

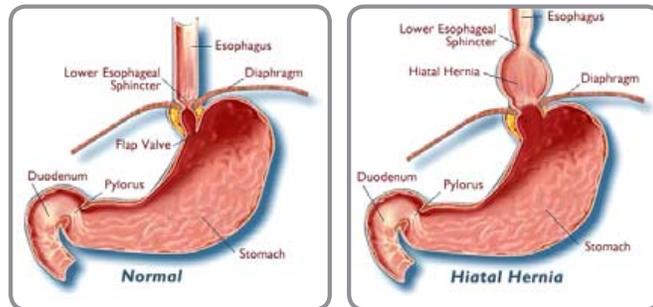
## Gastroesophageal Reflux

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**Gastroesophageal reflux**, also known as acid reflux, occurs when the stomach contents reflux or back up into the esophagus and/or mouth. Reflux is a normal process that occurs in healthy infants, children, and adults. Most episodes are brief and do not cause bothersome symptoms or complications.

In contrast, people with gastroesophageal reflux disease (GERD) experience symptoms as a result of the reflux. Symptoms can include heartburn, vomiting, or pain with swallowing. The reflux of stomach acid can adversely affect the vocal cords or even be inhaled into the lungs (called aspiration).

This topic review discusses the symptoms, causes, diagnosis, and treatment of adults with gastroesophageal reflux disease. A discussion of gastroesophageal reflux in infants, children, and adolescents is available separately.



### What is Gastroesophageal Reflux?

When we eat, food is carried from the mouth to the stomach through the esophagus, a tube-like structure that is approximately 10 inches long and 1 inch wide in adults. The esophagus is made of tissue and muscle layers that expand and contract to propel food to the stomach through a series of wave-like movements called peristalsis.

At the lower end of the esophagus, where it joins the stomach, there is a circular ring of muscle called the lower esophageal sphincter (LES). After swallowing, the LES relaxes to allow food to enter the stomach and then contracts to prevent the back-up of food and acid into the esophagus.

However, sometimes the LES is weak or becomes relaxed because the stomach is distended, allowing liquids in the stomach to wash back into the esophagus occasionally in all individuals. Most of these episodes occur shortly after meals, are brief, and do not cause symptoms. Normally, acid reflux should occur only rarely during sleep.

#### Acid reflux

Acid reflux becomes gastroesophageal reflux disease (GERD) when it causes bothersome symptoms or injury to the esophagus. The amount of acid reflux required to cause GERD varies.

In general, damage to the esophagus is more likely to occur when acid refluxes frequently, the reflux is very acidic, or the esophagus is unable to clear away the acid quickly. The most common symptoms associated with acid reflux are heartburn, regurgitation, chest pain, and trouble swallowing. The treatments of GERD are designed to prevent one or all of these symptoms from occurring.

#### Hiatus hernia

The diaphragm is a large flat muscle at the base of the lungs that contracts and relaxes as a person breathes in and out. The esophagus passes through an opening in the diaphragm called the diaphragmatic hiatus before it joins with the stomach.

Normally, the diaphragm contracts, which improves the strength of the LES, especially during bending, coughing, or straining. If there is a weakening in the diaphragm muscle at the hiatus, the stomach may be able to partially slip through the diaphragm into the chest, forming a sliding hiatus hernia.

The presence of a hiatus hernia makes acid reflux more likely. A hiatus hernia is more common in people over age 50. Obesity and pregnancy are also contributing factors. The exact cause is unknown but may be related to the loosening of the tissues around the diaphragm that occurs with advancing age. There is no way to prevent a hiatus hernia.

## Acid Reflux Symptoms

People who experience heartburn at least two to three times a week may have gastroesophageal reflux disease, or GERD. The most common symptom of GERD, heartburn, is estimated to affect 10 million adults in the United States on a daily basis. Heartburn is experienced as a burning sensation in the center of the chest, which sometimes spreads to the throat; there also may be an acid taste in the throat. Less common symptoms include:

- Stomach pain (pain in the upper abdomen)
- Non-burning chest pain
- Difficulty swallowing (called dysphagia), or food getting stuck
- Painful swallowing (called odynophagia)
- Persistent laryngitis/hoarseness
- Persistent sore throat
- Chronic cough, new onset asthma, or asthma only at night
- Regurgitation of foods/fluids; taste of acid in the throat
- Sense of a lump in the throat
- Worsening dental disease
- Recurrent pneumonia
- Chronic sinusitis
- Waking up with a choking sensation

