Complex Child E-Magazine

www.ComplexChild.com

Update on Fundoplications and Feeding Tubes

by Susan Agrawal

Children who receive feeding tubes sometimes also receive a procedure called a fundoplication, in which the stomach is partially or wholly wrapped around the lower esophageal sphincter to prevent reflux. Over time, opinions have changed within the medical field as to when this procedure should be performed and on which children. In many cases, who gets the procedure and who doesn't very well depends on where in the country you live, whether your child receives care at a teaching hospital, and the surgeon's personal opinions.

In past articles, we have taken a look at questions to ask before getting a fundoplication, the problem of retching after a fundoplication, and fundoplications in children with neurological impairment. In this piece, we will answer some questions based on the most current available research.

Question 1: Should my child get a "prophylactic" fundoplication with his G-tube placement?

Answer: Emphatically NO.

In the past, it was common for surgeons to give every child getting a feeding tube a "prophylactic" or preventative fundoplication, whether the child had reflux or not. In most cases, the stomach is secured to the abdomen during tube placement, and this change of position can alter the angle of the stomach, resulting in reflux. In order to prevent problems with reflux, children in the past routinely had a fundoplication performed with tube placement.

More recent research has shown that this is not necessary or advisable, because the procedure comes with its own risks, complications, and side effects, and in many cases is not helpful.

If a child has no reflux at all or mild reflux, a fundoplication should virtually never be performed. A recent article by Nathan M. Novotny and colleagues discussed predicting the need for a fundoplication. The authors are very clear that prophylactic fundoplications are not of value, stating, "children needing enteral access should not be routinely offered a concomitant antireflux procedure."[1] This article goes on to say that 95% of patients in their study of 863 children who received a tube placement alone

(without fundoplication) did fine without a fundoplication, with only 5% needing a fundoplication later on. Their data is similar to prior studies.

In children who are at high risk for reflux after tube placement, such as children with neurological impairment, a fundoplication is still not advised. Another study by Steven L. Lee and colleagues looked at hospital admissions before and after fundoplication. It clearly states, "the practice of performing antireflux procedures in patients undergoing gastrostomy tube placement and who are considered high risk of developing GERD [reflux disease] in the future should be abandoned."[2] This study specifically suggests that performing a fundoplication in a child with no complications from reflux, such as failure to thrive or aspiration, is not advisable, even if the child has neurological impairment and is at greater risk for reflux complications.

Another recent study by Hisayoshi Kawahara and colleagues looked at children with neurological impairment with and without reflux at the time of tube placement.[3] This population has always had a higher risk of reflux and fundoplication complications. In this small study, the authors found that children without reflux on pH probe before tube placement often did develop some reflux on pH probe, but most did not have clinical symptoms. Children who did develop clinical symptoms were easily managed by diet and medication changes. Children with pre-existing reflux more often than not showed improvement in their reflux as measured by pH probe. Only one child needed a fundoplication due to reflux after feeding tube placement. The recommendations of these authors are that children without reflux, as well as children with reflux that is controlled by medication, should not receive a fundoplication at the time of tube placement.

Question 2: My child has severe reflux and is getting a feeding tube. Should she have a fundoplication?

Answer: Maybe.

Ironically, the children who need a fundoplication the least—children without neurological impairment, children with mild reflux, or children with controllable reflux—usually do just fine if they end up having the procedure. But children with severe reflux often have complicated gastrointestinal issues after fundoplication that make this a difficult decision.

The study by Novotny mentioned earlier looked at factors that might predict which children should get fundoplications with their feeding tubes.[4] Neither gastric emptying scans nor upper gastrointestinal X-ray series were useful in predicting which patients would ultimately need a fundoplication. Another study by Rachel Rosen and colleagues drew the same conclusion regarding impedance probes that monitored for acid and non-acid reflux, and found that there was little correlation between results on the probe and improvement after fundoplication.[5] The only factor noted by Novotny to predict the potential need for fundoplication was a diagnosis of cerebral palsy. In summary, typical tests performed before surgery to decide whether a fundoplication is necessary, such as

gastric emptying scans, upper GI series, and pH or impedance probes, were unable to predict the need for fundoplication or the results after the surgery.

