENCE

◆◆◆ Prolonged Opioid Use and Pain Outcome and Associated Factors after Surgery under General Anesthesia: A Prospective Cohort Association Multicenter Study

K. Kuck, B. I. Naik, K. B. Domino, K. L. Posner, L. Saager, A. R. Stuart, K. B. Johnson, S. B. Alpert, M. E. Durieux, A. K. Sinha, C. M. Brummett, M. F. Aziz, K. C. Cummings III, J. G. Gaudet, A. Kurz, M. Rijdsdijk, J. P. Wanderer, N. L. Pace, and the Multicenter Perioperative Outcomes Group Enhanced Observation Study Investigator Group for the Multicenter Perioperative Outcomes Group Enhanced Observation Study Collaborator Group462

In these prospectively collected cohort data, preoperative opioid use was identified as the strongest risk factor for opioid use at 3 months postoperatively. No correlation was found between persistent opioid use at 3 months and surgical site pain at 3 months. No association was identified between preoperative anxiety, preoperative depression, or surgery type and opioid use at 3 months in multivariable models, although credible intervals were large for some variables.

BASIC SCIENCE

◆◆◆ Single-nucleus Atlas of Sevoflurane-induced Hippocampal Cell Type- and Sex-specific Effects during Development in Mice

S.-y. Song, K. Peng, X.-w. Meng, X.-s. Shan, Q.-c. Chen, W.-m. Zhao, B. Shen, H. Qiu, H. Liu, H.-y. Liu, F.-h. Ji.....477

Single-nucleus RNA sequencing revealed cell type- and sex-specific effects of repeated sevoflurane exposure in the hippocampus of neonatal mice. These differential effects of sevoflurane on distinct hippocampal cell populations and signaling pathways provide new insights into the mechanisms of actions of anesthetics in the developing brain.

CLINICAL SCIENCE

◆◆ Comparison of Single-operator Laser-assisted Ultrasound-guided Radial Arterial Cannulation in Young Children with Traditional Ultrasound Guidance: A Randomized Clinical Trial

L. Hou, X. Song, N. Yan, Z. Zhao, Z. Li.....497

In this prospective randomized study, laser-assisted ultrasound guidance, projecting the path of the target artery onto the skin surface, improved the speed and the success rate of radial artery cannulation in young children when compared to traditional ultrasound-guided cannulation.

◆◆ Association of Preoperative Growth Differentiation Factor-15 Concentrations and Postoperative Cardiovascular Events after Major Noncardiac Surgery

E. Duceppe, F. K. Borges, D. Conen, M. Tiboni, M. T. V. Chan, A. Patel, D. I. Sessler, P. A. Kavsak, S. Ofori, S. Srinathan, R. Pearse, A. S. Jaffe, D. Heels-Ansdell, A. X. Garg, S. Pettit, R. Sapsford, P. J. Devereaux508

This study used clinical data and serum samples from 5,238 patients enrolled in a multisite cohort study (Vascular Events in Noncardiac Surgery Evaluation study; VISION). The authors assessed the association between

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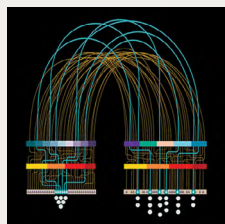
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ON THE COVER: There is insufficient prospective evidence regarding the relationship between surgical experience and prolonged opioid use and pain. In this issue of ANESTHESIOLOGY, Kuck *et al.* investigated the association of patient characteristics, surgical procedure, and perioperative anesthetic course with postoperative opioid consumption and pain 3 months postsurgery. In an accompanying editorial, Ladha and Schreiber examine the relationship between postoperative pain and opioid use in the wake of the opioid crisis. Cover illustration: A. Johnson, Vivo Visuals Studio.

- Kuck *et al.*: Prolonged Opioid Use and Pain Outcome and Associated Factors after Surgery under General Anesthesia: A Prospective Cohort Association Multicenter Study, p. 462
- Ladha and Schreiber: Uncoupling Pain and Opioid Use after Surgery, p. 457

increased preoperative serum growth differentiation factor-15 and the primary study outcome of 30-day risk of myocardial injury after noncardiac surgery and vascular death. A preoperative growth differentiation factor-15 concentration 1,500 pg/ml or greater was associated with a 24.9% risk of myocardial injury after noncardiac surgery and vascular death. In the subset of patients who had preoperative N-terminal-pro hormone brain natriuretic peptide results available (n = 4,246), the incidence of myocardial injury after noncardiac surgery and vascular death was 606 patients (14.3%). In a multivariable model that included preoperative Revised Cardiac Risk Index score and preoperative N-terminal-pro hormone brain natriuretic peptide categories, both preoperative growth differentiation factor-15 and N-terminal-pro hormone brain natriuretic peptide remained independently associated with myocardial injury after noncardiac surgery and vascular death and vascular mortality at 30 days.

BASIC SCIENCE

- ◇ **Intravenous Dabigatran Provides Adequate Anticoagulation for Cardiopulmonary Bypass Using a Rabbit Model**
S. M. Nadtochiy, T. Stefanos, R. E. Angona, N. Darrow, K. Jones, C. Feng, M. Algahim, D. LeMoine, R. Westcott, B. Anderson, M. F. Swartz, M. P. Eaton.....523

The hypothesis that dabigatran would provide sufficient anticoagulation for cardiopulmonary bypass was tested in a first-use, proof-of-concept study using a rabbit model of cardiopulmonary bypass that included a comparison group receiving heparin. The dabigatran loading dose and maintenance infusions were designed after first determining its pharmacokinetics in rabbits and the target concentration in an *in vitro* simulation of cardiopulmonary bypass. Dabigatran provided acceptable anticoagulation to prevent thrombosis during 2 h of cardiopulmonary bypass in rabbits that was similar to that provided by heparin and was well tolerated despite accumulating well above the target concentration during the period of anesthesia and cardiopulmonary bypass.

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