



Wolters Kluwer

When you have to be right

# **Introduction to Clinical Pharmacology**

## **Chapter 38**

### **Upper Gastrointestinal System Drugs**

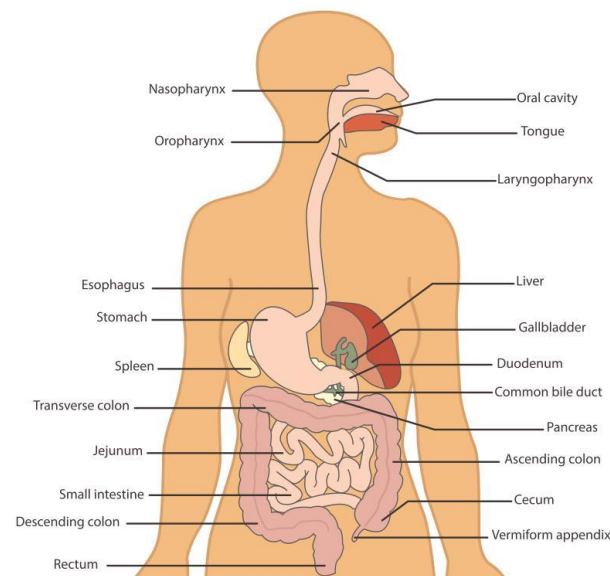
# Learning Objectives

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1. Explain the general drug actions, uses, adverse reactions, contraindications, precautions, and interactions of drugs used to treat conditions of the upper gastrointestinal (GI) system.
2. Distinguish important preadministration and ongoing assessment activities the nurse should perform with the client receiving a drug used to treat conditions of the upper GI system.
3. List nursing diagnoses particular to a client receiving a drug used to treat conditions of the upper GI system.
4. Examine ways to promote an optimal response to therapy, how to manage adverse reactions, and important points to keep in mind when educating clients about the use of drugs to treat conditions of the upper GI system.

# Gastrointestinal System

- ❖ Problems can occur when stomach acid or contents reverse direction and come back up into esophagus or stomach



# Upper Gastrointestinal System Drugs #1

- ❖ Drugs used to treat the upper GI system:
  - Antacids neutralize hydrochloric acid and protect mucosal lining
  - Histamine type 2 receptor antagonists, proton pump inhibitors, and other miscellaneous drugs reduce the production and release of hydrochloric acid
  - Proton pump inhibitors treat *Helicobacter pylori*; the infection often involved in duodenal ulcers, chronic gastritis, and peptic ulcers

# Upper Gastrointestinal System Drugs #2

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- ❖ Drugs used to treat the upper GI system (continued):
  - GI stimulants facilitate emptying of stomach contents into small intestine
  - Antiemetics prevent nausea and vomiting
  - Emetics stimulate vomiting

# Acid Neutralizers: Antacids—Actions

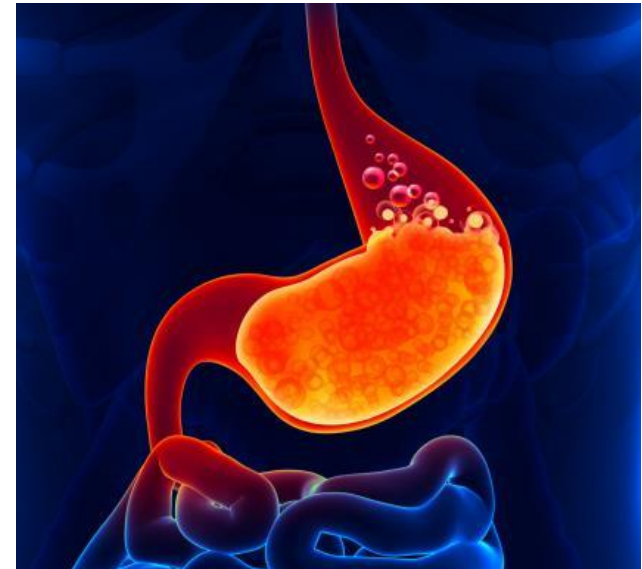
- ❖ Action: Neutralize or reduce the acidity of stomach and duodenal contents by combining with HCl and increasing the pH of the stomach acid
- ❖ Examples: aluminum, magaldrate, and magnesium



