

Researchers Warn on Anesthesia, Unsure of Risk to Children

By DENISE GRADY FEB. 25, 2015

Photo



Dr. Randall Flick, pediatric anesthesiologist at the Mayo Clinic Children's Center, gives anesthesia to an infant for a minor surgical procedure. Credit Mayo Clinic

Faced with mounting evidence that general [anesthesia](#) may impair brain development in babies and young children, experts said

Wednesday that more research is greatly needed and that when planning surgery for a child, parents and doctors should consider how urgently it is required, particularly in children younger than 3 years.

In the United States each year, about [a million children](#) younger than 4 have surgery with general anesthesia, according to the Food and Drug Administration.

So far, the threat is only a potential one; there is no proof that children have been harmed. The concern is based on [two types of research](#). Experiments in young monkeys and other animals have shown that commonly used anesthetics and [sedatives](#) can kill brain cells, diminish learning and memory and cause behavior problems. And studies in children have found an association between learning problems and multiple exposures to anesthesia early in life — though not single exposures.

But monkeys are not humans, and association does not prove cause and effect. Research now underway is expected to be more definitive, but results will not be available for several years.

Anesthesiologists and surgeons are struggling with how — and sometimes whether — to explain a theoretical hazard to parents who are already worried about the real risks of their child's medical problem and the surgery needed to correct it. If there is a problem with anesthesia, in many cases it may be unavoidable because there are no substitute drugs. The last thing doctors want to do is frighten parents for no reason or prompt them to delay or cancel an operation that their child needs.

“On the one hand, we don't want to overstate the risk, because we don't know what the risk is, if there is a risk,” said Dr. Randall P. Flick, a pediatric anesthesiologist and director of Mayo Clinic Children's Center in Rochester, Minn., who has conducted some of the studies in children suggesting a link to learning problems. “On the other hand, we want to make people aware of the risk because we feel we have a duty to do so.”

The goal, he added, is “informing without alarming.”

In an [article published Wednesday](#) in [The New England Journal of Medicine](#), five experts described “a heightened level of concern” about the potential risks, called the data from animal studies “compelling” and said “parents and care providers should be made aware of the potential risks that anesthetics pose to the developing brain.”

The issue came to light in the 1990s, when studies found brain damage in baby rats exposed to anesthetics during critical periods in brain development. Concern intensified as later research found that the exposed rats also had long-term abnormalities in their behavior. Worry escalated when similar findings were made in monkeys.

Photo



Dr. Alex S. Evers, a chairman of SmartTot’s scientific advisory board and head of anesthesiology at Washington University School of Medicine in St. Louis. CreditSid Hastings for The New York Times

In 2009, the F.D.A. and the International Anesthesia Research Society formed a nonprofit group to promote further research, called [SmartTots](#), for Strategies for Mitigating Anesthesia-Related Neurotoxicity in Tots. The authors of the article in The New England Journal of Medicine are involved with SmartTots.

In 2012, SmartTots recommended that elective surgery under general anesthesia be avoided in children younger than 3. Late last year, the group issued a new statement, still in draft form, this time saying that if an operation requiring anesthesia and sedation can reasonably be delayed, it “should possibly be postponed because of the potential risk to the developing brain of infants, toddlers and preschool children.”

But what surgery can reasonably be delayed? Dr. Alex S. Evers, a chairman of SmartTot’s scientific advisory board and head of anesthesiology at Washington University School of Medicine in St. Louis, said in an interview that a relatively minor operation like removing an extra finger could be delayed. But he and other doctors were reluctant to name other procedures that could be safely postponed, saying that it had to be decided on a case-by-case basis, by doctors and parents.

Dr. Evers said that a [continuing study](#) at multiple hospitals should help to determine whether there is any learning risk for children put

under anesthesia for relatively short operations. In the study, about 700 infants who need [hernia](#) surgery are being picked at random to have general anesthesia, or a spinal or other regional anesthetic that provides numbing without sedation. The groups will then be followed for five years and compared to see if there are significant differences in their scores on intelligence tests and other measures of brain development.

“Let’s hope there’s no effect,” Dr. Evers said. “That would give comfort to a lot of people. Most things done in infants are short duration.” But he added, “It wouldn’t address children having longer procedures, which, from everything we know from the animal studies, are the ones most likely to be at risk.”

Because of the concern about longer procedures, Dr. Evers said, experts are calling for more studies, including more research to find out if there are anesthetics that will not harm the brain, or if there are other drugs that could be given along with anesthesia to protect the brain.

Dr. Charles Berde, the division chief of pain medicine at Boston Children’s Hospital and a professor of pediatric anesthesia at Harvard Medical School, said it was not clear how much could be extrapolated from animal studies. He noted that research had found that if animals exposed to anesthesia were placed in an enriched, stimulating environment, their brains seemed to recover.

Nonetheless, he said that doctors were taking the animal data seriously, and that anesthesiologists at his hospital and others were working to use the lowest possible anesthetic doses for the shortest possible times, in hopes of minimizing any potential brain effects, while still keeping children pain-free during surgery. He said that [blood pressure](#), blood flow to the brain and levels of oxygen and carbon dioxide may also play a role in protecting the brain, so careful monitoring during surgery is important.

Dr. Santhanam Suresh, the chairman of pediatric anesthesiology at Ann and Robert H. Lurie Children’s Hospital of Chicago, said that his hospital was taking steps to inform pediatricians and surgeons about the potential problems, so parents could be told well ahead of time instead of being given the information shortly before their child is taken to the operating room.

“I feel very strongly that parents are under huge duress on the day of surgery, and to present information like this on the day of surgery is difficult,” Dr. Suresh said. “It’s difficult for them to comprehend.”

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