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## A COMPREHENSIVE REVIEW ON PEPTIC ULCER DISEASE AND IT'S PREVENTION

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### ABSTRACT

Peptic ulcer disease (PUD) is a prevalent gastrointestinal condition that is typified by the formation of mucosal ruptures in the duodenum (duodenal ulcers) or stomach lining (gastric ulcers). PUD was once thought to be mostly caused by stress and nutrition, but with the discovery of *Helicobacter pylori* infection and the widespread use of non-steroidal anti-inflammatory medicines (NSAIDs) as key etiological agents, our understanding of the condition has greatly changed. The pathophysiology, clinical signs, diagnostic methods, and current treatment techniques for peptic ulcer disease are summarized in this abstract.

PUD is caused by an imbalance between defensive mechanisms that shield the gastroduodenal mucosa and aggressive forces like acid and pepsin production. While NSAIDs reduce mucosal protection by inhibiting prostaglandin synthesis, *H. pylori* infections cause inflammation and direct damage that compromises mucosal integrity. Clinically, PUD patients may exhibit a range of symptoms, from problems including bleeding, perforation, and obstruction to epigastric pain, which is frequently alleviated by food in duodenal ulcers and made worse by food in gastric ulcers. To confirm ulceration and detect the presence of *H. pylori*, the diagnosis usually consists of a combination of clinical assessment and endoscopic examination with biopsy. Urea breath tests and stool antigen assays are non-invasive methods of testing for *H. pylori*.

**Keywords;** peptic ulcer disease, gastric ulcer, duodenal ulcer , etiology, Acid suppression etc.

### Introduction

A major and prevalent gastrointestinal disorder, peptic ulcer disease (PUD) is typified by the formation of mucosal erosion or ulcers in the upper portion of the small intestine (duodenal ulcer) or the stomach (gastric ulcer). A mismatch between defensive mechanisms like mucus and bicarbonate secretion, mucosal blood flow, and cellular repair processes and aggressive factors like stomach acid and pepsin causes these lesions. Millions of individuals are impacted by the illness globally, and it significantly increases morbidity and medical expenses. *Helicobacter pylori* (*H. pylori*) infection is the main cause of peptic ulcers, which in many populations account for over 90% of duodenal ulcers and around 70% of stomach ulcers.<sup>1</sup>

An additional Long-term usage of nonsteroidal anti-inflammatory medicines (NSAIDs), such ibuprofen and aspirin, is a major contributing factor since they block The gastric mucosa produces protective prostaglandins.<sup>2</sup> . Other High levels of psychological stress, smoking, binge drinking, and, less frequently, illnesses like Zollinger-Ellison syndrome are also possible causes<sup>3</sup>

### Symptoms

The primary sign is epigastric pain, which is frequently characterized as a burning or gnawing feeling that may go better with food or antacids in the case of duodenal ulcers or get worse with meals in the case of gastric ulcers . Additional signs of gastrointestinal bleeding include bloating, nausea, vomiting, and, in extreme situations, melena (black, tarry stools) or hematemesis (blood in the vomiting),<sup>3</sup>

## Types of peptic ulcers

Their clinical features, underlying causes, and anatomical location are used to categorize them. For proper diagnosis, treatment, and complications, it is essential to comprehend the different types of peptic ulcers.<sup>6</sup>

### Gastric ulcer

The stomach lining is the site of gastric ulcers, which are more prevalent in those 40 years of age and older. These ulcers are frequently linked to either normal or decreased production of stomach acid.<sup>7</sup>

### Duodenal ulcer

The first section of the duodenum is usually where duodenal ulcers, the most prevalent kind of peptic ulcers, develop.<sup>8</sup>

### Perforated ulcers

Happen when the ulcer pierces the entire thickness of the duodenum or stomach wall, allowing the contents of the stomach to flow into the peritoneal space.<sup>9</sup>

## ETIOLOGY

An imbalance between protective and aggressive forces within the gastrointestinal mucosa causes Peptic Ulcer Disease (PUD), which results in localized erosions or ulcers in the duodenum or stomach. Peptic ulcers are caused by a confluence of physiological, microbiological, and environmental variables, with genetic predisposition playing a role in some cases. For successful prevention and treatment, it is essential to comprehend these etiological elements.<sup>11</sup>

### Pathophysiology

Damage to the stomach and duodenum's protective mucosal lining triggers the ulcerogenic process. The mucosal lining is known to be harmed by *H. pylori* infections, NSAID usage, and low-dose aspirin. Both bacterial factors and the host's inflammatory response contribute to the damage to the mucosal lining in the context of an *H. pylori* infection.<sup>15</sup> The suppression of prostaglandins derived from cyclooxygenase 1 (COX-1), which are crucial for preserving mucosal integrity, is the secondary cause of mucosal injury in the case of NSAID (and aspirin) use. [1] The ulcerative process starts when the mucosal layer is broken, exposing the stomach epithelium to acid. The ulcer will deepen and eventually reach the serosal layer if the process persists.<sup>16</sup>

### Diagnosis

Peptic ulcer diagnosis is essential for appropriate treatment and to avoid complications. Imaging, endoscopic examination, laboratory testing, and clinical evaluation are all combined in this process. Knowing the diagnostic process aids in determining the underlying reasons and distinguishing peptic ulcers from other gastrointestinal conditions.<sup>17</sup>

**Assessment of Clinical Practice** In order to diagnose peptic ulcers, a thorough medical history and physical examination are required first.<sup>18</sup>

**Medical History:** Weight loss, nausea, vomiting, dyspepsia, and epigastric pain are among the symptoms that doctors evaluate.

