

Gastroesophageal Reflux

What is Gastroesophageal Reflux?

Gastroesophageal reflux (GER) is involuntary regurgitation of stomach contents into the esophagus.

Reflux causes a number of problems:

1. Chemical burning of the esophageal lining
2. Poor nutrition
3. Aspiration into the airway and lungs, leading to pneumonia or reactive airway disease/asthma
4. Stenosis (narrowing) of the esophagus
5. 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.

Who is affected by GER?

All babies reflux during their first year of life. 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. 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. These problems usually correct themselves as the baby gets older, and the child “grows out” of their reflux, usually around 8-12 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).



What are the Signs and Symptoms of GER?

Frequent regurgitation of feeding is the most common evidence of GER. All babies regurgitate, but if nutrition is compromised, 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.

Other symptoms of GER may include:

- Pain with eating
- Refusing to eat
- Chronic coughing
- Frequent respiratory illnesses
- Uncontrolled asthma
- Arching back during or after eating
- Poor weight gain
- Abdominal pain
- Vomiting
- Sore throat in the morning
- Sour taste in mouth
- Abdominal pain

When the regurgitation reaches the back of the throat at the same time that the baby or child 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 have similar symptoms of reflux:

- Achalasia
- esophageal dysmotility
- malrotation
- pyloric stenosis or atresia
- gastroparesis
- dysmotility syndromes

These other diseases must be ruled out prior to performing the anti-reflux procedure as it may worsen the symptoms.

What Diagnostic or Laboratory Tests Need to be performed to Diagnose Reflux?

- **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. At the same time if reflux is seen, it is certainly present even if the severity is hard to discern.
 - **A 24-hour pH probe study:** This study involves the placement of a small tube into 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.
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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:** An upper endoscopy may also be performed. It is used to visually examine the esophagus, stomach, and duodenum. During the endoscopy, the doctor will most likely take biopsies of the visualized areas as well as any suspicious lesions (tumors, yeast infection, etc.). This study will also reveal strictures or other abnormal anatomy, and diagnose ulcer disease. These biopsies may indicate the presence of allergies and their role in reflux.
- **Bronchoscopy:** A bronchoscopy may be done to visualize the anatomy of the airway as well as obtain sample cells (broncho-alveolar lavage), which may reflect reflux. Bronchoscopy is usually used in children with asthma-like symptoms or when other tests are unrevealing but symptoms persist.
- **Nuclear Medicine Scan:** During this study, 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 radio-labeled milk or formula leaves the stomach. 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 anti-reflux operation; your surgeon will discuss this with you.

What is the Treatment for GER?

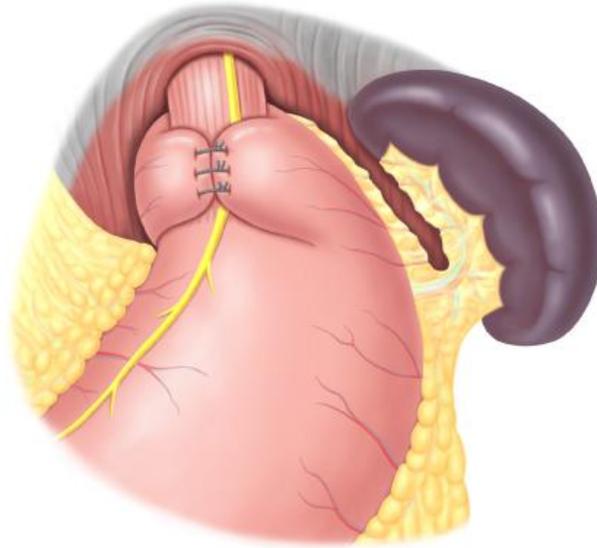
- **The first line of treatment is medical, not surgical.**
 - There are medications, positioning maneuvers, and changes in food consistency that may be tried to minimize reflux. Your child’s medical doctors will provide this information for you.
- **If medical management is unsuccessful, then surgery is an option.**
 - There are clear indications for anti-reflux surgery. Reflux becomes a surgical issue 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 and/or sinus infections
 - It has resulted in an acute life-threatening event from aspiration into the lungs

What is the Surgical Procedure to Correct GER?

The principle behind the anti-reflux procedure, known as a Nissen Fundoplication, is to take the upper portion to the stomach and wrap it around the lower part of the esophagus. This wrap will contract with the rest of the stomach to help move food from the stomach to the intestines. With the contraction, the stomach tightens around the esophagus and prevents food or acid from going into the esophagus. 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. This is called the Nissen Fundoplication
 - **Nationwide, thousands of Nissen funduplications have been performed in children and adults.** The operation’s effectiveness is excellent and there are relatively few complications. While there are other operative techniques, our group feels that the Nissen fundoplication has been the most successful in our hands and the one with which we have the most experience (thousands of cases).
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The Nissen fundoplication is almost always done by laparoscopy. Five small incisions (3mm to 5 mm) are made and the procedure is performed using a fiber optic camera providing excellent and detailed anatomy and long, thin (3 mm) instruments. Occasionally, the operation must be done as an open procedure. 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. These circumstances are very rare and nearly all children have laparoscopic fundoplication in our institution. Our results show that the laparoscopic method allows for a more precise procedure and shortens recovery times.



What Other Problems Can Accompany GER?

- **Not infrequently we also encounter a hiatal hernia in children with reflux.** A hiatal hernia occurs when the opening in which the esophagus passes through the diaphragm is too large. This sometimes allows the stomach to protrude through this opening into the chest cavity. When this occurs, reflux almost always follows. At the time of operation, we will tighten 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 adequate nutrition and saving many hours of time for the parents. It also makes it much easier to “burp” the child (see below).

Are There Post-operative Complications or Long Term Care after a Nissen?

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.

- **Infection:** Normally there is about 1/8” redness around the incisions. If you see spreading redness or pus, please call our office. Incisions should remain clean and dry for 2 days, and then bathing may resume as normal.

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- **Wrap Tightness:** as 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 2 weeks 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 obtain an UGI study. This is absolutely necessary to visualize the wrap, the location of the stomach, and adequacy of the wrap. If the wrap appears too tight, dilation can be performed. Reoperation because the wrap is too tight or too loose is infrequent, usually less than 1%.
 - **Occasionally, the wrap can become undone or a hiatal hernia can occur.** We find this may occur with severe vomiting or retching. These will require reoperations.
 - **Burping:** In a successful anti-reflux operation, food and liquid are stopped from coming up the esophagus. Therefore the procedure can inhibit a child from burping or vomiting. Most children cannot burp for some time after the operation. Also, a child with a “stomach bug” will more likely experience “dry heaving” rather than vomiting. In the post-operative period, your child will receive a prescription for an anti-nausea medication to prevent any vomiting, retching, or gagging. It is important to administer this medication if these symptoms occur to help protect the integrity of the wrap. This medication is important to have at home at all times after surgery.
 - Eventually, most children regain the ability to burp and vomit as the swelling in and around 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
 - **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, then the sugar levels in the bloodstream decrease quickly. This 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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Image obtained from:

Winter, H. (2014, March). *Management of gastroesophageal reflux disease in children and adolescents*. Retrieved April 25, 2014, from UpToDate: www.uptodate.com