

# Drugs That Affect the Gastrointestinal System

## Key Terms

antacids	<i>Helicobacter pylori</i>
antiflatulents	hydrochloric acid
emetic	hypersecretory
gallstone-solubilizing	paralytic ileus
gastric stasis	photophobia
gastroesophageal	proton pump inhibitor
reflux disease	

## Chapter Objectives

On completion of this chapter, the student will:

- List the types of drugs prescribed or recommended for gastrointestinal disorders.
- Discuss the uses, general drug actions, general adverse reactions, contraindications, precautions, and interactions associated with gastrointestinal drugs.
- Discuss important preadministration and ongoing assessment activities the nurse should perform on the patient taking a gastrointestinal drug.
- List some nursing diagnoses particular to a patient taking a gastrointestinal drug.
- Discuss ways to promote an optimal response to therapy, how to manage common adverse reactions, and important points to keep in mind when educating patients about the use of gastrointestinal drugs.

The gastrointestinal (GI) tract is subject to more diseases and disorders than any other system of the body. Some drugs used for GI disorders are available as nonprescription drugs, thereby creating the potential problems of misuse and overuse of the drugs and the disguising of more serious medical problems.

The drugs presented in this chapter include the antacids, anticholinergics, GI stimulants, proton pump inhibitors, histamine H<sub>2</sub> antagonists, antidiarrheals, antiflatulents, digestive enzymes, emetics, gallstone-solubilizing drugs, laxatives, and miscellaneous drugs. Some of the more common preparations are listed in the Summary Drug Table: Drugs Used in the Management of Gastrointestinal Disorders.

## ANTACIDS

### ACTIONS

Some of the cells of the stomach secrete **hydrochloric acid**, a substance that aids in the initial digestive process.

**Antacids** (against acids) are drugs that neutralize or reduce the acidity of stomach and duodenal contents by combining with hydrochloric acid and producing salt and water. Examples of antacids include aluminum hydroxide gel (Amphojel), magaldrate (Riopan), and magnesia or magnesium hydroxide (Milk of Magnesia).

### USES

Antacids are used in the treatment of hyperacidity, such as heartburn, gastroesophageal reflux, sour stomach, acid indigestion, and in the medical treatment of peptic ulcer. Many antacid preparations contain more than one ingredient. An additional use for aluminum carbonate is in the treatment of hyperphosphatemia or for use with a low phosphate diet to prevent formation of phosphate urinary stones. Calcium carbonate may be used in treating calcium deficiency states such as menopausal osteoporosis. Magnesium oxide may be used in the treatment of magnesium deficiencies or magnesium depletion from malnutrition, restricted diet, or alcoholism.

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**SUMMARY DRUG TABLE DRUGS USED IN THE MANAGEMENT OF GASTROINTESTINAL DISORDERS**

GENERIC NAME	TRADE NAME*	USES	DOSAGE RANGES
<b>Proton Pump Inhibitors</b>			
esomeprazole magnesium <i>ess-oh-me'-pra-zol</i>	Nexium	Erosive esophagitis, gastroesophageal reflux disease (GERD), long-term treatment of pathologic hypersecretory conditions	20–40 mg/d PO
lansoprazole <i>lan-soe'-pra-zole</i>	Prevacid	Duodenal ulcer, <i>H. pylori</i> eradication in patients with duodenal ulcer, gastric ulcer, erosive esophagitis, GERD, hypersecretory conditions	15–30 mg/d PO
omeprazole <i>oh-me'-pra-zol</i>	Prilosec	Duodenal ulcer, <i>H. pylori</i> eradication, hypersecretory conditions, gastric ulcer, erosive esophagitis, GERD, hypersecretory conditions	20–40 mg/d PO; 60 mg/d up to 120 mg TID
pantoprazole sodium <i>pan-toe'-pray-zol</i>	Protonix, Protonix IV	GERD	40 mg PO daily to BID up to 120 mg/d; IV, 80 mg; maximum dosage 240 mg/d
rabeprazole sodium <i>rah-beh'-pray-zol</i>	Aciphex	Duodenal ulcer, GERD, hypersecretory conditions	2–60 mg/d
<b>Miscellaneous Gastrointestinal Drugs</b>			
bismuth subsalicylate	Bismatrol Pepto-Bismol, Pink Bismuth	Nausea, diarrhea, abdominal cramps, <i>H. pylori</i> with duodenal ulcer	2 tablets or 30 mL PO q 30 min–1 h up to 8 doses in 24 h
balsalazide disodium <i>bal-sal'-a-zyde</i>	Colazal	Ulcerative colitis	3 750-mg capsules PO TID for 8 wk
infliximab <i>in-flicks'-ih-mab</i>	Remicade	Crohn's disease, rheumatoid arthritis	RA: 3 mg/kg IV; Crohn's: 5 mg/kg IV
mesalamine <i>me-sal'-a-meen</i>	Asacol, Rowasa, <i>generic</i>	Treatment of active to moderate ulcerative colitis, proctosigmoiditis, or proctitis	Suspension enema: 4 g once daily in 60 mL; rectal suppository: 500 mg (1 suppository) BID; oral: 800 mg TID PO
misoprostol <i>mye-soe-prost'-ole</i>	Cytotec	Prevention of gastric ulcers caused by aspirin or NSAID use (unlabeled use)	100–200 µg QID PO
olsalazine <i>ole-sal'-a-zeen</i>	Dipentum	Maintenance of remission of ulcerative colitis in patients intolerant of sulfasalazine	1 g/d in two divided doses PO
sucralfate <i>soo-kral'-fate</i>	Carafate, <i>generic</i>	Active duodenal ulcer	1 g/d PO in divided doses
sulfasalazine <i>sul-fa-sal'-a-zeen</i>	Azulfidine, <i>generic</i>	Ulcerative colitis, rheumatoid arthritis	1 g QID PO
<b>Antacids</b>			
aluminum carbonate gel, basic <i>a-loo'-mi-num</i>	Basaljel		2 tablets or capsules or 10 mL of regular suspension (in water or fruit juice) or 5 mL of extra strength suspension as often as every 2 h, up to 12 times daily

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**SUMMARY DRUG TABLE DRUGS USED IN THE MANAGEMENT OF GASTROINTESTINAL DISORDERS (Continued)**

GENERIC NAME	TRADE NAME*	USES	DOSAGE RANGES
aluminum hydroxide gel	Alu-Tab, Amphojel, Dialume, <i>generic</i>		Tablets or capsules: 500–1500 mg 3–6 times daily PO between meals and HS; suspension: 5–15 mL as needed between meals and HS PO
calcium carbonate <i>kal'-see-um</i>	Chooz, Tums, <i>generic</i>		0.5–12 g PO as needed
magaldrate (hydroxymagnesium aluminum) <i>mag'-al-drate</i>	Riopan, <i>generic</i>		980–1080 mg PO 1 and 3 hours after meals and HS
magnesia (magnesium hydroxide) <i>mag-nee'-zee-ah</i>	Milk of Magnesia, Phillips' Chewable		Liquid: 5–15 mL PO QID with water; tablets: 650 mg–1.3 g QID PO; laxative: 15–60 mL PO taken with liquid
magnesium oxide <i>mag-nee'-zee-um</i>	Mag-Ox 400, Maox 420, Uro-mag, <i>generic</i>		Capsules: 280 mg–1.5 g QID PO; tablets: 400–820 mg/d PO
sodium bicarbonate <i>sow-dee'-um</i>	Bell/ans, <i>generic</i>		0.3–2 g 1–4 times daily PO
<b>Anticholinergics</b>			
belladonna	<i>Generic</i>		Tincture: 0.6–1 mL TID–QID
clindinium bromide <i>klin-din'-ee-um</i>	Quarzan		2.5–5 mg PO TID–QID AC and HS geriatric or debilitated patients: 2.5 mg TID AC
dicyclomine HCl <i>dye-sye-klo'-meen</i>	Bentyl, Di-Spaz, <i>generic</i>		Oral: 80–160 mg/d in 4 doses PO; parenteral: 80 mg/d IM
glycopyrrolate <i>gly-ko-pie'-roll-ate</i>	Robinul, Robinul Forte, <i>generic</i>		Oral: 1 mg TID or 2 mg BID–TID PO; parenteral: 0.1–0.2 mg IM or IV TID–QID
1-hyoscyamine sulfate <i>el-hi'-o-si-ah-meen</i>	Anaspaz, Donnamar, Levbid, Levsin		Oral: 0.125–0.25 mg PO TID–QID PO or sublingually; sustained release: 0.375–0.75 mg q12h PO; parenteral: 0.25–0.5 mg SC, IM, IV BID–QID
mepenzolate bromide <i>me-pin-zo'-late</i>	Cantil		25–50 mg QID with meals and HS
methantheline bromide <i>meth-an'-tha-leen</i>	Banthine, <i>generic</i>		Adult: 50–100 mg PO q6h
methscopolamine bromide <i>meth-sco-pol'-a-meen</i>	Pamine		2.5 mg 30 min AC and 2.5–5 mg HS PO
propantheline bromide <i>proe-pan'-the-leen</i>	Pro-Banthine, <i>generic</i>		15 mg PO 30 min AC and HS
tridihexethyl chloride <i>tri-di-hex'-eth-l</i>	Pathilon		25–50 mg TID–QID AC and 50 mg HS PO