# Acid Neutralizers: Antacids—Uses

## ❖ Uses:

- Heartburn, acid indigestion, sour stomach, gastroesophageal reflux disease, peptic ulcer
- Conditions not associated with GI system:
- Aluminum carbonate—hyperphosphatemia, adjunct to a low-phosphate diet for prevention of phosphate-based urinary stones
- Calcium—calcium deficiencies and osteopenia/ osteoporosis
- Magnesium—magnesium depletion

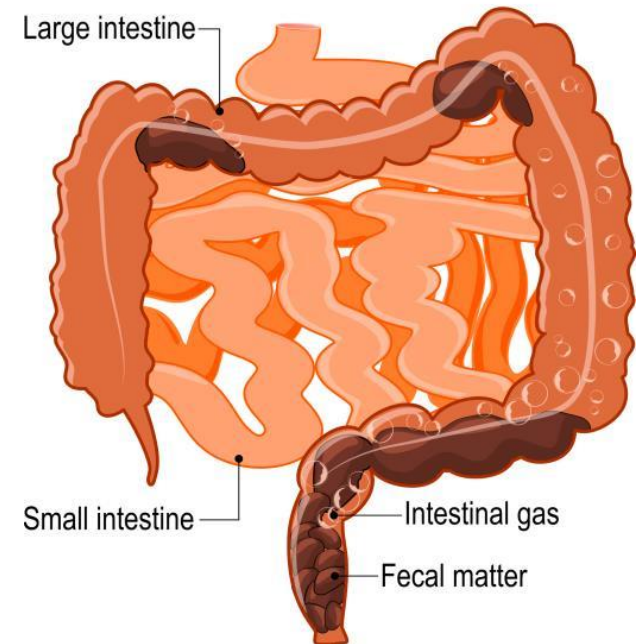


# Acid Neutralizers: Antacids—Adverse Reactions #1

## ❖ Aluminum-containing antacids:

- Constipation
- Intestinal impaction
- Anorexia
- Weakness
- Tremors
- Bone pain

