ANESTHESIA & THE DEVELOPING BRAIN

Anesthesiologists have an all-important role in the operating room, making conditions ideal for safe and successful surgery. Every day, they make decisions to protect and regulate critical life functions, including heart rate and rhythm, breathing, blood pressure, body temperature, and body fluid balance. If your child is having surgery at the Komansky Center for Children's Health, we want you to know that he/she is in experienced hands. At NewYork-Presbyterian Hospital/Weill Cornell Medical College, we administer anesthesia to over 5,000 pediatric patients each year. An anesthesiologist with specialized training in pediatric anesthesia closely monitors your child's breathing and will stay with your child throughout surgery and recovery.

You may be aware of the Food and Drug Administration's (FDA) ongoing review of the use of anesthesia and sedatives in infants and young children prior to age 4. This review is taking place because several studies in animals have suggested that commonly used anesthetics may affect the developing brain. Information available is insufficient to draw a definitive conclusion from these studies and currently no change in clinical practice is recommended.

Anesthesiologists are among the leaders in this area of research and use the best, most current available information to maximize safety. As opportunities for improvement are established, our anesthesiologists will review and adopt these practices as necessary to provide safe patient care.

We hope the information provided here helps to answer some of the questions you may have. We look forward to safely providing anesthesiology services for your child during his/her surgery.

What is the concern about the effects of anesthesia on the development of infants and young children?

Research into the effects of anesthesia on the developing nervous systems of mice and monkeys has shown that some anesthetics and sedatives given to these laboratory animals during periods of rapid brain growth may cause memory and learning difficulties. The effect of these agents on brain development in young children is unclear.

If studies show that anesthetics in animals can affect brain development, can there be similar effects on the developing brain of my child?

It is important to recognize that while animal research is helpful, it can sometimes cause undue worry. These findings in animals are limited, and it is not clear that the effects seen in laboratory animals pose a risk to infants and children. A great deal of research into the effects of anesthesia on the developing human brain is now underway in the medical and scientific communities around the world. At the present time, however, there is too little information to draw any definite conclusions.

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As we wait for more conclusive answers, parents should keep in mind that animal studies give these drugs in very large doses and for very long periods of time without monitoring blood pressure and oxygen. In laboratory studies, some monkeys are under anesthesia for as long as eight hours. The most common surgeries in young children are for tonsillectomies, hernias, circumcisions, and insertion of ear tubes, all typically lasting less than one hour.

Are children given the same drugs used in the animal studies?

Most children requiring surgery and general anesthesia are given the same drugs that have raised concern in animal studies. These are also the same classes of drugs used for adults, but given to children based on their weight.

Why would anesthesia cause learning disabilities in children?

It isn't clear why anesthesia would cause developmental or behavioral disorders. One theory says that during periods of delicate and rapid brain growth, these drugs could damage normal development of connections between brain cells. Much more research is needed to understand if there is a link between anesthesia and the ability to think and learn in young children.

Is there any substitute for general anesthesia?

For most surgical procedures, there are no other options for young children.

What are human studies telling us?

There have been only a handful of human studies published so far. In these early limited studies, findings are inconclusive and provide conflicting data.

In some studies, repeated exposure to anesthesia and surgery in young children before age two was found to be a risk for later development of learning disabilities. However, researchers agree that other variables may have distorted results. Several studies designed specifically to evaluate the effects of anesthetics on the developing brain in children are ongoing, but it may be some time before conclusive answers are found.

Should I delay surgery until my child is older than age two?

Parents should keep in mind that children do not undergo surgery requiring anesthesia unless it is considered necessary. Very often, delaying surgery can itself pose a greater risk than anesthesia and may not be in the best interest of your child. Currently, there is no direct scientific evidence for delaying any necessary surgery.

How do I get more information?

SmartTots is a partnership between the U.S. Food and Drug Administration (FDA) and the International Anesthesia Research Society (IARS) created to coordinate and fund research efforts into the safe use of anesthetic drugs and sedatives in young children. Their mission is to ensure safe surgery for the millions of infants and young children who have anesthesia every year. The SmartTots website, **www.SmartTots.org,** has more information on this important issue which may be of interest to you.

As you weigh the benefits of surgery for your child, we hope this information has helped to ease your concerns. If you still have questions, please discuss them with your child's pediatrician or our pediatric anesthesiology team here at the Phyllis and David Komansky Center for Children's Health.

You can reach us at 212-746-2959.