**SUMMARY DRUG TABLE DRUGS USED IN THE MANAGEMENT OF GASTROINTESTINAL DISORDERS (Continued)**

GENERIC NAME	TRADE NAME*	USES	DOSAGE RANGES
<b>Gastrointestinal Stimulants</b>			
dexpanthenol <i>dex-pan'-the-nole</i>	Ilopan, <i>generic</i>		250–500 mg IM, IV
metoclopramide <i>met-oh-kloe-pra'-mide</i>	Reglan, <i>generic</i>		10–15 mg PO 30 min AC and HS; 10–20 mg IM, IV
<b>Histamine H<sub>2</sub> Antagonists</b>			
cimetidine <i>sy-met'-i-deen</i>	Tagamet, Tagamet HB, <i>generic</i>		300–2400 mg/d PO; 300 mg q6h IM, IV; 50 mg/h continuous IV infusion
famotidine <i>fa-moe'-ti-deen</i>	Pepcid, Pepcid IV, <i>generic</i>		20–40 mg PO, IV as one dose or BID
nizatidine <i>ni-za'-ti-deen</i>	Axid Pulvules		Gastric or duodenal ulcer: 300 mg/d PO HS or 150 mg BID PO; maintenance of healed ulcer: 150 mg/d PO HS; heartburn: 75 mg PO <sup>1</sup> / <sub>2</sub> –1 h before food or beverages that cause the problem, taken with water
ranitidine <i>ra-nye'-te-deen</i>	Zantac		150 mg PO BID or 300 mg PO HS; 50 mg q6–8h IM, IV (do not exceed 400 mg/d)
<b>Antidiarrheals</b>			
difenoxin HCl with atropine <i>dye-fen-ox'-in-a'-troe-peen</i>	Motofen		Initial dose 2 tablets PO, then 1 tablet after each loose stool (no more than 8 mg/d for no more than 2 days)
diphenoxylate HCl with atropine <i>di-fen-ox'-i'-late</i>	Lomotil, Lonox, <i>generic</i>		Initial dose 5 mg PO TID–QID as needed
loperamide HCl <i>loe-per'-a-mide</i>	Imodium A-D, Kaopectate II, Maalox Anti-Diarrheal caplets, <i>generic</i>		Initial dose 4 mg PO then 2 mg after each loose stool (no more than 16 mg/d)
<b>Antiflatulents</b>			
charcoal <i>char'-kole</i>	Liqui-Char, <i>generic</i>		520 mg PO after meals or at the first sign of discomfort (up to 4.16 g/d)
simethicone <i>sigh-meth'-ih-kohn</i>	Gas-X, Mylicon, <i>generic</i>		Capsules: 125 mg PO QID PC and HS; tablets: 40–125 mg PO QID PC and HS; drops: 40–80 mg PO QID PC and HS (up to 500 mg/d)

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**SUMMARY DRUG TABLE DRUGS USED IN THE MANAGEMENT OF GASTROINTESTINAL DISORDERS (Continued)**

GENERIC NAME	TRADE NAME*	USES	DOSAGE RANGES
<b>Digestive Enzymes</b>			
pancreatin <i>pan-kre-at'-in</i>	Creon, Digepepsin, Donnazyme		1–2 tablets PO with meals or snacks
pancrelipase <i>pan-kre-li'-pase</i>	Cotazym Capsules, Viokase Powder, Ilozyme tablets		4000–48,000 lipase PO with meals and snacks; usually 1–3 capsules or tablets before or with meals and snacks
<b>Emetics</b>			
apomorphine HCl <i>a-po-mor'-feen</i>	Generic		2–10 mg SC; do not repeat
ipecac syrup <i>ip'-e-kak</i>	Generic		15–30 mL PO, followed by 3–4 glasses of water; children's dosage based on age: 5–15 mL PO followed by ½–3 glasses of water
<b>Gallstone-Solubilizing Agent</b>			
ursodiol <i>ur-soe-dye'-ole</i>	Actigall, generic		8–10 mg/kg/d PO in 2–3 divided doses
<b>Laxatives</b>			
<b>Saline Laxatives</b>			
magnesium preparations <i>mag-nez'-e-um</i>	Epsom Salt, Milk of Magnesia		Follow directions given on the container
<b>Irritant or Stimulant Laxatives</b>			
casacara sagrada <i>kas-kar'-a-sa-grad'-a</i>	Auromatic Cascara, generic		Follow directions given on the container
sennosides <i>sen-oh-sides</i>	Agoral, Ex-Lax, Senexon, Senna-Gel, Senokot		Follow directions given on the container
bisacodyl <i>bis-a-koe'-dill</i>	Bisca-Evac, Dulcolax, Modane		Tablets: 10–15 mg daily PO Suppositories: 10 mg once daily
<b>Bulk-Producing Laxatives</b>			
psyllium <i>sill'-i-um</i>	Fiberall Tropical Fruit Flavor, Genfiber, Hydrocil Instant, Konsyl, Metamucil, Serutan		Follow directions on the container
polycarbophil <i>pol-i-kar'-boe-fil</i>	Equalactin, FiberCon, Mitrolan		1250 mg one to four times daily or as needed (do not exceed 5 g in 24 h)
<b>Emollients</b>			
mineral oil	Kondremul Plain, Milkinol, generic		15–45 mL PO at HS
<b>Fecal Softeners/Surfactants</b>			
docusate sodium (dioctyl sodium sulfosuccinate: DDS) <i>dok'-yoo-sate</i>	Colace, D-S-S, Ex-Lax Stool Softener, Modane Soft, generic		Follow directions on the container
docusate calcium (dioctyl calcium sulfosuccinate) <i>dok'-yoo-sate</i>	Surfak Liquigels, generic		240 mg/d until bowel movements are normal

### SUMMARY DRUG TABLE DRUGS USED IN THE MANAGEMENT OF GASTROINTESTINAL DISORDERS (*Continued*)

GENERIC NAME	TRADE NAME*	USES	DOSAGE RANGES
<i>Hyperosmotic Agents</i>			
glycerin <i>gli'-ser-in</i>	Colace Suppositories, Sani-Supp, <i>generic</i>		Suppositories: insert 1 high in the rectum and retain 15 min; rectal liquid: insert all the liquid into rectum toward the navel
lactulose <i>lak-tyoo-los</i>	Chronulac, Constilac, Duphalac, <i>generic</i>		10–60 mL/d PO
<i>Bowel Evacuants</i>			
polyethylene glycol-electrolyte solution (PEG-ES) <i>pol-e-eth-i-leen</i>	CoLyte, GoLYTELY, NuLyteLy, OCL, <i>generic</i>		4 L oral solution before GI exam (do not give solid foods within 2 h before administration)
polyethylene glycol (PEG) solution	MiraLax		17 g of powder/d in 8 oz of water (48–72 h may be required to produce a bowel movement)

\*The term *generic* indicates the drug is available in generic form.

## ADVERSE REACTIONS

The magnesium- and sodium-containing antacids may have a laxative effect and produce diarrhea. Aluminum- and calcium-containing products tend to produce constipation. Some of the less common but more serious adverse reactions include:

- Aluminum-containing antacids—constipation, intestinal impaction, anorexia, weakness, tremors, and bone pain
- Magnesium-containing antacids—severe diarrhea, dehydration, and hypermagnesemia (nausea, vomiting, hypotension, decreased respirations)
- Calcium-containing antacids—rebound hyperacidity, metabolic alkalosis, hypercalcemia, vomiting, confusion, headache, renal calculi, and neurologic impairment
- Sodium bicarbonate—systemic alkalosis and rebound hypersecretion

Although the antacids have the potential for serious adverse reactions, they have a wide margin of safety, especially when used as prescribed.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

The antacids are contraindicated in patients with severe abdominal pain of unknown cause and during lactation. Sodium-containing antacids are contraindicated in

patients with cardiovascular problems, such as hypertension or congestive heart failure, and those on sodium-restricted diets. Calcium-containing antacids are contraindicated in patients with renal calculi or hypercalcemia.

Aluminum-containing antacids are used cautiously in patients with gastric outlet obstruction. Magnesium- and aluminum-containing antacids are used cautiously in patients with decreased kidney function. The calcium-containing antacids are used cautiously in patients with respiratory insufficiency, renal impairment, or cardiac disease. Antacids are classified as Pregnancy Category C drugs and should be used with caution during pregnancy.

Antacids may interfere with other drugs in three ways:

1. Increasing the gastric pH, which causes a decrease in absorption of weakly acidic drugs and results in a decreased drug effect (eg, digoxin, phenytoin, chlorpromazine, and isoniazid)
2. Absorbing or binding drugs to their surface, resulting in decreased bioavailability (eg, tetracycline)
3. Affecting the rate of drug elimination by increasing urinary pH (eg, the excretion of salicylates is increased, whereas excretion of quinidine and amphetamines is decreased)

The following drugs have a decreased pharmacologic effect when administered with an antacid: corticosteroids, digoxin, chlorpromazine, oral iron products, isoniazid, phenothiazines, ranitidine, phenytoin, valproic acid, and the tetracyclines.

