Sedation and Anesthesia Affects Subsequent Neurologic Development

Specialists in pediatric sedation and anesthesia have long been concerned that sedation drug exposure in early childhood may impair subsequent neurologic development. In December of 2016 the FDA issued a safety announcement confirming the risk. “The U.S. Food and Drug Administration (FDA) is warning that repeated or lengthy use of general anesthetic and sedation drugs during surgeries or procedures in children younger than 3 years or in pregnant women during their third trimester may affect the development of children’s brains.” The list of drugs included in the safety announcement includes: propofol, midazolam, lorazepam, etomidate, pentobarbital, methohexital, all potent inhaled anesthetics, and ketamine. The entire communication can be found at https://www.fda.gov/Drugs/DrugSafety/ucm532356.htm.

Dexmetetomidine and fentanyl were absent from the list. Most sedation and anesthesia procedures cannot be done with only these agents.

Currently the risk to a child’s cognitive development attributable to sedation drugs is uncertain. Non-human studies have demonstrated that potentially detrimental neurologic structural changes occur following sedation with most common sedative and anesthetic agents. Furthermore, in some animals, these structural changes correlate with lower cognitive performance in later life. Human studies have not yet been designed or powered to determine if repeated exposure to sedative agents, surgical procedures, or underlying illness causes cognitive impairment in later life. There does appear to be a correlation both with the number of surgical and sedation events as well as the severity of underlying illness necessitating surgery and procedures. The FDA and SmartTots.org are currently supporting research to answer these important questions.

Parents want definitive answers now. One universally agreed upon answer is to postpone elective treatments or tests that require sedation or anesthesia until after the most vulnerable period which is thought to be from conception to age three. Unfortunately, few completely elective sedation events are performed on infants or young children. Most currently performed sedations and anesthetics will need to continue being performed despite the FDA warning.

Smart Tots has issued a consensus statement regarding the risk targeted for healthcare provider use: “Answers to questions from parents and caregivers related to these risks should highlight the differences between research findings in animals and children and the uncertainty of any effect in children. It may also be emphasized that because most anesthetic drugs have been shown to cause injury in animal experiments, no specific medications or technique can be chosen that are safer than any other. Clearly, anesthetic drugs are a necessary part of the care of children needing any surgery, procedure, or test that cannot be delayed. Decisions regarding the timing of a procedure requiring anesthesia should be discussed with all members of the care team as well as the family or caregiver before proceeding. The benefits of an elective procedure should always be weighed against all of the risks associated with anesthesia and surgery.” A similar statement is also available in lay language for parents and caregivers.

The pediatric anesthesia division at MUSC ensures that time under sedation and anesthesia is minimized by working to consolidate multiple procedures and tests into a single sedation event. Additionally, incorporation of dexmetetomidine into many anesthetic regimens reduces the need for higher doses of risker agents. Finally, meticulous attentiveness to maintaining normal vital signs, oxygenation and other physiologic variables will reduce stress on vulnerable neurologic systems.
The Tenth Annual

Friday, March 24, 2017
8:00 am – 4:30 pm (Registration, Coffee/Donuts at 7:30 am)
MUSC Bioengineering Building, Room 110
Poster Viewing in the Lobby Area

MUSC Welcomes Keynote Presenter

Martin Hewison, PhD

Professor of Molecular Endocrinology
Deputy Director, Institute of Metabolism and Systems Research
The University of Birmingham Medical School,
Birmingham, UK

“Vitamin D, Immunity and Human Health: Are We There Yet?”

For more information, to register (FREE BUT REQUESTED), and/or submit an abstract visit the event website at: http://academicdepartments.musc.edu/pediatrics/research/dcri_anniversary.html

The DCRI & Pediatrics Research Day event is sponsored by the MUSC Department of Pediatrics and by the W.K. Kellogg Foundation
Abstract and Poster awards: to outstanding abstract & poster presentations