



# Complex Child E-Magazine

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## Ten Questions Every Parent Needs to Ask Before Fundoplication Surgery

by Susan Agrawal

The following questions are intended to help parents and doctors determine how risky a fundoplication surgery would be for a specific child. Each question discusses a condition or state that may make a fundoplication more likely to have complications.

### **1. Does my child have a motility problem?**

Many children with reflux also have concurrent motility problems, such as delayed gastric emptying, dysmotility, or an esophageal motility problem. If your child has a diagnosed motility problem, fundoplication surgery will not change the motility problem and usually, in fact, makes it worse. A study by top motility specialists demonstrated that almost all children with functional GI symptoms had abnormal motility after antroduodenal manometry testing, and that the group of children who had had a fundoplication surgery to relieve their symptoms continued to have the same symptoms after surgery.<sup>1</sup> In many cases, symptoms of a motility problem are mistaken for reflux when in fact the motility problem is the underlying cause of most symptoms.

Since fundoplications make the stomach smaller, children with delayed emptying may have even slower emptying. While some surgeons perform a simultaneous pyloroplasty to deal with this problem, this second surgery has its own risks and complications. Similarly, children with esophageal motility problems who have trouble swallowing may have even more problems after surgery since fundoplication tightens the junction between the esophagus and stomach, worsening motility in many children.

All children with significant motility problems should avoid a fundoplication if at all possible since complications such as retching, swallowing problems, and emptying appear to be much greater in this patient population. Motility medications and a GJ tube are far better options.

### **2. Have all medical treatments been tried?**

Almost all studies suggest trying conservative medical treatments for reflux, including medications that reduce acid, lifestyle changes such as raising the head of the bed or thickened feeds, or medications that improve stomach emptying. Despite this recommendation, as many as 14% of patients have surgery without even seeing a GI specialist and in one study 77% of patients had not exhausted all medical treatments before surgery.<sup>2</sup> Failed medical management of reflux, including failure of all PPIs to reduce acid, failure of motility medication, failure of G-tube feeds alone, and failure of

lifestyle changes, is a necessary prerequisite for fundoplication. Surgery should not be considered until all conservative medical treatments have been tried.

### **3. Has my child had the appropriate testing to rule out other conditions that mimic reflux?**

Shockingly, 14-26% of patients receiving a fundoplication have never had any basic testing to confirm reflux and rule out other disorders.<sup>3</sup> Testing should be performed to rule out gastroparesis, cyclic vomiting, rumination, and eosinophilic esophagitis, all of which mimic reflux but will not be helped by a fundoplication.<sup>4</sup> In addition, appropriate testing for reflux, particularly a pH probe or preferably an Impedance probe, should be performed to confirm reflux. The following tests are recommended at minimum:

- Upper GI to rule out anatomical problems
- Upper Endoscopy with biopsies to rule out Eosinophilic Esophagitis
- Gastric Emptying Scan or preferably Antroduodenal Manometry to rule out a motility problem
- pH probe or Impedance probe to confirm severity of reflux

### **4. Does my child have a history of vomiting, gagging, or retching?**

Children with vomiting, retching, and gagging may have undiagnosed motility problems including foregut dysmotility and/or delayed emptying. As mentioned in Question 1, children with motility problems tend to have worse outcomes after fundoplication.

Even without a motility problem, children who retch and vomit frequently tend to do very poorly with fundoplications.<sup>5</sup> These children often have a hypersensitive emetic (vomiting) reflex. Fundoplication has no positive effect on the emetic reflex, and in some cases, manipulation of the vagus nerve during surgery may make retching and vomiting even worse. In addition, since children are no longer able to vomit after fundoplication, retching may become constant and extremely debilitating.

A careful history can help determine if a child is refluxing or vomiting and retching before surgery is performed. Children with passive reflux tend to have minimal or no retching after surgery, while children who retch, salivate, become pale, and have an increased heart rate prior to forceful vomiting tend to retch constantly after surgery. A small but important early study separated 20 children into two groups: those who had only passive reflux before fundoplication and those who had retching and forceful vomiting before surgery.<sup>6</sup> None of the refluxers retched after surgery, while 67% of the preoperative retchers had increased retching, vomiting through the wrap, or wrap failure after fundoplication.

Children who retch and vomit preoperatively also have the highest risk of wrap failure since constant retching and vomiting ultimately loosens the wrap or causes it to herniate. According to the aforementioned study, “An antireflux procedure is not appropriate treatment for children with symptoms caused by activation of the emetic reflex and, indeed, by preventing the end-point of reflex (ie, vomiting), fundoplication may make these children’s symptoms worse and predispose to wrap failure.”<sup>7</sup> The authors recommend medication such as antiemetics and tricyclic antidepressants, along with

continuous gastric feeds or jejunal feeds as better options for any child who retches preoperatively.

### **5. Does my child aspirate his/her secretions or food/formula?**

Children who aspirate may be aspirating from below (gastric contents from vomit or reflux) or may aspirate their own secretions and food they eat or drink. While a fundoplication should help prevent aspiration of reflux or vomit from below, it does nothing to improve aspiration of secretions and foods taken orally. In fact, children who aspirate their secretions may actually have increased aspiration after surgery since esophageal motility tends to worsen, making secretions and food more difficult to swallow. All studies show that aspiration and aspiration pneumonia continue in many children despite fundoplication, and many of these aspirations may result from aspiration of secretions and food.