In general, fundoplication is now considered a treatment of last resort for children with reflux. As such, it should only be considered in children with severe life-threatening reflux-related complications. These may include failure to thrive, recurrent aspiration pneumonias, or severe respiratory issues, among other complications.

Unfortunately, fundoplication is not a cure-all for these conditions either. The study by Lee and colleagues demonstrated that fundoplication did not reduce overall hospital admissions for failure to thrive, apnea, or pneumonia. While it did reduce specific events (such as aspiration pneumonias) for specific children, other children with no history of pneumonia or failure to thrive went on to develop these conditions after fundoplication. Thus, the improvement of children with a history of reflux-related complications was canceled out by the onset of new complications in children after fundoplication.

Another study by Rajendu Srivastava and colleagues had more promising results, but still showed ongoing problems after surgery.[6] While hospital admissions for reflux and aspiration pneumonia decreased in this study, hospital admissions actually increased for asthma, and remained constant for all types of pneumonia. Other earlier studies show similar ongoing rates of hospital admissions for reflux before and after fundoplication, especially for older children and children with neurological impairments.

Older studies, as discussed in the previous article on fundoplication and neurological impairment [http://www.articles.complexchild.com/00008.html], also demonstrate that many children have breakthrough reflux and aspiration pneumonias after surgery, and more complicated children experience wrap failure of the fundoplication, meaning it no longer works to prevent reflux and aspiration. Since it only has limited effectiveness, especially for children with neurological impairment, fundoplication should only be performed in situations where reflux or aspiration is life threatening.

There are some cases in which a fundoplication should not be performed if at all possible. These cases include children with significant upper motility problems, such as persistent vomiting, esophageal dysmotility, severe gastric dysmotility or gastroparesis; children whose symptoms may be due to allergies or eosinophilic disorders; and young infants who are likely to outgrow their reflux symptoms. These children might benefit from a more temporary GJ-tube, a tube that feeds directly into the small intestine.

Question 3: My child has severe reflux and respiratory problems and already has a G-tube. Should he get a GJ-tube or a fundoplication?

Answer: In most cases, it is worth trying the GJ before getting a fundoplication.

The primary alternative to fundoplication surgery is the GJ-tube. This tube is a longer tube inserted into the regular G-tube stoma that allows feeding directly into the small

intestine. Most styles of tubes also allow simultaneous venting or draining of the stomach. Feeding directly into the intestine prevents food or formula from being refluxed or aspirated by keeping the stomach relatively empty.

The GJ-tube is typically used to avoid the potential complications of fundoplication surgery. Fundoplication complications include but are not limited to surgical complications such as infection or perforation, retching, gas-bloat, continued reflux after surgery, wrap failure, difficulty swallowing, increased motility problems such as delayed gastric emptying, and increased visceral pain.[7] Because the fundoplication is a permanent procedure, some of these complications may be difficult to control. Fundoplication complication and failure rates are also much higher for children with neurological impairment.

Just as the fundoplication surgery can have many side effects and complications, GJ-tubes can present some challenges. Children with GJ-tubes require continuous feeding, usually 12 to 24 hours per day, which can be difficult for some children. The tubes can easily be displaced or pulled out, and need to be reinserted at a hospital. Some children experience tube-related problems such as clogs, backflow of bile into the stomach, and other issues. Some children may still reflux and aspirate stomach juices with a GJ-tube.

One major plus to the GJ-tube is that it is not particularly invasive to insert or remove, and causes no permanent changes in anatomy or function. An Interventional Radiologist typically places GJ-tubes with no sedation or simple oral sedation. If the tube does not work for a given child, it may simply be pulled out and replaced with a G-tube. Thus, it is almost always worthwhile to try a GJ-tube for children with a preexisting G-tube who are having trouble tolerating feeds or aspirating.

