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ANESTHESIOLOGY

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Perioperative Medicine

CLINICAL SCIENCE

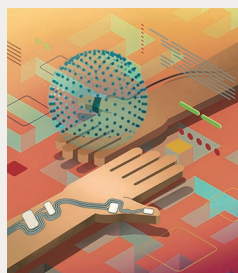
◆ ◇ Ipsilateral and Simultaneous Comparison of Responses from Acceleromyography- and Electromyography-based Neuromuscular Monitors <i>R. Nemes, S. Lengyel, G. Nagy, D. R. Hampton, M. Gray, J. R. Renew, E. Tassonyi, B. Fülesdi, S. J. Brull</i>	597
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Contractions and muscle action potentials from the same adductor pollicis muscle were measured simultaneously by acceleromyography- and electromyography-based neuromuscular monitors, respectively, in 48 patients undergoing surgery requiring muscle relaxation. The electromyography-based device is a better indicator of adequate recovery from neuromuscular blockade and readiness for safe tracheal extubation

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ON THE COVER: The paucity of easy-to-use, reliable objective neuromuscular monitors is an obstacle to universal adoption of routine neuromuscular monitoring. Electromyography (EMG) has been proposed as the optimal neuromuscular monitoring technology since it addresses several acceleromyography limitations. In this issue of ANESTHESIOLOGY, Nemes *et al.* compared simultaneous neuromuscular responses recorded from induction of neuromuscular block until recovery using the acceleromyography-based and EMG-based monitors. In an accompanying editorial, Bowdle and Michaelson discuss the limitations of both monitoring techniques and the need for further validation of currently commercially available EMG-based monitors. Cover Illustration: A. Johnson, Vivo Visuals.

- Nemes *et al.*: Ipsilateral and Simultaneous Comparison of Responses from Acceleromyography- and Electromyography-based Neuromuscular Monitors, p. 597
- Bowdle and Michaelson: Quantitative Twitch Monitoring: What Works Best and How Do We Know? p. 558

because normalized train-of-four ratios of 80% or more were observed earlier and more frequently with acceleromyography. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Smart Glasses for Radial Arterial Catheterization in Pediatric Patients: A Randomized Clinical Trial

Y.-E. Jang, S.-A. Cho, S.-H. Ji, E.-H. Kim, J.-H. Lee, H.-S. Kim, J.-T. Kim.....612

In a randomized controlled trial comparing radial artery cannulation in children, a head-mounted display, which projects the ultrasound screen in front of the operator's eye, had a greater first-attempt success rate and shorter times to cannulation compared to conventional ultrasound use.

Perioperative Normal Saline Administration and Delayed Graft Function in Patients Undergoing Kidney Transplantation: A Retrospective Cohort Study

K. Kolodzie, O. S. Cakmakkaya, E. S. Boparai, M. Tavakol, J. R. Feiner, M.-O. Kim, T. B. Newman, C. U. Niemann.....621

In a single-center analysis of 2,515 patients undergoing kidney transplantation between 2004 and 2015, delayed graft function occurred in 21% of patients receiving greater than or equal to 80% normal saline, in 17.5% of patients receiving between 30 and 80% normal saline, and in 15.8% of patients receiving less than or equal to 30% normal saline. For patients receiving greater than or equal to 80% normal saline compared with patients receiving less than or equal to 30% normal saline, the adjusted odds ratios for delayed graft function were 1.52 (95% CI, 1.05 to 2.21; $P = 0.028$) for deceased donor transplants ($n = 1,472$) and 1.66 (95% CI, 0.65 to 4.25; $P = 0.287$) for living donor transplants ($n = 1,043$). *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

BASIC SCIENCE

Excitation of Putative Glutamatergic Neurons in the Rat Parabrachial Nucleus Region Reduces Delta Power during Dexmedetomidine but not Ketamine Anesthesia

E. D. Melonakos, M. J. Siegmann, C. Rey, C. O'Brien, K. K. Nikolaeva, K. Solt, C. J. Nehs.....633

Chemogenetic excitation of parabrachial excitatory neurons in adult male rats reduced cortical delta power during low-dose dexmedetomidine but not during high-dose dexmedetomidine or ketamine anesthesia. Changes in cortical delta power did not correspond to changes in time to recovery from anesthesia. These observations suggest that the effectiveness of parabrachial nucleus excitation to change the neurophysiologic and behavioral effects of anesthesia depends on the molecular mechanisms of actions of general anesthetics. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Dose-dependent Respiratory Depression by Remifentanyl in the Rabbit Parabrachial Nucleus/Kölikker–Fuse Complex and Pre-Böttinger Complex

