

NR 507: Week 5 Edapt: Peptic Ulcer Disease

Pathophysiology of Peptic Ulcer Disease

Which of the following factors plays a significant role in the pathophysiology of peptic ulcer disease (PUD)?

- ☒ *Helicobacter pylori* (*H. pylori*) bacterial infection
- ☐ Excessive production of pancreatic enzymes
- ☐ Overactivation of the gallbladder
- ☐ Increased gastric mucus production

PUD is commonly associated with *Helicobacter pylori* (*H. pylori*) bacterial infection. *H. pylori* can colonize the gastric mucosa, leading to chronic inflammation and disruption of the mucosal barrier. This can result in increased acid secretion, impaired mucus production, and the development of ulcers.

Drag the findings that are risk factors for peptic ulcer disease (PUD) to the box on the right.

Findings

Sleeping position

Ibuprofen use

Alcohol consumption

Age

Consumption of spicy foods

Genetic history

Risk Factors for Peptic Ulcer Disease

Ibuprofen use

Alcohol consumption

Age

Genetic history

Nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen are well-known risk factors for PUD. Regular and prolonged use of NSAIDs can interfere with the protective mechanisms of the gastrointestinal mucosa, leading to the development of ulcers.

Excessive alcohol consumption is a recognized risk factor for PUD. Alcohol can irritate the gastric mucosa and increase the production of gastric acid, contributing to the development of ulcers.

Advancing age is associated with an increased risk of PUD. Older individuals may experience changes in the mucosal lining of the stomach that make them more susceptible to ulcers.

A family history of PUD suggests a potential genetic predisposition. Genetic factors may influence an individual's susceptibility to developing ulcers.

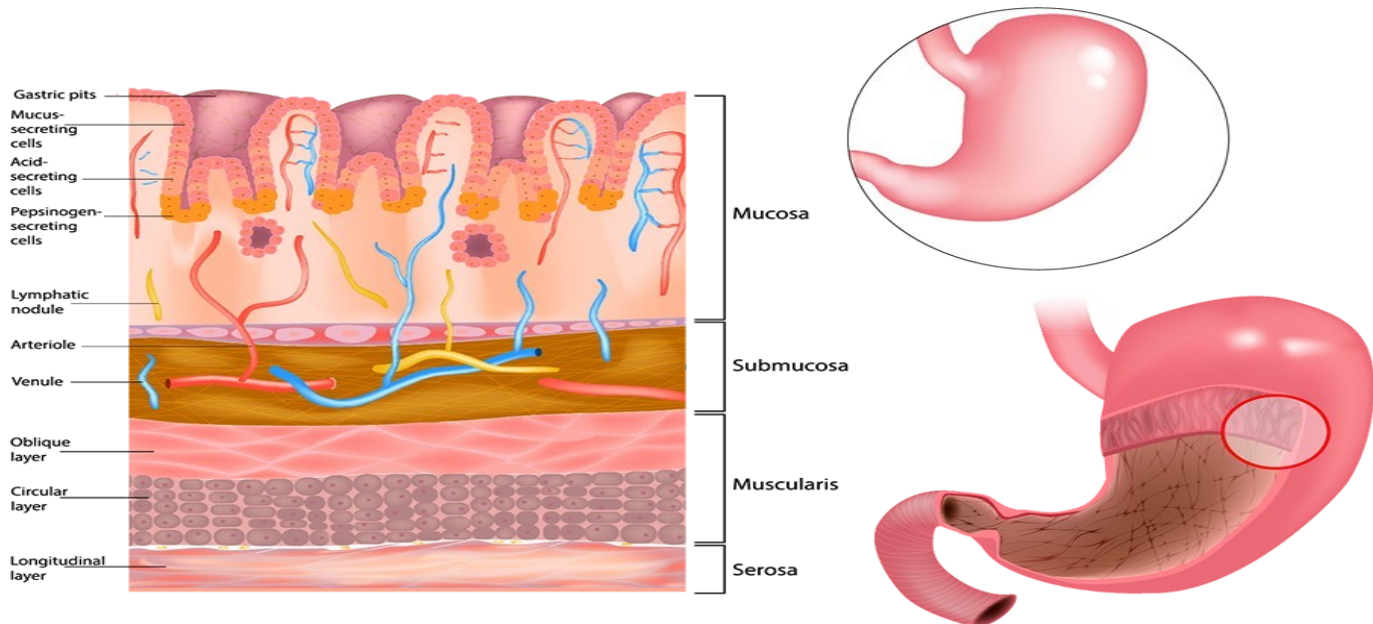
Pathophysiology of Peptic Ulcer Disease Risk Factors

Complete the following sentence by choosing from the list of options.