## Constipation

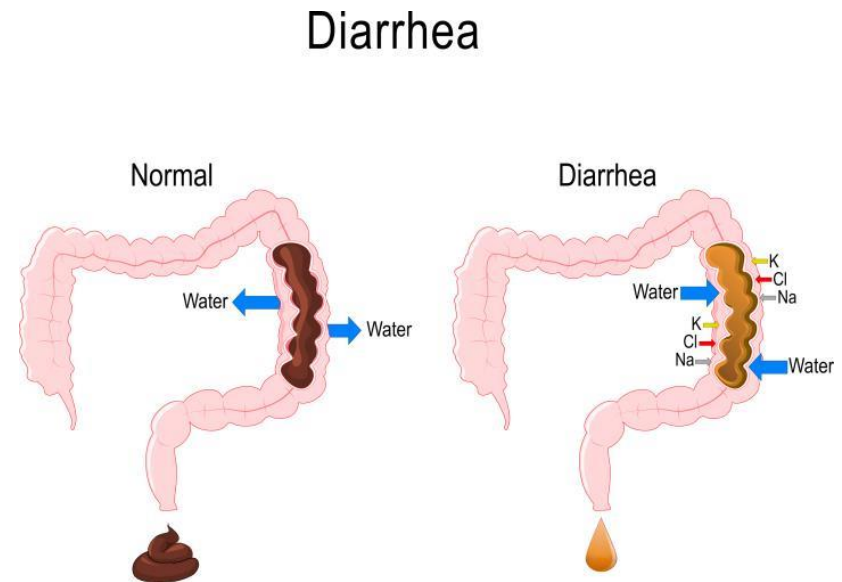




# Acid Neutralizers: Antacids—Adverse Reactions #2

## ❖ Magnesium-containing antacids:

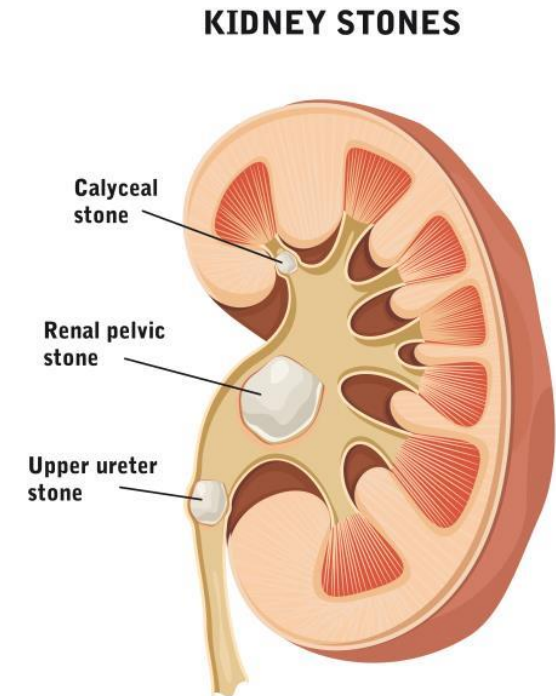
- Severe diarrhea
- Dehydration
- Hypermagnesemia



# Acid Neutralizers: Antacids—Adverse Reactions #3

## ❖ Calcium-containing antacids:

- Rebound hyperacidity
- Metabolic alkalosis
- Hypercalcemia
- Vomiting
- Confusion
- Headache
- Renal calculi



# Acid Neutralizers: Antacids— Contraindications

❖ Contraindicated in clients with:

- severe abdominal pain of unknown cause
- lactation
- cardiovascular problems (sodium-containing antacids)
- renal calculi or hypercalcemia (calcium-containing antacids)



# Acid Neutralizers: Antacids—Precautions

- ❖ Used cautiously in clients with:
  - gastric outlet obstruction or upper GI bleeding (aluminum-containing antacids)
  - decreased kidney function (magnesium- and aluminum-containing antacids)
  - respiratory insufficiency, renal impairment, or cardiac disease (calcium-containing antacids)
  - pregnancy (pregnancy category C)

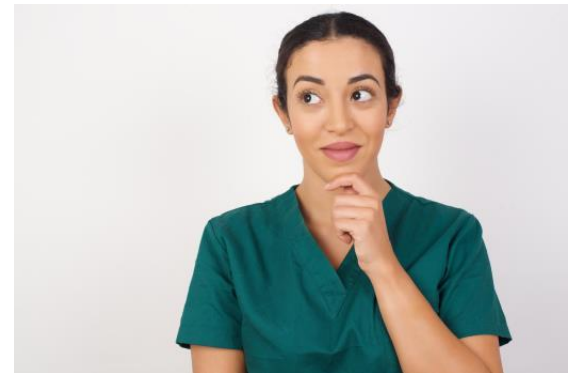


# Acid Neutralizers: Antacids—Interactions

Interacting Drug	Common Use	Effect of Interaction
Digoxin, isoniazid, phenytoin, and chlorpromazine	Treatment of cardiac problems, infection, seizures, and nausea and vomiting, respectively	Decreased absorption of the interacting drugs results in decreased effects of those drugs
Tetracycline	Anti-infective agent	Decreased effectiveness of anti-infective
Corticosteroids	Treatment of inflammation and respiratory problems	Decreased anti-inflammatory properties
Salicylates	Pain relief	Pain reliever is excreted more rapidly in urine

