Gastro-intestinal system

Peptic Ulcer Disease (PUD)

Definition

- Peptic ulcer disease is the formation of ulcers in the stomach or duodenal mucosa due to the damaging effects of gastric acid and pepsin.
- The main types are **gastric ulcers** and **duodenal ulcer**.

Types

1. **Gastric Ulcer**
   - Ulcer develops in the stomach lining.
   - It is commonly associated with reduced mucosal protection.
2. **Duodenal Ulcer**
   - Ulcer develops in the first part of the small intestine.
   - It is commonly associated with increased acid secretion.

Etiology

A. **Helicobacter pylori Infection**
   - Most common cause of peptic ulcers.
   - Damages the protective mucosal barrier.

B. **Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)**
   - **Examples:**
     - Aspirin.
     - Ibuprofen.
     - Diclofenac.
     - Reduce prostaglandin synthesis and weaken mucosal protection.

C. **Excess Gastric Acid Secretion**
   - Increased acid production can contribute to ulcer formation.

D. **Other Factors**
   - Smoking.
   - Alcohol consumption.
   - Stress.
   - Genetic predisposition.

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Etiopathogenesis

Step 1: Breakdown of Mucosal Defense

- Protective mucus and bicarbonate secretion decrease.
- The gastric lining becomes vulnerable.

Step 2: Increased Aggressive Factors

- Gastric acid and pepsin attack the mucosa.
- Tissue damage begins.

Step 3: Inflammation

- Local inflammation develops.
- Cellular injury increases.

Step 4: Ulcer Formation

- Deep erosion of the mucosa occurs.
- An ulcer develops.

Signs and Symptoms

- Burning epigastric pain
- Nausea
- Vomiting
- Bloating
- Loss of appetite
- Gastrointestinal bleeding in severe cases

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Pharmacotherapy of Peptic Ulcer Disease (PUD)

Drug Class / Treatment	Examples	Actions
Proton Pump Inhibitors (PPIs)	Omeprazole, Pantoprazole, Rabeprazole, Esomeprazole	Suppress gastric acid secretion and promote ulcer healing.
H_2-Receptor Antagonists	Famotidine, Ranitidine (historically used)	Reduce acid secretion.
Antacids	Magnesium hydroxide, Aluminium hydroxide	Neutralize gastric acid and provide symptomatic relief.
Mucosal Protective Agents	Sucralfate, Bismuth compounds	Form a protective layer over the ulcer.
H. pylori Eradication Therapy (Triple Therapy)	Proton Pump Inhibitor + Amoxicillin + Clarithromycin	Eliminate *H. pylori* infection and prevent ulcer recurrence.

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Non-Pharmacological Management

- Avoid smoking and alcohol.
- Limit NSAID use.
- Consume balanced meals.
- Reduce stress.

Reflux Esophagitis (Gastroesophageal Reflux Disease - GERD)

Definition

- GERD is inflammation and irritation of the esophagus caused by chronic reflux of gastric contents.

Etiology

1. **Lower Esophageal Sphincter (LES) Dysfunction**
   - Inadequate closure of the LES allows gastric contents to reflux.
2. **Hiatal Hernia**
   - Promotes reflux of gastric contents.
3. **Obesity**
   - Increases intra-abdominal pressure.
4. **Dietary Factors**
   - Fatty foods.
   - Caffeine.
   - Chocolate.
   - Alcohol.

Etiopathogenesis

Step 1: Lower Esophageal Sphincter Relaxation

- The sphincter fails to prevent backflow.

Step 2: Gastric Reflux

- Acidic stomach contents enter the esophagus.

Step 3: Mucosal Irritation

- Acid damages the esophageal lining.

Step 4: Inflammation

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- Esophagitis develops.

Step 5: Chronic Complications

- Ulceration
- Stricture formation
- Barrett's esophagus

Clinical Manifestations

- Heartburn.
- Acid regurgitation.
- Chest discomfort.
- Difficulty swallowing.
- Chronic cough.
- Hoarseness.

Pharmacotherapy of Gastroesophageal Reflux Disease (GERD)

Drug Class	Examples	Actions
Proton Pump Inhibitors (PPIs) – First-Line Drugs	Omeprazole, Pantoprazole, Esomeprazole	Suppress gastric acid secretion and promote healing of esophageal mucosa.
H_2-Receptor Antagonists	Famotidine, Cimetidine	Reduce acid production.
Antacids	Magnesium hydroxide, Calcium carbonate	Provide rapid symptom relief.
Prokinetic Agents	Metoclopramide, Domperidone	Increase gastric emptying and improve lower esophageal sphincter (LES) tone.

Lifestyle Modifications

- Weight reduction.
- Avoid large meals.
- Avoid lying down after meals.
- Elevate the head end of the bed.
- Avoid smoking and alcohol.

Inflammatory Bowel Disease (IBD)

Definition

- Chronic immune-mediated inflammation of the gastrointestinal tract with periods of remission and relapse.

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