A study from 2002 compared the GJ and fundoplication as options for preventing reflux and aspiration.[8] While the GJ had more complications, they tended to be minor and easily resolvable, such as tube blockage or displacement. On the other hand, fundoplication surgery had more major complications, including wrap failure, and children had significantly more retching after fundoplication surgery.

Children who received either a GJ or fundoplication continued to experience aspiration pneumonia even after surgery, with 15% of children with GJ-tubes experiencing aspiration pneumonia after tube placement, and 23% of children experiencing aspiration pneumonia after fundoplication.

A more recent study compared the effect of the GJ and fundoplication in preventing aspiration and death in children with neurological impairment.[9] After significant follow-up, children with fundoplications had similar rates of both aspiration pneumonia and death as compared to children with GJ-tubes. In other words, neither option does a very good job of preventing aspiration pneumonia or death. 15% of children with fundoplication had aspiration pneumonia, while 16% of children with GJ-tubes had it. 12 percent of children with a fundoplication died, while 21% of children with a GJ-tube died.

It is important to note, however, that the population of children receiving GJ-tubes is often a very different population from that receiving fundoplication surgery. Children rarely have a GJ-tube placed simply to prevent reflux or aspiration. In most cases, children who receive GJ-tubes have significant motility problems, vomiting, or visceral pain in the stomach. They also tend to be more complex. In the aforementioned study, for example, children in the GJ group were much more likely to have a tracheostomy, a shunt, or another gastrointestinal disease besides reflux.

Another confounding factor influencing this decision is the type of family and location of the family. Having a GJ-tube requires ongoing maintenance and continuous feeds, which may not be possible in families that are not well-committed to their children's care. These children may do better with fundoplication surgery and G-tube feeds. Some children who live in rural areas may not be able to access a children's hospital for GJ-tube replacement, making it difficult to maintain the tube over long periods of time. The latter may benefit from a separate J-tube or fundoplication surgery.

How to Decide?

The decision to have your child undergo a fundoplication is always a difficult one. For children without reflux or who only have mild controllable reflux, a fundoplication is not necessary or advisable. For children experiencing severe reflux complications, such as aspiration pneumonia or failure to thrive, a fundoplication should be considered if there are no other available options. A GJ-tube is a good alternative for children from committed families who live close enough to a children's hospital to get the tube replaced every few months.

---

[1] Nathan M. Novotny, *et al*. Preoperative prediction of need for fundoplication before gastrostomy tube placement in children. *Journal of Pediatric Surgery* 2009;44:175.
[2] Steven L. Lee, *et al*. Hospital admissions for respiratory symptoms and failure to thrive before and after Nissen fundplication. *Journal of Pediatric Surgery* 2008;43:62.
[3] Hisayoshi Kawahara, *et al*. Should fundoplication be added at the time of gastrostomy placement in patients who are neurologically impaired? *Journal of Pediatric Surgery* 2010;45:2373-6.
[4] Novotny,173-7.
[5] Rachel Rosen, *et al*. Reflux events detected by pH-MII do not determine fundoplication outcome. *Journal of Pediatric Gastroenterology and Nutrition* 2010;50(3)):251-5.
[6] Rajendu Srivastava, *et al*. Reflux related hospital admissions after fundoplication in children with neurological impairment: retrospective cohort study. *British Medical Journal* 2009;339:b4411.
[7] See http://www.articles.complexchild.com/00008.html

[8] Paul W. Wales, *et al*. Fundoplication and gastostomy versus image-guided gastroeunal tube for enteral feeding in neurologically impaired children with gatroesophageal reflux. *Journal of Pediatric Surgery* 2002;37(3):407-12.
[9] Srivastava, *et al*. Impact of fundoplication versus gastrojejunal feedinG-tubes on mortality and in preventing aspiration pneumonia in young children with neurologic impairment who have gastroesophageal reflux disease. *Pediatrics* 2009;123:338-45.