

Board Certified in Gastroenterology

PEPTIC ULCER DISEASE

INTRODUCTION — Peptic ulcer disease (PUD) is a **chronic** (long lasting) condition that affects the gastrointestinal (GI) tract or digestive system. PUD causes **ulcers** (sores or lesions) in the lining (mucosa) of the **stomach** or first part of the **small intestine** (duodenum). Peptic ulcer disease often results in burning pain in the upper center of the abdomen. In addition to the foods that we eat, a number of other substances also come in contact with the digestive tract. Some of these substances can be harmful to the gastric (stomach) or intestinal mucosa. Substances that can damage the lining of the stomach and duodenum include oral medications (e.g., nonsteroidal anti-inflammatory drugs [NSAIDs]), microorganisms (e.g., bacteria, parasites), and chemicals produced by the body during digestion (e.g., stomach [gastric] acid, pancreatic enzymes, bile). **Digestion** is the process of breaking down food into a form that can be absorbed into the bloodstream and used by the body.

Normally, a **complex defense system** helps to protect the lining of the digestive tract and repair damage to the gastrointestinal mucosa. This defense system includes the production of mucus and certain chemicals (e.g., bicarbonate), and blood circulation in the GI tract. Mucus coats and protects the lining of the GI tract, chemicals help neutralize stomach (gastric) acid, and blood flow helps to renew the lining of the digestive tract and repair damaged cells. Peptic ulcer disease occurs as a result of inflammation, damage, or a structural defect in the GI tract that disrupts this defense system, allowing ulcers (sores or lesions) to develop in the stomach or duodenum. These sores, called **peptic ulcers**, are larger than 5 mm in size and reach into the layer beneath the mucosa (submucosa). Peptic ulcers that form in the lining of the stomach are called **gastric ulcers** and those that form in the lining of the duodenum are called **duodenal ulcers**.

Sign and Symptoms — The most common symptom of peptic ulcer disease is **burning pain** in the upper center of the abdomen (called epigastric pain). Pain often comes and goes, improves after eating, and worsens when the stomach is empty (about 2 or 3 hours after eating). Many patients experience severe pain during the middle of the night. Other PUD symptoms include the following:

- Heartburn (acid reflux)
- Indigestion (dyspepsia)
- Nausea and vomiting
- Non-cardiac chest pain
- Weight loss

In patients who have peptic ulcer disease, stress, diet (e.g., spicy foods, foods that are high in fat), alcohol, and smoking can worsen symptoms. Peptic ulcer disease can cause **serious complications** that require immediate treatment. These complications include the following:

- Perforation (formation of a hole in the GI tract)
- Obstruction (blockage) of the GI tract
- Severe GI bleeding

Perforation, which also is called ulceration, is caused by digestive acids that burn through the mucosa and the gastric or duodenal tissue beneath the mucosa. Perforation of the stomach or small intestine can cause peritonitis (inflammation of the abdominal lining), which often requires surgery and aggressive antibiotic therapy.

Disease Treatment — Treatment for peptic ulcer disease (PUD) depends on the underlying cause and the severity of the condition. PUD usually is treated using **medications**. Peptic ulcer disease caused by *Helicobacter pylori* infection requires antibiotics (e.g., amoxicillin [Amoxil®, Trimox®], clarithromycin [Biaxin®], metronidazole [Flagyl®], tetracycline [Sumycin®]) to destroy the bacteria. In most cases, "triple therapy," which consists of two antibiotics and another type of medicine to promote healing and reduce symptoms is used. To work with the antibiotics, physicians often prescribe one or more of the following:

- Proton pump inhibitors (PPIs; e.g., Prilosec®, Nexium®, Prevacid®)
- Histamine-2 (H-2) blockers (e.g., Pepcid®, Tagamet®, Zantac®)
- Bismuth subsalicylate (e.g., Pepto-Bismol®)

This combination of medicines generally is taken for 10 to 14 days. Patients who have peptic ulcer disease should take all medications **as directed**, even if symptoms improve during treatment. **Antacids** may be used to reduce pain and other symptoms during treatment.

