

## Patient Care > Gastroesophageal Reflux

### Introduction

Gastroesophageal reflux (GER) is involuntary regurgitation of stomach contents into the esophagus. Reflux causes a number of problems:

- Chemical burning of the esophageal lining
- Poor nutrition
- Aspiration into the airway and lungs, leading to pneumonia or reactive airway disease/asthma
- Stenosis (narrowing) of the esophagus
- If untreated, possible cellular changes or even cancer in the esophagus

While reflux is common, it can be hard to diagnose unless suspected. Still, once reflux is identified, very effective medical and surgical therapies exist to control it.

### Anatomy and Functional Development

**All babies reflux.** Preventing stomach contents from flowing back up the esophagus in humans depends not on a distinct anatomic valve (like the anus or pylorus) but on the interplay of several anatomic and functional factors:

- The angle of His (the angle between the stomach and esophagus)
- Muscular tone at the lower esophagus
- A mucosal “rosette” that acts like a flutter valve
- The length of the esophagus inside the abdomen
- Brisk emptying of food from the stomach
- The pinch-cock effect of the crura of diaphragm
- Other factors (like [hiatal hernia](#))

In general, it seems that if any one of these is abnormal, there will be mild reflux; but multiple abnormalities will produce pathologic reflux. In most babies, many of the sphincter mechanisms may not work well, and a “spitty baby” is the result. Most of the time, these problems correct as the baby gets older, and the child “grows out of” their reflux, usually around 8 months. By this age for example, the abdominal portion of the esophagus has lengthened enough to resist the pressure in the stomach. Of course, if the stomach is upset, it can still produce enough pressure to produce vomiting. This is normal.

But sometimes, for various reasons, these abnormalities do not correct as the baby grows. Medical and surgical treatments for reflux attempt to restore some of these functional or anatomical relationships (see [Treatment](#))

## Symptoms and Signs

**Frequent regurgitation of feeding is the most common evidence of GER.**

All normal babies regurgitate. However, if the amount is such that nutrition is compromised, then medical attention should be sought. In the newborn, GER may cause a lowering of the heart rate and respiratory rate. When stomach fluid remains within the esophagus, the acid causes burning of the esophagus and pain. Some babies exhibit a peculiar arching movement, probably because GER hurts; they are often mistaken to have a neurological problem.

When the regurgitation reaches the back of the throat at the same time that the baby breathes, the material is aspirated into the windpipe and lungs. The aspirated material may cause a chemical or bacterial pneumonia. A child can be thought to have reactive airway disease, asthma, or bronchitis for some years before the real reason — reflux — is found.

**There are a few other diseases that can mimic the symptoms of reflux:**

achalasia, esophageal dysmotility, malrotation, pyloric stenosis or atresia, gastroparesis, dysmotility syndromes. Because the wrong operation could worsen some of these problems, it is crucial that the presence of reflux — and the absence of other anatomic — problems is firmly established before performing an antireflux procedure.

## Diagnostic Tests

**The upper gastrointestinal (UGI) contrast study is the most frequent test performed.**

Its purpose is to demonstrate reflux, define the anatomy of the gastrointestinal tract, show any possible hiatal hernias, and to eliminate other possible pathology (ulcer, malrotation, etc.). Since the UGI reveals only one moment in time, reflux may not necessarily be seen. In other words, if reflux is not demonstrated, it may still exist; on the other hand if it is seen, it is certainly present (even if the severity is hard to discern).

**A 24-hour pH probe study** involves the placement of a small tube in the esophagus that measures acidity. If reflux occurs, washing a wave of acid over the probe, the probe detects a drop in pH. The advantage of the pH probe is that it is done over many hours (whereas the UGI is a one time study). Furthermore, this study tells how many times the reflux occurs and how long the reflux episodes are. All humans reflux, but measuring the frequency and duration of reflux episodes distinguishes between normal and pathological reflux. The pH probe is the best test for detecting reflux.

**Upper endoscopy** may be performed to visually examine the esophagus, stomach, and duodenum. At endoscopy, the doctor can biopsy any suspicious lesions (tumors, yeast infection, etc), reveal strictures or other abnormal anatomy, and diagnose ulcer disease.

**Bronchoscopy** may be done to visualize the anatomy of the airway as well as to sample cells (broncho-alveolar lavage), which may reflect reflux. Bronchoscopy is usually only used when other tests are unrevealing but symptoms persist.

**In a Nuclear Medicine Scan**, milk with a small amount of radioactive material is fed to the child. If a scanner reveals radioactivity in the lungs, this is evidence of reflux with aspiration.

This test can also watch how fast the radiolabelled milk or formula leaves the stomach; particularly slow emptying implies problems with stomach movement, or anatomic problems downstream from the stomach. Occasionally, a very slow-emptying stomach will require an “emptying procedure” at the time of the antireflux operation; your surgeon will discuss this with you.

## **Treatment**

**The first line of treatment is medical, not surgical.** There are medications as well as positional maneuvers and changes in food consistency that may be tried to minimize reflux. Your child’s medical doctors will provide this information for you.

