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Patient information: Peptic ulcer disease (Beyond the Basics)

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PEPTIC ULCER DEFINITION — Peptic ulcers are open sores in the upper part of the digestive tract ([figure 1](#)) that can cause stomach pain or stomach upset, and that can lead to internal bleeding. There are two types of peptic ulcers:

- **Gastric ulcers**, which form on the lining of the stomach
- **Duodenal ulcers**, which form on the lining of the upper part of the small intestine (called the “duodenum”)

In some cases, peptic ulcers heal without treatment, but ulcers that have not been treated tend to recur. Many people with ulcers (sometimes called “peptic ulcer disease”) need treatment to relieve symptoms and prevent complications.

PEPTIC ULCER CAUSES — Peptic ulcers form when acid erodes the lining of the digestive tract. This can happen when there is excess acid in the system, or when the protective layer of mucus on the lining is broken down (making it more susceptible to damage).

There are two major causes of peptic ulcers, bacterial infection and the use of pain relievers called nonsteroidal anti-inflammatory medications (NSAIDs). NSAIDs include [aspirin](#), [ibuprofen](#) (sample brand names: Advil, Motrin), and [naproxen](#) (sample brand name: Aleve).

H. pylori infection — *Helicobacter pylori* is a type of bacteria that lives in the digestive tract. *H. pylori* is very common; some data suggest that it is present in approximately 50 percent of people. (See ["Patient information: H. pylori infection \(The Basics\)"](#).)

Most people who have *H. pylori* do not develop ulcers, but some do. This is because the bacteria can cause the following, all of which can contribute to peptic ulcer formation:

- An increase in the amount of acid in the stomach and small intestine
- Inflammation of the lining of the digestive tract
- A breakdown of the protective mucous layer

NSAIDs — The use of NSAIDs can also cause peptic ulcers in some people. They are commonly used to relieve pain and reduce inflammation. Many people also take low-dose [aspirin](#) daily to prevent heart attack or stroke.

NSAIDs can cause changes in the protective mucous layer of the digestive tract, leading to ulcers in some people. The

risk of ulcer formation depends on multiple factors, including the NSAID type, dose, and duration of use.

Other risk factors — Neither the presence of *H. pylori* nor the use of NSAIDs causes ulcers in every case; there are other factors as well:

- Genetics likely play a role, as studies have shown that having a family member with peptic ulcers makes a person more likely to develop ulcers as well.
- People who smoke cigarettes are more likely than nonsmokers to develop peptic ulcers.
- While drinking alcohol does not appear to be a cause of ulcers, alcohol abuse can interfere with ulcer healing.
- Although certain foods and beverages can cause stomach upset, there is no good evidence that they cause or worsen ulcers. Still, eating a healthy diet with plenty of fruits, vegetables, and fiber may decrease the risk of ulcers.
- The role of psychological stress in the formation of ulcers is controversial. There is some evidence that psychological factors (such as stress, anxiety, and depression) may contribute to the development of ulcers as well as impaired healing and increased recurrence. However, this relationship is not fully understood, as there are many other variables involved (eg, the presence or absence of *H. pylori*; use of NSAIDs; other individual characteristics) and “stress” can be difficult to measure and study.
- Other (non-NSAID) medications and health conditions can also cause ulcers, but this is fairly uncommon.

PEPTIC ULCER SYMPTOMS — Some people with peptic ulcers do not have any symptoms. (Ulcers that cause no symptoms are sometimes called “silent ulcers.”) People who do have symptoms may experience any of the following:

- Upper abdominal pain or discomfort (often a burning or hunger-like feeling)
- Feeling full quickly when eating
- Stomach pain, belching, or feeling bloated after eating
- Heartburn or acid reflux
- Nausea
- Vomiting (in severe cases, there may be blood in the vomit)
- Blood in the stools (which may cause stool to appear black or tar-like)

Duodenal ulcers tend to cause abdominal pain that comes on several hours after eating (often during the night); this is due to the presence of acid in the digestive tract without a food “buffer.” Eating or taking an acid-reducing medication may relieve symptoms.

PEPTIC ULCER DIAGNOSIS — Many of the symptoms of peptic ulcers can also be caused by other conditions, including acid reflux or gallstones. Your healthcare provider will review your history and symptoms, and can run tests to determine if you have an ulcer.

Upper endoscopy — An upper endoscopy is a procedure in which a thin, flexible tube is inserted into the mouth and down the throat. The tube has a light and a tiny camera on the end that projects images from within the digestive tract onto a monitor. (See ["Patient information: Upper endoscopy \(The Basics\)"](#).)

