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PHARMACOLOGY - III

UNIT 1

TOPIC :

- **Pharmacology of drugs acting on the Gastrointestinal Tract**

  a. Antiulcer agents.

Pharmacology of Drugs Acting on Gastrointestinal Tract

Antiulcer Agents

→ Antiulcer agents are drugs used for the treatment and prevention of peptic ulcers and acid-related disorders by reducing gastric acid secretion or protecting the gastric mucosa.

Peptic Ulcer

→ Peptic ulcer is an open sore or lesion formed in the lining of the stomach or duodenum due to the action of acid and pepsin.

Types of Peptic Ulcers

1. Gastric ulcer – Occurs in stomach
2. Duodenal ulcer – Occurs in duodenum
3. Esophageal ulcer – Occurs in esophagus

Causes of Peptic Ulcer

- Excess acid secretion
- Helicobacter pylori infection
- NSAIDs (Aspirin, Ibuprofen)
- Smoking
- Alcohol
- Stress
- Irregular food habits

Signs and Symptoms

- Burning stomach pain
- Acidity
- Nausea and vomiting
- Bloating
- Loss of appetite
- Heartburn
- Bleeding in severe cases

Classification of Antiulcer Agents

1. Antacids

- Neutralize gastric acid.

Systemic Antacids

- Sodium bicarbonate

Non-Systemic Antacids

- Magnesium hydroxide
- Aluminium hydroxide
- Calcium carbonate

2. H_2-Receptor Antagonists

- Block H_2 receptors in stomach and reduce acid secretion.

Examples:

- Cimetidine, Ranitidine, Famotidine

3. Proton Pump Inhibitors (PPIs)

- Block H^+/K^+ ATPase enzyme and strongly reduce acid secretion.

Examples:

- Omeprazole
- Pantoprazole
- Rabeprazole
- Esomeprazole

4. Cytoprotective Agents

- Protect gastric mucosa from acid.

Examples:

- Sucralfate
- Colloidal bismuth subcitrate

5. Prostaglandin Analogues

- Increase mucus and bicarbonate secretion.

Example:

- Misoprostol

6. Anti-H. pylori Drugs

- Used to eradicate Helicobacter pylori infection.

Examples:

- Amoxicillin,Clarithromycin

- Metronidazole

Mechanism of Action & Uses

Drug/Class	Mechanism of Action	Uses
Antacids	Neutralize gastric acid	Acidity, heartburn
H_2 blockers	Block H_2 receptors → decrease acid secretion	Peptic ulcer, GERD
PPIs	Inhibit proton pump (H^+/K^+ ATPase)	Peptic ulcer, Zollinger-Ellison syndrome
Sucralfate	Forms protective coating over ulcer	Gastric and duodenal ulcers
Misoprostol	Increases mucus and bicarbonate secretion	NSAID-induced ulcers
Antibiotics	Kill H. pylori bacteria	H. pylori-associated ulcers

Important Drugs

1. Omeprazole

Mechanism

- Irreversibly blocks proton pump in parietal cells.

Uses

- Peptic ulcer
- GERD
- Hyperacidity

Adverse Effects

- Headache
- Nausea
- Diarrhea

2. Ranitidine

Mechanism

- Blocks H_2 receptors and reduces acid secretion.

Uses

- Gastric ulcer
- Acid reflux

Adverse Effects

- Headache
- Constipation
- Dizziness

3. Sucralfate

Mechanism

- Forms protective barrier on ulcer surface.

Uses

- Duodenal ulcer

Adverse Effects

- Constipation
- Dry mouth

Adverse Effects of Antiulcer Drugs

Antacids

- Constipation (Aluminium salts)
- Diarrhea (Magnesium salts)

H_2 Blockers

- Headache
- Confusion (elderly)

PPIs

- Vitamin B12 deficiency (long-term)
- Increased infection risk

Misoprostol

- Diarrhea
- Uterine contractions

Precautions

- Avoid spicy food and alcohol
- Stop smoking
- Avoid long-term NSAID use
- Complete H. pylori treatment course
- Use PPIs carefully for long duration

Advantages of Antiulcer Agents

- Reduce stomach acid
- Promote ulcer healing
- Relieve pain and heartburn

- Prevent complications