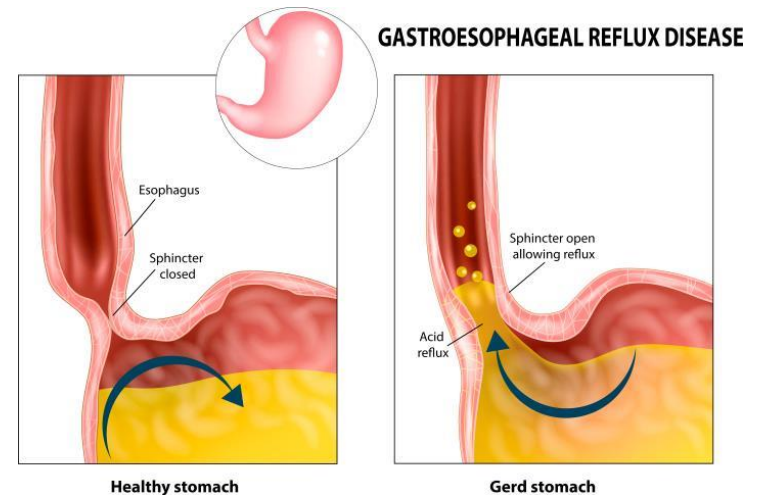
# Pharmacology in Practice Exercise #1

- ❖ A nurse has administered multiple doses of aluminum hydroxide gel to a client for the relief of stomach hyperacidity. What should the nurse begin to monitor for in this client after administration of a number of doses?
- a) Complaints of headache
  - b) Constipation
  - c) Signs of electrolyte imbalance
  - d) Amount of fluid lost



# Acid-Reducing Agents—Actions and Uses

- ❖ Actions: Inhibit the action of histamine at  $H_2$  receptor cells of the stomach; reduces the secretion of gastric acid
- ❖ Example: cimetidine
- ❖ Used in the treatment of
  - heartburn, acid indigestion, sour stomach
  - GERD
  - gastric or duodenal ulcer
  - gastric hypersecretory conditions



# Acid-Reducing Agents—Adverse Reactions

## ❖ Mild and Transient Adverse Reactions:

- Dizziness
- Somnolence
- Headache
- Confusion
- Hallucinations
- Diarrhea
- Reversible impotence





# Acid-Reducing Agents—Contraindications and Precautions

- ❖ Contraindicated in clients with:
  - known hypersensitivity to the drugs
- ❖ Used cautiously in clients:
  - with renal or hepatic impairment
  - who are severely ill, older, or debilitated
  - with diabetes (cimetidine)
  - with pregnancy (pregnancy category B and C) and lactation

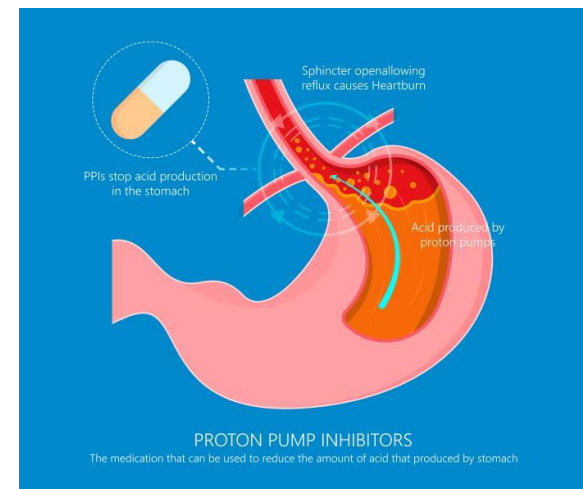


# Acid-Reducing Agents—Interactions

Interacting Drug	Common Use	Effect of Interaction
Antacids and metoclopramide	GI distress	Decreased absorption of the H <sub>2</sub> agonists
Carmustine	Anticancer therapy	Decreased white blood cell count
Oral analgesics	Pain relief	Increased risk of respiratory depression
Oral anticoagulants	Prevention of blood clots	Increased risk of bleeding
Digoxin	Cardiac problems	May decrease serum digoxin levels

# Proton Pump Inhibitors—Actions

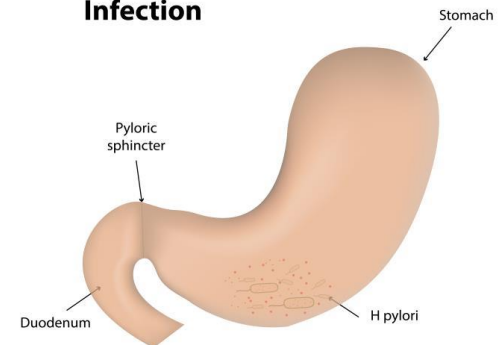
- ❖ Actions: suppress gastric acid secretion by inhibition of hydrogen-potassium adenosine triphosphatase enzyme system of the gastric parietal cells; block the final step in the production of gastric acid by the gastric mucosa also called the acid (proton) pump system
- ❖ Example: omeprazole