Ulcers can often be diagnosed through upper endoscopy. A small sample of tissue, called a biopsy, can also be taken to check for abnormal cells, cancer, or an infection with *H. pylori*.

Barium swallow — In some cases, a [barium](#) swallow may be done. This involves drinking a thick substance containing barium while X-rays are taken; the barium allows the digestive tract to be seen more clearly. This procedure is less common than endoscopy for diagnosing ulcers, but may be appropriate for some patients.

H. pylori testing — Anyone with a confirmed peptic ulcer should be tested for *H. pylori* so that the infection, if present, can be treated (see '[Treatment of H. pylori](#)' below). In people who have had a biopsy, the sample can be tested for infection. People who have not had a biopsy can instead have a breath or a stool sample test to check for *H. pylori*. Blood tests are also available, but may be less reliable.

PEPTIC ULCER TREATMENT — The exact course of treatment for peptic ulcers depends on the underlying cause. Most ulcers can be healed with medications.

Identifying the cause — Your healthcare provider will first try to determine what has caused your ulcer, since some causes (eg, *H. pylori* infection) need to be treated directly in order for the ulcer to heal.

Treatment of H. pylori — *H. pylori* is treated with several medications, usually including two antibiotics (to kill the bacteria) and an acid-suppressing medication called a proton pump inhibitor (PPI). Proton pump inhibitors include [esomeprazole](#) (sample brand name: Nexium), [lansoprazole](#) (sample brand name: Prevacid), and [omeprazole](#) (sample brand name: Prilosec) ([table 1](#)). Treatment for *H. pylori* usually takes two weeks.

Treatment of ulcers not due to H. pylori — If you have an ulcer but tested negative for *H. pylori*, your healthcare provider will still probably prescribe an acid-suppressing medication in order to help the ulcer heal. This may be a proton pump inhibitor (see above) or a medication called an H2 receptor antagonist. The H2 receptor antagonists include [ranitidine](#) (sample brand name: Zantac) and [famotidine](#) (sample brand name: Pepcid).

You should take your ulcer medication as directed, even if your ulcer doesn't cause bothersome symptoms. Some people can stop the medication after four to six weeks; others may need to keep taking it for longer if their ulcers are large or at risk of recurring, or if they have had complications due to ulcers in the past (see '[Peptic ulcer complications](#)' below).

Stopping NSAIDs — If you are taking any NSAID medications, your provider will probably advise you to stop them, regardless of whether or not they caused your ulcer. He or she may recommend alternative medications to NSAIDs, such as [acetaminophen](#) (sample brand name: Tylenol). If it is not possible for you to stop taking NSAIDs, you will likely need to keep taking a proton pump inhibitor medication as well. This is to help protect the lining of the digestive tract and reduce the risk of bleeding (see '[Bleeding](#)' below).

Other methods of symptom relief — In addition to taking prescribed medications and avoiding NSAIDs, there are other things you can do to relieve symptoms and help ulcers to heal:

- Quit smoking, if you smoke
- Limit the amount of alcohol you drink
- Take antacids if they help you feel better

PEPTIC ULCER COMPLICATIONS — Although most peptic ulcers heal completely with treatment, they can sometimes lead to complications. The risk of serious complications depends on the cause of the ulcer, the size and location of the ulcer, and the person's age and health.

Bleeding — Bleeding ulcers most often affect older people. Symptoms may include blood in the vomit or in the stool (this can give stools a black, tar-like appearance). People with bleeding ulcers usually need to take a proton pump inhibitor (see '[Peptic ulcer treatment](#)' above). Some people also need IV fluids and blood transfusions in the hospital.

Ulcers that are actively bleeding, or are at risk of bleeding again, can be treated during an upper endoscopy (see '[Upper endoscopy](#)' above). Treatment may involve cauterizing the ulcer, applying tiny clips to close off the blood vessels, or injecting a medication called epinephrine. The goal is to stop the bleeding and prevent future bleeding.

In rare cases, a person with a bleeding ulcer may need surgery or embolization. This involves identifying the specific

blood vessels that are the source of the bleeding, and blocking off the flow of blood through them.

Perforation — Perforation is when an ulcer leads to a hole or puncture in the wall of the stomach or duodenum. Symptoms include sudden, severe abdominal pain, a rapid heartbeat, and a low body temperature. Pain may radiate to one or both shoulders, and the abdomen may become rigid.

It is important to treat a perforated ulcer as quickly as possible. Treatment usually involves insertion of a nasogastric tube (a tube that goes through the nose into the stomach), IV fluids, and medications; some people also require surgery.