## ANTICHOLINERGICS

### ACTIONS

Anticholinergics (cholinergic blocking drugs) reduce gastric motility and decrease the amount of acid secreted by the stomach (see Chap. 25). Examples of anticholinergics used for GI disorders include propantheline (Pro-Banthine) and glycopyrrolate (Robinul).

### USES

Specific anticholinergic drugs are occasionally used in the medical treatment of peptic ulcer. These drugs have been largely replaced by histamine H<sub>2</sub> antagonists, which appear to be more effective and have fewer adverse drug reactions.

### ADVERSE REACTIONS

Dry mouth, blurred vision, urinary hesitancy, urinary retention, nausea, vomiting, palpitations, and headache are some of the adverse reactions that may be seen with the use of anticholinergic drugs (see Chap. 25).

Contraindications, precautions, and interactions of the anticholinergic drugs are discussed in Chapter 25.

## GASTROINTESTINAL STIMULANTS

### ACTIONS

Metoclopramide (Reglan) and dextanthenol (Ilopan) increase the motility of the upper GI tract. The exact mode of action of these drugs is unclear.

### USES

Oral preparations of metoclopramide are used in the treatment of symptomatic **gastroesophageal reflux disease** (GERD; a reflux or backup of gastric contents into the esophagus) and **gastric stasis** (failure to normally move food out of the stomach) in patients with diabetes. This drug is given intravenously (IV) to prevent nausea and vomiting associated with cancer chemotherapy and to prevent nausea and vomiting during the immediate postoperative period. Dextanthenol may be given IV immediately after major abdominal surgery to reduce the risk of **paralytic ileus** (lack of peristalsis or movement of the intestines).

## ADVERSE REACTIONS

The adverse reactions associated with metoclopramide are usually mild. Higher doses or prolonged administration may produce central nervous system (CNS) symptoms, such as drowsiness, dizziness, Parkinson-like symptoms (tremor, mask-like facial expression, muscle rigidity), depression, facial grimacing, motor restlessness, and involuntary movements of the eyes, face, or limbs. Dextanthenol administration may cause itching, difficulty breathing, and urticaria.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

The GI stimulants are contraindicated in patients with known hypersensitivity to the drugs, GI obstruction, gastric perforation or hemorrhage, or epilepsy. These drugs are secreted in breast milk and should not be used during lactation.

These drugs are used cautiously in patients with diabetes and cardiovascular disease. Metoclopramide is a Pregnancy Category B drug; dextanthenol is a Pregnancy Category C drug.

The effects of metoclopramide are antagonized by concurrent administration of anticholinergics or narcotic analgesics. Metoclopramide may decrease the absorption of digoxin and cimetidine and increase absorption of acetaminophen, tetracyclines, and levodopa. Metoclopramide may alter the body's insulin requirements.

## HISTAMINE H<sub>2</sub> ANTAGONISTS

### ACTIONS

These drugs inhibit the action of histamine at histamine H<sub>2</sub> receptor cells of the stomach, which then reduces the secretion of gastric acid and reduces total pepsin output. The decrease in acid allows the ulcerated areas to heal. Examples of histamine H<sub>2</sub> antagonists include cimetidine (Tagamet), famotidine (Pepcid), nizatidine (Axid Pulvules), ranitidine (Zantac).

### USES

These drugs are used for the medical treatment of a gastric or duodenal ulcer, gastric **hypersecretory** (excessive gastric secretion of hydrochloric acid) conditions, and GERD. These drugs may also be used as prophylaxis of stress-related ulcers and acute upper GI bleeding in critically ill patients.



## ADVERSE REACTIONS

Adverse reactions of the histamine H<sub>2</sub> antagonists include dizziness, somnolence, headache, confusion, hallucinations, diarrhea, and impotence (that is reversible when the drug is discontinued). Adverse reactions are usually mild and transient.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

The histamine H<sub>2</sub> antagonists are contraindicated in patients with a known hypersensitivity to the drugs.

These drugs are used cautiously in patients with renal or hepatic impairment and in the severely ill or debilitated patient. Cimetidine is used cautiously in patients with diabetes. The histamine H<sub>2</sub> antagonists are used cautiously in the older adult (causes confusion). A dosage reduction may be required. Histamine antagonists are Pregnancy Category B (cimetidine, famotidine, and ranitidine) drugs and C (nizatidine) drugs and should be used with caution during pregnancy and lactation.

There are many drug–drug interactions with the histamine H<sub>2</sub> antagonists. The following discussion does not cover all drugs that may interact with the H<sub>2</sub> antagonists but represents some of the more common interactions. Antacids and metoclopramide may decrease absorption of the H<sub>2</sub> antagonists if administered concurrently. Concurrent use of cimetidine and digoxin may decrease serum digoxin levels. There may be a decrease in white blood cell count when the H<sub>2</sub> antagonists are administered with the alkylating drugs or the antimetabolites. There is an increased risk of toxicity of oral anticoagulants, phenytoin, quinidine, lidocaine, or theophylline when administered with H<sub>2</sub> antagonists. Concurrent use of cimetidine and morphine increases the risk of respiratory depression.

## ANTIDIARRHEALS

### ACTIONS

Antidiarrheals decrease intestinal peristalsis, which is usually increased when the patient has diarrhea. Examples of these drugs include difenoxin with atropine (Motofen), diphenoxylate with atropine (Lomotil), and loperamide (Imodium).

### USES

Antidiarrheals are used in the treatment of diarrhea.

## ADVERSE REACTIONS

Diphenoxylate use may result in anorexia, nausea, vomiting, constipation, rash, dizziness, drowsiness, sedation, euphoria, and headache. This drug is a narcotic-related drug that has no analgesic activity but has sedative and euphoric effects and drug dependence potential. To discourage abuse, it is combined with atropine (an anticholinergic or cholinergic blocking drug), which causes dry mouth and other mild adverse effects. Loperamide is not a narcotic-related drug, and minimal adverse reactions are associated with its use. Occasionally, abdominal discomfort, pain, and distention have been seen, but these symptoms also occur with severe diarrhea and are difficult to distinguish from an adverse drug reaction.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

These drugs are contraindicated in patients whose diarrhea is associated with organisms that can harm the intestinal mucosa (*Escherichia coli*, *Salmonella*, *Shigella*) and in patients with pseudomembranous colitis, abdominal pain of unknown origin, and obstructive jaundice. The antidiarrheal drugs are contraindicated in children younger than 2 years.

The antidiarrheal drugs are used cautiously in patients with severe hepatic impairment or inflammatory bowel disease. Antidiarrheals are classified as Pregnancy Category B drugs and should be used cautiously during pregnancy and lactation.

The antidiarrheal drugs cause an additive CNS depression when administered with alcohol, antihistamines, narcotics, and sedatives or hypnotics. There are additive cholinergic effects when administered with other drugs having anticholinergic activity, such as antidepressants or antihistamines. Concurrent use of the antidiarrheals with a monoamine oxidase inhibitor increases the risk of a hypertensive crisis.

## ANTIFLATULENTS

### ACTIONS

Simethicone (Mylicon) and charcoal are used as **antiflatulents** (against flatus or gas in the intestinal tract). Simethicone has a defoaming action that disperses and prevents the formation of mucus-surrounded gas pockets in the intestine. Charcoal is an absorbent that reduces the amount of intestinal gas.



## USES

Antiflatulents are used for the relief of painful symptoms of excess gas in the digestive tract. These drugs are useful as adjunctive treatment of any condition in which gas retention may be a problem (ie, postoperative gaseous distention, air swallowing, dyspepsia, peptic ulcer, irritable colon, or diverticulosis). In addition to its use for the relief of intestinal gas, charcoal may be used in the prevention of nonspecific pruritus associated with kidney dialysis treatment and as an antidote in poisoning. Simethicone is in some antacid products, such as Mylanta Liquid and Di-Gel Liquid.

## ADVERSE REACTIONS

No adverse reactions have been reported with the use of antiflatulents.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

The antiflatulents are contraindicated in patients with known hypersensitivity to any components of the drug. The pregnancy category of simethicone is unknown; charcoal is a Pregnancy Category C drug. There may be a decreased effectiveness of other drugs because of adsorption by charcoal, which can also adsorb other drugs in the GI tract. There are no known interactions with simethicone.

## DIGESTIVE ENZYMES

### ACTIONS

The enzymes pancreatin and pancrelipase, which are manufactured and secreted by the pancreas, are responsible for the breakdown of fats, starches, and proteins. These enzymes are necessary for the breakdown and digestion of food. Both enzymes are available as oral supplements.

### USES

These drugs are prescribed as replacement therapy for those with pancreatic enzyme insufficiency. Conditions or diseases that may cause a decrease in or absence of pancreatic digestive enzymes include cystic fibrosis, chronic pancreatitis, cancer of the pancreas,

the malabsorption syndrome, surgical removal of all or part of the stomach, and surgical removal of all or part of the pancreas.