**If medical management is unsuccessful, then surgery is an option.** There are clear indications for anti-reflux surgery. reflux becomes an surgical illness anytime that medical treatment has failed and:

- weight and nutrition is compromised

- it is painful

- it causes damage (esophageal strictures, Barrett’s, tooth damage)

- it causes respiratory disease (asthma), pneumonia, or chronic ear infections

- it has resulted in an Acute Life-Threatening Event from aspiration into the lungs

**The principle behind the antireflux procedure** is to anchor a segment of the esophagus in the abdomen, restoring the mechanical relationships needed to prevent reflux (just as nature intended). The problem is how to anchor the esophagus so that it stays within the abdomen.

In the 1960s, Dr. Rudolph Nissen devised an operative procedure in which a portion of the upper part of the stomach (the fundus) is wrapped behind the esophagus and sutured to the esophagus and to itself in the front. This cuff of stomach effectively keeps the esophagus in the abdomen.

**Nationwide, thousands of these Nissen funduplications (wrapping the fundus) have been performed in children and adults.** The operation’s effectiveness is excellent and complications relatively few. While there are other operative techniques, our group feels that the Nissen fundoplication is the most successful in our hands and the one with which we have the most experience (thousands of cases).

**Not infrequently we also encounter a hiatal hernia in children with reflux.** A hiatal hernia is an opening through the diaphragm that is too large. This

sometimes allows the stomach to actually protrude into the chest. When this occurs, reflux almost always follows (no length of intra-abdominal esophagus, an obtuse gastro-esophageal angle, and poor muscular tone). At the time of operation, we will snug the opening with one or two stitches. Occasionally, the opening is so large that synthetic material needs to be used in the repair.

**Many patients with pathologic reflux may be premature or have severe neurologic disorders with swallowing and reflux problems.** In these instances a gastrostomy (or G-Button) may be done which allows for direct feeding into the stomach. This facilitates feeding providing adequate nutrition and saving many hours of time for the parents. It also makes it much easier to “burp” the child (see below).

**Finally, in our practice, the Nissen fundoplication is almost always done by laparoscopy.** Five small incisions (3mm to 5 mm) are made and the procedure is performed by a . ber optic camera providing excellent and detailed anatomy and long, thin (3 mm) instruments. Occasionally, the operation must be done “open”. This is usually because the patient will not tolerate the pressure of the gas placed into the abdomen to help visualization or if there is too much scarring. Rarely, bleeding or abnormal anatomy requires the open technique. But these circumstances are very rare; nearly all children have laparoscopic fundoplication in our institution. Our results show that the laparoscopic method allows a more precise procedure and shortens recovery times.

### **Post-operative Complications and Long Term Problems**

**The great majority of patients do very well without any complications or long-term problems after Nissen fundoplication.** Anyone undergoing general anesthesia and major surgery has the risk of reaction to the anesthetic or medications, bleeding, and infection. Normally there is about 1/8” redness about the incisions. If you see spreading redness or pus, please call our office.

Because the Nissen fundoplication involves wrapping the stomach around the esophagus, it can be too tight or too loose. Initially, the tightness may be due to swelling from handling the stomach and esophagus. This is why we generally recommend a special diet for 5 to 10 days after the operation to allow the swelling to resolve.

If symptoms of difficulty eating or pain persist after 4 to 6 weeks, we will generally do an UGI contrast study. This is absolutely necessary for us to visualize the wrap, the location of the stomach, and adequacy of the wrap. If the wrap should be too tight, dilation can be performed. Reoperation because the wrap is too tight or too loose is infrequent (<1%).

**Occasionally, the wrap can become undone.** We find this may occur with severe post-operative vomiting. A large hiatal hernia repair may also break down. These will require reoperations.

**Burping:** In a successful antireflux operation, not only will food and liquid stop coming up the esophagus — air will not come out either. In other words, most children cannot burp for some time after the operation. The same goes, of course, for vomiting (a child with a “stomach bug” will act like “dry heaves”). Eventually, most children regain the ability to burp (and vomit) as the swelling in the wrap goes down and normal eating stretches the wrap. Meanwhile, babies and children who swallow air when they eat may have gas pain that can be treated with simethicone (see [Nissen Post-operative Diet](#) instructions).

**Dumping Syndrome:** For unknown reasons, a few children will have dumping syndrome after fundoplication. In this syndrome, high sugar foods are ejected from the stomach into the small bowel too quickly. The sugar is rapidly absorbed, provoking a spike in insulin. The sugar levels in the blood stream then plummet, and the low blood sugar produces skin flushing, jitteriness, cramping, a racing heart rate, and other symptoms. Fortunately, the syndrome can be controlled with diet and a medication called Acarbose. Talk to your surgeon if you recognize these symptoms in your child.

[Gastrostomy care](#) is described at another location under Patient Care.

***Disclaimer:** Your child's condition is unique. The information contained on this web site is not intended to substitute for advice from a doctor or nurse. If you are unsure about any aspect of your patient's care, please contact us at 303-839-6001, or talk to your pediatrician.*

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