Obstruction — Gastric outlet obstruction is a less common complication of peptic ulcers. It refers to an obstruction or blockage of the outlet of the stomach (the part that leads to the small intestine). Vomiting is the most common symptom; other symptoms include feeling full quickly after eating, bloating, abdominal pain, loss of appetite, and nausea.

Gastric outlet obstruction is treated by inserting a nasogastric tube to remove food and fluid that has been unable to pass from the stomach into the small intestine. Many people also need IV fluids to stay hydrated. If the obstruction is related to an ulcer that was caused by *H. pylori* or NSAID use, addressing those causes (treating the *H. pylori* infection and/or stopping NSAIDs, along with treating the ulcer with acid-suppressing medication) often resolves the obstruction.

For people who don't respond to medication, obstruction can be treated during an endoscopy (see '[Upper endoscopy](#)' above). This is done by inserting a tiny balloon to dilate (open) the gastric outlet. A biopsy may be performed to rule out other, more serious causes of obstruction, such as stomach cancer.

If balloon dilation is not possible (or doesn't work), surgery may be an option.

FOLLOW-UP — Whether or not you need follow-up monitoring for your ulcer depends on:

- The size, location, and cause of the ulcer
- How the ulcer has responded to treatment
- Whether there were any complications

Duodenal ulcers — If you have been treated for a duodenal ulcer without complications, you most likely will not need any follow-up monitoring of the ulcer itself. If the ulcer was large or led to other problems (such as bleeding or perforation), or if your symptoms persist or recur, your healthcare provider may recommend a repeat endoscopy to make sure the ulcer is healing.

Gastric ulcers — Some healthcare providers recommend a follow-up endoscopy for anyone with a gastric ulcer, to confirm that the ulcer has healed and does not contain any cancerous cells. If you had a biopsy when your gastric ulcer was initially diagnosed, and the ulcer has responded well to treatment, you may not need follow-up. Your healthcare provider will decide whether a repeat endoscopy is necessary based on your individual situation.

All ulcers caused by *H. pylori* — If your ulcer was due to *H. pylori*, your healthcare provider will probably do a test to confirm that the infection is gone (see '[H. pylori testing](#)' above). However, the blood test cannot be used to determine successful clearance of the infection. Instead, a stool or breath test is usually performed about four weeks after the initial course of treatment is completed. This is because some medications (including antibiotics and proton pump inhibitors) can cause a “false negative” test result even if *H. pylori* is still present.

WHERE TO GET MORE INFORMATION — Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient information: Peptic ulcers \(The Basics\)](#)

[Patient information: H. pylori infection \(The Basics\)](#)

[Patient information: GI bleed \(The Basics\)](#)

[Patient information: Gastritis \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient information: Helicobacter pylori infection and treatment \(Beyond the Basics\)](#)

[Patient information: Upset stomach \(functional dyspepsia\) in adults \(Beyond the Basics\)](#)

[Patient information: Acid reflux \(gastroesophageal reflux disease\) in adults \(Beyond the Basics\)](#)

[Patient information: Gallstones \(Beyond the Basics\)](#)

[Patient information: Upper endoscopy \(Beyond the Basics\)](#)

[Patient information: Quitting smoking \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Association between Helicobacter pylori infection and duodenal ulcer](#)

[Clinical manifestations of peptic ulcer disease](#)

[Overview of the complications of peptic ulcer disease](#)

[Diagnosis of peptic ulcer disease](#)

[Management of duodenal ulcers in patients infected with Helicobacter pylori](#)

[Overview of the natural history and treatment of peptic ulcer disease](#)

[Peptic ulcer disease: Genetic, environmental, and psychological risk factors and pathogenesis](#)

[Refractory or recurrent peptic ulcer disease](#)

[Surgical management of peptic ulcer disease](#)

[Overview of the treatment of bleeding peptic ulcers](#)

[Unusual causes of peptic ulcer disease](#)

The following organizations also provide reliable health information.

