Peptic Ulcer Disease

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Acknowledgement: Badil
Objectives:

- Define peptic ulcer
- Describe the etiology and pathology of peptic ulcer
- Identify the sign and symptoms of peptic ulcer
- Determine the investigations of peptic ulcer
- Determine drug therapy of peptic ulcer
- Explain the nursing diagnosis for the patient of peptic ulcer
Anatomy of stomach and Duodenum

**Stomach**

- Esophagus
- Pylorus
- Duodenum
- Fundus
- Rugae

**Layers**

- Mucosa
- Submucosa
- Muscle layers
- Serosa
Anatomy of stomach
Gastric glands

Gastric glands contains three types of exocrine gland cells.

**Exocrine cells**

- **Chief cells**: Secretes pepsinogin and gastric lipase
- **Parietal cells**: Secrets HCL and intrinsic factor
- **Mucous neck cells**: Secretes the mucous

**Enteroendocrine cells**

**G cells**: It is mainly located in pyloric antrum. It secretes the gastrin hormone which stimulates the gastric activity
• Gastrin stimulates acid secretion indirectly by inducing the release of histamine by ECL cells; a direct effect on parietal cells also plays a lesser role.

• Enterochromaffin-like (ECL) cells in the fundus of the stomach secrete histamine
• Neuronal (acetylcholine, ACh), paracrine (histamine), and endocrine (gastrin) factors all regulate acid secretion

• ACh release from postganglionic vagal fibers directly stimulates gastric acid secretion through muscarinic M3 receptors on the basolateral membrane of parietal cells
Enteroendocrine hormones
Defense system of stomach and duodenum

- The mucous layer, which coats the stomach and duodenum, forms the first line of defense.

- Bicarbonate, which the mucous layer secretes, neutralizes the digestive acids.
Prostaglandin

• Hormone-like substances called prostaglandins

• Help to keep the blood vessels in the stomach dilated, ensuring good blood flow and protecting against injury.

• Prostaglandins are also believed to stimulate bicarbonate and mucus production.
**Peptic ulcer**

- Peptic ulcer is a term used to describe a group of ulcerative disorders that occur in areas of gastrointestinal tract that are exposed to acid-pepsin secretions.
- A peptic ulcer is a sore in the lining of stomach or duodenum.
- Most common forms are gastric ulcer and duodenal ulcer.
- Together, ulcers of the stomach and duodenum are referred to as peptic ulcer.
Etiology of Peptic Ulcer

- Most cases of peptic ulcer are caused by H. pylori (Helicobacter pylori)
- 70% of persons with gastric ulcer have H. pylori infection.
- Second most common cause is NSAID and aspirin use.
- The pathogenesis NSAID-induced ulcer is involved in mucosal injury and inhibition of prostaglandins
• Hyperacidity - eg. Zollinger Ellison syndrome.
• Cigarette smoking
• Alcohol
• Stress
• Coffee
Zollinger Ellison syndrome

Zollinger-Ellison tumor in pancreas

Duodenal ulcers due to hyperacidity
• A peptic ulcer is a mucosal break, 3 mm or greater, that can involve the stomach or duodenum.
• The most important contributing factors are H pylori, NSAIDs, acid, and pepsin.
• Additional aggressive factors include smoking, ethanol, bile acids, aspirin, steroids, and stress.
• Important protective factors are mucus, bicarbonate, mucosal blood flow, prostaglandins, and epithelial renewal.
  – Increased risk when older than 50 d/t decrease protection
• When an imbalance occurs, peptic ulcer might develop
Clinical features

- Epigastric (burning, or cramp like) Pain is usually located over a small area of midline in epigastrium near xiphoid
- Pain is relieved by food or antacids (Gastric ulcer)
- Dyspepsia
- Nausea, vomiting,
- Poor appetite
- weight loss
- Burping (belching)
Diagnostic Plan

Endoscopy (i.e. gastroscopy, duodenoscopy) is used to visualize the ulcers and obtain the biopsy specimen to test the H. pylori.

