Anesthesiology, V 128  •  No 4  April 2018

PODCAST TRANSCRIPTION

Hi, this is Evan Kharaish, Editor-in-Chief of Anesthesiology, with some highlights from the April 2018 issue, as selected by the journal editors. Of special note this month, Anesthesiology features two comprehensive articles and three accompanying editorials on the evidence for anesthetic developmental neurotoxicity in animals and in humans, following the FDA’s 2016 Safety Announcement and its 2017 drug labelling requirements related to the same topic.

But first, we begin with a clinical investigation which looks at the use of lung ultrasound as an emerging tool in perioperative care. Dr. In-Kyung Song of the University of Ulsan College of Medicine, Seoul, and colleagues there and elsewhere in Korea conducted a randomized, controlled trial to assess the utility of perioperative lung ultrasound examination in pediatric cardiac surgery. They assigned children aged 5 or younger, undergoing cardiac surgery, into either a control group or an intervention group. The control group received lung ultrasound examinations at the end of surgery and 6-12 hours postoperatively. The intervention group received lung ultrasound examinations and ultrasound-guided recruitment maneuver depending on ultrasound findings after inducing anesthesia, at the end of surgery, and at 6-12 hours postoperatively. Primary outcomes were incidences of intra- and postoperative desaturation and postoperative pulmonary complications were similar between the groups. Lung ultrasound scores were better in the intervention group than in the control group. Song et al. concluded that perioperative lung ultrasound examination followed by ultrasound-guided recruitment maneuver decrease postoperative desaturation events and shortened the duration of mechanical ventilation in pediatric cardiac surgery patients.

Next, we look at prolonged catheter use in neuraxial and regional anesthesia. This is controversial because of the risk of catheter-related infection. The extent to which the risk increases over time is not well known. Dr. Vesna Jevtovic-Toledovic of the University of Colorado School of Medicine authored an article focusing on experimental data in animals. A large body of evidence gathered from several mammalian species shows that there are effects of corticosteroids on the brain, but the exact mechanism by which adrenal androgenic steroids exert their effects has not been identified. In rats, corticosteroids activate membrane bound glucocorticoid and mineralocorticoid receptors in spinal cord and peripheral neurons, and modulate nociceptive behavior by non-genomic mechanisms. Xueqian Li of Charité University Berlin and colleagues investigated the role of glucocorticoid and mineralocorticoid receptors in spinal cord and peripheral neurons. They found that glucocorticoid receptor agonist dexamethasone or mineralocorticoid receptor antagonist desamethasone are important for nociceptive transmission in the spinal cord and peripheral nervous system. The investigators also explored the non-neuronal effects of glucocorticoids and mineralocorticoids, which include systemic effects and local effects in the brain. They concluded that glucocorticoids and mineralocorticoids are important for nociceptive transmission in the spinal cord and peripheral nervous system.

Lastly, this month we feature two review articles about the effect of exposure to anesthesia, or anesthesia and surgery, on the developing brain in neonates and children. This comes in relation to concerns and warnings issues by the United States Food and Drug Administration.

In our first review, Dr. Vesna Jevtovic-Toledovic of the University of Colorado School of Medicine authored an article focusing on experimental data in animals. A large body of evidence gathered from several mammalian species shows that there are effects of corticosteroids on the brain, but the exact mechanism by which adrenal androgenic steroids exert their effects has not been identified. In rats, corticosteroids activate membrane bound glucocorticoid and mineralocorticoid receptors in spinal cord and peripheral neurons, and modulate nociceptive behavior by non-genomic mechanisms. Xueqian Li of Charité University Berlin and colleagues investigated the role of glucocorticoid and mineralocorticoid receptors in spinal cord and peripheral neurons. They found that glucocorticoid receptor agonist dexamethasone or mineralocorticoid receptor antagonist desamethasone are important for nociceptive transmission in the spinal cord and peripheral nervous system. The investigators also explored the non-neuronal effects of glucocorticoids and mineralocorticoids, which include systemic effects and local effects in the brain. They concluded that glucocorticoids and mineralocorticoids are important for nociceptive transmission in the spinal cord and peripheral nervous system.

In our second review, Dr. Andrew J. Davidson of Royal Children’s Hospital, Melbourne, Australia, and Dr. Lena S. Sun of Columbia University authored a review article focusing on experimental and clinical evidence in humans. They note that human evidence is “weak,” regarding an association between anesthesia exposure in early childhood and increased risk of poor neurodevelopmental outcomes. They also cited increasing evidence that the risk is minimal with brief anesthetic exposure. Most, but not all, of the large population-based studies find evidence for associations between surgery in early childhood and slightly worse subsequent academic achievement or increased risk for a later diagnosis of a behavioral disability. These recommendations are in agreement with multiple other studies. These results may be consistent with the preclinical data but the possibility of confounding means the positive associations are weak evidence. There may be some evidence for a greater association with multiple exposures. Davidson and Sun conclude there is very little if any evidence to recommend that anesthesia and surgery at a particular age is either safe or unsafe.

Thanks for joining me for this brief exploration of the exciting work being published in Anesthesiology. I’ll be back in a few weeks with highlights from the May issue.