Digestive System

- Responsible for breaking down food, absorbing nutrients, eliminating wastes
- Alimentary canal
  - Also known as gastrointestinal tract
  - Reaches from mouth to anus

Digestive System (continued)

- Mucosa layer lines alimentary canal
  - Provides surface for breakdown and absorption of food.
- Peristalsis—rhythmic contractions of smooth muscle in GI tract
- Accessory organs
  - Salivary glands, liver, gallbladder, pancreas

Stomach

- Two muscular rings
  - Cardiac sphincter—keeps food from moving back up esophagus
  - Pyloric sphincter—regulates the flow of food out of the stomach into the small intestine
- Stomach’s chief cells secrete enzymes; parietal cells secrete hydrochloric acid
  - Accelerate process of chemical digestion
- Thick mucous layer and bicarbonate ion protect stomach mucosa from acid

Peptic Ulcer Disease

- Lesion in stomach called gastric ulcer
- Lesion in small intestine called duodenal ulcer
- Associated with several risk factors
  - Family history, type O blood
  - Tobacco use and caffeine
  - Glucocorticoids and NSAIDs
  - Psychological stress
Peptic Ulcer Disease (continued)

- *Helicobacter pylori*
  - Primary cause of peptic ulcers
  - Gram-negative bacterium
- Other causes (contributors to ulcers and inflammation)
  - Secretion of excess gastric acid
  - Hyposcretion of adequate mucus
  - NSAIDs (most common cause in those that are not infected with *H. pylori*)

Gastroesophageal Reflux Disease

- Caused by loosening of sphincter between esophagus and stomach
- Acidic stomach contents move up into esophagus
  - Causes intense burning (heartburn)
  - May lead to esophageal ulcers, esophagitis, or strictures

Duodenal Ulcer

- More common than gastric ulcer
- Occurs most commonly in 30–50 age group
- Usual symptom: gnawing or burning upper-abdominal pain
  - Occurs 1–3 hours after a meal
  - Pain worse when stomach is empty

Duodenal Ulcer (continued)

- Other symptoms: nocturnal pain, nausea, vomiting
- Bleeding may occur
  - Bright red blood in vomit
  - Black, tarry stools

Gastric Ulcers

- Less common type of ulcer
- More common in over-60 age group
- Symptoms
  - Pain may be relieved after food or may continue after a meal.
  - Anorexia, weight loss, vomiting
- Remissions infrequent or absent
- More commonly associated with cancer

Treatment of Gastroesophageal Reflux Disease

- Treatment of GERD and peptic ulcer disease is similar
- Primary goal is to reduce gastric-acid secretion
- Drug classes
  - H2-receptor blockers
  - Antacids
  - Proton pump inhibitors
- Surgery may be necessary
Treatment of Peptic Ulcer Disease

- Combination of lifestyle changes and pharmacotherapy best
- Treatment goals
  - Eliminate infection by *H. pylori*
  - Promote ulcer healing
  - Prevent recurrence of symptoms

Treatment of *H. pylori*

- Goals of treatment
  - Primary: bacteria completely eradicated
  - Ulcers heal more rapidly
  - Ulcers remain in remission longer
  - Very high reoccurrence when *H. pylori* not eradicated
  - Infection can remain active for life if not treated.

H2-Receptor Antagonist Therapy

- Assess client’s use of OTC formulations
- If using OTC formulations, client should seek medical attention if symptoms persist or reoccur
- Persistent epigastric pain or heartburn may be symptom of more serious disease

H2-Receptor Antagonist Therapy (continued)

- Dysrhythmias and hypotension have occurred with IV cimetidine
  - Ranitidine (Zantac) or famotidine (Pepcid) can be administered intravenously
  - Assess kidney and liver function
  - Evaluate client’s CBC for possible anemia during long-term use

Proton Pump Inhibitor Therapy for PUD

- Well tolerated for short-term use
- Monitor liver function and serum gastrin with long-term use
- Assess for drug-drug interactions
- Obtain client’s history of smoking

Drugs used in treatment
- H2-receptor antagonists
- Proton pump inhibitors
- Antacids
- Antibiotics and miscellaneous drugs
Proton Pump Inhibitor Therapy for PUD (continued)

- Take 30 minutes prior to eating, usually before breakfast
- May be administered at the same time as antacids
- Often administered in combination with clarithromycin (Biaxin)

Antacid Therapy for PUD

- Obtain medical history, including use of OTC and prescription drugs
- Assess client for signs of renal insufficiency
  - Hypermagnesemia may occur—kidneys unable to excrete excess magnesium
- Magnesium- and aluminum-based products may cause diarrhea
- Calcium-based products may cause constipation