- National Library of Medicine

www.nlm.nih.gov/medlineplus/healthtopics.html

- Centers for Disease Control and Prevention (CDC)

Phone: (404) 639-3534

Toll-free: (800) 311-3435

www.cdc.gov

- National Institute of Diabetes and Digestive and Kidney Diseases

Phone: (301) 654-3810

(www.niddk.nih.gov)

- The American Gastroenterological Association

(www.gastro.org)

- The American College of Gastroenterology (ACG)

(www.acg.gi.org)

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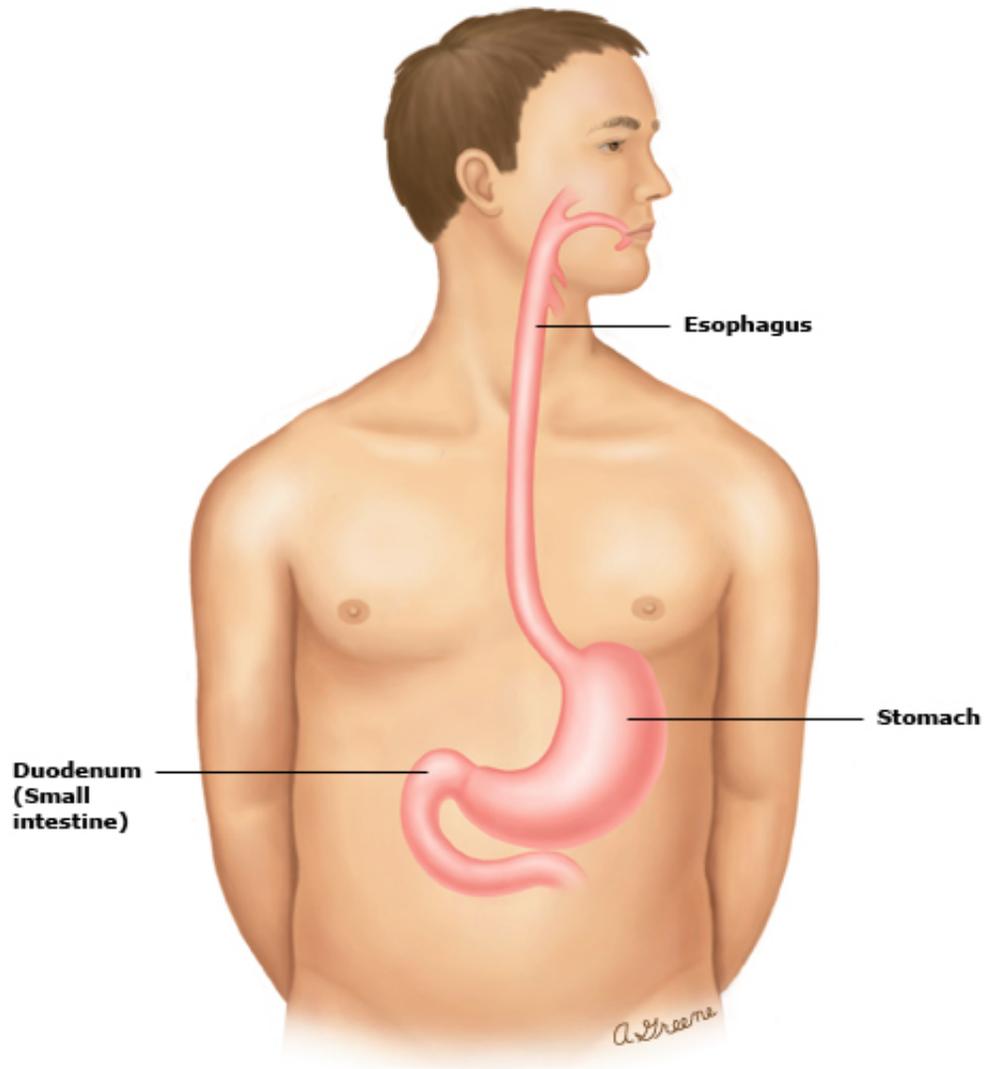
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GRAPHICS

Upper digestive tract



Graphic 55616 Version 4.0

Medicines used to reduce stomach acid

Medicine type	Medicine name examples
Antacids	Calcium carbonate (sample brand name: Tums)
	Aluminum hydroxide, magnesium hydroxide, and simethicone (sample brand name: Maalox)*
Surface agents	Sucralfate (brand name: Carafate)
Histamine blockers	Ranitidine (brand name: Zantac)
	Famotidine (brand name: Pepcid)
	Cimetidine (brand name: Tagamet)
Proton pump inhibitors	Omeprazole (brand name: Prilosec)
	Esomeprazole (brand name: Nexium)
	Pantoprazole (brand name: Protonix)
	Lansoprazole (brand name: Prevacid)
	Dexlansoprazole (brand name: Dexilant)
	Rabeprazole (brand name: AcipHex)

* The Food and Drug Administration warns that Maalox Total Relief should not be used as an antacid. Maalox Total Relief contains an ingredient that can cause stomach bleeding.

Graphic 78918 Version 8.0

Disclosures

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