When to seek help — The following signs and symptoms may indicate a more serious problem, and should be reported to a healthcare provider immediately:

- Difficulty or pain with swallowing (feeling that food gets “stuck”)
- Unexplained weight loss
- Chest pain
- Choking
- Bleeding (vomiting blood or dark-colored stools)

## Acid Reflux Diagnosis

Acid reflux is usually diagnosed based upon symptoms and the response to treatment. In people who have symptoms of acid reflux but no evidence of complications, a trial of treatment with lifestyle changes and in some cases, a medication, are often recommended, without testing. Specific testing is required when the diagnosis is unclear or if there are more serious signs or symptoms as described above.

It is important to rule out potentially life threatening problems that can cause symptoms similar to those of gastroesophageal reflux disease. This is particularly true with chest pain, since chest pain can also be a symptom of heart disease. When the symptoms are not life threatening and the diagnosis of gastroesophageal reflux disease is not clear, one or more of the following tests may be recommended.

### Endoscopy

An upper endoscopy is commonly used to evaluate the esophagus. A small, flexible tube is passed into the esophagus, stomach, and small intestine. The tube has a light source and a

camera that displays magnified images. Damage to the lining of these structures can be evaluated and a small sample of tissue (biopsy) can be taken to determine the extent of tissue damage.

## Acid Reflux Complications

The vast majority of patients with gastroesophageal reflux disease will not develop serious complications, particularly when reflux is adequately treated. However, a number of serious complications can arise in patients with severe gastroesophageal reflux disease.

### Ulcers

Ulcers can form in the esophagus as a result of burning from stomach acid. In some cases, bleeding occurs. You may not be aware of bleeding, but it may be detected in a stool sample with a test called hemocult. This test is performed by putting a small amount of stool on a chemically coated card.

### Stricture

Damage from acid can cause the esophagus to scar and narrow, causing a blockage (stricture) that can cause food or pills to get stuck in the esophagus. The narrowing is caused by scar tissue that develops as a result of ulcers that repeatedly damage and then heal in the esophagus.

### Lung and throat problems

Some people reflux acid into the throat, causing inflammation of the vocal cords, a sore throat, or a hoarse voice. The acid can be inhaled into the lungs and cause a type of pneumonia (aspiration pneumonia) or asthma symptoms. Chronic acid reflux into the lungs may eventually cause permanent lung damage, called pulmonary fibrosis or bronchiectasis.

### Barrett's esophagus

Barrett's esophagus occurs when the normal cells that line the lower esophagus (squamous cells) are replaced by a different cell type (intestinal cells). This process usually results from repeated damage to the esophageal lining, and the most common cause is longstanding gastroesophageal reflux disease. The intestinal cells have a small risk of transforming into cancer cells.

As a result, people with Barrett's esophagus are advised to have a periodic endoscopy to monitor for early warning signs of cancer.

### Esophageal cancer

There are two main types of esophageal cancer: adenocarcinoma and squamous cell carcinoma. A major risk factor for adenocarcinoma is Barrett's esophagus, discussed above. Squamous cell carcinoma does not appear to be related to GERD. Unfortunately, adenocarcinoma of the esophagus

is on the rise in the United States and in many other countries. However, only a small percentage of people with GERD will develop Barrett's esophagus and an even smaller percentage will develop adenocarcinoma.

## Reflux Treatment

Gastroesophageal reflux disease is treated according to its severity.

### Mild symptoms

Initial treatments for mild acid reflux include dietary changes and using non-prescription medications, including antacids or histamine antagonists.

### Antacids

Antacids are commonly used for short-term relief of acid reflux. Examples of antacids include Tums®, Maalox®, and Mylanta®.

### Histamine antagonists

The histamine antagonists reduce production of acid in the stomach. However, they are somewhat less effective than proton pump inhibitors

Examples of histamine antagonists available in the United States include ranitidine (Zantac®), famotidine (Pepcid®), cimetidine (Tagamet®), and nizatidine (Axid®).

### Lifestyle changes

Changes to the diet or lifestyle have been recommended for many years, although their effectiveness has not been extensively evaluated in well-designed clinical trials. A review of the literature concluded that weight loss and elevating the head of your bed may be helpful, but other dietary changes were not found helpful in all patients. Thus, these recommendations may be helpful in some, but not all people with mild symptoms of acid reflux.

For people with mild acid reflux, these treatments can be tried before seeking medical attention. However, anyone with more serious symptoms should speak to their healthcare provider before using any treatment.