In addition to medications, peptic ulcer disease treatment also may involve **lifestyle modifications**, such as smoking cessation, stress reduction, and dietary changes (e.g., avoiding foods that worsen symptoms). Patients who have PUD should **avoid** taking nonsteroidal anti-inflammatory drugs (NSAIDs).

In rare cases, **surgery** may be performed to treat severe peptic ulcer disease that does not respond to medications or to treat complications of PUD (e.g., perforation, obstruction). Types of PUD surgery include vagotomy (used to reduce the production of stomach [gastric] acid), pyloroplasty (used to widen the lower portion of the stomach [pylorus]), and partial gastrectomy (removal of part of the stomach).

Complications of surgery include the following:

- Adverse reaction to anesthesia
- Bleeding
- Infection

Prognosis and Prevention of Peptic Ulcer Disease — When the underlying cause for peptic ulcer disease is successfully treated, the prognosis (expected outcome) for patients with the condition is excellent. To help prevent peptic ulcers, **avoid** the following:

- Alcohol
- Common sources of *Helicobacter pylori* bacteria (e.g., contaminated food and water, floodwater, raw sewage)
- Long-term use of nonsteroidal anti-inflammatory drugs (NSAIDs)
- Smoking

Good hygiene can help reduce the risk for peptic ulcer disease caused by *Helicobacter pylori* infection. Washing the hands thoroughly with warm soapy water after using the restroom and before eating and avoiding sharing eating utensils and drinking glasses also can reduce the spread of bacteria that can cause PUD.

Causes and Risk Factors for Peptic Ulcer Disease — The most common cause for peptic ulcer disease is ***Helicobacter pylori*** (pronounced HEE-li-co BACK-ter pie-LOR-ee or HELL-uh-koh-BAK-tur py-LOH-ree) **infection**, also called *H. pylori* infection. *Helicobacter pylori* are spiral-shaped bacteria that are found in contaminated food and water. These bacteria, which were formerly called *Campylobacter pylori*, spread through close contact (e.g., sharing drinking glasses and eating utensils) and poor hygiene.

H. pylori infection occurs when these bacteria attach to the lining of the stomach or small intestine, multiply, and release toxins that cause mucosal inflammation and damage. *Helicobacter pylori* infection can cause peptic ulcer disease, gastritis (inflammation of the stomach lining), and other complications (e.g., stomach [gastric] cancer).

Long-term use of nonsteroidal anti-inflammatory drugs (**NSAIDs**), such as aspirin, ibuprofen, and naproxen, also can damage the lining of the GI tract and cause peptic ulcer disease. These medications, which are used to reduce pain and inflammation, should be **used only as directed**. When used in combination with NSAIDs, **corticosteroids** (e.g., prednisone) further increase the risk for peptic ulcers.

In most cases, peptic ulcer disease caused by *Helicobacter pylori* infection or nonsteroidal anti-inflammatory drugs resolves once the infection is treated or the medication is discontinued.

Serious illnesses (e.g., liver disease, chronic obstructive pulmonary disease [COPD], kidney failure) can increase the risk for developing peptic ulcer disease. **Trauma** resulting from physical stress (e.g., severe burns, traumatic brain injury [TBI], surgery) also can increase the risk for PUD.

Diagnosis of Peptic Ulcer Disease — Diagnosis of peptic ulcer disease involves taking a medical and family history and performing a physical examination and diagnostic tests. In most cases, an upper GI series and an upper endoscopy are performed to diagnose PUD.

In an **upper GI series**, the patient drinks a contrast solution (e.g., barium) and a series of x-rays are taken of the upper gastrointestinal tract (i.e., the esophagus, stomach, and small intestine). The contrast solution produces clearer images of the lining of the GI tract and helps the physician detect ulcers.

Upper endoscopy involves passing a thin, lighted tube with a tiny camera attached through the throat and into the stomach and upper portion of the small intestine (duodenum). Upper endoscopy, which is performed under sedation, allows the physician to visualize the lining of the GI tract and detect ulcers. During this procedure, a small piece of tissue can be removed for microscopic evaluation (called a **biopsy**).

Once a diagnosis of peptic ulcer disease has been made, other **laboratory tests** (e.g., breath tests, blood tests, stool tests) are performed to determine if the condition is caused by bacteria (e.g., *Helicobacter pylori*).

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