All children with aspiration should have a swallow study prior to surgery to determine the source of aspiration. Children who aspirate their secretions and food may benefit from medication to dry up secretions, aggressive suctioning to prevent aspiration, or tube feeds instead of fundoplication.

### **6. Does my child have a history of neuro-irritability, visceral hyperalgesia, or chronic abdominal pain?**

A recent study linked neuro-irritability in neurologically-impaired babies and toddlers to visceral hyperalgesia, or increased sensitivity to pain within the gut.<sup>8</sup> Children who perceive pain in the gut at a higher rate typically have extreme difficulty handling the pain of surgery on the stomach, and a surgery that fundamentally alters their anatomy is particularly difficult for them to handle. In addition, gastric hypersensitivity is a known side effect of fundoplication, and these children may have a dramatic increase in pain and irritability after fundoplication.<sup>9</sup>

Children with suspected or confirmed visceral hyperalgesia may have greater success with a GJ tube and medications such as Neurontin or Amytriptyline as opposed to an invasive procedure such as fundoplication.

### **7. Has a GJ tube been tried?**

A study by doctors at Toronto's Hospital for Sick Children compared the rate of complications in two groups of children, the first of which received GJ tubes and the second of which received fundoplications.<sup>10</sup> A GJ tube is a long tube threaded through an existing gastrostomy into the first part of the intestine for feeding directly into the jejunum. While minor complications were common in both groups, major complications were seen at a greater rate in children who received fundoplications. Children with fundoplications had a higher incidence of aspiration pneumonia after surgery, more esophagitis, more failure to thrive, and of course more incidences of wrap failure. Retching and dysphagia was also dramatically increased post-fundoplication as compared to children with GJ tubes, with 36.5% of children retching and 12.7% having dysphagia. While children with GJs needed to take anti-reflux medications after surgery, both groups

had similar rates of hospital admissions for reflux or aspiration after either fundoplication or GJ placement.

GJ tubes are not without their own set of complications. In rare cases, GJ tubes can cause perforation, intussusception, or bowel obstructions. More common are tube problems, such as breakage, accidental removal, or migration of the tube out of position. These are easily resolved by replacing or repositioning the tube or using a different style or size tube. Children with frequent migration of the tube, typically retchers and vomiters, may instead receive a separate jejunostomy for direct feeding into the jejunum, though this procedure also has its own risks and complications.

As mentioned previously, many hospitals suggest trying a GJ tube as a first line of treatment for children with severe reflux, vomiting, feeding problems, and aspiration. It appears to be as effective as a fundoplication in many children, without as many complications. Most importantly, a GJ is easily placed and removed, meaning it can simply be removed if it fails to work. All tube-fed children should try a GJ tube before considering fundoplication surgery.

#### **8. Does my child have a history of esophageal atresia?**

Multiple studies have shown that children with esophageal atresia have a much higher risk of complications due to esophageal dysmotility, respiratory disease, and smaller stomach volume that is common after repair.<sup>11</sup> Wrap failure and reoperation are both very common. Alternatives, such as a GJ tube, may be better options.

#### **9. Does my child have dysphagia or feeding problems?**

Children who have difficulty swallowing or coordinating chewing and swallowing may have a motility problem of the esophagus or poor feeding skills. These children often have even more difficulty with feeding after surgery since fundoplication creates a tighter junction between the stomach and esophagus, making it more difficult for food to pass into the stomach. Children with feeding problems may become solely dependent on tube feeds after fundoplication surgery. While this may be an acceptable outcome for many children, those who have a goal of oral eating may want to reconsider surgery.

#### **10. Is my child under two years of age?**

The majority of children with reflux, even those who are neurologically impaired, will outgrow or see a significant decline in reflux by the age of two. Symptoms may disappear altogether or lessen considerably. It is therefore advised that all children wait as long as possible before having a fundoplication to give the child a chance to outgrow his or her reflux.

In addition, the later in life a fundoplication is performed, the better the results. Waiting until after age two may mean a better fundoplication result.

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- <sup>1</sup> Di Lorenzo C, et al. Intestinal Motility in Symptomatic Children with Fundoplication. *Journal of Pediatric Gastroenterology and Nutrition* 1991;12, no. 2:169-73.
- <sup>2</sup> Hassall E, Outcomes of Fundoplication: Causes for Concern, Newer Options. *Archives of Disease in Children* 2005;90:1048; Smith CD, et al, Nissen Fundoplication in Children with Profound Neurologic Disability. *Annals of Surgery* 1992;215:655.
- <sup>3</sup> Hassall, 1048; Smith, 655.
- <sup>4</sup> Di Lorenzo C and Orenstein S, Fundoplication: Friend or Foe? *Journal of Pediatric Gastroenterology and Nutrition* 2002;34, no. 2:117-24.
- <sup>5</sup> Richards CA, et al. Retching and Vomiting in Neurologically Impaired Children After Fundoplication: Predictive Preoperative Factors. *Journal of Pediatric Surgery* 2001;36, no. 9:1401-4.
- <sup>6</sup> Richards, 1402.
- <sup>7</sup> Richards, 1403.
- <sup>8</sup> Hauer JM, et al. Gabapentin Successfully Manages Chronic Unexplained Irritability in Children With Severe Neurologic Impairment. *Pediatrics* 2007;119:519-22.
- <sup>9</sup> Di Lorenzo and Orenstein.
- <sup>10</sup> Wales, 408-9.
- <sup>11</sup> See Pearl.