B. Palkovic, J. J. Callison, V. Marchenko, E. A. E. Stuth, E. J. Zuperku, A. G. Stucke.....649

The hypothesis that opioid-induced respiratory depression is due to combined depression of parabrachial nucleus/Kölikker–Fuse complex activity and pre-Böttinger complex activity was tested in a decerebrate, hyperoxic, and moderately hypercapnic rabbit preparation at steady-state intravenous remifentanyl infusions that depressed the respiratory rate by 50% and after a remifentanyl bolus that produced apnea. Sequential naloxone microinjection into the bilateral Kölikker–Fuse nucleus, parabrachial nucleus, and pre-Böttinger complex did not completely reverse respiratory depression produced by the steady-state remifentanyl concentrations and reversed respiratory depression from apneic remifentanyl doses even less effectively. This suggests that opioids depress respiratory drive to the parabrachial nucleus/Kölikker–Fuse complex and pre-Böttinger complex and that depression of drive reduced the activity of these areas, especially at high opioid concentrations.

Critical Care Medicine

BASIC SCIENCE

Reversing Rivaroxaban Anticoagulation as Part of a Multimodal Hemostatic Intervention in a Polytrauma Animal Model

F. Rayatdoost, T. Braunschweig, B. Maron, H. Schöchl, N. Akman, R. Rossaint, E. Herzog, S. Heitmeier, O. Grottko.....673

In an animal model of rivaroxaban-treated pigs that underwent complex traumatic injury, prothrombin complex concentrates alone and in combination with tranexamic acid and fibrinogen concentrate effectively reduced blood loss, restored hemostasis, and improved thrombin generation. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Pain Medicine

CLINICAL SCIENCE

Neurolytic Splanchnic Nerve Block and Pain Relief, Survival, and Quality of Life in Unresectable Pancreatic Cancer: A Randomized Controlled Trial

D. Dong, M. Zhao, J. Zhang, M. Huang, Y. Wang, L. Qi, C.-f. Wan, X. Yu, T. Song.....686

A multicenter study was designed in which patients with unresectable pancreatic cancer and moderate to severe pain were randomized to lytic splanchnic nerve block or block using saline. All patients received opioids according to a set protocol. Pain relief was superior for those receiving lytic blocks for 3 months, and opioid use was lower for 5 months. Quality of life was not affected, however. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Anesthesia Method, Tourniquet Use, and Persistent Postsurgical Pain after Total Knee Arthroplasty: A Prespecified Secondary Analysis of a Randomized Trial

R. A. Palanne, M. T. Rantasalo, A. P. Vakkuri, R. Madanat, K. T. Oikola, E. M. Reponen, R. Linko, T. J. Vahlberg, N. K. A. Skants.....699

In a secondary analysis of a study involving 404 patients, no clinically important differences in pain scores 1 yr after arthroplasty were found

between the spinal and general anesthesia groups. In the same study, no clinically meaningful differences in 1-yr pain scores were found between the no-tourniquet and tourniquet use groups. *SUPPLEMENTAL DIGITAL CONTENT IS AVAILABLE IN THE TEXT*

Persistent Incisional Pain after Noncardiac Surgery: An International Prospective Cohort Study

J. S. Khan, D. I. Sessler, M. T. V. Chan, C. Y. Wang, I. Garutti, W. Szczeklik, A. Turan, J. W. Busse, D. N. Buckley, J. Paul, M. McGillion, C. Fernández-Riveira, S. K. Srinathan, H. Shanthanna, I. Gilron, M. Jacka, P. Jackson, J. Hankinson, P. Paniagua, S. Pettit, P. J. Devereaux711

Incisional pain persisting for up to 1 yr after major noncardiac surgery was assessed prospectively in a cohort of more than 14,000 patients. Persistent incisional pain was identified in 3.3% of the patients, with nearly half reporting moderate to severe pain. Several risk factors, including female sex, history of chronic pain, coronary heart disease, and others, were identified.

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M. Z. X. Xiao, S. A. A. Abbass, L. Bahrey, E. Rubinstein, V. W. S. Chan729

The authors provide an overview of the common plastics generated in the perioperative setting and outline practical recommendations that can help achieve a circular economy and lessen the impact of plastic waste on the environment.

Anticoagulation Monitoring for Perioperative Physicians

C. L. Maier, R. M. Sniecinski738

From preoperative medications to intraoperative needs to postoperative thromboprophylaxis, anticoagulants are encountered throughout the perioperative period. This review focuses on coagulation testing clinicians utilize to monitor the effects of these medications.

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