# Proton Pump Inhibitors—Uses

- ❖ Used in the treatment of:
  - gastric or duodenal ulcer
  - GERD and erosive esophagitis
  - pathologic hypersecretory conditions
  - prevention of bleeding in high-risk clients using antiplatelet drugs
  - *H. pylori* (treated with proton pump inhibitors and two anti-infectives)

**Helicobacter pylori Infection**



# Proton Pump Inhibitors—Adverse Reactions

## ❖ Most Common Adverse Reactions:

- Headache
- Nausea
- Diarrhea
- Abdominal pain



# Proton Pump Inhibitors—Contraindications and Precautions

- ❖ Contraindicated in clients with:
  - known hypersensitivity to the drugs
- ❖ Used cautiously in:
  - older adults with hepatic impairment
  - pregnancy (pregnancy category B and C) and lactation
  - menopausal women undergoing treatment of osteoporosis with bisphosphonates



# Proton Pump Inhibitors—Interactions #1

Interacting Drug	Common Use	Effect of Interaction
Sucralfate	Management of GI distress	Decreased absorption of the proton pump inhibitor
Ketoconazole and ampicillin	Anti-infective agents	Decreased absorption of the anti-infective
Oral anticoagulants	Prevention of blood clots	Increased risk of bleeding
Digoxin	Cardiac problems	Increased absorption of digoxin

## Proton Pump Inhibitors—Interactions #2

Interacting Drug	Common Use	Effect of Interaction
Benzodiazepines, phenytoin	Management of anxiety and seizure disorders	Risk for toxic level of antiseizure drug
Clarithromycin (with omeprazole specifically)	Anti-infective agent	Risk for increase in plasma levels of both drugs
Bisphosphonates	Bone strengthening	Increased risk of fracture



# Miscellaneous Acid Reducers—Actions

- ❖ Cholinergic blocking drugs: reduces gastric motility and decreases the amount of acid secreted by the stomach (e.g., glycopyrrolate)
- ❖ Pepsin inhibitor: binds with protein molecules to form a viscous substance which buffers acid and protects the mucosal lining (e.g., sucralfate)
- ❖ Prostaglandin drug: inhibits both the production of gastric acid and has mucosal protective properties (e.g., misoprostol)



# Pepsin Inhibitor—Uses, Adverse Reactions, and Interactions

- ❖ Sucralfate (pepsin inhibitor): used in the short-term treatment of duodenal ulcers
- ❖ Adverse Reactions: constipation
- ❖ Interactions: similar to proton pump inhibitors



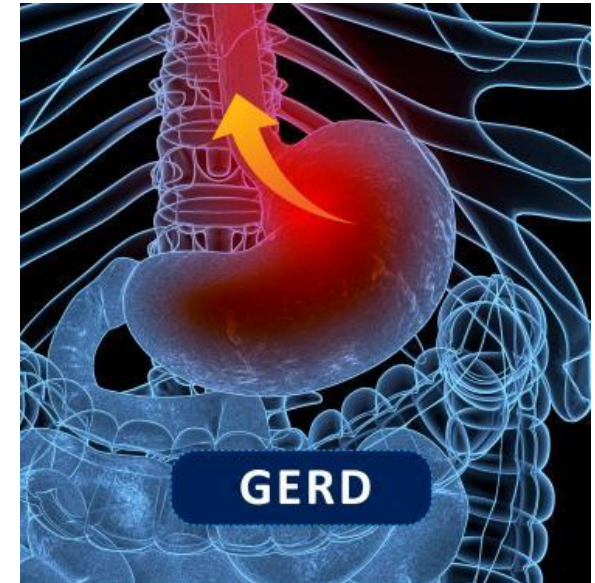
# Prostaglandin Drug—Uses, Adverse Reactions, and Interactions

- ❖ Misoprostol (prostaglandin drug): used to reduce the risk of NSAID-induced gastric ulcers in high-risk clients
- ❖ Adverse Reactions: headache, nausea, diarrhea, and abdominal pain
- ❖ Contraindicated in clients who are pregnant, may become pregnant, or who are lactating (can cause abortion and birth defects)
- ❖ Interactions: drug effects are decreased when taken with antacids