The nurse practitioner (NP) recognizes that a client with is at increased risk for developing peptic ulcer disease (PUD) because it causes .

Zollinger-Ellison syndrome causes an increased risk of peptic ulcers due to the increased production of gastric acid resulting from the presence of gastrin-secreting tumors.

Mucosa



Mucosa:

Surface epithelium: The innermost layer of the mucosa is the surface epithelium, composed mainly of mucous cells. These cells secrete mucus, forming a protective barrier that prevents the stomach's acidic contents from damaging the underlying tissues.

Gastric pits: These pits are depressions in the surface epithelium that serve as openings to the gastric glands.

Submucosa:

Connective tissue: The submucosa contains connective tissue with blood vessels, lymphatic vessels, and nerves. These vessels supply nutrients to the mucosal cells and transport absorbed substances away.

Muscularis:

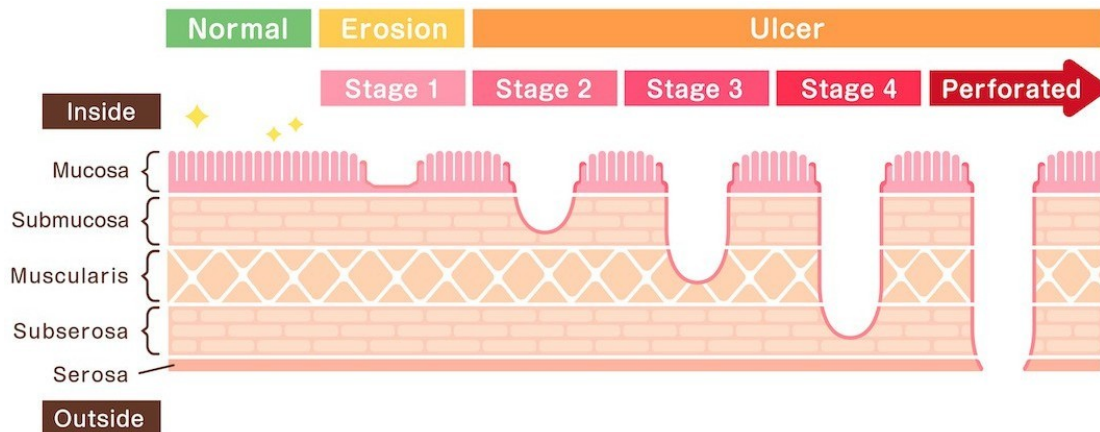
Smooth muscle: The muscularis externa is responsible for the peristaltic contractions that mix and churn the stomach contents. It consists of three layers of smooth muscle: an inner oblique layer, a middle circular layer, and an outer longitudinal layer.

Serosa:

Outermost layer: The stomach is covered by a protective outer layer known as the serosa, which helps prevent friction with surrounding structures.

Pathophysiology of Peptic Ulcer Disease

A peptic ulcer is an ulceration in the mucosal lining of the lower esophagus, stomach, or duodenum. As a result, inflammation can occur and penetrate submucosa. Examine the image below to learn more about the stages of peptic ulcer disease (PUD) progression.



Ulcer Progression

- Normal
- Erosion – Stage 1
- Ulcer – Stages 2, 3, 4, and perforated

Peptic Ulcer Disease Risk Factors

Peptic ulcers are most often caused by *Helicobacter pylori* (*H. pylori*) infection or nonsteroidal anti-inflammatory drug (NSAID)

H. pylori causes peptic ulcers by colonizing the stomach lining, leading to chronic inflammation and immune responses. *H. pylori* is a bacterium that weakens the protective mucus layer of the gastrointestinal tract, leaving it vulnerable to the corrosive effects of gastric acid. *H. pylori* infection stimulates increased gastric acid production, exacerbating mucosal damage. The release of cytotoxins further contributes to the destruction of gastric epithelial cells, creating an environment conducive to the formation of peptic ulcers

Regular use of NSAIDs suppresses mucosal prostaglandin synthesis, which results in decreased bicarbonate and mucin secretion and the production and increased secretion of hydrochloric acid.

Additional risk factors for the development of peptic ulcer disease (PUD) include the following:

- conditions associated with increased gastric acid secretion, such as **gastrinomas and Zollinger-Ellison syndrome**
- **smoking and excessive alcohol consumption**
- **acute pancreatitis and chronic obstructive pulmonary disease (COPD)**
- **obesity**
- **genetic predisposition**
- **age greater than 65 years**