## ADVERSE REACTIONS

No adverse reactions have been reported with the use of digestive enzymes; however, high doses may cause nausea and diarrhea.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

The digestive enzymes are contraindicated in patients with a hypersensitivity to hog or cow proteins and in patients with acute pancreatitis. The digestive enzymes are used cautiously in patients with asthma (an acute asthmatic attack can occur), hyperuricemia, and during pregnancy and lactation. These drugs are Pregnancy Category C drugs, and safe use in pregnancy has not been established.

Calcium carbonate or magnesium hydroxide antacids may decrease the effectiveness of the digestive enzymes. When administered concurrently with an iron preparation, the digestive enzymes decrease the absorption of oral iron preparations.

## EMETICS

### ACTIONS

The **emetic** (a drug that induces vomiting) ipecac causes vomiting because of its local irritating effect on the stomach and by stimulation of the vomiting center in the medulla.

### USES

Emetics are used to cause vomiting to empty the stomach rapidly when an individual has accidentally or intentionally ingested a poison or drug overdose. Not all poison ingestions or drug overdoses are treated with emetics.

## ADVERSE REACTIONS

There are no apparent adverse reactions to ipecac. Although not an adverse reaction, a danger associated with any emetic is the aspiration of vomitus.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

Emetics are contraindicated in patients who are unconscious, semiconscious, or convulsing and in poisoning caused by corrosive substances, such as strong acids or petroleum products. Ipecac is a Pregnancy Category C drug, and safe use in pregnancy has not been established. Activated charcoal may absorb ipecac, negating its effects.

## GALLSTONE-SOLUBILIZING DRUGS

### ACTIONS

**Gallstone-solubilizing** (gallstone-dissolving) drugs, such as ursodiol (Actigall), suppress the manufacture of cholesterol and cholic acid by the liver. The suppression of the manufacture of cholesterol and cholic acid may ultimately result in a decrease in the size of radiolucent gallstones.

### USES

These drugs are used in the nonsurgical treatment of radiolucent gallstones. They are not effective for all types of gallstones and require many months of usage to produce results. Because of the potential toxic effects associated with long-term use, these drugs are recommended for only carefully selected and closely monitored patients.

### ADVERSE REACTIONS

Diarrhea, cramps, nausea, and vomiting are the more common adverse drug reactions. A reduction in the dose may reduce or eliminate these problems. Prolonged use of these drugs may result in hepatotoxicity (toxic to the liver).

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

Ursodiol is used cautiously in patients with a hypersensitivity to the drug or bile salts and in patients with liver impairment, calcified stones, radiopaque stones or radiolucent bile pigment stones, severe acute cholecystitis, biliary obstruction, and gallstone pancreatitis. Ursodiol is used cautiously during pregnancy (Pregnancy Category B) and lactation. Absorption of ursodiol is decreased if the agent is taken with bile acid sequestering drugs or aluminum-containing antacids. Clofibrate, estrogens, and

oral contraceptives increase hepatic cholesterol secretion and encourage cholesterol gallstone formation and may counteract the effectiveness of ursodiol.

## LAXATIVES

### ACTIONS

There are various types of laxatives (see the Summary Drug Table: Drugs Used in the Management of Gastrointestinal Disorders). The action of each laxative is somewhat different, yet they produce the same result—the relief of constipation (Display 48-1).

### USES

A laxative is most often prescribed for the short-term relief or prevention of constipation. Certain stimulant, emollient, and saline laxatives are used to evacuate the colon for rectal and bowel examinations. Fecal softeners or mineral oil are used prophylactically in patients who should not strain during defecation, such as after anorectal surgery or a myocardial infarction. Psyllium may be used in patients with irritable bowel syndrome and diverticular disease. Polycarbophil may be prescribed for constipation or diarrhea associated with irritable bowel syndrome and diverticulosis. Mineral oil is

#### DISPLAY 48-1 • Actions of Different Types of Laxatives

- Bulk-producing laxatives are not digested by the body and therefore add bulk and water to the contents of the intestines. The added bulk in the intestines stimulates peristalsis, moves the products of digestion through the intestine, and encourages evacuation of the stool. Examples of bulk-forming laxatives are psyllium (Metamucil) and polycarbophil (FiberCon).
- Emollient laxatives lubricate the intestinal walls and soften the stool, thereby enhancing passage of fecal material. Mineral oil is an emollient laxative.
- Fecal softeners promote water retention in the fecal mass and soften the stool. One difference between emollient laxatives and fecal softeners is that the emollient laxatives do not promote the retention of water in the stool. Examples of fecal softeners include docusate sodium (Colace) and docusate calcium (Surfak).
- Hyperosmolar drugs dehydrate local tissues, which causes irritation and increased peristalsis, with consequent evacuation of the fecal mass. Glycerin is a hyperosmolar drug.
- Irritant or stimulant laxatives increase peristalsis by direct action on the intestine. An example of an irritant laxative is cascara sagrada and senna (Senokot).
- Saline laxatives attract or pull water into the intestine, thereby increasing pressure in the intestine, followed by an increase in peristalsis. Magnesium hydroxide (Milk of Magnesia) is a saline laxative.

**DISPLAY 48-2 • Drugs That May Cause Constipation**

- Anticholinergics
- Antihistamines
- Phenothiazines
- Tricyclic antidepressants
- Opiates
- Non-potassium-sparing diuretics
- Iron preparations
- Barium sulfate
- Clonidine
- Antacids containing either calcium carbonate or aluminum hydroxide

useful for the relief of fecal impaction. Docusate is used to prevent dry, hard stools.

Constipation may occur as an adverse drug reaction. When the patient has constipation as an adverse reaction to another drug, the primary care provider may prescribe a stool softener or another laxative to prevent constipation during the drug therapy. Display 48-2 lists the names of some drugs and drug classifications that may cause constipation.

## ADVERSE REACTIONS

Laxative use, especially high doses or use over a long time, can cause diarrhea and a loss of water and electrolytes. For some patients, this may be a serious adverse effect. Laxatives may also cause abdominal pain or discomfort, nausea, vomiting, perianal irritation, fainting, bloating, flatulence, cramps, and weakness. Prolonged use of a laxative can result in serious electrolyte imbalances, as well as the “laxative habit,” that is, a dependency on a laxative to have a bowel movement. Some of these products contain tartrazine, which may cause allergic-type reactions (including bronchial asthma) in susceptible individuals.

Obstruction of the esophagus, stomach, small intestine, and colon has occurred when bulk-forming laxatives are administered without adequate fluid intake or in patients with intestinal stenosis.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

Laxatives are contraindicated in patients with known hypersensitivity and those with persistent abdominal pain, nausea, or vomiting of unknown cause or signs of acute appendicitis, fecal impaction, intestinal obstruction, or acute hepatitis. These drugs are used only as directed because excessive or prolonged use may cause dependence. Magnesium hydroxide is used cautiously in patients with any degree of renal impairment. Laxatives

are used cautiously in patients with rectal bleeding, in pregnant women, and during lactation. The following laxatives are Pregnancy Category C drugs: cascara, sagrada, docusate, glycerin, phenolphthalein, magnesium hydroxide, and senna. These drugs are used during pregnancy only when the benefits clearly outweigh the risks to the fetus.

Mineral oil may impair the GI absorption of fat-soluble vitamins (A, D, E, and K). Laxatives may reduce absorption of other drugs present in the GI tract, by combining with them chemically or hastening their passage through the intestinal tract. When surfactants are administered with mineral oil, surfactants may increase mineral oil absorption. Milk, antacids, H<sub>2</sub> antagonists, and proton pump inhibitors should not be administered 1 to 2 hours before bisacodyl tablets because the enteric coating may dissolve early (before reaching the intestinal tract), resulting in gastric lining irritation or dyspepsia and decreasing the laxative effect of the drug.

## PROTON PUMP INHIBITORS

**Proton pump inhibitors**, such as lansoprazole, omeprazole, pantoprazole and rabeprazole, belong to a group of drugs with antisecretory properties. These drugs suppress gastric acid secretion by inhibition of the hydrogen-potassium adenosine triphosphatase (ATPase) enzyme system at the secretory surface of the gastric parietal cells. They block the last step of acid production.

The proton pump inhibitors are particularly important in the treatment of *Helicobacter pylori* in patients with active duodenal ulcers. ***Helicobacter pylori*** (*H. pylori*) has been implicated as a causative organism in a type of chronic gastritis and in a large number of cases of peptic and duodenal ulcers.

## ACTIONS

The proton pump inhibitors suppress gastric acid secretion by blocking the final step in the production of gastric acid by the gastric mucosa.

## USES

The proton pump inhibitors are used for treatment or symptomatic relief of various gastric disorders, including gastric and duodenal ulcers, GERD, or pathological hypersecretory conditions. Painful, persistent heartburn 2 or more days a week may indicate acid reflux disease, which can erode the delicate lining of the esophagus,

causing erosive esophagitis. Esomeprazole (Nexium) or Omeprazole (Prilosec) may provide 24-hour relief from the heartburn associated with GERD or erosive esophagitis while healing occurs.