# Gastrointestinal Stimulants—Actions and Uses

- ❖ Actions: increases the motility of the upper GI tract without increasing the production of secretions; result in faster emptying of gastric contents into small intestine
- ❖ Example: metoclopramide
- ❖ Used in the treatment of:
  - GERD
  - Gastric stasis in diabetic clients, with nausea and vomiting associated with cancer therapy, and in the immediate postoperative period



# Gastrointestinal Stimulants—Adverse Reactions

## ❖ Central Nervous System Reactions:

- Restlessness
- Drowsiness
- Dizziness
- Extrapyrarnidal effects
- Facial grimacing
- Depression



# Gastrointestinal Stimulants—Contraindications and Precautions

- ❖ Contraindicated in clients with:
  - known hypersensitivity to the drugs
  - GI obstruction
  - Gastric perforation or hemorrhage
  - Pheochromocytoma
  - Parkinson disease or a seizure disorder who are taking drugs likely to cause extrapyramidal symptoms
- ❖ Used cautiously in clients with:
  - diabetes and cardiovascular disease
  - pregnancy (pregnancy category B)
  - lactation



# Gastrointestinal Stimulants—Interactions

Interacting Drug	Common Use	Effect of Interaction
Cholinergic blocking drugs or opioid analgesics	Management of GI distress or pain relief	Decreased effectiveness of metoclopramide
Cimetidine	Management of GI distress	Decreased absorption of cimetidine
Digoxin	Decreased	Increased absorption of digoxin
MAOI depressants	Management of depression	Increased risk of hypertensive episode
Levodopa	Management of disease	Decreased metoclopramide and levodopa

# Antiemetics—Actions

- ❖ Antiemetics prevent vomiting caused by drugs, radiation, and metabolic disorders
- ❖ Actions:
  - act primarily by inhibiting the chemoreceptor trigger zone (CTZ) and the brain's primary neurotransmitters dopamine and acetylcholine
  - 5-hydroxytryptamine type 3 (5HT<sub>3</sub>) receptor antagonists target serotonin receptors in both the CTZ and peripherally acting at the nerve endings in the stomach
- ❖ Example: ondansetron





# Antiemetics—Uses

- ❖ Used in the treatment or prevention of nausea and vomiting:
  - Before surgery
  - Immediately after surgery
  - Before, during, or after administration of an antineoplastic drug
  - During radiation therapy
  - During pregnancy for hyperemesis
  - Related to motion sickness, adverse reactions, or from bacterial and viral infections
  - Being tested for use in irritable bowel syndrome

# Antiemetics—Adverse Reactions

## ❖ Most Common Adverse Reactions:

- Drowsiness
- Others specific to each drug



# Antiemetics—Contraindications

- ❖ Contraindicated in clients with:
  - known hypersensitivity to the drugs
  - heart block or prolonged QT intervals (5-HT<sub>3</sub> receptor antagonists)
  - pregnancy and lactation
  - uncomplicated vomiting in young children
  - bone marrow depression, blood dyscrasia, Parkinson disease, or severe liver or cardiovascular disease (prochlorperazine)



# Antiemetics—Precautions

- ❖ Used cautiously in clients with:
  - severe nausea and vomiting with an unknown cause
  - glaucoma, obstructive disease of the GI or GU system, renal or hepatic insufficiency, and in older men with possible prostatic hypertrophy (cholinergic blocking antiemetics)
  - conduction problems or electrolyte imbalances (5-HT<sub>3</sub> receptor antagonists)
  - pregnancy (pregnancy category B)



# Antiemetics—Interactions

Interacting Drug	Common Use	Effect of Interaction
Antihistamines	Management of allergy and respiratory distress	Increased risk of sedation
Antacids	Management of gastric distress	Decreased absorption of antiemetic
Rifampin with 5-HT3 receptor antagonist	Tuberculosis/HIV infection management	Decreased effectiveness of 5-HT3 receptor antagonist
Lithium with prochlorperazine	Management of bipolar disorder	Increased risk of extrapyramidal effects

# Emetics

- ❖ Actions: local irritation of the stomach and stimulation of the vomiting center to induce vomiting
- ❖ Example: syrup of ipecac
- ❖ Used in the treatment of:
  - some incidents of ingestion of a poison or drug overdose
- ❖ Contraindicated in ingestion of caustic substances



# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #1

## ❖ Preadministration Assessment

## ❖ Objective Data

- Vital signs
- Number of times emesis occurred, approximate amount of fluid lost, content, blood
- Palpate for skin turgor
- Weight
- Lab tests: electrolyte panel if dehydration suspected



# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #2

## ❖ Preadministration Assessment (continued)

### ❖ Subjective Data

- Description of nausea, type and intensity of symptoms (e.g., pain, discomfort, nausea, vomiting)
- Remedies client has attempted before seeking treatment
- Medical history
- Current list of all drugs and supplements taken





# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #3

## ❖ Ongoing Assessment

- Monitor the client frequently for continued complaints of pain, sour taste, or the production of bloody or coffee-ground emesis
- Monitor for signs and symptoms of electrolyte imbalance
- Measure and document intake and output
- Weigh client with repeated episodes of vomiting daily to weekly
- Assess the client for effectiveness of the drug in relieving symptoms

## Pharmacology in Practice Exercise #2

- ❖ A nurse is caring for a client experiencing nausea and vomiting. The primary healthcare provider has prescribed antiemetic drug therapy for the client. Which of the following symptoms describe the possibility of dehydration? Select all that apply.
- a) White streaks in stool
  - b) Decreased urinary output
  - c) Concentrated urine
  - d) Decreased respiratory rate
  - e) Dry mucous membranes



# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #4

## ❖ Nursing Diagnosis

- Risk for Dehydration related to diarrhea, nausea, and vomiting
- Malnutrition related to impaired ability to ingest and retain food and fluids, or offensive tastes and smells
- Altered Health Maintenance related to inability to take oral form of medication
- Injury Risk related to adverse drug effects of drowsiness

# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #5

## ❖ Planning

- Expected client outcomes depend on the reason for administration of the drug but include:
  - Optimal response to therapy
  - Management of adverse drug reactions
  - Confidence in an understanding of the prescribed medication regimen

# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #6

## ❖ Implementation

- *Promoting Optimal Response to Therapy—Antacids*
  - No oral drug should be administered within 1 to 2 hours of an antacid
  - Self-administration at the bedside: ensure there is adequate water and cups for measuring the dose



# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #7

## ❖ Implementation

- *Promoting Optimal Response to Therapy—Nonoral Methods of Drug Administration*
  - IV route is preferred for clients preoperatively, postoperatively, or due to inability to take orally
  - Monitor the rate of infusion at frequent intervals; too rapid of infusion can cause cardiac arrhythmias
  - If administering through an enteral tube, check if pill can be crushed or capsule can be opened; mix with 40 mL of water and administer; flush afterwards
  - Request liquid form of drug if available when administering through an enteral tube

# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #8

## ❖ Implementation

- *Promoting Optimal Response to Therapy—Prevention of Nausea in Clients Undergoing Cancer Therapy*
  - Administer the drugs before chemotherapy is given
  - Give first dose IV during therapy; ask client to take it orally when at home for specified time period
  - Explain the importance of taking the drug as directed



# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #9

## ❖ Implementation

### ○ Monitoring and Managing Client Needs

#### ■ Risk for Dehydration

- Observe the client for signs of dehydration
- Keep accurate record of fluid intake and output including stool (can cause diarrhea or constipation); monitor every 8 hours
- Describe diarrhea stool if present
- Contact primary healthcare provider if signs of dehydration or electrolyte imbalance occur
- Offer small sips of water if client is able to tolerate them



# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #10

## ❖ Implementation

### ○ Monitoring and Managing Client Needs

#### ■ Malnutrition

- Provide the client with an emesis basin and check the client at frequent intervals; if emesis occurs, measure and document the volume
- Offer comfort measures: damp washcloth or towel to wipe hands and face; mouthwash or oral rinses
- Make the environment as pleasant as possible; remove strong smells and odors

# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #11

## ❖ Implementation

### ○ Monitoring and Managing Client Needs

#### ■ Altered Health Maintenance

- Teach the client to chew the tablets thoroughly before swallowing and then drink a full glass of water or milk
- Shake liquid antacids thoroughly before administering
- Inform primary healthcare provider if client has dislike for taste of antacid or has difficulty chewing tablet form; flavored tablets are available

# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #12

## ❖ Implementation

- Monitoring and Managing Client Needs
  - **Altered Health Maintenance (continued)**
    - Contact primary healthcare provider if oral form has been ordered and client cannot retain the drug
    - If giving the drug via rectal suppository, use gloves to administer; provide client with gloves or finger cots if being sent home
    - Scopolamine transdermal patches are placed behind the ear about 4 hours prior to need for antiemetic effect
    - Advise the client to discard any disk that becomes detached and replace it with a fresh disk behind the opposite ear

# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #13

## ❖ Implementation

### ○ Monitoring and Managing Client Needs

#### ■ Injury Risk

- Instruct client to remain in bed and provide call light for assistance
- Observe client receiving long-term metoclopramide for adverse reactions related to the CNS
- Report signs of extrapyramidal symptoms or tardive dyskinesia



# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #14

## ❖ Implementation—Educating the Client and Family

- Emphasize avoiding driving or performing other hazardous tasks due to drowsiness
- Explain the correct method to take the drugs
- Explain the necessity of contacting the primary healthcare provider immediately if any adverse symptoms occur
- Explain that magnesium-containing products may produce a laxative effect, whereas aluminum- or calcium-containing antacids may cause constipation



# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #15

## ❖ Implementation—Educating the Client and Family (continued)—Using Emetics Properly

- Teach the client and family:
  - Prior to administration of an emetic, know the chemical or substance that was ingested, the time of ingestion, and the symptoms
  - Use syrup of ipecac only in clients that are fully conscious and as directed by a healthcare professional



# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #16

- ❖ **Implementation—Educating the Client and Family—Using Emetics Properly (continued)**
  - Teach the client and family:
    - Do not administer syrup of ipecac when the substance is caustic, corrosive, a low-viscosity petroleum distillate, or if the client has a medical contraindication
    - Healthcare professional should contact local poison control center



# Pharmacology in Practice Exercise #3

- ❖ An urgent care triage nurse receives a call about a client who has ingested poison. What priority information should the nurse obtain from a family member or friend of the client before discussing with the primary healthcare provider on duty? Select all that apply.
  - a) Substances that have been ingested
  - b) Reason for ingesting the poison
  - c) Approximately when the substances were ingested
  - d) Client's mental status before taking the poison
  - e) Symptoms noted before seeking medical treatment





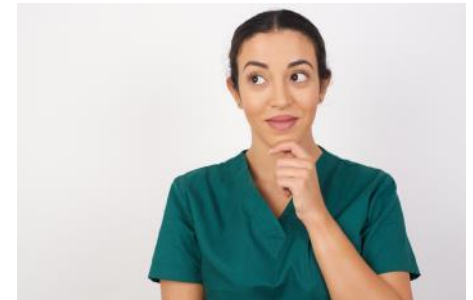
# Nursing Process—Client Receiving a Drug for an Upper Gastrointestinal Condition #17

## ❖ Evaluation

- Was the therapeutic effect achieved and nausea or pain controlled?
- Were adverse reactions: identified, reported, and managed?
  - Fluid volume balance is maintained
  - Client maintains adequate nutritional status
  - Client manages the therapeutic regimen effectively
  - No injury is evident
- Did client and family express confidence and demonstrate understanding of drug regimen?

# Turn and Talk—Case Study #1

- ❖ A client presents to the physician's office for a yearly physical. While in the office, the client mentions they are going on a cruise for spring break next week. Last time on a boat, they suffered from a bout of motion sickness and asks the nurse whether there is anything they can do to prevent motion sickness.
- 1. What product can be used prophylactically to prevent motion sickness?
- 2. The physician writes a prescription for scopolamine patches. How should the nurse advise the client to use the patch?



## Turn and Talk—Case Study #2

- ❖ A client presents to the physician's office for a yearly physical. While in the office, the client mentions they are going on a cruise for spring break next week. Last time on a boat, they suffered from a bout of motion sickness and asks the nurse whether there is anything they can do to prevent motion sickness.
- 3. What adverse effects should the nurse discuss with the client about the scopolamine patch?