- Weight loss — Losing weight may help people who are overweight to reduce acid reflux. In addition, weight loss has a number of other health benefits, including a decreased risk of type 2 diabetes and heart disease.
- Raise the head of the bed six to eight inches — Although most people only have heartburn for the two- to three-hour period after meals, some wake up at night with heartburn. People with nighttime heartburn can elevate the head of their bed, which raises the head and shoulders higher than the stomach, allowing gravity to prevent acid from refluxing.

Raising the head of the bed can be done with blocks of wood under the legs of the bed or a foam wedge under the mattress. Several manufacturers have developed commercial products for this purpose. However, it is not helpful to use additional pillows; this can cause an unnatural bend in the body that increases pressure on the stomach, worsening acid reflux.

- Avoid acid reflux inducing foods — Some foods also cause relaxation of the lower esophageal sphincter, promoting acid reflux. Excessive caffeine, chocolate, alcohol, peppermint, and fatty foods may cause bothersome acid reflux in some people.
- Quit smoking — Saliva helps to neutralize refluxed acid, and smoking reduces the amount of saliva in the mouth and throat. Smoking also lowers the pressure in the lower esophageal sphincter and provokes coughing, causing frequent episodes of acid reflux in the esophagus. Quitting smoking can reduce or eliminate symptoms of mild reflux.
- Avoid large and late meals — Lying down with a full stomach may increase the risk of acid reflux. By eating three or more hours before bedtime, reflux may be reduced. In addition, eating smaller meals may prevent the stomach from becoming overdistended, which can cause acid reflux.
- Avoid tight fitting clothing — At a minimum, tight fitting clothing can increase discomfort, but it may also increase pressure in the abdomen, forcing stomach contents into the esophagus.
- Chew gum or use oral lozenges — Chewing gum or using lozenges can increase saliva production, which may help to clear stomach acid that has entered the esophagus.

### Moderate to severe symptoms

Patients with moderate to severe symptoms of acid reflux, complications of gastroesophageal reflux disease, or mild acid reflux symptoms that have not responded to the lifestyle modifications and the medications described above usually require treatment with prescription medications. Most patients are treated with a proton pump inhibitor

### Proton pump inhibitors

PPIs include omeprazole (Prilosec®), esomeprazole (Nexium®), lansoprazole (Prevacid®), dexlansoprazole (Kapidex®), pantoprazole (Protonix®), and rabeprazole (Aciphex®), which are stronger and more effective than the H2 antagonists.

Once the optimal dose and type of PPI is found, you will probably be kept on the PPI for approximately eight weeks. Depending upon your symptoms after eight weeks, the medication dose may be decreased or discontinued. If symptoms return within three months, long-term treatment is

usually recommended. If symptoms do not return within three months, treatment may be needed only intermittently. The goal of treatment for GERD is to take the lowest possible dose of medication that controls symptoms and prevents complications.

Proton pump inhibitors are safe, although they may be expensive, especially if taken for a long period of time. Long-term risks of PPIs may include an increased risk of gut infections, such as *Clostridium* (*C. diff*), or reduced absorption of nutrients. In general, these risks are small to nonexistent. However, even a small risk emphasizes the need to take the lowest possible dose for the shortest possible time.

If symptoms are not controlled — If your symptoms of gastroesophageal reflux disease are not adequately controlled with one PPI, one or more of the following may be recommended:

- An alternate PPI may be prescribed or the dose of the PPI may be increased
- The PPI may be given twice per day instead of once
- Further testing may be recommended to confirm the diagnosis and/or determine if another problem is causing symptoms
- Surgical treatment may be considered

### **Surgical treatment**

Prior to the development of the potent acid-reducing medications described above, surgery was used for severe cases of GERD that did not resolve with medical treatment. Because of the effectiveness of medical therapy, the role of surgery has become more complex. In general, anti-reflux surgery involves repairing the hiatus hernia and strengthening the lower esophageal sphincter.

The most common surgical treatment is the laparoscopic Nissen fundoplication. This procedure involves wrapping the upper part of the stomach around the lower end of the esophagus

Although the outcome of surgery is usually good, complications can occur. Examples include persistent difficulty swallowing (occurring in about 5 percent of patients), a sense of bloating and gas (known as “gas-bloat syndrome”), breakdown of the repair (1 to 2 percent of patients per year), or diarrhea due to inadvertent injury to the nerves leading to the stomach and intestines.