An important use of these drugs is combination therapy for the treatment of *H. pylori* in patients with duodenal ulcers. One treatment regimen used to treat infection with *H. pylori* is a triple-drug treatment regimen, such as one of the proton pump inhibitors (eg, omeprazole or lansoprazole) and two anti-infectives (eg, amoxicillin and clarithromycin). Another treatment regimen includes bismuth subsalicylate plus two anti-infective drugs. Helidac, a treatment regimen of three drugs (bismuth subsalicylate, metronidazole, and tetracycline) may be given along with a histamine H<sub>2</sub> antagonist to treat disorders of the GI tract infected with *H. pylori*. Table 48-1 provides a listing of the various combinations used in the treatment of *H. pylori*. Additional information concerning the anti-infectives listed is found in Chapters 6 through 11. The Summary Drug Table: Drugs Used in the Management of Gastrointestinal Disorders provide information on the drugs used in the treatment of *H. pylori*.

## ADVERSE REACTIONS

The most common adverse reactions seen with the proton pump inhibitors include headache, diarrhea, and abdominal pain. Other less common adverse reactions include nausea, flatulence, constipation, and dry mouth.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

The proton pump inhibitors are contraindicated in patients who have hypersensitivity to any of the drugs. Omeprazole (Pregnancy Category C) and lansoprazole, rabeprazole, and pantoprazole (Pregnancy Category B) are contraindicated during pregnancy and lactation. The proton pump inhibitors are used cautiously in older adults and in patients with hepatic impairment.

There is a decreased absorption of lansoprazole when it is administered with sucralfate. Lansoprazole may decrease the effects of ketoconazole, iron salts, and digoxin. When lansoprazole is administered with theophylline, there is an

TABLE 48-1

Agents Used to Treat *H. Pylori* in Patients With Duodenal Ulcers

DRUG	USE FOR ERADICATION OF <i>H. PYLORI</i> IN PATIENTS WITH DUODENAL ULCER	DOSAGE RANGE
amoxicillin <i>a-mocks'-ih-sill-in</i>	In combination with lansoprazole and clarithromycin or lansoprazole alone	1 g BID for 14 d (triple therapy) or 1 g TID (double therapy)
bismuth <i>bis'-muth</i>	In combination with other products	525 mg QID in combination with other products
bismuth subsalicylate (Bismatrol) <i>bis'-muth sub-sa-li'-si-late</i>	<i>H. pylori</i> eradication in patients with duodenal ulcer	525-mg chewable tablets QID in combination with at least two anti-infectives
bismuth subsalicylate, metronidazole <i>me-troe-ni'-da-zole</i> Tetracycline <i>tet-ra-sye'-cleen</i> (Helidac)	<i>H. pylori</i> eradication in patients with duodenal ulcer	525-mg chewable tablets, 250 mg metronidazole, 500 mg tetracycline QID PO
clarithromycin (Biaxin) <i>clair-ith'-row-my-sin</i>	In combination with amoxicillin	500 mg TID
lansoprazole (Prevacid) <i>lan-sew-prah'-zoll</i>	In combination with clarithromycin and/or amoxicillin	30 mg BID for 14 d (triple therapy) or 30 mg TID for 14 d (double therapy)
metronidazole (Flagyl) <i>meh-trow-nye'-dah-zoll</i>	In combination with other products	250 mg QID
omeprazole (Prilosec) <i>oh-mep'-rah-zole</i>	In combination with clarithromycin	40 mg BID for 4 wk and 20 mg/d for 15–28 d
ranitidine bismuth citrate (Tritec) <i>rah-nih'-tih-deen</i>	In combination with clarithromycin	400 mg BID for 4 wk in combination with clarithromycin
tetracycline <i>tet-rah-si'-cleen</i>	In combination with other products	500 mg QID

increase in theophylline clearance requiring dosage changes of the theophylline. When omeprazole is administered with clarithromycin, there is a risk for an increase in plasma levels of both drugs. Omeprazole may prolong the elimination of warfarin when the two drugs are administered together. Increased serum levels and the risk for toxicity of benzodiazepines, phenytoin, and warfarin may occur if any of these drugs are used with omeprazole.

## MISCELLANEOUS DRUGS

The miscellaneous GI drugs include bismuth subsalicylate, mesalamine, misoprostol, olsalazine, sucralfate, and sulfasalazine.

### ACTIONS

Bismuth disrupts the integrity of the bacterial cell wall. Misoprostol (Cytotec) inhibits gastric acid secretion and increases the protective property of the mucosal lining of the GI tract by increasing the production of mucus by the lining of the GI tract. Sucralfate (Carafate) exerts a local action on the lining of the stomach. The drug forms a complex with the exudate of the stomach lining. This complex forms a protective layer over a duodenal ulcer, thus aiding in healing of the ulcer. Mesalamine (Asacol), olsalazine (Dipentum), and sulfasalazine (Azulfidine) exert a topical anti-inflammatory effect in the bowel. The exact mechanism of action of these drugs is unknown.

### USES

Bismuth subsalicylate is used in combination with other drugs to treat gastric and duodenal ulcers caused by *H. pylori* bacteria. Mesalamine is used in the treatment of chronic inflammatory bowel disease. Misoprostol is used to prevent gastric ulcers in those taking aspirin or nonsteroidal anti-inflammatory drugs in high doses for a prolonged time. Olsalazine is used in the treatment of ulcerative colitis in those allergic to sulfasalazine. Sulfasalazine is used in the treatment of Crohn's disease and ulcerative colitis. Sucralfate is used in the treatment of duodenal ulcer.

### ADVERSE REACTIONS

Adverse reactions of bismuth subsalicylate, include a temporary and harmless darkening of the tongue and stool and constipation. Salicylate toxicity (eg, tinnitus, rapid

respirations, see Chap. 17) may also occur, particularly when the drug is used for an extended period of time.

Oral administration of mesalamine may cause abdominal pain, nausea, headache, dizziness, fever, and weakness. The adverse reactions associated with rectal administration are less than those seen with oral administration, but headache, abdominal discomfort, flu-like syndrome, and weakness may still occur. Olsalazine administration may result in diarrhea, abdominal discomfort, and nausea. Sulfasalazine is a sulfonamide with adverse reactions the same as for the sulfonamide drugs (see Chap. 6).

The adverse reactions seen with the administration of sucralfate are usually mild, but constipation may be seen in a small number of patients. Misoprostol administration may result in diarrhea, abdominal pain, nausea, GI distress, and vomiting.

### CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

The miscellaneous GI drugs are given with caution to patients with a known hypersensitivity to the drugs. In addition mesalamine, olsalazine, and sulfasalazine are contraindicated in patients who have hypersensitivity to the sulfonamides and salicylates or intestinal obstruction, and in children younger than 2 years. There is a possible cross-sensitivity of mesalamine, olsalazine, and sulfasalazine with furosemide, sulfonylurea antidiabetic drugs, and carbonic anhydrase inhibitors. Misoprostol is contraindicated in those with an allergy to the prostaglandins and during pregnancy (Pregnancy Category X) and lactation.

Misoprostol is used cautiously in women of child-bearing age. Mesalamine, olsalazine, sucralfate, and sulfasalazine are Pregnancy Category B drugs; all are used with caution during pregnancy (safety has not been established) and lactation.

There is an increased risk of diarrhea in patients taking misoprostol with the magnesium-containing antacids. Sulfasalazine may increase the risk of toxicity of oral hypoglycemic drugs, zidovudine, methotrexate, and phenytoin. There is an increased risk of crystalluria when sulfasalazine is administered with methenamine. A decrease in the absorption of iron and folic acid may occur when these agents are administered with sulfasalazine. When bismuth subsalicylate is administered with aspirin-containing drugs, there is an increased risk of salicylate toxicity. There is an increased risk of toxicity of valproic acid and methotrexate and decreased effectiveness of the corticosteroids when these agents are administered with bismuth subsalicylate.



### Herbal Alert: Ginger

*Ginger is a pungent herb used primarily for GI problems such as motion sickness, nausea, vomiting, and digestion. In addition, it is recommended for the pain and inflammation of arthritis and may help lower cholesterol. The dosage of the dried form of ginger is 1 g (1000 mg) per day. Adverse reactions are rare, although heartburn has been reported by some individuals. The herb should be used cautiously in patients with hypertension or gallstones and during pregnancy or lactation. As with all herbs, a primary care provider should be consulted before any herbal remedy is taken. Ginger, like many herbs, has been used safely as a food by millions of individuals for hundreds of years.*

### Herbal Alert: Chamomile

*Chamomile has several uses in traditional herbal therapy, such as a mild sedative, digestive upsets, menstrual cramps, and stomach ulcers. It has been used topically for skin irritation and inflammation. Chamomile is on the US Food and Drug Administration list of herbs generally recognized as safe (GRAS). It is one of the most popular teas in Europe. When used as a tea, it appears to produce an antispasmodic effect on the smooth muscle of the gastrointestinal (GI) tract and to protect against the development of stomach ulcers. Although the herb is generally safe and nontoxic, the tea is prepared from the pollen-filled flower heads and has resulted in mild symptoms of contact dermatitis to severe anaphylactic reactions in individuals hypersensitive to ragweed, asters, and chrysanthemums.*

## NURSING PROCESS

### ● The Patient Receiving a Drug for a Gastrointestinal Disorder

#### ASSESSMENT

##### *Preadministration Assessment*

During the preadministration assessment, the nurse reviews the patient's chart for the medical diagnosis and reason for administration of the prescribed drug. The nurse questions the patient regarding the type and intensity of symptoms (such as pain, discomfort, diarrhea, or constipation) to provide a baseline for evaluation of the effectiveness of drug therapy.