H2-Receptor Blockers

- **Prototype drug**: ranitidine (Zantac)
- **Mechanism of action**: acts by blocking H2-receptors in the stomach to decrease acid production
- **Primary use**: to treat peptic ulcer disease
- **Adverse effects**: possible reduction in number of red and white blood cells and platelets, impotence or loss of libido in men

Proton Pump Inhibitors

- **Prototype drug**: omeprazole (Prilosec)
- **Mechanism of action**: reduces acid secretion in the stomach by binding irreversibly to enzyme H+ K+-ATPase
- **Primary use**: for short-term, 4- to 8-week therapy for peptic ulcers and GERD
- **Adverse effects**: headache, nausea, diarrhea, rash, abdominal pain
  - Long-term use associated with increased risk of gastric cancer

Antacids

- **Prototype drug**: aluminum hydroxide (Amphojel)
- **Mechanism of action**: neutralizes stomach acid by raising pH of stomach contents
- **Primary use**: in combination with other antiulcer agents for relief of heartburn due to PUD or GERD
- **Adverse effects**: minor; constipation

Antibiotics

- Administered to treat *H. pylori* infections of gastrointestinal tract
- Two or more antibiotics given concurrently
  - Increase effectiveness
  - Lower potential for resistance
### Antibiotics (continued)

- The regimen often includes:
  - Proton pump inhibitor
  - Bismuth compounds
    - Inhibit bacterial growth
    - Prevent *H. pylori* from adhering to gastric mucosa

### Miscellaneous Drugs to Treat PUD

- Sucralfate
  - Coats ulcer and protects it from further erosion
- Misoprostol
  - Inhibits acid and stimulates production of mucus
- Pirenzepine
  - Inhibits autonomic receptors responsible for gastric-acid secretion

### H2-Receptor Blockers

- Slow acid secretion by stomach
- Often drugs of choice in treating PUD and GERD
- Cimetidine used less frequently
  - Drug-drug interactions are numerous.
- Do not take antacids at same time as H2-receptor blockers.
  - Decreases absorption

### Proton Pump Inhibitors

- Block enzyme H+, K+, ATPase
  - This enzyme increases hydrochloric acid
- Used for short-term therapy for PUD and GERD
- More effective at reducing gastric-acid secretion
- Have longer duration than H2-receptor blockers

### Antacids

- Inexpensive and effective at neutralizing stomach acid
- Simethicone added to reduce gas
- Relieve symptoms but do not promote ulcer healing

### Antacids (continued)

- Aluminum compounds may cause constipation
- Magnesium compounds can cause diarrhea
Antibiotics
- Administered to treat *H. pylori* infections of gastrointestinal tract
- Two or more antibiotics given concurrently
  - Increase effectiveness
  - Lower potential for resistance
- Regimen often includes
  - Proton pump inhibitor
  - Bismuth compounds
    - Inhibit bacterial growth
    - Prevent *H. pylori* from adhering to gastric mucosa

Miscellaneous Drugs
- Several additional drugs are beneficial in treating PUD
  - Sucralfate
    - Coats ulcer and protects it from further erosion
  - Misoprostol
    - Inhibits acid and stimulates production of mucus
  - Pirenzepine
    - Inhibits autonomic receptors responsible for gastric-acid secretion

Patients Receiving Pharmacotherapy for PUD or GERD
- Assessment
  - Obtain complete health history
  - Assess client for signs of GI bleeding
  - Obtain vital signs. Assess level of consciousness
  - Obtain results of CBC, liver-, renal-function tests

Patients Receiving Pharmacotherapy for PUD or GERD
- Nursing Diagnoses
  - Risk for falls, related to adverse effect of drug
  - Deficient knowledge, related to drug therapy
  - Acute pain, related to gastric irritation from ineffective drug therapy
  - Altered nutrition, less than body requirements, related to adverse effects of drug

Patients Receiving Pharmacotherapy for PUD or GERD
- Planning—client will
  - Report episodes of drowsiness, dizziness
  - Demonstrate understanding of drug therapy
  - Report reoccurrence of abdominal pain or discomfort during drug therapy
  - Report decrease in symptoms

Patients Receiving Pharmacotherapy for PUD or GERD
- Implementation
  - Monitor use of OTC drugs to avoid drug interactions
  - Monitor level of abdominal pain or discomfort.
  - Monitor client use of alcohol
  - Institute effective safety measures regarding falls
  - Explain need for lifestyle changes
  - Observe client for signs of GI bleeding
Patients Receiving Pharmacotherapy for PUD or GERD

Evaluation

- Client verbalizes signs and symptoms to report to health-care provider
- Client accurately verbalizes understanding of drug therapy
- Client reports decrease in abdominal pain during drug therapy