Risk factors like *Helicobacter pylori* infection, NSAID use, alcohol intake, and smoking are also highlighted in the history. Red flags such as hematemesis, melena, severe anemia, and inadvertent weight loss could be signs of cancer or complex ulcers.<sup>19</sup>

**Testing in the Lab** Laboratory testing aids in assessing issues and determining their root causes.

- **Complete Blood Count (CBC):** Used to identify anemia, which could be a sign of ongoing bleeding ulcer blood loss. The Fecal Occult Blood Test (FOBT) detects blood in the stool that is hidden and may indicate bleeding in the gastrointestinal tract. Zollinger-Ellison syndrome, a rare cause of peptic ulcers caused by hypersecretion of stomach acid, may be indicated by elevated serum gastrin levels.<sup>20</sup>
- **Testing for *H. pylori*:**
  - o **Non-invasive tests:** To identify an *H. pylori* infection, the urea breath test and stool antigen test are frequently utilized.

### Prevention

The primary causes and risk factors for the development of peptic ulcers must be addressed in order to prevent them.

- 1) **Management of *Helicobacter pylori*:** The traditional treatment for bacteria that test positive is a combination of antibiotics and an acid-reducing drug, typically a proton pump inhibitor (PPI).<sup>22</sup>
- 2) **Limit Use:** Aspirin, ibuprofen, and naproxen are examples of non-steroidal anti-inflammatory medicines (NSAIDs) that might irritate the stomach lining and raise the risk of ulcers.<sup>23</sup>
- 3) **Give Up Smoking:** Smoking impedes the healing of peptic ulcers and raises their risk considerably. Drinking too much alcohol can raise stomach acid and damage the mucous lining of the stomach.
- 4) **Additional Drugs:** Keep in mind that several other drugs, like potassium supplements, bisphosphonates (for osteoporosis), and corticosteroids, can make ulcers more likely.<sup>24</sup>

#### 5) Balanced diet

- The integrity of the intestinal lining can be preserved with a nutritious, well-balanced diet. Whole grains, fruits, and vegetables are examples of foods high in fiber that may lower the incidence of ulcers [85].
- Foods high in probiotics, such as yogurt and fermented goods, can support gut health and reduce *H. pylori* infections.<sup>25</sup>

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## Treatment

The main goals of peptic ulcer treatment are symptom relief, ulcer healing, recurrence prevention, and avoiding complications. The method is determined on the ulcer's cause,<sup>26</sup>

Strategies for General Treatment:

Drugs:

- 1) Proton Pump Inhibitors (PPIs): These medications, which include pantoprazole, omeprazole, and lansoprazole, decrease the production of stomach acid and are essential to treatment,<sup>26</sup>
- 2) H<sub>2</sub> Receptor Blockers: Although they also lower stomach acid, these drugs—such as famotidine and cimetidine—are typically less effective than PPIs.
- 3) Antibiotics: A mixture of two or three antibiotics (such as amoxicillin, clarithromycin, and metronidazole) is administered to treat *Helicobacter pylori* (*H. pylori*) infections that cause ulcers. A PPI is frequently used in conjunction with this (triple treatment).<sup>27</sup>

Quitting Smoking: Smoking hinders ulcer healing considerably and raises the risk of complications and recurrence.

Steer clear of nonsteroidal anti-inflammatory medicines (NSAIDs): Aspirin, ibuprofen, and naproxen are examples of NSAIDs that should be avoided at all costs because they can harm the stomach lining. If they must be taken, medical supervision should be obtained, and protective medication may be prescribed.<sup>28</sup>

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## Complications

Untreated or improperly managed peptic ulcers can result in a number of serious side effects that could endanger the patient's health and well-being. These issues result from the erosion of the duodenal or stomach mucosa, which is frequently made worse by inflammation and extended exposure to acidic stomach contents,<sup>29</sup>

It Results In;

- 1) Gastrointestinal bleeding
- 2) Perforation
- 3) Gastric outlet obstructions
- 4) Malignancy
- 5) Refractory ulcers.<sup>30</sup>

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## Conclusion

Erosions in the stomach lining (gastric ulcers), the upper portion of the small intestine (duodenal ulcers), or, less frequently, the esophagus are the hallmarks of peptic ulcers, a serious gastrointestinal disorder. Previously linked to food and stress, *Helicobacter pylori* infection and long-term use of nonsteroidal anti-inflammatory medicines (NSAIDs) are now identified as the main causes. Peptic ulcers can present clinically in a wide range of ways, from asymptomatic to causing the typical burning or gnawing sensation in the epigastrium.

To manage peptic ulcers and enhance patient outcomes, it is ultimately critical to comprehend the etiology, identify the symptoms, use precise diagnostic techniques, and put efficient treatment plans into place. In order to lessen the impact of this prevalent gastrointestinal condition, more research is being done to improve treatment strategies and create preventative measures and develop preventive strategies.

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