##### *Ongoing Assessment*

The nurse assesses the patient receiving one of these drugs for relief of symptoms (such as diarrhea, pain, or constipation). The primary health care provider is notified if the drug fails to relieve symptoms. The nurse monitors vital signs daily or more frequently if the patient has a bleeding peptic ulcer, severe diarrhea, or other condition that may warrant more frequent

### Nursing Diagnoses Checklist

- ✓ **Deficient Fluid Volume** related to uncontrolled vomiting or diarrhea
- ✓ **Constipation** related to adverse drug effects (aluminum- or calcium-containing antacids)
- ✓ **Diarrhea** related to adverse reactions of magnesium- or sodium-containing antacids or other digestive system drugs
- ✓ **Risk for Imbalanced Nutrition: Less than Body Requirements** related to inability to eat, digest food, anorexia
- ✓ **Risk for Injury** related to adverse drug effects (eg, weakness, dizziness)

observation. The nurse observes the patient for adverse drug reactions associated with the specific GI drug being administered and reports any adverse reactions to the primary health care provider before the next dose is due. The nurse evaluates the effectiveness of drug therapy by a daily comparison of symptoms with those experienced before the initiation of therapy. In some instances, frequent evaluation of the patient's response to therapy may be necessary.

#### NURSING DIAGNOSES

Drug-specific nursing diagnoses are highlighted in the Nursing Diagnoses Checklist. Other nursing diagnoses applicable to these drugs are discussed in depth in Chapter 4.

#### PLANNING

The expected outcomes for the patient depend on the reason for administration of the drug but may include an optimal response to drug therapy, management of common adverse reactions, and an understanding of and compliance with the prescribed therapeutic regimen.

#### IMPLEMENTATION

##### *Promoting an Optimal Response to Therapy*

Ways in which the nurse can help promote an optimal response to therapy when administering GI drugs are listed in the following sections.

**ANTACIDS.** The nurse should not give antacids within 2 hours before or after administration of other oral drugs. Liquid antacid preparations must be shaken thoroughly immediately before administration. If tablets are given, the nurse instructs the patient to chew the tablets thoroughly before swallowing and then drink a full glass of water or milk. Liquid antacids are followed by a small amount of water. If the patient expresses a dislike for the taste of the antacid or has difficulty chewing the

tablet form, the nurse informs the primary health care provider. A flavored antacid may be ordered if the taste is a problem. A liquid form may be ordered if the patient has a problem chewing a tablet. The primary health care provider may order that the antacid be left at the patient's bedside for self-administration. The nurse makes certain an adequate supply of water and cups for measuring the dose are available. The antacid may be administered hourly for the first 2 weeks when used to treat acute peptic ulcer. After the first 2 weeks, the drug is administered 1 to 2 hours after meals and at bedtime.

### Nursing Alert

*Because of the possibility of an antacid interfering with the activity of other oral drugs, no oral drug should be administered within 1 to 2 hours of an antacid.*

**GASTROINTESTINAL STIMULANTS.** The nurse carefully times the administration of oral metoclopramide for 30 minutes before each meal. Dexpantenol is administered intramuscularly or IV. The nurse tells the patient that intestinal colic may occur within 30 minutes of administration and that this is not abnormal and will pass within a short time.

**HISTAMINE H<sub>2</sub> ANTAGONISTS.** The nurse administers ranitidine and oral cimetidine before or with meals and at bedtime. Nizatidine and famotidine are given at bedtime or, if twice-a-day dosing is prescribed, in the morning and at bedtime. These drugs are usually given concurrently with an antacid to relieve the pain. In certain situations or disorders, cimetidine and ranitidine may also be given by intermittent IV infusion or direct IV injection.

### Nursing Alert

*When one of these drugs is given IV, the nurse monitors the rate of infusion at frequent intervals. Too rapid an infusion may result in cardiac arrhythmias.*

Cimetidine and ranitidine may be administered by the intramuscular (IM) route. When administered via the IM route the nurse gives the drug deep into a large muscle group.

**ANTI-DIARRHEALS.** These drugs may be ordered to be given after each loose bowel movement. The nurse inspects each bowel movement before making a decision to administer the drug.

**DIGESTIVE ENZYMES.** When digestive enzymes are given in capsule or enteric-coated tablet form, the nurse

instructs the patient not to bite or chew the capsule or tablet. If the patient experiences difficulty swallowing the capsule form, the nurse opens the capsule and sprinkles the contents on a small amount of soft food, such as applesauce or flavored gelatin, which is at room temperature.

**EMETICS.** Because treatment of poison ingestion is an emergency, the nurse immediately obtains equipment for treatment. The nurse obtains the drug, an emesis basin, towels, specimen containers for sending contents of the stomach to the laboratory for analysis, and a suction machine and places them near the patient. The nurse obtains the patient's blood pressure, pulse, and respiratory rate and performs a brief physical examination to determine what other damages or injuries, if any, may have occurred.

### Nursing Alert

*Before an emetic is given, it is extremely important to know the chemicals or substances that have been ingested, the time they were ingested, and what symptoms were noted before seeking medical treatment. This information will probably be obtained from a family member or friend, but the adult patient may also contribute to the history. The primary health care provider or nurse may also contact the local poison control center to obtain information regarding treatment.*

The nurse must not give an emetic when a corrosive substance (such as lye) or a petroleum distillate (paint thinner, kerosene) has been ingested. In many cases of poisoning, it is preferable to insert a nasogastric tube to empty stomach contents. Emetics are used with great caution, if at all, when the substance ingested is unknown or in question. An emetic is never given to a patient who is unconscious or semiconscious because aspiration of vomitus may occur.

The nurse positions the patient on his or her side before or immediately after the drug is given. When emesis occurs, the nurse suction the patient as needed and observes closely for the possible aspiration of vomitus. The nurse monitors vital signs every 5 to 10 minutes until signs are stable.

**LAXATIVES.** The nurse gives bulk-producing or fecal-softening laxatives with a full glass of water or juice. The administration of a bulk-producing laxative is followed by an additional full glass of water. Mineral oil is preferably given to the patient with an empty stomach in the evening. Immediately before administration, the nurse thoroughly mixes and stirs laxatives that are in powder, flake, or granule form. If the laxative has an unpleasant or salty taste, the nurse explains this to the patient. The taste of some of these preparations may be disguised by chilling, adding to juice, or pouring over cracked ice.



**ANTIFLATULENTS.** Activated charcoal can adsorb drugs while they are in the GI tract. The nurse administers charcoal 2 hours before or 1 hour after other medications. If diarrhea persists or lasts longer than 2 days or is accompanied by fever, the nurse notifies the primary care provider. Simethicone is administered after each meal and at bedtime.

**PROTON PUMP INHIBITORS.** The nurse administers omeprazole before meals. The drug should be swallowed whole and not chewed or crushed. Esomeprazole magnesium must be swallowed whole and is administered at least 1 hour before meals. For patients who have difficulty swallowing, the nurse may open the capsule and place the granules onto a small amount of applesauce. The granules are mixed lightly with the applesauce and administered immediately. The patient is instructed to swallow the mixture without chewing. Likewise, lansoprazole may be sprinkled on approximately, 1 tablespoon of applesauce, cottage cheese, Ensure pudding, yogurt, or strained pears. The drug may also be administered through a nasogastric tube (NG). The granules are mixed with 40 mL of apple juice and injected through a tube. The tube is flushed with fluid afterward.

### Monitoring and Managing Adverse Drug Reactions

**ANTACIDS.** When antacids are given, the nurse keeps a record of the patient's bowel movements because these drugs may cause constipation or diarrhea. If the patient experiences diarrhea, the nurse keeps an accurate record of fluid intake and output along with a description of the diarrhea stool. Changing to a different antacid usually alleviates the problem. Diarrhea may be controlled by combining a magnesium antacid with an antacid containing aluminum or calcium.

**ANTICHOLINERGICS.** Urinary retention or hesitancy may be seen during therapy with these drugs. This can be avoided by instructing the patient to void before taking the drug. If urinary retention is suspected, the nurse monitors fluid intake and output. These drugs also may cause drowsiness, dizziness, and blurred vision, which may interfere with activities such as reading or watching television. If dizziness occurs, the patient will require assistance with ambulatory activities. If **photophobia** (aversion to bright light) occurs, the room may be kept semidark.

**GASTROINTESTINAL STIMULANTS.** If drowsiness or dizziness occurs with the administration of metoclopramide, the patient will require assistance with ambulatory activities. The nurse observes patients receiving high or prolonged doses of this drug for adverse reactions related to the CNS (extrapyramidal reactions or tardive dyskinesia, see Chap. 32). The nurse reports any

sign of extrapyramidal reaction or tardive dyskinesia to the primary health care provider before the next dose of metoclopramide is administered because the drug therapy may be discontinued. These reactions are irreversible if therapy is continued.

Dexpanthenol is administered to prevent paralytic ileus (intestinal atony) during the immediate postoperative period. The drug also may be given if a paralytic ileus has occurred, in which case bowel sounds will be diminished or absent. During the administration of the drug, the abdomen is frequently auscultated for the presence or absence of bowel sounds and the primary health care provider notified of the results of these assessments. The nurse observes the patient taking dexpanthenol for adverse reactions, such as nausea, vomiting, and diarrhea. The nurse checks the blood pressure at frequent intervals because a slight drop in blood pressure may occur. A common adverse reaction is intestinal colic that may occur within 30 minutes after administration of the drug.

**HISTAMINE H<sub>2</sub> ANTAGONISTS.** During early therapy with these drugs, the patient may experience dizziness or drowsiness. The patient may require assistance with ambulation. These reactions usually must be tolerated, but the nurse reassures the patient that they will disappear after several days of therapy.

The nurse immediately reports adverse reactions, such as skin rash, sore throat, fever, unusual bleeding, or hallucinations because the primary health care provider may want to discontinue the drug therapy.



### Gerontologic Alert

*The older adult is particularly sensitive to the effects of the histamine H<sub>2</sub> antagonists. The nurse must closely monitor older adults for confusion and dizziness. Dizziness increases the risk for falls in the older adult.*

*Assistance is needed for ambulatory activities. The environment is made safe by removing throw rugs or small pieces of furniture and so forth. The nurse reports any change in orientation to the primary health care provider.*

**ANTIDIARRHEALS.** The nurse notifies the primary health care provider if an elevation in temperature occurs or if severe abdominal pain or abdominal rigidity or distention occurs because this may indicate a complication of the disorder, such as infection or intestinal perforation. If diarrhea is severe, additional treatment measures, such as IV fluids and electrolyte replacement, may be necessary.

Drowsiness or dizziness may occur with these drugs. The patient may require assistance with ambulatory activities. If diarrhea is chronic, the nurse encourages the patient to drink extra fluids. Fluids

such as weak tea, water, bouillon, or a commercial electrolyte preparation may be used. The nurse closely monitors fluid intake and output. In some instances, the primary health care provider may prescribe an oral electrolyte supplement to replace electrolytes lost by frequent loose stools. For perianal irritation caused by loose stools, the nurse cleanses the area with mild soap and water after each bowel movement, dries the area with a soft cloth, and applies an emollient, such as petrolatum.

**DIGESTIVE ENZYMES.** The nurse observes the patient for nausea and diarrhea. If these occur, the nurse notifies the primary health care provider before the next dose is due because the dosage may need to be reduced. Digestive enzymes come in regular capsule form or as delayed-released capsules. The capsules are taken before or with meals. If necessary the capsules may be opened and sprinkled over soft foods (eg, Jello, applesauce, ice cream) that can be swallowed without chewing. It is particularly important that enteric-coated beads from the time-released capsules be swallowed and not chewed. If the drug is sprinkled over certain foods, it is important that the nurse check the patient's tray after each meal to determine if the foods sprinkled with the drug are eaten. If these foods are not eaten, the nurse notifies the primary health care provider. The nurse weighs the patient weekly (or as ordered) and alerts the primary health care provider if there is any significant or steady weight loss.

The nurse notes and records the appearance of each stool. Periodic stool examinations, as well as ongoing descriptions of the appearance of the stools, help the primary health care provider determine the effectiveness of therapy.

**EMETICS.** After the administration of an emetic, the nurse closely observes the patient for signs of shock, respiratory depression, or other signs and symptoms that may be part of the clinical picture of the specific poison or drug that was accidentally or purposely taken.

**LAXATIVES.** The nurse records the results of administration on the patient's chart. If excessive bowel movements or severe prolonged diarrhea occur or if the laxative is ineffective, the nurse notifies the primary health care provider. If a laxative is ordered for constipation, the nurse encourages a liberal fluid intake and an increase in foods high in fiber to prevent a repeat of this problem.

**PROTON PUMP INHIBITORS.** The adverse reactions of the proton pump inhibitors are usually mild. The most common adverse reactions associated with the proton

pump inhibitors are headache, diarrhea, and abdominal pain. Headache may be treated with analgesics. The nurse notes the number, color, and consistency of the stools. The nurse reports any excessive diarrhea or severe headache.

### *Educating the Patient and Family*

When a GI drug must be taken for a long time, there is a possibility that the patient may begin to skip doses or stop taking the drug. The nurse encourages patients to take the prescribed drug as directed by the primary health care provider and emphasizes the importance of not omitting doses or stopping the therapy unless advised to do so by the primary health care provider.

The nurse includes the following information in a patient and family teaching plan:

### **ANTACIDS**

- Do not use the drug indiscriminately. Check with a primary health care provider before using an antacid if other medical problems, such as a cardiac condition (some laxatives contain sodium), exist.
- Chew tablets thoroughly before swallowing and then drink a full glass of water.
- Effervescent tablets: allow to completely dissolve in water. Allow most of the bubbling to stop before drinking.
- Adhere to the dosage schedule recommended by the primary health care provider. Do not increase the frequency of use or the dose if symptoms become worse; instead, see the primary health care provider as soon as possible.
- Antacids impair the absorption of some drugs. Do not take other drugs within 2 hours before or after taking the antacid unless use of an antacid with a drug is recommended by the primary health care provider.
- If pain or discomfort remains the same or becomes worse, if the stools turn black or coffee ground vomitus occurs, contact the primary health care provider as soon as possible.
- Antacids may change the color of the stool (white, white streaks); this is normal.
- Magnesium-containing products may produce a laxative effect and may cause diarrhea; aluminum- or calcium-containing antacids may cause constipation; magnesium-containing antacids are used to avoid bowel dysfunction.
- Taking too much antacid may cause the stomach to secrete excess stomach acid. Consult the primary care provider or pharmacist about appropriate dose. Do not use the maximum dose for more than 2 weeks, except under the supervision of a primary care provider.

### ANTICHOLINERGICS

- If an aversion to light occurs, wear sunglasses when outside, keep rooms dimly lit, and schedule outdoor activities (when necessary) before the first dose of the drug is taken, such as early in the morning.
- If a dry mouth occurs, take frequent sips of cool water during the day, several sips of water before taking oral drugs, and frequent sips of water during meals.
- Constipation may be avoided by drinking plenty of fluids during the day.
- Drowsiness may occur with these drugs. Schedule tasks requiring alertness during times when drowsiness does not occur, such as early in the morning before the first dose of the drug is taken.

**GASTROINTESTINAL STIMULANTS.** Metoclopramide—Take 30 minutes before meals. If drowsiness or dizziness occurs, observe caution while driving or performing hazardous tasks. Immediately report any of the following signs: difficulty speaking or swallowing; mask-like face; shuffling gait; rigidity; tremors; uncontrolled movements of the mouth, face, or extremities; and uncontrolled chewing or unusual movements of the tongue.

### HISTAMINE H<sub>2</sub> ANTAGONISTS

- Keep the primary health care provider informed of the results of therapy, that is, relief of pain or discomfort.
- Take as directed (eg, with meals, at bedtime) on the prescription container.
- Follow the primary health care provider's recommendations regarding additional treatment, such as eliminating certain foods, avoiding the use of alcohol, and using additional drugs, such as an antacid.
- If drowsiness occurs, avoid driving or performing other hazardous tasks.
- Notify the primary health care provider of the following adverse reactions: sore throat, rash, fever, unusual bleeding, black or tarry stools, easy bruising, or confusion.
- Regular follow-up appointments are required while taking these drugs. These drugs may need to be taken for 4 to 6 weeks or longer.
- Cimetidine—Inform the primary health care provider if you smoke. Cigarette smoking may decrease the effectiveness of the drug.

### ANTI-DIARRHEALS

- Do not exceed the recommended dosage.
- The drug may cause drowsiness. Observe caution when driving or performing other hazardous tasks.

- Avoid the use of alcohol or other CNS depressants (tranquilizers, sleeping pills) and other nonprescription drugs unless use has been approved by the primary health care provider.
- Notify the primary health care provider if diarrhea persists or becomes more severe.

### ANTI-FLATULENTS

- Take simethicone after each meal and at bedtime. Thoroughly chew tablets because complete particle dispersion enhances antiflatulent action.
- Take charcoal 2 hours before or 1 hour after meals.
- Notify the health care provider if symptoms are not relieved within several days.

### DIGESTIVE ENZYMES

- Take the drugs as directed by the primary health care provider. Do not exceed the recommended dose.
- Do not chew tablets or capsules. Swallow the whole form of the drug quickly, while sitting upright to enhance swallowing and prevent mouth and throat irritation. Eat immediately after taking the drug.
- If capsules are difficult to swallow, they may be opened and their contents sprinkled over small quantities of food. Avoid sprinkling the drug over hot foods. All the food sprinkled with the powder must be eaten.
- Do not change brands without consulting with the primary care provider or the pharmacist.
- Do not inhale the powder dosage form or powder from capsules because it may irritate the skin or mucous membranes.

### EMETICS (IPECAC SYRUP)

- Ipecac is available without a prescription for use in the home. The instructions for use and the recommended dose are printed on the label.
- Read the directions on the label after the drug is purchased and be familiar with these instructions before an emergency occurs.
- In case of accidental or intentional poisoning, contact the nearest poison control center before using or giving this drug. Not all poisoning can be treated with this drug.
- Do not give this drug to semiconscious, unconscious, or convulsing individuals.
- Vomiting should occur in 20 to 30 minutes. Seek medical attention immediately after contacting the poison control center and giving this drug.

### GALLSTONE-SOLUBILIZING DRUGS

- Periodic laboratory tests (liver function studies) and ultrasound or radiologic examinations of the gallbladder may be scheduled by the primary health care provider.

- If diarrhea occurs, contact the primary health care provider. If symptoms of gallbladder disease (pain, nausea, or vomiting) occur, immediately contact the primary health care provider.
- Never take these drugs with aluminum-containing antacids. If antacids are required, take them 2 to 3 hours after ursodiol.

### LAXATIVES

- Avoid long-term use of these products unless use of the product has been recommended by the primary health care provider. Long-term use may result in the “laxative habit,” which is a dependence on a laxative to have a bowel movement. Constipation may also occur with overuse of these drugs. Read and follow the directions on the label.
- Avoid long-term use of mineral oil. Daily use of this product may interfere with the absorption of some vitamins (vitamins A, D, E, K). Take with the stomach empty, preferably at bedtime.
- Do not use these products in the presence of abdominal pain, nausea, or vomiting.
- Notify the primary health care provider if constipation is not relieved or if rectal bleeding or other symptoms occur.
- To avoid constipation, drink plenty of fluids, get exercise, and eat foods high in bulk or roughage.
- Bulk-producing or fecal-softening laxatives—Drink a full glass of water or juice, followed by more glasses of fluid in the next few hours.
- Bisacodyl (Dulcolax)—Do not chew the tablets or take them within 1 hour of taking antacids or milk.
- Cascara sagrada or senna—Pink-red, red-violet, red-brown, yellow-brown, or black discoloration of urine may occur.

### PROTON PUMP INHIBITORS

- Esomeprazole—Swallow whole at least 1 hour before eating. If you have difficulty swallowing, the capsule may be opened and the granules sprinkled on a small amount of applesauce.
- Omeprazole—Swallow tablets whole; do not chew them. This drug will be taken for up to 8 weeks or for a prolonged period. Regular medical check-ups are required.
- Lansoprazole—Take the drug before meals. Swallow the capsules whole. Do not chew, open, or crush. If you have difficulty swallowing the capsule, open and sprinkle granules on Jell-O or applesauce. You will need regular medical check-ups while taking this drug.

### H. PYLORI COMBINATION DRUGS

- Helidac—Each dose includes four tablets: two round, chewable pink tablets (bismuth), one white

tablet (metronidazole), and one pale orange and white capsule (tetracycline). Take each dose four times a day with meals and at bedtime for 14 days. Chew and swallow the bismuth subsalicylate tablets; swallow the metronidazole tablet and tetracycline capsule with a full glass of water. Take concomitantly prescribed H<sub>2</sub> antagonist therapy, as directed. Drink an adequate amount of fluid to reduce the risk of esophageal irritation and ulceration. Missed doses may be made up by continuing the formal dosing schedule until the medication is gone. Do not take double doses. If more than four doses are missed, contact the primary care provider.

- Bismuth subsalicylate—Immediately report any symptoms of salicylate toxicity (ringing in the ears, rapid respirations). Chew tablets thoroughly or dissolve them in the mouth. Do not swallow tablets whole. Stools may become dark. This is normal and will disappear when the drug therapy is discontinued. Do not take this drug with aspirin or aspirin products.

### MISCELLANEOUS DRUGS

- Olsalazine—If diarrhea develops, contact the primary health care provider as soon as possible.
- Mesalamine—Swallow tablets whole; do not chew them. For the suppository, remove foil wrapper and immediately insert the pointed end into the rectum without using force. For the suspension form, instructions are included with the product. Shake well, remove the protective sheath from the applicator tip, and gently insert the tip into the rectum. Partially intact tablets may be found in the stool; if this occurs, notify the primary health care provider.
- Misoprostol—Take this drug four times a day with meals and at bedtime. Continue to take the NSAID during this drug therapy. Take the drug with meals to decrease the severity of diarrhea. The administration of antacids before or after misoprostol may decrease the pain. Magnesium-containing antacids are avoided because of the risk of increasing the diarrhea.

This drug may cause spontaneous abortion. Women of childbearing age must use a reliable contraceptive. If pregnancy is suspected, discontinue use of the drug and notify the primary health care provider. Report severe menstrual pain, bleeding, or spotting.

- Sucralfate—Take on an empty stomach 1 hour before meals. Antacids may be taken for pain but not within 1/2 hour before or after sucralfate. Therapy will continue for 4 to 8 weeks. Keep all follow-up appointments with the primary health care provider.



**EVALUATION**

- The therapeutic drug effect is achieved.
- Adverse reactions are identified and reported to the primary health care provider.
- The patient and family demonstrate an understanding of the drug regimen.
- The patient verbalizes the importance of complying with the prescribed treatment regimen.
- The patient verbalizes an understanding of treatment modalities and the importance of continued follow-up care.

**● Critical Thinking Exercises**

1. Ms. Harris, age 76 years, tells you that she has been using various laxatives for constipation. She states that a laxative did help, but now she is more constipated than she was before she began taking a laxative. Discuss what advice or suggestions you would give this patient.
2. James is prescribed 0.7 g of powdered pancrelipase with meals. Discuss the preparation and administration of this drug.
3. Mr. Gates, your neighbor, has been given a prescription for diphenoxylate with atropine (Lomotil) to be taken if he should experience diarrhea while he is traveling in a foreign country. Describe the warnings you would give to your neighbor regarding this drug.
4. The primary health care provider has prescribed cimetidine for the treatment of a duodenal ulcer in Mr. Talley, who is 68 years old. A drug history by the nurse reveals that Mr. Talley is also taking the following drugs: Lanoxin 0.5 mg orally each day and a daily aspirin tablet. Analyze this situation. Discuss what you would tell Mr. Talley.
5. Ms. Jerkins has four children and wants to keep syrup of ipecac available in case of accidental poisoning. Discuss the information you feel that Ms. Jerkins should know before she administers this drug.

**● Review Questions**

1. When would the nurse most correctly administer an antacid to a patient taking other oral medications?
  - A. With the other drugs
  - B. 30 minutes before or after administration of other drugs
  - C. 2 hours before or after administration of other drugs
  - D. In early morning and at bedtime
2. The patient asks how fecal softeners relieve constipation. Which of the following would be the best response by the nurse? Fecal softeners relieve constipation by \_\_\_\_\_.

- A. stimulating the walls of the intestine
- B. promoting the retention of sodium in the fecal mass
- C. promoting water retention in the fecal mass
- D. lubricating the intestinal walls

3. When an anticholinergic drug is prescribed for the treatment of a peptic ulcer, the nurse observes the patient for which of the following adverse effects?
  - A. Dry mouth, urinary retention
  - B. Edema, tachycardia
  - C. Weight gain, increased respiratory rate
  - D. Diarrhea, anorexia

4. The nurse administers antidiarrheal drugs \_\_\_\_\_.
  - A. hourly until diarrhea ceases
  - B. after each loose bowel movement
  - C. with food
  - D. twice a day, in the morning and at bedtime

5. When an emetic is administered, the nurse must be alert to the possibility that the patient may \_\_\_\_\_.
  - A. become violent
  - B. experience severe diarrhea
  - C. retain fluid
  - D. aspirate vomitus

6. A nurse is to administer nizatidine once daily. When would the nurse most correctly administer the once-daily dose of nizatidine?
  - A. At bedtime
  - B. With the noon meal
  - C. In the morning before eating
  - D. Any time of the day with 4 ounces of orange juice

**● Medication Dosage Problems**

1. The patient is to receive 800 mg cimetidine PO. Available for use is the cimetidine shown below. The nurse administers \_\_\_\_\_.
 

100 mg	150 mg	200 mg	300 mg
400 mg	500 mg	600 mg	800 mg
2. Prescribed is 15 mL of 1.5% ipecac syrup. Available is 30 mL ipecac 1.5% syrup. The nurse administers \_\_\_\_\_.