- Endoscopic biopsy for urease test
- Urea breath test
- Stool antigen test
- Barium meal X-ray
HELICOBACTER PYLORI
H. Pylori

- It is gram negative
- Spiral shape
- Multiple flagella
- Producing Urease
**Helicobacter pylori** — the bacterium causing peptic ulcer disease

**Infection**
*Helicobacter pylori* infects the lower part of the stomach, antrum.

**Inflammation**
*Helicobacter pylori* causes inflammation of the gastric mucosa (gastritis). This is often asymptomatic.

**Ulcer**
Gastric inflammation may lead to duodenal or gastric ulcer. Severe complications include bleeding ulcer and perforated ulcer.

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Endoscopy
Barium X-Ray
Treatment Plan: H. Pylori

Medications: Triple therapy for 14 days is considered the treatment of choice

- Proton Pump Inhibitor + clarithromycin and amoxicillin
  - Omeprazole (Prilosec): 20 mg PO bid for 14 d or
  - Lansoprazole (Prevacid): 30 mg PO bid for 14 d or
  - Rabeprazole (Aciphex): 20 mg PO bid for 14 d or
  - Esomeprazole (Nexium): 40 mg PO qid for 14 d plus
  - Clarithromycin (Biaxin): 500 mg PO bid for 14 and
  - Amoxicillin (Amoxil): 1 g PO bid for 14 d
  - Can substitute Flagyl 500 mg PO bid for 14 days
Treatment (*H. pylori*)

- Most popular treatment (first choice)
  - A proton pump inhibitor
    > Omeprazole, Lansoprazole, Esomeprazole, Pantoprazole, Rabeprazol
  - Amoxicillin plus Clarithromycin twice daily for 10-14 days

- Most popular treatment (second choice)
  - Bismuth subsalicylate + Tetracycline + Metronidazol (Helicide) four times daily for 10-14 days
  - A proton pump inhibitor
**Lifestyle Changes**

- Discontinue NSAIDs and use Acetaminophen for pain control if possible.
- Acid suppression—Antacids
- Smoking cessation
- Avoid Alcohol
- Stress reduction
- Avoid fry diet, fast food, spicy diet, high chilies diet
- Avoid beverages
- Do exercise
- Take rest
Complications

- Perforation & Penetration—into pancreas, liver and retroperitoneal space
- Peritonitis
- Bleeding--occurs in 25% to 33% of cases and accounts for 25% of ulcer deaths.
- Gastric CA
Surgery

People who do not respond to medication, or who develop complications

**Vagotomy:*** cutting the vagus nerve to interrupt messages sent from the brain to the stomach to reducing acid secretion.

**Antrectomy:*** remove the lower part of the stomach (antrum), which produces a hormone that stimulates the stomach to secrete digestive juices. A vagotomy is usually done in conjunction with an antrectomy
**Pyloroplasty:** the opening into the duodenum and small intestine (pylorus) are enlarged, enabling contents to pass more freely from the stomach. May be performed along with a vagotony.
Surgical therapy

A Posterior division of vagus nerve

B Truncal vagotony prevents nerve stimulation of the stomach

Duodenal ulcer

Antrectomy (removal of the antrum)

Billroth I (antrectomy)
Treatment of gastric bleeding

- Angiographic therapy
Treatment of gastric bleeding

Photocoagulation (Laser)
Duodenal Ulcer

- **Incidence**
  Age 30–60
  Male: female 2–3:1
  80% of peptic ulcers are duodenal

**Signs & Symptoms**
Hypersecretion of stomach acid (HCl)
May have weight gain
Pain occurs 2–3 hours after a meal; often awakened between 1–2 AM
Ingestion of food relieves pain
Vomiting uncommon
Melena more common
Malignancy Possibility: Rare
Risk Factors: H. pylori, alcohol, smoking, cirrhosis, stress
Gastric Ulcer

Incidence
Usually 50 and over
Male: female 1:1
15% of peptic ulcers are gastric
Normal—hypo secretion of stomach acid (HCl)
Weight loss may occur
Pain occurs 1/2 to 1 hour after a meal
Pain may be relieved by vomiting
Vomiting common
Hematemesis more common
Malignancy Possibility: Occasionally
Risk factors: H. pylori, gastritis, alcohol, smoking, use of NSAIDs, stress
References:
