

UNIT 9 Digestive and Gastrointestinal Function

Case Study

IMPROVING NUTRITION UTILIZING QUALITY INDICATORS



You are working in an outpatient clinic that has a high volume of patients with inflammatory bowel disease (IBD). You know that nutrition is an important focus for patients with IBD and that a low-residue, high-protein, high-calorie, and high-vitamin diet can help

decrease symptoms such as diarrhea and weight loss. You recall several patients in the past few months who have presented with diarrhea and weight loss. For this reason, you report your observations to the nurse manager and suggest a quality improvement project for assessing the nutritional status of patients with IBD.

QSEN Competency Focus: **Quality Improvement**

The complexities inherent in today's health care system challenge nurses to demonstrate integration of specific interdisciplinary core competencies. These competencies are aimed at ensuring the delivery of safe, quality patient care (Institute of Medicine, 2003). The Quality and Safety Education for Nurses project (Cronenwett, Sherwood, Barnsteiner, et al., 2007; QSEN, 2020) provides a framework for the knowledge, skills, and attitudes (KSAs) required for nurses to demonstrate competency in these key areas, which include ***patient-centered care, interdisciplinary teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics.***

Quality Improvement Definition: Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of health care systems.

SELECT PRE-LICENSURE KSAs

APPLICATION AND REFLECTION

Knowledge

Describe strategies for learning about the outcomes of care in the setting in which one is engaged in clinical practice

What strategies will you use to learn about the best indicators of nutritional status for patients with IBD?

Skills

Seek information about outcomes of care for populations served in care setting

After a review of the literature, you determine that frequent diarrhea and weight loss are important indicators of the nutritional status of patients with IBD. Identify the indicators that will need to be monitored, the frequency with which they will be monitored, and what type of interventions might be used to improve these indicators.

Use quality measures to understand performance

Attitudes

Appreciate that continuous quality improvement is an essential part of the daily work of all health professionals

Reflect on how long it will take for this project to show an improvement in nutritional outcomes in these patients. Think about how the other members of the health care team can contribute to the project.

Cronenwett, L., Sherwood, G., Barnsteiner, J., et al. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55(3), 122–131; Institute of Medicine. (2003). *Health professions education: A bridge to quality*. Washington, DC: National Academies Press; QSEN Institute. (2020). *QSEN Competencies: Definitions and pre-licensure KSAs; Quality improvement*. Retrieved on 8/15/2020 at: qsen.org/competencies/pre-licensure-ksas/#quality_improvement

38 Assessment of Digestive and Gastrointestinal Function

LEARNING OUTCOMES

On completion of this chapter, the learner will be able to:

1. Describe the structure and function of the organs of the gastrointestinal tract.
2. Explain the mechanical and chemical processes involved in digesting and absorbing nutrients and eliminating waste products.
3. Discriminate between normal and abnormal assessment findings of the gastrointestinal system.
4. Recognize and evaluate the major symptoms of gastrointestinal dysfunction by applying the patient's health history and physical assessment findings.
5. Identify the diagnostic tests used to evaluate gastrointestinal tract function and related nursing implications.

NURSING CONCEPTS

Assessment
Elimination

GLOSSARY

absorption: phase of the digestive process that occurs when small molecules, vitamins, and minerals pass through the walls of the small and large intestine and into the bloodstream

amylase: an enzyme that aids in the digestion of starch

anus: last section of the gastrointestinal (GI) tract; outlet for waste products from the GI system

chyme: mixture of food with saliva, salivary enzymes, and gastric secretions that is produced as food passes through the mouth, esophagus, and stomach

digestion: phase of the digestive process that occurs when digestive enzymes and secretions mix with ingested food and when proteins, fats, and sugars are broken down into their component smaller molecules

dyspepsia: indigestion; upper abdominal discomfort associated with eating

elimination: phase of the digestive process that occurs after digestion and absorption, when waste products are evacuated from the body

esophagus: collapsible tube connecting the mouth to the stomach, through which food passes as it is ingested

hydrochloric acid: acid secreted by the glands in the stomach; mixes with chyme to break it down into absorbable molecules and to aid in the destruction of bacteria

ingestion: phase of the digestive process that occurs when food is taken into the GI tract via the mouth and esophagus

intrinsic factor: a gastric secretion that combines with vitamin B₁₂ so that the vitamin can be absorbed

large intestine: the portion of the GI tract into which waste material from the small intestine passes as absorption continues and elimination begins; consists of several parts—ascending segment, transverse segment, descending segment, sigmoid colon, and rectum (*synonym:* colon)

lipase: an enzyme that aids in the digestion of fats

microbiome: the collective genome of all microbes in a microbiota

microbiota: the complement of microbes in a given environment

pepsin: a gastric enzyme that is important in protein digestion

small intestine: longest portion of the GI tract, consisting of three parts—duodenum, jejunum, and ileum—through which food mixed with all secretions and enzymes passes as it continues to be digested and begins to be absorbed into the bloodstream

stomach: distensible pouch into which the food bolus passes to be digested by gastric enzymes

trypsin: enzyme that aids in the digestion of protein

Abnormalities of the gastrointestinal (GI) tract are numerous and represent every type of major pathology that can affect other organ systems, including bleeding, perforation, obstruction, inflammation, and cancer. Congenital, inflammatory, infectious, traumatic, and neoplastic lesions have been encountered in every portion and at every site along the length of the GI tract. As with all other organ systems, the GI tract is subject to circulatory disturbances, faulty nervous system control, and aging.

Apart from the many organic diseases to which the GI tract is susceptible, many extrinsic factors can interfere with its normal function and produce symptoms. Stress and anxiety, for example, often find their chief expression in indigestion, anorexia, or motor disturbances of the intestines, sometimes producing constipation or diarrhea. In addition, factors such as fatigue and an inadequate or abruptly changed dietary intake can markedly affect the GI tract. When assessing and educating the patient, the nurse should consider the variety of mental and physical factors that affect the function of the GI tract.

Anatomic and Physiologic Overview

The GI tract is a pathway 7 to 7.9 m (23 to 26 feet) in length that extends from the mouth to the esophagus, stomach, small and large intestines, and rectum, to the terminal structure, the **anus** (Fig. 38-1). The **esophagus** is located in the mediastinum, anterior to the spine and posterior to the trachea and heart. This hollow muscular tube, which is approximately 25 cm (10 inches) in length, passes through the diaphragm at an opening called the *diaphragmatic hiatus*.

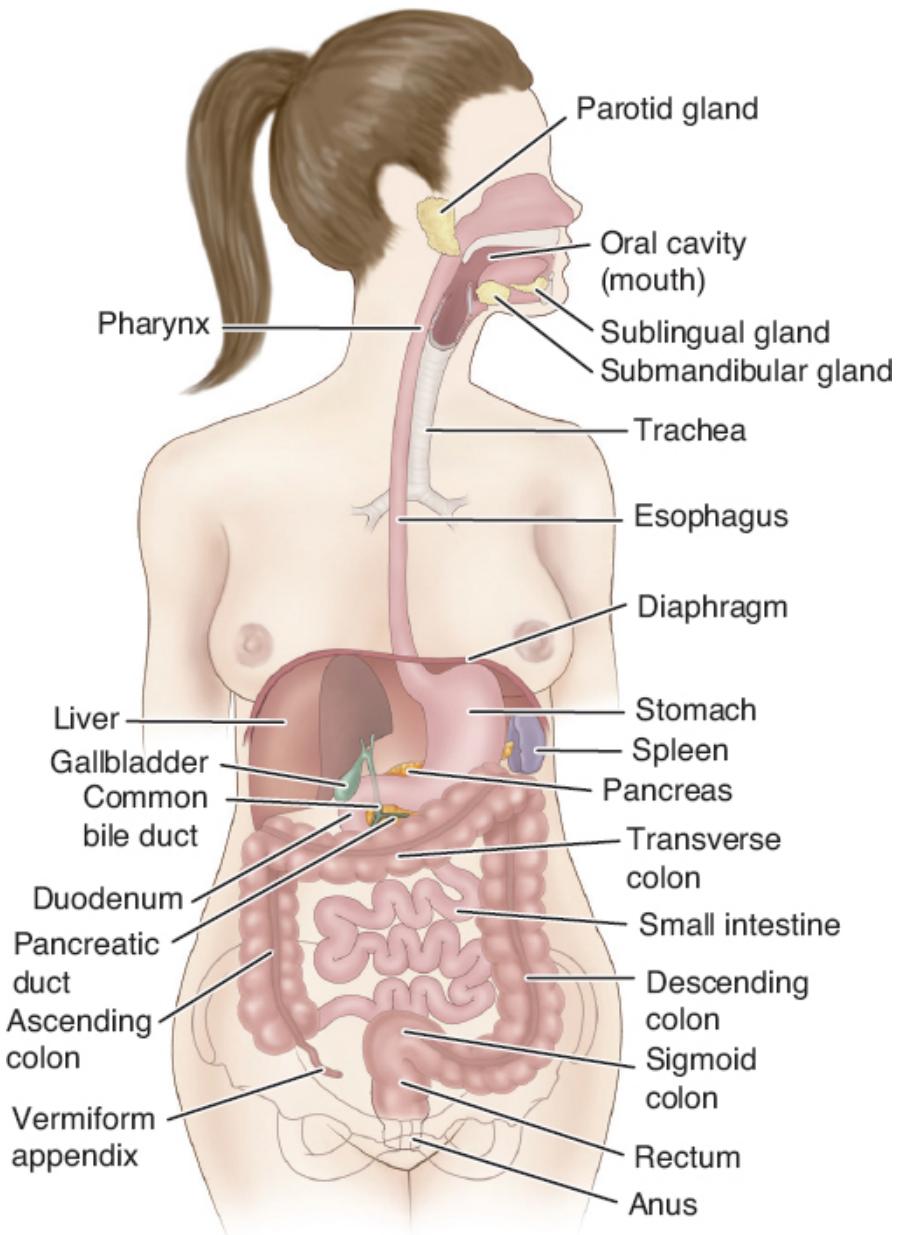


Figure 38-1 • Organs of the digestive system and associated structures.

The remaining portion of the GI tract is located within the peritoneal cavity. The **stomach** is situated in the left upper portion of the abdomen under the left lobe of the liver and the diaphragm, overlaying most of the pancreas (see Fig. 38-1). A hollow muscular organ with a capacity of approximately 1500 mL, the stomach stores food during eating, secretes digestive fluids, and propels the partially digested food, or chyme, into the small intestine. The gastroesophageal junction is the inlet to the stomach. The stomach has four anatomic regions: the cardia (entrance), fundus, body, and pylorus (outlet).

Circular smooth muscle in the wall of the pylorus forms the pyloric sphincter and controls the opening between the stomach and the small intestine.

The **small intestine** is the longest segment of the GI tract, accounting for about two thirds of the total length. It folds back and forth on itself, providing approximately 70 m (230 feet) of surface area for secretion and **absorption**, the process by which nutrients enter the bloodstream through the intestinal walls. It has three sections: The most proximal section is the duodenum, the middle section is the jejunum, and the distal section is the ileum. The ileum terminates at the ileocecal valve. This valve, or sphincter, controls the flow of digested material from the ileum into the cecal portion of the large intestine and prevents reflux of bacteria into the small intestine. Attached to the cecum is the vermiform appendix, an appendage that has little or no physiologic function. Emptying into the duodenum at the ampulla of Vater is the common bile duct, which allows for the passage of both bile and pancreatic secretions.

The **large intestine** consists of an ascending segment on the right side of the abdomen, a transverse segment that extends from right to left in the upper abdomen, and a descending segment on the left side of the abdomen. The sigmoid colon, the rectum, and the anus complete the terminal portion of the large intestine. A network of striated muscle that forms both the internal and the external anal sphincters regulates the anal outlet.

The GI tract receives blood from arteries that originate along the entire length of the thoracic and abdominal aorta and veins that return blood from the digestive organs and the spleen. This portal venous system is composed of five large veins: the superior mesenteric, inferior mesenteric, gastric, splenic, and cystic veins, which eventually form the vena portae that enters the liver. Once in the liver, the blood is distributed throughout and collected into the hepatic veins that then terminate in the inferior vena cava. Of particular importance are the gastric artery and the superior and inferior mesenteric arteries. Oxygen and nutrients are supplied to the stomach by the gastric artery and to the intestine by the mesenteric arteries ([Fig. 38-2](#)). Venous blood is returned from the small intestine, cecum, and the ascending and transverse portions of the colon by the superior mesenteric vein, which corresponds with the distribution of the branches of the superior mesenteric artery. Blood flow to the GI tract is about 20% of the total cardiac output and increases significantly after eating.

Both the sympathetic and parasympathetic portions of the autonomic nervous system innervate the GI tract. In general, sympathetic nerves exert an inhibitory effect on the GI tract, decreasing gastric secretion and motility and causing the sphincters and blood vessels to constrict. Parasympathetic nerve stimulation causes peristalsis and increases secretory activities. The sphincters relax under the influence of parasympathetic stimulation, except for the sphincter of the upper esophagus and the external anal sphincter, which are under voluntary control (Norris, 2019).

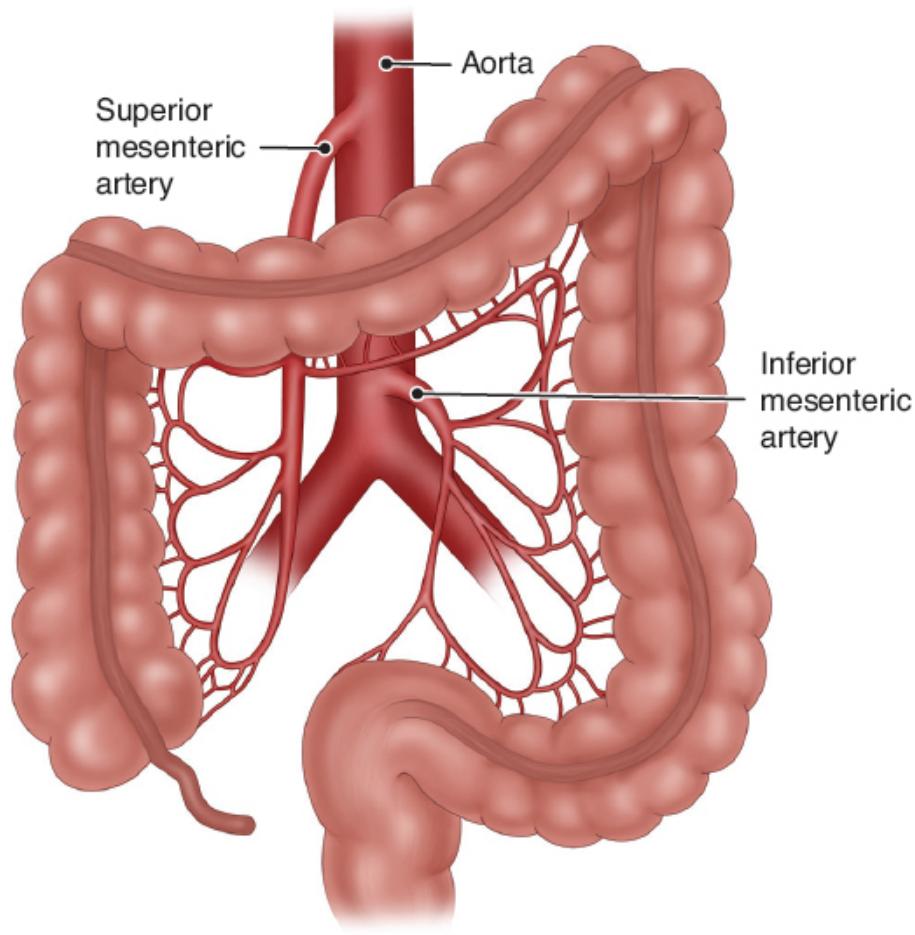


Figure 38-2 • Anatomy and blood supply of the large intestine.

Function of the Digestive System



All cells of the body require nutrients. These nutrients are derived from the intake of food that contains proteins, fats, carbohydrates, vitamins, minerals, and cellulose fibers and other vegetable matter, some of which has no nutritional value. Major functions of the GI tract include:

- Breakdown of food particles into the molecular form for **digestion**
- Absorption into the bloodstream of small nutrient molecules produced by digestion
- **Elimination** of undigested unabsorbed foodstuffs and other waste products

After food is ingested, it is propelled through the GI tract, coming into contact with a wide variety of secretions that aid in its digestion, absorption, or elimination from the GI tract.

Chewing and Swallowing

The process of digestion begins with the act of chewing, in which food is broken down into small particles that can be swallowed and mixed with digestive enzymes. Eating—or even the sight, smell, or taste of food—can cause reflex salivation. Approximately 1.5 L of saliva is secreted daily from the parotid, the submaxillary, and the sublingual glands. Ptyalin, or salivary **amylase**, is an enzyme that begins the digestion of starches. Water and mucus, also contained in saliva, help lubricate the food as it is chewed, thereby facilitating swallowing.

Swallowing begins as a voluntary act that is regulated by the swallowing center in the medulla oblongata of the central nervous system (CNS). As a bolus of food is swallowed, the epiglottis moves to cover the tracheal opening and prevent aspiration of food into the lungs. Swallowing, which propels the bolus of food into the upper esophagus, thus ends as a reflex action. The smooth muscle in the wall of the esophagus contracts in a rhythmic sequence from the upper esophagus toward the stomach to propel the bolus of food along the tract. During this process of esophageal peristalsis, the lower esophageal sphincter relaxes and permits the bolus of food to enter the stomach. Subsequently, the lower esophageal sphincter closes tightly to prevent reflux of stomach contents into the esophagus.

Gastric Function

The stomach, which stores and mixes food with secretions, secretes a highly acidic fluid in response to the presence or anticipated **ingestion** of food. This fluid, which can total 2.4 L/day, can have a pH as low as 1 and derives its acidity from **hydrochloric acid** (HCl) secreted by the glands of the stomach. The function of this gastric secretion is twofold: to break down food into more absorbable components and to aid in the destruction of most ingested bacteria. **Pepsin**, an important enzyme for protein digestion, is the end product of the conversion of pepsinogen from the chief cells ([Table 38-1](#)). **Intrinsic factor**, also secreted by the gastric mucosa, combines with dietary vitamin B₁₂ so that the vitamin can be absorbed in the ileum. In the absence of intrinsic factor, vitamin B₁₂ cannot be absorbed, and pernicious anemia results ([see Chapter 29](#)).

Peristaltic contractions in the stomach propel the stomach's contents toward the pylorus. Because large food particles cannot pass through the pyloric sphincter, they are churned back into the body of the stomach. In this way, food in the stomach is mechanically broken down into smaller particles. Food remains in the stomach for a variable length of time, from 30 minutes to several hours, depending on the volume, osmotic pressure, and chemical composition of the gastric contents. Peristalsis in the stomach and contractions of the pyloric sphincter allow the partially digested food to enter the small intestine at a rate that permits efficient absorption of nutrients. This partially digested food mixed with gastric secretions is called **chyme**. Hormones,

neuroregulators, and local regulators found in the gastric secretions control the rate of gastric secretions and influence gastric motility ([Table 38-2](#)).

Small Intestine Function

The digestive process continues in the duodenum. Duodenal secretions come from the accessory digestive organs—the pancreas, liver, and gallbladder—and the glands in the wall of the intestine itself. These secretions contain digestive enzymes: amylase, lipase, and bile. Pancreatic secretions have an alkaline pH due to their high concentration of bicarbonate. This alkalinity neutralizes the acid entering the duodenum from the stomach. Digestive enzymes secreted by the pancreas include **trypsin**, which aids in digesting protein; amylase, which aids in digesting starch; and **lipase**, which aids in digesting fats. These secretions drain into the pancreatic duct, which empties into the common bile duct at the ampulla of Vater. Bile, secreted by the liver and stored in the gallbladder, aids in emulsifying ingested fats, making them easier to digest and absorb. The sphincter of Oddi, found at the confluence of the common bile duct and duodenum, controls the flow of bile. Hormones, neuroregulators, and local regulators found in these intestinal secretions control the rate of intestinal secretions and also influence GI motility. Intestinal secretions total approximately 1 L/day of pancreatic juice, 0.5 L/day of bile, and 3 L/day of secretions from the glands of the small intestine. [Tables 38-1](#) and [38-2](#) give further information about the actions of digestive enzymes and GI regulatory substances.

TABLE 38-1 The Major Digestive Enzymes and Secretions

Enzyme/Secretion	Enzyme Source	Digestive Action
Enzymes That Digest Carbohydrates		
Ptyalin (salivary amylase)	Salivary glands	Starch→dextrin, maltose, glucose
Amylase	Pancreas and intestinal mucosa	Starch→dextrin, maltose, glucose Dextrin→maltose, glucose
Maltase	Intestinal mucosa	Maltose→glucose
Sucrase	Intestinal mucosa	Sucrose→glucose, fructose
Lactase	Intestinal mucosa	Lactose→glucose, galactose
Enzymes/Secretions That Digest Protein		
Pepsin	Gastric mucosa	Protein→polypeptides
Trypsin	Pancreas	Proteins and polypeptides→polypeptides, dipeptides, amino acids
Aminopeptidase	Intestinal mucosa	Polypeptides→dipeptides, amino acids
Dipeptidase	Intestinal mucosa	Dipeptides→amino acids
Hydrochloric acid	Gastric mucosa	Protein→polypeptides, amino acids
Enzymes/Secretions That Digest Fat (Triglyceride)		
Pharyngeal lipase	Pharynx mucosa	Triglycerides→fatty acids, diglycerides, monoglycerides
Steapsin	Gastric mucosa	Triglycerides→fatty acids, diglycerides, monoglycerides
Pancreatic lipase	Pancreas	Triglycerides→fatty acids, diglycerides, monoglycerides
Bile	Liver and gallbladder	Fat emulsification

→, converts to.

Two types of contractions occur regularly in the small intestine: segmentation contractions and intestinal peristalsis. *Segmentation contractions* produce mixing waves that move the intestinal contents back and forth in a churning motion. *Intestinal peristalsis* propels the contents of the small intestine toward the colon. Both movements are stimulated by the presence of chyme.

Food, ingested as fats, proteins, and carbohydrates, is broken down into absorbable particles (constituent nutrients) by the process of digestion. Carbohydrates are broken down into disaccharides (e.g., sucrose, maltose, galactose) and monosaccharides (e.g., glucose, fructose). Glucose is the major carbohydrate that tissue cells use as fuel. Proteins are a source of energy after they are broken down into amino acids and peptides. Ingested fats become monoglycerides and fatty acid through emulsification, which makes them

smaller and easier to absorb. Chyme stays in the small intestine for 3 to 6 hours, allowing for continued breakdown and absorption of nutrients.

TABLE 38-2 The Major Gastrointestinal Regulatory Substances

Substance	Stimulus for Production	Target Tissue	Effect on Secretions	Effect on Motility
Neuroregulators				
Acetylcholine	Stomach distention, vagal and local nerves in the stomach	Gastric glands, other secretory glands, gastric and intestinal muscle	↑ Gastric acid	Generally increased
Norepinephrine	Stress, other various stimuli	Secretory glands, gastric and intestinal muscle	Generally inhibitory	Generally decreased; increased sphincter tone
Hormonal Regulators				
Gastrin	Vagal stimulation, calcium containing foods	Gastric glands, stomach antrum, duodenum	↑ Secretion of gastric acid and pepsinogen	Increased motility of stomach; stimulates smooth muscle contraction
Cholecystokinin	Protein digestion products, long-chain fatty acids, presence of chyme in duodenum	Gallbladder Pancreas Stomach	Release of bile into duodenum ↑ Production of enzyme-rich pancreatic secretions	Slows gastric emptying
Secretin	pH of chyme in duodenum (pH < 3)	Pancreas Stomach	Inhibits gastrin and gastric acid secretion	Decreases GI motility
Local Regulator				
Histamine	Unclear; substances in food	Gastric glands	↑ Gastric acid production	

HCl, hydrochloric acid; ↑, increased.

Adapted from McCance, K. L., & Huether, S. E. (2019). *Pathophysiology: The biologic basis for disease in adults and children* (8th ed.). St. Louis, MO: Elsevier; Norris, T. L. (2019). *Porth's pathophysiology. Concepts of altered health states* (10th ed.). Philadelphia, PA: Wolters Kluwer.

Small, fingerlike projections called *villi* line the entire intestine and function to produce digestive enzymes as well as to absorb nutrients. Absorption is the major function of the small intestine. Vitamins and minerals are absorbed essentially unchanged. Absorption begins in the jejunum and is accomplished by active transport and diffusion across the intestinal wall into the circulation. Nutrients are absorbed at specific locations in the small intestine and duodenum, whereas fats, proteins, carbohydrates, sodium, and chloride are absorbed in the jejunum. Vitamin B₁₂ and bile salts are absorbed in the ileum. Magnesium, phosphate, and potassium are absorbed throughout the small intestine.

Colonic Function

Within 4 hours after eating, residual waste material passes into the terminal ileum and slowly into the proximal portion of the right colon through the ileocecal valve. With each peristaltic wave of the small intestine, the valve opens briefly and permits some of the contents to pass into the colon.

Gut microbes (bacteria), a major component of the contents of the large intestine, assist in completing the breakdown of waste material, especially of undigested or unabsorbed proteins and bile salts. Two types of colonic secretions are added to the residual material: an electrolyte solution and mucus. The electrolyte solution is chiefly a bicarbonate solution that acts to neutralize the end products formed by the colonic bacterial action, whereas the mucus protects the colonic mucosa from the intraluminal contents and provides adherence for the fecal mass.

Slow, weak peristalsis moves the colonic contents along the tract. This slow transport allows for efficient reabsorption of water and electrolytes, which is the major function of the colon. Intermittent strong peristaltic waves propel the contents for considerable distances. This generally occurs after another meal is eaten, when intestine-stimulating hormones are released. The waste materials from a meal eventually reach and distend the rectum, usually in about 12 hours. As much as one fourth of the waste materials from a meal may still be in the rectum 3 days after the meal was ingested.

Waste Products of Digestion

Feces consist of undigested foodstuffs, inorganic materials, water, and bacteria. Fecal matter is about 75% fluid and 25% solid material (Norris, 2019). The composition is relatively unaffected by alterations in diet because a large portion of the fecal mass is of nondietary origin, derived from the secretions of the GI tract. The brown color of the feces results from the breakdown of bile by the intestinal bacteria. Chemicals formed by intestinal bacteria are responsible in large part for the fecal odor. Gases formed contain methane, hydrogen sulfide, and ammonia, among others. The GI tract normally contains approximately 150 mL of these gases, which are either absorbed into the portal circulation and detoxified by the liver or expelled from the rectum as flatus.

Elimination of stool begins with distention of the rectum, which initiates reflex contractions of the rectal musculature and relaxes the normally closed internal anal sphincter. The internal sphincter is controlled by the autonomic nervous system; the external sphincter is under the conscious control of the cerebral cortex. During defecation, the external anal sphincter voluntarily relaxes to allow colonic contents to be expelled. Normally, the external anal sphincter is maintained in a state of tonic contraction. Thus, defecation is seen to be a spinal reflex (involving the parasympathetic nerve fibers) that can be inhibited voluntarily by keeping the external anal sphincter closed. Contracting the abdominal muscles (straining) facilitates emptying of the colon. The average frequency of defecation in humans is once daily, but this varies among people.

Gut Microbiome

In addition to assisting in the breakdown of waste material, the gut **microbiota** (the complement of microbes in the GI tract) also has a role in vitamin synthesis and immune function, including protection against invading pathogens, regulatory influences on innate and adaptive immune responses, and inflammation. Colonization of the GI tract begins shortly after birth; the normal gut microbiota is established by 2 years of age. Several factors over time affect the composition of normal gut microbiota including genetics, diet, personal hygiene, infection, and vaccinations. The number and diversity of

microbes within the gut change with aging and are influenced by diet, chronic disease, and medications. Additionally, administration of broad-spectrum antibiotics can disrupt the gut microbiota and lead to overgrowth of potentially pathogenic species (McCance & Huether, 2019; Norris, 2019).

The gut **microbiome**, the collective genome of the microbiota, protects the host against invasion by pathogenic organisms; it produces anti-inflammatory metabolites, destroys toxins, prevents colonization of pathogens, and provokes an immune response (McCance & Huether, 2019; Norris, 2019). The intestinal epithelium is the first line of defense against pathogenic microbes and microbial agents, as it contains innate immune cells such as macrophages, dendritic cells, granulocytes, and mast cells, and has a role in T-cell responses (Günther, 2018; Haller, 2018; Pezoldt, Yang, Zou, et al., 2018; Strowig, Thiemann, & Diefenbach, 2018). In addition, Peyer's patches (gut-associated lymph tissue) also have a role in antigen processing and immune defense (McCance & Huether, 2019). Collectively, the gut microbiome serves the roles of protection and defense.



Gerontologic Considerations

Although an increased prevalence of several common GI disorders occurs in the older adult population, aging per se appears to have minimal direct effect on most GI functions, in large part because of the functional reserve of the GI tract. Normal physiologic changes of the GI system that occur with aging are identified in [Table 38-3](#). Careful assessment and monitoring of signs and symptoms related to these changes are imperative. Although irritable bowel symptoms decrease with aging, there seems to be an increase in many GI disorders of function and motility. Older adult patients frequently report dysphagia, anorexia, dyspepsia, and disorders of colonic function (Eliopoulos, 2018).

Assessment of the Gastrointestinal System

The nursing assessment of the GI system involves obtaining a focused health history and physical examination.

TABLE 38-3

Age-Related Changes in the Gastrointestinal System

Structural Changes	Implications
Oral Cavity and Pharynx	
<ul style="list-style-type: none"> • Injury/loss or decay of teeth • Atrophy of taste buds • ↓ Saliva production • Reduced ptyalin and amylase in saliva 	Difficulty chewing and swallowing
Esophagus	
<ul style="list-style-type: none"> • ↓ Motility and emptying • Weakened gag reflex • ↓ Resting pressure of lower esophageal sphincter 	Reflux and heartburn
Stomach	
<ul style="list-style-type: none"> • Degeneration and atrophy of gastric mucosal surfaces with ↓ production of HCl • ↓ Secretion of gastric acids and most digestive enzymes • ↓ Gastric motility and emptying 	Food intolerances, malabsorption, or ↓ vitamin B ₁₂ absorption
Small Intestine	
<ul style="list-style-type: none"> • Atrophy of muscle and mucosal surfaces • Thinning of villi and epithelial cells 	↓ Motility and transit time, which lead to complaints of indigestion and constipation
Large Intestine	
<ul style="list-style-type: none"> • ↓ Mucus secretion • ↓ Elasticity of rectal wall • ↓ Tone of internal anal sphincter • Slower and duller nerve impulses in rectal area 	<p>↓ Motility and transit time, which lead to complaints of indigestion and constipation</p> <p>↓ Absorption of nutrients (dextrose, fats, calcium, and iron)</p> <p>Fecal incontinence</p>

↓, decreased; HCl, hydrochloric acid.

Adapted from Eliopoulos, C. (2018). *Gerontological nursing* (9th ed.). Philadelphia, PA: Wolters Kluwer.

Health History

A focused GI assessment begins with a complete history. Information about abdominal pain, dyspepsia, gas, nausea and vomiting, diarrhea, constipation, fecal incontinence, jaundice, and previous GI disease is obtained (Weber & Kelley, 2018).

Common Symptoms

Common GI symptoms that may lead patients to seek health care referrals include pain, dyspepsia, gas, nausea and vomiting, diarrhea, and constipation.

Pain

Pain can be a major symptom of GI disease; in particular, abdominal pain is a frequent presenting problem in general practice (Babakhanlou, 2018). The character, duration, pattern, frequency, location, distribution of referred abdominal pain (Fig. 38-3), and time of the pain can vary greatly depending on the underlying cause. Other factors such as meals, rest, activity, and defecation patterns may directly affect this pain (Weber & Kelley, 2018).

Dyspepsia

Dyspepsia—upper abdominal discomfort associated with eating (commonly called *indigestion*)—is the most common symptom of patients with GI dysfunction. Indigestion is an imprecise term that refers to a host of upper abdominal or epigastric symptoms such as pain, discomfort, fullness, bloating, early satiety, belching, heartburn, or regurgitation. Annually, dyspepsia affects approximately 25% of Americans (Longstreth & Lacy, 2019) while gastroesophageal reflux disease (GERD), which increases with age and manifests with dyspepsia (most frequently with heartburn), affects approximately 20% of adults in western cultures (Antunes & Curtis, 2019). Typically, fatty foods cause the most discomfort because they remain in the stomach for digestion longer than proteins or carbohydrates. Salads, coarse vegetables, and highly seasoned foods may also cause considerable GI distress. In some cases, health care providers make a distinction between gastroesophageal reflux (GER) and GERD; GERD is the more serious and longer-lasting condition (Mayo Clinic, 2019).

Intestinal Gas

The accumulation of gas in the GI tract may result in belching (expulsion of gas from the stomach through the mouth) or flatulence (expulsion of gas from the rectum). Usually, gases in the small intestine pass into the colon and are released as flatus. Patients often complain of bloating, distention, or feeling “full of gas” with excessive flatulence as a symptom of food intolerance or gallbladder disease.

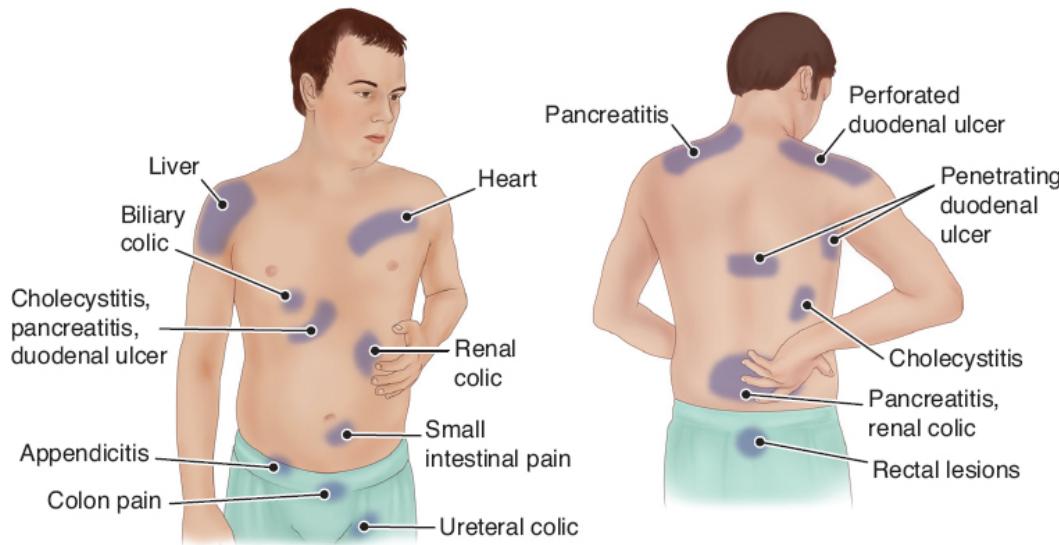


Figure 38-3 • Common sites of referred abdominal pain.

Nausea and Vomiting

Nausea is a vague, uncomfortable sensation of sickness or “queasiness” that may or may not be followed by vomiting. Distention of the duodenum or upper intestinal tract is a common cause of nausea; it may also be an early warning sign of a pathologic process. Nausea can be triggered by odors, activity, medications, or food intake. Vomiting is the forceful emptying of the stomach and intestinal contents through the mouth (McCance & Huether, 2019). The emesis, or vomitus, may vary in color and content and may contain undigested food particles, blood (hematemesis), or bilious material mixed with gastric juices. An acute onset of emesis that appears bright red or as coffee grounds is characteristic of a Mallory-Weiss tear (i.e., a laceration in the mucosal lining of the gastroesophageal junction) and indicates upper GI bleeding (Rich, 2018).

The causes of nausea and vomiting are many and may include visceral pain; motion or motion sickness; anxiety; several types of intestinal, vagal or sympathetic input including side effects of medications; and torsion or trauma of the ovaries, testes, uterus, bladder or kidney (McCance & Huether, 2019). Pathways for initiation of the vomiting reflex include medication therapy, metabolic abnormalities (chemoreceptor trigger zone), ingested toxins, chemotherapy, radiation therapy (vagal and splanchnic receptors), inner ear disorders, motion sickness (vestibular center), and anticipatory emesis (cerebral cortex) (Hainsworth, 2020).

Change in Bowel Habits and Stool Characteristics

Changes in bowel habits may signal colonic dysfunction or disease. Diarrhea, an abnormal increase in the frequency and liquidity of the stool or in daily stool weight or volume, commonly occurs when the contents move so rapidly

through the intestine and colon that there is inadequate time for the GI secretions and oral contents to be absorbed. This physiologic function is typically associated with abdominal pain or cramping and nausea or vomiting. Constipation—a decrease in the frequency of stool, or stools that are hard, dry, and of smaller volume than typical—may be associated with anal discomfort and rectal bleeding, and is a frequent reason patients seek health care referrals (see the Nursing Research Profile in [Chart 38-1](#)) (Shen, Zhu, Jiang, et al., 2018). See [Chapter 41](#) for further discussion of diarrhea and constipation.

The characteristics of the stool can vary greatly. Stool is normally light to dark brown; however, specific disease processes and ingestion of certain foods and medications may change the appearance of stool ([Table 38-4](#)). Blood in the stool can present in various ways and must be investigated. If blood is shed in sufficient quantities into the upper GI tract, it produces a tarry-black color (melena), whereas blood entering the lower portion of the GI tract or passing rapidly through it will appear bright or dark red. Lower rectal or anal bleeding is suspected if there is streaking of blood on the surface of the stool or if blood is noted on toilet tissue. Other common abnormalities in stool characteristics described by the patient may include:

- Bulky, greasy, foamy stools that are foul in odor and may or may not float
- Light gray or clay-colored stool, caused by a decrease or absence of conjugated bilirubin
- Stool with mucus threads or pus that may be visible on gross inspection of the stool
- Small, dry, rock-hard masses occasionally streaked with blood
- Loose, watery stool that may or may not be streaked with blood

Past Health, Family, and Social History

The nurse asks about the patient's normal toothbrushing and flossing routine; frequency of dental visits; awareness of any lesions or irritated areas in the mouth, tongue, or throat; recent history of sore throat or bloody sputum; discomfort caused by certain foods; daily food intake; the use of alcohol and tobacco, including smokeless chewing tobacco; and the need to wear dentures or a partial plate. For information about denture care, see [Chart 38-2](#).

Chart 38-1



NURSING RESEARCH PROFILE

Nurse-Led Educational Intervention for Patients with Functional Constipation

Shen, Q., Zhu, H., Jiang, G., et al. (2018). Nurse-led self-management educational intervention improves symptoms of patients with functional constipation. *Western Journal of Nursing Research*, 40(60), 874–888.

Purpose

Functional constipation (FC) is described as a persistent problem with defecation that may be characterized by a decrease in bowel movements, a feeling of incomplete bowel emptying post defecation, or difficulty having bowel movements. The purpose of the study was to investigate the effects of a self-management educational intervention on patients with FC and to compare outcomes to a control group that received routine nursing care.

Design

The pretest/posttest scores of *The Constipation Assessment Scale* and *The Constipation Cognition Scale* were collected on admission, discharge, and 1-month post discharge for 66 eligible participants who were randomly assigned to either an intervention group or a control group. Both groups received routine nursing care for constipation. In addition, the intervention group received the following support: visits from the multidisciplinary intervention team, dietary and lifestyle evaluation, education, assistance in developing a self-management plan, timely consultations and weekly group meetings both inpatient and outpatient, and the option to include family members in sessions. Patients in the intervention group were also encouraged to maintain a diary to document food and lifestyle choices. Members of the educational intervention team checked the diaries daily during hospitalization and provided follow-up via a phone call 1 week and then 1 month after discharge.

Findings

The constipation scores of all clinical symptoms were lower (improved) in the intervention group at 1 month after discharge ($p < 0.05$). Additionally, the intervention group had a higher number of patients with good health habits, including diet, exercise, and defecation habits, and proper use of laxatives ($p < 0.05$).

Nursing Implications

The findings of this study suggest that a multifaceted educational intervention can improve clinical symptoms and adherence behaviors, and promote healthy lifestyle choices in patients with FC. Nurses can apply findings to better manage FC, educate patients to improve outcomes, and tailor interventions to best meet the needs of this patient population.

TABLE 38-4 Foods and Medications That Alter Stool Color

Altering Substance	Color
Leafy green vegetables, spinach, kale	Green
Beets, red gelatin, tomato soup, food coloring	Red
Bismuth, iron, black licorice	Black
Barium	Milky white

Adapted from McEvoy, G. E. (Ed.). (2020). *AHFS Drug Information®*. Bethesda, MD: American Society of Health-System Pharmacists. *STAT!Ref Online Electronic Medical Library*. Retrieved on 2/14/2020 at: www.ahfsdruginformation.com/ahfs-drug-information; Wedro, B. (2019). Stool color, changes in color, texture, and form. *MedicineNet*. Retrieved on 1/14/2020 at: www.medicinenet.com/stool_color_changes/article.htm

Past and current medication use and any previous diagnostic studies, treatments, or surgery are noted. Current nutritional status is assessed via history; laboratory tests (complete metabolic panel including liver function studies, triglyceride, iron studies, and complete blood count [CBC]) are obtained. History of the use of tobacco and alcohol includes details about type, amount, length of use, and the date of discontinuation, if any. The nurse and patient discuss changes in appetite or eating patterns and any unexplained weight gain or loss over the past year. The nurse also asks questions about psychosocial, spiritual, or cultural factors that may be affecting the patient.

Physical Assessment

The physical examination includes assessment of the mouth, abdomen, and rectum and requires a good source of light, full exposure of the abdomen, warm hands with short fingernails, and a comfortable and relaxed patient with an empty bladder.

Oral Cavity Inspection and Palpation

Dentures should be removed to allow good visualization of the entire oral cavity.

Lips

The examination begins with inspection of the lips for moisture, hydration, color, texture, symmetry, and the presence of ulcerations or fissures. The lips should be moist, pink, smooth, and symmetric. The patient is instructed to open the mouth wide; a tongue blade is then inserted to expose the buccal mucosa for an assessment of color and lesions. Stensen duct of each parotid gland is visible as a small red dot in the buccal mucosa next to the upper molars.

Chart 38-2 HEALTH PROMOTION

Denture Care

- Brush dentures twice a day.
- Clean well under partial dentures, where food particles tend to get caught.
- Consume nonsticky foods that have been cut into small pieces; chew slowly.
- Remove dentures at night and soak them in water or a denture product. Never put dentures in hot water, because they may warp.
- Rinse mouth with warm salt water in the morning, after meals, and at bedtime.
- See dentist regularly to assess and adjust fit.

Gums

The gums are inspected for inflammation, bleeding, retraction, and discoloration. The odor of the breath is also noted. The hard palate is examined for color and shape.

Tongue

The dorsum (back) of the tongue is inspected for texture, color, and lesions. A thin white coat and large, vallate papillae in a “V” formation on the distal portion of the dorsum of the tongue are normal findings. The patient is instructed to protrude the tongue and move it laterally. This provides the examiner with an opportunity to estimate the tongue’s size as well as its symmetry and strength (to assess the integrity of the 12th cranial nerve [hypoglossal nerve]).

Further inspection of the ventral surface of the tongue and the floor of the mouth is accomplished by asking the patient to touch the roof of the mouth with the tip of the tongue. Any lesions of the mucosa or any abnormalities involving the frenulum or superficial veins on the undersurface of the tongue are assessed for location, size, color, and pain. This is a common area for oral cancer, which presents as a white or red plaque, lesions, ulcers, or nodules (Weber & Kelley, 2018).

A tongue blade is used to depress the tongue for adequate visualization of the pharynx. It is pressed firmly beyond the midpoint of the tongue; proper placement avoids a gagging response. The patient is told to tip the head back, open the mouth wide, take a deep breath, and say “ah.” Often, this flattens the posterior tongue and briefly allows a full view of the tonsils, uvula, and posterior pharynx. These structures are inspected for color, symmetry, and

evidence of exudate, ulceration, or enlargement. Normally, the uvula and soft palate rise symmetrically with a deep inspiration upon saying “ah”; this indicates an intact vagus nerve (10th cranial nerve).

A complete assessment of the oral cavity is essential because many disorders, such as cancer, diabetes, and immunosuppressive conditions resulting from medication therapy or acquired immunodeficiency syndrome, may be manifested by changes in the oral cavity, including stomatitis.

Abdominal Inspection, Auscultation, Percussion, and Palpation



The patient lies supine with knees flexed slightly for inspection, auscultation, percussion, and palpation of the abdomen. For the purposes of examination and documentation, the abdomen can be divided into either four quadrants or nine regions (Fig. 38-4).

Consistent use of one of these mapping methods results in a thorough evaluation of the abdomen and appropriate documentation. The four-quadrant method involves the use of an imaginary line drawn vertically from the sternum to the pubis through the umbilicus and a horizontal line drawn across the abdomen through the umbilicus. Inspection is performed first, noting skin changes, nodules, lesions, scarring, discolorations, inflammation, bruising, or striae. Lesions are of particular importance, because GI diseases often produce skin changes. The contour and symmetry of the abdomen are noted, and any localized bulging, distention, or peristaltic waves are identified. Expected contours of the anterior abdominal wall can be described as flat, rounded, or scaphoid.

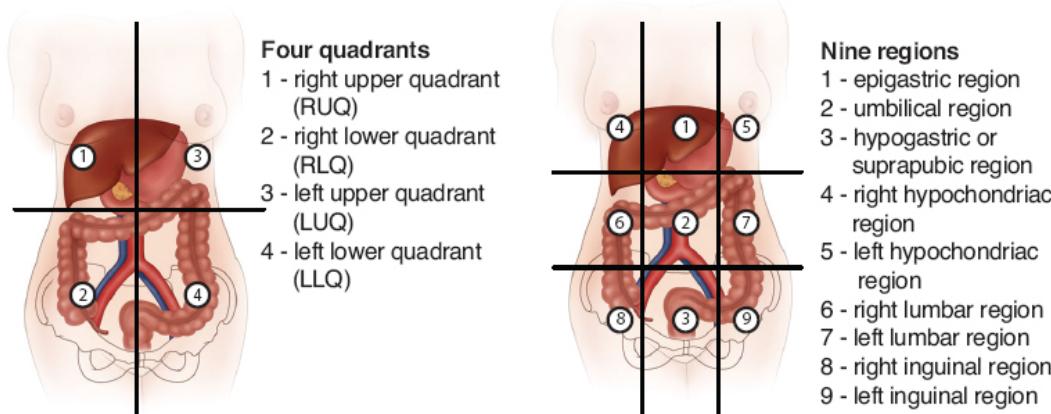


Figure 38-4 • Division of the abdomen into four quadrants or nine regions.

Auscultation always precedes percussion and palpation, because they may alter sounds. Auscultation is used to determine the character, location, and

frequency of bowel sounds and to identify vascular sounds. Bowel sounds are assessed using the diaphragm of the stethoscope for soft clicks and gurgling sounds (Weber & Kelley, 2018). The frequency and character of the sounds are usually heard as clicks and gurgles that occur irregularly and range from 5 to 30 per minute. Bowel sounds are designated as normal, hyperactive, hypoactive, or absent. The nurse should auscultate for a minimum of 5 minutes; listening for at least 1 minute in each quadrant to confirm the absence of bowel sounds (Weber & Kelley, 2018). Using the bell of the stethoscope, any bruits in the aortic, renal, iliac, and femoral arteries are noted. Friction rubs are high pitched and can be heard over the liver and spleen during respiration. Borborygmus (“stomach growling”) is heard as a loud prolonged gurgle.

Percussion is used to assess the size and density of the abdominal organs and to detect the presence of air-filled, fluid-filled, or solid masses. Percussion is used either independently or concurrently with palpation because it can validate palpation findings. All quadrants are percussed for overall tympani and dullness. Tympani is the sound that results from the presence of air in the stomach and small intestines; dullness is heard over organs and solid masses. The use of light palpation is appropriate for identifying areas of tenderness or muscular resistance, and deep palpation is used to identify masses. Testing for rebound tenderness is not performed by many examiners because it can cause severe pain; light percussion is used instead to produce a mild localized response when peritoneal irritation is present.

Rectal Inspection and Palpation

The final part of the examination is evaluation of the terminal portions of the GI tract, the rectum, perianal region, and anus. The anal canal is approximately 2.5 to 4 cm (1 to 1.6 inches) in length and opens into the perineum. Concentric rings of muscle, the internal and external sphincters, normally keep the anal canal securely closed. Gloves, water-soluble lubrication, a penlight, and drapes are necessary tools for the evaluation. Although the rectal examination is generally uncomfortable and often embarrassing for the patient, it is a mandatory part of every thorough examination. For women, the rectal examination may be part of the gynecologic examination. Positions for the rectal examination include knee-chest, left lateral with hips and knees flexed, or standing with hips flexed and upper body supported by the examination table. Most patients are comfortable on the right side with knees brought up to the chest. External examination includes inspection for lumps, rashes, inflammation, excoriation, tears, scars, pilonidal dimpling, and tufts of hair at the pilonidal area. The discovery of tenderness, inflammation, or both should alert the examiner to the possibility of a pilonidal cyst, perianal abscess, or anorectal fistula or fissure. The patient’s buttocks are carefully spread and visually inspected until the patient has relaxed the external sphincter control.

The patient is asked to bear down, thus allowing the ready appearance of fistulas, fissures, rectal prolapse, polyps, and internal hemorrhoids. Internal examination is performed with a gloved lubricated index finger inserted into the anal canal while the patient bears down. The tone of the sphincter is noted, as are any nodules or irregularities of the anal ring. Because this is an uncomfortable part of the examination for most patients, the patient is encouraged to focus on deep breathing and visualization of a pleasant setting during the brief examination.

Diagnostic Evaluation

GI diagnostic studies can confirm, rule out, stage, or diagnose various disease states, including cancer. After the diagnosis, time should be allotted for discussion with the patient, in addition to offering resource materials for information.

Many modalities are available for diagnostic assessment of the GI tract. The majority of these tests and procedures are performed on an outpatient basis in special settings designed for this purpose (e.g., endoscopy suite or GI laboratory). Preparation for many of these studies includes either a clear liquid or low residue diet, fasting, ingestion of a liquid bowel preparation, the use of laxatives or enemas, and ingestion or injection of a contrast agent or a radiopaque dye. These measures are poorly tolerated by some patients and are especially problematic in older adults or patients with comorbidities because bowel preparations can significantly alter the internal fluid and electrolyte balance. If further assessment or treatment is needed after any outpatient procedure, the patient may be admitted to the hospital.

Specific nursing interventions for each test are provided later in this chapter. General nursing interventions for the patient who is undergoing a GI diagnostic evaluation include:

- Establishing the need for more information
- Providing education to patients and families on the diagnostic test, and pre- and postprocedure restrictions and care
- Helping the patient cope with discomfort and alleviating anxiety
- Informing the primary provider of known medical conditions or abnormal laboratory values that may affect the procedure
- Assessing for adequate hydration before, during, and immediately after the procedure, and providing education about maintenance of hydration

Serum Laboratory Studies

Initial diagnostic tests begin with serum laboratory studies, including but not limited to CBC, complete metabolic panel, prothrombin time/partial thromboplastin time, triglycerides, liver function tests, amylase, and lipase; possibly, more specific studies may be indicated, such as carcinoembryonic antigen (CEA), cancer antigen (CA) 19-9, and alpha-fetoprotein, which are sensitive and specific for colorectal and hepatocellular carcinomas, respectively. CEA is a protein that is normally not detected in the blood of a healthy person; therefore, when detected it indicates that cancer is present, although not what type of cancer is present. CA 19-9 is also a protein that exists on the surface of certain cells and is shed by tumor cells, making it useful as a tumor marker to follow the course of the cancer. Tumor markers (e.g., mCEA and CA 19-9), along with other tests, are used in patients diagnosed with colorectal cancer to demonstrate the effectiveness of treatment or to provide an early warning that the cancer has returned (American Cancer Society [ACS], 2018).

Stool Tests

Basic examination of the stool includes inspecting the specimen for consistency, color, and occult (not visible) blood. Additional studies, including fecal urobilinogen, fecal fat, nitrogen, *Clostridium difficile*, fecal leukocytes, calculation of stool osmolar gap, parasites, pathogens, food residues, and other substances, require laboratory evaluation.

Stool samples are usually collected on a random basis unless a quantitative study (e.g., fecal fat, urobilinogen) is to be performed. Random specimens should be sent promptly to the laboratory for analysis; however, the quantitative 24- to 72-hour collections must be kept refrigerated until transported to the laboratory. Some stool collections require the patient to follow a specific diet or refrain from taking certain medications before the collection; patient education is important.

Guaiac-based fecal occult blood testing (gFOBT) is one of the most commonly performed stool tests. It can be useful in initial screening for several disorders, although it is used most frequently in early cancer detection programs. gFOBT can be performed at the bedside, in the laboratory, or at home. It is inexpensive, noninvasive, and carries minimal risk to the patient. However, it should not be performed when there is hemorrhoidal bleeding. Patients are advised to avoid ingesting red meats, aspirin, and nonsteroidal anti-inflammatory drugs for 72 hours prior to the study because it is thought that these factors are associated with false-positive results; likewise, patients are advised to avoid ingesting vitamin C from supplements or foods as it is believed that this is associated with false-negative results (ACS, 2019). A small amount of the specimen is applied to the guaiac-impregnated paper slide. If the test is performed at home, the patient mails the slide to the primary

provider or the lab in an envelope provided for that purpose. The ACS (2019) recommends using the highly sensitive versions of this type of test (e.g., fecal immunochemical test [FIT], FIT-fecal DNA test) for screening.

The FIT reacts to the human hemoglobin protein. The stool sample can be obtained at home, and dietary or medication restrictions are not required prior to collecting the stool specimen. This test is less likely to react to bleeding from other areas of the digestive tract and is done annually (ACS, 2019).

FIT-fecal DNA testing can detect abnormal sections of DNA from cancer or polyp cells (ACS, 2019). The Centers for Medicare & Medicaid Services approved this test for reimbursement and recommends performing the test every 3 years (Rex, Boland, Dominitz, et al., 2017). The FIT-fecal DNA test does not require any dietary or medication restrictions and can detect neoplasia anywhere in the colon.

Breath Tests

The hydrogen breath test was developed to evaluate carbohydrate absorption, in addition to aiding in the diagnosis of bacterial overgrowth in the intestine and short-bowel syndrome. This test determines the amount of hydrogen expelled in the breath after it has been produced in the colon (on contact of galactose with fermenting bacteria) and absorbed into the blood.

Urea breath tests detect the presence of *Helicobacter pylori*, the bacteria that can live in the mucosal lining of the stomach and cause peptic ulcer disease. After the patient ingests a capsule of carbon-labeled urea, a breath sample is obtained 10 to 20 minutes later. Because *H. pylori* metabolizes urea rapidly, the labeled carbon is absorbed quickly; it can then be measured as carbon dioxide in the expired breath to determine whether *H. pylori* is present. Prior to urea breath testing, the patient is instructed to avoid antibiotics or bismuth subsalicylate for 1 month before the test; proton pump inhibitors for 2 weeks before the test; and cimetidine and famotidine for 24 hours before the test (HealthLinkBC, 2018). *H. pylori* also can be detected by assessing serum antibody levels without requiring medication therapy adjustments.

Abdominal Ultrasonography

Ultrasonography is a noninvasive diagnostic technique in which high-frequency sound waves are passed into internal body structures, and the ultrasonic echoes are recorded on an oscilloscope as they strike tissues of different densities. It is particularly useful in the detection of an enlarged gallbladder or pancreas, the presence of gallstones, an enlarged ovary, an ectopic pregnancy, or appendicitis. Ultrasonography can be limited by patient body type, bowel gas patterns, and operator experience (Babakhanlou, 2018).

Advantages of abdominal ultrasonography include an absence of ionizing radiation, no noticeable side effects, relatively low cost, and almost immediate results. It cannot be used to examine structures that lie behind bony tissue, because bone prevents sound waves from traveling into deeper structures. Gas and fluid in the abdomen or air in the lungs also prevent transmission of ultrasound. An ultrasound produces no ill effects. However, some patients, such as pregnant women, have concerns regarding the energy emitted by the probe.

Endoscopic ultrasonography (EUS) is a specialized enteroscopic procedure that aids in the diagnosis of GI disorders by providing direct imaging of a target area. A small high-frequency ultrasonic transducer is mounted at the tip of the fiberoptic scope, which displays images that are of higher-quality resolution and definition than regular ultrasound imaging. EUS may be used to evaluate submucosal lesions, specifically their location and depth of penetration. In addition, EUS may aid in the evaluation of Barrett esophagus, portal hypertension, chronic pancreatitis, suspected pancreatic neoplasm, biliary tract disease, and changes in the bowel wall due to ulcerative colitis. Intestinal gas, bone, and thick layers of adipose tissue that hamper conventional ultrasonography are not problems when EUS is used.

Nursing Interventions

The patient is instructed to fast for 8 to 12 hours before ultrasound testing to decrease the amount of gas in the bowel. If gallbladder studies are being performed, the patient should eat a fat-free meal the evening before the test. If barium studies are to be performed, they should be scheduled after ultrasonography; otherwise, the barium could interfere with the transmission of the sound waves. Patients who receive moderate sedation are observed for about 1 hour to assess for level of consciousness, orientation, and ability to ambulate. Patients treated on an outpatient basis are given instructions regarding diet, activity, and how to monitor for complications (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2017).

Genetic Testing

Researchers have refined methods for genetics risk assessment, preclinical diagnosis, and prenatal diagnosis to identify people who are at risk for certain GI disorders (e.g., gastric cancer, lactose deficiency, inflammatory bowel disease, colon cancer) ([Chart 38-3](#)). People who are identified as being at risk for certain GI disorders may choose to have genetic counseling to learn about the disease and options for preventing and treating the disease, and to receive support in coping with the situation. Lynch syndrome is inherited in an autosomal dominant manner and is associated with colonic and extracolonic cancers; 3% of new cases of colon cancer are attributed to Lynch syndrome.

(Kohlmann & Gruber, 2018; Sinicrope, 2018). See [Chapter 6](#) for further discussion of genetic counseling.

Chart 38-3 GENETICS IN NURSING PRACTICE



Digestive and Gastrointestinal Disorders

Several digestive and gastrointestinal disorders are associated with genetic abnormalities. Some examples include:

Autosomal dominant:

- Hereditary diffuse gastric cancer
- Hereditary non-polyposis colorectal cancer (Lynch syndrome)
- Hirschsprung disease (aganglionic megacolon)

Autosomal recessive:

- Glucose galactose malabsorption
- Glycogen storage disease (von Gierke disease)
- Pompe disease
- Zellweger syndrome

Inheritance pattern includes autosomal dominant and autosomal recessive:

- Familial adenomatous polyposis

X-linked:

- Fabry disease

Inheritance pattern is not distinct; however, there is a genetic predisposition for the disease:

- Crohn's disease
- Type 1 diabetes
- Celiac disease
- Pancreatic cancer

Other genetic disorders that will impact the digestive and gastrointestinal system:

- Cleft lip and/or palate
- Cystic fibrosis

Nursing Assessments

Refer to [Chapter 4, Chart 4-2: Genetics in Nursing Practice: Genetic Aspects of Health Assessment](#)

Family History Assessment Related to Digestive and Gastrointestinal Disorders

- Careful family history assessment for other family members with a similar condition (e.g., cleft lip/palate, pyloric stenosis).
- Assess for other family members in several generations with early-onset colorectal cancer.
- Inquire about other family members with inflammatory bowel disease.

- Assess family history for other cancers (e.g., endometrial, ovarian, kidney).

Patient Assessment Specific to Digestive and Gastrointestinal Disorders

- Ask about bowel pattern and color of stool.
- Assess if patient experiences episodes of abdominal cramping, diarrhea, or dehydration.
- Assess for unexplained weight loss.
- Identify intolerance to specific foods (e.g., gluten, high-fat foods, lactose).
- Assess for prior history of liver disorders.

Assess for presence of other clinical conditions:

- With clefting—congenital heart defect, other birth defects suggestive of a genetic syndrome.
- With familial adenomatous polyposis—congenital hypertrophy of retinal pigment epithelium.

Genetics Resources

[Cancer.Net](#), www.cancer.net

Celiac Disease Foundation, www.celiac.org

Crohn's & Colitis Foundation, www.ccfa.org

See [Chapter 6, Chart 6-7](#) for components of genetic counseling.

Imaging Studies

Numerous minimally invasive and noninvasive imaging studies, including x-ray and contrast studies, computed tomography (CT) scan, magnetic resonance imaging (MRI) scan, positron emission tomography (PET) scan, scintigraphy (radionuclide imaging), and virtual colonoscopy are available today.

Upper Gastrointestinal Tract Study

An upper GI fluoroscopy delineates the entire GI tract after the introduction of a contrast agent. A radiopaque liquid (e.g., barium sulfate) is commonly used; however, thin barium, diatrizoate sodium (Hypaque), and at times water are used due to their low associated risks. The GI series enables the examiner to detect or exclude anatomic or functional disorders of the upper GI organs or sphincters. It also aids in the diagnosis of ulcers, varices, tumors, regional enteritis, and malabsorption syndromes. The procedure may be extended to examine the duodenum and small bowel (small-bowel follow-through). As the barium descends into the stomach, the position, patency, and caliber of the esophagus are visualized, enabling the examiner to detect or exclude any anatomic or functional derangement of that organ. Fluoroscopic examination

next extends to the stomach as its lumen fills with barium, allowing observation of stomach motility, thickness of the gastric wall, the mucosal pattern, patency of the pyloric valve, and the anatomy of the duodenum. Multiple x-ray images are obtained during the procedure, and additional images may be taken at intervals for up to 24 hours to evaluate the rate of gastric emptying. Small-bowel x-rays taken while the barium is passing through that area allow for observation of the motility of the small bowel. Obstructions, ileitis, and diverticula can also be detected.

Variations of the upper GI study include double-contrast studies and enteroclysis. The double-contrast method of examining the upper GI tract involves administration of a thick barium suspension to outline the stomach and esophageal wall, after which tablets that release carbon dioxide in the presence of water are given. This technique has the advantage of showing the esophagus and stomach in finer detail, permitting signs of early superficial neoplasms to be noted.

Enteroclysis is a very detailed, double-contrast study of the entire small intestine that involves the continuous infusion (through a duodenal tube) of 500 to 1000 mL of a thin barium sulfate suspension; after this, methylcellulose is infused through the tube. The barium and methylcellulose fill the intestinal loops and are observed continuously by fluoroscopy and viewed at frequent intervals as they progress through the jejunum and the ileum. Air may also be used, but methylcellulose is preferred as it is associated with enhanced visibility (Lampignano & Kendrick, 2018). This process (even with normal motility) can take up to 6 hours and can be quite uncomfortable for the patient. The procedure aids in the diagnosis of partial small-bowel obstructions or diverticula. After completion of the fluoroscopic component of the study, the patient may have a CT scan to assess for lesions or adhesions, and in this case an iodinated contrast media may be used (Lampignano & Kendrick, 2018).

Nursing Interventions

Instruction regarding dietary changes prior to the study may include a low residue or clear liquid diet, and nothing by mouth (*nil per os*; NPO) after midnight the night before the study. In addition, the patient is advised to not smoke or chew gum during the NPO period because these can increase gastric secretions and salivation (Lampignano & Kendrick, 2018). Polyethylene glycol (PEG)-based solutions are considered the most effective bowel cleansing preparatory agent; other agents include sodium phosphate, magnesium citrate, and preparations containing sodium picosulfate, citric acid, and magnesium oxide (Harrison & Hielkrem, 2016; Tan, Lin, Ma, et al., 2018). Typically, oral medications are withheld on the morning of the study and resumed that evening, but each patient's medication regimen should be evaluated on an individual basis. When a patient with insulin-dependent

diabetes is NPO, their insulin requirements will need to be adjusted accordingly (see [Chapter 46](#)).

Follow-up care is provided after the upper GI procedure to ensure that the patient has eliminated most of the ingested barium. Fluids may be increased to facilitate evacuation of stool and barium.

Lower Gastrointestinal Tract Study

Visualization of the lower GI tract is obtained after rectal installation of barium. The barium enema can be used to detect the presence of polyps, tumors, or other lesions of the large intestine and demonstrate any anatomic abnormalities or malfunctioning of the bowel. After proper preparation and evacuation of the entire colon, each portion of the colon may be readily observed. The procedure usually takes about 15 to 30 minutes, during which time x-ray images are obtained.

Other means for visualizing the colon include double-contrast studies and a water-soluble contrast study. These tests are still occasionally used because they are relatively inexpensive and simple. A double-contrast or air-contrast barium enema involves the instillation of a thicker barium solution, followed by the instillation of air. The patient may feel some cramping or discomfort during this process. This test provides a contrast between the air-filled lumen and the barium-coated mucosa, allowing easier detection of smaller lesions. CT colonography has replaced double-contrast barium enema for nearly all indicated GI disorders (Rex et al., 2017) (see later discussion).

If active inflammatory disease, fistulas, or perforation of the colon is suspected, a water-soluble iodinated contrast agent (e.g., diatrizoic acid [Gastrografin]) can be used. The procedure is the same as for a barium enema, but the patient must first be assessed for allergy to iodine or contrast agent. The contrast agent is eliminated readily after the procedure, so there is no need for postprocedure laxatives. Diarrhea may occur in some patients until the contrast agent has been totally eliminated.

Nursing Interventions

Preparation of the patient includes emptying and cleansing the lower bowel. This often necessitates a low residue diet 1 to 2 days before the test, a clear liquid diet and a laxative the evening before, NPO after midnight, and cleansing enemas until returns are clear the following morning. The nurse makes sure that barium enemas are scheduled before any upper GI studies. If the patient has active inflammatory disease of the colon, enemas are contraindicated. Barium enemas also are contraindicated in patients with signs of perforation or obstruction; instead, a water-soluble contrast study may be performed. Active GI bleeding may prohibit the use of laxatives and enemas.

Postprocedural patient education includes information about increasing fluid intake, evaluating bowel movements for evacuation of barium, and noting

increased number of bowel movements, because barium, due to its high osmolarity, may draw fluid into the bowel, thus increasing the intraluminal contents and resulting in greater output.

Computed Tomography

A CT scan provides cross-sectional images of abdominal organs and structures. Multiple x-ray images are taken from numerous angles, digitized in a computer, reconstructed, and then viewed on a computer monitor. As the sensitivity and specificity of CT scans have increased in recent years, so has their use. Volume CT scanners (i.e., helical or spiral scanning) provide more accurate reconstruction of patient data into alternate planes, require shorter scan times, and have less artifact when compared to single slice scanning (Lampignano & Kendrick, 2018). CT is a valuable tool for detecting and localizing many inflammatory conditions in the colon, such as appendicitis, diverticulitis, regional enteritis, and ulcerative colitis, as well as evaluating the abdomen for diseases of the liver, spleen, kidney, pancreas, and pelvic organs, and structural abnormalities of the abdominal wall. The CT procedure is completely painless, but radiation doses are considerable. A CT scan may be performed with or without oral or intravenous (IV) contrast, but the enhancement of the study is greater with the use of a contrast agent. In patients at risk for complications from use of contrast, the radiologist and provider must be in agreement that the scan is medically necessary and that the benefits outweigh the risks (Yale School of Medicine, 2019).

Nursing Interventions

Common risks from IV contrast agents include allergic reactions and contrast-induced nephropathy (CIN); therefore, patients must be screened for these risks (Hossain, Costanzo, Cosentino, et al., 2018). Any allergies to contrast agents, iodine, or shellfish, the patient's current serum creatinine level, and pregnancy status in females must be determined before administration of a contrast agent. Patients allergic to the contrast agent may be premedicated with a corticosteroid and antihistamine.

The most effective ways to prevent CIN include careful selection of patients, maintaining hydration status, using newer contrast agents, and avoiding nephrotoxic agents pre- and postprocedure (Hossain et al., 2018).

Magnetic Resonance Imaging

MRI is used in gastroenterology to supplement ultrasonography and CT. This noninvasive technique uses magnetic fields and radio waves to produce images of the area being studied. The use of oral contrast agents to enhance the image has increased the application of this technique for the diagnosis of GI diseases.

It is useful in evaluating abdominal soft tissues as well as blood vessels, abscesses, fistulas, neoplasms, and other sources of bleeding.

The physiologic artifacts of heartbeat, respiration, and peristalsis may create a less-than-clear image; however, newer, fast-imaging MRI techniques help eliminate these physiologic motion artifacts. MRI is not totally safe for all people; having the patient complete a preprocedure MRI tool that screens for contraindications to MRI is required (Lampignano & Kendrick, 2018). Any ferromagnetic objects (metals that contain iron) can be attracted to the magnet and cause injury. Items that can be problematic or dangerous include jewelry, dental implants, paper clips, pens, keys, IV poles, clips on patient gowns, and oxygen tanks.



Quality and Safety Nursing Alert

MRI is contraindicated in patients with any device containing metal because the magnetic field could cause malfunction. MRI is also contraindicated for patients with internal metal devices (e.g., aneurysm clips), intraocular metallic fragments, or cochlear implants. Foil-backed skin patches (e.g., nicotine, nitroglycerin, scopolamine, clonidine) should be removed before an MRI because of the risk of burns; however, the patient's primary provider should be consulted before the patch is removed to determine whether an alternate form of the medication should be provided.

Nursing Interventions

Preprocedure patient education includes NPO status 6 to 8 hours before the study and removal of all jewelry and other metals. The patient and family are informed that the study may take 60 to 90 minutes; during this time, the technician will instruct the patient to take deep breaths at specific intervals. The close-fitting scanners used in many MRI facilities may induce feelings of claustrophobia, and the machine will make a knocking sound during the procedure. Patients may choose to wear a headset and listen to music or wear a blindfold during the procedure. Open MRIs that are less close fitting eliminate the claustrophobia that many patients experience; however, they produce lower-resolution images.

Positron Emission Tomography

PET scans produce images of the body by detecting the radiation emitted from radioactive substances. The radioactive substances are injected into the body IV and are usually tagged with radioactive isotopes of oxygen, nitrogen, carbon, or fluorine (Lampignano & Kendrick, 2018). These isotopes decay quickly, do not harm the body, have lower radiation levels than a typical x-ray

or CT scan, and are eliminated in the urine or feces. The scanner essentially “captures” where the radioactive substances are in the body, transmits information to a scanner, and produces a scan with “hot spots” for evaluation by the radiologist or oncologist.

Scintigraphy

Scintigraphy (radionuclide testing) relies on the use of radioactive isotopes (i.e., technetium, iodine, indium) to reveal displaced anatomic structures, changes in organ size, and the presence of neoplasms or other focal lesions such as cysts or abscesses. Scintigraphic scanning is also used to measure the uptake of tagged red blood cells and leukocytes. Tagging of red blood cells and leukocytes by injection of a radionuclide is performed to define areas of inflammation, abscess, blood loss, or neoplasm. A sample of blood is removed, mixed with a radioactive substance, and reinjected into the patient. Abnormal concentrations of blood cells are then detected at 24- and 48-hour intervals. Tagged red cell studies are useful in determining the source of internal bleeding when all other studies have returned a negative result.

Gastrointestinal Motility Studies

Radionuclide testing also is used to assess gastric emptying and colonic transit time. During gastric emptying studies, the liquid and solid components of a meal (typically scrambled eggs) are tagged with radionuclide markers. After ingestion of the meal, the patient is positioned under a scintiscanner, which measures the rate of passage of the radioactive substance from the stomach (Parkman, 2018). This is useful in diagnosing disorders of gastric motility, diabetic gastroparesis, and dumping syndrome.

Colonic transit studies are used to evaluate colonic motility and obstructive defecation syndromes. The patient is given a capsule containing 20 radionuclide markers and instructed to follow a regular diet and usual daily activities. Abdominal x-rays are taken every 24 hours until all markers are passed. This process usually takes 4 to 5 days; in the presence of severe constipation it may take as long as 10 days. Patients with chronic diarrhea may be evaluated at 8-hour intervals. The amount of time that it takes for the radioactive material to move through the colon indicates colonic motility.

Endoscopic Procedures

Endoscopic procedures used in GI tract assessment include fibroscopy/esophagogastroduodenoscopy (EGD), colonoscopy, anoscopy, proctoscopy, sigmoidoscopy, small-bowel enteroscopy, and endoscopy through an ostomy.

Upper Gastrointestinal Fibroscopy/Eosphagogastrroduodenoscopy

Fibroscopy of the upper GI tract allows direct visualization of the esophageal, gastric, and duodenal mucosa through a lighted endoscope (gastroscope) (Fig. 38-5). EGD is valuable when esophageal, gastric, or duodenal disorders or inflammatory, neoplastic, or infectious processes are suspected. This procedure also can be used to evaluate esophageal and gastric motility and to collect secretions and tissue specimens for further analysis.



Figure 38-5 • Patient undergoing gastroscopy.

In EGD, the gastroenterologist views the GI tract through a viewing lens and can obtain images through the scope to document findings. Electronic video endoscopes also are available that attach directly to a video processor, converting the electronic signals into pictures that are projected on a screen. This allows larger and continuous viewing capabilities, as well as the simultaneous recording of the procedure.

PillCam ESO, or capsule endoscopy, requires that the patient swallows a capsule that travels by peristalsis through the small intestines. The capsule contains an oxide metal silicon chip video camera, which transmits digital images of the GI mucosa to a data recorder that is worn on the patient's waist. This technology is a diagnostic option for patients with esophageal diseases who cannot tolerate an EGD (Park, Cho, & Kim, 2018). Capsule colonoscopy is FDA approved for patients with previous incomplete colonoscopies, and for those who are not candidates for colonoscopies or sedation (Rex et al., 2017).

Endoscopic retrograde cholangiopancreatography (ERCP) uses the endoscope in combination with x-rays to view the bile ducts, pancreatic ducts,

and gallbladder (MedlinePlus, 2019). The side-viewing flexible scopes are used to visualize the common bile duct and the pancreatic and hepatic ducts through the ampulla of Vater in the duodenum. ERCP is helpful in evaluating jaundice, pancreatitis, pancreatic tumors, common bile duct stones, and biliary tract disease. Current trends show an increase in ERCP use for therapeutic indications (sphincterotomy, stone removal, and biliary stenting), with a decline in its use for conventional diagnostic testing (Ahmed, Kanotra, Savani, et al., 2017). ERCP is described further in [Chapter 44](#).

Upper GI fibroscopy also can be a therapeutic procedure when combined with other procedures. Therapeutic endoscopy can be used to remove common bile duct stones, dilate strictures, and treat gastric bleeding and esophageal varices. Laser-compatible scopes can be used to provide laser therapy for upper GI neoplasms. Sclerosing solutions can be injected through the scope in an attempt to control upper GI bleeding.

After the patient is sedated, the endoscope is lubricated with a water-soluble lubricant and passed smoothly and slowly along the back of the mouth and down into the esophagus. The gastroenterologist views the gastric wall and the sphincters and then advances the endoscope into the duodenum for further examination. Biopsy forceps to obtain tissue specimens or cytology brushes to obtain cells for microscopic study can be passed through the scope. The procedure usually takes about 30 minutes.

The patient may experience nausea, gagging, or choking. The use of topical anesthetic agents and moderate sedation makes it important to monitor and maintain the patient's oral airway during and after the procedure. Finger or ear oximeters are used to monitor oxygen saturation, and supplemental oxygen may be given if needed. Precautions must be taken to protect the scope, because the fiberoptic bundles can be broken if the scope is bent at an acute angle. The patient wears a mouth guard to keep from biting the scope.

Nursing Interventions

The patient should be NPO for 8 hours prior to the examination. Before the introduction of the endoscope, the patient is given a local anesthetic gargle or spray. Midazolam, a sedative that provides moderate sedation with loss of the gag reflex and relieves anxiety during the procedure, is given. Atropine may be given to reduce secretions, and glucagon may be given to relax smooth muscle. The patient is positioned in the left lateral position to facilitate clearance of pulmonary secretions and provide smooth entry of the scope.

After gastroscopy, assessment includes level of consciousness, vital signs, oxygen saturation, pain level, and monitoring for signs of perforation (i.e., pain, bleeding, unusual difficulty swallowing, rapidly elevated temperature). Temporary loss of the gag reflex is expected; after the patient's gag reflex has returned, lozenges, saline gargle, and oral analgesic agents may be offered to relieve minor throat discomfort. Patients who were sedated for the procedure

must remain in bed until fully alert. After moderate sedation, the patient must be transported home with a family member or friend if the procedure was performed on an outpatient basis. Someone should stay with the patient until the morning after the procedure. Because of sedation, many patients will not remember postprocedure instructions. For this reason, discharge and follow-up verbal and written instructions are provided to the person accompanying the patient home, as well as to the patient. In addition, many endoscopy suites have a program in which a nurse telephones the patient the morning after the procedure to find out if the patient has any concerns or questions related to the procedure.

Fiberoptic Colonoscopy

Historically, direct visualization of the bowel was the only means to evaluate the colon, but virtual colonoscopy (also known as CT colonography) is now available. Advantages include less risk for perforation when compared to colonoscopy; however, the need for bowel preparation is considered a disadvantage (Rex et al., 2017).

Direct visual inspection of the large intestine (anus, rectum, sigmoid, transcending and ascending colon) is possible by means of a flexible fiberoptic colonoscope (Fig. 38-6). These scopes have the same capabilities as those used for EGD but are larger in diameter and longer. Still and video recordings can be used to document the procedure and findings.

This procedure is used commonly as a diagnostic aid and screening device. It is most frequently used for cancer screening and for surveillance in patients with previous colon cancer or polyps. (See [Chapter 12, Table 12-3](#) for details on the ACS's screening guidelines.) In addition, tissue biopsies can be obtained as needed, and polyps can be removed and evaluated. Other uses of colonoscopy include the evaluation of patients with diarrhea of unknown cause, occult bleeding, or anemia; further study of abnormalities detected on barium enema; and diagnosis, clarification, and determination of the extent of inflammatory or other bowel disease.

The procedure can be used to remove all visible polyps with a special snare and cautery through the colonoscope. Many colon cancers begin with adenomatous polyps of the colon; therefore, one goal of colonoscopic polypectomy is early detection and prevention of colorectal cancer. This procedure also can be used to treat areas of bleeding or stricture. The use of bipolar and unipolar coagulators and heater probes, as well as injections of sclerosing agents or vasoconstrictors, is possible during this procedure. Laser-compatible scopes provide laser therapy for bleeding lesions or colonic neoplasms. Bowel decompression (removal of intestinal contents to prevent gas and fluid from distending the coils of the intestine) can also be completed during the procedure.

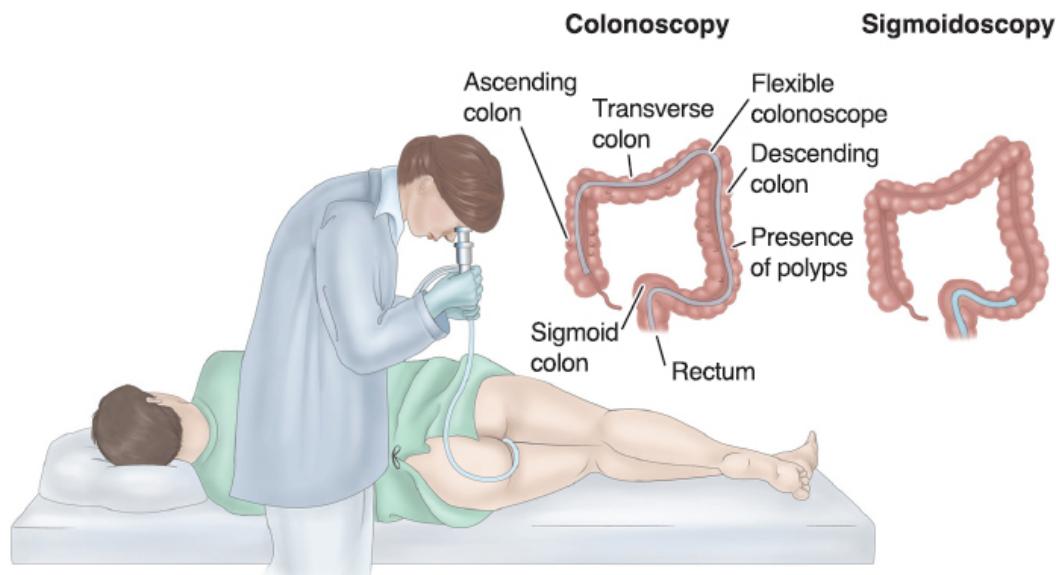


Figure 38-6 • Colonoscopy and flexible fiberoptic sigmoidoscopy.

For the colonoscopy, the flexible scope is passed through the rectum and sigmoid colon into the descending, transverse, and ascending colon. For the flexible fiberoptic sigmoidoscopy, the flexible scope is advanced past the proximal sigmoid and then into the descending colon.

Colonoscopy is performed while the patient is lying on the left side with the legs drawn up toward the chest. The patient's position may be changed during the test to facilitate advancement of the scope. Biopsy forceps or a cytology brush may be passed through the scope to obtain specimens for histology and cytology examinations. Complications during and after the procedure can include cardiac arrhythmias and respiratory depression resulting from the medications given, vasovagal reactions, and circulatory overload or hypotension resulting from overhydration or underhydration during bowel preparation. The patient's cardiac and respiratory function and oxygen saturation are monitored continuously, with supplemental oxygen used as necessary. Typically, the procedure takes about 1 hour, and postprocedure discomfort results from instillation of air to expand the colon and insertion and movement of the scope during the procedure.

Capsule colonoscopy is another option for patients who cannot tolerate colonoscopy or for patients with incomplete colonoscopies. This minimally invasive test consists of an ingestible capsule with a two-sided camera (similar to the PillCam ESO). This test requires that the patient completes a more extensive bowel preparation than required for a colonoscopy; patients with a positive test then require a follow-up colonoscopy on a separate day (Rex et al., 2017).

Nursing Interventions

The success of colonoscopy depends on how well the colon is prepared (Tariq, Kamal, Sapkota, et al., 2019). Adequate colon cleansing provides optimal visualization and decreases the time needed for the procedure. Cleansing of the colon can be accomplished in various ways. The primary provider may prescribe a laxative for two nights before the examination and a Fleet or saline enema until the return is clear the morning of the test. However, more commonly, PEG electrolyte lavage solutions (GoLYTELY, CoLyte, and NuLYTELY) are used for effective cleansing of the bowel. Current preparations include either the nonsplit dose regimen, in which the entire solution is ingested the night before the procedure, or the split-dose regimen, in which half of the dose is ingested the night before and half is ingested the morning of the procedure, 3 hours prior to the scheduled test. Tariq et al. (2019) report improved bowel preparation and cleansing with the split prep.

Patient health history and comorbidities such as diabetes, chronic constipation, or history of opioid use, or problematic colonoscopies influence patient preparation. Preprocedure diet instructions include a clear liquid or a low residue diet starting the day before the procedure; diet type has not been shown to affect bowel preparation in patients ingesting the split preparations (Tariq et al., 2019). If necessary, the nurse can give the solution through a feeding tube if the patient cannot swallow. Patients with a colostomy can receive this same bowel preparation. The use of lavage solutions is contraindicated in patients with intestinal obstruction or inflammatory bowel disease.

A sodium phosphate tablet (OsmoPrep, Visicol) can be used for colon cleansing prior to colonoscopy. Dosing consists of 32 tablets: 20 tablets (4 tablets every 15 minutes) with 8 oz of any clear liquid (water, any clear carbonated beverage, or juice) on the evening prior to the examination, and 12 tablets (taken in the same manner) on the morning of the examination.

With the use of lavage solutions, bowel cleansing is fast (rectal effluent is clear in about 4 hours) and is tolerated fairly well by most patients. Side effects of the electrolyte solutions include nausea, bloating, cramps or abdominal fullness, fluid and electrolyte imbalance, and hypothermia (patients are often told to drink the preparation as cold as possible to make it more palatable). The side effects are especially problematic for older adults, and sometimes they have difficulty ingesting the required volume of solution. Monitoring older patients after a bowel preparation is especially important because their physiologic ability to compensate for fluid loss is diminished. Many older adults take multiple medications each day; therefore, the nurse's knowledge of their daily medication regimen can prompt assessment for and prevention of potential problems and early detection of physiologic changes.

Additionally, the nurse advises the patient with diabetes to consult with their primary provider about medication adjustment to prevent hyperglycemia

or hypoglycemia resulting from the dietary modifications required in preparing for the test. The nurse also instructs all patients, especially older adults, to maintain adequate fluid, electrolyte, and caloric intake while undergoing bowel cleansing.

Special precautions must be taken for some patients. Implantable defibrillators and pacemakers are at high risk for malfunction if electrosurgical procedures (i.e., polypectomy) are performed in conjunction with colonoscopy. A cardiologist should be consulted before the test is performed for device management. These patients require careful cardiac monitoring during the procedure (American Society of Anesthesiology Taskforce, 2020; Neubauer, Wellman, Herzog-Niescerry, et al., 2018).

Colonoscopy cannot be performed if there is a suspected or documented colon perforation, acute severe diverticulitis, or acute colitis. Patients with prosthetic heart valves or a history of endocarditis require prophylactic antibiotics before the procedure.

Informed consent is obtained by the practitioner before the patient is sedated. Before the examination, an opioid analgesic agent or sedative (e.g., midazolam) is given to provide moderate sedation and relieve anxiety during the procedure. Glucagon may be given, if needed, to relax the colonic musculature and to reduce spasm during the test. Patients who are older or debilitated may require a reduced dosage of the analgesic agent or sedative to decrease the risks of oversedation and cardiopulmonary complications.

During the procedure, the patient is monitored for changes in oxygen saturation, vital signs, color and temperature of the skin, level of consciousness, abdominal distention, vagal response, and pain intensity. After the procedure, patients are maintained on bed rest until fully alert. Some patients have abdominal cramps caused by increased peristalsis stimulated by the air insufflated into the bowel during the procedure.

Immediately after the test, the patient is monitored for signs and symptoms of bowel perforation (e.g., rectal bleeding, abdominal pain or distention, fever, focal peritoneal signs). Because of the amnesic effects of midazolam, the patient may be unable to recall verbal information and should receive written instructions. If the procedure is performed on an outpatient basis, someone must transport the patient home. After a therapeutic procedure, the nurse instructs the patient to report any bleeding to the primary provider.

Anoscopy, Proctoscopy, and Sigmoidoscopy

Endoscopic examination of the anus, rectum, and sigmoid and descending colon is used to evaluate chronic diarrhea, fecal incontinence, ischemic colitis, and lower GI hemorrhage and to observe for ulceration, fissures, abscesses, tumors, polyps, or other pathologic processes.

The flexible fiberoptic sigmoidoscope (see Fig. 38-6) permits the colon to be examined up to 40 to 50 cm (16 to 20 inches) from the anus, much more

than the 25 cm (10 inches) that can be visualized with the rigid sigmoidoscope. It has many of the same capabilities as the scopes used for the upper GI study, including the use of still or video images to document findings.

For flexible scope procedures, the patient assumes a comfortable position on the left side with the right leg bent and placed anteriorly. It is important to keep the patient informed throughout the examination and to explain the sensations associated with it. Biopsies and polypectomies can be performed during this procedure. Biopsy is performed with small biting forceps introduced through the endoscope; one or more small pieces of tissue may be removed. If polyps are present, they may be removed with a wire snare, which is used to grasp the pedicle, or stalk. An electrocoagulating current is then used to sever the polyp and prevent bleeding. It is extremely important that all excised tissue be placed immediately in moist gauze or in an appropriate receptacle, labeled correctly, and delivered without delay to the pathology laboratory for examination.

Nursing Interventions

These examinations require only limited bowel preparation, including a warm tap water or Fleet enema until returns are clear. Dietary restrictions usually are not necessary, and sedation usually is not required. During the procedure, the nurse monitors vital signs, skin color and temperature, pain tolerance, and vagal response. After the procedure, the nurse monitors the patient for rectal bleeding and signs of intestinal perforation (i.e., fever, rectal drainage, abdominal distention, pain). On completion of the examination, the patient can resume regular activities and diet.

Small Bowel Studies

Several methods are available for visualization of the small intestine, including capsule endoscopy and double-balloon enteroscopy. Capsule endoscopy allows the noninvasive visualization of the mucosa throughout the entire small intestine. It is particularly useful in the evaluation of obscure GI bleeding. The technique consists of the patient swallowing a capsule embedded with a wireless miniature camera, a light source, and an image transmission system. The capsule is the size of a large vitamin pill. It is propelled through the intestine by peristalsis. Images are transmitted from the end of the capsule to a recording device worn by the patient. The capsule allows for inspection of the small intestine without patient discomfort (Yamamoto & Aabakken, 2019).

Double-balloon enteroscopy has made it possible to visualize the mucosa of the entire small bowel as well as carry out diagnostic and therapeutic interventions (Yamamoto & Aabakken, 2019). This endoscope is comprised of two balloons, one attached to the distal end of the scope and the other attached to the transparent overtube that slides over the endoscope. The endoscope is advanced alternately inflating and deflating the balloons; this causes

telescoping of the small intestine onto the overtube. As a result of this telescoping, the endoscope can visualize much more of the small intestine than the length of the scope itself. The procedure takes between 1 and 3 hours and requires moderate sedation. Nursing interventions are similar to those for other endoscopic procedures.

Endoscopy through an Ostomy

Endoscopy through an ostomy stoma is useful for visualizing a segment of the small or large intestine and may be indicated to evaluate the anastomosis for recurrent disease, or to visualize and treat bleeding in a segment of the bowel. Nursing interventions are similar to those for other endoscopic procedures.

Manometry and Electrophysiologic Studies

Manometry and electrophysiologic studies are methods for evaluating patients with GI motility disorders. The manometry test measures changes in intraluminal pressures and the coordination of muscle activity in the GI tract with the pressures transmitted to a computer analyzer.

Esophageal manometry is used to detect motility disorders of the esophagus and the upper and lower esophageal sphincter. Also known as esophageal motility studies, these studies are very helpful in the diagnosis of achalasia (i.e., absence of peristalsis), diffuse esophageal spasm, scleroderma, and other esophageal motor disorders. The patient must refrain from eating or drinking for 8 to 12 hours before the test. Medications that could have a direct effect on motility (e.g., calcium channel blockers, anticholinergic agents, sedatives) are withheld for 24 to 48 hours. A pressure-sensitive catheter is inserted through the nose and is connected to a transducer and a video recorder. The patient then swallows small amounts of water while the resultant pressure changes are recorded. Evaluation of a patient for GERD typically includes esophageal manometry.

Gastroduodenal, small intestine, and colonic manometry procedures are used to evaluate delayed gastric emptying and gastric and intestinal motility disorders such as irritable bowel syndrome or atonic colon. This is often an ambulatory outpatient procedure lasting 24 to 72 hours. Anorectal manometry measures the resting tone of the internal anal sphincter and the contractibility of the external anal sphincter. It is helpful in evaluating patients with chronic constipation or fecal incontinence and is useful in biofeedback for the treatment of fecal incontinence. It can be performed in conjunction with rectal sensory functioning tests. Dibasic sodium (Phospho-soda) or a saline cleansing enema is given 1 hour before the test, and positioning for the test is either the prone or the lateral position.

Rectal sensory function studies are used to evaluate rectal sensory function and neuropathy. A catheter and balloon are passed into the rectum, with

increasing balloon inflation until the patient feels distention. Then the tone and pressure of the rectum and anal sphincter are measured. The results are especially helpful in the evaluation of patients with chronic constipation, diarrhea, or incontinence.

Electrogastrography, an electrophysiologic study, also may be performed to assess gastric motility disturbances and can be useful in detecting motor or nerve dysfunction in the stomach. Electrodes are placed over the abdomen, and gastric electrical activity is recorded for up to 24 hours. Patients may exhibit rapid, slow, or irregular waveform activity.

Defecography measures anorectal function and is performed with very thick barium paste instilled into the rectum. Fluoroscopy is used to assess the function of the rectum and anal sphincter while the patient attempts to expel the barium. The test requires no preparation. The nurse educates the patient about what to expect during these procedures.

Gastric Analysis, Gastric Acid Stimulation Test, and pH Monitoring

Analysis of the gastric juice yields information about the secretory activity of the gastric mucosa and the presence or degree of gastric retention in patients thought to have pyloric or duodenal obstruction. It is also useful for diagnosing Zollinger-Ellison syndrome or atrophic gastritis.

The patient is NPO for 8 to 12 hours before the procedure. Any medications that affect gastric secretions are withheld for 24 to 48 hours before the test. Smoking is not allowed on the morning of the test because it increases gastric secretions. A small nasogastric tube with a catheter tip marked at various points is inserted through the nose. When the tube is at a point slightly less than 50 cm (21 inches), it should be within the stomach, lying along the greater curvature. Once in place, the tube is secured to the patient's cheek and the patient is placed in a semireclining position. The entire stomach contents are aspirated by gentle suction into a syringe, and gastric samples are collected every 15 minutes for the next hour.

Important diagnostic information to be gained from gastric analysis includes the ability of the mucosa to secrete HCl. This ability is altered in various disease states, including:

- *Pernicious anemia*: Patients with this disease secrete no acid under basal conditions or after stimulation.
- *Severe chronic atrophic gastritis or gastric cancer*: Patients with these diseases secrete little or no acid.
- *Gastric ulcer*: Patients with this disease secrete some acid.
- *Duodenal ulcers*: Patients with this disease usually secrete an excess amount of acid.

The gastric acid stimulation test usually is performed in conjunction with gastric analysis. Histamine or pentagastrin is given subcutaneously to stimulate gastric secretions. It is important to inform the patient that this injection may produce a flushed feeling. The nurse monitors the patient's blood pressure and pulse frequently to detect hypotension. Gastric specimens are collected after the injection every 15 minutes for 1 hour and are labeled to indicate the time of specimen collection after histamine injection. The volume and pH of the specimen are measured; in certain instances, cytologic study by the Papanicolaou technique may be used to determine the presence or absence of malignant cells.

Esophageal reflux of gastric acid may be diagnosed and evaluated by ambulatory pH monitoring (Triadafilopoulos, Zikos, Regalia, et al., 2018). The patient is NPO for 6 hours before the test. A sensor that measures pH is inserted and positioned via endoscopy. The sensor is then connected to an external recording device and is worn for 24 hours while the patient continues usual daily activities. The result is a computer analysis and graphic display of the results.

The Bravo pH monitoring system offers the advantage of pH monitoring of the esophagus without the transnasal catheter. The clinician, by means of endoscopy, attaches a capsule (approximately the size of a gel cap) to the patient's esophageal wall. Data related to pH are transmitted from the capsule to a pager-sized receiver that the patient wears. Data are collected for up to 96 hours and then downloaded and analyzed. The capsule spontaneously detaches from the esophagus in 7 to 10 days and then is passed through the patient's digestive system. The accuracy of this method of pH testing is greater than methods in which a catheter is used because the patient can eat normally and continue typical activities during the testing. The patient is evaluated for both acid reflux and nonacid reflux events (Medtronic, 2019).

Laparoscopy (Peritoneoscopy)

With the tremendous advances in minimally invasive surgery, diagnostic laparoscopy is efficient, cost-effective, and useful in the diagnosis of GI disease. After a pneumoperitoneum (injecting carbon dioxide into the peritoneal cavity to separate the intestines from the pelvic organs) is created, a small incision is made lateral to the umbilicus, allowing for the insertion of the fiberoptic laparoscope. This permits direct visualization of the organs and structures within the abdomen, permitting visualization and identification of any growths, anomalies, and inflammatory processes. In addition, biopsy samples can be taken from the structures and organs as necessary. This procedure can be used to evaluate peritoneal disease, chronic abdominal pain, abdominal masses, and gallbladder and liver disease. However, laparoscopy has not become an important diagnostic modality in patients with acute

abdominal pain, because less invasive tools (e.g., CT and MRI scans) are readily available. Laparoscopy usually requires general anesthesia and sometimes requires that the stomach and bowel be decompressed. Gas (usually carbon dioxide) is insufflated into the peritoneal cavity to create a working space for visualization. One of the benefits of this procedure is that after visualization of a problem, excision (e.g., removal of the gallbladder) can then be performed at the same time, if appropriate.

CRITICAL THINKING EXERCISES

1  You are caring for a 45-year-old woman recently admitted to the emergency department (ED) with new onset of right upper quadrant pain with radiation to the mid-upper back, accompanied by nausea and bloating. The symptoms began several hours after the patient ate lunch, which included several fatty foods. The patient's past medical history is unremarkable. Identify questions that you should ask when taking the patient's history. What are your priority assessments? What diagnostic tests would you expect? While in the ED, the patient reports that the pain has increased in intensity, and abdominal guarding and temperature elevation are noted. Given these new developments, what questions will you now ask and what are your priority assessments?

2  A 50-year-old man presents to the ED with midsternal chest discomfort, nausea, and diaphoresis. He has a history of elevated cholesterol, which is managed with an oral medication. You recognize the symptoms of a potential cardiac or gastrointestinal condition. Given the urgency of the evolving situation, which members of the health care team do you anticipate will participate in the care of this patient? How can you best coordinate care to assure positive patient outcomes?

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*Asterisk indicates nursing research

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Resources

American Cancer Society, www.cancer.org

American Society for Gastrointestinal Endoscopy (ASGE), www.asge.org

Society of Gastroenterology Nurses and Associates (SGNA), www.sgna.org

39 Management of Patients with Oral and Esophageal Disorders

LEARNING OUTCOMES

On completion of this chapter, the learner will be able to:

1. Define the relationship of dental hygiene and dental problems to nutrition and disease.
2. Describe the nursing management of patients with abnormalities of the oral cavity, jaw, and salivary glands, including cancer of the oral cavity and disorders of the esophagus.
3. Describe the nursing management of the patient receiving enteral nutrition support.
4. Use the nursing process as a framework for care of the patient undergoing neck dissection, having a gastrostomy or jejunostomy feeding tube placed, or with noncancerous disorders of the esophagus.

NURSING CONCEPTS

Elimination

Nutrition

GLOSSARY

- achalasia:** absent or ineffective peristalsis (wavelike contraction) of the distal esophagus accompanied by failure of the esophageal sphincter to relax in response to swallowing
- aspiration:** inhalation of fluids or foods into the trachea and bronchial tree
- dumping syndrome:** physiologic response to rapid emptying of gastric contents into the small intestine; manifested by nausea, weakness, sweating, palpitations, syncope, and possibly diarrhea (*synonym:* vagotomy syndrome)
- dysphagia:** difficulty swallowing
- dysplasia:** bizarre cell growth resulting in cells that differ in size, shape, or arrangement from other cells of the same tissue type
- enteral nutrition:** nutritional formula feedings infused through a tube directly into the gastrointestinal tract
- enteric:** of or relating to the intestines
- gastroesophageal reflux disease (GERD):** disorder marked by backflow of gastric or duodenal contents into the esophagus that causes troublesome symptoms and mucosal injury to the esophagus
- gastrostomy:** surgical creation of an opening into the stomach for the purpose of administering fluids, nutrition formulas, and medications or for decompression and drainage of stomach contents
- gingivitis:** inflammation of the gums; change in color from pink to red, with associated swelling, bleeding, and sensitivity/tenderness
- halitosis:** foul odor from the oral cavity; in laypersons' terms, "bad breath"
- hernia:** protrusion of an organ or part of an organ through the wall of the cavity that normally contains it
- jejunostomy:** surgical creation of an opening into the jejunum for the purpose of administering fluids, nutrition formulas, and medications
- lithotripsy:** the use of shock waves to break up or disintegrate stones
- odynophagia:** pain on swallowing
- osmolality:** ionic concentration of fluid
- parotitis:** inflammation of the parotid gland
- percutaneous endoscopic gastrostomy (PEG):** a feeding tube inserted endoscopically into the stomach
- periapical abscess:** abscessed tooth
- pyrosis:** a burning sensation in the stomach and esophagus that moves up to the mouth; commonly called heartburn
- sialadenitis:** inflammation of the salivary glands
- stoma:** artificially created opening between a body cavity (e.g., stomach or intestine) and the body surface
- stomatitis:** inflammation of the oral mucosa
- vagotomy syndrome:** gastrointestinal symptoms that includes diarrhea and abdominal cramping, resulting from rapid gastric emptying (*synonym:* dumping syndrome)
- xerostomia:** dry mouth

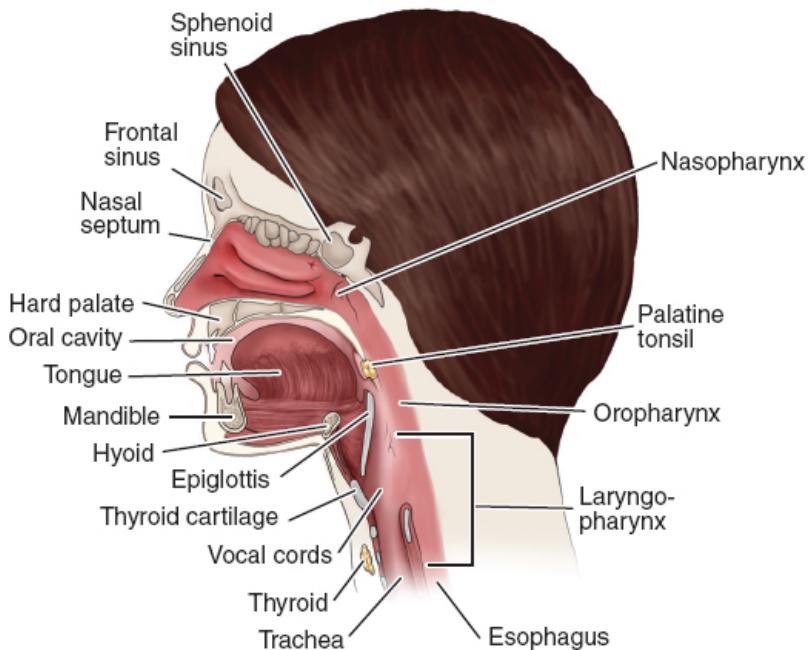


Figure 39-1 • Anatomy of the head and neck.

Because digestion normally begins in the mouth, adequate nutrition is related to good dental health and the general condition of the mouth. Any discomfort, abnormalities, or disease processes in the oral cavity can affect a person's nutritional status. Changes in the oral cavity can influence the type and amount of food ingested as well as the degree to which food particles are properly mixed with salivary enzymes. Disorders of the mouth or tongue can interfere with speech and thus affect communication and self-image. Esophageal problems related to swallowing can also adversely affect food and fluid intake, thereby jeopardizing general health and well-being. Given the close relationship between adequate nutritional intake and the structures of the upper gastrointestinal (GI) tract (lips, mouth, teeth, pharynx, esophagus), health education can help prevent disorders associated with these structures (see Fig. 39-1).

DISORDERS OF THE ORAL CAVITY

Oral health is a very important component of a person's physical and psychological sense of well-being. Periodontal disease, which encompasses both **gingivitis** (inflammation of the gums) and periodontitis (which involves the soft tissue and bone supporting the teeth), is the most common cause of tooth loss among adults (Office of the Surgeon General, 2003; U.S. Department of Health and Human Services [HHS], 2000). From 2011 to 2012, 44.7% of adults age 30 and older in the United States had periodontitis. When this prevalence is combined with the 2009 to 2010 data, there is a 45.9% prevalence of periodontitis, which means approximately 141 million adults ages 30 and older have diagnosed periodontitis. Severe periodontitis was diagnosed in 8.9% of adults ages 30 and older, but is most prevalent among adults ages 50 and older, males, Hispanic/Latino Americans (63.5%) and non-Hispanic/Latino African Americans (59.1%), those who didn't graduate high school, people living below 200% of the poverty level, and current smokers (Eke, Dye, Wei, et al., 2015). Current cigarette smoking, which increases the likelihood of periodontitis by at least 50%, remains a key modifiable risk factor for

periodontitis at all severity levels (Eke, Wei, Thornton-Evans, et al., 2016). Periodontal disease can be connected to a variety of other systemic diseases, such as cardiovascular disease, diabetes, and rheumatoid disease (American Academy of Periodontology [AAP], 2021). [Table 39-1](#) reviews common abnormalities of the oral cavity, their possible causes, and nursing considerations. [Figure 39-2](#) illustrates structures of the oral cavity.

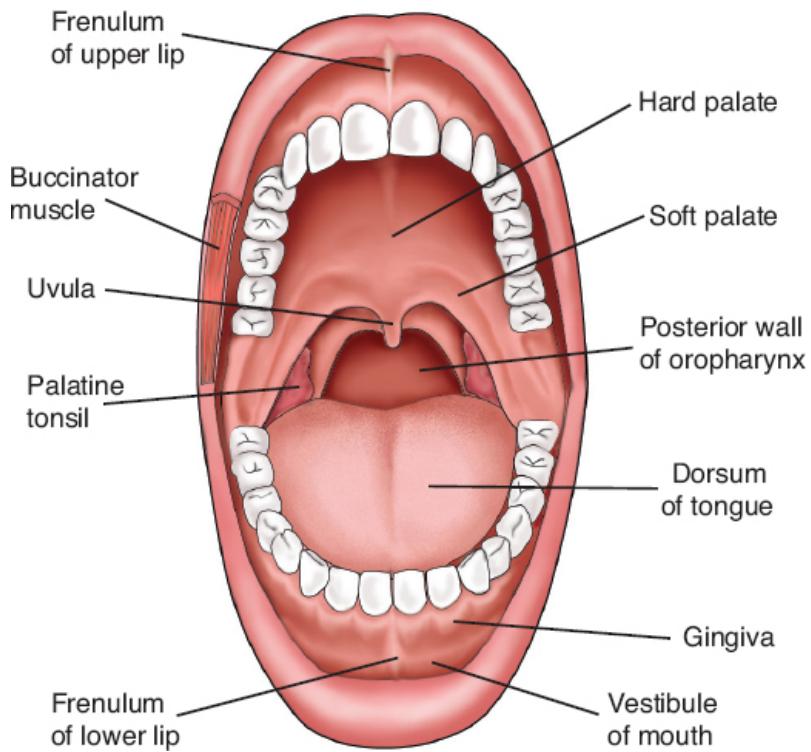


Figure 39-2 • Structures of the mouth, including the tongue and palate.

Dental Plaque and Caries

Tooth decay is an erosive process that begins with the action of bacteria on fermentable carbohydrates in the mouth, which produces acids that dissolve tooth enamel. Despite the fact tooth enamel is the hardest substance in the human body, caries and periodontal disease can still occur for several reasons. Contributing factors include nutrition, soft drink consumption, and genetic predisposition. In addition, the extent of damage to the teeth may be related to the following:

- Presence of dental plaque, which is a gluey, gelatinlike substance that adheres to the teeth
- Length of time acids are in contact with the teeth
- Strength of acids and the ability of the saliva to neutralize them
- Susceptibility of the teeth to decay

Dental decay begins with a small hole, usually in a fissure (a break in the tooth's enamel) or in an area that is hard to clean. Left unchecked, the decay extends into the dentin. Because dentin is not as hard as enamel, decay progresses more rapidly and in time, reaches the pulp of the tooth. The prevalence of dental caries in permanent teeth for adolescents ages 12 to 19 remains high at 56.8%, even though there is an increased use

(48.1%) of sealants on permanent teeth in this age group. Adults ages 20 to 64 years have an 89.9% prevalence of dental caries in permanent teeth; however, only 26.1% of adults have untreated tooth decay in permanent teeth. Older adults (65 years and older) present with a 96.2% prevalence of dental caries, with 15.9% of their tooth decay untreated (Centers for Disease Control and Prevention [CDC], 2019). Older adults are subject to decay from drug-induced or age-related oral dryness (see [Chart 39-1](#)).

TABLE 39-1 Disorders of the Lips, Mouth, and Gums

Condition	Signs and Symptoms	Possible Causes and Sequelae	Nursing Considerations
Abnormalities of the Lips			
Actinic cheilitis	Irritation of lips associated with scaling, crusting, fissure; white hyperkeratosis (overgrowth of horny layer of epidermis) Considered a premalignant squamous cell skin cancer	Exposure to sun; more common in fair-skinned people and in those whose occupations involve sun exposure, such as farmers Chronic inflammatory lesion that may lead to squamous cell cancer of the lip	Educate patient on importance of protecting lips from the sun by using protective ointment such as sun block. Instruct patient to have a periodic checkup by primary provider.
Chancre	Reddened circumscribed lesion that ulcerates and becomes crusted	Primary lesion of syphilis	Use comfort measures such as cold soaks to lip, mouth care. Administer antibiotics as prescribed. Instruct patient regarding contagion. Use topical over-the-counter agents (e.g., Blistex, Carmex) or antiviral agents (e.g., acyclovir, penciclovir) as prescribed.
Contact dermatitis (i.e., allergic contact cheilitis)	Red area or rash; itching	Allergic reaction to lipstick, cosmetic ointments, or toothpaste	Instruct patient to avoid possible causes. Administer corticosteroids as prescribed.
Herpes simplex virus-1 (cold sore or fever blister)	Symptoms may be delayed up to 20 days after exposure; singular or clustered, irregular, painful vesicles throughout the oral cavity and lips that may rupture	An opportunistic infection; frequently seen in patients who are immunosuppressed May recur with menstruation, fever, or sun exposure	Use acyclovir ointment or systemic medications as prescribed. Administer analgesic agents as prescribed. Instruct patient to avoid irritating foods.
Abnormalities of the Mouth			
Aphthous stomatitis (canker sore) (Classified as major or minor depending upon size)	Shallow ulcer with a white or yellow center and typically a well-defined red border; seen on the inner side of the lip and cheek or on the tongue; it begins with a burning or tingling sensation and slight swelling; painful; usually lasts 7–10 days (<i>minor</i>) and heals without a scar	Immune-mediated inflammatory disorder associated with HIV infection Associated with emotional or mental stress, fatigue, hormonal factors, minor trauma (e.g., biting), allergies, acidic foods and juices, and dietary deficiencies May recur	Instruct the patient in comfort measures (e.g., saline rinses) and a soft or bland diet. Antibiotics or corticosteroids may be prescribed. Use over-the-counter benzocaine as indicated.

Candidiasis (moniliasis/thrush)	Cheesy white plaque that looks like milk curds; when rubbed off, it leaves an erythematous and often bleeding base	<i>Candida albicans</i> fungus; predisposing factors include diabetes, antibiotic therapy, and immunosuppression	Antifungal medications such as nystatin or clotrimazole may be prescribed as suspensions or troche; when used as a suspension, instruct the patient to swish vigorously for at least 1 min and then swallow. If these treatments fail, oral agents such as fluconazole may be prescribed.
Ewing sarcoma	Located most commonly on the mandible; initial symptoms include swelling, pain, paresthesia, and dental displacement	Cancer (most often the primary site) that is often initially mistaken for dental infection. Median age at onset is 14 yrs old	Most commonly treated with chemotherapy and surgery, followed by chemotherapy and radiation therapy.
Erythroplakia	Red, velvety, asymptomatic patch on the oral mucous membrane; most commonly located on the mouth floor, the ventral aspect of the tongue, and the soft palate	Nonspecific inflammation with a high risk of malignant transformation More frequently seen in older adults	
Kaposi sarcoma	Appears first on the oral mucosa as a red, purple, or blue lesion; may be singular or multiple; may be flat or raised Lesions can occur in other parts of the body: skin, lymph nodes, lungs, digestive tract	Cancer that develops from the cells that line the blood vessels and lymph system Associated with HIV infection (AIDS), men who are HIV negative and who have sex with men, organ transplantation, and geographic region (Africa, Mediterranean)	Instruct patient regarding side effects of planned treatment for HIV.
Leukoplakia	White patches; may be hyperkeratotic; usually in buccal mucosa; typically painless	Fewer than 2% are malignant, but may progress to cancer (premalignant) Common among tobacco users	Instruct patient to see the primary provider if leukoplakia persists >2 wks. Eliminate risk factors, such as cigarettes, smokeless tobacco.
Oral hairy leukoplakia	White patches with rough hairlike projections; typically found on	Epstein–Barr virus-induced lesion	Instruct patient to see the primary provider if

	lateral border of the tongue	Related to smoking and the use of tobacco Associated with HIV infection	condition persists >2 wks.
Lichen planus	Radiating white, lacelike striations on the tongue and buccal mucosa; often association with painful ulcerations and erythema	Chronic inflammatory condition of unknown cause Recurrences are common May lead to a malignant process	Apply topical corticosteroids such as fluocinolone acetonide gel. Avoid foods that irritate. Administer corticosteroids systemically or intralesionally as prescribed. Instruct the patient of need for follow-up if condition is chronic.
Nicotine stomatitis (smoker's patch)	Two stages—begins as a red stomatitis; over time, the tongue and mouth become covered with a creamy, thick, white mucous membrane, which may slough, leaving a beefy red base	Chronic irritation by tobacco	Cessation of tobacco use; if condition exists >2 wks, a primary provider should be consulted and a biopsy may be needed.
Stomatitis	Mild erythema and edema; severe forms include painful ulcerations, bleeding, and secondary infection	Inflammation of the mucous lining of the mouth Associated with chemotherapy; radiation therapy; severe drug allergy; myelosuppression (bone marrow depression)	Prophylactic mouth care, including brushing, flossing, and rinsing, for any patient receiving chemotherapy or radiation therapy. Educate patient about proper oral hygiene, including the use of a soft-bristled toothbrush and nonabrasive toothpaste; for painful ulcers, oral swabs with spongeliike applicators can be used in place of a toothbrush; avoid alcohol-based mouth rinses and hot or spicy foods. Apply topical anti-inflammatory, antibiotic, and anesthetic agents as prescribed.

Abnormalities of the Gums

Gingivitis	Painful, inflamed, swollen gums; usually, the gums bleed in response to light contact	Reversible form of inflammation of the gingiva (i.e., mild	Educate patient about proper oral hygiene; tooth-brushing, flossing, rinsing (i.e.,
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		form of periodontal disease) Associated with poor oral hygiene: food debris, bacterial plaque, and calculus (tartar) accumulate Gums may also swell in response to normal processes such as puberty and pregnancy, with certain medications (phenytoin, calcium channel blockers, cyclosporine), or with a deficiency in the immune system (i.e., AIDS) or nutritional status	chlorhexidine), dental appointments every 3–6 mo. Remove causal agents as appropriate—medications, smoking, dental appliances.
Herpetic gingivostomatitis	Burning sensation with the appearance of small vesicles 24–48 h later; vesicles may rupture, forming sore, shallow ulcers covered with a gray membrane	Herpes simplex viral infection Occurs most frequently in people who are immunosuppressed; may occur in other infectious processes such as streptococcal pneumonia, meningococcal meningitis, and malaria	Apply topical anesthetics as prescribed; may need opioids if pain is severe. Saline or 2–3% hydrogen peroxide irrigations Antiviral agents such as acyclovir may be prescribed.
Necrotizing gingivitis (trench mouth)	Gray-white pseudomembranous ulcerations affecting the edges of the gums, mucosa of the mouth, tonsils, and pharynx; halitosis; painful, bleeding gums; swallowing and talking are painful	Progressive, painful bacterial infection Related to poor oral hygiene, lack of access to dental care, inadequate rest, overwork, emotional stress, smoking, and poor nutrition	Educate patient about proper oral hygiene; see Chart 39-2 . Irrigate with 2–3% hydrogen peroxide or normal saline solution. Avoid irritants such as smoking and spicy foods.
Periodontitis	Little discomfort at onset; may have bleeding, infection, gum recession, and loosening of teeth; later in the disease, tooth loss may occur	Deep, chronic inflammation of the gingiva May result from untreated gingivitis Poor or inadequate dental hygiene and inadequate diet contribute to development	Instruct patient in proper oral hygiene, chlorhexidine rinses. Instruct patient to consult a dentist or periodontist for antibiotic prescription, deep root scaling.

AIDS, acquired immune deficiency syndrome; HIV, human immune deficiency virus.

Adapted from American Cancer Society (ACS). (2021b). Kaposi sarcoma. Retrieved on 2/18/2021 at: www.cancer.org/cancer/kaposisarcoma/detailedguide/kaposi-sarcoma-what-is-kaposi-sarcoma; Lodi, G. (2020). Oral lesions. Retrieved on 2/18/2021 at: www.uptodate.com/contents/oral-lesions; Margalit-Muñoz, M., Bagán, J., & Poveda-Roda, R. (2017). Ewing sarcoma of the oral cavity. A review. *Journal of Clinical and Experimental Dentistry*, 9(2), 294–301; Mowad, C. (2019). Cheilitis. Retrieved on 2/18/2021 at: www.uptodate.com/contents/cheilitis; Silk, H. (2014). Disease of the mouth. *Primary Care: Clinics in Office Practice*, 41(1), 75–90.

Chart 39-1



Oral Conditions in the Older Adult

Many medications taken by older adults cause dry mouth, which is uncomfortable, impairs communication, and increases the risk of oral infection. These medications include the following:

- Antidepressant medications
- Antihypertensive medications
- Anti-inflammatory agents
- Diuretic agents

Poor dentition can exacerbate problems of aging, such as:

- Decreased food intake
- Increased susceptibility to systemic infection (from periodontal disease)
- Loss of appetite
- Social isolation
- Trauma to the oral cavity secondary to thinner, less vascular oral mucous membranes

Adapted from Eliopoulos, C. (2018). *Gerontological nursing* (9th ed.). Philadelphia, PA: Wolters Kluwer.

Dentists can determine the extent of damage and the type of treatment needed using x-ray studies. Treatment for dental caries includes fillings, dental implants, or extraction, if necessary. In general, dental decay can occur in anyone.

Prevention

Measures used to prevent and control primary dental caries include applying fluoride varnish/gel (Marinho, Worthington, Walsh, et al., 2015), using fluoride toothpaste, use of silver diamine fluoride compounds (Donovan, Marzola, Murphy, et al., 2018), applying dental sealants (Twetman, 2015), and ensuring community water fluoridation (HHS, 2000; HHS Federal Panel on Community Water Fluoridation, 2015). Other recommendations include implementing daily oral hygiene practices, seeking routine professional dental treatment, refraining from smoking and excessive alcohol use, making good dietary choices, and managing related systemic diseases (HHS, 2019). The inability to afford dental care is associated with a decrease in the quality of life of adults ages 45 years and older (Naavaal, Griffin, & Jones, 2019), which must be considered when assisting patients in navigating health care systems.

Mouth Care

Healthy teeth must be cleaned several times a day. Brushing and flossing are particularly effective in mechanically breaking up the bacterial plaque that collects around teeth.

Mastication (chewing) and the normal flow of saliva also aid greatly in keeping the teeth clean. Because many ill patients do not consume adequate nutrients, they produce less saliva, which in turn reduces this natural tooth-cleaning process. The nurse may need to assume the responsibility for brushing the patient's teeth. Merely wiping the patient's mouth and teeth with a swab is ineffective. The most effective method is mechanical cleansing (brushing). If brushing is not possible, it is better to wipe the teeth with a gauze pad and then have the patient swish an antiseptic mouthwash several times before expectorating into an emesis basin. A soft-bristled toothbrush is more effective than a sponge or foam stick. Flossing should be performed daily. To prevent drying, the lips may be coated with a water-soluble gel.

Diet

Dental caries may be prevented by decreasing the amount of sugar and starch in the diet. Patients who snack should be encouraged to choose less cariogenic alternatives, such as fruits, vegetables, nuts, cheeses, or plain yogurt. Brushing after meals is recommended.

Fluoridation

Fluoridation of public water supplies has been found to decrease dental caries. Some areas of the country have natural fluoridation; other communities have added fluoride to public water supplies. As of 2014, 66.3% of Americans receive fluoridated water (CDC, 2020b). Studies suggest that by instituting a community water fluoridation program, tooth decay is reduced by 25% in both children and adults (CDC, 2018).

Fluoridation may also be achieved by having a dentist apply a concentrated gel or solution to the teeth; adding fluoride to home water supplies; using fluoridated toothpaste or mouth rinse; or using sodium fluoride tablets, drops, or lozenges.

Pit and Fissure Sealants

The occlusal surfaces of the teeth have pits and fissures—areas that are prone to caries. Some dentists apply a coating to fill and seal these areas on the primary and permanent molars to protect them from potential exposure to cariogenic processes. These sealants can last 36 to 48 months and significantly prevent tooth decay. The economic benefits of applying sealants, especially in high-risk groups, exceed the costs and provide solid evidence for their use (Donovan et al., 2018).

Dental Health and Disease

Studies are ongoing that show the link between oral health and chronic disease such as diabetes, heart disease, low birth weight, premature births, and stroke. It had long been posited that bacteria, specifically gram-negative bacteria, were the culprits that link periodontal disease to other systemic diseases, specifically coronary artery disease, including myocardial infarction and stroke. More recently, it was confirmed that these bacteria cause an inflammatory response that initiates an increase in inflammatory markers such as C-reactive protein, white blood cells, and fibrinogen. These markers are associated with an increased risk of cardiovascular disease. Data from short-term studies suggest that if periodontal disease is treated, systemic inflammation and endothelial dysfunction are reduced (Hegde & Awan, 2019). One study reported that thrombus

aspirate and arterial blood taken from patients who had an ischemic stroke contained streptococcal bacteria. The most commonly identified *Streptococcus* species (found in 79% of the sample), *Streptococcus mitis*, is typically found in the mouth. Although a preliminary study, there is evidence that these oral bacteria may contribute to the progression of cardiovascular thrombotic events (Patrakka, Pienimäki, Tuomisto, et al., 2019).

The World Health Organization (WHO) Global Oral Health Programme (2019) espouses a global focus on oral health promotion and disease prevention, with an emphasis on policy and guideline development to support equitable implementation of evidence-based practices in global communities. The Programme supports an emphasis on addressing modifiable risk factors (e.g., diet, nutrition, tobacco, alcohol, and oral hygiene), water sanitation, and fluoride initiatives. Initiatives recognize the impact of social, economic, political, and cultural determinants of health, and seek to integrate the existing and emerging systems that address the burden and disability that stem from oral disease (WHO, 2019).

Periapical Abscess

A **periapical abscess**, more commonly referred to as an abscessed tooth, involves a collection of pus in the apical dental periosteum (fibrous membrane supporting the tooth structure) and the tissue surrounding the apex of the tooth (where it is suspended in the jaw bone). The abscess may be acute or chronic. An acute periapical abscess arises from an infection, usually secondary to dental caries. The infection of the dental pulp extends through the apical foramen of the tooth to form an abscess around the apex.

A chronic periodontal abscess occurs from a slowly progressive infectious process. In contrast to the acute form, a fully formed abscess may occur without the patient's knowledge. The infection eventually leads to a "blind dental abscess," which is actually a periapical granuloma. It may enlarge to as much as 1 cm in diameter. It is often discovered on x-ray images and is treated by extraction or root canal therapy, often with apicoectomy (excision of the apex of the tooth root).

Clinical Manifestations

The abscess produces a dull, gnawing, continuous pain, often with a surrounding cellulitis and swelling of the adjacent facial structures, temperature sensitivity, and mobility of the involved tooth. The gum opposite the apex of the tooth is usually swollen on the cheek side. Swelling and cellulitis of the facial structures may make it difficult for the patient to open the mouth. There may also be a systemic response, fever, and malaise.

Medical Management

In the early stages of an infection, a dentist or oral surgeon may perform a needle aspiration or drill an opening into the pulp chamber to relieve pressure and pain and to provide drainage. Drainage is provided by an incision through the gingiva down to the jawbone. Purulent material escapes under pressure. This procedure may be performed in a dentist's office, an outpatient surgery center, or a same-day surgery department. After the inflammatory reaction has subsided, the tooth may be extracted or root canal therapy

performed. Antibiotics, in the presence of overt spreading infection, and analgesics may be prescribed (Robertson, Keys, Rautemaa-Richardson, et al., 2015).

Nursing Management

The patient is assessed for bleeding after treatment and is instructed to use a warm saline or warm water mouth rinse to keep the area clean. The patient is also instructed to take antibiotic and analgesic agents as prescribed, to advance from a liquid diet to a soft diet as tolerated, and to keep follow-up appointments.

DISORDERS OF THE JAW

Abnormal conditions affecting the mandible (jaw) and the temporomandibular joint (which connects the mandible to the temporal bone at the side of the head in front of the ear) include congenital malformation, fracture, chronic dislocation, cancer, and syndromes characterized by pain and limited motion. Temporomandibular disorders and jaw surgery, a treatment common in many structural abnormalities or cancer of the jaw, are presented in this section.

Temporomandibular Disorders

Temporomandibular disorders are categorized as follows (National Institute of Dental and Craniofacial Research [NIDCR], 2018):

- Myofascial pain—a discomfort in the muscles controlling jaw function and in neck and shoulder muscles
- Internal derangement of the joint—a dislocated jaw, a displaced disc, or an injured condyle
- Degenerative joint disease—rheumatoid arthritis or osteoarthritis in the jaw joint

Diagnosis and treatment of temporomandibular disorders remain somewhat ambiguous, but the condition is thought to affect about 10 million people in the United States (NIDCR, 2018). Misalignment of the joints in the jaw and other problems associated with the ligaments and muscles of mastication are thought to result in tissue damage and muscle tenderness. Suggested causes include arthritis of the jaw, head injury, trauma or injury to the jaw or joint, stress, and malocclusion, although research does not support malocclusion (misalignment of bite) or associated orthodonture as a cause (NIDCR, 2018).

Clinical Manifestations

Patients have jaw pain ranging from a dull ache to throbbing, debilitating pain that can radiate to the ears, teeth, neck muscles, and facial sinuses. They often have restricted jaw motion and locking of the jaw. There also may be a sudden change in the way the upper and lower teeth fit together. The patient may hear clicking, popping, and grating sounds when the mouth is opened, and chewing and swallowing may be difficult. Symptoms such as headaches, earaches, dizziness, and hearing problems may sometimes be related to temporomandibular disorders (Gauer & Semidey, 2015; NIDCR, 2018).

Assessment and Diagnostic Findings

Diagnosis is based on the patient's report of pain, limitations in range of motion, **dysphagia** (difficulty swallowing), difficulty chewing, difficulty with speech, or hearing difficulties. Magnetic resonance imaging (MRI) and other imaging studies are generally only used for severe or chronic symptoms.

Medical Management

Signs and symptoms improve over time for the majority of patients with temporomandibular joint disorders, with or without treatment. Conservative treatment is recommended (NIDCR, 2018). Most patients improve with a combination of simple noninvasive therapies that may include: (1) patient education on self-care—eating soft foods, icing the jaw; (2) cognitive behavior modifications—stress reduction, sleep hygiene, avoidance of extreme mandibular movement, and elimination of habits such as chewing ice; (3) physical therapy—stretching and relaxing; (4) acupuncture—highly effective with six to eight 15- to 30-minute sessions; (5) psychosocial interventions; (6) analgesics—trial of nonsteroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants initially; and (7) oral appliance therapy—splints (Gauer & Semidey, 2015; NIDCR, 2018).

Jaw Disorders Requiring Surgical Management

Correction of mandibular structural abnormalities may require surgery involving repositioning or reconstruction of the jaw. Simple fractures of the mandible without displacement, resulting from a blow to the chin, and planned surgical interventions, as in the correction of long or short jaw syndrome, may require wiring or surgery. Jaw reconstruction may be necessary in the aftermath of trauma from a severe injury or cancer, both of which can cause tissue and bone loss. Research supports screening for concussion (see [Chapter 63](#)) with mandibular fractures associated with high-force impacts (Sobin, Kopp, Walsh, et al., 2016). Cervical spine injury must be ruled out since 2% to 10% of patients with facial fractures (up to 20% with panfacial injuries) also have a spinal injury (Pickrell, Serebrakian, & Maricevich, 2017).

Mandibular fractures are usually closed fractures. In the acute trauma setting, surgery providers should assess the patient's perception of the bite ("bite feels normal") for malocclusion, the fracture site for fragment mobility, dentition for loose or infected teeth, and sensation in the lower lip for nerve damage. When the dentition is sufficient and the fracture is isolated, maxillomandibular fixation (MMF; wiring the jaw shut) is a viable option. However, open reduction, internal fixation (ORIF) with plate fixation (insertion of one or more metal plates and screws or arch bars into the bone to approximate and stabilize the bone) is the surgery of choice (Pickrell et al., 2017). Current research revolves around the use of various types and number of reconstruction plates and fixation devices, quality of life after specific instrumentation, approach used (ORIF or endoscopic-assisted), and device choice (van den Bergh, de Mol van Otterloo, van der Ploeg, et al., 2015). Bone grafting may be performed to replace structural defects using bones from the patient's own ilium, ribs, or cranial sites.

Nursing Management

If used, MMF generally requires a short period (7 to 10 days) of a liquid diet and oral rinses followed by rehabilitation and a soft diet. After ORIF, patients are typically on a liquid or soft diet for 4 to 6 weeks to allow for healing. The most common complications are infection that may progress to osteomyelitis (infection of the bone), alignment issues or hardware failure (requiring surgical repair or MMF), and wound dehiscence (Pickrell et al., 2017). Dietary counseling is provided to ensure adequate protein intake with supplementation as needed. Oral care, including the use of medicated rinses, needs to be reinforced. To decrease the risk of complications, patients are advised to take prescribed medications and to abstain from smoking, use of electronic nicotine delivery systems (ENDS), including e-cigarettes, e-pens, e-pipes, e-hookah and e-cigars and use of alcohol and other substances. Regular follow-up with the surgeon is required to ensure healing is progressing.

DISORDERS OF THE SALIVARY GLANDS

The salivary glands consist of the parotid glands, one on each side of the face below the ear; the submandibular glands, located below the jawbone; the sublingual glands, in the floor of the mouth under the tongue; and the minor salivary glands in the lips, buccal mucosa, and the lining of the mouth and throat. About 1500 mL of saliva is produced daily and swallowed. The major functions of the salivary glands include lubrication, protection against harmful bacteria, and digestion.

Parotitis

Parotitis (inflammation of the parotid gland) is the most common inflammatory condition of the salivary glands. Inflammation of the parotid may be due to mumps (epidemic parotitis), a communicable disease caused by viral infection and most commonly affecting unvaccinated children (Grennan, 2019).

People who are older, acutely ill, or debilitated with decreased salivary flow from general dehydration or medications are at high risk for bacterial parotitis. The infecting organism, typically *Staphylococcus aureus*, travels from the mouth through the salivary duct. The onset of parotitis is sudden and associated with fever, chills, and other systemic signs of infection. The gland swells and becomes tense and tender. The patient feels pain in the ear, and swollen glands interfere with swallowing. The swelling increases rapidly, and the overlying skin soon becomes red and shiny.

Medical management includes maintaining adequate nutritional and fluid intake, good oral hygiene, applying cold packs, and discontinuing medications (e.g., tranquilizers, diuretic agents) that can diminish salivation. Antibiotic therapy is necessary for bacterial parotitis, and analgesics may be prescribed to control pain. If antibiotic therapy is not effective, the gland may need to be drained by a surgical procedure known as parotidectomy. This procedure may be necessary to treat chronic parotitis. The patient is advised to have any necessary dental work performed prior to surgery.

Sialadenitis

Sialadenitis (inflammation of the salivary glands) may be caused by dehydration, radiation therapy, stress, malnutrition, salivary gland calculi (stones; sialolithiasis), or

improper oral hygiene. The inflammation is commonly associated with infection by *S. aureus*, which requires antibiotic therapy. In hospitalized or institutionalized patients, the infecting organism may be methicillin-resistant *S. aureus* (MRSA). Symptoms include pain, swelling, and purulent discharge. Massage, hydration, warm compresses, and sialagogues (substances that trigger saliva flow like hard candy or lemon juice) frequently cure the problem. Chronic sialadenitis is typically due to decreased salivary flow and may be treated with sialendoscopy, an endoscopic procedure that allows for direct visualization of Stensen duct (diagnostic) and instillation of antibiotics, corticosteroids, or irrigation (treatment), particularly in adolescents with recurrent parotitis (Papadopoulou-Alataki, Dogantzis, Chatziavramidis, et al., 2019). Surgical drainage or excision of the gland and its duct are considered in cases of sialadenitis that are recurrent or refractory to antibiotics.

Salivary Calculus (Sialolithiasis)

Sialolithiasis, or salivary calculi (stones), occur in 80% of cases in the submandibular gland (Fabie, Kompelli, Naylor, et al., 2019). Calculi within the salivary gland itself may cause no symptoms unless infection arises; however, a calculus that obstructs the gland's duct causes swelling and sudden, local, and often colicky pain, which is abruptly relieved by a gush of saliva. On physical assessment, the gland is swollen and quite tender, the stone itself may be palpable, and may be visualized by ultrasound, noncontrast computed tomography (CT), or sialendoscopy.

Salivary calculi are formed mainly from calcium phosphate. If located within the gland, the calculi are irregular and vary in diameter from 1 to 35 mm. Sialendoscopy is considered the standard in the treatment of sialothiasis, but gland-preserving incisional approaches alone may also be used for palpable stones 6 mm or larger (Fabie et al., 2019). **Lithotripsy**, a procedure that uses shock waves to disintegrate the stone, may be used instead of surgical extraction for parotid stones and smaller submandibular stones. Lithotripsy requires no anesthesia, sedation, or analgesia. Side effects can include local hemorrhage and swelling. Gland removal may be necessary if symptoms and calculi recur repeatedly.

Neoplasms

Salivary gland neoplasms (tumors or growths) of almost any type may develop in the salivary gland. Malignant (cancerous) salivary gland neoplasms account for more than 0.5% of all malignancies and approximately 3% to 5% of head and neck cancers (National Cancer Institute [NCI], 2021d). Risk factors include prior exposure to ionizing radiation to the head and neck, older age, and specific carcinogens introduced in specific work environments (asbestos, plumbing, and woodworking). Most patients with a benign tumor present with painless swelling of the glands; patients with a malignancy tend to have neurologic symptoms (weakness or numbness of the facial nerve) and persistent facial pain (NCI, 2021d). Diagnosis is based on the health history, physical examination, and the results of fine-needle aspiration biopsy.

Early-stage salivary gland tumors are usually curable with surgery alone. Dissection is carefully performed to preserve the seventh cranial nerve (facial nerve). It may not be possible to safely dissect if the tumor is extensive. Complications from surgery may

involve facial nerve dysfunction and Frey syndrome. Frey syndrome, also known as auriculotemporal syndrome, involves facial sweating and flushing in the general location of the (removed) parotid gland that occurs while eating. Frey syndrome may be successfully treated with botulinum toxin type A injections (NCI, 2021d). If the salivary gland tumor is malignant, radiation therapy may follow surgery. Radiation therapy alone may be a treatment choice for tumors thought to be localized or if there is risk of facial nerve damage from surgical intervention. Chemotherapy may be considered in late stages, but due to the many different subtypes of salivary gland cancer, tumor mapping, including immunohistochemistry and genomic profiling, should be used to optimize treatment (Lassche, van Boxtel, Ligtenberg, et al., 2019). Recurrent tumors usually are more aggressive than initial tumors.

CANCER OF THE ORAL CAVITY AND PHARYNX

Cancers of the oral cavity and pharynx, which can occur in any part of the mouth or throat, are curable if discovered early. Risk factors for cancer of the oral cavity and pharynx include any use of any form of tobacco or nicotine (cigarette, cigar, pipe, smokeless tobacco, ENDS), excessive use of alcohol, infection with human papillomavirus (HPV), and a history of previous head and neck cancer (NCI, 2021b). Oral cancers are often associated with the combined use of alcohol and tobacco—these substances have a synergistic carcinogenic effect. Patient education directed toward avoiding high-risk behaviors is critical to prevent oral cancers.

In the United States, approximately 53,000 new cases of oral cavity and oropharyngeal cancer occur annually, with an estimated 10,860 deaths. Men are diagnosed with oral and oropharyngeal cancer in almost 72% of diagnosed cases (Siegel, Miller, & Jemal, 2019). Despite a rise in rates associated with HPV over the past 10 years (0.8% rise each year), patients with cancer of the oral cavity and oropharynx have a relatively stable 5-year survival rate of 65.3% (NCI, 2021b; Siegel et al., 2019).

Pathophysiology

Malignancies of the oral cavity are usually squamous cell carcinomas (NCI, 2021c). Any area of the oropharynx can be a site of malignant growths, but the lips, the lateral aspects of the tongue, and the floor of the mouth are most commonly affected. High-risk HPV infection is associated with about 70% of oropharyngeal cancers. Vaccination against HPV shows promise in impacting rates of head and neck cancer. A study of young adults in the United States found oral HPV infections (including the two high-risk, cancer-causing types 16 and 18) were 88% lower among young adults who received at least one dose of the vaccine (NCI, 2017).

Clinical Manifestations

Many oral cancers produce few or no symptoms in the early stages. Later, the most frequent symptom is a painless sore or lesion that bleeds easily and does not heal. Oral cancer may also present as a red or white patch (leukoplakia) in the mouth or throat. A typical lesion in oral cancer is a painless indurated (hardened) ulcer with raised edges. Depending on the location (tonsil, base of the tongue, soft palate, or pharyngeal wall), the patient may report tenderness, difficulty in chewing, swallowing, or speaking, coughing

of blood-tinged sputum, trismus (limited jaw range of motion), weight loss, a neck mass, or enlarged cervical lymph nodes (NCI, 2021c).

Assessment and Diagnostic Findings

Diagnostic evaluation consists of an oral examination as well as an assessment of the cervical lymph nodes to detect possible metastases. Positron emission tomography-computed tomography scan (PET-CT scan), MRI, endoscopy, laryngoscopy, and biopsy, including testing of HPV status may be used to detect and guide therapy (NCI, 2021c).

Human Papillomavirus Prevention

HPV vaccine is generally recommended for all children ages 11 or 12 (can be started at age 9), up to the age of 26 years for women and 21 years for men. Men who have sex with men, transgender men and women, and immunocompromised people, including those with human immune deficiency virus (HIV), may receive the vaccine up to 26 years of age (CDC, 2020a).

Medical Management

In patients diagnosed with oropharyngeal cancer, management varies with the nature of the lesion, the preference of the provider, and patient choice. Surgical resection and chemoradiation (CRT) are associated with improved survival for all adults over age 70, including those who are positive for HPV infection (Lu, Luu, Nguyen, et al., 2019).

In cancer of the lip, small lesions are usually excised liberally. Radiation therapy may be more appropriate for larger lesions involving more than one third of the lip because of superior cosmetic results. The choice depends on the extent of the lesion and what is necessary to cure the patient while preserving the best appearance. Tumors larger than 4 cm often recur.

In cancer of the tongue, treatment with radiation therapy and chemotherapy may preserve function and maintain quality of life. A combination of radioactive interstitial implants (surgical implantation of a radioactive source into the tissue adjacent to or at the tumor site) and external-beam radiation may be used. Total glossectomy (removal of the tongue) remains the principal treatment of advanced stage or cancers at the base of the tongue; long-term data on functional outcomes following these procedures are being studied (Han, Kuan, Mallen-St. Clair, et al., 2019).

Often, cancer of the oral cavity has metastasized through the extensive lymphatic channel in the neck region, requiring a neck dissection and reconstructive surgery of the oral cavity. Reconstructive techniques involve the use of the traditional pedicled (attached and tunneled) regional tissue flaps (graft of tissue with its own blood supply) or the current mainstay of free (cut and removed) tissue transfer most commonly obtained from the pectoralis major, vertical rectus abdominis myocutaneous, anterolateral thigh, fibula, or radial forearm. Laryngeal preservation is associated with better speech and verbal communication, but swallowing and aspiration issues remain common functional deficits with total glossectomy and free flap reconstruction (Han et al., 2019).

Nursing Management

The nurse assesses the patient's nutritional status preoperatively, and a dietary consultation may be necessary. The patient may require enteral (through the GI tract) or parenteral (intravenous [IV]) feedings before and after surgery to maintain adequate nutrition (see [Chapter 41](#)). The interprofessional team, including a registered dietician (RD), provides continual nutritional assessment and reevaluation.

Verbal communication may be impaired by radical surgery for oral cancer, especially if the larynx is removed. It is therefore vital to assess the patient's ability to communicate in writing before surgery. Pen and paper are provided postoperatively to patients who can use them to communicate. A communication board with commonly used words or pictures is obtained preoperatively and given after surgery to patients who cannot write so that they may point to needed items. Electronic devices, such as tablets or smartphones, may also be options for facilitating communication. The interprofessional team benefits from the input of a speech therapist, with physical and occupational therapists consulted as needed.

Postoperatively, the priority for the nurse is assessing for and maintaining a patent airway. The patient may be unable to manage oral secretions, making suctioning necessary. If grafting was part of the surgery, suctioning is performed with care to prevent damage to the graft. Nurses assess the graft postoperatively for viability. Although color should be assessed (white may indicate arterial occlusion, and blue mottling may indicate venous congestion), it can be difficult to assess the graft by looking into the mouth. A Doppler ultrasound device may be used to locate the pulse at the graft site and to assess tissue perfusion. Depending on the extent of the surgery, the patient may require a temporary or permanent tracheostomy after surgery (see [Chapter 19](#)).

NURSING MANAGEMENT OF THE PATIENT WITH DISORDERS OF THE ORAL CAVITY

The nurse caring for the patient with disorders of the oral cavity promotes mouth care, ensures adequate food and fluid intake, minimizes pain and discomfort, and prevents infection.

Promoting Mouth Care

Incidence of oral complications, such as infection, during cancer therapy may be decreased and less severe with the incorporation of professional oral care before and during cancer treatment. Guidelines, based on systematic review of the literature, support the implementation of multi-agent combination oral care protocols in patients undergoing head and neck chemotherapy and radiotherapy (radiation therapy) to prevent oral mucositis (OM), a painful inflammatory, typically ulcerative condition that is also referred to as **stomatitis**. Although there are limited data, experts recognize that using saline or sodium bicarbonate rinses increases oral clearance, promotes oral hygiene, and promotes patient comfort (Hong, Gueiros, Fulton, et al., 2019). The nurse facilitates the patient rinsing or irrigating with a solution of $\frac{1}{2}$ to 1 teaspoon of baking soda (or $\frac{1}{4}$ -teaspoon salt) in 8 oz of warm water. The nurse reinforces the need to perform oral care and provides such care to patients who cannot provide it for themselves. Chlorhexidine has been studied more rigorously than other rinses and is generally not recommended for the prevention of OM, specifically not for patients undergoing head and neck radiotherapy (Hong et al., 2019). There is continued debate about the efficacy of *magic mouthwash*, particularly for chemotherapy-induced OM. The recipe for the mouthwash

varies and frequently involves out-of-pocket expense for the patient, but most commonly contains diphenhydramine, aluminum-magnesium hydroxide, and viscous lidocaine, with intended mechanism of action to both numb and protect the mouth. More research needs to be done on OM treatment and prevention (Uberoi, Brown, & Gupta, 2019a, 2019b).

Exciting developments regarding intra-oral photobiomodulation (PBM), specifically low-level laser therapy, show positive impact on the prevention of OM in patients with head and neck cancer undergoing radiotherapy with and without chemotherapy (Hong et al., 2019). If specific antimicrobial, antifungal, antibacterial, or antiviral agents are indicated (Maria, Eliopoulos, & Muanza, 2017), the nurse administers the prescribed medications and instructs the patient on how to administer the medications at home. The nurse monitors the patient's physical and psychological response to treatment.

Xerostomia (dryness of the mouth) is a frequent sequela of oral cancer, particularly when the salivary glands have been exposed to radiation or major surgery. It is also seen in patients who are receiving psychopharmacologic agents, taking multiple medications, or using drugs recreationally; in patients who have rheumatic diseases, eating disorders (Villa, Nordio, & Gohel, 2015) or HIV infection; and in patients who cannot close the mouth and, as a result, breathe through the mouth instead of the nose. Current recommendations to treat xerostomia include sipping water, using oral mucosal lubricants (saliva substitutes topically applied), incorporating the use of newer edible saliva substitutes such as oral moisturizing jelly (OMJ), and taking medications that stimulate saliva production (Nuchit, Lam-ubol, & Paemuang, 2020). The hope is that providing oral moisture increases swallowing ability, and ultimately improves nutritional status for these patients.

Ensuring Adequate Food and Fluid Intake

Determination of nutritional intake goals requires consideration of the patient's weight, age, and level of activity. A daily calorie count may be necessary to determine the exact quantity of food and fluid ingested. This intake should include enteral feedings, oral intake, and supplements. The frequency of intake; presence of symptoms such as oral discomfort/pain, dysphagia, nausea; increased or decreased saliva or mucous production; and changes in taste or smell all impact the typically diminishing food intake seen in these patients. The social aspects of eating, reasonable expectations for the timing and amount of intake, and the importance of supportive people are all important considerations. Recommendations to navigate this challenging time include involving a registered dietician or other health care professional with specific nutritional expertise (Sandmæl, Sand, Bye, et al., 2019). The goal is to help the patient attain and maintain desirable body weight and level of energy, as well as to promote the healing of tissue.

Supporting a Positive Self-Image

A patient who has a disfiguring oral condition or has undergone disfiguring surgery may experience an alteration in self-image. The patient is encouraged to verbalize the perceived and actual change in body appearance and to realistically discuss changes or losses. The nurse offers support while the patient verbalizes fears and negative feelings (withdrawal, depressed mood, anger). The nurse listens attentively and determines the patient's needs and individualizes the plan of care.

The nurse should determine the patient's concerns about relationships with others. Referral to support groups, a psychiatric liaison nurse, a social worker, or a spiritual

advisor may be useful in helping the patient cope with anxieties and fears. The patient's progress toward development of positive self-esteem is documented. The nurse should be alert to signs of effective and ineffective grieving and should document emotional changes. By providing acceptance and support, the nurse encourages the patient to verbalize feelings.

Minimizing Pain and Discomfort

Oral lesions can be painful. Strategies to reduce pain and discomfort include avoiding foods that are spicy, hot, or hard (e.g., pretzels, nuts). A soft or liquid diet may be preferred. The patient is instructed about mouth care, including the use of a soft toothbrush and any prescribed rinses or topical medications. The patient may require an analgesic agent such as viscous lidocaine or opioids, as prescribed. The nurse can reduce the patient's fear of pain by providing information about pain control methods.

Preventing Infection

Leukopenia (a decrease in white blood cells) may result from radiation, chemotherapy, acquired immune deficiency syndrome (AIDS), and some medications used to treat HIV infection. Leukopenia reduces defense mechanisms, increasing the risk of infections. Malnutrition, which is also common among these patients, may further decrease resistance to infection. If the patient has diabetes, the risk of infection is further increased.

Laboratory results should be evaluated frequently and the patient's temperature checked every 4 to 8 hours for an elevation that may indicate infection. Visitors who might transmit microorganisms are prohibited if the patient's immunologic system is depressed. Sensitive skin tissues are protected from trauma to maintain skin integrity and prevent infection. Aseptic technique is necessary when changing dressings. Desquamation (shedding of the epidermis) is a reaction to radiation therapy that can lead to a break in skin integrity and subsequent infection. Dry desquamation can be treated with topical lotions, but wet desquamation requires individualized treatment (see [Chapter 12](#)). Signs of wound infection (redness, swelling, drainage, tenderness) are reported to the primary provider. Antibiotics may be prescribed prophylactically.

Promoting Home, Community-Based, and Transitional Care



Educating Patients About Self-Care

The patient who is recovering from treatment of an oral disorder is instructed about mouth care, nutrition, prevention of infection, and signs and symptoms of complications (see [Chart 39-2](#)). Methods of preparing nutritious foods that are seasoned according to the patient's preference and at the preferred temperature are explained to the patient and family. For some patients, it may be more convenient (but also more expensive) to use commercial baby foods than to prepare liquid and soft diets. The patient who cannot take foods orally may receive enteral or parenteral nutrition; the nurse should demonstrate administration techniques and facilitate a return demonstration by the patient and/or caregiver(s).

Chart 39-2 HOME CARE CHECKLIST

The Patient with an Oral Disorder

At the completion of education, the patient and/or caregiver will be able to:

- State the impact of the oral disorder and treatment on communication and other physiologic functioning, ADLs, IADLs, body image, roles, relationships, and spirituality.
- Identify modification of home environment, interventions, and strategies (e.g., utilizing durable medical equipment, employing a home health aide) used in safely adapting to changes in structure or function and promote effective recovery and rehabilitation.
- Describe ongoing therapeutic regimen, including diet and activities to perform (e.g., oral care, suctioning) and to limit or avoid (e.g., oral foods if NPO).
 - Identify foods or therapies necessary to meet caloric needs and dietary needs (e.g., change in consistency, seasoning limitations, supplements, enteral or parenteral therapy).
 - Participate in prescribed therapy (e.g., speech therapy) to promote recovery and rehabilitation.
 - Demonstrate the use of suction equipment if indicated.
 - Demonstrate use of humidification if indicated.
 - Demonstrate effective oral hygiene.
 - Demonstrate care of incision as appropriate.
- State the name, dose, side effects, frequency, and schedule for all medications.
 - Describe approaches to controlling pain (e.g., take analgesics as prescribed; use nonpharmacologic interventions).
- Identify possible complications and interventions.
- Relate how to reach primary provider with questions or complications.
- State time and date of follow-up medical/dental appointments, therapy, and testing.
- Identify sources of support (e.g., friends, relatives, faith community, cancer support, caregiver support).
- Identify the need for health promotion, disease prevention, and screening activities.

ADLs, activities of daily living; IADLs, instrumental activities of daily living; NPO, nothing by mouth.

For patients with oral cancer, instructions are provided in the use and care of any dentures. The importance of keeping dressings clean and the need for conscientious oral hygiene are emphasized.

Continuing and Transitional Care

The need for ongoing care in the home depends on the patient's condition. The patient, family members, and other health care team members responsible for home care (e.g., nurse, speech therapist, registered dietician/nutritionist, and psychologist) work together to prepare an individual plan of care.

If suctioning of the mouth or tracheostomy tube is required, the necessary equipment is obtained and the patient and caregivers are taught how to use it. Considerations include the control of odors and humidification of the home to keep secretions moist. The patient and caregivers are educated to assess for obstruction, hemorrhage, and infection, as well as what actions to take if they occur. The nurse may provide physical care, monitor for changes in the patient's physical status (e.g., skin integrity, nutritional status, respiratory function), and assess the adequacy of pain control measures. The nurse also assesses the patient's and family's ability to manage incisions, drains, and feeding tubes and the use of recommended strategies for communication. The ability of the patient and family to accept physical, psychological, and role changes is assessed and addressed.

Follow-up visits to the primary provider are important to monitor the patient's condition and to determine the need for modifications in treatment and general care. Because patients and their family members, as well as health care providers, tend to focus on the most obvious needs and issues, the nurse reminds the patient and family about the importance of continuing health promotion and screening practices and refers them to appropriate practitioners. The nurse also reinforces instructions in an effort to promote the patient's self-care and comfort.

NECK DISSECTION

Deaths from malignancies of the head and neck are primarily attributable to regional metastasis to the cervical lymph nodes in the neck and extra capsular spread, which is a specific characteristic of regional metastasis where the malignant tumor in the lymph node extends into the surrounding connective tissue (Stack & Moreno, 2019). Metastasis, both regional and distant, occurs by way of the lymphatics before the primary lesion has been treated. This regional metastasis is not amenable to surgical resection and responds poorly to chemotherapy and radiation therapy. The cervical lymph nodes are classified as anterior or posterior and divided into anatomic regions/nodal levels for classification (Grègoire, Ang, Budach, et al., 2014; Stack & Moreno, 2019) (see [Fig. 39-3](#)).

A radical neck dissection involves removal of all cervical lymph nodes from the mandible to the clavicle and removal of the sternocleidomastoid muscle, internal jugular vein, and spinal accessory nerve on one side of the neck. The associated complications include shoulder drop/dysfunction and poor cosmesis (visible neck depression). Because of the high mortality and known complications, a radical neck dissection is now only performed when the extent and growth pattern of the cancer require aggressive intervention. Modified radical neck dissection, which preserves one or more of the nonlymphatic structures (internal jugular vein, sternocleidomastoid muscle, and the spinal accessory nerve) is used more often. A selective neck dissection (in comparison to a radical neck dissection or modified radical neck dissection) preserves one or more of the lymph node groups that are typically removed in a radical neck dissection. The selective neck dissection is the treatment usually used in oral cavity cancer for patients who are infected with HPV (Sabatini & Chiocca, 2019; Stack & Moreno, 2019) (see [Fig. 39-4](#)).

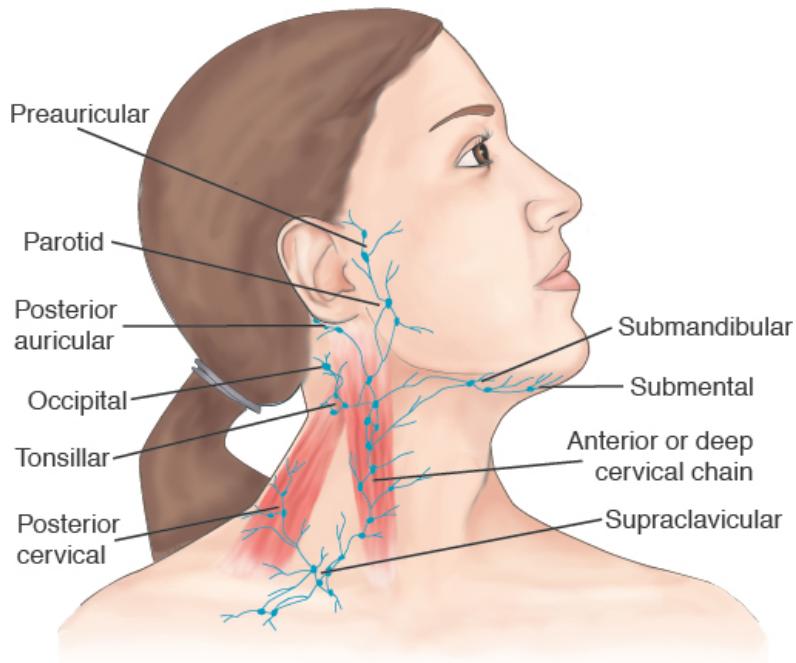


Figure 39-3 • Lymphatic drainage of the head and neck.

Reconstructive techniques may be performed with a variety of grafts. A cutaneous flap (skin and subcutaneous tissue), such as the deltopectoral flap, may be used. A myocutaneous platysma flap (subcutaneous tissue, muscle, and skin) is a more frequently used graft; the pectoralis major muscle is usually used. For large grafts, a microvascular free flap may be used. This involves the transfer of muscle, skin, or bone with an artery and vein to the area of reconstruction, using microinstrumentation. Areas used for a free flap include the scapula, the radial area of the forearm, or the anterolateral thigh (Stack & Moreno, 2019).

NURSING PROCESS

The Patient Undergoing a Neck Dissection

Assessment

Preoperatively, the patient's physical and psychological preparation for major surgery is assessed, along with the patient's knowledge of the preoperative and postoperative procedures. Postoperatively, the patient is assessed for complications such as altered respiratory status, wound infection, and hemorrhage. As healing occurs, nutritional support is provided and neck range of motion is assessed to determine whether there has been a decrease in range of motion due to nerve or muscle damage.

Diagnosis

NURSING DIAGNOSES

Based on the assessment data, major nursing diagnoses may include the following:

- Lack of knowledge about preoperative and postoperative procedures
- Impaired airway clearance associated with obstruction by mucus, hemorrhage, or edema
- Acute pain associated with surgical incision
- Impaired tissue integrity secondary to surgery and grafting
- Impaired nutritional status associated with disease process or treatment
- Risk for situational low self-esteem associated with diagnosis or prognosis
- Risk for caregiver stress associated with physical and emotional effects of disease and related surgical procedure
- Impaired verbal communication secondary to surgical resection
- Impaired mobility secondary to nerve injury

COLLABORATIVE PROBLEMS/POTENTIAL COMPLICATIONS

Potential complications include the following (Stack & Moreno, 2019):

- Hemorrhage, including hematoma formation, and rupture ("blowout") of the internal jugular vein (IJV) or carotid artery
- Chyle leak, a lymphatic leak in the thoracic duct
- Neurologic complications, including stroke and nerve injury (spinal accessory, marginal mandibular, vagus, phrenic, hypoglossal, lingual, brachial plexus)

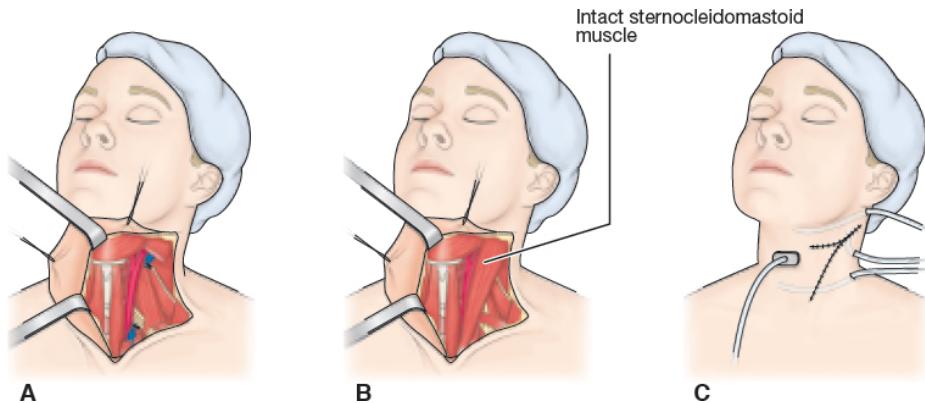


Figure 39-4 • A. A classic radical neck dissection in which the sternocleidomastoid and smaller muscles are removed. All tissue is removed, from the ramus of the jaw to the clavicle. The jugular vein has also been removed. **B.** The modified neck dissection is similar, but preserves the sternocleidomastoid muscle, internal jugular vein, and/or spinal accessory nerve. **C.** The wound is closed, and portable suction drainage tubes are in place.

Planning and Goals

The major goals for the patient include increased knowledge of surgical procedure and treatment plan, maintenance of respiratory status, decreased pain, viability of the graft, maintenance of adequate intake of food and fluids, effective coping strategies (for patient and caregivers), effective communication, maintenance of shoulder and neck motion, and absence of complications.

Nursing Interventions



PROVIDING PREOPERATIVE PATIENT EDUCATION

Before surgery, the patient should be informed about the nature and extent of the surgery and what to expect in the postoperative period. Preoperative education addresses interventions that cover the entire perioperative period. As part of the informed consent process, the patient should be made aware of the potential/actual risks and benefits of the procedure as well as other treatment options, and the projected outcome if the procedure is not done. The patient is encouraged to ask questions and to express concerns about the upcoming surgery and the expected results. During this exchange, the nurse has an opportunity to assess the patient's coping abilities, answer questions, and develop a plan for offering assistance. A sense of mutual understanding and rapport make the postoperative experience less traumatic for the patient. The patient's expressions of concern, anxieties, and fears guide the nurse in providing support postoperatively.

PROVIDING GENERAL POSTOPERATIVE CARE

The general postoperative nursing interventions are similar to those presented in Chapter 16 and are directed toward the identified nursing diagnoses and goals.

MAINTAINING AIRWAY CLEARANCE

After the endotracheal tube or airway has been removed and the effects of the anesthesia have worn off, the patient may be placed in the Fowler position to facilitate

breathing and promote comfort. This position also increases lymphatic and venous drainage, facilitates swallowing, decreases venous pressure on the skin flaps, and prevents regurgitation and aspiration of stomach contents. If the patient has a tracheostomy, the nurse performs focused assessment and care of the stoma (see Chapter 19). Signs of respiratory distress, such as dyspnea, cyanosis, changes in mental status, and changes in vital signs, are assessed because they may suggest edema, hemorrhage/hematoma formation, inadequate oxygenation, or inadequate drainage.



Quality and Safety Nursing Alert

In the immediate postoperative period, the nurse assesses for stridor (coarse, high-pitched sound on inspiration) by listening frequently over the trachea with a stethoscope. This finding must be reported immediately because it indicates obstruction of the airway.

Pneumonia may occur in the postoperative phase if pulmonary secretions are not removed. To aid in the removal of secretions, coughing and deep breathing are encouraged. With the nurse supporting the neck, the patient should assume a sitting position so that excessive secretions can be coughed up and expectorated. If this is ineffective, the patient's respiratory tract may have to be suctioned. Care is taken to protect the suture lines during suctioning. If a tracheostomy tube is in place, suctioning is performed through the tube. The patient may also be instructed on use of Yankauer suction (tonsil-tip suction) to remove oral secretions. Humidified air or oxygen is provided through the tracheostomy to keep secretions thin. Temperature should not be taken orally.

RELIEVING PAIN

The nurse assesses and manages pain and the patient's fear of pain. Patients with head and neck cancer often report less pain than patients with other types of cancer; however, the nurse needs to be aware that each person's pain experience is different. The nurse works with the patient to establish reasonable pain goals and creates an interprofessional plan to meet those mutually defined goals. Patient-controlled analgesia may be prescribed for postoperative pain management (see Chapters 9 and 16).

PROVIDING WOUND CARE

Wound drainage tubes are usually inserted during surgery to prevent the collection of fluid subcutaneously. The drainage tubes are connected to a portable suction device (e.g., Jackson-Pratt), and the container is emptied periodically. Between 80 and 120 mL of serosanguineous secretions may drain over the first 24 hours. Excessive drainage may be indicative of a chyle fistula or hemorrhage (see later discussion). Dressings are reinforced as needed and are observed for evidence of hemorrhage and constriction, which impair respiration and perfusion of the graft. A graft, if present, is assessed for color and temperature and for the presence of a pulse, if applicable, to determine viability. The graft should be pale pink and warm to the touch. The surgical incisions are also assessed for signs of infection (purulent, malodorous drainage), which are reported immediately. Prophylactic antibiotics may be prescribed in the early postoperative period. Aseptic technique is used when cleansing skin around the

drains; dressings are changed as prescribed by the surgeon, usually on the second through the fifth postoperative days. Care should be taken to not apply excessive pressure to the surgical site in order to not impair flap perfusion and viability (Hudson & Carr, 2020). If radiation is planned (either with or without chemotherapy), brachytherapy catheters are inserted intraoperatively (Stack & Moreno, 2019).

Maintaining Adequate Nutrition

The interprofessional team assesses the patient's nutritional status preoperatively; early intervention to correct nutritional imbalances may decrease the risk of postoperative complications. Frequently, nutrition is less than optimal because of inadequate intake and nutritional support is required before surgery or the start of radiation due to the psychological stress of the cancer diagnosis, the location of the tumor(s), and diagnostic procedures. Prophylactic nutritional support using a tube feeding is common and may prevent weight loss, reduce fluid imbalances, decrease hospitalizations, and increase treatment tolerance (Sandmæl et al., 2019). Supplements that are nutritionally dense may help reestablish a positive nitrogen balance. They may be taken enterally by mouth, by a nasogastric (NG) feeding tube, or by a gastrostomy feeding tube (see later discussion).

The patient who can chew may take food by mouth; the patient's chewing ability determines whether some diet modification (e.g., soft, puréed, or liquid foods) is necessary. Food preferences should also be discussed with the patient. Oral care before eating may enhance the patient's appetite, and oral care after eating is important to prevent infection and dental caries.

SUPPORTING PATIENT SELF-ESTEEM AND THE NEEDS OF CAREGIVERS

Preoperatively, information about the planned surgery is given to the patient and family. Any questions are answered as accurately as possible. Postoperatively, psychological nursing interventions are aimed at supporting the patient who has had a change in body image or who has major concerns related to the prognosis. The patient may have difficulty communicating and may be concerned about having the ability to breathe and swallow normally. Head and neck cancer recovery is unique in that the patient's behavioral issues (e.g., HPV infection status, alcohol, smoking) often directly relate to the underlying cause of the cancer. The psychological adaptation required after a disfiguring surgery, and the social complications inherent in swallowing and speech are profound. The *patient-caregiver dyad* is often considered a single unit, which reinforces the need to consider both entities, as well as their interrelationship (Dri, Bressan, Cadorin, et al., 2019).

The person who has had extensive neck surgery often is sensitive about their appearance. This can occur when the operative area is covered by bulky dressings, when the incision line is visible, or later after healing has occurred and the appearance of the neck and possibly the lower face has been significantly altered. If the nurse accepts the patient's appearance and expresses a positive, optimistic attitude, the patient is more likely to be encouraged. The patient also needs an opportunity to express fears and concerns regarding the success of the surgery and the prognosis. The American Cancer Society (ACS) may be a resource to provide a volunteer who meets with the patient either preoperatively or postoperatively and shares their own experience about the diagnosis, treatment, and recovery. The Look Good Feel Better programs of the ACS provide information about clothing and cosmetics that can be used to improve body image and self-esteem (see the Resources section at the end of this chapter).

People with cancer of the head and neck frequently have used alcohol or tobacco before surgery; postoperatively, they are encouraged to abstain from these substances. Alternative methods of coping need to be explored. A referral to Alcoholics Anonymous, a smoking cessation program, and family counseling may be appropriate.

PROMOTING EFFECTIVE COMMUNICATION

Communication plans begin preoperatively, when the patient and family determine which method of communication will be the best postoperatively. Useful communication methods for the patient who has undergone a laryngectomy include dry-erase boards, writing materials, pictorial guides, computer aids, smart phones, tablets, and hand signals. During the postoperative period, the call bell must be readily accessible to the patient at all times. For the patient who is intubated and mechanically ventilated postoperatively, not being able to communicate well can result in anxiety, depression, and frustration, which can lead to prolonged stress and increased hospitalization (Koszalinski, Heidel, & McCarthy, 2020). (See the Nursing Research Profile in [Chart 39-3](#).)

The nurse obtains a consultation with a speech-language pathologist. Alternative speech techniques, such as a voice prosthesis or esophageal speech, may be taught by a speech-language pathologist (see [Chapter 18](#)).

Chart 39-3



NURSING RESEARCH PROFILE

Envisioning a Positive Future: Patients Who Are Communication Vulnerable

Koszalinski, R. S., Heidel, R. E., & McCarthy, J. (2020). Difficulty envisioning a positive future: Secondary analyses in patients in intensive care who are communication vulnerable. *Nursing & Health Sciences*, 22(2), 374–380.

Purpose

This study explored the experience of patients who, for myriad reasons, find themselves unable to communicate in the intensive care unit (ICU) setting.

Design

This secondary analysis was based on an equivalent control group design. Data were analyzed with a mixed-effect analysis of variance (ANOVA; between and within groups), repeated measure to compare the control and treatment groups over time. The focus of this analysis was on considering the impact of a nurse-led electronic communication intervention, called *Speak for Myself Voice* (SFMV), on depression and anxiety. Data were collected using the Hospital Anxiety and Depression scale (HADS) from 36 participants in a trauma surgical ICU, neuro ICU, progressive care unit, medical ICU, and cardiovascular ICU at an academic medical center in rural Tennessee.

Findings

Although change was detected from preintervention to postintervention on several questions on the HADS, one item piqued the interest of the researchers: “I look forward with enjoyment to things.” There was a statistically significant interaction ($p = 0.017$) from preintervention to postintervention. This indicates that patients who are mechanically ventilated or unable to communicate because of obstruction, trauma, or surgical resection (including head and neck procedures) may be silently suffering with depressive symptoms.

Nursing Implications

These results are supported by other studies in the literature. Nurses have the unique ability to make sure patients who are unable to communicate feel seen and heard. Intentional presence and honest interest in the patient as a person by the nurse opens the door to communication that extends beyond mere vocalizations and provides the patient comfort.

MAINTAINING PHYSICAL MOBILITY

Excision of the sternocleidomastoid muscle and spinal accessory nerve results in weakness at the shoulder that can cause shoulder drop, which is a forward curvature of the shoulder. Many problems can be avoided with a conscientious exercise program. These exercises are usually started in collaboration with a physical therapist after the drains have been removed and the neck incision is sufficiently healed. The purpose of the exercises depicted in [Figure 39-5](#) is to promote maximal shoulder function and neck motion after surgery.

MONITORING AND MANAGING POTENTIAL COMPLICATIONS

Hemorrhage. Hemorrhage may occur from carotid artery rupture as a result of necrosis of the graft or damage to the artery itself from tumor or infection. This can result in frank bleeding or the formation of a hematoma. The following measures are indicated:

- Vital signs are assessed frequently (every 1 to 2 hours or every 15 minutes if the patient is critical). Once the patient is stabilized, assessment is performed every 4 hours. Tachycardia, tachypnea, and hypotension may indicate hemorrhage and impending hypovolemic shock (see [Chapter 11](#) for discussion of treatment of hypovolemic shock).

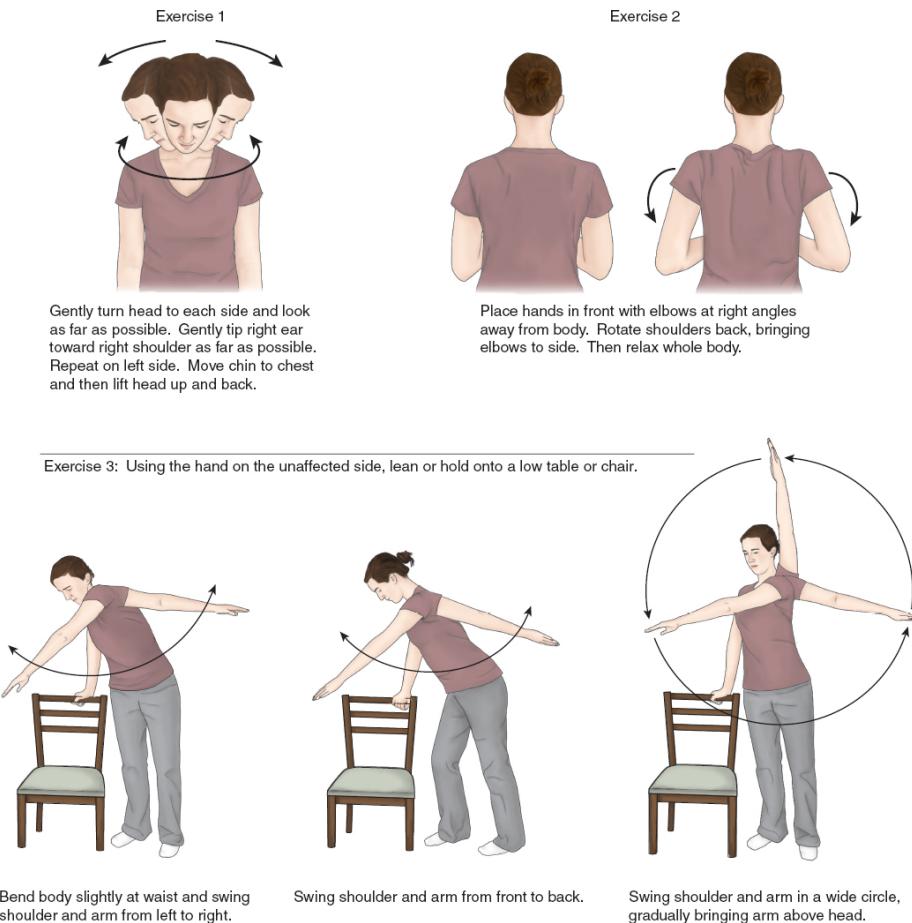


Figure 39-5 • Three rehabilitation exercises after head and neck surgery. The objective is to regain maximum shoulder function and neck motion after neck surgery. Adapted from Exercise for radical neck surgery patients. Head and Neck Service, Department of Surgery, Memorial Hospital, New York, NY.

- The patient is instructed to avoid the Valsalva maneuver to prevent stress on the graft and carotid artery.
- Signs of impending rupture, such as high epigastric pain or discomfort, are reported.
- Dressings and wound drainage are observed for excessive bleeding.
- If hemorrhage occurs, assistance is summoned immediately.
- Hemorrhage requires the continuous firm application of pressure to the bleeding site or major associated vessel.
- The head of the patient's bed should be elevated at least 30 degrees to maintain airway patency and prevent aspiration.

- A controlled, calm manner allays the patient's anxiety.
- The surgeon is notified immediately, because a vascular or ligature tear requires surgical intervention.

Chyle Leak. A chyle leak (milklike, lymphatic fluid drainage from the thoracic duct into the thoracic cavity) may develop as a result of damage to the thoracic duct during surgery. Although not very common (3% to 5.7% of cases), this leak may be recognized during surgery (where it can be repaired immediately) or in the postoperative setting, especially when oral intake begins. If a chyle leak is suspected postoperatively, conservative measures to limit increases in intrathoracic pressure will reduce the flow of chyle fluid in the thoracic duct. Recommended interventions include initiating enteral feeding or supporting a low fat diet focused on the intake of small- and medium-chain fatty acids (chylous fluid is formed from long-chain fatty acids). Medium-chain triglycerides/fats, like those found in coconut oil, are metabolized in the liver into ketones to provide energy without the formation of chyle. Other interventions include fluid and electrolyte replacement, activity restriction, head of bed elevation, stool softeners (to prevent straining), and occasionally, pressure dressings. Providers often prescribe octreotide, a synthetic analogue of the natural hormone somatostatin, that works primarily by inhibiting the release of gastrointestinal hormones that regulate digestion and absorption, thereby reducing lymph flow and decreasing the chyle flow (Rudrappa & Paul, 2019; Stack & Moreno, 2019).

Nerve Injury. Nerve injury can occur if the spinal accessory, marginal mandibular (branch of the facial nerve), vagus, phrenic, hypoglossal, lingual, or brachial plexus nerves are severed or injured during surgery. Because lower facial paralysis may occur as a result of injury to the facial nerve, this complication is observed for and reported. The patient with nerve damage may have difficulty swallowing liquids and food because of the partial lack of sensation of the glottis, impaired tongue movement, or vagus nerve injury. Speech therapy may be indicated to assist with the problems related to nerve injury. Shoulder dysfunction is most common in radical neck dissection and often requires extensive physical rehabilitation.

PROMOTING HOME, COMMUNITY-BASED, AND TRANSITIONAL CARE

 **Educating Patients About Self-Care.** The patient and caregiver require instructions about management of the wound, the dressing, and any drains that remain in place. Patients who require oral suctioning or who have a tracheostomy may be very anxious about their care at home; the transition to home can be eased if the caregiver is given several opportunities to demonstrate the ability to meet the patient's needs (see [Chart 39-4](#)). The patient and caregiver are also instructed about possible complications, specifically bleeding and respiratory distress, and when to notify the primary provider.

Chart 39-4 HOME CARE CHECKLIST

The Patient Recovering from Neck Surgery

At the completion of education, the patient and/or caregiver will be able to:

- Name the procedure that was performed and identify any permanent changes in anatomic structure or function as well as changes in communication, ADLs, IADLs, roles, body image, relationships, and spirituality.
- Identify modification of home environment, interventions, and strategies (e.g., utilizing durable medical equipment, employing a home health aide) used in safely adapting to changes in structure or function and promote effective recovery and rehabilitation.
- Describe ongoing therapeutic regimen, including diet and activities to perform (e.g., oral care, suctioning) and to limit or avoid (e.g., lifting weights, driving a car, contact sports).
 - Identify foods or therapies necessary to meet caloric needs and dietary needs (e.g., change in consistency, seasoning limitations, supplements, enteral or parenteral therapy).
 - Participate in prescribed therapy (e.g., speech therapy, PT, OT) to promote recovery and rehabilitation.
 - Demonstrate the use of tracheostomy care and suctioning if indicated.
 - Demonstrate use of humidification if indicated.
 - Demonstrate effective oral hygiene.
 - Demonstrate care of incision and drains.
- State the name, dose, side effects, frequency, and schedule for all medications.
- Describe approaches to controlling pain (e.g., take analgesics as prescribed; use nonpharmacologic interventions).
- Identify possible complications (e.g., bleeding, respiratory distress) and interventions.
- Relate how to reach primary provider with questions or complications.
- State time and date of follow-up medical/dental appointments, therapy, and testing.
- Identify sources of support (e.g., friends, relatives, faith community, cancer support, caregiver support).
- Identify the need for health promotion, disease prevention, and screening activities.

ADLs, activities of daily living; IADLs, instrumental activities of daily living; OT, occupational therapy; PT, physical therapy.

If the patient cannot take food by mouth, detailed instructions and demonstration of enteral or parenteral feedings will be required. Education in techniques of effective oral hygiene is also important.

Continuing and Transitional Care. A referral for home, community-based, or transitional care may be necessary in the early period after discharge. The nurse assesses healing, ensures that feedings are being given properly, and monitors for any complications. The patient's adjustment to changes in physical appearance and status and ability to communicate and eat normally is also assessed. Physical and speech therapy also are likely to be continued at home.

The patient is given information regarding local support groups such as “New Voice Club,” if indicated. The local chapter of the ACS may be contacted for information and equipment needed for the patient (see the Resources section).

Evaluation

Expected patient outcomes may include:

1. Exhibits increased knowledge of course of treatment
2. Demonstrates adequate respiratory exchange
 - a. Lungs are clear to auscultation
 - b. Breathes easily with no shortness of breath
 - c. Demonstrates ability to use suction effectively
3. Verbalizes comfort and relief of pain
4. Graft is pink and warm to touch
5. Maintains adequate intake of foods and fluids
 - a. Accepts altered route of feeding
 - b. Is well hydrated
 - c. Maintains or gains weight
6. Demonstrates ability to cope (both patient and caregivers)
 - a. Discusses emotional responses to the diagnosis
 - b. Utilizes available support
7. Communicates effectively with caregivers and family members
8. Attains maximal mobility
 - a. Adheres to physical therapy exercises
 - b. Attains maximal range of motion
9. Exhibits no complications
 - a. Vital signs stable
 - b. No excessive bleeding or discharge
 - c. Able to move muscles of lower face and shoulders

DELIVERING NUTRITION ENTERALLY

Feeding via the **enteric** route infers that the intestines are receiving nutrients. Thus, delivering **enteral nutrition** refers to infusing nutritional formula feedings through a tube directly into the GI tract. The nurse plays a key role in ensuring that patients prescribed this therapy achieve nutritional balance sufficient to meet their metabolic needs.

Nursing Management

Administering Tube Feedings

Tube feedings are given to meet nutritional requirements when oral intake is inadequate or not possible and the GI tract is functional. The feedings are delivered to the stomach, duodenum, or proximal jejunum and help preserve GI integrity by preserving normal intestinal and hepatic metabolism. Tube feedings have several advantages over parenteral nutrition: they are lower in cost, safer, usually well tolerated by the patient, and easier to

use in extended care facilities and in the patient's home. When possible, the physiological-based preference is to *feed the gut*.

TABLE 39-2 Conditions That May Require Enteral Therapy

Condition or Need	Examples
Alcoholism, chronic depression, anorexia nervosa ^a	Chronic illness, psychiatric or neurologic disorder
Cancer therapy	Radiation, chemotherapy
Coma, semiconsciousness ^a	Stroke, head injury, neurologic disorder, neoplasm
Convalescent care	Surgery, injury, severe illness
Debilitation ^a	Disease or injury
Gastrointestinal problems	Fistula, short-bowel syndrome, mild pancreatitis, Crohn's disease, ulcerative colitis, nonspecific malabsorption
Hypermetabolic conditions	Burns, trauma, multiple fractures, sepsis, acquired immune deficiency syndrome, organ transplantation
Maxillofacial or cervical surgery	Disease or injury
Oropharyngeal or esophageal paralysis ^a	Disease or injury, neoplasm, inflammation, trauma, respiratory failure
Preoperative bowel preparation	After administration of larger-volume cathartics

^aBecause some patients with these conditions are at risk for regurgitating or vomiting and aspirating administered formula, each condition must be considered individually.

Nasoduodenal or nasojejunal feeding is indicated when the esophagus and stomach need to be bypassed or when the patient is at risk for **aspiration** (i.e., inhalation of fluids or foods into the trachea and bronchial tree). For tube feedings longer than 4 weeks, gastrostomy or jejunostomy tubes are preferred for administration of medications or nutrition. Indications for enteral nutrition are summarized in Table 39-2.

Osmolality

The **osmolality** of normal body fluids (i.e., concentration) is approximately 300 mOsm/kg. The body attempts to keep the osmolality of the contents of the stomach and intestines at this level. Osmolality is an important consideration for patients receiving tube feedings through the duodenum or jejunum because feeding formulas with a high osmolality may lead to undesirable effects. For example, when a concentrated solution of high osmolality entering the stomach is taken in quickly or in large amounts, the small intestines expand and water moves rapidly into the intestinal lumen from fluid surrounding the organs and the vascular compartment. The patient may have feelings of fullness, nausea, cramping, dizziness, diaphoresis, and osmotic diarrhea, collectively termed **dumping syndrome**. Dumping syndrome can lead to dehydration, hypotension, and tachycardia. Patients fed by the small intestinal route vary in the degree to which they tolerate the effects of high osmolality; the nurse needs to be knowledgeable about the patient's formula and take steps to prevent this undesired effect. The small intestines may be able to adapt to a formula of high osmolality if it is initiated at a low hourly rate that is advanced slowly (Seres, 2019).

Formulas

The choice of formula to be delivered by tube feeding is influenced by the status of the GI tract and the nutritional needs of the patient. Formula characteristics that are considered include the chemical composition of the nutrient source (protein, carbohydrates, fat), caloric density, osmolality, fiber content, vitamins, minerals, electrolytes, and cost. Enteral formulas contain 70% to 85% free water and are not designed to meet total fluids needs (Seres, 2019). A wide variety of containers, delivery systems, and enteral pumps are available for use with tube feedings.

Various tube feeding formulas are available commercially. Polymeric formulas are the most common and are composed of protein (10% to 15%), carbohydrates (50% to 60%), and fats (30% to 35%). Standard polymeric formulas are undigested and require that the patient has relatively normal digestive function and absorptive capacity. Specialty formulas may be prescribed to treat disease-specific disorders (e.g., diabetes), organ-specific disorders (e.g., renal, pulmonary, or hepatic), sepsis, or trauma, or to support wound-healing or immune-modulation. Chemically defined or *predigested* formulas contain easier-to-absorb nutrients. Modular products contain only one major nutrient, such as protein, and are used to enhance commercially prepared products. Fiber, either premixed in or added to formulas, helps bulk the stool to decrease the occurrence of both diarrhea and constipation (McClave, Taylor, Martindale, et al., 2016).

Some feedings are given as supplements, and others are given to meet the patient's total nutritional needs. Registered dietitians (RD), registered dietitian nutritionists (RDN), and certified nutrition support clinicians collaborate with primary providers and nurses to determine the best formula for each patient. The volume of formula delivered varies depending on the caloric density of the formula and the energy needs of the patient. The overall goal is to achieve positive nitrogen balance and weight maintenance or gain without producing discomfort or diarrhea.

Administration Methods



The tube feeding method chosen depends on the location of the tube in the GI tract, patient tolerance, convenience, and cost. Large-bore (larger than 12-Fr) nasogastric (NG) tubes can be uncomfortable and their usefulness for tube feedings is limited; however, they may be used for administration of short-term feedings (Mueller, 2017). Small-bore (Dobhoff) tubes that are typically inserted into the jejunum with a guidewire and manufactured for tube feedings, are better tolerated for up to 6 weeks; however, they require diligent monitoring and frequent flushing to remain patent.

Bolus and intermittent drip tube feeding methods are practical and inexpensive options for the patient receiving tube feedings who resides at home or in a long-term care facility; however, these methods may be poorly tolerated in patients who are acutely ill. Bolus infusion requires dividing the total daily feeding volume into 4 to 6 feeds throughout the day. Boluses can be given into the stomach through a large (50-mL) syringe via gravity (see Fig. 39-6). The typical volume is 200 to 400 mL of feeding over a 15- to 60-minute period, but these parameters should be outlined in the provider's prescription (Bischoff et al., 2020; Boullata et al., 2017). Bolus feedings can be delivered as quickly as the patient can tolerate them, but are initiated slowly, increasing the rate as tolerated. With gravity feedings, raising or lowering the syringe above the abdominal wall regulates the rate of flow. The amount and flow rate is often determined by the patient's reaction. If the patient feels full, it may be desirable to slow the delivery time or give smaller volumes more frequently. The intermittent gravity drip feeding method requires administering

feedings over 30 minutes or longer at designated intervals by a reservoir enteral bag and tubing, with the flow rate regulated by a roller clamp or automated pump.

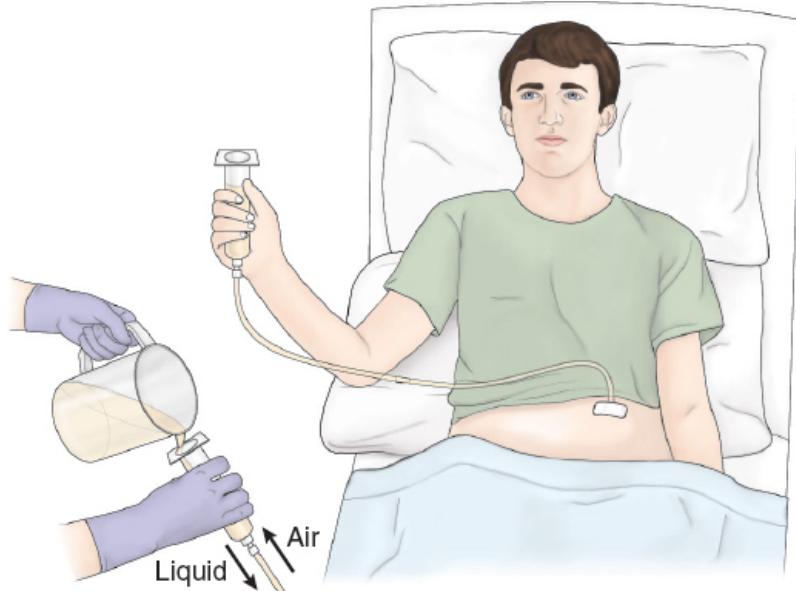


Figure 39-6 • Bolus gastrostomy feeding by gravity. Syringe is raised perpendicular to the abdomen so that feeding can enter by gravity.

Continuous feeding is the delivery of feedings incrementally by a slow infusion over long periods. Slow drip feedings are recommended for patients who are critically ill, patients at high risk for aspiration, patients at risk for intolerance (e.g., patients with pancreatitis), and for small bowel feedings (Boullata, Carrera, Harvey, et al., 2017). Enteral feeding pumps control the delivery rate of the formula (see Fig. 39-7). They allow for a constant flow rate and can infuse a viscous formula through a small-diameter feeding tube. However, they do not allow the patient as much flexibility as intermittent feedings. Portable lightweight enteral pumps are available for home use. In addition, feeding pumps have built-in alarms that signal when the bag is empty, the battery is low, or the tube is occluded. The patient and caregiver need to be aware of these alarms and know how to troubleshoot the pump.

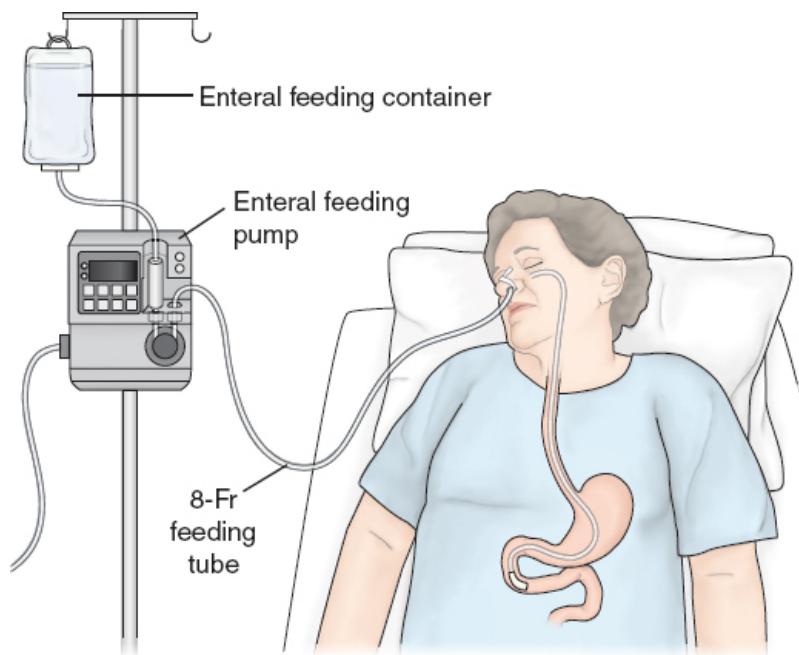


Figure 39-7 • Nasoenteric tube feeding by continuous controlled pump. The head of the bed should be elevated to prevent aspiration.

Chart 39-5  **ASSESSMENT**

Assessing Patients Receiving Tube Feedings

Be alert for the following assessment findings:

- Tube placement, patient's position (head of bed elevated > 30 degrees), and formula flow rate
- Patient's ability to tolerate the formula; observe for fullness, bloating, distention, nausea, vomiting, and stool pattern
- Clinical responses, as noted in laboratory findings (blood urea nitrogen, serum protein, prealbumin, electrolytes, kidney function, hemoglobin, hematocrit)
- Signs of dehydration (dry mucous membranes, thirst, decreased urine output)
- Amount of formula actually taken in by the patient
- Elevated blood glucose level, decreased urinary output, sudden weight gain, and periorbital or dependent edema
- Signs of infection (to avoid infection, replace any formula given by an open system every 4 to 8 hours with fresh formula; change tube feeding container and tubing every 24 hours)
- Signs of complications (if suspected, check gastric residual volume before each feeding or, in the case of continuous feedings, every 4 hours; return the aspirate to the stomach)
- Intake and output
- Weekly weights
- Recommendations made on dietitian consult

Adapted from McClave, S. A., Taylor, B. E., Martindale, R. G., et al. (2016). Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (ASPEN). *Journal of Parenteral and Enteral Nutrition*, 40(2), 159–211.

An alternative to the continuous infusion method is cyclic feeding, in which the infused feeding is given by an enteral feeding pump over 8 to 18 hours. Feedings may be infused at night to avoid interrupting the patient's lifestyle. Cyclic infusions may be appropriate for patients who are being weaned from tube feedings to an oral diet, for patients who cannot eat enough and need supplements, and for patients at home who need daytime hours free from the pump.

Key assessment findings for patients receiving tube feedings are noted in [Chart 39-5](#).



COVID-19 Considerations

Patients hospitalized with severe coronavirus disease (COVID-19) pneumonia and respiratory failure necessitating intubation and mechanical ventilation may require the delivery of enteral nutrition (see [Chapter 19](#) for further discussion of severe COVID-19 pneumonia). Guidelines developed by the American Society for Parenteral and Enteral Nutrition (ASPEN) stipulate that enteral nutrition should be initiated for these patients within 36 hours of admission to the intensive care unit (Martindale, Patel, Taylor, et al., 2020). These guidelines should be implemented unless the decision has been made that the patient receives end-of-life palliative care. Large-bore nasogastric tubes are the preferred route of delivery; these can be placed rapidly and are less prone to clogging

compared to small-bore nasoduodenal or nasojejunal feeding tube. Therefore, there is less risk of contamination for nurses and other providers responsible for inserting or manipulating the feeding tubes (Martindale et al., 2020).

However, inserting a nasogastric feeding tube still incurs risk. Placement of a nasogastric feeding tube can generate a cough, which can produce sputum; consequently, placing a nasogastric tube is considered an aerosol-generating procedure. When inserting a nasogastric tube in a patient with known or suspected COVID-19, whether for feeding or for decompression, the nurse should wear appropriate personal protective equipment (PPE) (see [Chapter 66](#) for description of PPE) (Anderson, 2020). In addition, if possible, the patient's mouth should be covered with a mask during the procedure (Martindale et al., 2020). The feedings should be delivered as continuous rather than bolus infusions (Martindale et al., 2020).

Many patients with severe COVID-19 pneumonia who are intubated and mechanically ventilated experience an improvement in their respiratory status when they are placed in the prone position (see [Chapter 19](#)); however, if they are also receiving enteral nutrition, they are at greater risk for aspiration in this position. These patients should be placed in reverse Trendelenburg, with their heads elevated 10 to 25 degrees, to minimize this risk (Martindale et al., 2020). Some experts also advocate that feedings be held for 1 hour prior to the patient being moved into the prone position, to further reduce the risk of aspiration (Anderson, 2020; Arkin, Krishnan, & Chang, 2020).

Maintaining Feeding Equipment and Nutritional Balance



The temperature and volume of the feeding, the flow rate, and the patient's total fluid intake are important factors to consider when tube feedings are given. The schedule of tube feedings, including the correct quantity and frequency, is maintained. The nurse must carefully monitor the drip rate and avoid administering fluids too rapidly.

For patients receiving tube feedings, measuring gastric residual volumes (GRVs) by removing gastric contents with a large syringe at routine intervals has been a commonly prescribed practice. However, the usefulness of measuring GRVs has not been validated by research; furthermore, this practice may cause clogging of gastric tubes (Boullata et al., 2017). Previously, GRV in excess of 250 to 500 mL had been thought to indicate feeding intolerance. Other indicators of feeding tolerance that the nurse needs to consider include abdominal distention, patient reports of discomfort, vomiting, hypoactive bowel sounds, changes in passing flatus, and presence of diarrhea (McClave et al., 2016). The most recent guidelines for assessment and provision of nutrition in the patient who is critically ill, authored by the Society of Critical Care Medicine (SCCM) and the American Society for Parenteral and Enteral Nutrition (ASPEN), do not advocate using GRVs to monitor tolerance of enteral feedings (McClave et al., 2016). Research findings show that GRVs between 250 and 500 mL did not increase the incidence of vomiting, aspiration, or pneumonia (McClave et al., 2016). Although feedings should not routinely be held if residuals are 250 to 500 mL, measures to decrease the risk of aspiration should be implemented (Boullata et al., 2017; McClave et al., 2016). If agency protocols and policies include assessing GRV as part of routine care, research and guidelines support holding the feeding for 2 hours only if the GRV is greater than 500 mL (Boullata et al., 2017; McClave et al., 2016). Growing evidence supports moving away from routine assessment of GRVs (Seres, 2019).

Maintaining tube function is an ongoing responsibility of the nurse, patient, primary provider, and caregiver. To ensure patency and to decrease the chance of bacterial growth,

sludge build-up, or occlusion of the tube, at least 30 mL of water flush is recommended for adults receiving tube feedings in each of the following instances (Bischoff, Austin, Boeykens, et al., 2020; Boullata et al., 2017):

- Before and after intermittent tube feeding
- Before and after medication administration (see later discussion)
- After checking for gastric residuals (if required by policy) and gastric pH
- Every 4 hours with continuous feedings
- When the tube feeding is discontinued or interrupted for any reason

Water used to flush these tubes must be recorded as fluid intake. Although distribution (i.e., tap) or drinking (i.e., distribution and bottled) water can be used for flushes, the likelihood of contamination with pathogens must be considered. Purified (contaminant free; distillation or ultrafiltration) or sterile (purified water free of microorganisms and pyrogens) should be used for medication preparation. The use of sterile water is considered best practice for patients who are immunocompromised and for reconstitution of powdered formula (Bischoff et al., 2020; Boullata et al., 2017).

Potential complications of enteral therapy are noted in [Table 39-3](#).

Providing Medications by Tube

When different types of medications are prescribed, a bolus method is used for administration that is compatible with the medication's preparation. The feeding is paused, and the tube is flushed with at least 15 mL of water before and at least 15 mL of water after medication administration (30 mL total). Each medication should be prepared and administered separately, with a 15-mL flush provided between medications. When small-bore feeding tubes for continuous infusion are irrigated after administration of medications, a 20-mL or larger syringe is used because the pressure generated by smaller syringes could rupture the tube. Nursing judgment is required to individualize care; institutional protocols and pharmacist input should guide the primary provider's prescriptions regarding medication choices and route of delivery. Consideration needs to be given to preparations (tablets that can be crushed/dissolved; availability of elixirs), absorption (e.g., some medications bind to enteral feedings, location of distal end of tube in the stomach or jejunum), and the patient's fluid volume status (i.e., increased number of medications necessitates increases in the flush/water that is administered).



Quality and Safety Nursing Alert

Administering medications through postpyloric enteric tubes may adversely affect their absorption; therefore, this should be avoided if possible. In addition, to avoid nutrient and drug interactions, medications should not be mixed with the feeding formulas.

Maintaining Delivery Systems

Tube feeding formula is delivered to patients by either an open or a closed system. The open system is packaged as a liquid or a powder to be mixed with water that is either poured into a feeding container or given by a large syringe. The feeding container (which is hung on a pole) and the tubing used with the open system should be changed every 24 hours (Bischoff et al., 2020; Boullata et al., 2017). The open system can be used for bolus feedings, intermittent feedings, or continuous drip feedings and can be delivered by

push (with a syringe and plunger), gravity (syringe with plunger removed or gravity bag with roller clamp), or pump. To avoid bacterial contamination, the formula hang time in the bag at room temperature should never exceed what the formula manufacturer recommends, which is usually no more than 4 to 8 hours. Closed delivery systems use a prefilled, sterile container of about 1 L of formula that is spiked with enteral tubing and allows a typical hang time of 24 hours at room temperature. The closed delivery system must always use a pump to control formula rate in order to avoid dispensing a large formula volume in a short period of time. Closed systems lower the risk of infection from bacterial contamination (Boullata et al., 2017).

Maintaining Normal Bowel Elimination Pattern

Patients receiving gastric or enteric tube feedings can experience diarrhea or constipation. Possible causes of diarrhea include:

- Intolerance to enteral nutrition, related to underlying disease
- Malnutrition: A decrease in the intestinal absorptive area can cause diarrhea
- Medication therapy:
 - Elixir-based medications—often contain sorbitol, which can act as a cathartic
 - Magnesium—acts as a cathartic
 - Antibiotics—thought to alter normal intestinal flora, allowing pathogenic bacteria to flourish
- *Clostridium difficile* (*C. difficile*) colitis: Can result after antibiotic use alters normal intestinal flora and promotes the abnormal growth of this potentially dangerous microbe; *C. difficile* colitis occurs most commonly in patients who are hospitalized (Read, Olson, & Calderwood, 2020)
- Zinc deficiency: Zinc is lost with diarrhea, and zinc deficiency can then cause continued diarrhea
- Concomitant lactose intolerance
- Concomitant hyperthyroidism
- Dumping syndrome: Formula is infused into the small intestine quickly or formula bypasses the stomach too readily into the small intestine and causes expansion of the intestinal wall. This leads to bloating, cramping, diarrhea, dizziness, diaphoresis, and weakness. Measures for managing the GI symptoms associated with dumping syndrome are presented in [Chart 39-6](#).
- Contamination of the formula and feeding equipment with diarrhea-causing pathogens (Boullata et al., 2017)

Possible causes of constipation include:

- Inadequate water intake: Tube feedings typically do not meet total fluid needs and additional water needs to be given.
- Administration of fiber-free tube feeding formulas
- Concomitant use of opioids

TABLE 39-3 Potential Complications of Enteral Therapy

		Select Nursing Interventions		
Complications	Causes	Therapeutic	Preventive	
Gastrointestinal				
Constipation	Lack of fiber Inadequate fluid intake/dehydration Opioid use	Check fiber and water content; report findings.	Administer adequate amount of hydration as flushes. Consider cathartic.	
Diarrhea	Hyperosmolar feedings Rapid infusion/bolus feedings Cold formula Medications, especially antibiotic therapy	Assess fluid balance and electrolyte levels; report findings. Implement changes in tube feeding formula or rate. Review medications.	Ensure appropriate rate of infusion and temperature of formula. Avoid multiple elixirs and prokinetic medications.	
Gas/bloating/cramping	Air in tube Excess fiber	Notify primary provider if persistent.	Keep tubing free of air.	
Nausea/vomiting	Change in formula or rate Inadequate gastric emptying	Review medications.	Check residuals; if ≥200 mL, reinstill and recheck; report if residual is consistently high.	
Mechanical				
Aspiration pneumonia	Improper tube placement Vomiting with aspiration of tube feeding Flat in bed	Assess respiratory status and notify primary provider.	Implement reliable method for checking tube placement. Keep head of bed elevated 30 degrees.	
Nasopharyngeal irritation	Tube position/improper taping Use of large tubes	Assess nasopharyngeal mucous membranes every 8 h.	Tape tube to prevent pressure on nares. Reposition tape.	
Tube displacement	Excessive coughing/vomitus Tension on the tube or unsecured tube Tracheal suctioning Airway intubation	Stop feeding, and notify primary provider.	Check tube placement before administering feeding.	

Tube obstruction	Inadequate flushing/formula rate Inadequate crushing of medications and flushing after administration	Follow policy for declogging feeding tubes (for the procedural guidelines for declogging a feeding tube, go to thepoint.lww.com/Brunner15e).	Obtain liquid medications when possible. Flush tube and crush medications adequately.
Metabolic			
Dehydration and azotemia (excessive urea in the blood)	Hyperosmolar feedings with insufficient fluid intake	Report signs and symptoms of dehydration. Implement changes in tube feeding formula, rate, or ratio to water.	Provide adequate hydration through flushes.
Hyperglycemia	Glucose intolerance High carbohydrate content of the feeding	Check blood glucose levels routinely. Dietary consult to reevaluate feeding regimen.	
Refeeding syndrome, caused by rapid shifts in intracellular and extracellular electrolytes	Inadequate nutritional intake for >2 wks/Anorexia Poorly controlled diabetes Cancer Short bowel syndrome/inflammatory bowel disease Older adult patient living alone Chronic infections	Monitor fluid balance, daily weight, electrolyte status, and metabolic/nutrition parameters	Initiate feedings at 25% of the estimated goal and advance slowly over 3–5 days with careful laboratory monitoring

Adapted from Blumenstein, I., Shastri, Y. H., & Stein, J. (2014). Gastroenteric tube feeding: Techniques, problems, and solutions. *World Journal of Gastroenterology*, 20(26), 8505–8524; Boullata, J. I., Carrera, A. L., Harvey, L., et al. (2017). ASPEN safe practices for enteral nutrition therapy. *Journal of Parenteral and Enteral Nutrition*, 41(1), 15–103.

Maintaining Adequate Hydration

The nurse carefully monitors hydration because in many cases the patient cannot communicate the need for water. Water flushes are given every 4 hours and after feedings to prevent hypertonic dehydration. The feeding may be initially given as a continuous drip in order to help the patient develop tolerance, especially for hyperosmolar solutions. Key nursing interventions include observing for signs of dehydration (e.g., dry mucous membranes, thirst, decreased urine output); administering water routinely; and monitoring intake and output, residual volume, and fluid balance.

Promoting Coping Ability

The psychosocial goal of nursing care is to support and encourage the patient to accept physical changes and to convey hope that daily progressive improvement is possible. If the patient is having difficulty adjusting to the treatment, the nurse intervenes by encouraging self-care within the parameters of the patient's activity level. In addition, the nurse reinforces an optimistic approach by identifying indicators of progress (daily weight trends, electrolyte balance, absence of nausea and diarrhea, improvement in plasma proteins).

Chart 39-6

Preventing Dumping Syndrome

The following strategies may help prevent some of the uncomfortable signs and symptoms of dumping syndrome related to tube feeding:

- Slow the formula instillation rate to provide time for carbohydrates and electrolytes to be diluted.
- Administer feedings at room temperature, because temperature extremes stimulate peristalsis.
- Administer feeding by continuous drip (if tolerated) rather than by bolus, to prevent sudden distention of the intestine.
- Advise the patient to remain in semi-Fowler position for 1 hour after the feeding; this position prolongs intestinal transit time by decreasing the effect of gravity.
- Instill the minimal amount of water needed to flush the tubing before and after a feeding, because fluid given with a feeding increases intestinal transit time.

Promoting Home, Community-Based, and Transitional Care



Educating Patients About Self-Care

Patients who require long-term tube feedings may have had recent surgery, dysphagia due to a neuromuscular disease, head and neck cancer, radiation or other types of trauma to the throat, an obstruction of the upper GI tract, GI cancer and other malignancies, GI disease (including malabsorptive syndromes), or decreased level of consciousness. For a patient to be considered for tube feeding at home, the patient should:

- Be medically stable and successfully tolerating at least 60% to 70% of the feeding regimen
- Be capable of self-care or have a caregiver willing to assume the responsibility
- Have access to supplies and interest in learning how to administer tube feedings at home

Preparation of the patient for home administration of enteral feedings begins while the patient is still hospitalized. The nurse should educate the patient and caregiver while administering the feedings so that they can observe the mechanics and participate in the procedure, ask questions, and express any concerns. Before discharge, the nurse provides information about the equipment needed, formula purchase and storage, and administration of the feedings and water flushes (frequency, quantity, rate of instillation).

Family members who will be active in the patient's home care are encouraged to participate in education sessions. Available printed information about the equipment, the formula, and the procedure is reviewed. Arrangements are made to obtain the equipment and formula and have it ready for use before the patient's discharge.

Continuing and Transitional Care

Referral to home, community-based, or transitional care is important so that a nurse can supervise and provide support during the first tube feedings at home. Additional visits will depend on the skill and comfort of the patient or caregiver in administering the feedings. During all visits, the nurse monitors the patient's physical status (weight,

hydration status, vital signs, activity level) and the ability of the patient and family to administer the tube feedings correctly and assess the enteral access device and site. Enteral access devices require periodic replacement, and the nurse should be sure that the patient and caregiver have the necessary information to set up these tube replacement appointments. In addition, the nurse assesses for any complications. The patient or caregiver is encouraged to record times and amounts of feedings and water flushes, bowel patterns, and any symptoms that occur. The nurse can review the record with the patient and caregiver during home visits.

Gastrostomy and Jejunostomy

A **gastrostomy** is a procedure in which an opening is created into the stomach either for the purpose of administering nutrition, fluids, and medications via a feeding tube, or for gastric decompression in patients with gastroparesis, gastroesophageal reflux disease, or intestinal obstruction. A gastrostomy is preferred over a nasally inserted tube to deliver enteral nutrition support longer than 4 to 6 weeks (Bischoff et al., 2020; Boullata et al., 2017). Gastrostomy is also preferred over nasogastric or orogastric feedings in the patient who is comatose because the gastroesophageal sphincter remains intact, making regurgitation and aspiration less likely. Placement involves creation of a **stoma**, an artificially created opening, that houses the tube.

Insertion of a **percutaneous endoscopic gastrostomy (PEG)** requires the services of a provider skilled in endoscopy, utilizes moderate sedation, and takes approximately 15 to 20 minutes. A lighted endoscope is inserted through the mouth into the stomach. Once in the stomach, the light indicates the location for hollow needle and guidewire insertion into the stomach. The wire is pulled back through the mouth, then the PEG tube itself is attached to the wire to guide the PEG tube as it moves into the mouth, down the esophagus, into the stomach, and out the incision in the abdominal wall. An internal fixation bolster, often called a *bumper*, is pulled snug against the stomach wall. An external retention disc/phalange sits close to the abdominal surface. The tension between the external and internal fixations bolsters keeps the tube in place (see Fig. 39-8A). A radiologically inserted gastrostomy tube (RIG) can be placed fluoroscopically by a skilled provider when an endoscope cannot be passed through a strictured or obstructed esophagus. The RIG is internally sutured and held in place by an internal balloon that is inflated with a small amount of water (Anderson, 2019; Thompson, 2017).

Feeding can be initiated via PEG tubes within several hours (≤ 4 hours) of placement. The stomal tract will take 30 to 90 days to mature, so replacement should not occur until at least 30 days after placement. Manufacturer guidelines should be followed for replacement of tubes, but deterioration or dysfunction, a ruptured balloon, stomal tract disruption, nonhealing ulcers, or fistula formation may accelerate this recommended time frame. With optimal care, tubes may last 1 to 2 years; however, most policies encourage preventative maintenance that includes elective changing of the balloon gastrostomy tube every 3 to 6 months (Boullata et al., 2017). An alternative to standard gastrostomy tubes that are bulky are low-profile gastrostomy devices (see Fig. 39-8B). Specific types of low-profile gastrostomy devices include the MIC-KEY or the Bard Button. These devices are flush with the skin, eliminate the possibility of inward tube migration, have antireflux valves to prevent gastric leakage, and do not require tape or other securement devices (Boullata et al., 2017). Patients requiring enteral nutrition support can conceal the feeding tube access site under their clothing. Low-profile gastrostomy devices require special

connection tubing so they can be attached to the feeding container. Patients must be instructed to bring this connection tubing with them when traveling, going to the emergency department or hospital, or undergoing diagnostic procedures that require access into the GI tract.

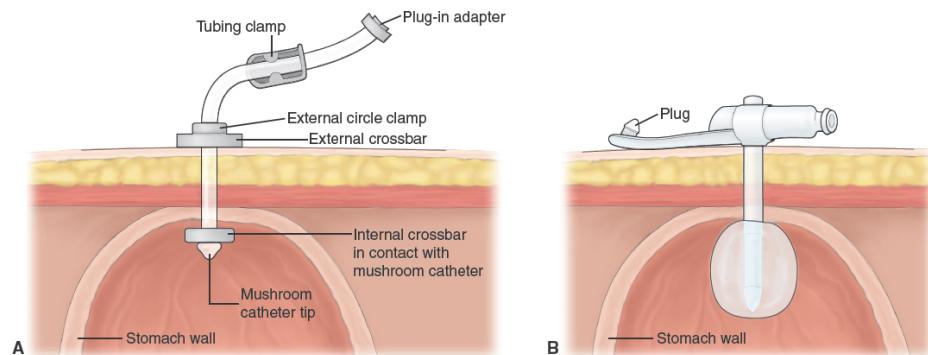


Figure 39-8 • A. A detail of the abdomen and the percutaneous endoscopic gastrostomy (PEG) tube showing catheter fixation. **B.** A detail of the abdomen and the nonobturated low-profile gastrostomy device showing balloon fixation.

A **jejunostomy** is a surgically, endoscopically (percutaneous gastrojejunostomy or jejunal; PEJ), or radiologically placed opening into the jejunum for the purpose of administering nutrition, fluids, and medications. A jejunostomy tube is indicated when the gastric route is not accessible, or to decrease aspiration risk when the stomach is not functioning adequately to process and empty food and fluids. These tubes either have an internal balloon or dacron cuff, or are sutured externally to secure them. Unlike the gastrostomy tubes, jejunostomy tubes should not be rotated and only last between 6 to 9 months (Anderson, 2019; Boullata et al., 2017). The small intestine can also be accessed by placing a jejunal extension tube through an existing gastrostomy tube and manipulating it through the pylorus into the small intestine endoscopically, fluoroscopically, or during a surgical procedure—this is referred to as a *gastrojejunostomy* tube.

NURSING PROCESS

The Patient with a Gastrostomy or Jejunostomy

Assessment

The focus of the preoperative assessment is to determine the patient's ability to understand and cooperate with the procedure. The nurse assesses the ability of both patient and family to adjust to a change in body image and to participate in self-care. There are multiple medical and ethical issues that the patient, the caregivers, and the primary provider should discuss together.

The purpose of the procedure and expected postoperative course should be explained. The patient needs to know that the feeding tube will bypass the mouth and esophagus so that liquid feedings can be given directly into the stomach or intestine. If the feeding tube is expected to be permanent, the patient should be made aware of this. If the procedure is being performed to relieve discomfort, prolonged vomiting, debilitation, or an inability to eat, the patient may find the feeding tube more acceptable.

In the postoperative period, the patient's fluid and nutritional needs are assessed to ensure proper intake and GI function. The nurse inspects the tube for proper maintenance and the incision for any drainage, skin breakdown, or signs of infection. As the nurse evaluates patients' responses to the change in body image and their understanding of the feeding methods, interventions are identified to help them cope with the tube and learn self-care measures.

Diagnosis

NURSING DIAGNOSES

Based on the assessment data, major nursing diagnoses may include the following:

- Impaired nutritional status
- Risk for infection associated with presence of wound and tube
- Risk for impaired skin integrity at tube insertion site
- Disturbed body image associated with presence of tube

COLLABORATIVE PROBLEMS/POTENTIAL COMPLICATIONS

Potential complications may include the following (Anderson, 2019):

- Wound infection, cellulitis, and leakage
- GI bleeding
- Premature dislodgement of the tube
- Tube obstruction/clogging

Planning and Goals

The major goals for the patient may include achieving nutritional requirements, preventing infection, maintaining skin integrity, adjusting to changes in body image, and preventing complications.

Nursing Interventions

MEETING NUTRITIONAL NEEDS

The first fluid nourishment is given soon after tube insertion and can consist of a sterile water or normal saline flush of at least 30 mL. Formula feeding can begin as

prescribed, typically within 4 hours post tube insertion. The infusion rate or bolus amount given is gradually increased.

If the tube has been placed for gastric drainage, it can be connected to either low intermittent suction or to a gravity drainage bag. This drainage should be measured and recorded because it is a significant indicator of GI function. A decrease in the amount of drainage may indicate that the tube can be clamped for periods of time, allowing greater freedom of movement. High output can result in significant fluid and electrolyte losses.

PREVENTING INFECTION AND PROVIDING SKIN CARE

For the first week after insertion, interventions are focused on prevention of stomal tract infection and promotion of incisional healing. The insertion site should be kept clean and dry using aseptic wound care daily and/or a glycerin hydrogel or glycogel dressing. It is normal to see scant serous drainage at the site for a few days post insertion. After approximately 1 week, the site (including under the external disc, if one is present) can be cleansed twice a week with soap and water and left open to air. Skin at the exit site is evaluated daily for signs of breakdown, irritation, excoriation, and the presence of drainage, bleeding or hypertrophic tissue growth or scattered, raised red papules that could indicate a yeast or candidal infection. Candida may appear in warm moist areas of the body; the area beneath the gastric tube external retention bolster is a common location for it to develop and spread. The nurse encourages the patient and family members to participate in this evaluation and in hygiene activities. If gastric contents leak and irritate the skin at the stoma site, zinc oxide-based protectants may be used. After the first week of healing, buried bumper syndrome, a severe, but rare complication, can be prevented by rotating the gastric tube (not done with jejunostomy tubes) daily and moving the tube inward 2 to 10 cm at least once a week (Bischoff et al., 2020; Boullata et al., 2017).

ENHANCING BODY IMAGE

Eating is a major physiologic and social function, and the patient with a gastrostomy has experienced a major change in body image. The patient is also aware that gastrostomy as a therapeutic intervention is performed only in the presence of a major, chronic, or perhaps terminal illness. It is necessary to evaluate the existing family support system because adjustment takes time and is facilitated by family acceptance.

MONITORING AND MANAGING POTENTIAL COMPLICATIONS

During the postoperative course, the most common complications are wound infection or cellulitis at the exit site, bleeding, leakage, excessive tightness of external retention bolster, and dislodgement. Because many patients who receive tube feedings are debilitated and have compromised nutritional status, any signs of infection are promptly reported to the primary provider so that appropriate therapy can be instituted. Bleeding from the insertion site in the stomach can also occur and should be reported promptly. The nurse closely monitors the patient's vital signs and observes all operative site drainage, vomitus, and stool for evidence of bleeding. If an external retention bolster, tape, securement device, or sutures are present, they are evaluated for adequate tension and securement. Excessive tension of the external retention bolster can cause excruciating pain and will lead to skin breakdown and ulceration. The nurse should notify the primary provider if excessive pain occurs at the incision site post insertion.

Dislodgement of a recently inserted tube requires immediate attention because the tract can close within 4 to 6 hours if the tube is not replaced promptly. Aspiration is a

potential risk with tube dislodgment, especially with nasally inserted tubes. The head of bed for the patient should be elevated to at least 30 degrees. Careful assessment of external tube markings that could suggest drift in placement, and of the patient for signs and symptoms of fullness or nausea that might lead to gastric reflux are important strategies that may prevent aspiration (Boullata et al., 2017).

Tube occlusion/clogging occurs in 23% to 35% of patients with feeding tubes and can lead to delays in feeding and medication administration (Boullata et al., 2017). Prevention is important and can be accomplished by administering adequate and frequent flushes as previously described. If a tube does become clogged, warm water may be instilled into the enteral nutrition device with a 30- to 60-mL syringe, followed by a gentle pulling and pushing on the plunger. If this method does not resolve the obstruction, an enzyme-containing commercially available declogging kit may be used or a combination of a pancreatic enzyme tablet and a bicarbonate tablet may be used (Boullata et al., 2017).



For the procedural guidelines for declogging a feeding tube, go to
thepoint.lww.com/Brunner15e.

PROMOTING HOME, COMMUNITY-BASED, AND TRANSITIONAL CARE

 **Educating Patients About Self-Care.** The patient with a gastrostomy or jejunostomy tube in the home setting must be capable of maintaining patency of the tube or have a caregiver who can do so. The nurse assesses the patient's level of knowledge and interest in learning about the tube, as well as an ability to understand how to flush, provide site care, and administer feedings or facilitate decompression and drainage. Education is similar to that described earlier. To facilitate self-care, the nurse encourages the patient to participate in flushing the tube, administering medications and tube feedings during hospitalization, and establishing as normal a routine as possible.

Adapters are available that can be secured to the end of the tube to create a "Y" site for ease of flushing, suction, or medication delivery. The flushing equipment is cleaned with warm, soapy water and rinsed after each use. The tube can be marked at skin level to provide the patient with a baseline for later comparison. The patient or caregiver should be advised to monitor the tube's length and to notify the primary provider or home care nurse if the segment of the tube outside the body becomes shorter or longer.

Chart 39-7 HOME CARE CHECKLIST

The Patient Receiving Tube Feeding

At the completion of education, the patient and/or caregiver will be able to:

- Name the procedure that was performed and identify any permanent changes in anatomic structure or function as well as changes in ADLs, IADLs, roles, relationships, and spirituality.
- State what types of changes are needed (if any) to maintain a clean home environment and prevent infection.
- State how to contact the primary provider, the team of home care professionals overseeing care, and tube feeding supply vendor.
 - List emergency phone numbers.
- State how to obtain medical supplies and carry out dressing changes, site care, and other prescribed regimens.
- Demonstrate how to perform site care.
- Demonstrate how to prepare tube feeding.
- Demonstrate how to deliver tube feeding via prescribed method (e.g., bolus method, intermittent drip method, continuous feeding).
 - When indicated, demonstrate how to operate, disconnect, and clean the tube feeding pump.
 - When indicated, demonstrate tube maintenance functions.
 - Flush before and after bolus and intermittent feeding and medication administration
 - Flush every 4 hours with continuous feeding
 - Flush once daily if tube is not being used
- Demonstrate how to record all fluid intake and output.
- Identify a plan for operation of tube feeding pump during a power outage or other emergency.
- State the name, dose, side effects, frequency, and schedule for all medications.
- Demonstrate medication preparation and administration via bolus method, with flushing before, after and between medications.
- Identify possible tube feeding complications and interventions.
- Relate how to reach primary provider with questions or complications.
- State time and date of follow-up appointments and testing.
- State understanding of community resources and referrals (if any).
- Identify the need for health promotion (e.g., weight reduction, smoking cessation, stress management), disease prevention and screening activities.

ADLs, activities of daily living; IADLs, instrumental activities of daily living.

Continuing and Transitional Care. Referral to home, community-based, or transitional care is important to ensure initial supervision and support for the patient and caregiver. The nurse assesses the patient's status and progress and evaluates the care of the tube and healing status of the tube insertion site. Further instruction and supervision in the home setting may be required to help the patient and caregiver adapt to a physical environment and equipment that are different from the hospital setting (see [Chart 39-7](#)). The nurse also reviews with the patient and caregiver what

complications to report and assists the patient and family in establishing as normal a routine as possible.

Evaluation

Expected patient outcomes may include:

1. Achieves nutrition goals
 - a. Attains weight goal
 - b. Tolerates tube feeding prescription without nausea, emesis, cramping, abdominal pain, or feelings of early satiety
 - c. Has acceptable bowel movements without constipation or large-volume liquid stools
 - d. Has normal plasma protein, glucose, vitamin, and mineral levels
 - e. Has normal electrolyte values
2. Is free of infection at enteral access site
 - a. Is afebrile
 - b. Has no induration, redness, pain, or purulent drainage
 - c. Has no scattered papules indicative of a yeast infection
3. Has dry, intact skin surrounding enteral access site
 - a. No evidence of excessive drainage or bleeding
 - b. No skin breakdown or hypertrophic tissue growth
4. Adjusts to change in body image
 - a. Is able to discuss expected changes
 - b. Verbalizes concerns
5. Demonstrates skill in tube care
 - a. Handles equipment competently
 - b. Successfully maintains tube patency
 - c. Keeps an accurate record of intake and output
 - d. Demonstrates how to gently wash tube site daily and keep clean and dry
6. Avoids other complications
 - a. Exhibits adequate wound healing
 - b. Tube remains intact and is routinely replaced for the duration of therapy

DISORDERS OF THE ESOPHAGUS

The esophagus is a mucus-lined, muscular tube that carries food from the mouth to the stomach. It begins at the base of the pharynx and ends about 4 cm below the diaphragm. Its ability to transport food and fluid is facilitated by two sphincters. The upper esophageal sphincter, also called the *hypopharyngeal sphincter*, is located at the junction of the pharynx and the esophagus. The lower esophageal sphincter, also called the *gastroesophageal sphincter* or *cardiac sphincter*, is located at the junction of the esophagus and the stomach. An incompetent lower esophageal sphincter allows reflux (backward flow) of gastric contents. Because there is no serosal layer of the esophagus, if surgery is necessary, it is more difficult to perform suturing or anastomosis.

Disorders of the esophagus include motility disorders (achalasia, spasms), hiatal hernias, diverticula, perforation, foreign bodies, chemical burns, gastroesophageal reflux disease, Barrett esophagus (BE), benign tumors, and carcinoma. Dysphagia, the most

common symptom of esophageal disease, may vary from an uncomfortable feeling that a bolus of food is caught in the upper esophagus to acute **odynophagia** (pain on swallowing). Obstruction of food (solid and soft) and even liquids may occur anywhere along the esophagus. Often, the patient can indicate that the problem is located in the upper, middle, or lower third of the esophagus.

Achalasia

Achalasia is absent or ineffective peristalsis of the distal esophagus accompanied by failure of the esophageal sphincter to relax in response to swallowing. Narrowing of the esophagus just above the stomach results in a gradually increasing dilation of the esophagus in the upper chest. Achalasia is rare, may progress slowly, and occurs most often in people between ages 20 and 40 and ages 60 and 70 years (Swanström, 2019).

Clinical Manifestations

The main symptom is dysphagia, with the hallmark being difficulty with solid food. The patient has a sensation of food sticking in the lower portion of the esophagus. As the condition progresses, food is commonly regurgitated either spontaneously or intentionally by the patient to relieve the discomfort produced by prolonged distention of the esophagus by food that will not pass into the stomach. The patient may also report noncardiac chest or epigastric pain and **pyrosis** (heartburn) that may or may not be associated with eating. These symptoms mirror those of GERD, and patients are often misdiagnosed and treated for GERD (Swanström, 2019).

Assessment and Diagnostic Findings

X-ray studies show esophageal dilation above the narrowing at the lower gastroesophageal sphincter, which is called a *birds beak* deformity. Barium swallow, CT scan of the chest, and endoscopy may be used for diagnosis; however, high-resolution manometry, a process in which peristalsis, contraction amplitudes, and esophageal pressure is measured by a radiologist or gastroenterologist, confirms the diagnosis (Swanström, 2019).

Management

The patient is instructed to eat slowly and to drink fluids with meals. Injection of botulinum toxin into quadrants of the esophagus via endoscopy has been helpful because it inhibits the contraction of smooth muscle. However, because the benefits of these injections fade over time and there is a risk of submucosal fibrosis, botulinum toxin is only used in patients who cannot receive other definitive treatments (Swanström, 2019).

Achalasia may be treated conservatively by pneumatic dilation to stretch the narrowed area of the esophagus (see Fig. 39-9). Pneumatic dilation has a high success rate; however, typically two dilations are required and the long-term results are variable (Swanström, 2019). Although perforation is a potential complication, its incidence is low (see later discussion). The procedure can be painful; therefore, moderate sedation in the form of an analgesic or tranquilizer, or both, is given for the treatment.

Achalasia may be treated surgically by esophagomyotomy, called a Heller myotomy, which involves cutting the esophageal muscle fibers. A complete lower esophageal sphincter myotomy is usually performed laparoscopically, with or without a *fundoplication* (antireflux procedure that minimizes the incidence of GERD). A newer technique, an endoscopic myotomy (per-oral endoscopic myotomy [POEM]) provides an alternative procedure that has been adopted by many high-volume achalasia centers (Swanström, 2019).

Esophageal Spasm

The three types of esophageal spasm include jackhammer esophagus, diffuse esophageal spasm (DES), and type III (spastic) achalasia. In jackhammer esophagus, referred to as hypercontractile esophagus, spasms occur on more than 20% of swallows at a very high amplitude, duration, and length. In DES, the spasms are normal in amplitude but are premature/uncoordinated, move quickly, and occur at various places in the esophagus at once. Type III achalasia is characterized by lower esophageal sphincter obstruction with esophageal spasms (Clermont & Ahuja, 2018).

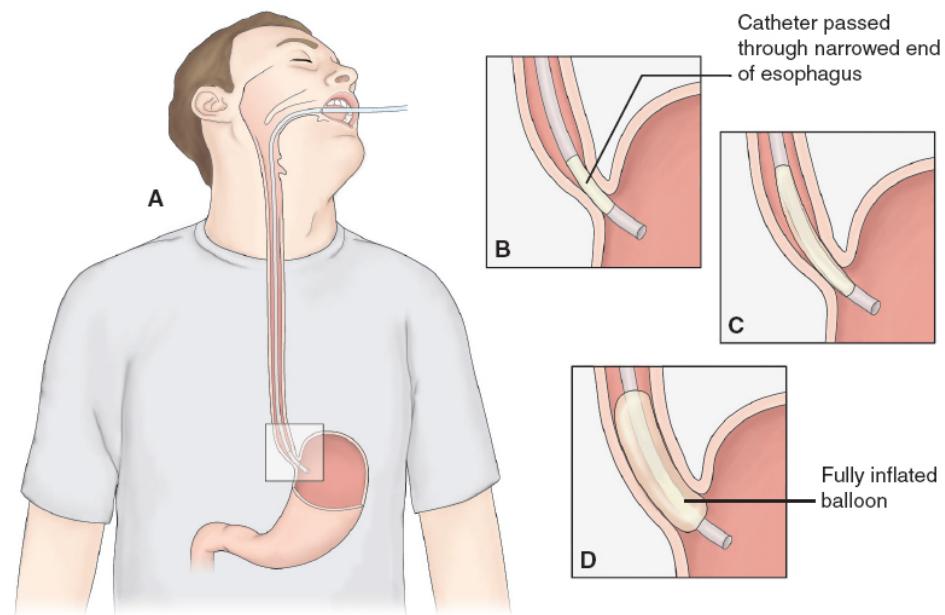


Figure 39-9 • Treatment of achalasia by pneumatic dilation. **A–C.** The dilator is passed, guided by a previously inserted guide wire. **D.** When the balloon is in proper position, it is distended by pressure sufficient to dilate the narrowed area of the esophagus.

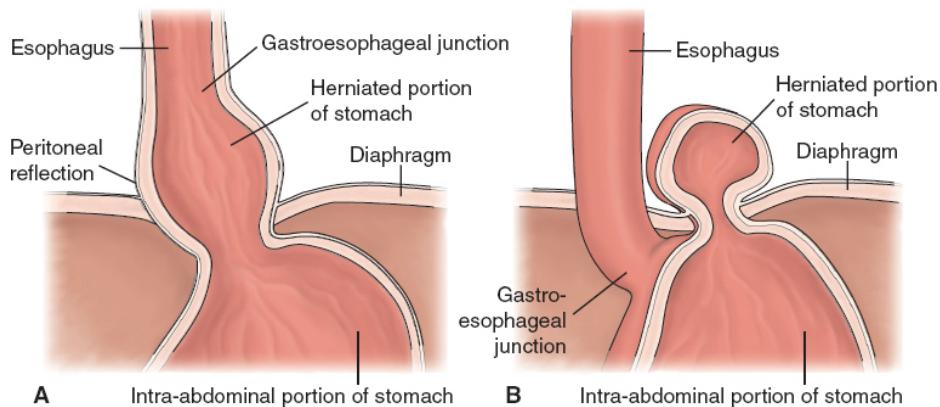


Figure 39-10 • A. Sliding esophageal hernia. The upper stomach and gastroesophageal junction have moved upward and slide in and out of the thorax. **B.** Paraesophageal hernia. All or part of the stomach pushes through the diaphragm next to the gastroesophageal junction.

Clinical Manifestations

All three forms of esophageal spasm are characterized by dysphagia, pyrosis, regurgitation, and chest pain similar to that of coronary artery spasm.

Assessment and Diagnostic Findings

Esophageal manometry, which measures the motility and internal pressure of the esophagus, remains the standard test for irregular and high-amplitude spasms.

Management

In all three spastic disorders, smooth muscle relaxants such as calcium channel blockers and nitrates may be used to reduce the pressure and amplitude of contractions. Like the treatment for achalasia, botulinum toxin may be used in specific frail patients who cannot tolerate other interventions. Proton pump inhibitors (PPIs) may also be indicated, especially if symptoms of GERD are present (Clermont & Ahuja, 2018). Small, frequent feedings and a soft diet are usually recommended to decrease the esophageal pressure and irritation that lead to spasm. If conservative therapies do not provide relief, Heller myotomy or POEM may be tried (Clermont & Ahuja, 2018). Since many patients also experience GERD, surgical procedures that also address GERD may be beneficial (see later discussion).

Hiatal Hernia

In the condition known as **hiatal hernia**, the opening in the diaphragm through which the esophagus passes becomes enlarged, and part of the upper stomach moves up into the lower portion of the thorax. Hiatal hernia occurs more often in women than in men. There are two main types of hiatal hernias: sliding and paraesophageal. Sliding, or type I, hiatal hernia occurs when the upper stomach and the gastroesophageal junction are displaced upward and slide in and out of the thorax (see Fig. 39-10A). Between 90% and 95% of

patients with esophageal hiatal hernia have a sliding hernia. A paraesophageal hernia occurs when all or part of the stomach pushes through the diaphragm beside the esophagus (see Fig. 39-10B). Paraesophageal hernias are further classified as types II, III, or IV, depending on the extent of herniation. Type IV has the greatest herniation, with other intra-abdominal viscera such as the colon, omentum, or small bowel present in the hernia sac that is displaced through the hiatus along with the stomach (Huerta, Plymale, Barrett, et al., 2019).

Clinical Manifestations

The patient with a sliding hernia may have pyrosis, regurgitation, and dysphagia, but many patients are asymptomatic. The patient may present with vague symptoms of intermittent epigastric pain or fullness after eating. Large hiatal hernias may lead to intolerance to food, nausea, and vomiting. Sliding hiatal hernias are commonly associated with GERD. Hemorrhage, obstruction, volvulus (bowel obstruction caused by a twist in the intestines and supporting mesentery), and strangulation can occur with any type of hernia but are more common with paraesophageal hernia (Huerta et al., 2019).

Assessment and Diagnostic Findings

Diagnosis is typically confirmed by x-ray studies; barium swallow; esophagogastroduodenoscopy (EGD), which is the passage of a fiberoptic tube through the mouth and throat into the digestive tract for visualization of the esophagus, stomach, and small intestine; esophageal manometry; or chest CT scan (Kohn, Price, Demeester, et al., 2013).

Management

Management for a hiatal hernia includes frequent, small feedings that can pass easily through the esophagus. The patient is advised not to recline for 1 hour after eating, to prevent reflux or movement of the hernia, and to elevate the head of the bed on 4- to 8-inch (10- to 20-cm) blocks to prevent the hernia from sliding upward. Surgical hernia repair is indicated in patients who are symptomatic, although the primary reason for the surgery is typically to relieve GERD symptoms and not repair the hernia. Current guidelines recommend a laparoscopic approach (Toupet or Nissen fundoplication procedures) (Huerta et al., 2019), with an open transabdominal or transthoracic approach reserved for patients with complications such as bleeding, dense adhesions, or injury to the spleen.

Up to 50% of patients may experience early postoperative dysphagia; therefore, the nurse advances the diet slowly from liquids to solids, while managing nausea and vomiting, tracking nutritional intake, and monitoring weight. The nurse also monitors for postoperative belching, vomiting, gagging, abdominal distention, and epigastric chest pain, which may indicate the need for surgical revision; these should be reported immediately to the primary provider. Surgical repair is often reserved for patients with more extreme cases that involve gastric outlet obstruction or suspected gastric strangulation, which may result in ischemia, necrosis, or perforation of the stomach (Kohn et al., 2013).

Diverticulum

An esophageal diverticulum is an out-pouching of mucosa and submucosa that protrudes through a weak portion of the musculature of the esophagus. Diverticula may occur in one of the three areas of the esophagus—pharyngoesophageal (upper), midesophageal (middle), or epiphrenic (lower).

The most common type of diverticulum is Zenker diverticulum (ZD). Located in the pharyngoesophageal area, ZD is caused by a dysfunctional sphincter that fails to open, which leads to increased pressure that forces the mucosa and submucosa to herniate through the esophageal musculature (called a pulsion diverticulum) (Smith, 2015) (see Fig. 39-11). It is usually seen in people older than 60 years of age.

Midesophageal diverticula are uncommon. Symptoms are less acute, and usually the condition does not require surgery. Epiphrenic diverticula are usually larger diverticula in the lower esophagus just above the diaphragm. They may be related to the improper functioning of the lower esophageal sphincter or to motor disorders of the esophagus. Intramural diverticulosis is the occurrence of numerous small diverticula associated with a stricture in the upper esophagus.

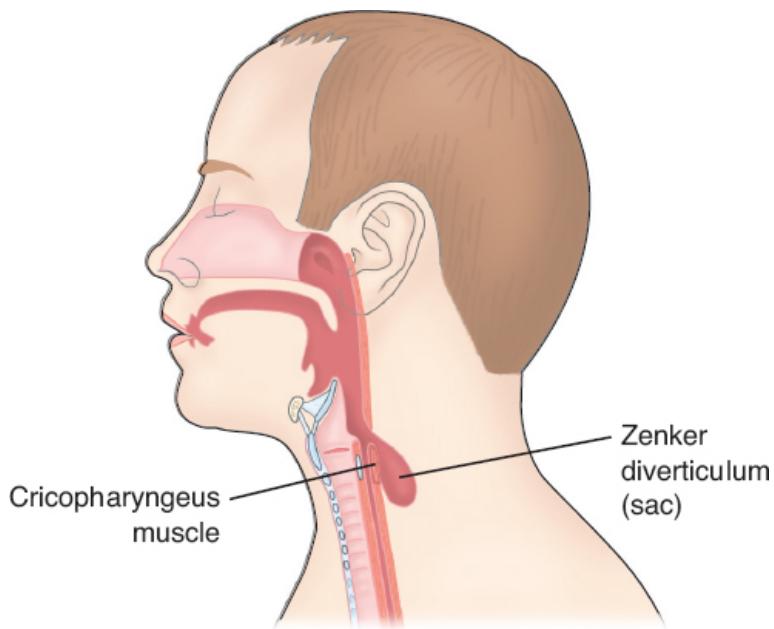


Figure 39-11 • Zenker diverticulum.

Clinical Manifestations

Symptoms experienced by the patient with a pharyngoesophageal pulsion diverticulum include dysphagia, fullness in the neck, belching, regurgitation of undigested food, and gurgling noises after eating. The diverticulum, or pouch, becomes filled with food or liquid. When the patient assumes a recumbent position, undigested food is regurgitated, and coughing may be caused by irritation of the trachea or aspiration. **Halitosis** (foul odor from the oral cavity) and a sour taste in the mouth are also common because of the decomposition of food retained in the diverticulum. Although less acute, dysphagia is the primary symptom in the other types of diverticula (Smith, 2015).

Assessment and Diagnostic Findings

A barium swallow may determine the exact nature and location of a diverticulum. Manometric studies may be performed for patients with epiphrenic diverticula to rule out a motor disorder. Esophagoscopy usually is contraindicated because of the danger of perforation of the diverticulum, with resulting mediastinitis (inflammation of the organs and tissues that separate the lungs). Blind insertion of an NG tube should be avoided.

Management

ZD can be treated by endoscopy (rigid or flexible) or open surgery. Endoscopic septotomy effectively treats ZD, with a recurrence rate of 11% to 30% of cases; POEM may be a better option as it is associated with a decreased risk of symptom recurrence (Gutierrez, Ichkhanian, Spadaccini, et al., 2019). If surgery is required, care is taken to avoid trauma to the common carotid artery and internal jugular veins. In addition to a diverticulectomy, a myotomy of the cricopharyngeal muscle is often performed to relieve spasticity of the musculature, which seems to contribute to a continuation of symptoms. An NG tube may be inserted at the time of surgery. Postoperatively, the nurse observes the incision for evidence of leakage from the esophagus and a developing fistula. Food and fluids are withheld until x-ray studies show no leakage at the surgical site. The diet begins with liquids and is progressed as tolerated.

Surgery is indicated for epiphrenic and midesophageal diverticula only if the symptoms are troublesome and becoming worse. Treatment consists of a diverticulectomy and long myotomy. Intramural diverticula usually regress after the esophageal stricture is dilated.

Perforation

Esophageal perforation is a surgical emergency. It may result from iatrogenic causes, such as endoscopy or intraoperative injury, or from spontaneous perforation associated with forceful vomiting or severe straining (Boerhaave syndrome), foreign-body ingestion, trauma, and malignancy. Immediate diagnosis and treatment are essential to minimize mortality. A delay of more than 24 hours is associated with higher mortality (20%) when compared to rapid recognition and treatment (7.4%). Perforation can occur at the cervical, thoracic, or abdominal portion of the esophagus (Olivero, 2019; Raymond, 2020).

Clinical Manifestations

The patient has excruciating retrosternal pain followed by dysphagia. Infection, fever, leukocytosis, and severe hypotension may be noted. In addition, mediastinal sepsis can occur with Boerhaave syndrome, which may be accompanied by pneumothorax and subcutaneous emphysema (see [Chapter 19](#) for discussion of pneumothorax and subcutaneous emphysema).

Assessment and Diagnostic Findings

X-ray studies, fluoroscopy by either a barium swallow or esophagram (a noninvasive test), or a chest CT scan may be used to identify the site and scope of the injury.

Management

Esophageal perforation requires immediate treatment. Treatment includes having the patient remain NPO (*nil per os*; nothing by mouth), beginning IV fluid therapy, administering broad-spectrum antibiotics (ampicillin-sulbactam, piperacillin-tazobactam, or a carbapenem [e.g., imipenem]), considering the need for antifungal therapy (if the patient is immunosuppressed, has HIV infection, or shows no improvement with antibiotics), supportive monitoring and care (intensive care unit level-of-care often required), and evaluating and preparing the patient for surgery (Raymond, 2020). Surgical repair of the perforation site is performed in most cases, even if the diagnosis is made after 24 hours. If surgical repair of the perforation is not possible due to the clinical status of the patient, then drainage, diversion, stent placement, or an esophagostomy (removal of the esophagus) may be performed (Raymond, 2020).

Postoperative nutritional status is a major concern. The patient remains NPO for approximately 7 days, so enteral (e.g., jejunal feeding) or parenteral nutrition is started on postoperative day 2 or 3 (see [Chapter 41](#) for further discussion of parenteral nutrition). The nurse uses water to moisten the patient's mouth for comfort measures only. A repeat esophagram is obtained on postoperative day 7 to verify there is no leak or ileus before the NG tube is removed and oral intake is permitted. It is common for broad-spectrum antibiotics to continue for 7 to 10 days postoperatively (Raymond, 2020).

Foreign Bodies

Many swallowed foreign bodies pass through the GI tract without the need for medical intervention. However, some swallowed foreign bodies (e.g., dentures, fish bones, pins, small batteries, items containing mercury or lead) may injure the esophagus or obstruct its lumen and must be removed. Pain and dysphagia may be present, and dyspnea may occur as a result of pressure on the trachea. The foreign body may be identified by x-ray. Perforation may have occurred (see earlier discussion).



Quality and Safety Nursing Alert

The nurse performs an initial and ongoing respiratory (airway-focused) assessment of a patient with a foreign body in the esophagus. Intubation may be required to protect the airway.

Glucagon, because of its relaxing effect on the esophageal muscle, may be injected IV (a 1-mg dose). A flexible endoscope and retrieval devices (e.g., forceps, graspers) may be used to remove the impacted food or object from the esophagus. Foreign bodies such as short-blunt objects, long objects, sharp-pointed objects, disc batteries, magnets, coins, or narcotic packets require special consideration (American Society for Gastrointestinal Endoscopy Standards of Practice Committee, 2011; Fung, Sweetser, Wong Kee Song, et al., 2019). Various devices can be used for endoscopic extraction (overtubes, forceps, snares, baskets, etc.) and dilation techniques can be used to facilitate the passage of foreign objects to the stomach. Decisions regarding the best course of action consider the likelihood of the object passing on its own (blunt, nontoxic objects), the patient's condition (airway maintenance), the length of time the obstruction has been present (typical intervention occurs within 24 hours), and the type of foreign object that is

impacted. For example, ingested drug packets are not removed by endoscopy for fear of packet rupture; no intervention or surgical intervention are recommended in these cases. The endoscopic procedure usually is performed in the endoscopy suite or clinic by the gastroenterologist under moderate sedation (Fung et al., 2019).

Chemical Burns

Chemical burns of the esophagus occur most often when a patient, either intentionally (67%; typically adults) or unintentionally (33%; typically children), swallows a strong acid or base, with alkaline agents being the most common (Byard, 2015). The patient is often emotionally distraught as well as in acute physical pain. Chemical burns of the esophagus may also be caused by undissolved medications in the esophagus, or they may occur after swallowing of a battery, which may release a caustic alkaline. The National Capital Poison Center (2018) provides an algorithm for button battery ingestion and triage (see Resources section). An acute chemical burn of the esophagus may be accompanied by severe burns of the lips, mouth, and pharynx, with pain on swallowing. Breathing difficulties due to either edema of the throat or a collection of mucus in the pharynx may occur. The patient needs to be closely monitored for tracheoesophageal fistula, perforation of large vessels, mediastinitis, vocal cord paralysis, tracheal stenosis or tracheomalacia, aspiration pneumonia, empyema, lung abscess, pneumothorax, spondylodiscitis, and strictures (National Capital Poison Center, 2018).

The patient, who may be profoundly toxic, febrile, and in shock, is treated immediately for shock, pain, and respiratory distress. Esophagoscopy and barium swallow are performed as soon as possible to determine the extent and severity of damage. Vomiting and gastric lavage are avoided to prevent further exposure of the esophagus to the caustic agent. Emergent esophagectomy (a total resection of the esophagus) or gastrectomy may be required (Byard, 2015). The patient remains NPO and IV fluids are given. The use of corticosteroids to reduce inflammation and minimize subsequent scarring and stricture formation is of questionable value. Antibiotics are prescribed if there is documented infection.

After the acute phase has subsided, the patient may need nutritional support via enteral or parenteral feedings. The patient may require further treatment to prevent or manage strictures of the esophagus. Dilation may be sufficient, but may need to be repeated periodically (see previous discussion). For strictures that do not respond to dilation, surgical management may be necessary. Reconstruction may be accomplished by esophagectomy and colon interposition to replace the portion of esophagus removed. This surgery is quite complex and should be considered only when other options have failed.

Gastroesophageal Reflux Disease

Gastroesophageal reflux disease (GERD) is a fairly common disorder marked by backflow of gastric or duodenal contents into the esophagus that causes troublesome symptoms and/or mucosal injury to the esophagus. Excessive reflux may occur because of an incompetent lower esophageal sphincter, pyloric stenosis, hiatal hernia, or a motility disorder. The incidence of GERD seems to increase with aging and is seen in patients with irritable bowel syndrome and obstructive airway disorder exacerbations (e.g., asthma, COPD, cystic fibrosis) (Broers & Tack, 2017; Gabel, Galante, & Freedman,

2019), BE (see later discussion), peptic ulcer disease, and angina. GERD is associated with tobacco use, coffee drinking, alcohol consumption, and gastric infection with *Helicobacter pylori*.

Clinical Manifestations

Pyrosis (heartburn, specifically more commonly described as a burning sensation in the esophagus that is noncardiac in nature) and regurgitation are the hallmark symptoms, but patients may also experience dyspepsia (indigestion), dysphagia or odynophagia, hypersalivation, and esophagitis. GERD can result in dental erosion, ulcerations in the pharynx and esophagus, laryngeal damage, esophageal strictures, adenocarcinoma, and pulmonary complications (Kroch & Madanick, 2017; Patti, 2016).

Assessment and Diagnostic Findings

The patient's history aids in obtaining an accurate diagnosis. Diagnostic testing may include ambulatory pH monitoring, which is the gold standard for the diagnosis of GERD, or a PPI trial. Ambulatory pH monitoring involves transnasal catheter placement or endoscopic wireless capsule placement for approximately 24 hours. Endoscopy or barium swallow is used to evaluate damage to the esophageal mucosa and rule out strictures and hernias (Patti, 2016).

Management

Management begins with educating the patient to avoid situations that decrease lower esophageal sphincter pressure or cause esophageal irritation. Lifestyle modifications include tobacco cessation, limiting alcohol, weight loss, elevating the head of the bed, avoiding eating before bed, and altering the diet (Kroch & Madanick, 2017). See [Table 39-4](#) for a list of medications commonly used to manage GERD.

If medical management is unsuccessful, surgical intervention may be necessary. Surgical management involves an open or laparoscopic Nissen fundoplication, which involves wrapping of a portion of the gastric fundus around the sphincter area of the esophagus (Huerta et al., 2019; Patti, 2016).

Barrett Esophagus

BE is a condition in which the lining of the esophageal mucosa is altered. It occurs predominantly in White men aged 50 or older, and occurs in association with family history of BE or esophageal adenocarcinoma (EAC), GERD, smoking, and obesity. The rate of BE was found to increase by 1.2% for each additional risk factor, indicating the additive effect of risk factors (Qumseya, Bukannan, Gendy, et al., 2019). BE is the only known precursor to EAC, one of the fastest rising cancers in Western populations (Qumseya et al., 2019). The 5-year survival rate for EAC does not exceed 20% (Iyer & Kaul, 2019; Qumseya et al., 2019).

Clinical Manifestations

The patient complains of symptoms of GERD, notably frequent heartburn. The patient may also complain of symptoms related to peptic ulcers or esophageal stricture, or both.

Assessment and Diagnostic Findings

An EGD provides screening in patients with multiple risk factors. This usually reveals an esophageal lining that is pink rather than pale white. Biopsies are performed, and BE is diagnosed when the squamous mucosa of the esophagus is replaced by columnar epithelium (columnar metaplasia) at least 1 cm above the gastric folds, and that area resembles that of the stomach or intestines (intestinal metaplasia) as evidenced by the presence of goblet cells (Iyer & Kaul, 2019).

Management

Monitoring varies depending on the extent of cell changes. When BE is caught and treated early, endoscopic ablation techniques have been shown to eliminate BE in up to 80% of patients, thereby preventing progression to **dysplasia**, the bizarre cell growth resulting in cells that differ in size, shape, or arrangement from other cells of the same tissue type. Such dysplasia is indicative of early EAC. Follow-up biopsies are recommended no sooner than 3 to 5 years after a biopsy shows no evidence of dysplasia (Iyer & Kaul, 2019; Sharma, Katzka, Gupta, et al., 2015). Treatment is individualized for each patient. Recommendations include surveillance with biopsies, the use of PPIs (see [Table 39-4](#)) to control reflux symptoms, followed by endoscopic resection and/or radiofrequency ablation (high-frequency heat/cold energy that kills surrounding cells and tissues) for progression of dysplasia (Iyer & Kaul, 2019; Sharma et al., 2015).

Benign Tumors of the Esophagus

Benign tumors are rare, but can arise anywhere along the esophagus. The most common lesion is a leiomyoma (tumor of the smooth muscle), which can occlude the lumen of the esophagus and cause dysphagia, pain, and pyrosis. Half of patients with benign tumors are asymptomatic and the other half present with multiple symptoms that have been present for a long period of time. The diagnosis may be made incidentally and is confirmed by endoscopy and needle biopsy. Due to the slow growth of most of these tumors, monitoring and minimally invasive techniques (endoscopic, thoracic, or laparoscopic resections) tend to be indicated rather than surgical resection (Ha, Regan, Cetindag, et al., 2015).

TABLE 39-4

Pharmacologic Management of GERD

Key Examples	Actions/Class	Key Nursing Considerations
Antacids/Acid neutralizing agents <ul style="list-style-type: none"> • Calcium carbonate • Aluminum hydroxide, magnesium hydroxide, and simethicone • Alginate 	Neutralize acid <i>Therapeutic and Pharmacologic class</i> —Antacid	<ul style="list-style-type: none"> • Potential risk of gastric acid suppression is the loss of protective flora and an increased risk of infection, especially <i>Clostridium difficile</i>
Histamine-2 (H₂) receptor antagonists <ul style="list-style-type: none"> • Famotidine • Cimetidine 	Decrease gastric acid production <ul style="list-style-type: none"> • <i>Therapeutic class</i>—Antilulcer drugs • <i>Pharmacologic class</i>—H₂-receptor antagonists 	<ul style="list-style-type: none"> • Potential risk of gastric acid suppression is the loss of protective flora and an increased risk of infection, especially <i>Clostridium difficile</i> • For direct injection (IVP), dilute 2 mL (20 mg) with compatible solution to a total volume of either 5 or 10 mL; administer over at least 2 min • Monitor for QT-interval prolongation in patients with kidney injury
Prokinetic agents Metoclopramide	Accelerate gastric emptying <i>Therapeutic class</i> —GI stimulants <i>Pharmacologic class</i> —Dopamine antagonist	<ul style="list-style-type: none"> • May cause tardive dyskinesia • Typically used short term
Proton pump inhibitors (PPIs) First-line drugs used <ul style="list-style-type: none"> • Pantoprazole • Omeprazole • Esomeprazole • Lansoprazole • Rabeprazole • Dexlansoprazole 	Decrease gastric acid production <i>Therapeutic class</i> —Antilulcer drugs <i>Pharmacologic class</i> —Proton pump inhibitors	<ul style="list-style-type: none"> • Potential risk of gastric acid suppression is the loss of protective flora and an increased risk of infection, especially <i>Clostridium difficile</i> • For a 2-min infusion (IVP), give the reconstituted vials (4 mg/mL) over at least 2 min • May increase the risk of hip fractures and interfere with some vitamin and mineral absorption (B₁₂, iron, magnesium) • Interact with commonly prescribed medications such as diuretics and clopidogrel
Reflux inhibitors Bethanechol chloride	Stimulates parasympathetic	<ul style="list-style-type: none"> • Primary use is for urinary retention

	<i>Therapeutic and Pharmacologic class</i> —Cholinergic	Do not use with possible GI obstruction or peptic ulcer
Surface agents/Alginate-based barriers Sucralfate	Preserve mucosal barrier <i>Therapeutic class</i> — Antiulcer drugs <i>Pharmacologic class</i> — GI protectants	<ul style="list-style-type: none"> Give on an empty stomach—either one hour before or two hours after meals Separate from doses of antacid by 30 min
Inhibitors of transient lower esophageal sphincter relaxations (TLESRs) Baclofen	Reducing TLESRs to reduce reflux <i>Therapeutic class</i> — Muscle relaxant <i>Pharmacologic class</i> — gamma-aminobutyric acid (GABA) agonist	<ul style="list-style-type: none"> Only approved GABA-B agonist that reduces TLESRs Used when PPI therapy fails

GI, gastrointestinal; IVP, intravenous push.

Adapted from Kroch, D. A., & Madanick, R. D. (2017). Medical treatment of gastroesophageal reflux disease. *World Journal of Surgery*, 41(7), 1678–1684; Whalen, K. (2019). *Pharmacology* (7th ed.). Philadelphia, PA: Wolters Kluwer.

NURSING PROCESS

The Patient with a Noncancerous Disorder of the Esophagus

Assessment

Emergency disorders of the esophagus (perforation, chemical burns) usually occur in the home or away from medical help and require emergency medical care. The patient is treated for shock and respiratory distress and transported as quickly as possible to a health care facility. Foreign bodies in the esophagus do not pose an immediate threat to life unless pressure is exerted on the trachea, resulting in dyspnea or interfering with respiration, or unless there is leakage of caustic alkali from a battery or exposure to another corrosive agent.

For nonemergency symptoms, a complete health history may reveal the nature of the esophageal disorder. The nurse asks about the patient's appetite. Has it remained the same, increased, or decreased? Is there any discomfort with swallowing? If so, does it occur only with certain foods? Is it associated with pain? Does a change in position affect the discomfort? The patient is asked to describe the pain. Does anything aggravate it? Are there any other symptoms that occur regularly, such as regurgitation, nocturnal regurgitation, eructation (belching), pyrosis, substernal pressure, a sensation that food is sticking in the throat, a feeling of fullness after eating a small amount of food, nausea, vomiting, or weight loss? Are the symptoms aggravated by emotional upset? If the patient reports any of these symptoms, the nurse asks about when they occur, their relationship to eating, and factors that relieve or aggravate them (e.g., position change, belching, antacids, vomiting; Bickley, 2016).

This history also includes questions about past or present causative factors, such as infections and chemical, mechanical, or physical irritants; alcohol and tobacco use; and the amount of daily food intake. The nurse determines whether the patient appears emaciated and auscultates the patient's chest to assess for pulmonary complications (Bickley, 2016).

Diagnosis

NURSING DIAGNOSES

Based on the assessment data, nursing diagnoses may include the following:

- Impaired nutritional intake associated with difficulty swallowing
- Risk for aspiration associated with difficulty swallowing or tube feeding
- Acute pain associated with difficulty swallowing, ingestion of an abrasive agent, tumor, or frequent episodes of gastric reflux
- Lack of knowledge about the esophageal disorder, diagnostic studies, medical management, surgical intervention, and rehabilitation

Planning and Goals

The major goals for the patient may include attainment of adequate nutritional intake, avoidance of respiratory compromise from aspiration, relief of pain, and increased knowledge level.

Nursing Interventions

ENCOURAGING ADEQUATE NUTRITIONAL INTAKE

The patient is encouraged to eat slowly and to chew all food thoroughly so that it can pass easily into the stomach. Small, frequent feedings of nonirritating foods are

recommended to promote digestion and to prevent tissue irritation. Sometimes liquid swallowed with food helps the food pass through the esophagus, but usually liquids should be consumed between meals. Food should be prepared in an appealing manner to help stimulate the appetite. Irritants such as tobacco and alcohol should be avoided. A baseline weight is obtained, and daily weights are recorded. The patient's intake of nutrients is assessed.

DECREASING RISK OF ASPIRATION

The patient who has difficulty swallowing or difficulty managing secretions should be kept in at least a semi-Fowler position to decrease the risk of aspiration. The patient is instructed in the use of oral suction to decrease the risk of aspiration further.

RELIEVING PAIN

Small, frequent feedings (6 to 8 per day) are recommended because large quantities of food overload the stomach and promote gastric reflux. The patient is advised to avoid any activities that increase pain and to remain upright for 1 to 4 hours after each meal to prevent reflux. The head of the bed should be placed on 4- to 8-inch (10- to 20-cm) blocks. Eating before bedtime is discouraged.

The patient is advised that excessive use of over-the-counter antacids can cause rebound acidity. Antacid use should be directed by the primary provider, who can recommend the daily, safe dose needed to neutralize gastric juices and prevent esophageal irritation. H₂-antagonists or PPIs (more commonly) are given as prescribed to decrease gastric acid irritation.



PROVIDING PATIENT EDUCATION

The patient is prepared physically and psychologically for diagnostic tests, treatments, and possible surgery. Nursing interventions include reassuring the patient and explaining the procedures and their purposes. Some disorders of the esophagus evolve over time, whereas others are the result of trauma (e.g., chemical burns, perforation). In instances of trauma, the emotional and physical preparation for treatment is more difficult because of the short time available and the circumstances of the injury. Treatment interventions must be evaluated continually, and the patient is given sufficient information to participate in care and diagnostic tests. If endoscopic diagnostic methods are used, the patient is instructed regarding the moderate sedation that will be used during the procedure. If outpatient procedures are performed with the use of moderate sedation, someone must be available to drive the patient home after the procedure. If surgery is required, immediate and long-term evaluation is similar to that for a patient undergoing thoracic surgery.

PROMOTING HOME, COMMUNITY-BASED, AND TRANSITIONAL CARE



Educating Patients About Self-Care. The self-care required of the patient depends on the nature of the disorder and on the surgery or treatment measures used (e.g., diet, positioning, medications). If an ongoing condition exists, the nurse helps the patient plan for needed physical and psychological adjustments and for follow-up care (see [Chart 39-8](#)).

Special equipment, such as suction or enteral or parenteral feeding devices, may be required. The patient may need assistance in planning meals, using medications as prescribed, and resuming activities. Education about nutritional requirements and how to measure the adequacy of nutrition is important. Older adults and patients who are

debilitated in particular often need assistance and education about ways they can adjust to their limitations and resume activities that are important to them.

Continuing and Transitional Care. Patients with chronic esophageal conditions require an individualized approach to their management at home. Foods may need to be prepared in a special way (blenderized foods, soft foods), and the patient may need to eat more frequently (e.g., 6 to 8 small servings per day). The medication schedule is adjusted to the patient's daily activities as much as possible. Analgesic medications and antacids can usually be taken as needed every 3 to 4 hours.

Postoperative home health care focuses on nutritional support, management of pain, and respiratory function. Some patients are discharged from the hospital with enteral feeding by means of a gastrostomy or jejunostomy tube, or parenteral nutrition. The patient and caregiver need specific instructions regarding management of the equipment and treatments. Home care visits by a nurse may be necessary to assess the patient and the caregiver's ability to provide the necessary care. A multidisciplinary team that includes a dietitian, a social worker, and family members is helpful. Hospice care and consideration of end-of-life issues are appropriate for some patients.

Chart 39-8



HOME CARE CHECKLIST

The Patient with an Esophageal Disorder

At the completion of education, the patient and/or caregiver will be able to:

- State the impact of the esophageal disorder and treatment on physiologic functioning, ADLs, IADLs, body image, roles, relationships, and spirituality.
- Identify modification of home environment, interventions, and strategies (e.g., utilizing durable medical equipment, employing a home health aide) used in safely adapting to changes in structure or function and promote effective recovery and rehabilitation.
- Describe ongoing therapeutic regimen, including diet and activities to perform (e.g., suctioning) and to limit or avoid (e.g., oral foods if NPO).
 - Identify foods or therapies necessary to meet caloric needs and dietary needs (e.g., change in consistency, seasoning limitations, supplements, enteral or parenteral therapy).
 - Participate in prescribed therapy (e.g., speech therapy) to promote recovery and rehabilitation.
 - Demonstrate the use of suction equipment if indicated.
 - Demonstrate care of incision if indicated.
- State the name, dose, side effects, frequency, and schedule for all medications.
 - Describe approaches to controlling pain (e.g., take analgesics as prescribed; use nonpharmacologic interventions).
- Identify possible complications (e.g., difficulty swallowing, pain, respiratory distress) and interventions.
- Relate how to reach primary provider with questions or complications.
- State time and date of follow-up medical appointments, therapy, and testing.
- Identify sources of support (e.g., friends, relatives, faith community, cancer support, caregiver support).
- Identify the need for health promotion, disease prevention, and screening activities.

ADLs, activities of daily living; IADLs, instrumental activities of daily living; NPO, nothing by mouth.

Evaluation

Expected patient outcomes may include:

1. Achieves an adequate nutritional intake
 - a. Eats small, frequent meals
 - b. Drinks small sips of water with small servings of food
 - c. Avoids irritants (alcohol, tobacco, very hot beverages)
 - d. Maintains optimal weight
2. Does not aspirate or develop pneumonia
 - a. Maintains upright position during feeding
 - b. Uses oral suction equipment effectively
3. Is free of pain or able to control pain within a tolerable level
 - a. Avoids large meals and irritating foods

- b. Takes medications as prescribed and with adequate fluids (at least 4 oz), and remains upright for at least 10 minutes after taking medications
 - c. Maintains an upright position after meals for 1 to 4 hours
 - d. Reports that there is less eructation (belching) and chest pain
4. Increases knowledge level of esophageal condition, diagnostic tests, treatment, and prognosis
- a. States cause of condition
 - b. Discusses rationale for medical or surgical management and diet or medication regimen
 - c. Describes treatment program
 - d. Practices preventive measures so that injuries are avoided

Cancer of the Esophagus

In the United States, there are about 18,440 newly diagnosed cases of carcinoma of the esophagus annually; of these, 14,350 are men and 4,090 are women. Adenocarcinoma is more common among Whites, and squamous cell carcinoma is more frequently seen in African Americans. In the 1960s and 1970s, only about 5% of patients diagnosed with esophageal cancer survived at least 5 years. Today, survival rates are approximately 20% at the 5-year mark (ACS, 2021a).

Pathophysiology

Esophageal cancer can be of two cell types: adenocarcinoma and squamous cell carcinoma. The rate of adenocarcinoma is rapidly increasing in the United States as well as in other Western countries. It is found primarily in the distal esophagus and gastroesophageal junction (ACS, 2021a).

Risk factors for esophageal cancer include chronic esophageal irritation or GERD. In the United States, cancer of the esophagus has been associated with ingestion of alcohol and the use of tobacco. There is an apparent association between GERD and adenocarcinoma of the esophagus. Patients with BE (see previous discussion of risks) have a higher incidence of esophageal cancer (Iyer & Kaul, 2019; Sharma et al., 2015). Risk factors for squamous cell carcinoma of the esophagus include chronic ingestion of hot liquids or foods, nutritional deficiencies, poor oral hygiene, exposure to nitrosamines in the environment or food, cigarette smoking or chronic alcohol exposure (especially in Western cultures), and some esophageal medical conditions such as caustic injury.

Early stages of esophageal cancer are limited to the mucosa or submucosa; these stages of cancer have a 5-year survival rate of about 90% (Levine & Rubesin, 2012). In later stages, tumor cells of adenocarcinoma and of squamous cell carcinoma may spread beneath the esophageal mucosa or directly into, through, and beyond the muscle layers into the lymphatics. Obstruction of the esophagus is noted, with possible perforation into the mediastinum and erosion into the great vessels (Levine & Rubesin, 2012).

Clinical Manifestations

Many patients have an advanced ulcerated lesion of the esophagus before symptoms manifest. Symptoms include dysphagia, initially with solid foods and eventually with

liquids; a sensation of a mass in the throat; painful swallowing; substernal pain or fullness; and, later, regurgitation of undigested food with halitosis and hiccups. The patient first becomes aware of intermittent and increasing difficulty in swallowing. As the tumor grows and the obstruction becomes nearly complete, even liquids cannot pass into the stomach. Regurgitation of food and saliva occurs, hemorrhage may take place, and progressive loss of weight and strength occurs from inadequate nutrition. Later symptoms include substernal pain, persistent hiccup, respiratory difficulty, and halitosis.

The delay between the onset of early symptoms and the patient seeking medical advice is often 12 to 18 months. Any person having swallowing difficulties should be encouraged to consult the primary provider immediately.

Assessment and Diagnostic Findings

Several imaging techniques may provide useful diagnostic information. A CT scan of the chest and abdomen is beneficial for detecting any anatomic evidence of metastatic disease, especially of the lungs, liver, and kidney. A PET scan may also help detect metastasis. Endoscopic ultrasound is used to determine whether the cancer has spread to the lymph nodes and other mediastinal structures; it can also determine the size and invasiveness of the tumor. Exploratory laparoscopy is the best method for finding positive lymph nodes in patients with distal lesions (Cools-Lartigue, Molena, & Gerdes, 2018).

Future diagnostic techniques that may serve as predictors for dysplastic progression in patients with BE involve molecular markers. Some data have shown that a small percentage of people may have a genetic predisposition to esophageal cancer. Researchers have identified several biomarkers with strong potential to predict outcomes in esophageal cancer, but none of these biomarkers are currently recommended or clinically available (Iyer & Kaul, 2019). The usefulness of molecular markers in treating esophageal cancer continues to be researched.

Medical Management

If esophageal cancer is detected at an early stage, treatment goals may be directed toward cure; however, it is often detected in late stages, making relief of symptoms the only reasonable goal of therapy. Treatment may include surgery, radiation, chemotherapy, or a combination of these modalities, depending on the type of cancer cell, the extent of the disease, and the patient's condition. A standard treatment plan for a patient who is newly diagnosed with esophageal cancer will vary depending on the staging but may include: endoscopic resection, chemoradiation followed by surgery, chemotherapy followed by surgery, surgery alone, definitive chemoradiation, or palliative measures (NCI, 2021a).

Although minimally invasive surgery may be possible in some cases, standard surgical management includes esophagectomy with removal of the tumor plus a wide tumor-free margin of the esophagus and the lymph nodes in the area. Variations on the original esophagectomy preserve nerves, employ less invasive techniques, and target specific areas of the esophagus (Schlottmann, Molena, & Patti, 2018). The surgical approach may be through the neck, thorax and/or the abdomen, depending on the location of the tumor. When tumors occur in the cervical or upper thoracic area, and the stomach cannot be mobilized, pulled up, and anastomosed to the esophagus, esophageal continuity may be maintained by performing a colon graft transfer, in which the tumor is removed and the area is replaced with a portion of the colon (see Fig. 39-12). In many of these cases, a feeding tube is placed in the jejunum during surgery for feeding (Schlottman et al., 2018).

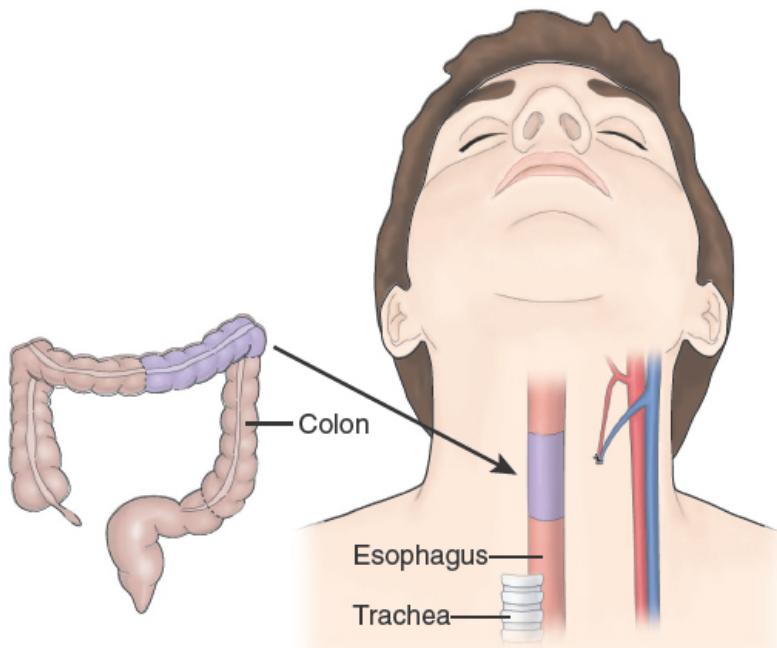


Figure 39-12 • Esophageal reconstruction with colonic interposition. A portion of the colon is grafted between the esophagus and pharynx to replace the abnormal portion of the esophagus. The vascular structures are also anastomosed.

Tumors of the lower thoracic esophagus are more amenable to surgery than are tumors located higher in the esophagus. GI tract integrity is maintained by anastomosing the lower esophagus to the stomach (see Fig. 39-13).

Surgical resection of the esophagus has a relatively high mortality rate because of infection, pulmonary complications, or leakage through the anastomosis. Postoperatively, the patient has an NG tube in place that should not be manipulated. The patient remains NPO until x-ray studies that confirm that the anastomosis is free from an esophageal leak, there is no obstruction, and that there is no evidence of pulmonary aspiration.

Palliative treatment may be necessary to keep the esophagus open, to assist with nutrition, and to control saliva. Palliation may be accomplished with dilation of the esophagus, laser therapy, placement of an endoprosthesis (stent) via EGD, radiation, or chemotherapy.



Nursing Management

Preoperative nursing management is directed toward improving the patient's nutritional and physical status in preparation for surgery, radiation therapy, and/or chemotherapy. A program to promote weight gain based on a high-calorie and high-protein diet, in liquid or soft form, is provided if adequate food can be taken by mouth. If this is not possible, parenteral or enteral nutrition is initiated. Nutritional status is monitored throughout treatment. The patient is informed about the nature of the postoperative equipment that will be used, including that required for closed chest drainage, NG suction, parenteral fluid therapy, and gastric intubation.

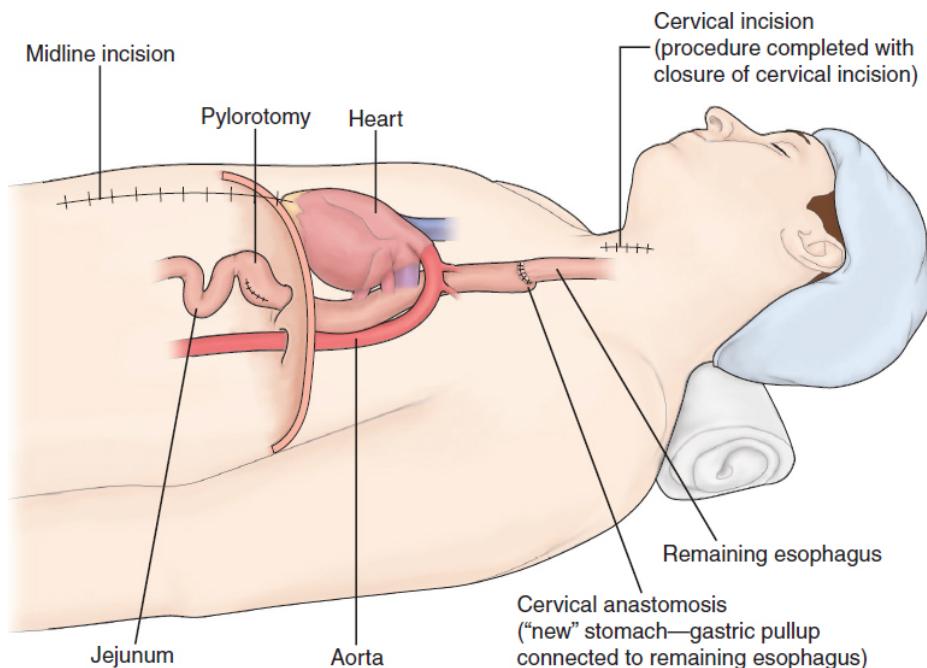


Figure 39-13 • Transhiatal esophagectomy. Surgical removal of tumor of the lower esophagus with anastomosis of the remaining esophagus to the stomach. Redrawn from Heitmiller, R. F. (1999). Closed chest esophageal resection, 252–265. *Operative Techniques in Thoracic and Cardiovascular Surgery*, 4(3). © 1999, with permission from Elsevier. doi: 10.1016/S1522-2942(07)70121-6.

Immediate postoperative care is similar to that provided for patients undergoing thoracic surgery. It is not uncommon for patients to have a tracheostomy and be placed in an intensive care unit or step-down unit. After recovering from the effects of anesthesia, the patient is placed in a low Fowler position, and later in a Fowler position, to help prevent reflux of gastric secretions. The patient is observed carefully for regurgitation and dyspnea. A common postoperative complication is aspiration pneumonia (Brownlee & Ferguson, 2018). Therefore, the patient is placed on a vigorous pulmonary plan of care that includes incentive spirometry, sitting up in a chair, and, if necessary, nebulizer treatments. Chest physiotherapy is avoided due to the risk of aspiration. The patient's temperature is monitored to detect any elevation that may indicate aspiration or seepage of fluid through the operative site into the mediastinum, which would indicate an esophageal leak. Drainage from the cervical neck wound, usually saliva, is evidence of an early esophageal leak. Typically, no treatment other than maintaining NPO status and parenteral or enteral support is warranted. The patient is also monitored for a postoperative chylothorax (accumulation of chyle/lymphatic fluid in the pleural cavity), which would require pleural drainage (Brownlee & Ferguson, 2018; Rudrappa & Paul, 2019).

Cardiac complications include atrial fibrillation, which occurs due to irritation of the vagus nerve at the time of surgery. Typical medical management includes digitalization or the use of beta-blockers, calcium channel blockers, amiodarone, and/or cardioversion depending on the patient's hemodynamic status (Brownlee & Ferguson, 2018).

Esophageal anastomotic leak is managed by facilitating adequate drainage, initiating broad-spectrum antibiotics (often including antifungal agents), and optimizing nutrition

via enteral or parenteral feeding (Brownlee & Ferguson, 2018). During surgery, an NG tube is inserted and taped in place. It is connected to low intermittent suction. The NG tube is not manipulated; if displacement occurs, it is not replaced because damage to the anastomosis may occur. The NG tube is typically removed 5 days after surgery; before the patient is allowed to eat, a barium swallow is performed to assess for any anastomotic leak.

Once feeding begins, the nurse encourages the patient to swallow small sips of water. Eventually, the diet is advanced as tolerated to a soft, mechanical diet. When the patient can increase food and fluid intake to an adequate amount, parenteral fluids are discontinued. After each meal, the patient remains upright for at least 2 hours to allow the food to move through the GI tract. It is a challenge to encourage the patient to eat because the appetite is usually poor. Family involvement and home-cooked favorite foods may help the patient to eat. Antacids may help patients with gastric distress. Erythromycin, metoclopramide, or domperidone are useful in promoting gastric emptying (Brownlee & Ferguson, 2018).

If chemotherapy and radiation are part of the therapy, the patient's appetite will be further depressed, and esophagitis may occur, causing pain when food is eaten. Liquid supplements may be more easily tolerated. Surgical adjuncts to esophagectomy that address delayed gastric emptying (a major complication in 15% to 39% of patients after esophagectomy) may promote **vagotomy syndrome** (dumping syndrome), which can occur with each meal or approximately 20 minutes to 2 hours after eating (Zhang & Zhang, 2019). Vagotomy syndrome occurs due to interruption of vagal nerve fibers, which in turn causes an alteration in the storage function of the stomach and the pyloric emptying mechanism. As a result, large amounts of solids and liquids rapidly "dump" into the duodenum. The patient experiences severe abdominal cramping, followed by a liquid bowel movement that may or may not be associated with diaphoresis, rapid heart rate or rapid respirations, or both. It can be quite disabling but typically resolves without incident, and the patient is left feeling extremely tired. As the patient's recovery progresses and the patient begins to eat soft foods and remains in an upright position for 2 hours after eating, the frequency and severity of episodes decrease.

Often, in either the preoperative or the postoperative period, an obstructed or nearly obstructed esophagus causes difficulty with excess saliva, and drooling becomes a problem. Oral suction may be used if the patient cannot manage oral secretions, or a wick-type gauze may be placed at the corner of the mouth to direct secretions to a dressing or emesis basin. The possibility that the patient may aspirate saliva into the tracheobronchial tree and develop pneumonia is a concern.

When the patient is ready to go home, the family is instructed about how to promote nutrition, what observations to make, what measures to take if complications occur, how to keep the patient comfortable, and how to obtain needed physical and emotional support.

CRITICAL THINKING EXERCISES

1  ebp A 63-year-old female patient presents to a primary care clinic where you work reporting a slightly sore throat and a red patch on the side of her mouth that bleeds easily and simply will not heal. What questions should you ask? What are the primary risk factors for oral cancer? How should you frame assessment questions regarding actual and potential HPV exposure? What guidelines and evidence should inform this conversation?

2  ipc You are a nurse working on an inpatient oncology unit and have been assigned a postoperative patient who has had a classic, radical neck resection due to head and neck cancer. What nerve and muscular changes do you expect with this specific procedure? Based on this information, what are the key priority nursing interventions that will prevent short-term postoperative and long-term complications in this patient? What interprofessional consults should you plan to facilitate? What is the role of each of these interprofessional team members?

3  pq A patient diagnosed with stage III esophageal cancer undergoes the standard treatment of chemoradiation prior to an esophagostomy, and is admitted postoperatively to the surgical unit where you work. You notice on your first postoperative assessment that the NG tube that was placed in the OR has been pulled out 5 cm. What should you do *first*? What is the rationale for this NG tube? What are the risks (if any) with it being dislodged? For what other esophagostomy-specific postoperative complications should you monitor (*list four*)?

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*Asterisk indicates nursing research article.

**Double asterisk indicates classic reference.

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Resources

Academy of General Dentistry (AGD), agd.org

American Cancer Society (ACS), cancer.org

American Cancer Society (ACS) Online Communities and Support, cancer.org/treatment/support-programs-and-services/online-communities.html

American Dental Association (ADA), ada.org/en/

Healthy People 2020, healthypeople.gov

Look Good Feel Better, lookgoodfeelbetter.org

National Capital Poison Center, Battery Ingestion Triage and Treatment Guideline, www.poison.org/battery/guideline

National Institute of Dental and Craniofacial Research (NIDCR), National Institutes of Health, nidcr.nih.gov

40 Management of Patients with Gastric and Duodenal Disorders

LEARNING OUTCOMES

On completion of this chapter, the learner will be able to:

1. Compare the etiology, pathophysiology, clinical manifestations, and management of acute gastritis, chronic gastritis, and peptic ulcer disease.
2. Use the nursing process as a framework for care of the patient with acute or chronic gastritis, or peptic ulcer.
3. Discuss the etiology, pathophysiology, clinical manifestations, and management of gastric cancer and tumors of the small intestine.
4. Use the nursing process as a framework for care of the patient with gastric cancer or tumors of the small intestine.

NURSING CONCEPT

Nutrition

GLOSSARY

achlorhydria: lack of hydrochloric acid in digestive secretions of the stomach

antrectomy: removal of the pyloric (antrum) portion of the stomach with anastomosis (surgical connection) either to the duodenum (gastroduodenostomy or Billroth I) or to the jejunum (gastrojejunostomy or Billroth II)

dumping syndrome: physiologic response to rapid emptying of gastric contents into the small intestines, manifested by nausea, weakness, sweating, palpitations, syncope, and diarrhea (*synonym:* vagotomy syndrome)

duodenum: first portion of the small intestine, between the stomach and the jejunum

dyspepsia: indigestion; upper abdominal discomfort associated with eating

gastric: refers to the stomach

gastric outlet obstruction: any condition that mechanically impedes normal gastric emptying; there is obstruction of the channel of the pylorus and duodenum through which the stomach empties; also called pyloric obstruction

gastritis: inflammation of the stomach

Helicobacter pylori (H. pylori): a spiral-shaped gram-negative bacterium that colonizes the gastric mucosa; is involved in most cases of peptic ulcer disease

hematemesis: vomiting of blood

hematochezia: bright red, bloody stools

melena: tarry or black stools; indicative of occult blood in stools

omentum: fold of the peritoneum that surrounds the stomach and other organs of the abdomen

peritoneum: thin membrane that lines the inside of the wall of the abdomen and covers all of the abdominal organs

pyloroplasty: surgical procedure to increase the opening of the pyloric orifice

pylorus: opening between the stomach and the duodenum

pyrosis: a burning sensation in the stomach and esophagus that moves up to the mouth (*synonym:* heartburn)

serosa: thin membrane that covers the outer surface of the stomach; visceral peritoneum covering the outer surface of the stomach

steatorrhea: fatty stool; typically malodorous with an oily appearance and floats in water

stenosis: narrowing or tightening of an opening or passage in the body

A person's nutritional status depends not only on the type and amount of intake, but also on the functioning of the **gastric** (stomach) and intestinal portions of the gastrointestinal (GI) system. The scope of disorders that may affect a person's nutritional status is of particular note. Given the prevalence of Americans who have gastric and duodenal disorders, nurses will encounter adults and older adults with these disorders in virtually every inpatient and outpatient clinical setting. This chapter

describes disorders of the stomach and small intestine, their etiology, pathophysiology, clinical manifestations, management, and related nursing care.

Gastritis

Gastritis (inflammation of the gastric or stomach mucosa) is a common GI problem, accounting for approximately two million visits to outpatient clinics annually in the United States, with increasing prevalence occurring in adults older than 60 years of age (Wehbi, Dacha, Sarver, et al., 2019). It affects women and men about equally. Gastritis may be acute, lasting several hours to a few days, or chronic, resulting from repeated exposure to irritating agents or recurring episodes of acute gastritis.

Acute gastritis may be classified as erosive or nonerosive, based on pathologic manifestations present in the gastric mucosa (Wehbi et al., 2019). The erosive form of acute gastritis is most often caused by local irritants such as aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs) (e.g., ibuprofen); corticosteroids; alcohol consumption; and gastric radiation therapy (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2020a; Norris, 2019; Wehbi et al., 2019). The nonerosive form of acute gastritis is most often caused by an infection with a spiral-shaped gram-negative bacterium, *Helicobacter pylori* (*H. pylori*) (Wehbi et al., 2019). It is estimated that 50% of individuals globally are infected with *H. pylori* (Santacroce & Bhutani, 2019).

A more severe form of acute gastritis is caused by the ingestion of strong acid or alkali, which may cause the mucosa to become gangrenous or to perforate (see [Chapter 67](#)). Scarring can occur, resulting in pyloric **stenosis** (narrowing or tightening) or obstruction. Acute gastritis also may develop in acute illnesses, especially when the patient has had major traumatic injuries, burns, severe infection, lack of perfusion to the stomach lining, or major surgery. This type of acute gastritis is often referred to as *stress-related gastritis or ulcer* (Clarke, Ferraro, Gbadehan, et al., 2020; Norris, 2019).

Chronic gastritis is often classified according to the underlying causative mechanism, which most often includes an infection with *H. pylori*. Chronic *H. pylori* gastritis is implicated in the development of peptic ulcers, gastric adenocarcinoma (cancer), and gastric mucosa-associated lymphoid tissue lymphoma (Akiva & Greenwald, 2019; Lloyd & Leiman, 2019). Chronic gastritis may also be caused by a chemical gastric injury (gastropathy) as the result of long-term drug therapy (e.g., aspirin and other NSAIDs) or reflux of duodenal contents into the stomach, which most often occurs after gastric surgery (e.g., gastrojejunostomy, gastroduodenostomy). Autoimmune disorders such as Hashimoto thyroiditis, Addison disease, and Graves disease are also associated with the development of chronic gastritis (see [Chapter 45](#)) (Akiva & Greenwald, 2019; Norris, 2019).

Pathophysiology

Gastritis is characterized by a disruption of the mucosal barrier that normally protects the stomach tissue from digestive juices (e.g., hydrochloric acid [HCl] and pepsin). The impaired mucosal barrier allows corrosive HCl, pepsin, and other irritating agents

(e.g., alcohol, NSAIDs, *H. pylori*) to come in contact with the gastric mucosa, resulting in inflammation. In acute gastritis, this inflammation is usually transient and self-limiting in nature. Inflammation causes the gastric mucosa to become edematous and hyperemic (congested with fluid and blood) and to undergo superficial erosion (Fig. 40-1). Superficial ulceration may occur as a result of erosive disease and may lead to hemorrhage. In chronic gastritis, persistent or repeated insults lead to chronic inflammatory changes, and eventually atrophy (or thinning) of the gastric tissue (Norris, 2019).

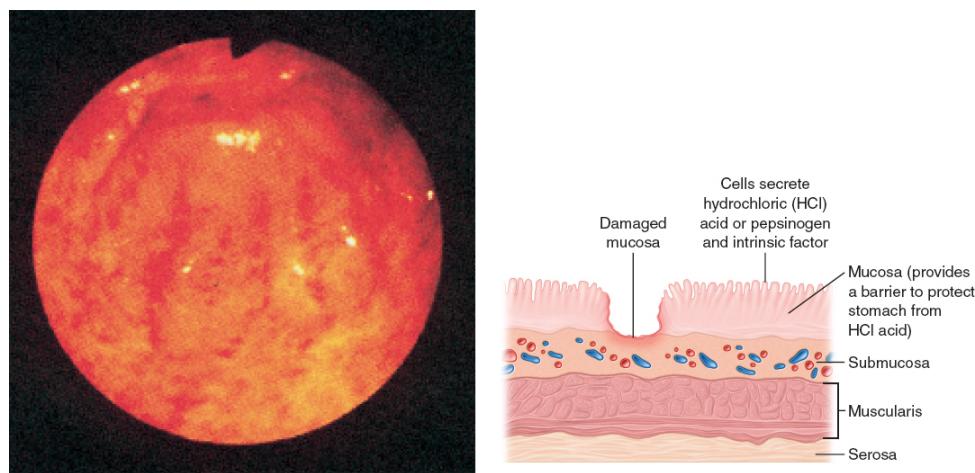


Figure 40-1 • Endoscopic view of erosive gastritis (**left**). Damage from irritants (**right**) results in increased intracellular pH, impaired enzyme function, disrupted cellular structures, ischemia, vascular stasis, and tissue death. Image at left reproduced with permission from Strayer, D. S., Saffitz, J. E., & Rubin, E. (2015). *Rubin's pathology: Mechanisms of human disease* (8th ed., Fig. 19-15). Philadelphia, PA: Lippincott Williams & Wilkins.

Clinical Manifestations

The patient with acute gastritis may have a rapid onset of symptoms, such as epigastric pain or discomfort, **dyspepsia** (indigestion; upper abdominal discomfort associated with eating), anorexia, hiccups, or nausea and vomiting, which can last from a few hours to a few days. Erosive gastritis may cause bleeding, which may manifest as blood in vomit or as **melena** (black, tarry stools; indicative of occult blood in stools) or **hematochezia** (bright red, bloody stools) (Wehbi et al., 2019).

The patient with chronic gastritis may complain of fatigue, **pyrosis** (a burning sensation in the stomach and esophagus that moves up to the mouth; heartburn) after eating, belching, a sour taste in the mouth, halitosis, early satiety, anorexia, or nausea and vomiting. Some patients may have only mild epigastric discomfort or report intolerance to spicy or fatty foods or slight pain that is relieved by eating (Akiva & Greenwald, 2019). Patients with chronic gastritis may not be able to absorb vitamin B₁₂ because of diminished production of intrinsic factor by the stomach's parietal cells due to atrophy, which may lead to pernicious anemia (see Chapter 29) (Zayouna

& Piper, 2018). Some patients with chronic gastritis have no symptoms (Marcus & Greenwald, 2019) ([Table 40-1](#)).

Assessment and Diagnostic Findings

The definitive diagnosis of gastritis is determined by an endoscopy and histologic examination of a tissue specimen obtained by biopsy (Akiva & Greenwald, 2019; Wehbi et al., 2019). A complete blood count (CBC) may be drawn to assess for anemia as a result of hemorrhage or pernicious anemia. Diagnostic measures for detecting *H. pylori* infection may be used and are discussed later in this chapter in the Peptic Ulcer Disease section.

TABLE 40-1 Clinical Manifestations of Acute and Chronic Gastritis

	Acute Gastritis	Chronic Gastritis
Gastrointestinal Manifestations	<ul style="list-style-type: none">• Anorexia• Epigastric pain (rapid onset)• Hematemesis• Hiccups• Melena or hematochezia• Nausea and vomiting	<ul style="list-style-type: none">• Belching• Early satiety• Intolerance of spicy or fatty foods• Nausea and vomiting• Pyrosis• Sour taste in mouth• Vague epigastric discomfort relieved by eating
Systemic Manifestations	<ul style="list-style-type: none">• Possible signs of shock	<ul style="list-style-type: none">• Anemia• Fatigue

Adapted from Marcus, A. J., & Greenwald, D. (2019). Chronic gastritis. *Medscape*. Retrieved on 2/25/2020 at: www.emedicine.medscape.com/article/176156; Wehbi, M., Dacha, S., Sarver, G., et al. (2019). Acute gastritis. *Medscape*. Retrieved on 2/25/2020 at: www.emedicine.medscape.com/article/175909

Medical Management

The gastric mucosa is capable of repairing itself after an episode of acute gastritis. As a rule, the patient recovers in about 1 day, although the patient's appetite may be diminished for an additional 2 or 3 days. Acute gastritis is also managed by instructing the patient to refrain from alcohol and food until symptoms subside. When the patient can take nourishment by mouth, a nonirritating diet is recommended. If the symptoms persist, intravenous (IV) fluids may need to be given. If bleeding is present, management is similar to the procedures used to control upper GI tract hemorrhage discussed later in this chapter.

Therapy is supportive and may include nasogastric (NG) intubation, antacids, histamine-2 receptor antagonists (H₂ blockers) (e.g., famotidine, cimetidine), proton pump inhibitors (e.g., omeprazole, lansoprazole), and IV fluids (Wehbi et al., 2019). Fiberoptic endoscopy may be necessary. In extreme cases, emergency surgery may be required to remove gangrenous or perforated tissue. A gastric resection or a

gastrojejunostomy (anastomosis of jejunum to stomach to detour around the pylorus) may be necessary to treat **gastric outlet obstruction**, also called *pyloric obstruction*, a narrowing of the pyloric orifice, which cannot be relieved by medical management.

Chronic gastritis is managed by modifying the patient's diet, promoting rest, reducing stress, recommending avoidance of alcohol and NSAIDs, and initiating medications that may include antacids, H₂ blockers, or proton pump inhibitors (Akiva & Greenwald, 2019). *H. pylori* may be treated with select drug combinations which typically include a proton pump inhibitor, antibiotics, and sometimes bismuth salts (Table 40-2).

Nursing Management

Reducing Anxiety

If the patient has ingested acids or alkalis, emergency measures may be necessary (see Chapter 67). The nurse offers supportive therapy to the patient and family during treatment and after the ingested acid or alkali has been neutralized or diluted. In some cases, the nurse may need to prepare the patient for additional diagnostic studies (endoscopies) or surgery. The patient may be anxious because of pain and planned treatment modalities. The nurse uses a calm approach to assess the patient and to answer all questions as completely as possible.

Promoting Optimal Nutrition

For acute gastritis, the nurse provides physical and emotional support and helps the patient manage the symptoms, which may include nausea, vomiting, and pyrosis. The patient should take no foods or fluids by mouth—possibly for a few days—until the acute symptoms subside, thus allowing the gastric mucosa to heal. If IV therapy is necessary, fluid intake and output are monitored, along with serum electrolyte values. After the symptoms subside, the nurse may offer the patient ice chips followed by clear liquids. Introducing solid food as soon as possible may provide adequate oral nutrition, decrease the need for IV therapy, and minimize irritation to the gastric mucosa. As food is introduced, the nurse evaluates and reports any symptoms that suggest a repeat episode of gastritis.

The nurse discourages the intake of caffeinated beverages, because caffeine is a central nervous system stimulant that increases gastric activity and pepsin secretion. The nurse also discourages alcohol use. Discouraging cigarette smoking is important. The level of nicotine measured in gastric acid can be 10 times greater than arterial blood and 80 times greater than venous blood. Nicotine will increase secretion of gastric acid and will also interfere with the mucosal barrier in the GI tract (Berkowitz, Schultz, Salazar, et al., 2018). When appropriate, the nurse initiates and refers the patient for alcohol counseling and smoking cessation programs.

TABLE 40-2

Select Pharmacotherapy for Peptic Ulcer Disease and
Gastritis

Pharmacologic Agent	Major Action	Key Nursing Considerations
Antibiotics		
Amoxicillin	A bactericidal antibiotic that assists with eradicating <i>H. pylori</i> bacteria in the gastric mucosa	<ul style="list-style-type: none"> • May cause abdominal pain and diarrhea • Should not be used in patients allergic to penicillin
Clarithromycin	Exerts bactericidal effects to eradicate <i>H. pylori</i> bacteria in the gastric mucosa	<ul style="list-style-type: none"> • May cause GI upset, headache, altered taste • Many drug–drug interactions (e.g., colchicine, lovastatin, warfarin); interacts with grapefruit juice
Metronidazole	A synthetic antibacterial and antiprotozoal agent that assists with eradicating <i>H. pylori</i> bacteria in the gastric mucosa when given with other antibiotics and proton pump inhibitors	<ul style="list-style-type: none"> • Should be given with meals to decrease GI upset; may cause anorexia and metallic taste • Patient should avoid alcohol; increases blood-thinning effects of warfarin
Tetracycline	Exerts bacteriostatic effects to eradicate <i>H. pylori</i> bacteria in the gastric mucosa	<ul style="list-style-type: none"> • May cause photosensitivity reaction; advise patient to use sunscreen • May cause GI upset • Must be used with caution in patients with renal or hepatic impairment • Milk or dairy products may reduce effectiveness
Antidiarrheal		
Bismuth subsalicylate	Suppresses <i>H. pylori</i> bacteria in the gastric mucosa and assists with healing of mucosal ulcers	<ul style="list-style-type: none"> • Given concurrently with antibiotics to eradicate <i>H. pylori</i> infection • Should be taken on empty stomach • May darken the bowel movements
H₂ Receptor Antagonists		
Cimetidine	Decreases amount of HCl produced by stomach by blocking action of histamine on histamine receptors of parietal cells in the stomach	<ul style="list-style-type: none"> • Least expensive of H₂ receptor antagonists • May cause confusion, agitation, or coma in older

		<ul style="list-style-type: none"> adults or those with renal or hepatic insufficiency Long-term use may cause diarrhea, dizziness, and gynecomastia Many drug–drug interactions (e.g., amiodarone, amitriptyline, benzodiazepines, metoprolol, nifedipine, phenytoin, warfarin)
Famotidine	Same as for cimetidine	<ul style="list-style-type: none"> Best choice for patient who is critically ill because it is known to have the least risk of drug–drug interactions; does not alter liver metabolism Prolonged half-life in patients with renal insufficiency Short-term relief for GERD
Nizatidine	Same as for cimetidine	<ul style="list-style-type: none"> Used for treatment of ulcers and GERD Prolonged half-life in patients with renal insufficiency May cause headache, dizziness, diarrhea, nausea/vomiting, GI upset, and urticaria

Proton Pump Inhibitors of Gastric Acid

Esomeprazole	Decreases gastric acid secretion by slowing the H ⁺ ,K ⁺ -ATPase pump on the surface of the parietal cells of the stomach	<ul style="list-style-type: none"> Used mainly for treatment of duodenal ulcer disease and <i>H. pylori</i> infection A delayed-release capsule that is to be swallowed whole and taken before meals
Lansoprazole	Same as for esomeprazole	<ul style="list-style-type: none"> A delayed-release capsule that is to be swallowed whole and taken before meals
Omeprazole	Same as for esomeprazole	<ul style="list-style-type: none"> A delayed-release capsule that is to be swallowed whole and taken before meals May cause diarrhea, nausea, constipation, abdominal pain, vomiting, headache, or dizziness

Pantoprazole	Same as for esomeprazole	<ul style="list-style-type: none"> • A delayed-release tablet that is to be swallowed whole and taken before meals • May cause diarrhea and hyperglycemia, headache, abdominal pain, and abnormal liver function tests
Rabeprazole	Same as for esomeprazole	<ul style="list-style-type: none"> • A delayed-release tablet that is to be swallowed whole and taken without regard to meals; however, if used for duodenal ulcers give after meals and when used for <i>H. pylori</i> treatment, give with food. • May cause abdominal pain, diarrhea, nausea, and headache • Drug–drug interactions with digoxin, iron, and warfarin

Prostaglandin E₁ Analogue

Misoprostol	Synthetic prostaglandin; protects the gastric mucosa from agents that cause ulcers; also increases mucus production and bicarbonate levels	<ul style="list-style-type: none"> • Used to prevent ulceration in patients using NSAIDs • Administer with food • May cause diarrhea and cramping (including uterine cramping) • Used mainly for the treatment of duodenal ulcers • Pregnancy category X (i.e., should not be taken by a pregnant woman as it can soften the cervix and result in miscarriage or premature labor.)
Sucralfate	Creates a viscous substance in the presence of gastric acid that forms a protective barrier, binding to the surface of the ulcer, and prevents digestion by pepsin	<ul style="list-style-type: none"> • Should be taken without food but with water 1 h prior to meals • Other medications should be taken 2 h before or after this medication • Many drug–drug interactions (e.g., digoxin, phenytoin, warfarin)

- May cause constipation or nausea

CNS, central nervous system; GERD, gastroesophageal reflux disease; GI, gastrointestinal; H₂, histamine-2; HCl, hydrochloric acid; H⁺,K⁺-ATPase, hydrogen–potassium adenosine triphosphatase; NSAIDs, nonsteroidal anti-inflammatory drugs.

Adapted from Karch, A. M. (2018). *Lippincott nursing drug guide*. Philadelphia, PA: Lippincott Williams & Wilkins.

Chart 40-1



HOME CARE CHECKLIST

The Patient with Gastritis

At the completion of education, the patient and/or caregiver will be able to:

- State the impact of gastritis on physiologic functioning, ADLs, IADLs, roles, relationships, and spirituality.
- State the need for vitamin B₁₂ injections if patient has pernicious anemia.
- Explain the importance of and necessity for adherence with prescribed medication regimen.
- Demonstrate methods of keeping track of the medication regimen and storage of the prescribed medications and use reminders such as beepers and/or pillboxes.
- State the name, dose, side effects, frequency, and schedule for all medications.
- Identify foods and other substances that may cause gastritis (e.g., spicy, highly seasoned foods, caffeine, nicotine, alcohol).
- Identify side effects and complications (e.g., increased or return of abdominal discomfort, inability to ingest adequate solids and liquids) that should be reported to primary provider.
- State how to reach primary provider with questions or complications.
- State time and date of follow-up appointments and testing.

ADLs, activities of daily living; IADLs, instrumental activities of daily living.

Promoting Fluid Balance

Daily fluid intake and output are monitored to detect early signs of dehydration (minimal fluid intake of 1.5 L/day, urine output of less than 1 mL/kg/h). If food and oral fluids are withheld, IV fluids (3 L/day) usually are prescribed and a record of fluid intake plus caloric value (1 L of 5% dextrose in water = 170 calories of carbohydrate) needs to be maintained. Electrolyte values (sodium, potassium, chloride) are assessed every 24 hours to detect any imbalance (see [Chapter 10](#)).

The nurse must always be alert to any indicators of hemorrhagic gastritis, which include **hematemesis** (vomiting of blood), tachycardia, and hypotension. All stools should be examined for the presence of frank or occult bleeding. If these occur, the primary provider should be notified, and the patient's vital signs are monitored as the

patient's condition warrants. Guidelines for managing upper GI tract bleeding are discussed later in this chapter.

Relieving Pain

Measures to help relieve pain include instructing the patient to avoid foods and beverages that may irritate the gastric mucosa as well as the correct use of medications to relieve chronic gastritis. The nurse must regularly assess the patient's level of pain and the extent of comfort achieved through the use of medications and avoidance of irritating substances.

Promoting Home, Community-Based, and Transitional Care



Educating Patients About Self-Care

The nurse evaluates the patient's knowledge about gastritis and develops an individualized education plan that includes information about stress management, diet, and medications (see [Table 40-2](#)). Dietary instructions take into account the patient's daily caloric needs as well as cultural aspects of food preferences and patterns of eating. The nurse and patient review foods and other substances to be avoided (e.g., spicy, irritating, or highly seasoned foods; caffeine; nicotine; alcohol). Consultation with a dietitian may be recommended ([Chart 40-1](#)).

Providing information about prescribed medications, which may include antacids, H₂ blockers, or proton pump inhibitors, may help the patient to better understand why these medications assist in recovery and prevent recurrence. The importance of completing the medication regimen as prescribed to eradicate *H. pylori* infection must be reinforced to the patient and caregiver (see later discussion).

Continuing and Transitional Care

The nurse reinforces previous education and conducts ongoing assessment of the patient's symptoms and progress. Patients with malabsorption of vitamin B₁₂ need information about lifelong vitamin B₁₂ injections; the nurse may instruct a family member or caregiver how to administer the injections or make arrangements for the patient to receive the injections from the primary provider. Finally, the nurse emphasizes the importance of keeping follow-up appointments with the primary provider.

Peptic Ulcer Disease

Peptic ulcer disease affects approximately 4.6 million Americans annually, with the peak onset between 30 and 60 years of age (Anand, 2020; Norris, 2019). A peptic ulcer may be referred to as a gastric, duodenal, or esophageal ulcer, depending on its location. A peptic ulcer is an excavation (hollowed-out area) that forms in the mucosa of the stomach, in the **pylorus** (the opening between the stomach and duodenum), in the **duodenum** (the first portion of the small intestine, between the stomach and the jejunum), or in the esophagus. Erosion of a circumscribed area of mucosa is the cause

(Fig. 40-2). This erosion may extend as deeply as the muscle layers or through the muscle to the **peritoneum** (thin membrane that lines the inside of the wall of the abdomen) (Norris, 2019).

Peptic ulcers are more likely to occur in the duodenum than in the stomach. As a rule, they occur alone but they may occur in multiples. Chronic gastric ulcers tend to occur in the lesser curvature of the stomach, near the pylorus. Esophageal ulcers occur as a result of the backward flow of HCl from the stomach into the esophagus (gastroesophageal reflux disease [GERD]).



Figure 40-2 • Deep peptic ulcer. Reprinted with permission from Strayer, D. S., Saffitz, J. E., & Rubin, E. (2015). *Rubin's pathology: Mechanisms of human disease* (8th ed., Fig. 19-23). Philadelphia, PA: Lippincott Williams & Wilkins.

Women have 8% to 11% and men have an 11% to 14% lifetime risk of developing peptic ulcers (Anand, 2020). The rates of peptic ulcer disease among middle-age men have diminished over the past several decades, whereas the rates among older adults have increased, particularly among women (Anand, 2020). Those who are 65 years and older present to both outpatient and inpatient settings for treatment of peptic ulcers more than any other age group. This trend may be explained, at least in part, by higher rates of NSAID use and *H. pylori* infections in older adult populations (Anand, 2020).

In the past, stress and anxiety were thought to be causes of peptic ulcers, but research has documented that most peptic ulcers result from infection with *H. pylori*, which may be acquired through ingestion of food and water. Person-to-person transmission of the bacteria also occurs through close contact and exposure to emesis. Although *H. pylori* infection is common in the United States, most infected people do not develop ulcers. It is not known why *H. pylori* infection does not cause ulcers in all people, but most likely the predisposition to ulcer formation depends on certain factors, such as the type of *H. pylori* and other as yet unknown factors (Anand, 2020; Norris, 2019; Santacroce & Bhutani, 2019).

The use of NSAIDs, such as ibuprofen and aspirin, represents a major risk factor for peptic ulcers. Studies report that both NSAIDs and *H. pylori* impair the protective gastric mucosa, and the failure of the GI tract to repair the mucosa may result in ulceration (Anand, 2020; Norris, 2019). It is believed that smoking and alcohol consumption may be risks, although the evidence is inconclusive (Anand, 2020; NIDDK, 2020c).

Familial tendency also may be a significant predisposing factor. People with blood type O are more susceptible to the development of peptic ulcers than are those with blood type A, B, or AB. There also is an association between peptic ulcer disease and chronic obstructive pulmonary disease, cirrhosis of the liver, chronic kidney disease, and autoimmune disorders (Anand, 2020).

Peptic ulcer disease is also associated with Zollinger-Ellison syndrome (ZES). ZES is a rare condition in which benign or malignant tumors form in the pancreas and duodenum that secrete excessive amounts of the hormone gastrin (NIDDK, 2020d; Roy, 2019). The excessive amount of gastrin results in extreme gastric hyperacidity and severe peptic ulcer disease. While the exact cause of ZES is unknown, 25% to 30% of cases are linked to an inherited, genetic condition called multiple endocrine neoplasia, type 1 (MEN-1) (NIDDK, 2020b; Norris, 2019).

Pathophysiology

Peptic ulcers occur mainly in the gastroduodenal mucosa because this tissue cannot withstand the digestive action of gastric acid (HCl) and pepsin. The erosion is caused by the increased concentration or activity of acid-pepsin or by decreased resistance of the normally protective mucosal barrier. A damaged mucosa cannot secrete enough mucus to act as a barrier against normal digestive juices. Exposure of the mucosa to gastric acid (HCl), pepsin, and other irritating agents (e.g., NSAIDs or *H. pylori*) leads to inflammation, injury, and subsequent erosion of the mucosa. Patients with duodenal ulcers secrete more acid than normal, whereas patients with gastric ulcers tend to secrete normal or decreased levels of acid. When the mucosal barrier is impaired, even normal or decreased levels of HCl may result in the formation of peptic ulcers.

The use of NSAIDs inhibits prostaglandin synthesis, which is associated with a disruption of the normally protective mucosal barrier. Damage to the mucosal barrier also results in decreased resistance to bacteria, and thus infection from *H. pylori* bacteria may occur (Anand, 2020; Norris, 2019).

ZES is suspected when a patient has several peptic ulcers or an ulcer that is resistant to standard medical therapy. It is identified by the following: hypersecretion of gastrin, duodenal ulcers, and gastrinomas (islet cell tumors) in the pancreas or duodenum. More than 80% of gastrinomas are found in the “gastric triangle,” which encompasses the cystic and common bile ducts, the second and third portions of the duodenum, and the junction of the head and body of the pancreas. Most gastrinomas tend to grow slowly; however, more than 50% of these tumors are malignant (Bonheur & Nachimuthu, 2019). The patient with ZES may experience epigastric pain, pyrosis, diarrhea, and **steatorrhea** (fatty stools). Patients with ZES associated with MEN-1 syndrome may have coexisting pituitary or parathyroid tumors. ZES-associated MEN-1 syndrome is diagnosed with hyperparathyroidism; therefore,

patients may exhibit signs of hypercalcemia for several years before MEN-1 is diagnosed (NIDDK, 2020b).

Stress ulcer is the term given to the acute mucosal ulceration of the duodenal or gastric area that occurs after physiologically stressful events, such as burns, shock, sepsis, and multiple organ dysfunction syndrome (Clarke et al., 2020). Stress ulcers, which are clinically different from peptic ulcers, are most common in patients following significant burn injuries, traumatic brain injury, or who require mechanical ventilation. Stress ulcers are believed to be a result of ischemia to gastric mucosa and alterations in the mucosa barrier (Clarke et al., 2020; Norris, 2019). When the patient recovers, the lesions are reversed. This pattern is typical of stress ulceration.

Differences of opinion exist as to the actual cause of mucosal ulceration in stress ulcers. Usually, the ulceration results from a disruption of the normally protective mucosal barrier and decreased mucosal blood flow (ischemia). Mucosal ischemia results in the reflux of duodenal contents into the stomach, which increases exposure of the unprotected gastric mucosa to the digestive effects of gastric acid (HCl) and pepsin (Anand, 2020; Clarke et al., 2020; Norris, 2019). The combination of mucosal ischemia and increased gastric acid and pepsin exposure creates an ideal climate for ulceration.

Specific types of ulcers that result from stressful conditions include Curling ulcers and Cushing ulcers. Curling ulcer is frequently observed after extensive burn injuries and often involves the antrum of the stomach or the duodenum (Anand, 2020). Cushing ulcer is common in patients with a traumatic head injury, stroke, brain tumor, or following intracranial surgery. Cushing ulcer is thought to be caused by increased intracranial pressure, which results in overstimulation of the vagal nerve and an increased secretion of gastric acid (HCl) (Norris, 2019). Cushing ulcers are typically deep, single ulcerations and have increased risk of perforation (Anand, 2020).

Clinical Manifestations

Symptoms of peptic ulcer disease may last for a few days, weeks, or months and may disappear only to reappear, often without an identifiable cause. Many patients with peptic ulcers have no signs or symptoms. These *silent peptic ulcers* most commonly occur in older adults and those taking aspirin and other NSAIDs (Anand, 2020).

As a rule, the patient with an ulcer complains of dull, gnawing pain or a burning sensation in the mid epigastrium or the back. There are few clinical manifestations that differentiate gastric ulcers from duodenal ulcers; however, classically, the pain associated with gastric ulcers most commonly occurs immediately after eating, whereas the pain associated with duodenal ulcers most commonly occurs 2 to 3 hours after meals. In addition, approximately 50% to 80% of patients with duodenal ulcers awake with pain during the night, whereas 30% to 40% of patients with gastric ulcers voice this type of complaint. Patients with duodenal ulcers are more likely to express relief of pain after eating or after taking an antacid than patients with gastric ulcers (Anand, 2020).

Other nonspecific symptoms of either gastric ulcers or duodenal ulcers may include pyrosis, vomiting, constipation or diarrhea, and bleeding. These symptoms are often accompanied by sour eructation (burping), which is common when the patient's stomach is empty.

Although vomiting is rare in an uncomplicated peptic ulcer, it may be a symptom of a complication of an ulcer. It results from gastric outlet obstruction, caused by either muscular spasm of the pylorus or mechanical obstruction from scarring or acute swelling of the inflamed mucous membrane adjacent to the ulcer. Vomiting may or may not be preceded by nausea; usually, it follows a bout of severe pain and bloating, which is relieved by vomiting. Emesis may contain undigested food eaten many hours earlier. Constipation or diarrhea may occur, probably as a result of diet and medications.

The patient with bleeding peptic ulcers may present with evidence of GI bleeding, such as hematemesis or the passage of melena (Anand, 2020). Approximately 20% of patients with bleeding peptic ulcers do not experience abdominal pain at the time of diagnosis (Norris, 2019). Peptic ulcer perforation results in the sudden onset of signs and symptoms. The patient often reports severe, sharp upper abdominal pain, which may be referred to the shoulder; extreme abdominal tenderness; and nausea or vomiting. Hypotension and tachycardia may occur, indicating the onset of shock (Azer, 2018).

Assessment and Diagnostic Findings

A physical examination may reveal pain, epigastric tenderness, or abdominal distention. Upper endoscopy is the preferred diagnostic procedure because it allows direct visualization of inflammatory changes, ulcers, and lesions. Through endoscopy, a biopsy of the gastric mucosa and any suspicious lesions can be obtained. Endoscopy may reveal lesions that, because of their size or location, are not evident on x-ray studies. *H. pylori* infection may be determined by endoscopy and histologic examination of a tissue specimen obtained by biopsy, or a rapid urease test of the biopsy specimen. Other less invasive diagnostic measures for detecting *H. pylori* include serologic testing for antibodies against the *H. pylori* antigen, stool antigen test, and urea breath test (Anand, 2020).

The patient who has a bleeding peptic ulcer may require periodic CBCs to determine the extent of blood loss and whether or not blood transfusions are advisable (see [Chapter 28](#)). Stools may be tested periodically until they are negative for occult blood. Gastric secretory studies are of value in diagnosing ZES and **achlorhydria** (lack of HCl), hypochlorhydria (low levels of HCl), or hyperchlorhydria (high levels of HCl).

Medical Management

Once the diagnosis is established, the patient is informed that the condition can be managed. Recurrence may develop; however, peptic ulcers treated with antibiotics to eradicate *H. pylori* have a lower recurrence rate than those not treated with antibiotics. The goals are to eradicate *H. pylori* as indicated and to manage gastric acidity. Methods used include medications, lifestyle changes, and surgical intervention.

Pharmacologic Therapy

Currently, the most commonly used therapy for peptic ulcers is a combination of antibiotics, proton pump inhibitors, and sometimes bismuth salts that suppress or

eradicate *H. pylori*. Recommended combination drug therapy is typically prescribed for 10 to 14 days and may include triple therapy with two antibiotics (e.g., metronidazole or amoxicillin and clarithromycin) plus a proton pump inhibitor (e.g., lansoprazole, omeprazole, or rabeprazole), or quadruple therapy with two antibiotics (metronidazole and tetracycline) plus a proton pump inhibitor and bismuth salts (Anand, 2020; Marcus & Greenwald, 2019). Research is currently being conducted to develop a vaccine against *H. pylori* (Liu, Zhong, Chen, et al., 2020).

H_2 blockers and proton pump inhibitors that reduce gastric acid secretion are used to treat ulcers not associated with *H. pylori* infection. Table 40-3 provides information about the medication regimens for peptic ulcer disease.

TABLE 40-3



Drug Regimens for Peptic Ulcer Disease

Indications	Drug Regimen	Nursing Considerations
Ulcer healing	H_2 receptor antagonist Cimetidine 400 mg bid or 800 mg at bedtime Famotidine 20 mg bid or 40 mg at bedtime Nizatidine 150 mg bid or 300 mg at bedtime PPIs: Esomeprazole 40 mg daily Lansoprazole 30 mg daily Omeprazole 20 mg daily Pantoprazole 40 mg daily Rabeprazole 20 mg daily	Should be used for 6–8 wks for complete peptic ulcer healing; patients who are at high risk require a maintenance dose for 1 yr
<i>H. pylori</i> infection	<i>Quadruple therapy</i> with bismuth subsalicylate 525 mg qid, plus tetracycline 500 mg qid, plus metronidazole 500 mg bid, plus a PPI daily for 10–14 days <i>Alternate therapy</i> with clarithromycin 500 mg bid, amoxicillin 1 g bid, metronidazole 500 mg bid, plus PPI for 10–14 days	Efficacy of therapy is approximately 85% qid dosing may decrease adherence to the regimen
Prophylactic therapy for NSAID ulcers	Peptic ulcer healing doses of PPIs (above) Misoprostol 100–200 mcg qid	Prevents recurrent ulceration in approximately 80–90% of patients; qid dosing may decrease adherence to the regimen Pregnancy category X (i.e., should not be taken by a pregnant woman as it can soften the cervix and result in miscarriage or premature labor.)

bid, two times a day; H_2 , histamine-2; NSAID, nonsteroidal anti-inflammatory drug; PPIs, proton pump inhibitors; qid, four times a day.

Adapted from Anand, B. S. (2020). Peptic ulcer disease. *Medscape*. Retrieved on 4/29/2020 at: www.emedicine.medscape.com/article/181753

The patient is advised to adhere to and complete the medication regimen to ensure complete healing of the ulcer. The patient also is advised to avoid the use of NSAIDs. Because most patients become symptom free within a week, the nurse stresses to the patient the importance of following the prescribed regimen so that the healing process can continue uninterrupted and the return of chronic ulcer symptoms can be prevented. Maintenance dosages of H₂ blockers are usually recommended for 1 year.

For patients with ZES, hypersecretion of gastrin stimulates the release of gastric acid (HCl), which may be controlled with proton pump inhibitors. Octreotide, a medication that suppresses gastrin levels, also may be prescribed (Daniels, Khalili, Morano, et al., 2019). Patients with ZES will require periodic endoscopy to evaluate the effectiveness of medication therapy.

Patients at high risk for stress ulcers (e.g., patients who are mechanically ventilated for more than 48 hours) may be treated prophylactically with either H₂ blockers or proton pump inhibitors, and cytoprotective agents (e.g., misoprostol, sucralfate) because of the increased risk of upper GI tract hemorrhage (Clarke et al., 2020; Young, Bagshaw, Forbes, et al., 2020).



Quality and Safety Nursing Alert

Misoprostol should not be taken by a pregnant woman as it can soften the cervix and result in miscarriage or premature labor. The nurse should be aware of this risk when caring for women of childbearing age.

Smoking Cessation

Smoking decreases the secretion of bicarbonate from the pancreas into the duodenum, resulting in increased acidity of the duodenum. Continued smoking is also associated with delayed healing of peptic ulcers (Berkowitz et al., 2018; Kennedy & Winter, 2017). Therefore, the patient is encouraged to stop smoking. Refer to [Chapter 23](#) for information on how the nurse may promote cessation of tobacco use.

Dietary Modification

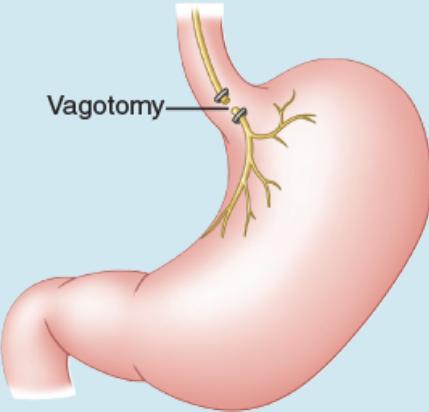
The intent of dietary modification for patients with peptic ulcers is to avoid oversecretion of acid and hypermotility in the GI tract. These can be minimized by avoiding extremes of temperature in food and beverages and overstimulation from the consumption of alcohol, coffee (including decaffeinated coffee, which also stimulates acid secretion), and other caffeinated beverages. In addition, an effort is made to neutralize acid by eating three regular meals a day. Small, frequent feedings are not necessary as long as an antacid or an H₂ blocker is taken. Diet compatibility becomes an individual matter: The patient eats foods that are tolerated and avoids those that produce pain.

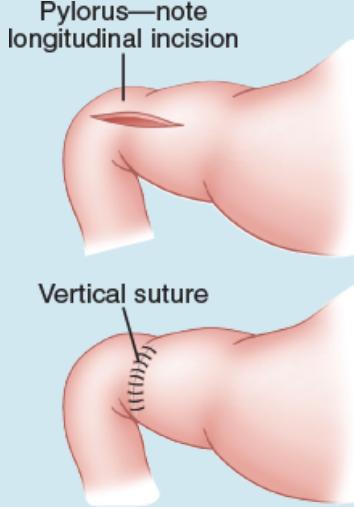
Surgical Management

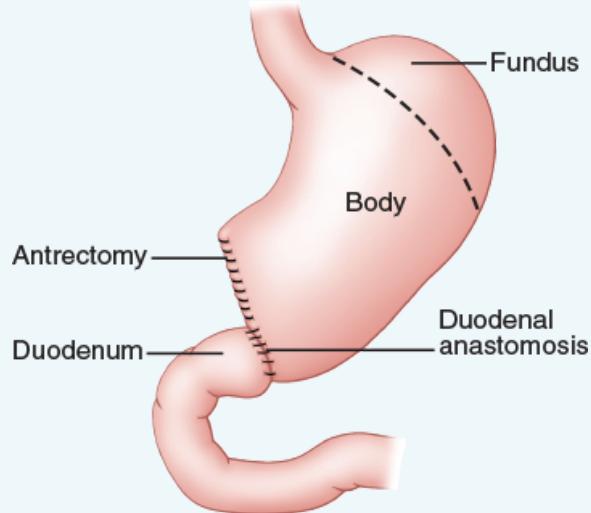
The introduction of antibiotics to eradicate *H. pylori* and of proton pump inhibitors as treatment for ulcers results in ulcer healing in approximately 85% to 90% of patients (Anand, 2020). However, surgery is usually recommended for patients with

intractable ulcers (those failing to heal after 12 to 16 weeks of medical treatment), life-threatening hemorrhage, perforation, or obstruction and for those with ZES that is unresponsive to medications (Anand, 2020; Bonheur & Nachimuthu, 2019; Upchurch, 2019). Surgical procedures include vagotomy, with or without **pyloroplasty** (transecting nerves that stimulate acid secretion and opening the pylorus), and **antrectomy**, which is removal of the pyloric (antrum) portion of the stomach with anastomosis (surgical connection) to either the duodenum (gastroduodenostomy or Billroth I) or jejunum (gastrojejunostomy or Billroth II) ([Table 40-4](#)).

TABLE 40-4 Surgical Procedures for Peptic Ulcer Disease

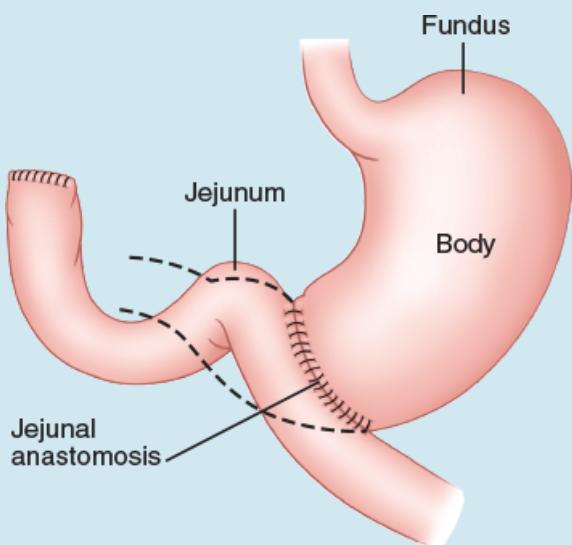
Operation	Description	Adverse Effects
Vagotomy	<p>Severing of the vagus nerve. Decreases gastric acid by diminishing cholinergic stimulation to the parietal cells, making them less responsive to gastrin. May be performed via an open surgical approach or laparoscopy. May be performed to reduce gastric acid secretion. A drainage type of procedure (see pyloroplasty) is usually performed to assist with gastric emptying (because there is total denervation of the stomach).</p> 	Some patients experience problems with feeling of fullness, dumping syndrome, diarrhea, and gastritis.
Truncal vagotomy	Severs the right and left vagus nerves as they enter the stomach at the distal part of the esophagus; most commonly used to decrease acid secretions.	Some patients experience problems with feeling of fullness, dumping syndrome, diarrhea, or constipation.
Selective vagotomy	Severs vagal	Fewer associated

		innervation to the stomach but maintains innervation to the rest of the abdominal organs.	adverse effects than with truncal vagotomy.
Proximal (parietal cell) gastric vagotomy without drainage	Denerves acid-secreting parietal cells but preserves vagal innervation to the gastric antrum and pylorus.	No associated dumping syndrome.	
Pyloroplasty	<p>Longitudinal incision is made into the pylorus and transversely sutured closed to enlarge the outlet and relax the muscle; usually accompanies truncal and selective vagotomies.</p> 	See adverse effects associated with truncal and selective vagotomies, as appropriate.	
Antrectomy Billroth I (gastroduodenostomy)	Removal of the lower portion of the antrum of the stomach (which contains the cells that secrete gastrin) as well as a small portion of the duodenum and pylorus.	Patients may have problems with feeling of fullness, dumping syndrome, and diarrhea.	



The remaining segment is anastomosed to the duodenum. May be performed in conjunction with a truncal vagotomy.

Billroth II (gastrojejunostomy)



Removal of lower portion (antrum) of stomach with anastomosis to jejunum. *Dotted lines* show portion removed (antrectomy). A duodenal stump remains and is oversewn. Patients frequently have associated dumping syndrome, anemia, weight loss, and malabsorption.

Surgery may be performed using a traditional open abdominal approach (requiring a long abdominal incision) or through the use of laparoscopy (only requiring small abdominal incisions). Laparoscopy is a type of minimally invasive surgery that involves the indirect visualization of the abdominal cavity through the use of a laparoscope (a thin flexible tube) attached to a camera. The laparoscope is placed into the abdomen through small “keyhole” incisions (0.5 to 1.5 cm in length). Laparoscopy has been associated with decreased postoperative bleeding, pain, infection, respiratory complications, and recovery time (Davenport, Ueland, Kumar, et al., 2019). The choice of using an open abdominal approach or laparoscopy is determined by the surgeon’s preference and expertise as well as clinical factors, such as the patient’s current health status; the presence of coexisting medical conditions; and a history of previous abdominal surgery.

Follow-Up Care

Recurrence of peptic ulcer disease within 1 year may be prevented with the prophylactic use of H₂ blockers taken at a reduced dose. Not all patients require maintenance therapy; it may be prescribed only for those with two or three recurrences per year, those who have had a complication such as bleeding or gastric outlet obstruction, or those for whom gastric surgery poses too high a risk. The likelihood of recurrence is reduced if the patient avoids smoking, coffee (including decaffeinated coffee) and other caffeinated beverages, alcohol, and ulcerogenic medications (e.g., NSAIDs).

NURSING PROCESS

The Patient with Peptic Ulcer Disease



Assessment

The nurse asks the patient to describe the pain, its pattern and whether or not it occurs predictably (e.g., after meals, during the night), and strategies used to relieve it (e.g., food, antacids). If the patient reports a recent history of vomiting, the nurse determines how often emesis has occurred and notes important characteristics of the vomitus: Is it bright red, does it resemble coffee grounds, or is there undigested food from previous meals? Has the patient noted any bloody or tarry stools?

The nurse also asks the patient to list their usual food intake for a 72-h period. Lifestyle and other habits are a concern as well. For example, do they smoke cigarettes? If yes, how many? Do they use any type of electronic nicotine delivery systems (ENDS)? If yes, what type and how often? Does the patient ingest alcohol? If yes, how much and how often? Are NSAIDs used? Is there a family history of ulcer disease?

The nurse assesses the patient's vital signs and reports tachycardia and hypotension, which may indicate anemia from GI bleeding. The stool is tested for occult blood, and a physical examination, including palpation of the abdomen for localized tenderness, is performed.

Diagnosis

NURSING DIAGNOSES

Based on the assessment data, nursing diagnoses may include the following:

- Acute pain associated with the effect of gastric acid secretion on damaged tissue
- Anxiety associated with an acute illness
- Impaired nutritional intake associated with changes in diet

COLLABORATIVE PROBLEMS/POTENTIAL COMPLICATIONS

Potential complications may include the following:

- Hemorrhage
- Perforation
- Penetration
- Gastric outlet obstruction

Planning and Goals

The goals for the patient may include relief of pain, reduced anxiety, maintenance of nutritional requirements, and absence of complications.

Nursing Interventions

RELIEVING PAIN

Pain relief can be achieved with prescribed medications. The patient should avoid NSAIDs, aspirin in particular, as well as alcohol. In addition, meals should be eaten at regularly paced intervals in a relaxed setting. Medications prescribed to

treat the peptic ulcer should provide relief of ulcer-associated pain. Some patients benefit from learning relaxation techniques to help manage stress and pain.

REDUCING ANXIETY

The nurse assesses the patient's level of anxiety. Explaining diagnostic tests and administering medications as scheduled help reduce anxiety. The nurse interacts with the patient in a relaxed manner; helps identify stressors; and explains various coping techniques and relaxation methods, such as biofeedback, hypnosis, or behavior modification. The patient's family is also encouraged to participate in care and to provide emotional support.

MAINTAINING OPTIMAL NUTRITIONAL STATUS

The nurse assesses the patient for malnutrition and weight loss. After recovery from an acute phase of peptic ulcer disease, the patient is advised about the importance of adhering to the medication regimen and dietary restrictions.

MONITORING AND MANAGING POTENTIAL COMPLICATIONS

Hemorrhage. Gastritis and hemorrhage from peptic ulcer are the two most common causes of upper GI tract bleeding (which may also occur with esophageal varices, as discussed in [Chapter 43](#)). Hemorrhage in patients with duodenal ulcers is associated with an approximately 5% mortality rate (Anand, 2020). Bleeding peptic ulcers account for 27% to 40% of all upper GI bleeds and it may be manifested by hematemesis or melena (Anand, 2020; Upchurch, 2019). The vomited blood can be bright red, or it can have a dark coffee grounds appearance from the oxidation of hemoglobin to methemoglobin. When the hemorrhage is large (2000 to 3000 mL), most of the blood is vomited. Because large quantities of blood may be lost quickly, immediate correction of blood loss may be required to prevent hemorrhagic shock. When the hemorrhage is small, much or all of the blood is passed in the stools, which appear tarry black because of the digested hemoglobin. Management depends on the amount of blood lost and the rate of bleeding.

The nurse assesses the patient for faintness or dizziness and nausea, which may precede or accompany bleeding. The nurse must monitor vital signs frequently and evaluate the patient for tachycardia, hypotension, and tachypnea. Other nursing interventions include monitoring the hemoglobin and hematocrit, testing the stool for gross or occult blood, and recording hourly urinary output to detect anuria or oliguria (absence of or decreased urine production).

Many times, the bleeding from a peptic ulcer stops spontaneously; however, the incidence of recurrent bleeding is high. Because bleeding can be fatal, the cause and severity of the hemorrhage must be identified quickly, and the blood loss treated to prevent hemorrhagic shock. The nurse monitors the patient carefully so that bleeding can be detected quickly. Patients suspected of having an ulcer who present with symptoms of acute GI bleeding should undergo evaluation with endoscopy within 12 h to confirm the diagnosis and allow targeted endoscopic interventions (Upchurch, 2019). These endoscopic interventions may include injecting the bleeding site with epinephrine or alcohol, or cauterizing the site, or clipping the ulcer, all in efforts to stop the bleeding (Anand, 2020; Upchurch, 2019). Arteriography with embolization may be needed if therapeutic endoscopy fails to control the bleeding (Spiliopoulos, Inchingolo, Lucatelli, et al., 2018). If

bleeding cannot be managed by these methods, surgery may be indicated, in which the area of the ulcer is removed, or the bleeding vessels are ligated. Many patients also undergo procedures (e.g., vagotomy and pyloroplasty, gastrectomy) aimed at controlling the underlying cause of the ulcers (see [Table 40-4](#)).

For patients who are not candidates for surgery or for those with persistent, severe bleeding despite medical and endoscopic treatment, arteriography with embolization may be indicated (Spiliopoulos et al., 2018). Arteriography with embolization is more commonly referred to as *Transcatheter Arterial Embolization* (TAE). TAE is an interventional radiologic procedure in which a catheter is placed percutaneously (through the skin) into an artery (e.g., femoral or brachial artery) and is advanced under use of fluoroscopy to the site of the bleeding peptic ulcer. An embolic agent is then delivered via the catheter, which selectively occludes blood flow to the bleeding vessel(s), and thus stops bleeding of the peptic ulcer. Common embolic agents used include metallic coils (a small metal device) and ethylene vinyl alcohol copolymer (Loffroy, Midulla, Falvo, et al., 2018; Spiliopoulos et al., 2018).

The patient with GI bleeding may require treatment for hemorrhagic shock. If that is the case, then the collaborative treatment guidelines described in [Chapter 11](#) must be followed (e.g., hemodynamic monitoring, IV line insertion for fluid resuscitation, blood component therapy). In addition, other related nursing and collaborative interventions may include inserting an NG tube to distinguish fresh blood from material resembling coffee grounds, to aid in the removal of clots and acid through administering a saline lavage, to prevent nausea and vomiting through suction decompression of gastric contents, and to provide a means of monitoring further bleeding.

Perforation and Penetration. Perforation is the erosion of the ulcer through the gastric **serosa** (thin membrane covering the outer surface of the stomach) into the peritoneal cavity without warning. It is an abdominal emergency and requires immediate surgery. Perforation occurs more commonly with duodenal ulcers than it does with gastric ulcers; however, in both cases, it is a very serious complication that can result in sepsis or multiorgan failure (Azer, 2018; Norris, 2019). Penetration is erosion of the ulcer through the gastric serosa into adjacent structures such as the pancreas, biliary tract, or gastrohepatic **omentum** (membranous fold of the peritoneum). Symptoms of penetration include back and epigastric pain not relieved by medications that were effective in the past. Like perforation, penetration usually requires surgical intervention.

Signs and symptoms of perforation include the following:

- Sudden, severe upper abdominal pain (persisting and increasing in intensity); pain may be referred to the shoulders, especially the right shoulder, because of irritation of the phrenic nerve in the diaphragm
- Vomiting
- Collapse (fainting)
- Extremely tender and rigid (boardlike) abdomen
- Hypotension and tachycardia, indicating shock

Because chemical peritonitis develops within a few hours of perforation and is followed by bacterial peritonitis, the perforation must be closed as quickly as possible and the abdominal cavity lavaged of stomach or intestinal contents. In

some patients, it may be safe and advisable to perform surgery to treat the ulcer disease in addition to suturing the perforation.

During surgery and postoperatively, the stomach contents are drained by means of an NG tube. The nurse monitors fluid and electrolyte balance and assesses the patient for localized infection or peritonitis (increased temperature, abdominal pain, paralytic ileus, increased or absent bowel sounds, abdominal distention). Antibiotic therapy is given as prescribed.

Gastric Outlet Obstruction. Peptic ulcer disease is the leading benign (noncancerous) cause of gastric outlet obstruction (Castellanos & Podolsky, 2020). Gastric outlet obstruction occurs when the area distal to the pyloric sphincter becomes scarred and stenosed from spasm or edema or from scar tissue that forms when an ulcer alternately heals and breaks down. The patient may have nausea and vomiting, constipation, epigastric fullness, anorexia, and, later, weight loss.

In treating the patient with gastric outlet obstruction, the first consideration is to insert an NG tube to decompress the stomach. Confirmation that obstruction is the cause of the discomfort is accomplished by assessing the amount of fluid aspirated from the NG tube. A residual of more than 400 mL suggests obstruction. Usually, an upper GI study or endoscopy is performed to confirm gastric outlet obstruction. Decompression of the stomach and management of extracellular fluid volume and electrolyte balances may improve the patient's condition and avert the need for surgical intervention. Balloon dilation of the pylorus via endoscopy may be beneficial. If the obstruction is unrelieved by medical management, surgery (in the form of a vagotomy and antrectomy or gastrojejunostomy and vagotomy) may be required.

PROMOTING HOME, COMMUNITY-BASED, AND TRANSITIONAL CARE

 **Educating Patients About Self-Care.** The nurse educates the patient about the factors that relieve and those that aggravate the condition. The nurse reviews information about medications to be taken at home, including name, dosage, frequency, and possible side effects, stressing the importance of continuing to take medications even after signs and symptoms have decreased or subsided (Chart 40-2). The patient is instructed to avoid medications and foods that exacerbate symptoms (e.g., NSAIDs, alcohol). If relevant, the nurse also informs the patient about the irritant effects of smoking on the ulcer and provides information about smoking cessation programs.

Continuing and Transitional Care. The nurse reinforces the importance of follow-up care; the need to report recurrence of symptoms; and the need for treating possible problems that occur after surgery, such as intolerance to specific foods. The patient and family are reminded of the importance of participating in health promotion activities and recommended health screening.

Evaluation

Expected patient outcomes may include:

1. Reports freedom from pain between meals and at night
2. Reports feeling less anxious
3. Maintains weight
4. Demonstrates knowledge of self-care activities

- a. Avoids irritating foods and beverages (alcohol) and medications such as NSAIDs, particularly aspirin
 - b. Takes medications as prescribed
5. No evidence of complications (e.g., hemorrhage, perforation or penetration, gastric outlet obstruction)
-

Gastric Cancer

According to the American Cancer Society (ACS, 2020b), an estimated 27,000 Americans were expected to be diagnosed with gastric cancer in 2020, and an estimated 11,000 deaths from the disease were expected to occur that year. Gastric cancer is a more common diagnosis among older adults, with the mean age at diagnosis of 68 years (ACS, 2020b). Men have a higher incidence of gastric cancer than women. Hispanic Americans, African Americans, and Asian/Pacific Islanders are at higher risk of developing gastric cancer than Caucasian Americans.

Chart 40-2 HOME CARE CHECKLIST

The Patient with Peptic Ulcer Disease

At the completion of education, the patient and/or caregiver will be able to:

- State the impact of peptic ulcer disease on physiologic functioning, ADLs, IADLs, roles, relationships, and spirituality.
- Explain the importance of and necessity for adherence with prescribed medication regimen.
- Demonstrate methods of keeping track of the medication regimen and storage of the prescribed medications and use reminders such as beepers and/or pillboxes.
- State the name, dose, side effects, frequency, and schedule for all medications.
- Identify foods and other substances to avoid (e.g., food and drinks with extreme temperatures, coffee and other caffeinated beverages, alcohol, foods that were not tolerated in the past).
- Identify side effects and complications that should be reported to primary provider:
 - Hemorrhage—cool skin, confusion, increased heart rate, labored breathing, blood in stool (either bright red or tarry black)
 - Penetration and perforation—severe abdominal pain, rigid and tender abdomen, vomiting, elevated temperature, increased heart rate
 - Gastric outlet obstruction—nausea and vomiting, distended abdomen, abdominal pain
- State how to reach primary provider with questions or complications.
- State time and date of follow-up appointments and testing.
- Identify the need for health promotion (e.g., cessation of use of tobacco products, stress management), disease prevention and screening activities.

ADLs, activities of daily living; IADLs, instrumental activities of daily living.

Worldwide, gastric cancer is the fifth most common cancer diagnosis, with the highest incidence in Eastern and Central Asia (e.g., Republic of Korea, Mongolia, and Japan) and Latin America (Rawla & Barsouk, 2019). Countries with high incidence of gastric cancer, such as Japan, have implemented mass screening programs, which resulted in earlier diagnosis (at a more curable stage of disease), and may have reduced the number of deaths from gastric cancer (ACS, 2020b).

Diet appears to be a significant risk factor for the development of gastric cancer. A diet high in smoked, salted, or pickled foods and low in fruits and vegetables may increase the risk of gastric cancer (ACS, 2020b). *H. pylori* infection is a major risk factor for the development of gastric cancer. Other factors related to the incidence of gastric cancer include gastritis, pernicious anemia, smoking, obesity, achlorhydria, gastric ulcers, previous partial gastrectomy (more than 20 years ago), and genetics (ACS, 2020b; National Cancer Institute [NCI], 2020).

The vast majority of gastric cancers are sporadic or occurring as a result of acquired, not inherited, gene mutations. However, it is understood that gastric cancers may have a familial component (e.g., blood type A and those with another first-degree

relative [parent, sibling, or child] with gastric cancer) and are associated with inherited cancer predisposition syndromes (ACS, 2020b; Cabebe, 2020; NCI, 2020). Inherited cancer predisposition syndromes associated with increased risk of developing gastric cancer include hereditary diffuse gastric cancer, Lynch syndrome (i.e., hereditary non-polyposis colorectal cancer), juvenile polyposis syndrome, familial adenomatous polyposis, and Peutz–Jeghers syndrome (ACS, 2020b; Cabebe, 2020; NCI, 2020).

The prognosis for patients with gastric cancer is generally poor. The 5-year survival rate for all patients with gastric cancer is about 32% (NCI, 2020). One reason for the poor survival rate is that the diagnosis is usually made late because most patients are asymptomatic during the early stages of the disease. Most cases of gastric cancer are discovered only after the cancer has spread from the stomach to involve the lymph nodes or has metastasized to distant organs.

Pathophysiology

Ninety to 95% of gastric cancers are adenocarcinomas, which arise from the mucus-producing cells of the innermost lining of the stomach (ACS, 2020b). Gastric cancer begins with a lesion involving cells on the top layer of the stomach mucosa. The lesion then penetrates cells in the deeper layers of the mucosa, submucosa, and stomach wall. Eventually the lesion infiltrates the stomach wall and extends to organs or structures adjacent to the stomach. Lymph node involvement and metastasis tend to occur early due to the abundant lymphatic and vascular networks of the stomach. Common sites of metastasis include the liver, peritoneum, lungs, and brain (ACS, 2020b).

Clinical Manifestations

Gastric cancer is associated with few if any symptoms in the early stages of the disease (ACS, 2020b; Cabebe, 2020). Symptoms of early-stage disease may include pain that is relieved by antacids, resembling those of benign ulcers, and are seldom definitive. Symptoms of advanced disease are similar to those of peptic ulcer disease, such as dyspepsia, early satiety, weight loss, abdominal pain just above the umbilicus, loss or decrease in appetite, bloating after meals, and nausea or vomiting. Fatigue often occurs as a result of the cancer itself or blood loss from the lesion infiltrating the stomach or surrounding tissue (ACS, 2020b; Cabebe, 2020).

Assessment and Diagnostic Findings

The physical examination is usually not helpful in detecting the cancer because most early gastric tumors are not palpable. Advanced gastric cancer may be palpable as a mass. Ascites and hepatomegaly (enlarged liver) may be apparent if the cancer cells have metastasized to the liver. Palpable nodules around the umbilicus, called *Sister Mary Joseph's nodules*, are a sign of a GI malignancy, usually a gastric cancer (Cabebe, 2020).

Esophagogastroduodenoscopy for biopsy and cytologic washings is the diagnostic study of choice, and a barium x-ray examination of the upper GI tract may also be

performed (ACS, 2020b; Cabebe, 2020; Li, Chung, & Mullen, 2019; Norris, 2019). Endoscopic ultrasound is an important tool to assess tumor depth and any lymph node involvement. Computed tomography (CT) scanning completes the diagnostic studies, particularly to assess for surgical resectability of the tumor before surgery is scheduled. CT scans of the chest, abdomen, and pelvis are valuable in staging gastric cancer.

A CBC may be used to evaluate for the presence of anemia. Assessment of tumor markers (blood analysis for antigens indicative of cancer), such as carcinoembryonic antigen (CEA), carbohydrate antigen (CA 19-9), and CA 50 are monitored to determine the effectiveness of treatment(s). Tumor marker values are usually elevated in the presence of gastric cancer before treatment and decrease if the tumor is responding to the treatment (Cabebe, 2020).

Medical Management

The treatment of gastric cancer is multimodal, often involving surgery, chemotherapy, targeted therapy, and radiation therapy. In general, the patient with a resectable tumor undergoes a surgical procedure to remove the tumor and appropriate lymph nodes. If the tumor can be removed while it is still localized to the stomach, the patient may be cured. In patients with a tumor that is not surgically resectable or those with advanced disease, cure is less likely. Treatment may include surgery to control the cancer growth or for the palliation of symptoms, chemotherapy, targeted therapy, and radiation therapy.

Surgical Management

A total gastrectomy may be performed for a resectable cancer in the midportion or body of the stomach. The entire stomach is removed along with the duodenum, the lower portion of the esophagus, supporting mesentery, and lymph nodes. Reconstruction of the GI tract is performed by anastomosing the end of the jejunum to the end of the esophagus, a procedure called an *esophagojejunostomy*. A radical partial (subtotal) gastrectomy is performed for a resectable tumor in the middle and distal portions of the stomach. A Billroth I or a Billroth II operation (see [Table 40-4](#)) is performed. The Billroth I involves a limited resection and offers a lower cure rate than the Billroth II. The Billroth II procedure is a wider resection that involves removing approximately 75% of the stomach and decreases the possibility of lymph node spread or metastatic recurrence. A proximal partial (subtotal) gastrectomy may be performed for a resectable tumor located in the proximal portion of the stomach or cardia. A total gastrectomy or an esophagogastrectomy is usually performed in place of this procedure to achieve a more extensive resection (Chisti & Willner, 2020; Norris, 2019).

Surgery may be also required to treat common complications of advanced gastric cancer, which may include gastric outlet obstruction, bleeding, and severe pain. Gastric perforation is an emergency situation requiring surgical intervention. A gastric resection may be the most effective palliative procedure for advanced gastric cancer. Palliative procedures such as gastric or esophageal bypass, gastrostomy, or jejunostomy may temporarily alleviate symptoms such as nausea and vomiting.

Palliative rather than radical surgery may be performed if there is metastasis to other vital organs, such as the liver, or to achieve a better quality of life.

Complications of Gastric Surgery

The patient undergoing gastric surgery may experience complications, including hemorrhage, dumping syndrome, bile reflux, and gastric outlet obstruction. Postoperative bleeding from the surgical site is a common complication of gastric surgery. Bleeding may be severe (hemorrhage) and manifest as vomiting large amounts of bright red blood, which may result in hemorrhagic shock (see [Chapter 11](#)). The medical management and nursing care of the patient experiencing hemorrhage is discussed in the Peptic Ulcer Disease section of this chapter.

Dumping syndrome may occur as a result of any surgical procedure that involves the removal of a significant portion of the stomach or includes resection or removal of the pylorus (see [Table 40-4](#)). The rapid bolus of hypertonic food from the stomach to the small intestines draws extracellular fluid into the lumen of the intestines to dilute the high concentrations of electrolytes and sugars, which results in intestinal dilation, increased intestinal transit, hyperglycemia, and the rapid onset of GI and vasomotor symptoms (Kanth & Roy, 2019; NIDDK, 2019). It is estimated that 25% to 50% of all patients who have undergone gastric surgery experience at least some symptoms of dumping syndrome (Kanth & Roy, 2019). Early symptoms tend to occur within 10 to 30 minutes after a meal and often include early satiety, cramping abdominal pain, nausea, vomiting, and diarrhea. Vasomotor symptoms may manifest as a headache, flushing and feelings of warmth, diaphoresis, dizziness, palpitations, drowsiness, faintness, or syncope. Early symptoms tend to resolve within 1 hour or with bowel evacuation (defecation) (NIDDK, 2019). Later, the rapid elevation in blood glucose is followed by the increased secretion of insulin, which results in hypoglycemia 2 to 3 hours after eating. Manifestations of hypoglycemia may include irritability, anxiety, shakiness, weakness, fatigue, diaphoresis, palpitations, and hunger. Dumping syndrome typically lasts for a few months after surgery, although in some patients, symptoms may persist on a long-term basis.

Bile reflux may occur with any gastric surgery that involves manipulation or removal of the pylorus, which acts as a barrier to prevent reflex of duodenal contents back into the stomach. Prolonged exposure of bile acid from the duodenum results in irritation and damage to the gastric mucosa, which may lead to gastritis, esophagitis, and possibly peptic ulcer formation. The patient with bile reflux may experience burning epigastric pain that may increase after meals. Vomiting usually does not provide relief from pain. Pharmacologic management of bile reflux includes the administration of proton pump inhibitors and ursodiol. Ursodiol changes the composition of bile, reducing acidity and promoting gastric healing (Kumar & Thompson, 2017; Li, Zhang, Yao, et al., 2020).

Gastric outlet obstruction may occur as a complication of gastric surgery. Postoperative gastric outlet obstruction may be caused by stenosis (narrowing) or stricture (scar tissue) formation at the surgical anastomosis site. Typical clinical manifestations and management of gastric outlet obstruction were previously discussed (see the Peptic Ulcer Disease section of this chapter).

Chemotherapy and Targeted Therapy

In instances where the gastric tumor is not resectable, treatment with chemotherapy may offer further control of the disease or palliation. Chemotherapy may also be used in addition to surgery as adjuvant treatment of gastric cancer. Chemotherapeutic agents often include fluorouracil, carboplatin, capecitabine, cisplatin, docetaxel, epirubicin, irinotecan, oxaliplatin, and paclitaxel. For improved tumor response rates, it is more common to administer combination chemotherapy, primarily fluorouracil-based therapy, with other agents (e.g., fluorouracil plus cisplatin or oxaliplatin) (ACS, 2020b; National Comprehensive Cancer Network [NCCN], 2020).

Targeted therapies have become an important addition to the treatment of advanced gastric cancers (NCCN, 2020). Trastuzumab (a recombinant humanized anti-HER-2 monoclonal antibody) prescribed in combination with fluorouracil or capecitabine and cisplatin has shown an improvement in survival of patients with advanced gastric cancer who are HER-2 positive (Miura, Sukawa, Hironaka, et al., 2018). Other targeted therapies are currently being investigated for the treatment of advanced gastric cancers. For example, ramucirumab is currently in clinical trial studies in combination with olaparib for tumors considered to be inoperable (NCI, 2020). Ramucirumab works by blocking VEGFR2, which reduces the blood supply to the tumor to decrease tumor growth (NCCN, 2020; Ramucirumab, 2020) ([Chart 40-3](#)).

Radiation Therapy

Radiation therapy is primarily used for advanced gastric cancers to slow the rate of tumor growth or for the palliation of symptoms related to obstruction, bleeding, and significant pain (ACS, 2020b). Radiation therapy may also be used alone or along with chemotherapy before surgery to decrease the size of the tumor or after surgery to destroy any remaining cancer cells and to delay or prevent reoccurrence of the cancer (ACS, 2020b; NCCN, 2020). Common approaches to radiation therapy for gastric cancer include traditional external-beam radiation therapy or newer specialized approaches to external-beam radiation therapy, such as three-dimensional conformal radiation therapy (3D-CRT), intraoperative radiotherapy, and intensity-modulated radiation therapy (IMRT). These specialized approaches to external radiation therapy precisely direct the radiation beam to the site of the tumor, thus limiting damage to the healthy surrounding tissue (ACS, 2020b; Cabebe, 2020).

Chart 40-3



ETHICAL DILEMMA

Should Patients at the End-of-Life Be Enrolled in Clinical Trials?

Case Scenario

You are a nurse who works in an outpatient oncology treatment center. R.K. is a 68-year-old woman who was diagnosed with advanced gastric adenocarcinoma 13 months ago. She had a gastrectomy and peritonectomy last year, and finished six cycles of chemotherapy 2 months ago. Her most recent postchemotherapy positron emission tomography (PET) scans reveal metastatic disease to her liver, lungs, and pelvis. The oncologist discusses her options with R.K. and her husband, and tells them that R.K. should make preparations for end of life. The oncologist tells them that R.K. can elect to receive palliative chemotherapy, which is associated with good quality of life and extended survival by 2 months in most patients like R.K. who take this option. Another option R.K. might pursue is to enroll in a phase I clinical trial with a novel immunotherapeutic agent. The oncologist is clear that the aim of this treatment would be not to extend R.K.'s life, but to test the safety of the new immunotherapy, and that any potential benefits could only be reaped by future patients with gastric cancer. R.K. and her husband decide to go home and discuss her options between themselves. A few days later, they return to the oncology center to tell the oncologist that they wish for R.K. to enroll in the clinical trial. After you finish checking them into an examination room in preparation to see the oncologist, R.K.'s husband turns to you with tears in his eyes and says "I want my wife to have the very best treatments possible. I will take any chance of a cure for her and this new drug might be the right ticket."

Discussion

Phase I of a clinical trial is one of the very earliest steps in testing a new therapy. This step in the research process aims to find if the new therapy is safe in humans. The effectiveness of the new therapy in treating a disease is not subject to testing at this early juncture. R.K.'s oncologist noted this during discussions with R.K. and her husband. However, it is not uncommon for patients and family members who face a life-threatening diagnosis to misunderstand the aims of an intervention or of enrolling in a research study, and falsely assume that there is indeed a therapeutic aim that does not exist. For this reason, most researchers who conduct clinical trials will give patients written information about the nature of the research to read at home and to give them time to digest and discuss their enrollment in the research study with their friends and family members so that they may make a fully informed decision.

Analysis

- Describe the ethical principles that are in conflict in this case (see [Chapter 1, Chart 1-7](#)). Do you believe that R.K. is making a well-informed decision should she go through with enrolling in the clinical trial?
- Is it just to not invite patients who are near end of life to participate in research? Is it morally defensible to offer a patient with a terminal diagnosis the option to enroll in a clinical trial when there is no clear potential benefit to them?
- What if R.K. turns to you, after her husband voices his hopes for a cure, and says "I agree with my husband and I will take any chance I can get!" On the other hand, what if she turns to you and says "My husband is having a difficult

time letting go right now, and I am trying to do my best to support him. I want to do this because I want my death to have some meaning. I want to help future patients with my type of cancer."

- What resources might be mobilized to be of assistance to you and to R.K. and her husband so that they make the decision that is in R.K.'s best interests?

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Resources

See Chapter 1, Chart 1-10 for Steps of an Ethical Analysis and Ethics Resources.



Gerontologic Considerations

Gastric cancer mostly affects older adults. It is estimated that 6 of every 10 patients diagnosed with gastric cancer each year are 65 years old or older (ACS, 2020c). According to most recent Surveillance, Epidemiology, and End Results (SEER) data, 65.9% of all deaths from gastric cancer occur in patients 65 years old or older (NCI, 2020). Confusion, agitation, and restlessness may be the only symptoms seen in older adult patients, who may have no gastric symptoms until their tumors are well advanced. At this time, they present with reduced functional ability and other signs and symptoms of malignancy.

Surgery is more hazardous for the older adult, and the risk increases proportionately with increasing age. Nonetheless, gastric cancer should be treated with surgery in older patients. Patient education is important to prepare older patients with cancer for treatment, to help them manage adverse effects, and to face the challenges that cancer and aging present.

NURSING PROCESS

The Patient with Gastric Cancer

Assessment

The nurse obtains a dietary history from the patient, focusing on recent nutritional intake and status. Has the patient lost weight? If so, how much and over what period of time? Can the patient tolerate a full diet? If not, what foods can they eat? What other changes in eating habits have occurred? Does the patient have an appetite? Does the patient feel full after eating a small amount of food? Is the patient in pain? Do foods, antacids, or medications relieve the pain, make no difference, or worsen the pain? Is there a history of infection with *H. pylori*? Other health information to obtain includes the patient's tobacco use and alcohol history and family history (e.g., any first- or second-degree relatives with gastric or other cancer). A psychosocial assessment, including questions about social support, individual and family coping skills, and financial resources, helps the nurse plan for care in acute and community settings.

After the interview, the nurse performs a complete physical examination, carefully assesses the patient's abdomen for tenderness or masses, and palpates and percusses the abdomen to detect ascites.

Nursing Diagnosis

Based on the assessment data, major nursing diagnoses may include the following:

- Anxiety associated with the disease and anticipated treatment
- Impaired nutritional intake associated with early satiety or anorexia
- Acute pain associated with tumor mass
- Grief associated with the diagnosis of cancer
- Lack of knowledge regarding self-care activities

Planning and Goals

The major goals for the patient may include reduced anxiety, optimal nutrition, relief of pain, and adjustment to the diagnosis and anticipated lifestyle changes.

Nursing Interventions

REDUCING ANXIETY

A relaxed, nonthreatening atmosphere is provided so the patient can express fears, concerns, and possibly anger about the diagnosis and prognosis. The nurse encourages the family or significant other to support the patient, offering reassurance and supporting positive coping measures. The nurse educates the patient about any procedures and treatments so that the patient knows what to expect.

PROMOTING OPTIMAL NUTRITION

The nurse encourages the patient to eat small, frequent portions of nonirritating foods to decrease gastric irritation. Food supplements should be high in calories, as well as vitamins A and C and iron, to enhance tissue repair. Because the patient may develop dumping syndrome when enteral feeding resumes after gastric resection, the nurse explains ways to prevent and manage it and informs the patient

that symptoms often resolve after several months. Management of dumping syndrome includes encouraging six small feedings daily that are low in carbohydrates and sugar and the consumption of fluids between meals rather than with meals. If a total gastrectomy is performed, injection of vitamin B₁₂ will be required for life, because intrinsic factor, secreted by parietal cells in the stomach, binds to vitamin B₁₂ so that it may be absorbed in the ileum. This deficiency in vitamin B₁₂ metabolism can result in decreased production of red blood cells, or pernicious anemia. If the patient is unable to eat adequately prior to surgery to meet nutritional requirements, parenteral nutrition may be necessary. Weight loss is a common occurrence in the postoperative period following gastric surgery. Chemotherapy treatment can contribute to ongoing weight loss. Research suggests that a multidisciplinary approach is necessary to manage symptoms that may contribute to ongoing weight loss such as early satiety, dysphagia, reflux and regurgitation, and elimination issues (Aoyama, Sato, Maezawa, et al., 2017; Grace, Shaw, Lalji, et al., 2018). The nurse monitors the IV therapy and nutritional status and records intake, output, and daily weights to ensure that the patient is maintaining or gaining weight. The nurse assesses for signs of dehydration (thirst, dry mucous membranes, poor skin turgor, tachycardia, decreased urine output) and reviews the results of daily laboratory studies to note any metabolic abnormalities (sodium, potassium, glucose, BUN). Antiemetic agents are given as prescribed.

RELIEVING PAIN

The nurse administers analgesic agents as prescribed. A continuous IV infusion of an opioid or a patient-controlled analgesia (PCA) pump set to infuse an opioid may be necessary to mitigate postoperative pain. The frequency, intensity, and duration of the pain are routinely assessed to determine the effectiveness of the analgesic agent. The nurse works with the patient to help manage pain by suggesting nonpharmacologic methods for pain relief, such as position changes, imagery, distraction, relaxation exercises (using relaxation apps and online videos), backrubs, massage, and periods of rest and relaxation. See [Chapter 9](#) for further discussion of pain management.

PROVIDING PSYCHOSOCIAL SUPPORT

The nurse helps the patient express fears, concerns, and grief about the diagnosis. The nurse answers the patient's questions honestly and encourages the patient to participate in treatment decisions. Some patients mourn the loss of a body part and perceive their surgery as a type of mutilation. Some express disbelief and need time and support to accept the diagnosis (see the Nursing Research Profile in [Chart 40-4](#) for more discussion).

The nurse offers emotional support and involves family members and significant others whenever possible. This includes recognizing mood swings and defense mechanisms (e.g., denial, rationalization, displacement, regression) and reassuring the patient, family members, and significant others that emotional responses are normal and expected. The services of clergy, psychiatric clinical nurse specialists, psychologists, social workers, and psychiatrists are made available, if needed. The nurse projects an empathetic attitude and spends time with the patient. Many patients may begin to participate in self-care activities after they have acknowledged their loss.

PROMOTING HOME, COMMUNITY-BASED, AND TRANSITIONAL CARE

 **Educating Patients About Self-Care.** Self-care activities depend on the type of treatments used—surgery, chemotherapy, radiation, or palliative care. Patient and family education include information about diet and nutrition, treatment regimens, activity and lifestyle changes, pain management, and possible complications ([Chart 40-5](#)). Consultation with a dietitian is essential to determine how the patient’s nutritional needs can best be met at home. The nurse instructs the patient or caregiver about administration of enteral or parenteral nutrition. If chemotherapy or radiation is prescribed, the nurse provides explanations to the patient and family about what to expect, including the length of treatments, the expected side effects (e.g., nausea, vomiting, anorexia, fatigue, neutropenia), and the need for transportation to appointments for treatment. Psychological counseling may also be helpful (see [Chapter 12](#)).

Chart 40-4 NURSING RESEARCH PROFILE

Understanding Uncertainty and Care Needs in Patients with Gastric Cancer

Lee, J. Y., Jang, Y., Kim, S., et al. (2020). Uncertainty and unmet care needs before and after surgery in patients with gastric cancer: A survey study. *Nursing & Health Sciences*, 22(2), 427–435.

Purpose

Patients diagnosed with cancer often experience uncertainty and a variety of other physical, psychological, emotional, and educational needs throughout their illness course. Little is known about unmet care needs across the illness trajectory in patients who have gastric cancer. Gastric cancer is frequently preceded by nonspecific symptoms that patients often attribute to less serious causes; symptom ambiguity at time of diagnosis may contribute to high levels of uncertainty. Varying symptom clusters and levels of symptom intensity and frequency after surgical intervention for gastric cancer may also increase uncertainty. Understanding how uncertainty and needs change over time may help improve the effectiveness of nursing interventions. The purpose of this study was to assess levels of uncertainty and unmet care needs before and after surgery in patients with gastric cancer.

Design

This was a descriptive study using a before and after design to evaluate uncertainty and unmet care needs at time of diagnosis and after gastrectomy in patients with a diagnosis of gastric cancer. Purposeful sampling was used to recruit participants 20 years of age or older with a new diagnosis of gastric cancer; patients receiving chemotherapy or with other types of cancer were excluded. Demographic and clinical data were collected at baseline. Uncertainty was measured using the *Uncertainty in Illness Scale* and unmet care needs were examined using the *Supportive Care Needs Survey-Short Form 34* at two time points; time 1 (day of admission after diagnosis) and time 2 (first postoperative outpatient follow-up). Both scales were translated to Korean and validated. Data were analyzed using descriptive statistics and differences in uncertainty and unmet needs from time 1 to time 2 were examined using a dependent *t*-test.

Findings

Eighty-six participants with a mean age of 58.5 years completed the study; the majority were male (58.1%), married (83.7%), and educated at or above a high school level (74.4%). Most had a diagnosis of early gastric cancer (93%), with no family history of cancer (61.6%), or no cancer-related symptoms prior to their diagnosis (59.3%); the majority (81.4%) had sought out information about gastric cancer after their diagnosis. Patients reported moderate levels of uncertainty at time of diagnosis and after surgery; however, total uncertainty scores and the subscales of ambiguity, inconsistency, and unpredictability were significantly higher at time of diagnosis. Needs related to patient care support, psychological status, and health care system information (e.g., disease progression, testing, recovery, self-management) were also significantly higher at time of diagnosis compared to follow-up. However, physical needs (e.g., tiredness, pain, ability to do usual activities/work at home, and feeling unwell) were significantly higher at follow-up. Needs related to sexuality were low at both time points and there were

no significant differences in scores from time of diagnosis to postoperative follow-up.

Nursing Implications

This study demonstrates that patients who have gastric cancer experience moderate levels of uncertainty related to symptoms, prognosis, and treatment duration that are higher at time of diagnosis. Patient care needs varied across the course of treatment, which suggests that nurses should perform ongoing assessments in various domains and individualize interventions based on patients' priority concerns.

Chart 40-5 HOME CARE CHECKLIST

The Patient with Gastric Cancer

At the completion of education, the patient and/or caregiver will be able to:

- State the impact of cancer and treatment on physiologic functioning, ADLs, IADLs, roles, relationships, and spirituality.
- Identify modification of home environment, interventions, and strategies (e.g., utilizing durable medical equipment, employing a home health aide) used in safely adapting to changes in structure or function and promote effective recovery and rehabilitation.
- Identify foods or therapies necessary to meet caloric needs and dietary needs (e.g., change in consistency, seasoning limitations or other dietary restrictions, supplements, enteral or parenteral therapy).
- Demonstrate safe management of enteral or parenteral feedings, if applicable.
- State the name, dose, side effects, frequency, and schedule for all medications.
- Describe approaches to controlling pain (e.g., take antispasmodic agents as prescribed; use nonpharmacologic interventions).
- When indicated, list possible side effects of chemotherapeutic agents and suggested management approaches.
- When indicated, list possible side effects of radiation therapy and suggested management approaches.
- Identify possible complications (e.g., infection, bleeding, obstruction, perforation or worsening pain or other symptoms) and interventions.
- Relate how to reach primary provider with questions or complications.
- State time and date of follow-up medical appointments, therapy, and testing.
- Identify sources of support (e.g., friends, relatives, faith community, cancer support, caregiver support).
- Identify the need for health promotion, disease prevention, and screening activities.
- Make decisions about end-of-life care as appropriate.

Resources

See [Chapter 39, Chart 39-5](#) for additional information on The Patient Receiving Tube Feeding, and [Chapter 41, Chart 41-7](#) The Patient Receiving Parenteral Nutrition.

ADLs, activities of daily living; IADLs, instrumental activities of daily living.

Continuing and Transitional Care. The need for ongoing care in the home depends on the patient's condition and treatment. The nurse reinforces nutritional counseling and supervises the administration of any enteral or parenteral feedings; the patient or caregiver must become skillful in administering the feedings and in detecting and preventing untoward effects or complications related to the feedings (see [Chapter 39](#)). The nurse instructs the patient or caregiver to record the patient's

daily intake, output, and weight and explains strategies to manage pain, nausea, vomiting, or other symptoms. Education is provided on how to recognize and report signs and symptoms of complications that require immediate attention, such as bleeding, obstruction, perforation, or any symptoms that become progressively worse. The nurse must explain the chemotherapy or radiation therapy regimen and ensure that the patient and family or significant other understand the care that will be needed during and after treatments (see [Chapter 12](#)). Because the prognosis for gastric cancer is poor, the patient, family, or significant other may need assistance with decisions regarding end-of-life care; the nurse should provide support and make referrals as needed.

Evaluation

Expected patient outcomes may include the following:

1. Reports less anxiety
 - a. Expresses fears and concerns about surgery
 - b. Seeks emotional support
2. Attains optimal nutrition
 - a. Eats small, frequent meals high in calories, iron, and vitamins A and C
 - b. Adheres to enteral or parenteral nutrition as needed
3. Has decreased pain
4. Performs self-care activities and adjusts to lifestyle changes
 - a. Resumes typical activities within 3 months
 - b. Alternates periods of rest and activity
 - c. Manages enteral feedings
5. Verbalizes knowledge of disease management
 - a. Acknowledges disease process
 - b. Reports control of symptoms
 - c. Verbalizes fears and concerns about dying; involves family/caregiver in discussions
 - d. Completes advance directives and other appropriate documents

Tumors of the Small Intestine

Benign or malignant tumors of the small intestine are rare. Approximately 64% of all tumors of the small intestines are malignant (Somasundar, Fisichella, & Espan, 2019). Malignant tumors of the small intestine account for only about 1% to 2% of all GI cancers (Somasundar et al., 2019); it was estimated that in 2020, approximately 11,000 new cases of cancer of the small intestine would be diagnosed in the United States (ACS, 2020a). Rates are higher among older adults (mean age at diagnosis of 60 years) and are also higher among African Americans and men (ACS, 2020c). Malignant tumors are often not discovered until they have metastasized to distant sites. Benign tumors may place patients at an increased risk for malignancy (Terry & Santora, 2019). The relative rarity of tumors of the small intestine, the diversity of tumor types (that may include adenocarcinomas, carcinoid tumors, lymphomas, or

sarcomas), and the nonspecific nature of their manifestations complicate their diagnosis and treatment. Multiple factors, including preexisting GI disorders, can increase the risk of tumors in the small intestine and often contribute to advanced metastatic disease at the time of diagnosis. The lack of surveillance for multiple risk factors can contribute to a delay in treatment (Chen & Vaccaro, 2018; Somasundar et al., 2019).

Clinical Manifestations

Tumors of the small intestine often present insidiously with vague, nonspecific symptoms. Most benign tumors are discovered incidentally on an x-ray study, during surgery, or at autopsy. When the patient is symptomatic, benign tumors often present with intermittent pain. The next most common presentation is occult bleeding. Malignant tumors often result in symptoms that lead to their diagnosis, although these symptoms may reflect advanced disease. Most patients have sustained weight loss and may be malnourished at the time of diagnosis. Occult GI bleeding is less common than is found in patients with benign tumors, and complaints of pain are common. The patient also frequently presents with complaints of weakness, fatigue, nausea, vomiting, and intestinal obstruction (ACS, 2020a). Intestinal perforation is rare and associated with a poorer overall prognosis (ACS, 2020a; Somasundar et al., 2019). Clinical manifestations and management of the patient experiencing an intestinal obstruction and intestinal perforation are discussed in [Chapter 41](#).

Assessment and Diagnostic Findings

A CBC may reveal a low hematocrit and hemoglobin level that is consistent with anemia if the patient has an occult source of GI bleeding. The bilirubin may also be elevated if tumor mass has caused biliary obstruction. CEA levels may also be elevated, consistent with a malignant mass.

An upper GI x-ray series with small bowel follow-through using oral water-insoluble contrast with frequent and detailed x-rays to follow the contrast through the small bowel is the traditional approach to diagnosis. A more sensitive examination is an enteroclysis, in which an NG tube is advanced into the small bowel to a position above the area in question; the area is then studied by single- and double-contrast techniques. Abdominal CT scan is used to determine the extent of disease (Somasundar et al., 2019).

Management

Benign tumors of the small intestine include adenomas, lipomas, hemangiomas, and hamartomas (a focal malformation that resembles a neoplasm, but unlike a neoplasm does not result in compression of adjacent tissue). These tumors may be treated endoscopically by excision/resection or electrocautery if the patient is symptomatic. Routine monitoring is recommended to assess for malignant transformation (Terry & Santora, 2019).

The most common primary malignant tumor of the small intestine is adenocarcinoma; the second and third portions of the duodenum are most often

involved. These tumors may present with obstruction. If the tumor is located at the ampulla of Vater, obstructive jaundice is likely. Other rare malignant tumors of the small intestine include carcinoid tumors, lymphoma, and GI stromal tumors (Chen & Vaccaro, 2018; Terry & Santora, 2019). Abdominal surgery may be required to remove these rare tumors. Chemotherapy and radiation therapy are commonly part of the treatment regimen.

The nursing process related to the care of the patient with a tumor of the small intestine is similar to that of the patient with gastric cancer. Each patient requires specialized care, astute assessment for complications, prompt interventions, and individualized education for self-care.

CRITICAL THINKING EXERCISES

1 ebp A 65-year-old woman is diagnosed with a peptic ulcer after experiencing fatigue, epigastric pain associated with meals, and coffee ground emesis. She is started on treatment with omeprazole and sucralfate. The patient asks you if taking these medications will be successful in treating her ulcer. How would you respond to this patient? On what evidence do you base your response?

2 pq A 55-year-old female patient arrives in the emergency department with the onset of melena, abdominal pain, and weight loss of 18 lb. Upon admission, she is awake, alert, and oriented. Her pain level is 8 (on a 0 to 10 numeric pain scale). Her blood pressure is 90/60 mm Hg, heart rate is 126 bpm, respiratory rate is 16 breaths/min and regular, and temperature is 36.7°C (98.1°F). Her abdomen is hard and rigid and no bowel sounds are assessed upon auscultation. What is your first nursing action? Describe the priorities of care for this patient.

3 ipc You are caring for a 67-year-old man who was recently diagnosed with peptic ulcer disease and was admitted with melena. The dietitian met with the patient to discuss changes in his diet. Prior to discharge, you are reviewing a 7-day diet plan with the patient. Describe food selections that would necessitate follow-up with the dietitian prior to the patient's discharge.

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*Asterisk indicates nursing research.

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Resources

- American Cancer Society, www.cancer.org
 American Gastroenterological Association (AGA), www.gastro.org
 Centers for Disease Control and Prevention (CDC), www.cdc.gov
 National Comprehensive Cancer Network (NCCN) Clinical Practice Guidelines, www.nccn.org
 National Digestive Diseases Information Clearinghouse (NDDIC), www.digestive.niddk.nih.gov
 Society of Gastroenterology Nurses and Associates, www.sgna.org

41 Management of Patients with Intestinal and Rectal Disorders

LEARNING OUTCOMES

On completion of this chapter, the learner will be able to:

1. Describe the pathophysiology, clinical manifestations, and management of patients with constipation, diarrhea, fecal incontinence, and irritable bowel syndrome.
2. Identify celiac disease as a disorder of malabsorption; describe its pathophysiology, clinical manifestations, and management.
3. Discuss the nursing management of the patient with appendicitis, diverticular disease, and intestinal obstruction.
4. Compare Crohn's disease and ulcerative colitis with regard to their pathophysiology; clinical manifestations; diagnostic evaluation; and medical, surgical, and nursing management.
5. Identify the purposes, indications for, types, and administration techniques of parenteral nutrition access devices and formulas.
6. Use the nursing process as a framework for care of the patient with inflammatory bowel disease, or receiving parenteral nutrition, or with colorectal cancer.
7. Explain the nursing management of the patient with an anorectal disorder.

NURSING CONCEPTS

Elimination
Inflammation
Nutrition

GLOSSARY

abscess: localized collection of purulent material surrounded by inflamed tissues

central venous access device (CVAD): a device designed and used for administration of sterile fluids, nutrition formulas, and medications into central veins

colostomy: surgical opening into the colon by means of a stoma to allow drainage of bowel contents; one type of fecal diversion

constipation: fewer than three bowel movements weekly or bowel movements that are hard, dry, small, or difficult to pass

diarrhea: an increased frequency of bowel movements or an increased amount of stool with altered consistency (i.e., increased liquidity) of stool

diverticulitis: inflammation of a diverticulum from obstruction by fecal matter resulting in abscess formation

diverticulosis: presence of several diverticula in the intestine

diverticulum: saclike out-pouching of the lining of the bowel protruding through the muscle of the intestinal wall

fecal incontinence: involuntary passage of feces

fissure: normal or abnormal fold, groove, or crack in body tissue

fistula: anatomically abnormal tract that arises between two internal organs or between an internal organ and the body surface

gastrocolic reflex: peristaltic movements of the large bowel occurring five to six times daily that are triggered by distention of the stomach

hemorrhoids: dilated portions of the anal veins

ileostomy: surgical opening into the ileum by means of a stoma to allow drainage of bowel contents; one type of fecal diversion

inflammatory bowel disease (IBD): group of chronic disorders (ulcerative colitis and Crohn's disease) that result in inflammation or ulceration (or both) of the bowel lining

irritable bowel syndrome (IBS): chronic functional disorder characterized by recurrent abdominal pain that affects frequency of defecation and consistency of stool; is associated with no specific structural or biochemical alterations

lipid injectable emulsion (ILE): an oil-in-water emulsion of oils, egg phospholipids, and glycerin (*synonym:* intravenous fat emulsion [IVFE] or lipid)

malabsorption: impaired transport across the mucosa

parenteral nutrition: method of supplying nutrients to the body by an intravenous route

peripherally inserted central catheter (PICC): a device inserted into a peripheral vein and designed and used for administration of sterile fluids, nutrition formulas, and medications into central veins

peritonitis: inflammation of the lining of the abdominal cavity

steatorrhea: excess of fatty wastes in the feces

tenesmus: ineffective and sometimes painful straining and urge to eliminate feces

total nutrient admixture (TNA): an admixture of lipid emulsions, proteins, carbohydrates, electrolytes, vitamins, trace minerals, and water

Between 60 and 70 million people in the United States are diagnosed with some type of disease of the gastrointestinal (GI) tract. These diseases account for more than 48.3

million office visits to health care facilities and clinics and approximately 21.7 million hospital admissions annually. GI diseases cost the American public more than \$141.8 billion and account for approximately 246,000 deaths each year (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2014b). The types of diseases and disorders that affect the lower GI tract are many and varied; examples include constipation, diarrhea, diverticulitis, and inflammatory bowel disease (IBD).

In all age groups, a fast-paced lifestyle, high levels of stress, irregular eating habits, insufficient intake of fiber and water, and lack of daily exercise contribute to GI disorders. There is a growing understanding of the biopsychosocial implications of GI disease. The mind and emotions can have a profound impact on the GI system. Nurses can influence these GI disorders by identifying behavior patterns that put patients at risk, by educating the public about prevention and management, and by helping those affected to improve their condition and prevent complications.

ABNORMALITIES OF FECAL ELIMINATION

Changes in patterns of fecal elimination are symptoms of functional disorders or diseases of the GI tract. The most common changes seen are constipation, diarrhea, and fecal incontinence.

Constipation

Constipation is defined as fewer than three bowel movements weekly or bowel movements that are hard, dry, small, or difficult to pass (Simren, Palsson, & Whitehead, 2017). Approximately 63 million Americans have chronic constipation, making it a very common GI disorder. People more likely to become constipated are women, particularly pregnant women, patients who recently had surgery, older adults, non-Caucasians, and people with a history of irritable bowel syndrome (NIDDK, 2018). Notably, constipation is a symptom and not a disease; however, constipation can indicate an underlying disease or motility disorder of the GI tract. Perceived constipation can also be an issue. This subjective problem occurs when a person's bowel elimination pattern is not consistent with what they consider normal (Dimidi, Cox, Grant, et al., 2019; Mari, Mahamid, Amara, et al., 2020).

Constipation can be caused by certain medications, such as anticholinergic agents, antidepressants, anticonvulsants, antispasmodics (muscle relaxants), calcium channel antagonists, diuretic agents, opioids, aluminum- and calcium-based antacids, and iron preparations. Other causes of constipation may include weakness, immobility, debility, fatigue, celiac disease, and an inability to increase intra-abdominal pressure to facilitate the passage of stools, as may occur in patients with emphysema or spinal cord injury, for instance. Many people develop constipation because they do not take the time to defecate or ignore the urge to defecate. Constipation is also a result of dietary habits (i.e., low consumption of fiber and inadequate fluid intake), lack of regular exercise, and a stress-filled life (NIDDK, 2018). Fiber is particularly important to bowel health because it increases the bulk of stool, generally easing its passage. One of the most significant benefits of dietary fiber, most of which is derived from plant cell walls, is its fermentability, which affects the diversity of microbes in the GI tract and promotes good bowel wall health (Williams, Grant, Gidley, et al., 2017).

Pathophysiology

The pathophysiology of constipation is poorly understood, but it is thought to include interference with one of three major functions of the colon: mucosal transport (i.e., mucosal secretions facilitate the movement of colon contents), myoelectric activity (i.e., mixing of the rectal mass and propulsive actions), or the processes of defecation (e.g., pelvic floor dysfunction). There are four classes of constipation, based upon their underlying pathophysiologic mechanisms (Basson, 2019a):

- Functional constipation, which involves normal transit mechanisms of mucosal transport. This type of constipation is most common and can be successfully treated by increasing intake of fiber and fluids.
- Slow-transit constipation, which is caused by inherent disorders of the motor function of the colon (e.g., Hirschsprung disease), and is characterized by infrequent bowel movements.
- Defecatory disorders, which are caused by dysfunctional motor coordination between the pelvic floor and anal sphincter. Dyssynergic constipation is a common cause of chronic constipation and is caused by an inability to coordinate the abdominal, pelvic floor, and rectoanal muscles to defecate. *Anismus* is a term used to describe pelvic floor dysfunction and constipation. This can cause not only constipation but also fecal incontinence (see later discussion).
- Opioid-induced constipation, which includes new or worsening symptoms that occur when opioid therapy is initiated, changed, or increased and must include two or more symptoms of functional constipation (see later discussion).

The urge to defecate is stimulated normally by rectal distention that initiates a series of four actions: stimulation of the inhibitory rectoanal reflex, relaxation of the internal sphincter muscle, relaxation of the external sphincter muscle and muscles in the pelvic region, and increased intra-abdominal pressure. Interference with any of these processes can lead to constipation.

When the urge to defecate is ignored, the rectal mucous membrane and musculature become insensitive to the presence of fecal masses, and consequently a stronger stimulus is required to produce the necessary peristaltic rush for defecation. The initial effect of fecal retention is to produce irritability of the colon, which at this stage frequently goes into spasm, especially after meals, giving rise to colicky midabdominal or low abdominal pains. After several years of this process, the colon loses muscular tone and becomes essentially unresponsive to normal stimuli (similar to an overstretched balloon). Atony or decreased muscle tone occurs with aging. This may lead to constipation because the stool is retained for longer periods.

Clinical Manifestations

Clinical manifestations of constipation include fewer than three bowel movements per week; abdominal distention; abdominal pain and bloating; a sensation of incomplete evacuation; straining at stool; and the elimination of small-volume, lumpy, hard, dry stools. The patient may report **tenesmus** (i.e., ineffective and sometimes painful straining and urge to eliminate feces) or low back pain. Chronic constipation, often associated with psychological disorders, is the presence of these symptoms for at least 12 weeks during the previous year (Basson, 2019a).

Assessment and Diagnostic Findings

The diagnosis of constipation is based on the patient's history, physical examination, possibly the results of a barium enema or sigmoidoscopy, and stool testing for occult blood. These tests are used to determine whether this symptom results from spasm or narrowing of the bowel. Anorectal manometry (i.e., pressure studies such as a balloon expulsion test) may be performed to assess malfunction of the sphincter. Defecography and colonic transit studies can also assist in the diagnosis because they permit assessment of active anorectal function. X-ray, colonoscopy, and lower GI endoscopy can be used to evaluate the patient with constipation (Basson, 2019a).

As noted previously, the majority of patients with constipation have functional constipation. The Rome IV Diagnostic Criteria provide the framework to make this determination (Simren, Palsson, & Whitehead, 2017) (see Chart 41-1).

Secondary causes of constipation should be evaluated. Neurologic diseases that can impact bowel function include stroke, Parkinson's disease, diabetes, spinal cord injury, and traumatic brain injury. Other causes of secondary constipation include colonic obstruction, rectal or vaginal prolapse, effects of some medications, hemorrhoids, anal fissures, and diverticular disease. Diagnostic testing is usually indicated for patients who fail to respond to conservative treatment (e.g., increasing fluids, fiber, physical activity) after 3 to 6 months (Basson, 2019a).

Complications

Increased arterial pressure can occur with defecation. Straining at stool, which results in the Valsalva maneuver (i.e., forcibly exhaling with the glottis closed), has a striking effect on arterial blood pressure. During active straining, the flow of venous blood in the chest is temporarily impeded because of increased intrathoracic pressure. This pressure tends to collapse the large veins in the chest. The atria and the ventricles receive less blood, and consequently less blood is ejected by the left ventricle. Cardiac output is decreased, and there is a transient drop in arterial pressure, which may cause orthostasis, dizziness, or syncope (Norris, 2019).

Chart 41-1



ASSESSMENT

Rome IV Diagnostic Criteria for Functional Constipation

Reported signs and symptoms must be present for the past 3 months with onset at least 6 months prior to diagnosis; these must include two or more of the following:

- Straining during at least 25% of bowel movements
- Lumpy or hard stools from at least 25% of bowel movements
- Sensation of incomplete evacuation during at least 25% of bowel movements
- Sensation of anorectal obstruction or blockage during at least 25% of bowel movements
- Manual maneuvers (e.g., digital stimulation, support of pelvic floor) needed to facilitate at least 25% of bowel movements
- Less than three spontaneous bowel movements weekly

In addition to these, loose stools are rarely present without the use of laxatives, and there must be insufficient suspicion of irritable bowel syndrome.

Adapted from Lacy, B. E., Mearin, F., Chang, L., et al. (2016). Bowel disorders. *Gastroenterology*, 150(6), 1393–1407.

Additional complications of constipation include fecal impaction, which may lead to fecal incontinence, **hemorrhoids** (dilated portions of anal veins), **fissures** (normal or abnormal folds, grooves, or cracks in body tissue), rectal prolapse, and megacolon (see later discussion of disorders of the anorectum, which includes hemorrhoids and fissures). Fecal impaction occurs when an accumulated mass of dry feces, called a *fecolith*, cannot be expelled. The mass may be palpable on digital examination, may produce pressure on the colonic mucosa that results in ulcer formation, most typically in the rectosigmoid colon, and may cause fecal incontinence, with seepage of liquid stools. Treatment can be embarrassing and also painful, because impaction removal usually involves digital dislodgement and enema administration. An ulcer also has the potential to perforate the colon wall, leading to **peritonitis** (i.e., inflammation of the lining of the abdominal cavity) (Basson, 2019a).

Hemorrhoids develop as a result of perianal vascular congestion caused by straining. Anal fissures may result from the passage of the hard stool through the anus, tearing the lining of the anal canal. The rectum may prolapse through the anal canal, causing seepage of mucus (NIDDK, 2018).

Megacolon is a dilated and atonic colon caused by a fecal mass that obstructs the passage of colon contents. Symptoms include constipation, liquid fecal incontinence, and abdominal distention. Megacolon can lead to perforation of the bowel and peritonitis (Norris, 2019).



Gerontologic Considerations

Visits to primary providers for treatment of constipation are common in people 65 years and older. The most common complaint they voice is the need to strain at stool. The aging process inevitably generates changes in the colon; but the extent and physiologic implications for defecation remain unclear. The clinical situation is made more complex by ubiquitous factors among the aged (Eliopoulos, 2018). For instance, older adults who have loose-fitting dentures or have lost their teeth have difficulty chewing and frequently choose soft, processed foods that are low in fiber. Older adults tend to have decreased

food intake, reduced mobility, and weak abdominal and pelvic muscles, and they are more likely to have multiple chronic illnesses requiring multiple medications (polypharmacy) that often cause constipation. Low-fiber convenience foods are widely used by people who have lost interest in eating. Some older adults reduce their fluid intake if they are not eating regular meals. Depression, weakness, and prolonged bed rest also contribute to constipation by decreasing intestinal motility and anal sphincter tone. Nerve impulses are dulled, and there is a decreased urge to defecate. Many older adults overuse laxatives in an attempt to have a daily bowel movement and become dependent on them. Chronic constipation profoundly impairs quality of life comparable to other conditions such as diabetes, rheumatoid arthritis, and osteoarthritis (Eliopoulos, 2018).

Medical Management

Treatment targets the underlying cause of constipation and prevention of recurrence. It includes education, exercise, bowel habit training, increased fiber and fluid intake, and judicious use of laxatives. Management may also include discontinuing laxative use or replacing medications that could cause or exacerbate constipation with other nonconstipating medications (Lacy, Mearin, Chang, et al., 2016). Patients can be educated to sit on the toilet with legs supported and to utilize the **gastrocolic reflex** (peristaltic movements of the large bowel occurring five to six times daily that are triggered by distention of the stomach) by attempting to defecate following a meal and a warm drink. Routine exercise to strengthen abdominal muscles is encouraged. Biofeedback is a technique that can be used to help patients learn to relax the sphincter mechanism to expel stool. Biofeedback is an effective therapy for patients with dyssynergic defecation and is considered first-line therapy once anorectal structural lesions have been excluded as the cause for constipation (Rao & Patcharatrakul, 2016; Rao, Valestin, Xiang, et al., 2018). Daily dietary intake of 25 to 30 g/day of fiber (soluble and bulk forming) is recommended, especially for the treatment of constipation in the older adult. It is important to add fiber to the diet slowly in order to avoid adverse effects such as abdominal cramping and bloating. Fiber is increased daily in 5 g increments, along with encouraging fluid intake (Mari et al., 2020). If laxative use is necessary, one of the following may be prescribed: bulk-forming agents (fiber laxatives), saline and osmotic agents, lubricants, stimulants, or emollient stool softeners. The physiologic action and patient education information related to these laxatives are presented in [Table 41-1](#). Enemas and rectal suppositories are generally not recommended for treating constipation unless other medications have failed.

Nursing Management

The nurse elicits information about the onset and duration of constipation, current and past elimination patterns, the patient's expectation of normal bowel elimination, and lifestyle information (e.g., exercise and activity level, occupation, food and fluid intake, and stress level) during the health history interview. Past medical and surgical history, current medications, and laxative and enema use are important, as is information about the sensation of rectal pressure or fullness, abdominal pain, excessive straining at defecation, and flatulence.

Chart 41-2 PATIENT EDUCATION

Preventing Constipation

The nurse instructs the patient to:

- Recognize the physiology of defecation and the importance of responding to the urge to defecate.
- Understand the normal variations in patterns of defecation.
- Establish a bowel routine, and be aware that having a regular time for defecation (e.g., best time is after a meal) may aid in initiating the reflex.
- Ensure proper dietary habits, such as eating high-residue, high-fiber foods (e.g., fruits, vegetables); adding fiber to the diet slowly with adequate fluid intake; choosing dietary sources of fiber, which are preferred over fiber supplements; adding bran daily (must be introduced gradually); and increasing fluid intake (unless contraindicated) to help prevent constipation.
- Increase muscle strength through an exercise regimen, increased ambulation, and abdominal muscle toning to help propel colon contents.
- Perform abdominal toning exercises, including contracting abdominal muscles 4 times daily and leg-to-chest lifts 10 to 20 times each day.
- Use the normal position (semisquatting) to maximize the use of abdominal muscles and force of gravity.
- Avoid overuse or long-term use of stimulant laxatives.

After the health history is obtained, the nurse sets specific goals for patient education (see Chart 41-2). Goals for the patient include restoring or maintaining a regular pattern of elimination by responding to the urge to defecate, ensuring adequate intake of fluids and high-fiber foods, learning about methods to avoid constipation, relieving anxiety about bowel elimination patterns, and avoiding complications.

Diarrhea

Diarrhea is an increased frequency of bowel movements (more than 3 per day) with altered consistency (i.e., increased liquidity) of stool. It can be associated with urgency, perianal discomfort, incontinence, nausea, or a combination of these factors (NIDDK, 2016b). Any condition that causes increased intestinal secretions, decreased mucosal absorption, or altered motility can produce diarrhea.

Diarrhea can be classified as acute, persistent, or chronic. Acute diarrhea is self-limiting, lasting 1 or 2 days; persistent diarrhea typically lasts between 2 and 4 weeks; and chronic diarrhea persists for more than 4 weeks and may return sporadically. Acute and persistent diarrheas are frequently caused by viral infections (e.g., norovirus). In addition, some drugs can cause acute or persistent diarrhea, including some antibiotics (e.g., erythromycin) and magnesium-containing antacids (e.g., magnesium hydroxide). Chronic diarrhea may be caused by adverse effects of chemotherapy, antiarrhythmic agents, antihypertensive agents, metabolic and endocrine disorders (e.g., diabetes, Addison disease, thyrotoxicosis), malabsorptive disorders (e.g., lactose intolerance, celiac disease), anal sphincter defect, Zollinger-Ellison syndrome, acquired immune

deficiency syndrome (AIDS), and by parasitic or *Clostridium difficile* infections (NIDDK, 2016b).

TABLE 41-1

Select Laxative Medications

Classification/Medications	Action	Patient Education
Bulk Forming methylcellulose, psyllium, wheat dextrin	Polysaccharides and cellulose and wheat derivatives mix with intestinal fluids, swell, and stimulate peristalsis.	Take with 8-oz water and follow with 8-oz water; do not take dry. Report abdominal distention or unusual amount of flatulence.
Saline Agent magnesium hydroxide	Nonabsorbable magnesium ions alter stool consistency by drawing water into the intestines by osmosis; peristalsis is stimulated. Action occurs within 2 h.	Be aware that the liquid preparation is more effective than the tablet form. Note that only short-term use is recommended because of toxicity (central nervous system or neuromuscular depression, electrolyte imbalance). Do not take magnesium laxatives with renal insufficiency.
Lubricant mineral oil, glycerin suppository	Nonabsorbable hydrocarbons soften fecal matter by lubricating the intestinal mucosa; the passage of stool is facilitated. Action occurs within 6–8 h for mineral oil and within 30 min for glycerin suppository.	Do not take mineral oil with meals, because it can impair the absorption of fat-soluble vitamins and delay gastric emptying. Swallow carefully, because drops of oil that gain access to the pharynx can produce a lipid pneumonia. Insert glycerin suppositories fully and retain.
Stimulant bisacodyl, senna	Irritates the colonic epithelium by stimulating sensory nerve endings and increasing mucosal secretions and decreasing large intestinal water absorption. Action occurs within 6–8 h.	Be aware that catharsis may cause fluid and electrolyte imbalance, especially in the older adult. Do not swallow, crush, or chew tablets. Avoid milk or antacids within 1 h of taking medication, because the enteric coating may dissolve prematurely. Note that stimulant laxatives are <i>not</i> indicated for long-term use.
Emollient Stool Softener docusate	Hydrates the stool by its surfactant action on the colonic epithelium (increases the wetting efficiency of intestinal water); aqueous and fatty substances are mixed. Does <i>not</i> exert a laxative action.	Note that this can be used safely by patients who should avoid straining (cardiac patients, patients with anorectal disorders). Be aware that this will not evacuate hard stool because it is not a true laxative. Best for short-term use; decreased effectiveness with long-term use.
Osmotic Agent polyethylene glycol and electrolytes (sodium and potassium)	Attracts water and electrolytes, increasing intraluminal pressure, shorten colonic transit time, and increase bowel motility.	Polyethylene glycol-based agents originally used for bowel cleansing prior to colonoscopy; now available in powder-base daily dose, which is generally safe and effective. Monitor electrolyte levels with long-term use. Effects of long-term therapy not well known.
Chloride Channel Activator lubiprostone	Stimulates chloride channels in the colonic mucosa, causing passive	Approved for opioid-induced constipation in people with chronic, non-cancer pain. Avoid pregnancy during treatment, keep

	passage of sodium and fluid into the colon.	in mind that it may cause increased flatulence and loose stools. Do not use for more than 4 wks.
Serotonin-4 Receptor Agonist prucalopride	Prokinetic, stimulates selective serotonin receptors in gastrointestinal tract, causing release of acetylcholine, stimulating gastrointestinal motility.	Approved for chronic idiopathic constipation. Selective action reduces cardiovascular adverse effects of other nonselective serotonin receptor agonists.

Adapted from Mari, A., Mahamid, M., Amara, H., et al. (2020). Chronic constipation in the elderly patient: Updates in evaluation and management. *Korean Journal of Family Medicine*, 41(3), 139–145. doi.org/10.4082/kjfm.18.0182

C. difficile is a gram-positive anaerobic organism and the most commonly identified bacterium in antibiotic-associated diarrhea (Mada & Alam, 2019). Approximately half a million patients are infected annually, causing 15,000 deaths. Antibiotic use, including penicillins, cephalosporins, fluoroquinolones, and clindamycin are known risk factors. More than half of patients admitted to the hospital will receive an antibiotic during their stay, and the Centers for Disease Control and Prevention (CDC) estimates that 30% to 50% of those antibiotics are either unnecessary or incorrectly prescribed (Mada & Alam, 2019). Other risk factors for *C. difficile* infection include advanced age, the use of proton pump inhibitors or chemotherapy, and a history of chronic liver disease, kidney disease, or malnutrition.

Pathophysiology

Acute and persistent diarrheas are classified as either noninflammatory (large-volume) or inflammatory (small-volume). Enteric pathogens that are noninvasive (e.g., *S. aureus*, *Giardia*) do not cause inflammation but secrete toxins that disrupt colonic fluid transport. They cause noninflammatory diarrhea, which is characterized by a large volume of loose, watery stools. Other pathogens that invade the intestinal mucosa and cause inflammatory changes typically result in smaller volumes of stool that is bloody (e.g., dysentery). Organisms implicated may include *Shigella*, *Salmonella*, and *Yersinia* species (Norris, 2019).

Types of chronic diarrhea include secretory, osmotic, malabsorptive, infectious, and exudative. Secretory diarrhea is usually high-volume diarrhea. Often associated with bacterial toxins and chemotherapeutic agents used to treat neoplasms, it is caused by increased production and secretion of water and electrolytes by the intestinal mucosa into the intestinal lumen. Osmotic diarrhea occurs when water is pulled into the intestines by the osmotic pressure of unabsorbed particles, slowing the reabsorption of water. It can be caused by lactase deficiency, pancreatic dysfunction, or intestinal hemorrhage. Malabsorptive diarrhea combines mechanical and biochemical actions, inhibiting effective absorption of nutrients. Low serum albumin levels lead to intestinal mucosa swelling and liquid stool. Infectious diarrhea results from infectious agents invading the intestinal mucosa. Exudative diarrhea is caused by changes in mucosal integrity, epithelial loss, or tissue destruction by radiation or chemotherapy. Diarrhea may also be caused by laxative misuse (Norris, 2019).

Clinical Manifestations

In addition to the increased frequency and fluid content of stools, the patient usually has abdominal cramps, distention, borborygmus (i.e., a rumbling noise caused by the movement of gas through the intestines), anorexia, and thirst. Painful spasmodic contractions of the anus and tenesmus may occur with defecation. Other symptoms depend on the cause and severity of the diarrhea but are related to dehydration and to fluid and electrolyte imbalances.

Voluminous, greasy stools suggest intestinal **malabsorption** (i.e., impaired transport across the mucosa), and the presence of blood, mucus, and pus in the stools suggests inflammatory enteritis or colitis. Oil droplets on the toilet water may be suggestive of pancreatic insufficiency. Nocturnal diarrhea may be a manifestation of diabetic neuropathy (NIDDK, 2016b; Weber & Kelley, 2018). The possibility of *C. difficile* infection should be considered in all patients with unexplained diarrhea who are taking or have recently taken antibiotics.

Assessment and Diagnostic Findings

When the cause of the diarrhea is not obvious, the following diagnostic tests may be performed: complete blood cell count (CBC); serum chemistries; urinalysis; routine stool examination; and stool examinations for infectious or parasitic organisms, bacterial toxins, blood, fat, electrolytes, and white blood cells. Endoscopy or barium enema may assist in identifying the cause.

Complications

The most common complication of diarrhea is dehydration. Dehydration with electrolyte loss (especially loss of potassium) may cause cardiac arrhythmias. Loss of bicarbonate with diarrhea can also lead to metabolic acidosis. Urinary output less than 0.5 mL/kg/h for 2 to 3 consecutive hours, muscle weakness, paresthesia, hypotension, anorexia, and drowsiness with a potassium level less than 3.5 mEq/L (3.5 mmol/L) must be reported. Chronic diarrhea can also result in skin care issues related to irritant dermatitis (NIDDK, 2016b). Cleansing with a wet wipe and applying barrier cream can prevent dermatitis.



Gerontologic Considerations

Older patients can become dehydrated quickly and develop hypokalemia (low potassium levels) as a result of diarrhea. The nurse observes for clinical manifestations of muscle weakness, arrhythmias, or decreased peristaltic motility that may lead to paralytic ileus. The older patient taking digitalis (e.g., digoxin) must be aware of how quickly dehydration and hypokalemia can occur with diarrhea. The nurse educates the patient to recognize the symptoms of hypokalemia, because low levels of potassium potentiate the action of digitalis, leading to digitalis toxicity (Eliopoulos, 2018).

The skin of an older person is more sensitive to excoriation due to decreased turgor and reduced subcutaneous fat layers. Gentle cleansing with a perineal cleansing solution (i.e., wet wiping method) and the use of a barrier cream or a liquid skin sealant will prevent or treat the excoriation (Eliopoulos, 2018).

Medical Management

Management is directed at controlling symptoms, preventing complications, and eliminating or treating the underlying disease. Until the definitive cause is discovered, infection control measures that restrict the transmission of infectious organisms (e.g., *C. difficile*–associated diarrhea) are warranted (see [Chapter 66](#) for further discussion of *C. difficile* infection). Certain medications (e.g., antibiotics, anti-inflammatory agents) and antidiarrheal agents (e.g., loperamide, diphenoxylate with atropine) may be prescribed to reduce the severity of the diarrhea and treat the underlying disease. In most cases, loperamide is the medication of choice because it has fewer side effects than diphenoxylate with atropine. Findings from a systematic review supported the use of probiotics (live organisms given to a host) in some forms of diarrhea (Jones & Cantor, 2019). The specific organisms used were *Saccharomyces boulardii* (yeast) or lactic acid bacteria such as *Lactobacillus* and *Enterococcus lactic acid bacterium* species. Benefits include shortened duration of symptoms and early improvement of symptoms; there were no serious adverse effects reported (Jones & Cantor, 2019).

Nursing Management

The nurse assesses and monitors the characteristics and pattern of diarrhea. A health history should address the patient’s medication therapy, medical and surgical history, and dietary patterns and intake. Reports of recent acute illness or recent travel to another geographic area are important. Assessment includes abdominal auscultation and palpation for tenderness. Inspection of the abdomen, mucous membranes, and skin is important to determine hydration status. Stool samples are obtained for testing. The perianal area should also be assessed for skin excoriation.

During an episode of diarrhea, the patient is encouraged to increase intake of liquids and foods low in bulk until the symptoms subside. When the patient is able to tolerate food intake, the patient should avoid caffeine, alcoholic beverages, dairy products, and fatty foods for several days (NIDDK, 2016b). Antidiarrheal medications such as diphenoxylate with atropine or loperamide may be taken as prescribed. Intravenous (IV) fluid therapy may be necessary for rapid rehydration in some patients, especially in older adults and in patients with preexisting GI conditions (e.g., IBD). It is important to monitor serum electrolyte levels closely. The nurse immediately reports evidence of arrhythmias or a change in a patient’s level of consciousness.

The perianal area may become excoriated because diarrheal stool contains digestive enzymes that can irritate the skin. The patient should follow a perianal skin care routine to decrease irritation and excoriation (see [Chapter 56](#)).

Fecal Incontinence

Fecal incontinence or inadvertent bowel leakage describes the recurrent involuntary passage of stool from the rectum for at least 3 months. Factors that influence this disorder include the ability of the rectum to sense and accommodate stool, the amount and consistency of stool, the integrity of the anal sphincters and musculature, and rectal motility. Fecal incontinence is a widespread problem, affecting at least 7 out of 100 nonhospitalized adults and at least half of adults who reside in long-term care facilities

(i.e., nursing homes) (NIDDK, 2017b). Fecal incontinence can have a substantially negative impact on quality of life (NIDDK, 2017b).

Pathophysiology

Fecal incontinence has many causes and risk factors and may be a symptom of an underlying condition. In general, it results from conditions that interrupt or disrupt the structure or function of the anorectal unit. Common causes include anal sphincter weakness, both traumatic (e.g., after surgical procedures involving the rectum) and nontraumatic (e.g., scleroderma); neuropathies, both peripheral (e.g., pudendal) and generalized (e.g., diabetes); disorders of the pelvic floor (e.g., rectal prolapse); inflammation (radiation proctitis, IBD); central nervous system disorders (e.g., dementia, stroke, spinal cord injury, multiple sclerosis); diarrhea; fecal impaction with overflow; and behavioral disorders. It is less commonly a long-term consequence of vaginal childbirth injuries than in years past, most likely because of improved delivery methods. It is more common with advancing age (i.e., weakness or loss of anal or rectal muscle tone) (Emmanuel, 2019; Rao, Bharucha, Chiaroni, et al., 2016).

Clinical Manifestations

Patients may have minor soiling, occasional urgency and loss of control, or complete incontinence. Patients may also experience poor control of flatus, diarrhea, or constipation. Passive incontinence occurs without warning; whereas, patients with urge incontinence have the sensation of the urge to defecate but cannot reach the toilet in time (Rao et al., 2016).

Assessment and Diagnostic Findings

Assessing the patient's medical history is helpful in identifying the most likely etiology. Diagnostic studies are necessary because the treatment of fecal incontinence depends on the cause. A rectal examination and an endoscopic examination such as a flexible sigmoidoscopy are performed to rule out tumors, inflammation, fissures, or impaction. Anorectal manometry, defecography, electromyography, anal endosonography, pelvic MRI scan, and transit studies may be helpful in identifying alterations in intestinal mucosa and muscle tone or in detecting other structural or functional problems (NIDDK, 2017b).

Medical Management

Medical management of fecal incontinence is directed at correcting the underlying cause. If fecal incontinence is related to diarrhea, the incontinence may disappear when diarrhea is successfully treated. Fecal incontinence secondary to a fecal impaction may cease after the impaction is removed and the rectum is cleansed. If the fecal incontinence is related to the use of contributory drugs (e.g., laxatives, antacids containing magnesium), the incontinence may improve or cease when the drug regimen is altered. When fecal incontinence is related to other disorders, treatments targeted at correcting the underlying disorder are initiated. Some patients benefit from the addition of psyllium as a fiber supplement. In addition, administering loperamide 30 minutes prior to meals can be an effective intervention in some patients. Biofeedback therapy with pelvic floor muscle

training can be of assistance if the problem is decreased sensory awareness or sphincter control. Transanal irrigation and bowel training programs, including techniques to assist evacuation such as abdominal massage, Valsalva maneuver, and digital rectal stimulation can also be effective (Emmanuel, 2019; Rao et al., 2016). Sacral nerve stimulation, provided by implanting a subcutaneous stimulator that delivers low amplitude electrical stimulation to the sacral nerve, may be an option for some patients refractory to other interventions (Emmanuel, 2019). Surgical procedures include surgical reconstruction or repair of anal sphincter, artificial sphincter implantation, anal sphincter bulking by injection of synthetic agents, sacral nerve stimulation, or fecal diversion (Emmanuel, 2019).

Nursing Management

The nurse obtains a thorough health history, including information about previous surgical procedures, chronic illnesses, dietary patterns, bowel habits and problems, and current medication regimen. A bowel diary covering a 1- to 2-week period may be helpful in identifying elimination patterns and factors affecting bowel function (Emmanuel, 2019). Stool charts (e.g., Bristol Stool Form, see later discussion) may help with identifying frequency, volume, and consistency of the feces. The nurse also completes an examination of the rectal area. If a fecal impaction is noted, it must be removed before instituting any preventive therapies (Gump & Schmelzer, 2016; Taylor, Lynn, & Bartlett, 2019).

The nurse initiates a bowel training program that involves setting a schedule to establish bowel regularity. The goal is to help the patient achieve fecal continence. If this is not possible, the goal should be to manage the problem so the patient can have predictable, planned elimination. Sometimes it is necessary to use suppositories to stimulate the anal reflex. After the patient has achieved a regular schedule, the suppository can be discontinued. Biofeedback in conjunction with pelvic floor exercises can be used to help the patient improve sphincter contractility and rectal sensitivity. Bowel regulation also involves the therapeutic use of diet and fiber. Foods that thicken stool (e.g., applesauce) and fiber supplements help improve continence (Gump & Schmelzer, 2016). Conversely, foods that loosen stool (e.g., rhubarb, figs, prunes, plums) should be avoided. Some patients with fecal incontinence may benefit from the use of antidiarrheal medications (Gump & Schmelzer, 2016). Loperamide and diphenoxylate with atropine can be used; loperamide is the preferred medication because it does not cause central nervous system adverse effects (Comerford & Durkin, 2020; Rao et al., 2016).

Fecal incontinence can disrupt perineal skin integrity. Maintaining skin integrity is a priority, especially in the debilitated or older adult patient. Incontinence briefs or adult diapers, although helpful in containing the fecal material, permit increased skin contact with feces and may cause skin excoriation. In general, incontinence briefs are to be used only for brief periods of time. The nurse encourages and instructs about meticulous skin hygiene and uses perineal skin cleansers and skin protection products to protect perineal skin. Some patients may benefit from occasional use of foam anal plugs. However, many people find them unacceptable (Gump & Schmelzer, 2016).

Continence sometimes cannot be achieved, and the nurse assists the patient and family to accept and cope with this chronic situation. Patients with dementia may benefit from toileting assistance, including prompted or timed voiding and habit training, which is the setting of a regular time to go to the bathroom (e.g., after breakfast to have a bowel

movement) (Gump & Schmelzer, 2016). The patient can use fecal incontinence devices, which include external collection devices and internal drainage systems. External devices are special rectal pouches (called *fecal incontinence collectors*) that are drainable. They are attached to a synthetic adhesive skin barrier specially designed to conform to the buttocks. Designed for patients with chronic, debilitating illnesses (e.g., in long-term care facilities) or acute illnesses, fecal management systems (e.g., Flexi-Seal Fecal Management System) can be used to eliminate fecal skin contact and are especially useful when there is extensive excoriation or skin breakdown. These systems, which consist of a tube with a low-pressure balloon that conforms to the internal rectal area, may be used for short-term management of liquid stools (no more than 4 consecutive weeks) (see Fig. 41-1).



Figure 41-1 • Flexi-Seal Fecal Management System. Reprinted with permission from ConvaTec, Inc.

Irritable Bowel Syndrome (IBS)

Irritable bowel syndrome (IBS) is a chronic functional disorder characterized by recurrent abdominal pain associated with disordered bowel movements, which may include diarrhea, constipation, or both, without an identifiable cause (Lehrer, 2019; NIDDK, 2017c; Pacheco, Roizenblatt, Góis, et al., 2019). Global prevalence is estimated at 11%; its prevalence among American adults is estimated to be 12%. It is typically diagnosed in adults younger than 45 years of age (NIDDK, 2017c). Women are affected more often than men, with twice as many women diagnosed with IBS in the United States than men. A complex interplay of genetic, environmental, and psychosocial factors is thought to be associated with the onset of IBS. It is believed that some triggers can

either herald the initial onset of IBS or exacerbate symptoms in those with diagnosed IBS; these may include chronic stress, sleep deprivation, neurohormonal deregulation, bacterial overgrowth, genetics, surgery, infections (e.g. *Giardia*), inflammation, and food intolerance (Pacheco et al., 2019).

Pathophysiology

IBS results from a functional disorder of intestinal motility. The change in motility may be related to neuroendocrine dysregulation, especially changes in serotonin signaling, infection, irritation, or a vascular or metabolic disturbance. The peristaltic waves are affected at specific segments of the intestine and in the intensity with which they propel the fecal matter forward. There is no evidence of inflammation or tissue changes in the intestinal mucosa (Norris, 2019).

Clinical Manifestations

Symptoms can vary widely, ranging in intensity and duration from mild and infrequent to severe and continuous. The main symptom is an alteration in bowel patterns: constipation (classified as IBS-C), diarrhea (classified as IBS-D), or a combination of both (classified as IBS-M for “mixed”). The few patients with IBS who do not fit any of these three categories of IBS-C, IBS-D, or IBS-M, are classified as IBS-U for “unclassified.” Pain, bloating, and abdominal distention often accompany changes in bowel pattern. The abdominal pain is sometimes precipitated by eating and is frequently relieved by defecation. IBS frequently occurs concomitant with other GI disorders, including gastroesophageal reflux disease (GERD) and with a variety of non-GI functional disorders, including chronic fatigue syndrome, chronic pelvic pain, fibromyalgia, interstitial cystitis, migraine headaches, anxiety, and depression (NIDDK, 2017c).

Assessment and Diagnostic Findings

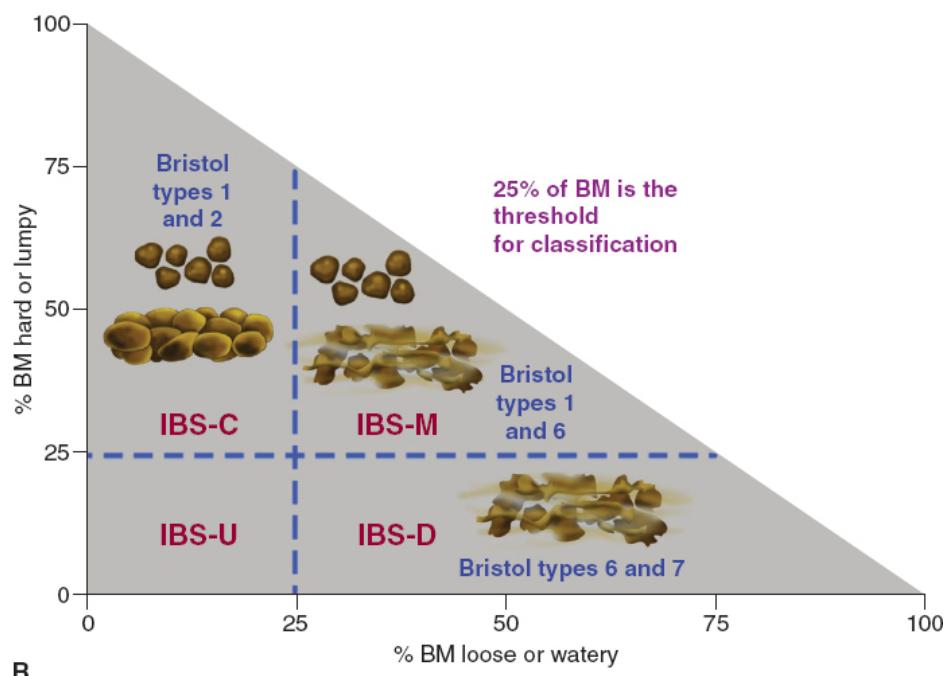
The Rome IV criteria define IBS as recurrent abdominal pain occurring at least once daily during the last 3 months, associated with two or more of the following (Lehrer, 2019):

- Abdominal pain related to defecation;
- Abdominal pain associated with a change in frequency of stool;
- Abdominal pain associated with a change in form/appearance of stool.

Recording the quality and quantity of bowel movements in a stool diary such as the Bristol Stool Form Scale can be useful in determining the category of IBS (Lacy et al., 2016) (see Fig. 41-2).

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on the surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Water, no solid pieces, entirely liquid

A



B

Figure 41-2 • A. The Bristol Stool Form Scale (BSFS) is used to evaluate bowel movement (BM) habit. B. Characteristics of stools as recorded on the BSFS are then used to determine category of irritable bowel syndrome (IBS), where IBS-C (constipation), IBS-D (diarrhea), IBS-M (mixed), and IBS-U (unclassified). Reprinted with permission from Lacy, B. E., Mearin, F., Chang, L., et al. (2016). Bowel disorders. *Gastroenterology*, 150(6), 1393–1407.

A definite diagnosis of IBS also necessitates testing to confirm the absence of structural or other disorders. Results from a CBC and C-reactive protein or fecal calprotectin can rule out IBD (see later discussion) for patients who may have IBS-D or

IBS-M, as well as serologic tests for celiac disease (see later discussion). Stool studies and colonoscopy may be performed to rule out other colon diseases (e.g., colorectal cancer, colitis) (Lacy et al., 2016).

Medical Management

The goals of treatment are to relieve abdominal pain and control diarrhea or constipation. Lifestyle modification, including stress reduction, ensuring adequate sleep, and instituting an exercise regimen, can result in symptom improvement. The introduction of soluble fiber (e.g., psyllium) to the diet is important to IBS management. Restriction and then gradual reintroduction of foods that are possibly irritating may help determine what types of food are acting as irritants. Low-FODMAP diets, which restrict intake of the following types of foods, might improve symptoms for some patients (Pacheco et al., 2019):

- **Fermentable Oligosaccharides** (e.g., wheat, rye, asparagus, legumes, garlic, onions),
- **Disaccharides** (lactose-containing foods such as milk, yogurt),
- **Monosaccharides** (fructose-containing foods such as honey, agave nectar, figs, mangoes), And
- **Polyols** (e.g., blackberries, lychee, and low-calorie sweeteners)

For patients with IBS-D, antidiarrheal agents (e.g., loperamide) may be given to control the diarrhea and fecal urgency. Women with severe IBS-D that persists for more than 6 months that does not respond to other therapies may be prescribed alosetron, a highly selective 5-HT₃ antagonist that slows colonic motility. Other drugs that can mitigate IBS-D symptoms include rifaximin, a nonabsorbable oral antibiotic, and eluxadoline, a mu-receptor agonist/delta-receptor antagonist that neuromodulates colonic motility (Pacheco et al., 2019). Lubiprostone, a chloride channel regulator in the gut, can be prescribed for patients with IBS-C (Lacy et al., 2016).

Patients with all types of IBS complain of abdominal pain. This symptom may be mitigated by prescribing smooth muscle antispasmodic agents (e.g., dicyclomine). Antidepressants can assist in treating underlying anxiety and depression but also have secondary benefits. Antidepressants may affect serotonin levels, thus modulating intestinal transit time and improving abdominal comfort. Peppermint oil, a complementary medication, has proven effective in diminishing abdominal discomfort (Lacy et al., 2016). Other alternatives for IBS management include probiotics. Probiotics are bacteria that include *Lactobacillus* and *Bifidobacterium* that can be given to help decrease abdominal bloating and gas (Lacy et al., 2016).

Nursing Management

The nurse's role is to provide patient and family education and encourage self-care activities. The nurse may provide education on the appropriate use of a bowel habit diary, such as the Bristol Stool Form Scale (see Fig. 41-2A). The nurse emphasizes and reinforces good sleep habits and good dietary habits (e.g., avoidance of food triggers). A good way to identify problem foods is to keep a 1- to 2-week food diary and correlate symptoms with food intake. Patients are encouraged to eat at regular times and to avoid food triggers. They should understand that although adequate fluid intake is necessary, fluid should not be taken with meals because this results in abdominal distention.

Alcohol use and cigarette smoking are discouraged. Stress management via relaxation techniques, cognitive-behavioral therapy, yoga, and exercise can be recommended.

DISORDERS OF MALABSORPTION

The inability of the digestive system to absorb one or more of the major vitamins (especially A and B₁₂), minerals (i.e., iron and calcium), and nutrients (i.e., carbohydrates, fats, and proteins) occurs in disorders of malabsorption. Interruptions in the complex digestive process may occur anywhere in the digestive system and cause decreased absorption (Norris, 2019). The conditions that cause malabsorption can be grouped into the following categories (Norris, 2019):

- Mucosal (transport) disorders causing generalized malabsorption (e.g., celiac disease, Crohn's disease, radiation enteritis)
- Luminal disorders causing malabsorption (e.g., bile acid deficiency, Zollinger-Ellison syndrome, pancreatic insufficiency, small bowel bacterial overgrowth, or chronic pancreatitis)
- Lymphatic obstruction, interfering with transport of fat by products of digestion into the systemic circulation (e.g., neoplasms, surgical trauma).

Chart 41-3 PATIENT EDUCATION

Managing Lactose Intolerance

The nurse instructs the patient to:

- Recognize that deficiency of lactase, a digestive enzyme essential for the digestion and absorption of lactose ("milk sugar") from the intestines, results in an intolerance to milk.
- Prevent symptoms by eliminating milk and milk substances.
- Eliminate processed foods that have fillers, such as dried milk, added to them; recognizing this can help determine which foods may need to be eliminated.
- Reduce symptoms by pretreating foods with lactase preparations (e.g., Lactaid drops) before ingestion or by ingesting lactase enzyme tablets with the first bite of food.
- Understand that most people can tolerate 1 to 2 cups of milk or milk products daily without major problems; they are best tolerated if ingested in small amounts during the day.
- Be aware that lactase activity of yogurt with "active cultures" helps the digestion of lactose within the intestine better than lactase preparations.
- Recognize that milk and milk products are rich sources of calcium and vitamin D; elimination of milk from the diet may result in calcium and vitamin D deficiencies; decreased intake without supplements can lead to osteoporosis.

Table 41-2 lists the clinical and pathologic aspects of select malabsorptive disorders. Chart 41-3 provides an education plan for a patient with lactose intolerance, a common malabsorptive disorder caused by a deficiency in lactase.

Celiac Disease

Celiac disease is a disorder of malabsorption caused by an autoimmune response to consumption of products that contain the protein gluten. Gluten is most commonly found in wheat, barley, rye, and other grains, malt, dextrin, and brewer's yeast. Celiac disease has become more common in the past decade, with an estimated prevalence of 1% in the United States. Women are afflicted twice as often as men. This disease is more common among Caucasians, although the rates of celiac disease are on the rise among non-Caucasians. Celiac disease also has a familial risk component, particularly among first-degree relatives. Others at heightened risk include those with type 1 diabetes, Down syndrome, and Turner syndrome. Celiac disease may manifest at any age in a person who is genetically predisposed (NIDDK, 2016a).

Pathophysiology

Nearly 30% of the population in the United States may be genetically predisposed to developing celiac disease. Individuals who are predisposed share a major histocompatibility complex (MHC) class II allele human leukocyte antigen (HLA), HLA-DQ2 or HLA-DQ8. Those who develop celiac disease exhibit an autoimmune response to gluten products that is both humoral and cell mediated. It is not known what trigger or triggers may incite this autoimmune response, although it cannot occur if gluten is not ingested. As a result of this response, the epithelial cells that line the small intestines become inflamed, particularly the proximal portion, where most absorption of nutrients occurs. Eventually, the mucosal villi of the small intestine become denuded and cannot function. This results in loss of ability to absorb both micronutrients and macronutrients, causing systemic nutritional deficits (Norris, 2019).

TABLE 41-2 Select Disorders of Malabsorption

Diseases/Disorders	Pathophysiology	Clinical Features
Gastric resection with gastrojejunostomy	Decreased pancreatic stimulation because of duodenal bypass; poor mixing of food, bile, pancreatic enzymes; decreased intrinsic factor	Weight loss, moderate steatorrhea, anemia (combination of iron deficiency, vitamin B ₁₂ malabsorption, folate deficiency)
Pancreatic insufficiency (chronic pancreatitis, pancreatic carcinoma, pancreatic resection, cystic fibrosis)	Reduced intraluminal pancreatic enzyme activity, with maldigestion of lipids and proteins	History of abdominal pain followed by weight loss; marked steatorrhea, azotorrhea (excess of nitrogenous matter in the feces or urine); also frequent glucose intolerance (70% in pancreatic insufficiency)
Ileal dysfunction (resection or disease)	Loss of ileal absorbing surface leads to reduced bile salt pool size and reduced vitamin B ₁₂ absorption; bile in colon inhibits fluid absorption	Diarrhea, weight loss with steatorrhea, especially when >100-cm resection, decreased vitamin B ₁₂ absorption
Stasis syndromes (surgical strictures, blind loops, enteric fistulas, multiple jejunal diverticula, scleroderma)	Overgrowth of intraluminal intestinal bacteria, especially anaerobic organisms, to $>10^6/\text{mL}$ results in deconjugation of bile salts, leading to decreased effective bile salt pool size, also bacterial utilization of vitamin B ₁₂	Weight loss, steatorrhea; low vitamin B ₁₂ absorption; may have low D-xylose absorption
Zollinger-Ellison syndrome	Hyperacidity in duodenum inactivates pancreatic enzymes	Ulcer diathesis, steatorrhea
Lactose intolerance	Deficiency of intestinal lactase results in high concentration of intraluminal lactose with osmotic diarrhea	Varied degrees of diarrhea and cramps after ingestion of lactose-containing foods; positive lactose intolerance test, decreased intestinal lactase
Celiac disease (gluten-sensitive enteropathy)	Toxic response to a gluten fraction gliadin by surface epithelium results in destruction of absorbing surface of intestine	Weight loss, diarrhea, bloating, anemia (low iron, folate), osteomalacia, steatorrhea, azotorrhea, low D-xylose absorption; folate and iron malabsorption
Tropical sprue	Unknown toxic factor results in mucosal inflammation, partial villous atrophy	Weight loss, diarrhea, anemia (low folate, vitamin B ₁₂); steatorrhea; low D-xylose absorption, low vitamin B ₁₂ absorption
Whipple disease	Bacterial invasion of intestinal mucosa	Arthritis, hyperpigmentation, lymphadenopathy, serous effusions, fever, weight loss, steatorrhea, azotorrhea
Certain parasitic diseases (giardiasis, strongyloidiasis, coccidiosis, capillariasis)	Damage to or invasion of surface mucosa	Diarrhea, weight loss; steatorrhea; organism may be seen on jejunal biopsy or recovered in stool
Immunoglobulinopathy	Decreased local intestinal defenses, lymphoid hyperplasia, lymphopenia	Frequent association with <i>Giardia</i> : hypogammaglobulinemia or

Adapted from Hammami, M. B. (2019). Malabsorption. *Medscape*. Retrieved on 2/29/2019 at: emedicine.medscape.com/article/180785-overview; Norris, T. L. (2019). *Porth's pathophysiology: Concepts of altered health states* (10th ed.). Philadelphia, PA: Wolters Kluwer.

Clinical Manifestations

The most common GI clinical manifestations of celiac disease include diarrhea, steatorrhea, abdominal pain, abdominal distention, flatulence, and weight loss. However, these manifestations are more common among children than adults. Adults can present with non-GI signs and symptoms of celiac disease, which are highly variable and can include fatigue, general malaise, depression, hypothyroidism, migraine headaches, osteopenia, anemia, seizures, paresthesias in the hands and feet, and a red, shiny tongue. Some adults and children may evidence ridges in the enamel of their adult teeth, as well as discoloration or yellowing. Dermatitis herpetiformis is a rash that is frequently associated with celiac disease in adults; it manifests as clusters of erythematous macules that develop into itchy papules and vesicles on the forearms, elbows, knees, face, or buttocks (NIDDK, 2016a).

Assessment and Diagnostic Findings

A comprehensive assessment of the patient's presenting signs and symptoms, as well as a family history and risk factor assessment, may provide the first clues that the patient may have celiac disease. The definitive diagnosis is based upon a series of serologic tests and endoscopic biopsy. It is important that the patient continues to consume gluten products during testing, or there could be a false-negative serologic finding. The first serologic test is the immunoglobulin A (IgA) anti-tissue transglutaminase (tTG), which is 90% sensitive and 95% specific to celiac disease. Findings are confirmed with upper endoscopy with biopsies of the proximal small intestine (Goebel, 2019).

Medical Management

Celiac disease is a chronic, noncurable, lifelong disease. There are no drugs that induce remission; the treatment is to refrain from exposure to gluten in foods and other products (see later discussion). A consultation with a dietitian may be advisable. The patient should be advised that it will likely take time before bothersome signs and symptoms resolve; it will take a full year before the integrity of the intestinal villi can be restored. The patient should be cautioned that despite adhering to a gluten-free diet, symptoms can still occur and can have an impact on quality of life (Roos, Liedberg, Hellström, et al., 2019). Other manifestations of celiac disease may require specific, targeted treatment. For instance, patients who present with anemia may require folate, cobalamin, or iron supplements (see Chapter 29). Patients with osteopenia may require treatment for osteoporosis (see Chapter 36).

Nursing Management

The nurse provides patient and family education regarding adherence to a gluten-free diet (see Chart 41-4), and how to avoid other gluten products. For instance, oats are not

contraindicated in gluten-free diets; however, many oat products are produced in facilities that are cross-contaminated with wheat or other contraindicated grains. Likewise, gluten-free foods prepared in restaurants or dining areas that share preparatory space can become gluten-contaminated. For instance, gluten-free toast prepared in a toaster that is also used for wheat-based toast can become gluten-contaminated. Patients must become vigilant in asking restaurant and dining hall staff about how gluten-free foods are prepared.

Chart 41-4 PATIENT EDUCATION

How to Avoid Gluten

The nurse instructs the patient to choose foods that are naturally gluten-free such as:

- Fresh fruits and vegetables
- Meat and poultry
- Fish and seafood
- Dairy
- Beans, legumes, and nuts
- Corn, rice, soy, quinoa, and potato

The nurse instructs the patient to avoid foods that commonly contain gluten, including the following:

- Wheat (wheat-free does not mean gluten-free), barley, bran, durum, spelt, faro, rye, bulgur, graham, semolina, farina, emmer, and triticale; these are generally used in:
 - Cakes, pastries, cookies
 - Breads, pastas, rolls, pizza, crackers
- Brewer's yeast; this generally includes beer, ale, and porter
- Malt, malt extract, and malt flavoring
- Modified food starch made from wheat (commonly contained in sour cream)

The nurse instructs the patient to exercise caution and carefully read labels on foods,^a particularly before consuming the following:

- Candies (gluten-free candy list is available on Celiac Disease Foundation site)
- Caramel-colored foods
- Cornflakes and puffed rice cereals (these often contain malt flavoring or extract, which contains gluten)
- Oat products not specifically labeled as produced in gluten-free facilities
- Processed lunch meats and "shaped" foods (e.g., cheese sticks)
- Salad dressings, condiments, soy sauce, seasonings
- Sauces (wheat is often used as thickening agent)
- Soft drinks

^aThe U.S. Food and Drug Administration (FDA) standard for "gluten-free" is that the product must contain less than 200 parts per million (ppm) of gluten.

Adapted from Celiac Disease Foundation. Gluten-Free Living. Retrieved on 2/29/2020 at: celiac.org/gluten-free-living/gluten-free-foods/

Products that are not foods can also contain gluten. Many generic and over-the-counter drugs can be prepared with gluten gels. Toothpastes, communion wafers, and some cosmetics (e.g., lipsticks) and art supplies (e.g., modeling clay) can also contain gluten. Patients must understand how to carefully read labels on both foods and nonfood products to determine if they contain gluten. The U.S. Food and Drug Administration (FDA) regulates and monitors the appropriate application of gluten-free labels.

ACUTE ABDOMEN

An acute abdomen, sometimes called a *surgical abdomen* is characterized by an acute onset of abdominal pain that does not have a traumatic etiology and that most typically requires swift surgical intervention to prevent peritonitis, sepsis, and septic shock. Disorders of the lower GI tract that may cause similar initial presenting clinical manifestations, causing acute abdominal pain and an acute abdomen include appendicitis, severe diverticulitis, and intestinal obstruction, all of which may lead to peritonitis.

Peritonitis

Peritonitis is inflammation of the peritoneum, which is the serous membrane lining the abdominal cavity and covering the viscera. Usually, it is a result of bacterial infection but may occur secondary to a fungal or mycobacterial infection; the organisms come from diseases or disorders of the GI tract or, in women, from the internal reproductive organs (e.g., fallopian tube). The most common bacteria implicated are *Escherichia coli* and *Klebsiella*, *Proteus*, *Pseudomonas*, and *Streptococcus* species. Peritonitis can also result from external sources such as abdominal surgery or trauma (e.g., gunshot wound, stab wound) or an inflammation that extends from an organ outside the peritoneal area, such as the kidney, or from continuous ambulatory peritoneal dialysis (CAPD) (see [Chapter 48](#)). Peritonitis can be categorized as (Daley, 2019):

- Primary peritonitis, also called *spontaneous bacterial peritonitis (SBP)*, occurs as a spontaneous bacterial infection of ascitic fluid. This occurs most commonly in adult patients with liver failure (see [Chapter 43](#)).
- Secondary peritonitis occurs secondary to perforation of abdominal organs with spillage that infects the serous peritoneum. The most common causes include a perforated appendix (see later discussion), perforated peptic ulcer (see [Chapter 40](#)), perforated sigmoid colon caused by severe diverticulitis (see later discussion), volvulus of the colon (see later discussion), and strangulation of the small intestine (see later discussion). The major focus of this section is on secondary peritonitis.
- Tertiary peritonitis occurs as a result of a superinfection in a patient who is immunocompromised. Tuberculous peritonitis in a patient with AIDS is an example of tertiary peritonitis; these are rare causes of peritonitis.

Pathophysiology

Secondary peritonitis is caused by leakage of contents from abdominal organs into the abdominal cavity, usually as a result of inflammation, infection, ischemia, trauma, or tumor perforation. Bacterial proliferation occurs. Edema of the tissues results, and exudation of fluid develops in a short time. Fluid in the peritoneal cavity becomes turbid

with increasing amounts of protein, white blood cells, cellular debris, and blood. The immediate response of the intestinal tract is hypermotility, soon followed by paralytic ileus with an accumulation of air and fluid in the bowel (Daley, 2019; Norris, 2019).

Clinical Manifestations

Symptoms depend on the location and extent of the inflammation. The early clinical manifestations of peritonitis frequently are the signs and symptoms of the disorder causing the condition (e.g., manifestations of infection). At first, pain is diffuse but then becomes constant, localized, and more intense over the site of the pathologic process (site of maximal peritoneal irritation). Movement usually aggravates the pain. The affected area of the abdomen becomes extremely tender and distended, and the muscles become rigid. Rebound tenderness may be present. Usually, anorexia, nausea, and vomiting occur and peristalsis is diminished, followed by paralytic ileus. An initial temperature of 37.8° to 38.3°C (100° to 101°F) can be expected, along with an increased pulse rate. With progression of the condition, patients may become hypotensive and oliguric or anuric. Without swift and decisive intervention, clinical manifestations will mirror those of sepsis and septic shock (Daley, 2019) (see [Chapter 11](#)).

Assessment and Diagnostic Findings

The white blood cell count is elevated ($> 11,000/\text{mm}^3$) and may demonstrate a relative increase in the bands (i.e., immature neutrophils), consistent with bacterial infection (Daley, 2019). The hemoglobin and hematocrit levels may be low if blood loss has occurred. Serum electrolyte studies may reveal altered levels of potassium, sodium, and chloride. Blood chemistry panels and arterial blood gases may reveal dehydration and acidosis.

An abdominal x-ray may show free air and fluid as well as distended bowel loops. Abdominal ultrasound may reveal **abscesses** (localized collection of purulent material surrounded by inflamed tissues) and fluid collections, and ultrasound-guided aspiration may assist in easier placement of drains. A computed tomography (CT) scan of the abdomen may show abscess formation. Peritoneal aspiration and culture and sensitivity studies of the aspirated fluid may reveal infection and identify the causative organisms. Ultrasound-guided paracentesis may be indicated for the patient with ascites. MRI may be used for diagnosis of intra-abdominal abscesses (Daley, 2019).

Medical Management

Fluid, colloid, and electrolyte replacement is the major focus of medical management. The administration of several liters of an isotonic solution is prescribed. Hypovolemia occurs because massive amounts of fluid and electrolytes move from the intestinal lumen into the peritoneal cavity and deplete the fluid in the vascular space.

Analgesic medications are prescribed for pain. Antiemetic agents are given as prescribed for nausea and vomiting. Intestinal intubation and suction assist in relieving abdominal distention and in promoting intestinal function. Fluid in the abdominal cavity can cause pressure that restricts expansion of the lungs and causes respiratory distress. Oxygen therapy by nasal cannula or mask generally promotes adequate oxygenation, but airway intubation and ventilatory assistance occasionally are required.

Antibiotic therapy is initiated early in the treatment of peritonitis. Large doses of a broad-spectrum antibiotic are given IV until the specific organism causing the infection is identified and appropriate antibiotic therapy can be initiated.

The main focus of treatment in secondary peritonitis is to identify and control the source of infection, maintain organ function, and prevent complications (Daley, 2019). Treatment is multidisciplinary and involves hemodynamic support, fluid and electrolyte replacement, systemic broad-spectrum antibiotics, and nutritional support. Control of the source of infection can be treated surgically and nonsurgically depending on the patient's condition and underlying pathology. Nonsurgical treatment includes percutaneous drainage of abscesses and endoscopic stent placement. In select instances, ultrasound-guided and CT-guided peritoneal drainage of abdominal and extraperitoneal abscesses has allowed for avoidance or delay of surgical therapy until the acute septic process has subsided (Daley, 2019). Surgical treatment is directed toward excision (e.g., appendix), resection with or without anastomosis (e.g., intestine), repair (e.g., perforation), and drainage (e.g., abscess). With extensive sepsis, a fecal diversion may need to be created (see later discussions). Antibiotic therapy is continued postoperatively.



Nursing Management

Intensive care is needed for the patient with septic shock (see [Chapter 11](#)). Signs indicating that peritonitis is subsiding include a decrease in temperature and pulse rate, softening of the abdomen, return of peristaltic sounds, passing of flatus, and bowel movements. The nurse increases fluid and food intake gradually and reduces parenteral fluids as prescribed. A worsening clinical condition may indicate a complication, and the nurse must prepare the patient for emergency surgery. The nursing management of a patient treated for secondary peritonitis is based upon the patient's primary diagnosis and treatment (see later discussions of [Nursing Management of Patients with Appendicitis, Diverticular Disease, and Intestinal Obstruction](#)).

Appendicitis

The appendix is a small, vermiform (i.e., wormlike) appendage about 8 to 10 cm (3 to 4 inches) long that is attached to the cecum just below the ileocecal valve. The appendix fills with byproducts of digestion and empties regularly into the cecum. Because it empties inefficiently and its lumen is small, the appendix is prone to obstruction and is particularly vulnerable to infection (i.e., appendicitis). Appendicitis, the most frequent cause of acute abdomen in the United States, is the most common reason for emergency abdominal surgery. Although it can occur at any age, it typically occurs between the ages of 10 and 30 years. Its incidence is slightly higher among males and there is a familial predisposition (Craig, 2018; NIDDK, 2014a).

Pathophysiology

The appendix becomes inflamed and edematous as a result of becoming kinked or occluded by a fecolith, lymphoid hyperplasia (secondary to inflammation or infection), or rarely, foreign bodies (e.g., fruit seeds) or tumors. The inflammatory process increases

intraluminal pressure, causing edema and obstruction of the orifice. Once obstructed, the appendix becomes ischemic, bacterial overgrowth occurs, and eventually gangrene or perforation occurs (Craig, 2018).

Clinical Manifestations

Vague periumbilical pain (i.e., visceral pain that is dull and poorly localized) with anorexia progresses to right lower quadrant pain (i.e., parietal pain that is sharp, discrete, and well localized) and nausea in approximately 50% of patients with appendicitis (Craig, 2018). A low-grade fever may be present. Local tenderness may be elicited at McBurney's point when pressure is applied (see Fig. 41-3). Rebound tenderness (i.e., production or intensification of pain when pressure is released) may be present. Rovsing's sign may be elicited by palpating the left lower quadrant; this paradoxically causes pain to be felt in the right lower quadrant (see Fig. 41-3). If the appendix has ruptured, the pain becomes consistent with peritonitis (see previous discussion); abdominal distention develops as a result of paralytic ileus, and the patient's condition worsens (Craig, 2018).

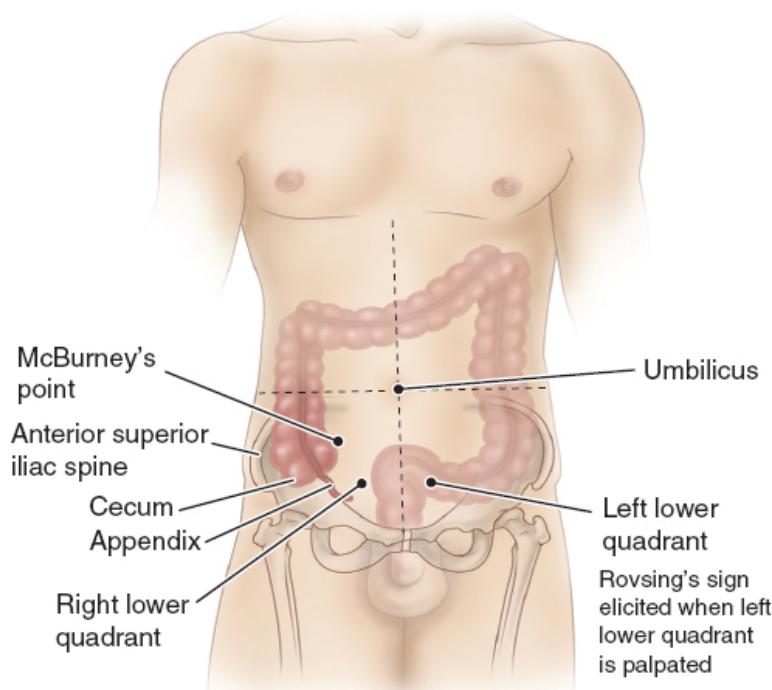


Figure 41-3 • When the appendix is inflamed, tenderness can be noted in the right lower quadrant at McBurney's point, which is between the umbilicus and the anterior superior iliac spine. Rovsing's sign is pain felt in the right lower quadrant after the left lower quadrant has been palpated.

Constipation can also occur with appendicitis. Laxatives given in this instance may result in perforation of the inflamed appendix. In general, a laxative or cathartic should not be given when a person has fever, nausea, and abdominal pain.

Assessment and Diagnostic Findings

Diagnosis is based on the results of a complete history and physical examination, laboratory findings, and imaging studies. The white blood cell (WBC) count is useful when determining diagnosis; between 80% and 85% of adults with appendicitis will have a WBC count $>10,500/\text{mm}^3$; 78% of patients have neutrophilia, where neutrophils comprise $>75\%$ of the WBCs (Daley, 2019). C-reactive protein levels are typically elevated, especially within the first 12 hours of symptoms, but may return to normal in patients who are symptomatic longer than 24 hours (Daley, 2019). A CT scan or ultrasound is used to confirm the diagnosis. A pregnancy test may be ordered for women of childbearing age to rule out ectopic pregnancy and before radiologic studies are done. As an alternative, a transvaginal ultrasound may be used to confirm the diagnosis (Craig, 2018). A urinalysis is usually obtained to rule out urinary tract infection or renal calculi.

Complications

The major complications of appendicitis are gangrene or perforation of the appendix, which can lead to peritonitis, abscess formation, or portal pylephlebitis, which is septic thrombosis of the portal vein caused by vegetative emboli that arise from septic intestines. Perforation generally occurs within 6 to 24 hours after the onset of pain and leads to peritonitis (Craig, 2018; Spelman, 2019).



Gerontologic Considerations

Acute appendicitis is uncommon in older adults. When appendicitis does occur, classic signs and symptoms are altered and may vary greatly. Pain may be absent or minimal. Symptoms may be vague, suggesting bowel obstruction or another process. Fever and leukocytosis may not be present. As a result, diagnosis and prompt treatment may be delayed, causing complications and mortality. The patient may have no symptoms until the appendix becomes gangrenous or perforates. The incidence of complications is higher in older adults because many of these patients do not seek health care as quickly as younger patients (Craig, 2018; Eliopoulos, 2018).

Medical Management

Immediate surgery is typically indicated if appendicitis is diagnosed (Craig, 2018). To correct or prevent fluid and electrolyte imbalance, dehydration, and sepsis, antibiotics, and IV fluids are given until surgery is performed. Appendectomy (i.e., surgical removal of the appendix) is performed as soon as possible to decrease the risk of perforation. Appendectomy has traditionally been performed under general anesthesia with an open technique via transverse incision in the right lower quadrant (laparotomy). The laparoscopic approach is becoming the procedure of choice; it allows the patient an earlier return to normal activities (Santacroce, 2019). Both laparotomy and laparoscopy are safe and effective in the treatment of appendicitis with or without perforation. Antibiotic prophylaxis is recommended for less than 24 hours for nonperforated appendicitis and for <5 days for perforated appendicitis (Daley, 2019). Antibiotic selection should follow guidelines outlined by the CDC to prevent surgical site infections (CDC, 2017a).

Some patients may have abscess formation that involves the cecum or terminal ileum. In these select cases, appendectomy may be deferred until the mass is drained. Most

commonly, these abscesses are drained percutaneously or surgically. The patient continues to receive treatment with antibiotics. After the abscess is drained and there is no further evidence of infection, an appendectomy is then performed (Craig, 2018).

Nursing Management

Goals include relieving pain, preventing fluid volume deficit, reducing anxiety, preventing or treating surgical site infection, preventing atelectasis, maintaining skin integrity, and attaining optimal nutrition.

The nurse prepares the patient for surgery, which includes an IV infusion to replace fluid loss and promote adequate renal function, antibiotic therapy to prevent infection, and administration of analgesic agents for pain. An enema is not given because it can lead to perforation.

After surgery, the nurse places the patient in a high Fowler position. This position reduces the tension on the incision and abdominal organs, helping to reduce pain. It also promotes thoracic expansion, diminishing the work of breathing, and decreasing the likelihood of atelectasis. The patient is educated on the use of an incentive spirometer and encouraged to use it at least every 2 hours while awake (see [Chapter 19](#) for discussion on atelectasis and incentive spirometry). A parenteral opioid (e.g., morphine) is typically prescribed to relieve pain; this is switched to an oral agent when the patient is able to tolerate oral fluids and foods. Any patient who was dehydrated before surgery receives IV fluids. When tolerated, oral fluids are given. Food is provided as desired and tolerated on the day of surgery when bowel sounds are present. The nurse auscultates for the return of bowel sounds and queries the patient for passing of flatus. Urine output is monitored to ensure that the patient is not hampered by postoperative urinary retention and to ensure that hydration status is adequate. The patient is encouraged to ambulate the day of surgery to reduce risks of atelectasis and venous thromboembolism (VTE) formation.

The patient may be discharged on the day of surgery if the temperature is within normal limits, there is no undue discomfort in the operative area, and the appendectomy was performed laparoscopically. Discharge instruction for the patient and family is imperative. The nurse instructs the patient to make an appointment to have the surgeon remove any sutures and inspect the wound between 1 and 2 weeks after surgery. Incision care and activity guidelines are discussed; heavy lifting is to be avoided postoperatively, although normal activity can usually be resumed within 2 to 4 weeks.

Patients with a gangrenous or perforated appendix are at greater risk for infection and peritonitis; therefore, they may be kept in the hospital for several days. Secondary abscesses may form in the pelvis, under the diaphragm, or in the liver, causing elevation of the temperature, pulse rate, and white blood cell count. When the patient is ready for discharge, the patient and family are educated about how to care for the incision and perform dressing changes and irrigations as prescribed. A home health nurse may be needed to assist with this care and to monitor the patient for complications and wound healing.

A **diverticulum** is a saclike herniation of the lining of the bowel that extends through a defect in the muscle layer. True diverticula are herniations of all layers of the GI wall (mucosa, muscularis propria, and adventitia), while pseudo-diverticula only involve the mucosa and submucosa (Ghoulam, 2019). Diverticula may occur anywhere in the GI tract, from the esophagus to the colon, but occur most commonly in the colon. In the colon there is only one complete muscle layer, in contrast to the small intestine and rectum which have two muscular layers. People with Asian ancestry are more likely to develop diverticula in the right colon, while people of European descent are more prone to diverticular disease in the sigmoid colon (Ghoulam, 2019).

Diverticulosis is defined by the presence of multiple diverticula without inflammation or symptoms. Diverticular disease of the colon is very common in developed countries, and its prevalence increases with increasing age; it is present in half of all adults over 65 years of age, and 70% of adults over 80 years of age (Krzyzak & Mulrooney, 2019). Diverticulosis is the most common pathologic incidental finding on colonoscopy. Approximately 80% of patients with diverticulosis never develop any complications or symptoms of disease. Risk factors include low intake of dietary fiber, slow colonic transit time, obesity, a history of cigarette smoking, regular use of nonsteroidal anti-inflammatory drugs (NSAIDs), and a positive family history. Dietary factors such as high intake of red meat, fat, particularly dairy fat, and refined sugar are strongly associated with diverticular disease (Ghoulam, 2019; Krzyzak & Mulrooney, 2019).

Diverticulitis is inflammation of one or more diverticula and is a common reason for elective colectomy (Ghoulam, 2019). Approximately 1% to 4% of people with diverticulosis develop diverticulitis; of those, 20% will have another episode within 10 years (Ghoulam, 2019).

Pathophysiology

Diverticula form when the mucosal and submucosal layers of the colon herniate through the muscular wall because of high intraluminal pressure, low volume in the colon (i.e., fiber-deficient contents), and decreased muscle strength in the colon wall (i.e., muscular hypertrophy from hardened fecal masses). The etiology of diverticulitis is not completely understood. One theory is the cause due to an altered immune response in the gut microbiome (Krzyzak & Mulrooney, 2019). Other explanations are feces or food particles become trapped in diverticula, resulting in bacterial overgrowth, distention, increased intraluminal pressure, muscle spasms, vascular compromise, and subsequent micro- or macroperforation. Complications include intra-abdominal abscesses, peritonitis, **fistula** (abnormal tract formation), and hemorrhage (Krzyzak & Mulrooney, 2019). Repeated bouts of diverticulitis can result in scar tissue formation, which may lead to narrowing of the colonic lumen and bowel obstruction.

Bowel contents can accumulate in a diverticulum and decompose, causing inflammation and infection. The diverticulum can also become obstructed and then inflamed if the obstruction continues. The inflammation of the weakened colonic wall of the diverticulum can cause it to perforate, giving rise to irritability and spasticity of the colon (i.e., diverticulitis). In addition, abscesses may develop and may eventually perforate, leading to peritonitis and erosion of the arterial blood vessels, resulting in bleeding. When a patient develops symptoms of diverticulitis, microporformation of the colon has occurred.

Clinical Manifestations

Chronic constipation sometimes precedes the development of diverticulosis by many years. Most commonly, no problematic symptoms occur with diverticulosis. Some patients may have mild signs and symptoms that include bowel irregularity with intervals of alternating constipation and diarrhea, with nausea, anorexia, and bloating or abdominal distention.

With diverticulitis, up to 70% of patients report an acute onset of mild to severe cramping pain in the left lower quadrant (Ghoulam, 2019). This may be accompanied by a change in bowel habits, most typically constipation or obstipation (i.e., severe constipation) and bloating, with nausea, fever, and leukocytosis. Acute complications of diverticulitis may include abscess formation, bleeding, and peritonitis. If an abscess develops, the associated findings are tenderness, a palpable mass, fever, and leukocytosis. Inflamed diverticula may erode areas adjacent to arterial branches, causing massive rectal bleeding. An inflamed diverticulum that perforates results in abdominal pain localized over the involved segment, usually the sigmoid; local abscess or peritonitis follows (see previous discussion).

Recurrent episodes of diverticulitis may cause chronic complications that include fistula formation, including colovesicular fistulas (i.e., between the colon and bladder) and, in women, colovaginal fistulas (i.e., between the colon and vagina). As a response to repeated inflammation, the colon may narrow with scar tissue and fibrotic strictures, leading to cramps, narrow stools, and increased constipation, or, at times, intestinal obstruction (see later discussion).

Assessment and Diagnostic Findings

Diverticulosis is typically diagnosed by colonoscopy, which permits visualization of the extent of diverticular disease. Laboratory tests that assist in diagnosis of diverticulitis include a CBC; if the patient has frank blood in the stool, the hemoglobin level should be analyzed. The WBC is frequently elevated; however, a normal WBC count does not rule out diverticulitis. Up to 40% of patients with diverticulitis have a normal WBC count (Ghoulam, 2019). Urinalysis and urine cultures should be analyzed in patients with suspected colovesicular fistulas.

An abdominal CT scan with contrast agent is the diagnostic test of choice to confirm diverticulitis; it can also reveal perforation and abscesses. Abdominal x-rays may demonstrate free air under the diaphragm if a perforation has occurred from the diverticulitis. Results from these radiologic tests confirm whether or not the patient has uncomplicated diverticulitis or complicated diverticulitis that could require surgical intervention. The Modified Hinchey Classification System is used as a guide to determine treatment (Hinchey, Schaal, & Richards, 1978; Krzyzak & Mulrooney, 2019) (see [Table 41-3](#)).



Gerontologic Considerations

The incidence of diverticular disease increases with age because of degeneration and structural changes in the circular muscle layers of the colon and because of cellular hypertrophy. The symptoms are less pronounced in the older adult than in other adults. Older adults may not have abdominal pain until infection occurs. They may delay

reporting symptoms because they fear surgery or are afraid that they may have cancer (Eliopoulos, 2018).

Medical Management

Medical management is guided by the severity of disease and the presence of comorbid diagnoses and complications. Treatment for patients with uncomplicated diverticulitis is on an outpatient basis with diet and medication. This is the typical treatment for most patients with diagnosed diverticulitis. Rest, oral fluids, and analgesic medications are recommended. Initially, a clear liquid diet is consumed until the inflammation subsides; then a high-fiber, low-fat diet is recommended. This type of diet helps increase stool volume, decrease colonic transit time, and reduce intraluminal pressure. The American Gastroenterology Association recommends selective use of antibiotics for patients with acute, uncomplicated diverticulitis (Ghoulam, 2019).

TABLE 41-3 Modified Hinchey Classification: Staging of Acute, Complicated Diverticulitis

Modified Hinchey Classification Stage	Description	Category
0	Mild diverticulitis or diverticula with colonic thickening on CT	Uncomplicated
Ia	Colonic reaction with inflammatory reaction in the pericolic fat	Uncomplicated
Ib	Localized pericolic or mesenteric abscess	Complicated
II	Intra-abdominal, pelvic, or retroperitoneal abscess	Complicated
III	Perforated diverticulitis causing generalized purulent peritonitis	Complicated
IV	Rupture of diverticula into the peritoneal cavity with generalized fecal peritonitis	Complicated

Adapted from Ghoulam, E. M. (2019). Diverticulitis. *Medscape*. Retrieved on 2/29/2020 at:

emedicine.medscape.com/article/173388-overview; Krzyzak, M., & Mulrooney, S. (2019).

Diverticulitis: A review of diagnosis, treatment, and prevention. *Consultant*, 59(2), 35–37, 44.

In acute cases of diverticulitis with significant symptoms, hospitalization is required. Hospitalization is often indicated for those who are older, immunocompromised, taking corticosteroids, or unable to tolerate oral fluids. Patients with complicated disease (see Table 41-3) can require hospitalization; those with higher stages require surgery and hospitalization (see later discussion). Withholding oral intake, administering IV fluids, and instituting nasogastric (NG) suctioning if vomiting or distention occurs are used to rest the bowel. Broad-spectrum antibiotics (e.g., ampicillin/sulbactam, ticarcillin/clavulanate) are prescribed. An opioid or other analgesic agent may be prescribed for pain relief. Oral intake is increased as symptoms subside. A low-fiber diet may be necessary until signs of infection decrease.

Surgical Management

Although acute diverticulitis usually subsides with medical management, immediate surgical intervention is necessary if complications (e.g., perforation, peritonitis, hemorrhage, obstruction) occur. In cases of abscess formation without peritonitis,

hemorrhage, or obstruction, CT-guided percutaneous drainage may be performed to drain the abscess, and IV antibiotics are given. After the abscess is drained and the acute episode of inflammation has subsided (after approximately 6 weeks), surgery may be recommended to prevent repeated episodes. Two types of surgery are typically considered either to treat acute complications or prevent further episodes of inflammation:

- One-stage resection, in which the inflamed area is removed and a primary end-to-end anastomosis is completed
- Multiple-stage procedures for complications such as obstruction or perforation (see Fig. 41-4)

The type of surgery performed depends on the extent of complications found during the procedure. When possible, the area of diverticulitis is resected and the remaining bowel is joined end to end (i.e., primary resection and end-to-end anastomosis). This is performed using traditional surgical or laparoscopically assisted colectomy with lavage. A two-stage resection may be performed in patients with Hinchey Stage IV diverticulitis; the diseased colon is resected (as in a one-stage procedure) but no anastomosis is performed. In this procedure, one end of the bowel is brought out to the abdominal wall and the distal end is closed over and left in the abdomen (Hartmann procedure), or if the blood supply to the distal colon is questionable, both ends of the bowel are brought out to the abdominal wall (double-barrel). Both Hartmann procedures and double-barrel colostomies usually can be reanastomosed at a later time.

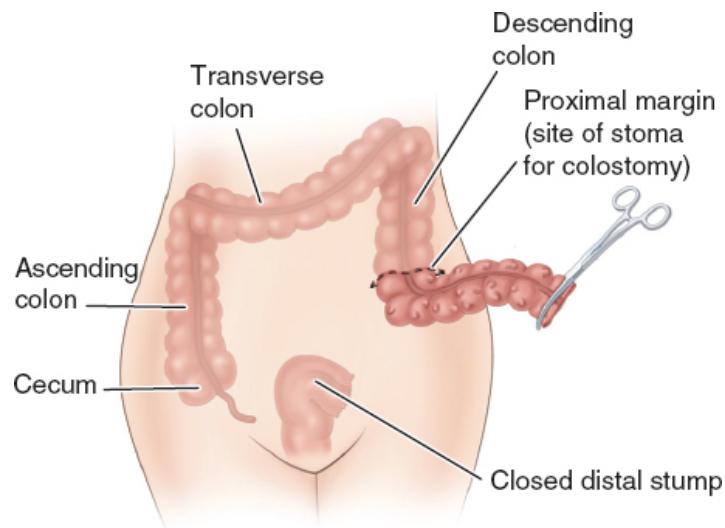


Figure 41-4 • Hartmann procedure for diverticulitis: primary resection for diverticulitis of the colon. The affected segment (*clamp attached*) has been divided at its distal end. In a primary anastomosis, the proximal margin (*dotted line*) is transected and the bowel attached end to end. In a two-stage procedure, a colostomy is constructed at the proximal margin with the distal stump oversewn (Hartmann procedure, as shown) and the stump is left in the pelvis. The distal stump may be brought to the surface as a mucous fistula if there is concern about blood supply. The second stage consists of colostomy takedown and anastomosis.

Nursing Management

The nurse recommends a fluid intake of 2 L/day (within limits of the patient's cardiac and renal reserve) and suggests foods that are soft but have increased fiber, such as prepared cereals or soft-cooked vegetables, to increase the bulk of the stool and facilitate peristalsis, thereby promoting defecation. An individualized exercise program is encouraged to improve abdominal muscle tone. It is important to review the patient's daily routine to establish a schedule for meals and a set time for defecation and to assist in identifying habits that may have suppressed the urge to defecate. The nurse encourages daily intake of bulk laxatives such as psyllium, which helps propel feces through the colon. Some people with diverticulosis may have food triggers such as nuts and popcorn that bring on a diverticulitis attack, whereas others may not report food triggers. If triggers are identified, patients should be urged to avoid them.

For the patient who has had a colostomy placed, refer to the later section on Nursing Management of the Patient Requiring an Ostomy.

Intestinal Obstruction

Intestinal obstruction exists when blockage prevents the normal flow of intestinal contents through the intestinal tract. Two types of processes can impede this flow (Norris, 2019; Ramnarine, 2017):

- *Mechanical obstruction:* *Extrinsic* lesions from outside the intestines or *intrinsic* lesions within the intestines can obstruct flow. Examples of extrinsic lesions include adhesions, hernias, and abscesses. Examples of intrinsic lesions include intestinal tumors (benign and cancerous), strictures (from prior surgery or radiation), or *intraluminal* lesions due to a defect in the bowel lumen (e.g., intussusception).
- *Functional or paralytic obstruction:* The intestinal musculature cannot propel the contents along the bowel either due to interruption of innervation or vascular supply to the bowel. Examples are amyloidosis, muscular dystrophy, endocrine disorders such as diabetes, or neurologic disorders such as Parkinson's disease. The blockage also can be temporary and the result of the manipulation of the bowel during surgery (i.e., ileus).

Obstruction can occur in the large or small intestine and can be partial or complete. Severity depends on the region of bowel affected, the degree to which the lumen is occluded, and especially the degree to which the vascular supply to the bowel wall is disturbed. Most obstructions occur in the small intestine. Adhesions, hernia, and tumor account for 90% of obstructions in the small intestines (Bordeianou & Yeh, 2019). Other causes of small bowel obstruction include Crohn's disease, intussusception, volvulus, and paralytic ileus. Most obstructions in the large intestines occur in the sigmoid colon. The most common causes of large bowel obstruction are cancer (60%), diverticular disease (20%), and volvulus (5%). Other causes of large bowel obstruction include benign tumors, strictures, and obstipation or fecal impaction (Hopkins, 2017). [Table 41-4](#) and [Figure 41-5](#) list mechanical causes of obstruction and describe how they occur.

TABLE 41-4 Mechanical Causes of Intestinal Obstruction

Cause	Description	Result
Adhesions	Loops of intestine become adherent to areas that heal slowly or scar after abdominal surgery; occurs most commonly in small intestine	After surgery, adhesions produce a kinking of an intestinal loop.
Intussusception (see Fig. 41-5A)	One part of the intestine slips into another part located below it (like a telescope shortening); occurs more commonly in infants than adults	The intestinal lumen becomes narrowed, and blood supply becomes strangulated.
Volvulus (see Fig. 41-5B)	Bowel twists and turns on itself and occludes the blood supply	Intestinal lumen becomes obstructed. Gas and fluid accumulate in the trapped bowel.
Hernia (see Fig. 41-5C)	Protrusion of intestine through a weakened area in the abdominal muscle wall	Intestinal flow may be completely obstructed. Blood flow to the area may be obstructed as well.
Tumor	A tumor that exists within the wall of the intestine extends into the intestinal lumen, or a tumor outside the intestine causes pressure on the wall of the intestine. Most common type is colorectal adenocarcinoma	Intestinal lumen becomes partially obstructed; if the tumor is not removed, complete obstruction results.

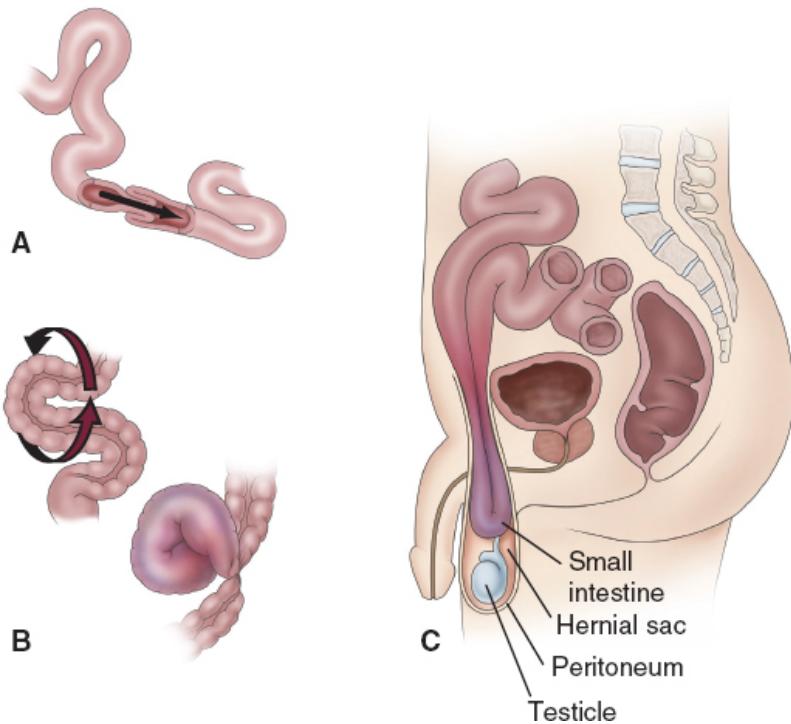


Figure 41-5 • Three causes of intestinal obstruction. **A.** Intussusception; invagination or shortening of the colon caused by the movement of one segment of bowel into another. **B.** Volvulus of the sigmoid colon; the twist is counterclockwise in most cases. Note the edematous bowel. **C.** Hernia (inguinal). The sac of the hernia is a continuation of the peritoneum of the abdomen. The hernial contents are intestine, omentum, or other abdominal contents that pass through the hernial opening into the hernial sac.

Small Bowel Obstruction

Pathophysiology

Intestinal contents, fluid, and gas accumulate proximal to the intestinal obstruction. The abdominal distention and retention of fluid reduce the absorption of fluids and stimulate more gastric secretion. With increasing distention, pressure within the intestinal lumen increases, causing a decrease in venous and arteriolar capillary pressure. Third-spacing of fluids, electrolytes, and proteins into the intestinal lumen occurs, resulting in decreased circulating fluid volume and dehydration. With continued intestinal distention and edema, perfusion to the affected intestinal segment can be compromised, leading to ischemia, necrosis, and eventual rupture or perforation of the intestinal wall, with resultant peritonitis (Bordeianou & Yeh, 2019; Ramnarine, 2017).

Clinical Manifestations

The initial symptom is usually crampy pain that is wavelike and colicky due to persistent peristalsis both above and below the blockage. The patient may pass blood and mucus but no fecal matter and no flatus. Vomiting occurs. If the obstruction is complete, the peristaltic waves initially become extremely vigorous and eventually assume a reverse

direction, with the intestinal contents propelled toward the mouth instead of toward the rectum. The signs of dehydration become evident: intense thirst, drowsiness, oliguria, generalized malaise, aching, and a parched tongue and mucous membranes. The patient may continue to have flatus and stool early in the process due to distal peristalsis. The abdomen becomes distended. The lower the obstruction in the GI tract, the more marked the abdominal distention; this may cause reflux vomiting. Vomiting results in loss of hydrogen ions and potassium from the stomach, leading to reduction of chloride and potassium in the blood and to metabolic alkalosis. Dehydration and acidosis develop from loss of water and sodium. With acute fluid losses, hypovolemic shock may occur; septic shock may also occur (Bordeianou & Yeh, 2019; Ramnarine, 2017) (see [Chapter 11](#)).

Assessment and Diagnostic Findings

Diagnosis is based on the symptoms, physical assessment findings, and the results of imaging studies. Early in the process, bowel sounds are high-pitched and hyperactive in an attempt to pass the obstruction; later, bowel sounds will be hypoactive. Changes in the pattern (constant) or increased intensity of bowel sounds may also be indicative of strangulation or ischemic bowel (Bordeianou & Yeh, 2019; Ramnarine, 2017). Abdominal x-ray and CT scan findings include abnormal quantities of gas, fluid, or both in the intestines and sometimes collapsed distal bowel. Laboratory studies (i.e., electrolyte studies and a CBC) reveal a picture of dehydration, loss of plasma volume, and possible infection. The approach to small bowel obstruction focuses on confirming the diagnosis, identifying the etiology, and determining the likelihood of strangulation.

Medical Management

Decompression of the bowel through insertion of an NG tube is necessary for all patients with small bowel obstruction; this may be tried for up to 3 days for patients with partial obstructions, as resting the bowel in this manner can result in resolution of the obstruction (Ramnarine, 2017). For patients with adhesions, administration of hypertonic water-soluble GI contrast media (Gastrograffin) may be of benefit in stimulating peristalsis and determining the probability of needing surgical intervention. The dye is administered via NG tube, the tube is clamped for 2 to 4 hours, then an abdominal x-ray is taken within 6 to 24 hours; evidence of the dye in the large intestine is predictive of resolution of obstruction without surgical intervention (Bordeianou & Yeh, 2019).

Surgical Management

Approximately 25% of patients with obstruction will need surgical intervention (Bordeianou & Yeh, 2019). When the bowel is completely obstructed, the possibility of strangulation and tissue necrosis warrants surgical intervention. Before surgery, IV fluids are necessary to replace the depleted water, sodium, chloride, and potassium.

The surgical treatment of intestinal obstruction depends on the cause of the obstruction. For the most common causes of obstruction, such as hernia and adhesions, the surgical procedure involves repairing the hernia or dividing the adhesion to which the intestine is attached. In some instances, the portion of affected bowel may be removed and an anastomosis performed. The complexity of the surgical procedure depends on the

duration of the intestinal obstruction and the condition of the intestine. Open or laparoscopic technique can be used.

Nursing Management

Nursing management of the patient with a small bowel obstruction who does not require surgery includes maintaining the function of the NG tube, assessing and measuring the NG output, assessing for fluid and electrolyte imbalance, monitoring nutritional status, and assessing for manifestations consistent with resolution (e.g., return of normal bowel sounds, decreased abdominal distention, subjective improvement in abdominal pain and tenderness, passage of flatus or stool).



Quality and Safety Nursing Alert

Maintaining fluid and electrolyte balance is a priority to monitor in the patient with a small bowel obstruction. The presence of the NG tube in conjunction with the patient's nothing-by-mouth (NPO) status places the patient at significant risk of fluid imbalance. Thus, measures to promote fluid balance are critically important.

The nurse reports discrepancies in the patient's intake and output, worsening of pain or abdominal distention, and increased NG output. If the patient's condition does not improve, the nurse prepares them for surgery. This preparation includes preoperative education as the patient's condition indicates. Nursing care of the patient after surgical repair of a small bowel obstruction is similar to that for other abdominal surgeries (see Chapter 16).

Unfolding Patient Stories: Stan Checketts • Part 2



Recall from **Chapter 9 Stan Checketts**, who arrived in the emergency department with severe abdominal pain. He is diagnosed with a small bowel obstruction. He is NPO and has an NG tube placed to low intermittent suction. Describe the steps of a focused GI assessment performed by the nurse. How would the nurse explain the rationale for an NG tube and NPO status? What are specific assessments and nursing care responsibilities for an NG tube?

Care for Stan and other patients in a realistic virtual environment: **vSim for Nursing** (thepoint.lww.com/vSimMedicalSurgical). Practice documenting these patients' care in DocuCare (thepoint.lww.com/DocuCareEHR).

Large Bowel Obstruction

Pathophysiology

A large bowel obstruction results in an accumulation of intestinal contents, fluid, and gas proximal to the obstruction. It can lead to severe distention and perforation unless some

gas and fluid can flow back through the ileocecal valve. Large bowel obstruction, even if complete, may be undramatic if the blood supply to the colon is not disturbed. However, if the blood supply is cut off, intestinal strangulation and necrosis occur; this condition is life threatening. In the large intestine, dehydration occurs more slowly than in the small intestine because the colon can absorb its fluid contents and can distend to a size considerably beyond its normal full capacity. Similar to small bowel obstruction, complications include perforation, peritonitis, and sepsis.

Clinical Manifestations

Large bowel obstruction differs clinically from small bowel obstruction in that the symptoms develop and progress relatively slowly. In patients with obstruction in the sigmoid colon or the rectum, constipation may be the only symptom for weeks. The shape of the stool is altered as it passes the obstruction that is gradually increasing in size. Blood loss in the stool may result in iron deficiency anemia. The patient may experience weakness, weight loss, and anorexia. Eventually, the abdomen becomes markedly distended, loops of large bowel become visibly outlined through the abdominal wall, and the patient has crampy lower abdominal pain (Hopkins, 2017).

Assessment and Diagnostic Findings

Diagnosis is based on symptoms, physical assessment findings, and on imaging studies. The abdomen may be distended, bowel sounds may be normal early in the obstruction, but later hypoactive to absent, and the abdomen hyperresonant (Hopkins, 2017).

Abdominal x-ray and abdominal CT or MRI findings reveal a distended colon and pinpoint the site of the obstruction (Hopkins, 2017).

Medical Management

Restoration of intravascular volume, correction of electrolyte abnormalities, and NG aspiration and decompression are instituted immediately. A colonoscopy may be performed to untwist and decompress the bowel. A rectal tube may be used to decompress an area that is lower in the bowel. As an alternative, a metal colonic stent may be used as either a palliative intervention or as a bridge to definitive surgery. The colonic stent is placed endoscopically with the assistance of an image intensifier, which creates a fluoroscopic image (Hopkins, 2017). The usual treatment is surgical resection to remove the obstructing lesion. A temporary or permanent colostomy may be necessary. An ileoanal anastomosis may be performed if removal of the entire large bowel is necessary (Hopkins, 2017).

Nursing Management

The nurse's role is to monitor the patient for symptoms indicating that the intestinal obstruction is worsening or resolving and to provide emotional support and comfort. The nurse administers IV fluids and electrolytes as prescribed. If the patient's condition does not respond to nonsurgical treatment, the nurse prepares the patient for surgery. This preparation includes preoperative education as the patient's condition indicates. After surgery, routine postoperative nursing care is provided, including abdominal wound care (see [Chapter 16](#)).

INFLAMMATORY BOWEL DISEASE

Inflammatory bowel disease (IBD) is a group of chronic disorders: Crohn's disease and ulcerative colitis that result in inflammation or ulceration (or both) of the bowel. Both disorders have striking similarities but also several differences. Approximately 10% to 15% of patients with IBD have characteristics of both disorders and cannot be definitively diagnosed with either disorder and are classified as having indeterminate colitis (Rowe, 2020). [Table 41-5](#) compares Crohn's disease and ulcerative colitis.

The prevalence of IBD in the United States has increased in the past century; it is estimated that 1.3% of adults are diagnosed with IBD (CDC, 2019). Prevalence is highest in Europe (particularly in Germany and Norway), the United States, and Canada, although the incidence has been increasing in South America, Africa, and Asia (Piovani, Danese, Peyrin-Biroulet, et al., 2019).

Family history predisposes people to IBD, particularly if a first-degree relative has the disease (Rowe, 2020). Other risk factors for IBD include being Caucasian, of Ashkenazi Jewish descent, living in a northern climate, and living in an urban area (Rowe, 2020). Both diseases are commonly diagnosed in people 15 to 40 years of age, with a second peak incidence in adults 55 to 65 years of age (Rowe, 2020). Current smokers are at risk for Crohn's disease, but those who are ex-smokers or nonsmokers are at risk for ulcerative colitis (Piovani et al., 2019).

Despite extensive research, the cause of IBD is still unknown. Three underlying factors are genetic predisposition, altered immune response, and an altered response to gut microorganisms (Rowe, 2020). Researchers theorize that environmental triggers (e.g., exposure to air pollutants), food, tobacco, and viral illnesses in people genetically predisposed to developing an IBD can trigger the cell-mediated immune response that results in the inflammatory changes that characterize IBDs (Rowe, 2020). Inflammatory cytokines have been identified in the pathologic and clinical characteristics of both disorders (Rowe, 2020; Walfish, 2019). Both disorders have extra-intestinal manifestations; systemic symptoms common to both include fever, arthralgias, malaise, and episodes of diaphoresis (Rowe, 2020).

Crohn's Disease (Regional Enteritis)

Crohn's disease, also called regional enteritis, is characterized by a subacute and chronic inflammation of the GI tract wall that extends through all layers (i.e., transmural lesion). Although its characteristic histopathologic changes can occur anywhere in the GI tract, it most commonly occurs in the distal ileum and the ascending colon. Approximately 35% of patients have ileitis (only ileal involvement); 45% have ileocolitis (diseased ileum and colon); and 20% have granulomatous colitis (only colon involvement) (Rowe, 2020).

Pathophysiology

The inflammatory process in Crohn's disease begins with crypt inflammation and abscesses, which develop into small, focal ulcers. These initial lesions then deepen into longitudinal and transverse ulcers, separated by edematous patches, creating a characteristic *cobblestone* appearance in the affected bowel. Fistulas, fissures, and abscesses form as the inflammation extends into the peritoneum. Granulomas can occur in lymph nodes, the peritoneum, and through the layers of the bowel in about half of patients. Diseased bowel segments are sharply demarcated by adjoining areas of normal

bowel tissue. These are called *skip* lesions, from which the label *regional enteritis* is derived. As the disease advances, the bowel wall thickens and becomes fibrotic, and the intestinal lumen narrows. Diseased bowel loops sometimes adhere to other loops surrounding them (Rowe, 2020).

TABLE 41-5 Comparison of Crohn's Disease and Ulcerative Colitis

	Crohn's Disease	Ulcerative Colitis
Course	Prolonged, variable	Exacerbations, remissions
Pathology		
Early	Transmural thickening	Mucosal ulceration
Late	Deep, penetrating granulomas	Minute, mucosal ulcerations
Clinical Manifestations	Ileum, ascending colon (usually) Usually not, but if it occurs, it tends to be mild	Rectum, descending colon Common—severe Rare—mild
Location		
Bleeding	Common	Rare
Perianal involvement	Common Less severe	Severe Rare
Fistulas	Common	
Diarrhea		
Abdominal mass		
Diagnostic Study		
Findings		
Barium studies	Regional, discontinuous skip lesions Narrowing of colon Thickening of bowel wall Mucosal edema Stenosis, fistulas May be unremarkable unless accompanied by perianal fistulas	Diffuse involvement No narrowing of colon No mucosal edema Stenosis rare Shortening of colon Abnormal inflamed mucosa
Sigmoidoscopy		
Colonoscopy	Distinct ulcerations separated by relatively normal mucosa in ascending colon	Friable mucosa with pseudopolyps or ulcers in descending colon
Therapeutic Management	Corticosteroids, aminosalicylates (sulfasalazine) Immunomodulators (e.g., azathioprine) or monoclonal antibodies (e.g., infliximab, adalimumab) may be tried if refractory to corticosteroids and aminosalicylates Antibiotics Parenteral nutrition Partial or complete colectomy, with ileostomy or anastomosis Rectum can be preserved in some patients Recurrence common	Corticosteroids, aminosalicylates (sulfasalazine) useful in preventing recurrence Immunomodulators (e.g., azathioprine) or monoclonal antibodies (e.g., infliximab, adalimumab) may be tried if refractory to corticosteroids and aminosalicylates Bulk hydrophilic agents Antibiotics Proctocolectomy, with ileostomy Rectum can be preserved in only a few patients “cured” by colectomy
Systemic Complications	Small bowel obstruction Right-sided hydronephrosis Nephrolithiasis Colon cancer Cholelithiasis Arthritis Uveitis Erythema nodosum	Toxic megacolon Perforation Hemorrhage Colon cancer Pyelonephritis Nephrolithiasis Cholangiocarcinoma Arthritis Uveitis Erythema nodosum

Adapted from Walfish, A. E. (2019). Inflammatory bowel disease. *Merck Manual: Professional Version*. Retrieved on 3/1/2020 at: www.merckmanuals.com/professional/gastrointestinal-disorders/inflammatory-bowel-disease-ibd/overview-of-inflammatory-bowel-disease

Clinical Manifestations

The onset of symptoms is usually insidious in Crohn's disease, with diarrhea and prominent right lower quadrant abdominal pain unrelieved by defecation. Scar tissue and the formation of granulomas interfere with the ability of the intestine to transport products of upper intestinal digestion through the constricted lumen, resulting in crampy abdominal pain. There is abdominal tenderness and spasm. Because eating stimulates intestinal peristalsis, the crampy pains occur after meals. To avoid these bouts of crampy pain, the patient tends to limit food intake, reducing the amounts and types of food to such a degree that normal nutritional requirements are often not met. As a result, weight loss, malnutrition, and secondary anemia occur. Ulcers in the membranous lining of the intestine and other inflammatory changes result in a weeping, edematous intestine that continually empties an irritating discharge into the colon. Disrupted absorption causes chronic diarrhea and nutritional deficits, which can lead to significant weight loss and dehydration. In some patients, the inflamed intestine may perforate, leading to intra-abdominal and anal abscesses. Fever and leukocytosis occur. Chronic symptoms include diarrhea, abdominal pain, **steatorrhea** (i.e., excessive fat in the feces), anorexia, weight loss, and nutritional deficiencies.

Manifestations may extend beyond the GI tract and can include joint disorders (e.g., arthritis), skin lesions (e.g., erythema nodosum), ocular disorders (e.g., uveitis), and oral ulcers. The clinical course and symptoms can vary; in some patients, periods of remission and exacerbation occur, but in others, the disease follows a fulminating course. When intestinal symptoms worsen, some extraintestinal manifestations can worsen, whereas the clinical course of some extraintestinal manifestations seems independent of the clinical course of the Crohn's disease (Walfish, 2019).

Assessment and Diagnostic Findings

CT scan is indicated to find bowel wall thickening and mesenteric edema, as well as obstructions, abscesses, and fistulas, and may help specify abscess formation and location, guiding percutaneous access and drainage. MRI is both highly sensitive and specific in terms of identifying pelvic and perianal abscesses and fistulas (Rowe, 2020).

A CBC is performed to assess hematocrit and hemoglobin levels (which may be decreased) as well as the WBC count (may be elevated). The erythrocyte sedimentation rate (ESR) is usually elevated. Albumin and protein levels may be decreased, indicating malnutrition (Rowe, 2020).

Complications

Complications of Crohn's disease include intestinal obstruction or stricture formation, perianal disease, fluid and electrolyte imbalances, malnutrition from malabsorption, and fistula and abscess formation. The most common type of small bowel fistula caused by Crohn's disease is the enterocutaneous fistula (i.e., an abnormal opening between the small bowel and the skin). Abscesses can be the result of an internal fistula that results in fluid accumulation and infection. Patients with colonic Crohn's disease are also at increased risk of colon cancer (NIDDK, 2017d).

Ulcerative Colitis

Ulcerative colitis is a chronic ulcerative and inflammatory disease of the mucosal and submucosal layers of the colon and rectum that is characterized by unpredictable periods of remission and exacerbation with bouts of abdominal cramps and bloody or purulent diarrhea. The inflammatory changes typically begin in the rectum and progress proximally through the colon (Basson, 2019b).

Pathophysiology

Ulcerative colitis affects the superficial mucosa of the colon and is characterized by multiple ulcerations, diffuse inflammations, and desquamation or shedding of the colonic epithelium. Bleeding occurs as a result of the ulcerations. The mucosa becomes edematous and inflamed. The lesions are contiguous, occurring one after the other. Eventually, the bowel narrows, shortens, and thickens because of muscular hypertrophy and fat deposits. Because the inflammatory process is not transmural (i.e., it affects the inner lining only), abscesses, fistulas, obstruction, and fissures are uncommon in ulcerative colitis (Walfish, 2019).

Clinical Manifestations

The clinical course is usually one of remissions and exacerbations. The predominant symptoms of ulcerative colitis include diarrhea, with passage of mucus, pus, or blood; left lower quadrant abdominal pain; and intermittent tenesmus. The bleeding may be mild or severe, and pallor, anemia, and fatigue result. The patient may have anorexia, weight loss, fever, vomiting, and dehydration, as well as cramping, and the passage of six or more liquid stools each day. The disease is classified as mild, severe, or fulminant, depending on the severity of the symptoms. Hypoalbuminemia, electrolyte imbalances, and anemia frequently develop. Extraintestinal manifestations include skin lesions (e.g., erythema nodosum), eye lesions (e.g., uveitis), joint abnormalities (e.g., arthritis), and liver disease (Basson, 2019b).

Assessment and Diagnostic Findings

Abdominal x-ray studies are useful for determining the cause of symptoms. Free air in the peritoneum and bowel dilation or obstruction should be excluded as a source of the presenting symptoms. Colonoscopy is the definitive screening test that can distinguish ulcerative colitis from other diseases of the colon with similar symptoms. It may reveal friable, inflamed mucosa with exudate and ulcerations. Biopsies are typically taken to determine histologic characteristics of the colonic tissue and extent of disease. CT scanning, MRI, and ultrasound studies can identify abscesses and perirectal involvement (Basson, 2019b).

The stool is positive for blood, and laboratory test results reveal low hematocrit and hemoglobin levels in addition to an elevated WBC count, low albumin levels (indicating malabsorptive disorders), and an electrolyte imbalance. C-reactive protein levels are elevated. Elevated antineutrophil cytoplasmic antibody levels are common. Careful stool examination for parasites and other microbes is performed to rule out dysentery caused by common intestinal organisms, especially *Entamoeba histolytica*, *C. difficile* and *Campylobacter*, *Salmonella*, *Shigella*, and *Cryptosporida* species (Basson, 2019b).

Complications

Complications of ulcerative colitis include toxic megacolon, perforation, and bleeding as a result of ulceration. In toxic megacolon, the inflammatory process extends into the muscularis, inhibiting its ability to contract and resulting in colonic distention. Symptoms include fever, abdominal pain and distention, vomiting, and fatigue. If the patient with toxic megacolon does not respond within 72 hours to medical management with NG suction, IV fluids with electrolytes, corticosteroids, and antibiotics, surgery is required. A subtotal colectomy may be performed if bowel perforation has not occurred. Otherwise, colectomy is indicated; it is ultimately needed in up to one third of patients with severe ulcerative colitis (Walfish, 2019). For many patients, surgery becomes necessary to relieve the effects of the disease and to treat these serious complications; an ileostomy usually is performed. The surgical procedures involved and the care of patients with this type of fecal diversion are discussed later in this chapter.

Patients with ulcerative colitis also have a significantly increased risk of osteoporotic fractures due to decreased bone mineral density. Corticosteroid therapy may also contribute to the diminished bone density. Patients with ulcerative colitis are also at increased risk for colon cancer. Approximately 20 years post diagnosis, an estimated 7% to 10% of patients with extensive ulcerative colitis (i.e., not contained to the rectum) will have colon cancer (Walfish, 2019).

Management of Inflammatory Bowel Disease

Most patients with either Crohn's disease or ulcerative colitis have long periods of well-being interspersed with short intervals of illness. Medical treatment for both of these types of IBD is aimed at inducing disease remission, using a management process called induction therapy, and preventing flare-ups of the disease process while maximizing quality of life, using a management process called maintenance therapy (Basson, 2019b; Rowe, 2020; Rubin, Ananthakrishnan, Siegel, et al., 2019; Walfish, 2019). Pharmacologic therapy is indicated to meet the goals of inducing and maintaining remission of IBD.

Medical Management

Pharmacologic Therapy

Aminosalicylates such as sulfasalazine are typically the first pharmacologic agents selected to induce and maintain remission of mild to moderate IBD (Rowe, 2020; Wilhelm & Love, 2017). Sulfa-free aminosalicylates (e.g., mesalamine, olsalazine, balsalazide) are indicated for patients with sulfa allergies; these drugs tend to be better tolerated by most patients, including those without sulfa allergies, and are effective in preventing and treating recurrence of inflammation. Aminosalicylates tend to be more effective agents in treating ulcerative colitis than Crohn's disease, although they are indicated as first-line agents for both types of IBDs (Wilhelm & Love, 2017). These drugs are administered orally or topically (by enema or rectal suppository) for patients with more distal disease involvement (Rowe, 2020). Common adverse effects of aminosalicylates include headaches, nausea, and diarrhea (Comerford & Durkin, 2020).

Some select patients with perianal fistulas or inflammatory abdominal masses that occur from flare-ups of Crohn's disease may be prescribed antibiotics as first line agents,

rather than aminosalicylates. The most commonly prescribed antibiotics include a combination therapy of both metronidazole and ciprofloxacin, taken orally. These drugs are not prescribed long-term, however. Therefore, another medication regimen must be selected for maintenance therapy. These antibiotics are associated with adverse effects that include nausea and diarrhea, and increased risk of *Clostridium difficile* infection. Furthermore, metronidazole can cause peripheral neuropathy that, if present, can warrant its discontinuance (Rowe, 2020; Walfish, 2019).

Tapering dosages of corticosteroids may be prescribed for patients who are refractory to inducing remission with other drugs such as aminosalicylates, or who are experiencing an exacerbation of the disease process (i.e., a flare-up or acute episode). These medications have potent anti-inflammatory effects (Rowe, 2020). Corticosteroids can be given orally (e.g., prednisone) in outpatient treatment or parenterally (e.g., hydrocortisone) in patients who are hospitalized. Topical (i.e., rectal administration) corticosteroids (e.g., budesonide) are widely used in the treatment of proctitis and colon disease associated with IBD. Because corticosteroids can adversely affect intestinal wound healing, they are only indicated for short-term use. Other adverse effects of corticosteroids are discussed in [Chapter 45](#) and summarized in [Table 45-3](#) (Walfish, 2019).

Immunomodulators (e.g., azathioprine, mercaptopurine, methotrexate, cyclosporine) alter the pathologic immune response present in IBD. The exact mechanism of action of these medications in treating IBD is unclear. These agents have demonstrated effectiveness in reducing inflammation and decreasing the need for corticosteroids, hospitalization, and surgery. Because it takes at least 2 months before they are effective, these agents tend to not be used to induce remission, but are useful as maintenance therapy, particularly for patients intolerant to aminosalicylates or in those who would otherwise require long-term use of corticosteroids to maintain remission (Rowe, 2020; Wilhelm & Love, 2017). These agents depress bone marrow function; therefore, the CBC must be periodically monitored for neutropenia (i.e., low WBC counts) and pancytopenia (i.e., generally low blood cells counts) that may warrant reducing the dosage or changing to a different agent (Rowe, 2020). Liver function should also be monitored periodically as these agents can be toxic to the liver (see [Chapter 43](#), [Table 43-1](#) for Common Laboratory Tests to Assess Liver Function). These agents can be immunosuppressive, placing patients at increased risk for pneumonia and cancers. Because of these risks, adults receiving these agents should be advised to receive pneumococcal vaccination with both PCV13 and PPSV23 (see [Chapter 19](#) for further discussion of PCV13 and PPSV23); women should be screened for cervical cancer annually (i.e., Papanicolaou [Pap] Smear; see [Chapter 50](#) for further discussion). Patients taking azathioprine or mercaptopurine should be screened annually for squamous cell carcinoma, particularly if they are over 50 years of age (Farraye, Melmed, Lichtenstein, et al., 2017).

Anti-tumor necrosis factor (TNF) medications incorporate monoclonal antibodies that inhibit the inflammatory effects of the cytokine TNF in the gut. These agents are indicated for use in patients with moderate to severe IBD that is refractory to treatment with immunomodulators (Wilhelm & Love, 2017). The first drug in this class that was approved for treatment of both types of IBD is infliximab. Infliximab has proven to be effective at inducing and maintaining remission of IBD, especially Crohn's disease. However, it must be administered by IV infusion. Infliximab is generally well tolerated by most patients, although it can rarely be associated with flulike symptoms. For those patients who experience these symptoms, premedication with diphenhydramine and acetaminophen seems to mitigate those unpleasant effects. Newer alternative anti-TNF

medications include adalimumab (for both types of IBD), certolizumab (for Crohn's disease only), and golimumab (for ulcerative colitis only). Each of these agents may be administered by subcutaneous injections (Walfish, 2019). Since all of these anti-TNF agents can potentially reactivate latent viral infections, patients must be tested for tuberculosis and hepatitis B before treatment commences (Rowe, 2020; Wilhelm & Love, 2017). Furthermore, all age-appropriate immunizations should be up to date prior to commencing treatment with these medications (Farraye et al., 2017) (see [Chapter 3](#), [Table 3-3](#) for adult immunizations). Patients prescribed these medications over the long-term need to be educated that they are at higher risk for cancers, particularly lymphomas and melanomas (Farraye et al., 2017; Rowe, 2020; Wilhelm & Love, 2017).

Nutritional Therapy

During induction therapy, oral fluids and a low-residue, high-protein, high-calorie diet with supplemental vitamin therapy and iron replacement are prescribed to meet nutritional needs, reduce inflammation, and control pain and diarrhea (Rowe, 2020). Patients prescribed corticosteroids may require supplemental calcium and vitamin D to prevent osteopenia (Rowe, 2020). Fluid and electrolyte imbalances from dehydration caused by diarrhea are corrected by IV therapy as necessary if the patient is hospitalized, or by oral fluids if the patient is managed at home. Any foods that cause or exacerbate bothersome symptoms, such as bloating or diarrhea, are avoided. Cold foods and smoking are avoided because both increase intestinal motility. Some patients may experience an improvement in symptoms if they follow the FODMAP diet that is commonly indicated for patients with IBS (see previous discussion), while others experience symptomatic improvement by restricting intake of milk and treating lactose intolerance (see Chart 41-3) (DeLegge, 2020).

Once remission is induced, patients with IBD are educated to avoid food triggers and maintain a diet that best meets their nutritional needs. Probiotic supplements (e.g., *Escherichia coli Nissle*, *Lactobacillus rhamnosus*) might be indicated to maintain remission in patient with ulcerative colitis, but have not been found to be similarly effective in patients with Crohn's disease (Bischoff, Escher, Hebuterne, et al., 2020). Most patients who achieve remission need not restrict fiber during maintenance therapy (DeLegge, 2020). A consultation with a dietitian may be indicated (Bischoff et al., 2020).

Patients with IBD are at risk for becoming malnourished. Fewer patients with IBD are malnourished and require intensive nutritional therapy than was the case 30 years ago (DeLegge, 2020). In general, patients with IBD who have lost more than 10% of their lean body mass are considered malnourished, and are at risk for increased morbidity (e.g., infections, poor wound healing). These patients may require intensive nutritional therapy, which might include enteral nutrition (see [Chapter 39](#)) or parenteral nutrition (DeLegge, 2020). Oral nutrition or enteral nutrition is generally preferable to parenteral nutrition. However, parenteral nutrition may be indicated for patients intolerant of oral and enteral nutrition, or those with bowel obstruction or short bowel syndrome, or in patients with Crohn's disease and proximal fistula formation (see later discussion of parenteral nutrition) (Bischoff et al., 2020).

Surgical Management

When nonsurgical measures fail to relieve severe symptoms of IBD, surgery may be necessary. Nearly one third of patients with severe ulcerative colitis and between 60%

and 70% of patients with Crohn's disease require surgery (Walfish, 2019). Common indications for surgery in patients with ulcerative colitis include the presence of colon cancer or colonic dysplasia/polyps (see later discussion); megacolon; severe, intractable bleeding; or perforation (Walfish, 2019). The most common indication for surgery in patients with Crohn's disease is small bowel obstruction, which occurs in 30% to 50% of patients; other indications for surgery include abscess, perforation, hemorrhage, or fistula formation (Ghazi, 2019; Walfish, 2019).

Patients with either ulcerative colitis or Crohn's disease may require surgery to relieve strictures. A common procedure performed for strictures of the small bowel is laparoscope-guided strictureplasty, in which blocked or narrowed sections of the intestines are widened, leaving the intestines intact. In some cases, a small bowel resection is performed; diseased segments of the small intestines are resected, and the remaining portions of the intestines are anastomosed. Surgical removal of up to 80% of the small bowel usually can be tolerated (Gilroy, 2018).

Some patients with severe Crohn's disease may benefit from an intestinal transplant. This technique is now available to children and to young and middle-aged adults who have lost intestinal function from disease. It may improve quality of life for some patients. The associated technical and immunologic problems remain formidable, and the costs and mortality rates continue to be high (Gilroy, 2018).

Proctocolectomy and Total Colectomy with Ileostomy

Proctocolectomy (i.e., surgical excision of the colon and rectum) with **ileostomy** (i.e., a surgical opening into the ileum by means of a stoma to allow drainage of bowel contents) is recommended in the patient with IBD with a severely diseased colon and rectum that is refractory to medical therapy. This surgery cures the disease in patients with ulcerative colitis; however surgical cure is not possible with Crohn's disease (Ghazi, 2019; Walfish, 2019).

An ileostomy is a type of fecal diversion that allows for drainage of fecal matter, called *effluent*, from the ileum to the outside of the body. The drainage is liquid to unformed and occurs at frequent intervals. Nursing management of the patient with an ileostomy is discussed later in this chapter.

An ileostomy is indicated after a proctocolectomy or a total colectomy (i.e., surgical excision of the entire colon) and is either temporary or permanent. For patients with severe ulcerative colitis, restorative proctocolectomy with ileal pouch anal anastomosis (IPAA) is the procedure of choice. This option is not generally recommended for patients with Crohn's disease, however, as the surgically formed ileal pouch frequently becomes diseased in these patients. A permanent ileostomy is typically indicated for the patient with Crohn's disease who must have a total colectomy.

Restorative Proctocolectomy with Ileal Pouch Anal Anastomosis

A restorative proctocolectomy with IPAA is the surgical procedure of choice in cases where the rectum can be preserved because it eliminates the need for a permanent ileostomy. It establishes an ileal reservoir that functions as a "new" rectum, and anal sphincter control of elimination is retained. The procedure involves connecting the ileum to the anal pouch (made from a small intestine segment), and the surgeon connects the pouch to the anus in conjunction with removing the colon and the rectal mucosa (i.e., total abdominal colectomy and mucosal proctectomy) (see Fig. 41-6). A temporary

diverting loop ileostomy that promotes healing of the surgical anastomoses is constructed at the time of surgery and closed about 3 months later.

With IPAA or restorative proctocolectomy, the diseased colon and rectum are removed, voluntary defecation is maintained, and anal continence is preserved. The ileal reservoir decreases the number of bowel movements significantly. Nighttime elimination is gradually reduced to one bowel movement. Complications of ileoanal anastomosis include irritation of the perianal skin from leakage of fecal contents, stricture formation at the anastomosis site, pelvic abscess, fistula, small bowel obstruction, and *pouchitis* (i.e., inflammation of the ileoanal pouch) (Wu, Ke, Kiran, et al., 2020). This procedure involves pelvic dissection; therefore, it is also associated with the risk of infertility in women. Women wanting to become pregnant may want to consider other treatment options (Rowe, 2020). Dietary intolerances may persist after the IPAA is formed. Increased stool output, flatulence, and perineal irritation are associated with consumption of nuts, corn, chocolate, spicy foods, onions, and citrus fruits. Consequently, some patients may need to alter their diet to avoid complications and perineal breakdown.

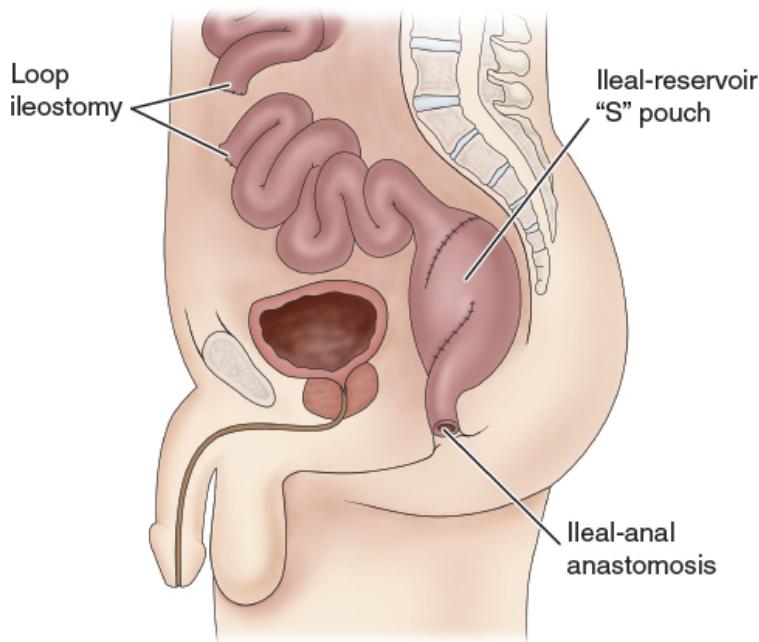


Figure 41-6 • A mucosal proctectomy precedes anastomosis of the ileal reservoir. A temporary loop ileostomy diverts effluent for several months to allow healing.

Continent Ileostomy

The procedure consists of a proctocolectomy, with 30 to 45 cm of the terminal ileum used to create a J- or S-shaped continent ileal reservoir (i.e., Kock pouch) by diverting a portion of the distal ileum to the abdominal wall and creating a stoma. This procedure eliminates the need for an external fecal collection bag. A nipple valve is created by pulling a portion of the terminal ileal loop back into the ileum. GI effluent can accumulate in the pouch for several hours and then be removed by means of a catheter inserted through the nipple valve. Possible indications for a total colectomy with Kock pouch placement (rather than a restorative proctocolectomy with IPAA) include a badly diseased rectum, lack of rectal sphincter tone, or inability to achieve fecal continence.

post IPAA (Wu et al., 2020). Variations on the Kock pouch include the Barnett continent intestinal reservoir and T-pouch (Wu et al., 2020).

The major challenge with the Kock pouch is malfunction of the nipple valve, which often requires additional corrective surgery. Other potential postoperative complications include fistulas, stoma-related problems (strictures, parastomal hernia, difficulty with catheterization), pouchitis, and short-bowel syndrome (i.e., nutritional deficits that occur from loss of part of the small intestines). Kock pouches are used less commonly because they have greater complication rates than does restorative proctocolectomy with IPAA (Wu et al., 2020). A major advantage of the procedure is potential improved body image and lack of external drainage appliance (Wu et al., 2020).

NURSING PROCESS

Management of the Patient with Inflammatory Bowel Disease



Assessment

The nurse obtains a health history to identify the onset, duration, and characteristics of abdominal pain; the presence of diarrhea, fecal urgency, or tenesmus; nausea, anorexia, or weight loss; and family history of IBD. It is important to discuss dietary patterns and smoking habits. The nurse asks about patterns of bowel elimination, including character, frequency, and presence of blood, pus, fat, or mucus. Allergies and food intolerance, especially milk (lactose) intolerance, must be noted. The patient may identify sleep disturbances if diarrhea or pain occurs at night.

Diagnosis

NURSING DIAGNOSES

Based on the assessment data, nursing diagnoses may include the following:

- Diarrhea associated with the inflammatory process
- Acute pain associated with increased peristalsis and GI inflammation
- Hypovolaemia associated with anorexia, nausea, and diarrhea
- Impaired nutritional status associated with dietary restrictions, nausea, and malabsorption
- Activity intolerance associated with generalized weakness
- Anxiety associated with impending surgery
- Difficulty coping associated with repeated episodes of diarrhea
- Risk for impaired skin integrity associated with malnutrition and diarrhea
- Lack of knowledge concerning the process and management of the disease

COLLABORATIVE PROBLEMS/POTENTIAL COMPLICATIONS

Potential complications may include the following:

- Electrolyte imbalance
- Cardiac arrhythmias related to electrolyte imbalances
- GI bleeding with fluid volume loss
- Perforation of the bowel

Planning and Goals

The major goals for the patient include attainment of normal bowel elimination patterns, relief of abdominal pain and cramping, prevention of fluid volume deficit, maintenance of optimal nutrition and weight, avoidance of fatigue, reduction of anxiety, promotion of effective coping, absence of skin breakdown, increased knowledge about the disease process and self-health management, and avoidance of complications.

Nursing Interventions

MAINTAINING NORMAL ELIMINATION PATTERNS

The nurse assists the patient in determining if there is a relationship between diarrhea and certain foods, activities, or emotional stressors. Identifying precipitating factors, the frequency of bowel movements, and the character, consistency, and amount of stool passed is important. The nurse provides ready access to a bathroom, commode,

or bedpan and keeps the environment clean and odor free. It is important to administer antidiarrheal medications as prescribed. Loperamide may be prescribed 30 minutes before meals (see previous discussion on interventions for diarrhea). The nurse should record the frequency and consistency of stools after therapy is initiated.

RELIEVING PAIN

The character of the pain is described as dull, burning, or crampy. It is important to ask about its onset. Does it occur before or after meals, during the night, or before elimination? Is the pattern constant or intermittent? Is it relieved with medications? The nurse administers analgesic agents as prescribed for pain. Position changes, local application of heat (as prescribed), diversional activities, and prevention of fatigue also are helpful for reducing pain.

MAINTAINING FLUID INTAKE

To detect fluid volume deficit, the nurse keeps an accurate record of intake and output. The nurse monitors daily weights for fluid gains or losses and assesses the patient for signs of fluid volume deficit (i.e., dry skin and mucous membranes, decreased skin turgor, oliguria, fatigue, decreased temperature, increased hematocrit, elevated urine specific gravity, and hypotension). It is important to encourage oral intake of fluids and to monitor the flow rate of any IV fluids. The nurse initiates measures to decrease diarrhea (e.g., dietary restrictions, stress reduction, antidiarrheal agents).

MAINTAINING OPTIMAL NUTRITION

Nursing interventions focus on optimizing the patient's nutritional status and include ensuring that the patient maintains adequate intake of fluids and nutrients and recognizes and avoids foods that exacerbate symptoms (DeLegge, 2020). The nurse assesses the patient's nutrition, including usual dietary habits, changes in appetite and body mass index (BMI) and trends in weight loss or gain (see [Chapter 4](#) for further discussion of nutritional assessment). Laboratory studies to detect vitamin and mineral deficiencies may help identify the need for supplementation, especially vitamin D and B₁₂ (Rowe, 2020). During the induction therapy, if oral foods are tolerated, small, frequent, low-residue feedings are given to avoid overdistending the stomach and stimulating peristalsis. For the patient with IBD who is malnourished and hospitalized, enteral nutrition or parenteral nutrition may be prescribed (see [Chapter 39](#) for further discussion of enteral nutrition). Parenteral nutrition is indicated in patients who have short-bowel syndrome, bowel obstruction, or Crohn's disease with severe malnutrition and intolerance to enteral nutrition and who are expected to likely remain intolerant to enteral nutrition for more than 1 to 2 weeks (DeLegge, 2020) (see later discussion on parenteral nutrition in this chapter).

PROMOTING REST

The nurse recommends intermittent rest periods during the day and schedules or restricts activities to conserve energy and reduce the metabolic rate. It is important to encourage activity within the limits of the patient's capacity. The nurse suggests naps and periods of bed rest for a patient who is febrile, has frequent diarrheal stools, or is bleeding. However, the patient should perform active exercises to maintain muscle tone and prevent venous thromboembolic complications. If the patient cannot perform these active exercises, the nurse performs passive exercises and joint range of motion. Activity restrictions are modified as needed on a day-to-day basis.

REDUCING ANXIETY

Anxiety is nearly twice as prevalent in individuals with IBD than in the general population. The prevalence of anxiety in patients with IBD is not dependent upon whether or not the disease is active or in remission (Farraye et al., 2017). Therefore, the nurse must recognize that the patient with IBD may experience anxiety throughout the spectrum of disease; that is, during periods of remission as well as exacerbation. Rapport can be established by being attentive and displaying a calm, confident manner. The nurse allows time for the patient to ask questions and express feelings. Careful listening and sensitivity to nonverbal indicators of anxiety (e.g., restlessness, tense facial expressions) are helpful. The patient may be emotionally labile because of the consequences of the disease and the uncertainty of exacerbations with complications. The nurse tailors information about possible impending surgery to the patient's level of understanding and desire for detail. If surgery with placement of a stoma is planned, photographs, illustrations, websites, and blogs help explain the surgical procedure and help the patient visualize what a stoma looks like.

ENHANCING COPING MEASURES

Because the patient may feel isolated, helpless, and out of control, understanding and emotional support are essential. The patient may respond to stress in a variety of ways that may alienate others (e.g., anger, denial, social self-isolation).

The nurse needs to recognize that the patient's behavior may be affected by a number of factors. Any patient suffering the discomforts of frequent bowel movements and rectal soreness is anxious, discouraged, and unhappy. It is important to develop a relationship with the patient that supports their attempts to cope with these stressors. It is also important to communicate that the patient's feelings are understood by encouraging the patient to talk and express their feelings and to discuss any concerns. Stress reduction measures that may be used include relaxation techniques, visualization, breathing exercises, and biofeedback. Professional counseling may be needed to help the patient and family manage issues associated with chronic illness and resulting disability.

PREVENTING SKIN BREAKDOWN

The nurse examines the patient's skin frequently, especially the perianal skin. Perianal care, including the use of a skin barrier (e.g., petroleum ointment), is important after each bowel movement. The nurse gives immediate attention to reddened or irritated areas over bony prominences and uses pressure-relieving devices to prevent skin breakdown. Consultation with a wound-ostomy-continence (WOC) nurse (or WOCN; a nurse specially educated in the management of a variety of fecal and urinary diversions) is often helpful.

MONITORING AND MANAGING POTENTIAL COMPLICATIONS

Serum electrolyte levels are monitored daily, and electrolyte replacements are given as prescribed. Evidence of arrhythmias or changes in level of consciousness must be reported immediately.

The nurse closely monitors rectal bleeding and administers blood component therapy and volume expanders as prescribed to prevent hypovolemia. It is important to monitor the blood pressure for hypotension and to obtain coagulation profiles and hemoglobin and hematocrit levels frequently. Vitamin K may be prescribed to increase clotting factors.

The nurse closely monitors the patient for indications of perforation (i.e., acute increase in abdominal pain, rigid abdomen, vomiting, or hypotension) and obstruction and toxic megacolon (i.e., abdominal distention, decreased or absent bowel sounds, change in mental status, fever, tachycardia, hypotension, dehydration, and electrolyte imbalances).

PROMOTING HOME, COMMUNITY-BASED, AND TRANSITIONAL CARE

 **Educating Patients About Self-Care.** The nurse assesses the patient's understanding of the disease process and their need for additional information about medical management (e.g., medications, diet) and surgical interventions. The nurse provides information about nutritional management and foods that might relieve symptoms and decrease diarrhea (e.g., FODMAP diet). It is important to explain the rationale for the use of corticosteroids and anti-inflammatory, antibacterial, and antidiarrheal medications. The nurse emphasizes the importance of taking medications as prescribed and not abruptly discontinuing them (especially corticosteroids) to avoid development of serious medical problems (see Chart 41-5). Patients over the age of 50 should be educated about the importance of receiving the herpes zoster vaccination; all patients should receive the influenza vaccination annually (Farraye et al., 2017). Patient education information can be obtained from the Crohn's and Colitis Foundation of America (CCFA) and from a patient skills education program developed by the American College of Surgeons (see Resources section).

Continuing and Transitional Care. For patients who have been hospitalized to treat IBD, readmission rates are as high as 18% at 30 days, and as high as 36% at 90 days (Nguyen, Koola, Dulai, et al., 2020). Overall, readmission rates were higher for patients with Crohn's disease than for those with ulcerative colitis. The most common reasons for rehospitalization were IBD flare-ups, infections, postoperative complications, pain management, or need for parenteral nutrition or surgery (Nguyen et al., 2020). Risk factors for readmission include history of chronic disease, psychiatric comorbidities, smoking, and opioid dependence (Cohen-Meekburg, Rosenblatt, Wallace, et al., 2019; George, Martin, Gupta, et al., 2019; Micic, Gaetano, Rubin, et al., 2017; Nguyen et al., 2020). Patients treated at large centers with IBD specialty departments tend to have lower rates of readmission (George et al., 2019).

Patients with IBD are managed at home with follow-up care by their primary provider or through an outpatient clinic. Those whose nutritional status is compromised and who are receiving enteral or parenteral nutrition need the home health or transitional care nurse to consult and ensure that their nutritional requirements are being met and that they or their caregivers can follow through with the instructions for maintaining the nutrition plan. Patients who are undergoing medical treatment need to understand that their disease can be controlled and that they can lead a healthy life between exacerbations. Control implies management based on an understanding of the disease and its treatment. Patients in the home or transitional setting need information about their medications (i.e., name, dose, side effects, and frequency of administration) and need to take medications on schedule. Medication reminders such as containers that separate pills according to day and time or daily checklists are helpful.

During a flare-up, the nurse encourages the patient to rest as needed and to modify activities according to their energy level. Patients should limit tasks that impose strain on the lower abdominal muscles. They should sleep in a room close to the bathroom

because of the frequent diarrhea; quick access to a toilet helps alleviate worry about having an “accident.” Room deodorizers help control odors.

Dietary modifications can control but do not cure the disease; the nurse recommends a low-residue, high-protein, high-calorie diet, especially during an acute phase. It is important to encourage the patient to keep a record of the foods that irritate the bowel and to avoid them and to drink at least eight glasses of water each day.

The prolonged nature of the disease has an impact on the patient and often strains their family life and financial resources. Family support is vital; however, some family members may be resentful or feel guilty, tired, or unable to cope with the emotional demands of the illness and the physical demands of providing care. Some patients with IBD do not socialize for fear of being embarrassed. Because they have lost control over elimination, they may fear losing control over other aspects of their lives. They need time to express their fears and frustrations. Individual and family counseling may be helpful.

Chart 41-5 HOME CARE CHECKLIST

The Patient with Inflammatory Bowel Disease

At the completion of education, the patient and/or caregiver will be able to:

- State the impact of inflammatory bowel disease on physiologic functioning, ADLs, IADLs, roles, relationships, and spirituality.
- Discuss nutritional management: high-protein, high-vitamin diet; identify foods to include and foods to be avoided.
- Explain the importance of and necessity for adherence with prescribed medication regimen.
- Demonstrate methods of keeping track of the medication regimen, storing the prescribed medications, and using reminders such as beepers and/or pillboxes.
- State the name, dose, side effects, frequency, and schedule for all medications.
- Identify measures to be used to treat exacerbation of symptoms, to include rest, dietary modifications, and medications.
- Identify measures to be used to promote fluid and electrolyte balance during acute exacerbations.
- Demonstrate management of enteral or parenteral nutrition therapy, if applicable; identify possible complications and interventions.
- State how to reach primary provider with questions or complications.
 - State time and date of follow-up appointments, testing.
- Verbalize ways to cope with stress successfully, plans for regular exercise, and rationale for obtaining adequate rest.
- Identify the need for health promotion (e.g., cessation of use of tobacco products), disease prevention and screening activities.

ADLs, activities of daily living; IADLs, instrumental activities of daily living.

Evaluation

Expected patient outcomes may include:

1. Reports a decrease in the frequency of diarrheal stools
 - a. Adheres to dietary restrictions; maintains bed rest
 - b. Takes medications as prescribed
2. Has reduced pain
3. Maintains fluid volume balance
 - a. Drinks 1 to 2 L of oral fluids daily
 - b. Has normal body temperature
 - c. Displays adequate skin turgor and moist mucous membranes
4. Attains optimal nutrition; tolerates small, frequent feedings without diarrhea
5. Avoids fatigue
 - a. Rests periodically during the day
 - b. Adheres to activity restrictions
6. Is less anxious
 - a. Seeks emotional support as appropriate

- b. Verbalizes fewer feelings of anxiety and concern
- 7. Copes successfully with diagnosis
 - a. Verbalizes feelings freely
 - b. Uses appropriate stress reduction behaviors
- 8. Maintains skin integrity
 - a. Cleans perianal skin after defecation
 - b. Uses appropriate skin barrier
- 9. Acquires an understanding of the disease process
 - a. Modifies diet appropriately to decrease diarrhea
 - b. Adheres to medication regimen as prescribed
 - c. Recognizes signs and symptoms of complications
- 10. Recovers without complications
 - a. Electrolytes within normal ranges
 - b. Normal sinus or baseline cardiac rhythm
 - c. Maintains fluid balance
 - d. Experiences no perforation or rectal bleeding

DELIVERING NUTRITION PARENTERALLY

PARENTERAL NUTRITION is a method of providing nutrients to the body by an IV route. The nutrients are a complex admixture containing proteins, carbohydrates, fats, electrolytes, vitamins, trace minerals, and sterile water in a single container. The goals of parenteral nutrition are similar to the goals of enteral feedings (see [Chapter 39](#)); namely, to improve nutritional status, establish a positive nitrogen balance, maintain muscle mass, promote weight maintenance or gain, and enhance the healing process (Seres, 2020). Parenteral nutrition is indicated in adults who are malnourished or at risk for becoming malnourished and who cannot tolerate receiving nutrition orally or by the enteral route (Worthington, Balint, Bechtold, et al., 2017).

Nursing Management

Establishing Positive Nitrogen Balance

Most IV fluids do not provide sufficient calories or protein to meet the body's daily requirements. Parenteral nutrition solutions can provide enough calories and nitrogen to meet the patient's daily nutritional needs. The patient with fever, trauma, burns, major surgery, or hypermetabolic disease requires additional daily calories (Norris, 2019). When highly concentrated dextrose is given, caloric requirements are satisfied and the body uses amino acids for protein synthesis rather than for energy. Additionally, electrolytes such as calcium, phosphorus, magnesium, and sodium chloride are added to the solution to maintain proper electrolyte balance and to transport glucose and amino acids across cell membranes.

The volume of fluid necessary to provide these calories peripherally can surpass fluid tolerance. To provide the required calories in a smaller volume, it is necessary to increase the concentration of nutrients and use a route of administration that rapidly dilutes incoming nutrients to the proper levels of body tolerance. Typically, a large, high-flow

vein such as the superior vena cava (at the right atrio caval junction) is the preferred site (Worthington et al., 2017).

Recognizing Clinical Indications

The indications for parenteral nutrition include an inability to ingest at least 50% of the daily required calories and nutrients within a 7-day timeframe for adults who are physiologically stable and well nourished, and within a 3- to 5-day time frame for adults who are malnourished. Enteral nutrition should be considered before parenteral support because it assists in maintaining gut mucosal integrity and improved immune function and is typically associated with fewer complications (Worthington et al., 2017). In both the home and hospital setting, parenteral nutrition is indicated in the situations listed in Table 41-6.

TABLE 41-6 Indications for Parenteral Nutrition

Condition or Need	Examples
Insufficient oral or enteral intake	Severe burns, malnutrition, short-bowel syndrome, acquired immune deficiency syndrome, sepsis, cancer
Impaired ability to ingest or absorb food orally or enterally	Paralytic ileus, Crohn's disease, short-bowel syndrome, postradiation enteritis, high-output enterocutaneous fistula
Patient unwilling or unable to ingest adequate nutrients orally or enterally	Major psychiatric illness (e.g., severe anorexia nervosa)
Prolonged preoperative and postoperative nutritional needs	Extensive bowel surgery, acute pancreatitis

Adapted from McClave, S. A., Taylor, B. E., Martindale, R. G., et al. (2016). Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (ASPEN). *Journal of Parenteral and Enteral Nutrition*, 40(2), 159–211.

Administering Formulas

A total of 1 to 3 L of solution is given over a 24-hour period. The label of the solution is verified by at least two identifiers and compared with the prescription (Guenter, Worthington, Ayers, et al., 2018). When parenteral nutrition is delivered as a **2-in-1** admixture of dextrose and amino acids, they are typically supplemented with a **lipid injectable emulsion (ILE)**; also called intravenous fat emulsions [IVFE] or lipid). The dextrose and amino acid solution should be administered using a 0.22-micron in-line filter, and the ILE should be administered using a 1.2-micron in-line filter. The ILE may be administered in the same IV line as the 2-in-1 solution; however, a Y-connector should be used for the ILE, and the connector should be placed closer to the patient so that it bypasses the 0.22-micron filter. The 2-in-1 solution is not to be piggybacked into the ILE. As an alternative, the ILE may be delivered via a separate IV line from the 2-in-1 solution (Guenter et al., 2018). Usually, 500 mL of a 10% ILE or 250 mL of 20% ILE is given over 6 to 12 hours, one to three times a week. ILEs can provide up to 30% of the total daily calorie intake.



Quality and Safety Nursing Alert

Before a parenteral nutrition infusion is administered, the solution must be inspected for separation, oily appearance (also known as a “cracked solution”), or any precipitate (which appears as white crystals). If any of these are present, the solution is not used.

ILEs can be mixed by the pharmacy staff with other components of parenteral nutrition to create a *3-in-1* admixture commonly called a **total nutrient admixture (TNA)**. TNA is delivered using a 1.2-micron filter to prevent the administration of a precipitate (i.e., calcium, phosphorus, incompatibilities) that cannot be seen due to the opacity of the solution (Guenther et al., 2018). Advantages of TNA over parenteral nutrition are cost savings in preparation and equipment, decreased risk of catheter or nutrient contamination, decreased nursing time, and increased patient convenience and satisfaction (Gervasio, 2015). Ideally, the pharmacist, nutritionist, and primary provider should collaborate to determine the specific formula needed.

Initiating Therapy

Parenteral nutrition solutions are initiated slowly and advanced gradually each day to the desired rate as the patient’s fluid and dextrose tolerance permits. The patient’s laboratory test results and response to parenteral nutrition therapy are monitored on an ongoing basis by the primary provider. These parameters include the patient’s weight, intake and output, blood glucose, CBC, and chemistry panel, including serum carbon dioxide, magnesium, phosphorus, and triglycerides. A 24-hour urine collection for nitrogen may be done to analyze nitrogen balance. In most hospitals, admixture solutions are prescribed on a daily standard parenteral nutrition form. The formulation of the parenteral nutrition solutions is calculated carefully each day to meet the complete nutritional needs of the individual patient.

Providing Parenteral Nutrition

Various vascular access devices are used to administer parenteral nutrition solutions in clinical practice. Parenteral nutrition may be given through either peripheral or central IV lines, depending on the patient’s condition and the anticipated length of therapy.

Peripheral Method

To supplement oral intake, peripheral parenteral nutrition (PPN) may be prescribed. PPN is given through a peripheral vein; this is possible because the solution is less hypertonic than a full-calorie parenteral nutrition solution. PPN formulas are not nutritionally complete because of their low dextrose content. ILEs are given simultaneously to buffer the PPN and to protect the peripheral vein from irritation. The usual length of therapy using PPN is 5 to 7 days.



Quality and Safety Nursing Alert

Formulations with dextrose concentrations of more than 10% should not be given through peripheral veins because they irritate the intima (innermost walls) of small veins, causing chemical phlebitis.

Central Method

Because central parenteral nutrition solutions have at least five times the solute concentration of blood (and exert an osmotic pressure of about 2000 mOsm/L), they are given into the vascular system through a catheter inserted into a high-flow, large blood vessel, ideally at the superior vena cava/right atricaval junction (Worthington et al., 2017). Concentrated solutions are then very rapidly diluted to isotonic levels by the blood in this vessel.

Several types of **central venous access devices (CVADs)** are available: percutaneous (or nontunneled), peripherally inserted central catheters (PICCs), surgically placed (or tunneled) catheters, and implanted vascular access ports.

Percutaneous (Nontunneled) Central Catheters

Percutaneous central catheters are used for short-term (less than 6 weeks) IV therapy in acute care settings. The subclavian vein is the most common vessel accessed because the subclavian area provides a stable insertion site to which the catheter can be anchored, is easily compressible (facilitating control of hemorrhage), allows the patient freedom of movement, and provides easy access to the dressing site. The subclavian access site should be avoided in patients with advanced kidney disease and those on hemodialysis to prevent subclavian vein stenosis. The second most common access sites include the basilic, brachial, or cephalic veins in the arm followed by the jugular vein. The femoral vein should be avoided for this purpose and should only be used as a last resort because of concerns about infection (Gorski, Hadaway, Hagle, et al., 2016). For a patient with limited IV access, a triple-lumen catheter can be used because it offers three ports for various uses (see [Fig. 41-7](#)). The use of a single-lumen catheter dedicated for the administration of parenteral nutrition is not typically feasible, because most patients require administration of medications and fluids in addition to parenteral nutrition, and the line used to administer parenteral nutrition cannot be used for other purposes (Gorski et al., 2016).

When a patient requires IV access for parenteral nutrition, the insertion procedure is first explained so that the patient is aware of what to expect. The patient is placed supine in the Trendelenburg position to produce dilation of neck and shoulder vessels, which makes insertion easier and decreases the risk of air embolus. The skin is cleansed with 2% chlorhexidine to remove surface oils. To afford maximal accuracy in the placement of the catheter, the patient is instructed to turn their head away from the site of venipuncture and to remain motionless while the catheter is inserted and the wound is dressed. The nurse maintains the sterile field and supports the patient throughout the procedure. Maximal barrier precautions mandate that full-body sterile drapes are applied and sterile gloves, cap, gown, and masks are donned to reduce risk of central line-associated bloodstream infection (CLABSI) (The Society for Healthcare Epidemiology of America [SHEA] Guideline Central, 2015) (see [Chapter 11](#), Chart 11-2). Lidocaine is injected to anesthetize the skin and underlying tissues. A large-bore needle on a syringe is inserted and moved parallel to and beneath the clavicle until it enters the vein. A radiopaque wire is inserted through the needle into the vein. The catheter is then advanced over the wire, the needle is withdrawn, and the hub of the catheter is attached to the IV tubing. Until the syringe is detached from the needle and the catheter is inserted, the patient may be asked to perform the Valsalva maneuver. The patient is instructed to take a deep breath, hold it, and bear down with the mouth closed to produce a positive phase in central venous pressure, thereby lessening the possibility of air being drawn into the circulatory system (air embolism). The catheter is sutured to the skin. A

chlorhexidine-impregnated disc or gel with a semipermeable transparent dressing is applied using sterile technique (Gorski et al., 2016).

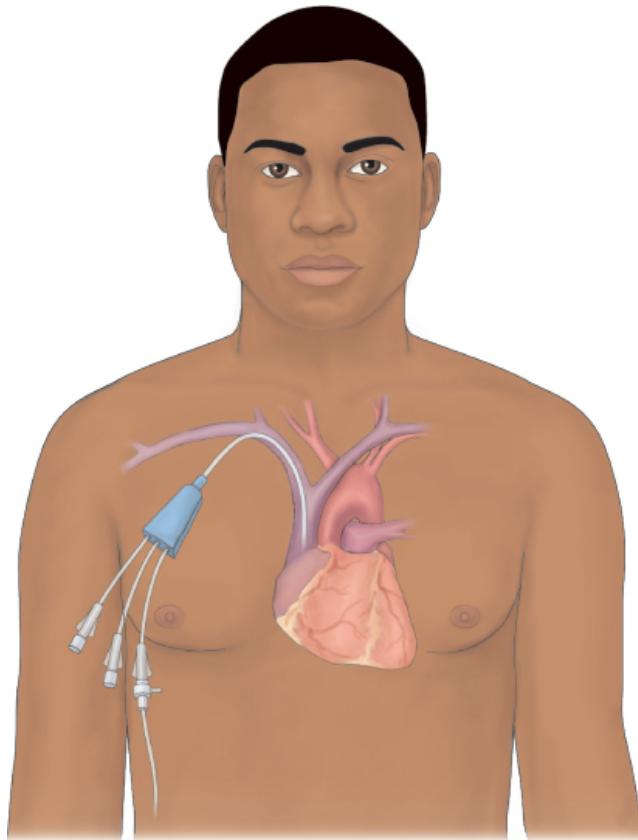


Figure 41-7 • Subclavian triple-lumen catheter used for parenteral nutrition and other adjunctive therapy. The catheter is threaded through the subclavian vein into the vena cava/right atriocaval junction. Each lumen is an avenue for solution administration. The lumens are secured with threaded needleless adapters or Luer lock-type caps when the device is not in use.

The position of the tip of the catheter is verified with x-ray or fluoroscopy to confirm its location in the superior vena cava at the junction of the right atrium and to rule out a pneumothorax resulting from inadvertent puncture of the pleura. Once the catheter's position is confirmed, the prescribed central parenteral nutrition solution can be started. The initial rate of infusion is usually low, and the rate is gradually increased to the target rate.

An injection cap is attached to the end of each central catheter lumen, creating a closed system. IV infusion tubing is connected to the insertion cap of the central catheter with a threaded needleless adapter or Luer lock device. To ensure patency, all lumens are initially flushed according to institution policy with a 10-mL syringe. Smaller-volume syringes are not to be used because the pressure from smaller syringes is potentially harmful to the catheter. Lumens are flushed with normal saline or diluted heparin (10 U/mL) after each intermittent infusion and after blood drawing; this flushing is necessary daily when the catheter is not in use. Force is never used to flush the catheter (Gorski et al., 2016). If resistance is met, aspiration may restore lumen patency; if this is not effective, the primary provider is notified. Low-dose tissue plasminogen activator may be

prescribed to dissolve a clot or fibrin sheath. If attempts to clear the lumen are ineffective, the catheter should be changed.

Peripherally Inserted Central Catheters



Peripherally inserted central catheters (PICCs) are used for intermediate-term (several days to months) IV therapy in the hospital, long-term care, or home setting. These catheters may be inserted at the bedside or in the outpatient setting by a primary provider or specially trained nurse. The basilic, brachial, or cephalic vein is accessed above the antecubital space, and the catheter is threaded to the superior vena cava/right atrio caval junction (see [Chapter 12, Fig. 12-6](#)). Taking of blood pressure and blood specimens from the extremity with the PICC is avoided.

Surgically Placed (Tunneled) Central Catheters

Surgically placed central catheters are for long-term use and may remain in place for many years. These catheters are cuffed and can have single or double lumens; examples are the Power line (Power injectable), Hickman, Groshong, and Permacath. These catheters are inserted surgically. They are threaded (or tunneled) under the skin (reducing the risk of ascending infection) to the subclavian vein and advanced into the superior vena cava.

Implanted Vascular Access Ports



Implanted vascular access ports are also used for long-term IV therapy; examples include the Power injectable Port-A-Cath, Mediport, Hickman Port, and P.A.S. Port. Instead of exiting from the skin, the end of the catheter is attached to a small chamber that is placed in a subcutaneous pocket, either on the anterior chest wall or on the forearm. The port requires minimal care and allows the patient complete freedom of activity. Implanted ports are more expensive than the external catheters, and access requires passing a special noncoring needle (Huber tipped) through the skin into the chamber to initiate IV therapy (see [Chapter 12, Fig. 12-3](#)).

Discontinuing Parenteral Nutrition

The parenteral nutrition solution is discontinued gradually to allow the patient to adjust to decreased levels of glucose. If the parenteral nutrition solution is abruptly terminated, isotonic dextrose can be given at the same rate the parenteral nutrition solution was infusing for 1 to 2 hours to prevent rebound hypoglycemia. Symptoms of rebound hypoglycemia include weakness, faintness, sweating, shakiness, feeling cold, confusion, and increased heart rate. Once IV therapy is completed, the percutaneous central venous catheter or PICC is removed, pressure is held until hemostasis is achieved, and an occlusive dressing is applied to the exit site. Surgically placed central catheters and implanted vascular access ports are removed only by the primary provider.

NURSING PROCESS

The Patient Receiving Parenteral Nutrition

Assessment

The nurse assists in identifying patients unable to tolerate oral or enteral feedings who may be candidates for parenteral nutrition. Indicators include significant weight loss (10% or more of usual weight), a decrease in oral food intake for more than 1 week, muscle wasting, decreased tissue healing, abnormal urea nitrogen excretion, and persistent vomiting and diarrhea (McClave et al., 2016). The nurse carefully monitors the patient's hydration status, electrolyte levels, and calorie intake.

Diagnosis

NURSING DIAGNOSES

Based on the assessment data, major nursing diagnoses may include the following:

- Impaired nutritional intake associated with inadequate oral intake of nutrients
- Risk for infection associated with contamination of the central catheter site or infusion line
- Fluid imbalance associated with altered infusion rate
- Risk for activity intolerance associated with restrictions because of the presence of IV access device

COLLABORATIVE PROBLEMS/POTENTIAL COMPLICATIONS

The most common complications are pneumothorax, air embolism, a clotted or displaced catheter, sepsis, hyperglycemia, fluid overload, and rebound hypoglycemia. These problems and the associated collaborative interventions are described in [Table 41-7](#).

Planning and Goals

The major goals for the patient receiving parenteral nutrition may include optimal level of nutrition, absence of infection, adequate fluid volume, optimal level of activity (within individual limitations), knowledge of and skill in self-care, and absence of complications.

Nursing Interventions

MAINTAINING OPTIMAL NUTRITION

A continuous, uniform infusion of parenteral nutrition solution over a 24-hour period is desired. However, in some cases (e.g., home care patients), cyclic parenteral nutrition may be appropriate. Cyclic parenteral nutrition is infused during a set period of time. The time periods for infusion are sufficient to meet the patient's nutritional and pharmacologic needs. Ideally, cyclic parenteral nutrition is infused over a 10- to 14-hour period that continues through the night (Worthington et al., 2017). The cyclic parenteral nutrition is titrated up during the beginning of the infusion cycle and down at the conclusion of the infusion to prevent hyperglycemia and hypoglycemia, respectively.

The patient is initially weighed daily (this may be decreased to 2 or 3 times per week once stable) at the same time of the day under the same conditions for accurate comparison. Under the parenteral nutrition regimen, satisfactory weight maintenance or gain can usually be achieved. It is important to keep accurate intake and output

records and calculations of fluid balance. A calorie count is kept of any oral nutrients. Trace elements (copper, zinc, chromium, manganese, and selenium) are included in parenteral nutrition solutions and are individualized for each patient.

PREVENTING INFECTION

The high dextrose and fat content of parenteral nutrition solutions makes them an ideal culture medium for bacterial and fungal growth, and CVADs provide a port of entry. Gram-positive cocci, gram-negative bacilli, and *Candida* species are frequently isolated as causes of CLABSI. Common organisms include *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*, *Acinetobacter* species, and *Klebsiella pneumoniae*.



Quality and Safety Nursing Alert

Meticulous aseptic technique is essential to prevent infection any time the IV line setup is manipulated.

The skin and the catheter hub are the major sources for CLABSIs. The catheter site is covered with a chlorhexidine disc or gel and semipermeable transparent film dressing. The semipermeable transparent dressing allows frequent examination of the catheter site, adheres well to the skin, and is more comfortable for the patient. The transparent semipermeable membrane CVAD dressing is changed every 7 days unless the dressing is damp, bloody, loose, or soiled. Alternatively, an occlusive gauze dressing may be used and is changed every 48 hours or as needed (Gorski et al., 2016). During dressing changes, the nurse and patient wear masks to reduce the possibility of airborne contamination. Sterile technique is used (e.g., the nurse wears sterile gloves). The area is checked for leakage; bloody or purulent drainage; a kinked catheter; and skin reactions such as inflammation, redness, swelling, or tenderness. If chlorhexidine is used for skin asepsis, it is important to allow it to completely dry before applying the new dressing to avoid skin irritation.

The catheter is another major source of colonization and infection. The use of chlorhexidine/silver sulfadiazine- or minocycline/rifampin-impregnated catheters is recommended for a patient whose catheter is expected to remain in place for longer than 5 days if there is concern over a possibility of the patient acquiring a CLABSI (CDC, 2017b).

MAINTAINING FLUID BALANCE

The ubiquitous use of infusion pumps ensures that an accurate rate of parenteral nutrition administration can be achieved. A designated rate is set in milliliters per hour (i.e., mL/h), and the rate is routinely verified per institution policy, generally at least every 4 hours. The infusion rate should not be increased or decreased to compensate for fluids that have infused too quickly or too slowly. If the solution runs out, 10% dextrose and water is infused at the same rate to prevent hypoglycemia until the next parenteral nutrition solution is available for administration.

TABLE 41-7 Potential Complications of Parental Nutrition

Select Nursing Interventions			
Complications	Causes	Therapeutic	Preventive
Pneumothorax	Improper catheter placement and inadvertent puncture of the pleura	Place patient in Fowler position. Offer reassurance. Monitor vital signs. Prepare for thoracentesis or chest tube insertion.	Assist patient to remain still in Trendelenburg position during catheter insertion.
Air embolism	Disconnected tubing Cap missing from port Blocked segment of vascular system	Replace tubing immediately and notify primary provider. Replace cap and notify primary provider. Turn patient on left side and place in the head-low position. Notify primary provider.	Examine all tubing connection sites for their security.
Clotted catheter line	Inadequate/infrequent saline/heparin flushes Disruption of infusion	At direction of primary provider, flush with thrombolytic medication as prescribed.	Flush lines per established protocols. Monitor infusion rate hourly and inspect integrity of the line.
Catheter displacement and contamination	Excessive movement, possibly with a nonsecured catheter Separation of tubing and contamination	Stop the infusion, and notify the primary provider.	Examine all tubing connection sites. Avoid interrupting the main line or piggybacking other lines.
Sepsis	Separation of dressings Contaminated solution Infection at insertion site of catheter	Reinforce or change dressing quickly using aseptic technique. Discard. Notify pharmacist. Notify primary provider. Monitor vital signs.	Maintain sterile technique when changing tubing, dressing, or parenteral nutrition bag. Scrub the hub for 15 s prior to accessing line for any reason; air-dry prior to use.
Hyperglycemia	Glucose intolerance	Notify primary provider; addition of insulin to parenteral nutrition solution may be prescribed.	Monitor glucose levels (blood and urine). Monitor urine output. Observe for stupor, confusion, or lethargy.
Fluid overload	Fluid infusing rapidly	Decrease infusion rate. Monitor vital signs. Notify primary provider.	Use infusion pump. Verify correct infusion rate ordered.

		Treat respiratory distress by sitting patient upright and administering oxygen as needed, if prescribed.	
Rebound hypoglycemia	Feedings stopped too abruptly	Monitor for symptoms (weakness, tremors, diaphoresis, headache, hunger, and apprehension); notify primary provider.	Gradually wean patient from parenteral nutrition.

Adapted from McClave, S. A., Taylor, B. E., Martindale, R. G., et al. (2016). Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (ASPEN). *Journal of Parenteral and Enteral Nutrition*, 40(2), 159–211.

If the rate is too rapid, hyperosmolar diuresis can occur. Excess glucose is excreted by the renal tubules, pulling large volumes of water into the tubules via osmosis, resulting in higher-than-normal urine output and intravascular fluid volume deficit. If the flow rate is too slow, the patient does not receive the maximal benefit of calories and nitrogen. Intake and output is recorded on an ongoing basis so that fluid imbalance can be readily detected.

ENCOURAGING ACTIVITY

Activities and ambulation are encouraged when the patient is physically able. With a central catheter, the patient is free to move the extremities, and normal activity should be encouraged to maintain good muscle tone. If applicable, the education and exercise program initiated by occupational and physical therapists is reinforced.

PROMOTING HOME, COMMUNITY-BASED, AND TRANSITIONAL CARE

 **Educating Patients About Self-Care.** Successful home parenteral nutrition requires educating the patient and family in specialized skills using an intensive training program and follow-up supervision in the home. This is best accomplished through a team effort. Initiation of a home program facilitates the patient's discharge from the hospital.

Ideal candidates for home parenteral nutrition are patients who have a reasonable life expectancy after return home, have a limited number of illnesses other than the one that has resulted in the need for parenteral nutrition, and are highly motivated and fairly self-sufficient. Ethical dilemmas occur when the patient and family, as well as the caregiver, do not thoroughly understand what is involved in home parenteral nutrition. In addition, the ability to learn, availability of family interest and support, adequate finances, and physical plan of the home are factors that must be assessed when the decision about home parenteral nutrition is made (Worthington et al., 2017) (see Chart 41-6).

Chart 41-6 ASSESSMENT

Assessing for Home Nutrition Support

Be alert to the following assessment findings:

- *Water*: Water is necessary for hand hygiene and cleaning of work areas.
- *Electricity*: A reliable power source is needed to provide proper lighting and charging of pumps.
- *Refrigeration*: Refrigeration must be adequate for accommodation of several bags of parenteral nutrition solution.
- *Telephone*: A telephone is necessary for contacting home health personnel, arranging for prompt delivery of supplies, and for emergency purposes.
- *Environment*:
 - Should be free of rodents and insects
 - Should have storage that is not accessible to pets and small children
 - Should be assessed for stairs, carpets, and inaccessible areas, which can limit mobility with infusion pumps if the patient has a disability

Adapted from Worthington, P., Balint, J., Bechtold, M., et al. (2017). When is parenteral nutrition appropriate? *Journal of Parenteral and Enteral Nutrition*, 41(3), 324–377.

Many home health care agencies have developed education brochures and videos for home parenteral nutrition treatment. Topics include catheter and dressing care, the use of an infusion pump, administration of lipid emulsions, and catheter maintenance. Education begins in the hospital and continues in the home or ambulatory infusion center.

Continuing and Transitional Care. The home, community-based, or transitional care nurse should be aware that the typical patient needs several instruction sessions for assessment of learning and reinforcement. More information about home patient education is presented in Chart 41-7.

Evaluation

Expected patient outcomes may include:

1. Attains or maintains nutritional balance
2. Is free of catheter-related infection
 - a. Is afebrile
 - b. Has no purulent drainage from the catheter insertion site
3. Is hydrated, as evidenced by good skin turgor
4. Achieves an optimal level of activity, within limitations
5. Demonstrates skill in managing parenteral nutrition regimen
6. Prevents complications
 - a. Maintains proper catheter and equipment function
 - b. Maintains metabolic balance within normal limits

MANAGEMENT OF THE PATIENT REQUIRING AN OSTOMY

Approximately 100,000 patients have surgery to create fecal diversions in the United States annually (Taneja, Netsch, Ralstad, et al., 2017). Common indications for these

procedures include not only IBD and diverticulitis, but also advanced colorectal cancer (see later discussion) (Hendren, Hammond, Glasgow, et al., 2015). Fecal diversions may be either ileostomies or colostomies, both of which may be permanent or temporary. While an ileostomy surgically creates an opening into the small intestine, a **colostomy** surgically creates an opening into the colon; both divert fecal drainage to the abdominal wall by means of a stoma. The Plan of Nursing Care summarizes care for the patient requiring an ostomy (see Chart 41-8).

Chart 41-7 HOME CARE CHECKLIST

The Patient Receiving Parenteral Nutrition

At the completion of education, the patient and/or caregiver will be able to:

- State the goal and purpose of parenteral nutrition therapy and any impact on physiologic functioning, ADLs, IADLs, roles, relationships, and spirituality.
- State what types of changes are needed (if any) to support home parenteral nutrition therapy and maintain a clean home environment and prevent infection.
- State how to contact the primary provider, the team of home care professionals overseeing care, and parental nutrition supply vendor.
 - List emergency phone numbers
- State how to obtain medical supplies and carry out catheter and dressing care, and other prescribed regimens.
- Demonstrate how to perform catheter and dressing care.
- Discuss basic components of parenteral nutrition solution and intravenous fat emulsions.
- State the name, dose, side effects, frequency, and schedule for all medications.
- Demonstrate accurate and safe administration of medications.
- Demonstrate how to handle solutions and medications correctly.
- Demonstrate correct administration of parenteral nutrition
 - Operate infusion pump
 - Prime tubing and filter
 - Connect and disconnect parenteral nutrition infusion
 - Flush central line
 - Clean and maintain pump
 - Change tubing and filters as directed
- Discuss pump warning signals and how to address these signals.
- Identify possible parenteral nutrition complications and interventions.
- Identify a plan for refrigeration of parenteral nutrition solutions and operation of parental nutrition pump during a power outage or other emergency.
- State time and date of follow-up appointments and testing.
- Identify the need for health promotion, disease prevention, and screening activities.

ADLs, activities of daily living; IADLs, instrumental activities of daily living.

Chart 41-8  **PLAN OF NURSING CARE**

The Patient Undergoing Ostomy Surgery

NURSING DIAGNOSIS: Lack of knowledge about the surgical procedure and preoperative preparation

GOAL: Understands the surgical process and the necessary preoperative preparations

Nursing Interventions	Rationale	Expected Outcomes
Preoperative Care		
1. Ascertain whether the patient has had a previous surgical experience, and ask for recollections of positive and negative impressions.	1. Fear of a repeated negative experience increases anxiety. Talking about the experience with a nurse helps clarify misconceptions and helps the patient ventilate any repressed emotions. Positive experiences are reinforced.	• Expresses anxieties and fears about the surgical process
2. Determine what information the surgeon gave the patient and family and whether it was understood. Clarify and elaborate as necessary. Determine whether the stoma is permanent or temporary. Be aware of the patient's prognosis if carcinoma exists.	2. Clarification prevents misunderstandings and alleviates anxiety.	• Projects a positive attitude toward the surgical procedure
3. Use pictures, drawings, or websites to illustrate the location and appearance of the surgical wounds (abdominal, perineal) and the stoma if the patient is receptive.	3. Knowledge, for some, alleviates anxiety because fear of the unknown is decreased. Others choose not to know because it makes them more anxious.	• Repeats in own words information given by the surgeon
4. Explain that oral/parenteral antimicrobial agents will be given to cleanse the bowel preoperatively. Mechanical cleansing may also be required.	4. Antimicrobial agents and mechanical cleansing (e.g., laxatives, enemas) reduce intestinal bacterial flora.	• Identifies normal anatomy and physiology of gastrointestinal (GI) tract and how it will be altered; can point to expected location of abdominal wound and stoma; describes stoma appearance and size
5. Assist the patient during nasogastric/nasoenteric intubation, if indicated. Measure drainage from the tube.	5. Nasoenteral intubation is used for decompression and drainage of GI contents before surgery.	• Adheres to "bowel prep" regimen of antimicrobial agents or mechanical cleansing
NURSING DIAGNOSIS: Disturbed body image		

GOAL: Attainment of a positive self-concept

Nursing Interventions	Rationale	Expected Outcomes
<ol style="list-style-type: none">1. Encourage the patient to verbalize feelings about the stoma. Offer to be present when the stoma is first viewed and touched.2. Suggest that the spouse or significant other view the stoma.3. Offer counseling, if desired.4. Arrange for a visit, phone call, or online chat with another patient with a stoma.	<ol style="list-style-type: none">1. Free expression of feelings allows the patient the opportunity to verbalize and identify concerns. Expressed concerns can be therapeutically addressed by health care team members.2. Helps patient to overcome fears about the response of significant other.3. Provides opportunity for additional support.4. People with stomas can offer support and share mutual feelings and experiences.	<ul style="list-style-type: none">• Freely expresses concerns and fears• Accepts support• Seeks help as needed• States is willing to talk with another patient with a stoma or participate in support groups or blog sites

NURSING DIAGNOSIS: Anxiety associated with the loss of bowel control**GOAL:** Reduction of anxiety

Nursing Interventions	Rationale	Expected Outcomes
<p>Postoperative Care</p> <ol style="list-style-type: none">1. Provide information about expected bowel function:<ol style="list-style-type: none">a. Characteristics of effluentb. Frequency of discharge2. Explain how to prepare the appliance for an adequate fit.<ol style="list-style-type: none">a. Choose the drainage appliance that will provide a secure fit around the stoma. Measure the stoma size with a	<ol style="list-style-type: none">1. Emotional adjustment is facilitated if adequate information is provided at the level of the learner.2. Adequate fit is necessary for successful use of the appliance.<ol style="list-style-type: none">a. The appliance opening should be larger than the stoma for	<ul style="list-style-type: none">• Expresses interest in learning about altered bowel function• Handles equipment correctly• Changes the appliance unassisted• Irrigates colostomy successfully, if indicated• Progresses toward a regular schedule of elimination

- measuring guide provided by the ostomy equipment manufacturer and compare with the opening on the pouch. The barrier opening should be sized to "hug" the stoma and cover the peristomal skin; wafer barriers can be pulled or molded to the size of the stoma.
- b. Remove any plastic covering that protects the appliance adhesive. *Note:* The pouch is applied by pressing the adhesive for 30 seconds to the skin barrier.
3. Demonstrate how to change the appliance or empty the pouch before leakage occurs. Be aware that the older adult may have diminished vision and difficulty handling equipment.
4. If appropriate, demonstrate how to irrigate the colostomy (usually on the 4th or 5th day). Recommend that irrigation be performed at a consistent time, depending on the type of colostomy.
- an adequate fit. Available brands come in different sizes to fit the stoma. Adjustments are made as necessary.
- b. The appliance is ready to apply directly to the skin or skin protector.
3. Manipulation of the appliance is a learned motor skill that requires practice and positive reinforcement.
4. Colostomy irrigation is used to regulate the passage of fecal material; alternatively, the bowel can be allowed to evacuate naturally. Irrigation is not routinely indicated.

NURSING DIAGNOSIS: Risk for impaired skin integrity associated with irritation of the peristomal skin by the effluent

GOAL: Maintenance of skin integrity

Nursing Interventions	Rationale	Expected Outcomes
1. Provide information about signs and symptoms of irritated or	1. Peristomal skin should be slightly pink without	• Describes appearance of healthy skin

<p>inflamed skin. Use pictures if possible.</p> <ol style="list-style-type: none"> 2. Instruct patient how to cleanse the peristomal skin gently. 3. Demonstrate how to apply a skin barrier (e.g., wafer). 4. Demonstrate how to remove the pouch. 	<p>abrasions and similar to that of the entire abdomen.</p> <ol style="list-style-type: none"> 2. Mild friction with warm water and a gentle soap cleanses the skin and minimizes irritation and possible abrasions. After rinsing the soap, patting the skin dry prevents tissue trauma. 3. Skin barriers protect the peristomal skin from enzymes and bacteria. 4. Gently separate adhesive from the skin to avoid irritation. Never pull! 	<ul style="list-style-type: none"> • Correctly cleanses the skin • Successfully applies a skin barrier • Gently removes the drainage appliance without skin damage • Demonstrates intact skin around the stoma
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NURSING DIAGNOSIS: Impaired nutritional intake associated with avoidance of foods that may cause GI discomfort

GOAL: Achievement of an optimal nutritional intake

Nursing Interventions	Rationale	Expected Outcomes
<ol style="list-style-type: none"> 1. Conduct a complete nutritional assessment to identify any foods that may increase peristalsis by irritating the bowel. 2. Advise the patient to avoid food products with a cellulose or hemicellulose base (nuts, seeds). 3. Recommend moderation in intake of certain irritating fruits such as prunes, grapes, and bananas. 	<ol style="list-style-type: none"> 1. Patients react differently to certain foods because of individual sensitivity. 2. Cellulose food products are the nondigestible residue of plant foods. They hold water, provide bulk, and stimulate elimination. 3. These fruits tend to increase the quantity of effluent. 	<ul style="list-style-type: none"> • Modifies diet to avoid offensive foods yet maintains adequate nutritional intake • Avoids cellulose-based foods, such as peanuts • Modifies intake of certain fruits

NURSING DIAGNOSIS: Impaired sexual functioning associated with altered body image

GOAL: Attainment of satisfactory sexual performance

Nursing Interventions	Rationale	Expected Outcomes
1. Encourage the patient to verbalize concerns and fears. The sexual partner is welcomed to participate in the discussion. 2. Recommend alternative sexual positions. 3. Seek assistance from a sexual therapist or wound-ostomy-continence nurse.	1. Expressed needs help to develop a plan of care. 2. Avoids patient embarrassment with the visual appearance of the stoma. Avoids peristomal skin irritation or stomal trauma secondary to friction. 3. Some patients may benefit from professional sexual counseling.	• Expresses fears and concerns • Discusses alternative sexual positions • Accepts services of a professional counselor

NURSING DIAGNOSIS: Risk for hypovolaemia associated with anorexia and vomiting and increased loss of fluids and electrolytes from GI tract**GOAL:** Attainment of fluid balance

Nursing Interventions	Rationale	Expected Outcomes
1. Estimate fluid intake and output: a. Record intake and output b. Daily weights 2. Assess serum and urinary values of sodium and potassium. 3. Observe and record skin turgor and the appearance of the tongue.	1. Provides indication of fluid balance a. An early indicator of fluid imbalance is a daily, significant difference between intake and output. The average person ingests (food, fluids) and loses (from urine, feces, lungs) about 2 L of fluid every 24 hours. b. A gain/loss of 1 L of fluid is reflected in a body weight change of 1 kg (2.2 lb). 2. Sodium is the major electrolyte regulating water	• Maintains fluid balance • Maintains normal serum and urinary values for sodium and potassium • Normal skin turgor • Surface of tongue is pink, with a moist mucous membrane

balance. Vomiting results in decreased urinary and serum sodium levels. Urinary sodium values, in contrast to serum values, reflect early, sensitive changes in sodium balance. Sodium works in conjunction with potassium, which is also decreased with vomiting. A significant deficiency in potassium is associated with a decrease in intracellular potassium bicarbonate, which leads to acidosis and compensatory hyperventilation.

3. Adequate hydration is reflected by the skin's ability to return to its normal shape after being grasped between the fingers. *Note:* In the older person, it is normal for the return to be delayed. Changes in the mucous membrane covering the tongue are accurate and early indicators of hydration status.

Preoperative Nursing Management

A period of preparation with replacement of fluid, blood, and protein is necessary prior to surgery. Antibiotics may be prescribed. If the patient has been taking corticosteroids (e.g., to treat IBD), they will be continued during the surgical phase to prevent steroid-induced adrenal insufficiency. Usually, the patient is given a low-residue diet, provided in frequent, small feedings. All other preoperative measures are similar to those for general abdominal surgery. The abdomen is marked for the proper placement of the stoma by the surgeon or the WOC nurse. Care is taken to ensure that the stoma is conveniently placed—for instance, ileostomy stomas are usually placed in the right lower quadrant about 5 cm (2 inches) below the waist, in an area away from previous scars, bony prominences, skin folds, or fistulas. The stoma site must be visible to the patient.

The patient must have a thorough understanding of the surgery to be performed and what to expect after surgery. Preoperative education ideally should be delivered by a WOC nurse and include information about the ostomy by means of written materials, models, websites, and discussion. Preoperative education should also include management of drainage from the stoma; the nature of drainage; an introduction to use of common stoma appliances; and the need for NG intubation, parenteral fluids, and possibly perineal packing (Francone, 2020).

Postoperative Nursing Management

General abdominal surgery care is required. As with other patients undergoing abdominal surgery, the nurse encourages those with an ostomy to engage in early ambulation. It is important to administer prescribed pain medications as required. The nurse observes the stoma for color and size. It should be pink to bright red and shiny. Typically, a temporary clear or transparent plastic bag (i.e., appliance or pouch) with an adhesive facing is placed over the ostomy in the operating room and firmly pressed onto the surrounding skin. The nurse monitors the ostomy for fecal drainage, which should begin about 24 to 48 hours after surgery for an ileostomy and within 3 to 6 days after surgery for a colostomy.

The drainage from an ileostomy is a continuous liquid from the small intestine because the stoma does not have a controlling sphincter. The contents drain into the pouch and are thus kept from coming into contact with the skin. They are collected, measured, and discarded when the pouch becomes full. If a continent ileal reservoir was created, as described for the Kock pouch, continuous drainage is provided by an indwelling reservoir catheter for 2 to 3 weeks after surgery. This allows the suture lines to heal. Stool drainage from

transverse colostomies may be soft and unformed; whereas, stool from descending and sigmoid colostomies is more solid (see Fig. 41-8).

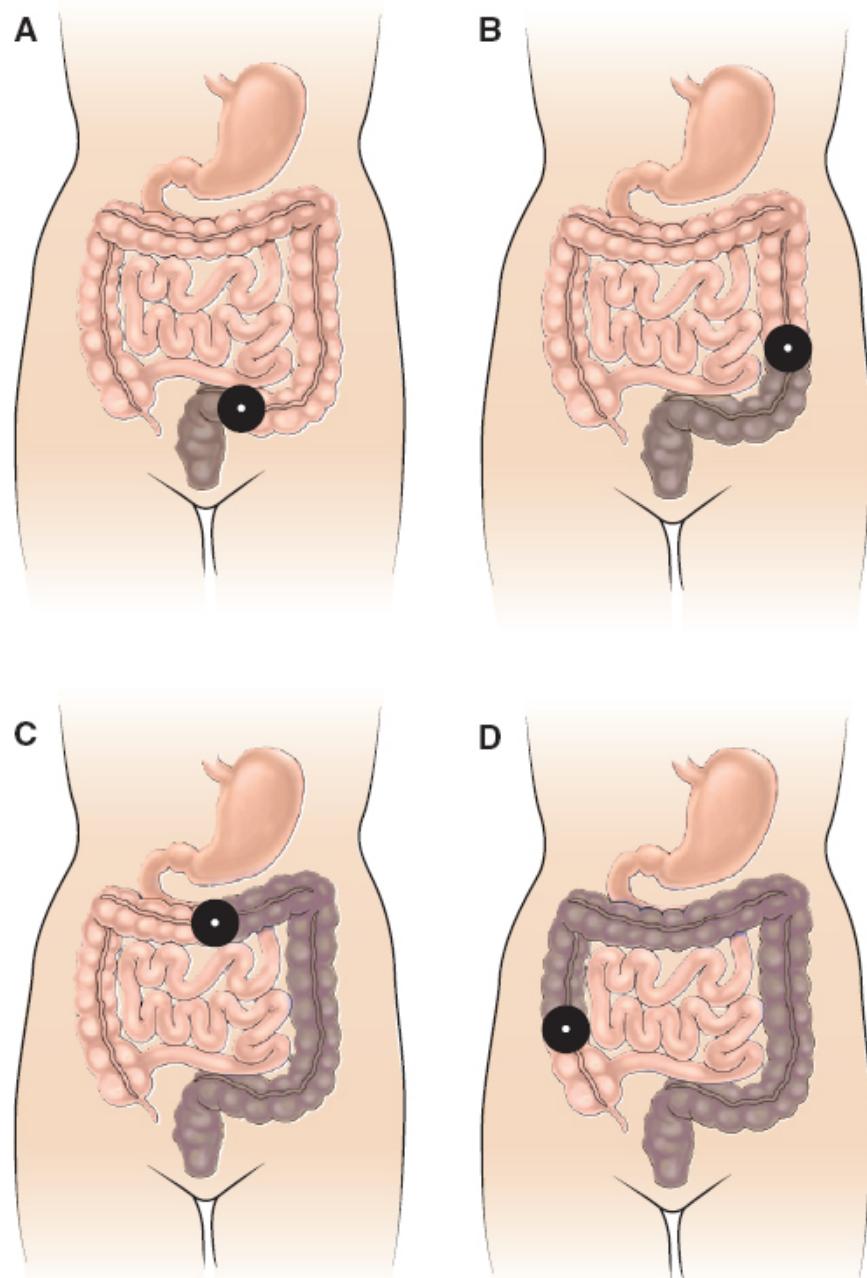


Figure 41-8 • Placement of permanent colostomies. The nature of the discharge varies with the site. *Shaded areas* show sections of bowel removed. **A.** With a sigmoid colostomy, the feces are formed. **B.** With a descending colostomy, the feces are semifomed. **C.** With a transverse colostomy, the feces are unformed. **D.** With an ascending colostomy, the feces are fluid.

Because patients lose large fluid volumes in the early postoperative period, an accurate record of fluid intake and output, including fecal discharge, is necessary to help gauge each patient's fluid needs. Between 600 and 1200 mL of daily output from an ileostomy and between 200 and 600 mL of daily output from a colostomy can be expected (Bridges, Nasser, & Parrish, 2019). With these losses, sodium and potassium are depleted. The nurse monitors laboratory values and administers electrolyte replacements as prescribed. Fluids may be given IV for 4 to 5 days to replace lost fluids.

NG suction may be a part of the immediate postoperative care, with the tube requiring frequent irrigation, as prescribed. The purpose of NG suction is to prevent a buildup of gastric contents while the intestines are not functioning. After the tube is removed, the nurse offers sips of clear liquids and gradually progresses the diet. Nausea and abdominal distention, which may indicate intestinal obstruction, must be reported immediately.

If rectal packing has been used, it is removed by the end of the first week. Because this procedure may be uncomfortable, the nurse may administer an analgesic agent an hour before the removal. After the packing is removed, the perineum is irrigated two or three times daily until full healing takes place.

Providing Emotional Support

The patient may think that everyone is aware of the ostomy and may view the stoma as a mutilation compared with other abdominal incisions that heal and are hidden. Because there is loss of a body part and a major change in anatomy and function, the patient often goes through the phases of grief—denial, anger, bargaining, depression, and acceptance. Nursing support through these phases is important, and understanding of the patient's emotional state should determine the approach taken. For example, education may be ineffective until the patient is ready to learn. Concern about body image may lead to questions related to family relationships, sexual function, and, for women of childbearing years, the ability to become pregnant and deliver a baby vaginally. Patients need to know that the nurse understands and cares about them; a calm, nonjudgmental attitude aids in gaining the patient's confidence. It is important to recognize that treatment of a possibly terminal illness (e.g., cancer) makes patients irritable, anxious, and unhappy. The nurse can coordinate patient care through meetings attended by consultants such as the primary provider, psychologist, psychiatrist, social worker, WOC nurse, and dietitian.

Conversely, a surgical procedure to create an ileostomy can produce dramatic positive changes in patients who have suffered from IBD for several years. After the discomfort of the disease has decreased and the patient learns how to take care of the ileostomy, they often develop a more positive outlook. Until the patient progresses to this phase, an empathetic and tolerant approach by the nurse plays an important part in recovery. The sooner the patient

masters the physical care of the ostomy, the sooner they will psychologically accept it.

Support from other people with ostomies is also helpful. The United Ostomy Associations of America (UOAA) is dedicated to the rehabilitation of people with ostomies. This organization gives patients useful information about living with an ostomy through an educational program of literature, lectures, and exhibits (see Resources section at the end of this chapter). Local associations offer consultations by qualified members who provide hope and rehabilitation services to patients with new ostomies. Hospitals and other health care agencies may have a WOC nurse on staff who can serve as a valuable resource person for the patient with an ileostomy.

Managing Skin and Stoma Care

The patient with an ileostomy cannot establish regular bowel habits because the contents of the ileum are fluid and are discharged continuously. The patient must wear a pouch at all times. Stomal size and pouch size vary initially; the stoma should be rechecked 3 weeks after surgery, when the edema has subsided. The final size and type of appliance is selected in 3 months, after the patient's weight has stabilized and the stoma shrinks to a stable shape.

The incidence of complications related to a colostomy is usually less than that of an ileostomy. Postoperatively, the stoma is examined for swelling (slight edema from surgical manipulation is normal), color (a healthy stoma is pink or red), discharge (a small amount of oozing is normal), and bleeding (an abnormal sign if bright red or more than trace amounts).

Skin excoriation around the stoma can be a persistent problem, particularly for ileostomies. Peristomal skin integrity may be compromised by several factors, such as an allergic reaction to the ostomy appliance, skin barrier, or paste; chemical irritation from the effluent; mechanical injury from the removal of the appliance; and infection. If irritation and yeast growth occur, antifungal spray, water-based cream, or powder can be applied on the peristomal skin and a pouch with skin barrier is applied over the affected area (Stelton, 2019).

Changing an Appliance



A regular schedule for changing the appliance before leakage occurs must be established for those with an ostomy. The patient should be educated to change the pouch.



For the procedural guidelines for changing an ostomy appliance,
go to thepoint.lww.com/Brunner15e.

The amount of time a person can keep the appliance sealed to the body surface depends on the location of the stoma and on body structure. The usual wearing time, which also depends on the type of skin barrier, is 5 to 10 days. The appliance is emptied every 4 to 6 hours, or at the same time the patient empties the bladder. An emptying spout at the bottom of the appliance is closed with a special clip or Velcro closure made for this purpose. If the patient wishes to bathe or shower before putting on a clean appliance, micropore tape applied to the sides of the pouch keeps it secure during bathing.

Most pouches are disposable and odor proof. Foods such as spinach and parsley act as deodorizers in the intestinal tract; foods that cause odors include asparagus, cabbage, onions, and fish. Bismuth subcarbonate tablets, which may be prescribed and taken orally three or four times each day, are effective in reducing odor. Oral diphenoxylate with atropine can be prescribed to diminish intestinal motility, thereby thickening the stool and assisting in odor control. Foods such as rice, mashed potatoes, and applesauce may also thicken stool.

Irrigating a Colostomy

The purpose of irrigating a colostomy is to empty the colon of gas, mucus, and feces so that the patient can go about social and business activities without fear of fecal drainage. A stoma does not have voluntary muscular control and may empty at irregular intervals. Regulating the passage of fecal material is achieved by irrigating the colostomy or allowing the bowel to evacuate naturally without irrigations. This choice depends on the person and the type of the colostomy (i.e., descending or sigmoid colostomies). By irrigating the stoma at a regular time, there is less gas and retention of the irrigant. The time for irrigating the colostomy should be consistent with the schedule that the person will follow after leaving the hospital.

Colostomy irrigation is not recommended for people with extensive pelvic irradiation because it carries a risk of perforation. Likewise, it is contraindicated in patients currently receiving chemotherapy, those with IBS, Crohn's disease, diverticulitis, and peristomal hernias (Bauer, Arnold-Long, & Kent, 2016).

As soon as the patient with a descending or sigmoid colostomy has established a routine for evacuation with irrigations, pouches may be dispensed with, and a closed ostomy appliance or a stoma cap is used to cover

the stoma. Except for gas and a slight amount of mucus, nothing escapes from the colostomy opening between irrigations. New assistive devices and ostomy care algorithms are available to help nurses learn ostomy assessment and ostomy product selection (see Resources section at the end of this chapter).

Irrigating a Continent Ileostomy

In the first several days postoperatively after a continent ileostomy (i.e., Kock pouch) is created, a catheter extends from the stoma and is attached to a closed drainage suction system. To ensure patency of the catheter, the nurse instills 10 to 20 mL of normal saline gently into the pouch usually every 3 hours; return flow is not aspirated but is allowed to drain by gravity.

After approximately 2 weeks, when the healing process has progressed to the point at which the catheter is removed from the stoma, the patient is educated how to drain the pouch. A catheter is inserted into the reservoir to drain the fluid. The length of time between drainage periods is gradually increased until the reservoir needs to be drained only every 4 to 6 hours and irrigated once each day. A pouch is not necessary; instead, most patients wear a small dressing over the opening.

When the fecal discharge is thick, water can be injected through the catheter to loosen and soften it. The consistency of the effluent is affected by food intake. At first, drainage is only 60 to 80 mL, but as time goes on, the amount increases significantly. The internal Kock pouch stretches, eventually accommodating between 500 and 1000 mL. The patient learns to use the sensation of pressure in the pouch as a gauge to determine how often the pouch should be drained.

Managing Dietary and Fluid Needs

A low-residue diet is followed for the first 6 to 8 weeks. Strained fruits and vegetables are ingested. These foods are important sources of vitamins A and C. Later, there are few dietary restrictions, except for avoiding foods that are high in fiber or hard-to-digest kernels, such as celery, popcorn, corn, poppy seeds, caraway seeds, and coconut, which may result in a stomal obstruction (food blockage) for the person with an ileostomy. Foods are reintroduced one at a time.

Getting enough fluids during the summer may be a challenge, when fluid lost through perspiration adds to the fluid loss through the ileostomy. Fluids such as sports drinks (Gatorade) are helpful in maintaining electrolyte balance. If the fecal discharge is too watery, fibrous foods (e.g., whole-grain cereals, fresh fruit skins, beans, corn, nuts) are restricted. If the effluent is excessively dry, salt intake is increased. Increased intake of water or fluid does not increase the effluent, because excess water is excreted in the urine.



Gerontologic Considerations

Some older adults may require an ostomy but have difficulty managing care due to decreased vision, impaired hearing, and difficulty with fine motor coordination. Skin care is a major concern in older patients with an ostomy because of the skin changes that occur with aging—the epithelial and subcutaneous fatty layers become thin, and the skin is irritated easily (Eliopoulos, 2018). To prevent skin breakdown, special attention is paid to skin cleansing and the proper fit of an appliance. Stoma skin barriers should be molded into shape around the stoma (e.g., Convatec; see Fig. 41-9). Arteriosclerosis may also be an issue; it causes decreased blood flow to the wound and stoma site, which may lead to delayed nutrient transport and prolonged healing time. Some patients have delayed elimination after irrigation because of decreased peristalsis and mucus production. Most patients require 6 months before they feel comfortable with their ostomy care.

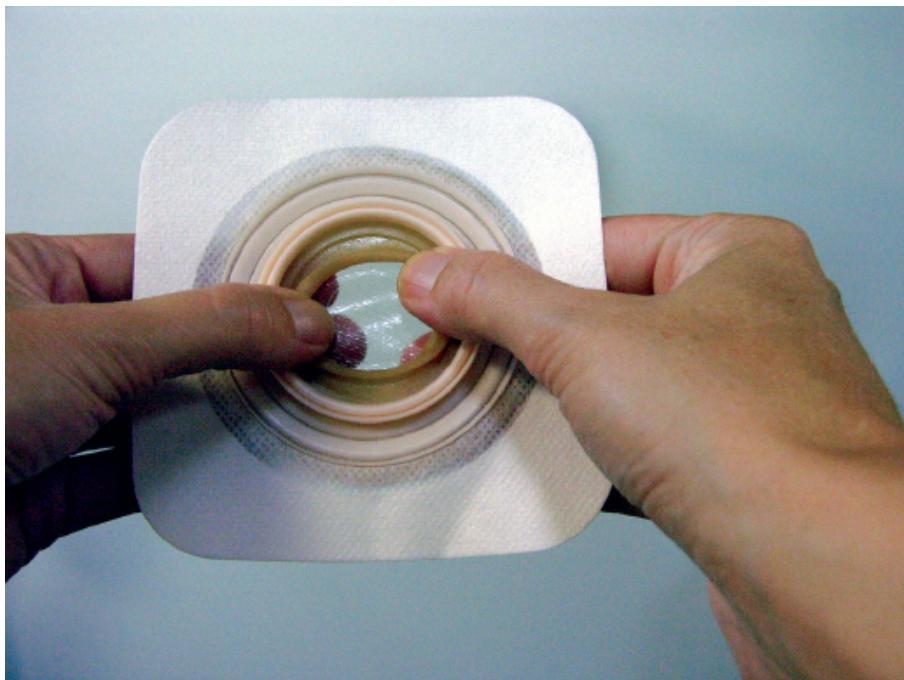


Figure 41-9 • Moldable stomal skin barrier. Reprinted with permission of Convatec, Inc.

Preventing Complications

Monitoring for complications is an ongoing activity for the patient with an ostomy. Peristomal skin irritation, which results from leakage of effluent, is the most common complication of an ileostomy. A drainable pouching system that does not fit well is often the cause. Components of the drainable pouching system include the pouch, a solid skin barrier, and adhesive. The WOC nurse

typically recommends the appropriate drainable pouching system. The solid skin barrier is the component of this system that is most important in ensuring healthy peristomal skin. Solid skin barriers are typically shaped as rectangular or elliptical wafers and are composed of polymers and hydrocolloids. They protect the skin around the stoma from effluent from the stoma and provide a stable interface between the stoma and the pouch. It is critical that the barrier be sized appropriately to “hug” the stoma (up to the stoma but not touching) and not expose peristomal skin.

Other common complications include diarrhea, stomal stenosis, urinary calculi, and cholelithiasis. Even in the presence of a properly fitted drainable pouching system, diarrhea can be problematic. Diarrhea, manifested by very irritating effluent that rapidly fills the pouch (every hour or sooner), can quickly lead to dehydration and electrolyte losses. Supplemental water, sodium, and potassium are given to prevent hypovolemia and hypokalemia. Antidiarrheal agents are given. Stenosis is caused by circular scar tissue that forms at the stoma site. The scar tissue must be surgically released. Urinary calculi may occur in patients with ileostomies and are at least partly attributed to dehydration from decreased fluid intake. Crohn’s disease is a risk factor for cholelithiasis (i.e., gallstones) due to altered absorption of bile acids (see Chapter 44).

Promoting Home, Community-Based, and Transitional Care



Educating Patients About Self-Care

Wound and ostomy care has been identified by family caregivers as one of the most challenging care responsibilities (Kirkland-Kyhn, Martin, Zaratkiewicz, et al., 2018). Ostomy care can be complex and may be viewed as unpleasant by caregivers, and some patients may have body image issues (Kirkland-Kyhn et al., 2018). Nurses can provide the patient and family with information and resources prior to discharge, so they are prepared when the patient arrives home. The family should be familiar with adjustments that will be necessary; for example, they need to know why it is necessary for the patient to occupy the bathroom for 10 minutes or more at certain times of the day and why certain equipment is needed. Their understanding is necessary to reduce tension; a relaxed patient tends to have fewer problems. Visits from a home health, WOC, or transitional care nurse may be arranged to ensure that the patient is progressing as expected and to provide additional guidance and education as needed.

Continuing and Transitional Care

The patient needs to know the commercial name of the drainable pouching system to be used so that they can obtain a ready supply; the patient should also know how to obtain other supplies. The names and contact information of a local WOC nurse and local self-help groups are often helpful. Any restrictions on driving or working also need to be reviewed. The nurse educates the patient about common postoperative complications and how to recognize and report them (see Chart 41-9).

COLORECTAL NEOPLASMS

The term *neoplasm* means new growth. Colorectal neoplasms encompass both cancerous and benign growths, including colorectal cancer and cancerous and benign colorectal polyps.

Colorectal Cancer

Tumors of the colon and rectum are relatively common; the colorectal area (the colon and rectum combined) is the third most common site of new cancer cases in the United States. In the United States, approximately 104,600 new cases and 53,200 deaths from colorectal cancer occur annually; these deaths include 3640 people under age 50 years (American Cancer Society [ACS], 2020). Colorectal cancer is the third leading cause of cancer death in men or women and the second leading cause of cancer death among all adults in the United States (ACS, 2020). The WHO estimates there were 1.8 million new cases and nearly 861,000 deaths worldwide in 2018 (Macrae & Bendell, 2020).

Chart 41-9



HOME CARE CHECKLIST

Managing Ostomy Care

At the completion of education, the patient and/or caregiver will be able to:

- Name the procedure that was performed and identify changes in anatomic structure or function as well as changes in ADLs, IADLs, roles, relationships, and spirituality.
 - Describe the frequency and character of effluent.
- Identify sources for obtaining ostomy care/appliance supplies.
- State the name, dose, side effects, frequency, and schedule for all medications.
- Demonstrate ostomy care, including wound cleansing, irrigation, and appliance changing.
- Describe the importance of assessing and maintaining peristomal skin integrity.
- Identify dietary restrictions (foods that can cause diarrhea and constipation), process for reintroduction of foods, as well as foods that may be encouraged.
- Identify measures to be used to promote fluid and electrolyte balance.
- Describe potential complications and necessary actions to be taken if complications occur.
- Relate how to reach primary provider with questions or complications.
 - Identify how to contact wound-ostomy-continence or home health nurse.
- State time and date of follow-up medical appointments, therapy, and testing.
- Identify sources of support (e.g., friends, relatives, faith community, ostomy support, caregiver support).
- Identify the need for health promotion, disease prevention, and screening activities.

ADLs, activities of daily living; IADLs, instrumental activities of daily living.

The most significant risk factor for colorectal cancer is older age. The median age at diagnosis is now 66 years of age compared to the median age 20 years ago of 72 years of age (ACS, 2020). The median age at diagnosis is younger for rectal cancer (62 years for men and 63 years for women) (ACS, 2020). The incidence of colorectal cancer in adults over 50 years of age has been declining by approximately 2% annually (Macrae & Bendell, 2020). This corresponds with an approximate 19% increase in colonoscopies being performed (Simonson, 2018). However, recent trends in epidemiologic data from the Surveillance, Epidemiology, and End Results registry (SEER) of the National Cancer Institute (NCI) revealed that nearly one in seven new

diagnoses of colorectal cancer were among adults younger than 50 years of age; furthermore, these patients were more likely to have more advanced disease at the time of diagnosis. These cancers are largely left-sided cancers (i.e., more distal); rectal cancer is particularly prevalent among younger adults with colorectal cancer (Macrae & Bendell, 2020). Research findings suggest that sedentary behavior in adults younger than 50 years of age might be linked to colorectal cancer (Nguyen, Liu, Zheng, et al., 2018).

Approximately 30% of patients with colorectal cancer have a family history of the disease (ACS, 2020). The exact cause of colon and rectal cancer is still unknown, but risk factors have been identified (see Chart 41-10). A specific form of hereditary colorectal cancer is *Lynch syndrome*, or hereditary non-polyposis colorectal cancer (HNPCC). HNPCC-defining cancers include those of the colorectum, uterus, stomach, ovaries, urinary epithelium, and small bowel. HNPCC is characterized by early age of onset. Another disorder with high risk of colorectal cancer is familial adenomatous polyposis (FAP), in which patients develop hundreds of colonic polyps that can become malignant.

The stage at presentation affects the prognosis in colon cancer. If the disease is localized and treated before it spreads, the 5-year survival rate is 89%; with distant metastases, the survival rate drops to 15% (ACS, 2020). SEER estimates the overall 5-year survival rate for all stages at 67% (ACS, 2020). Many people are asymptomatic for long periods and seek health care only when they notice a change in bowel habits or rectal bleeding (ACS, 2020). Education, prevention, and early screening are key to detection and reduction of mortality rates.

Pathophysiology

Cancer of the colon and rectum is predominantly (95%) adenocarcinoma (i.e., arising from the epithelial lining of the intestine) (Dragovich, 2020). It may start as a mutation of the adenomatous polyposis gene (*APC*), leading to malignancy. The genetic mutations are associated with the transformation of a benign polyp to invasive adenocarcinoma, which can invade and destroy normal tissues and extend into surrounding structures. Cancer cells may migrate away from the primary tumor and spread to other parts of the body, most often to the liver, peritoneum, and lungs.

Chart 41-10  **RISK FACTORS**

Colorectal Cancer

- Cigarette smoking
- Family history of colon cancer (especially if history of Lynch syndrome) or polyps (especially if history of familial adenomatous polyposis)
- High consumption of alcohol (i.e., >2 drinks daily in men, >1 drink daily in women)
- High-fat, high-protein (with high intake of beef), low-fiber diet
- History of genital cancer (e.g., endometrial cancer, ovarian cancer) or breast cancer (in women)
- History of inflammatory bowel disease
- History of radiation to the pelvis
- History of type 2 diabetes
- Increasing age
- Male gender
- Overweight or obesity
- Previous colon cancer or adenomatous polyps
- Racial/ethnic background: African American or Ashkenazi Jewish

Adapted from American Cancer Society (ACS). (2020). Colorectal cancer facts & figures 2020–2022, American Cancer Society, Inc., Surveillance Research; Colorectal (Colon) Cancer: What Are the Risk Factors for Colorectal Cancer? CDC. Retrieved on 3/09/2020 at: https://www.cdc.gov/cancer/colorectal/basic_info/risk_factors.htm

Clinical Manifestations

The symptoms are determined by the location of the tumor, the stage of the disease, and the function of the affected intestinal segment. The most common presenting symptom is a change in bowel habits. The passage of blood in or on the stools is the second most common symptom. Symptoms may also include unexplained anemia, anorexia, weight loss, and fatigue (ACS, 2020). Patients younger than 50 years of age may report abdominal pain rather than the usual “alarm” symptoms associated with colorectal cancer, which include rectal bleeding, a change in bowel habits, the presence of an abdominal mass, or anemia (Dragovich, 2020).

The symptoms most commonly associated with right-sided lesions (i.e., more proximal tumors) are dull abdominal pain and melena (i.e., black, tarry stools). Patients with right-sided tumors tend to have poorer outcomes than those with left-sided tumors. The symptoms most commonly associated with left-sided lesions are a change in bowel habits or those associated with obstruction (i.e., abdominal pain and cramping, narrowing stools, constipation, distention), as well as hematochezia (i.e., bright red blood in the stool). Symptoms associated with rectal lesions are tenesmus, rectal pain, the feeling

of incomplete evacuation after a bowel movement, alternating constipation and diarrhea, and bloody stool (Dragovich, 2020).

Assessment and Diagnostic Findings

Screening is an effective method to identify and prevent colorectal cancer. Screening colonoscopies can reduce mortality by decreasing the incidence of and increasing the survival rates for patients with colorectal cancer (ACS, 2020). Colorectal cancer develops slowly from polyps in the colon or rectum and if identified early, can be removed before undergoing malignant transformation (Simonson, 2018). Screening recommendations differ based on the organization publishing the guidelines; differences include the frequency and method of screening and age to begin and discontinue screening. The U.S. Preventive Services Task Force (USPSTF) recommends that all adults should begin periodic screening for colorectal cancer at the age of 50 years. Due to the increased incidence of colorectal cancer in people under age 50, the 2018 ACS guideline recommends screening begin at age 45 for people of average risk (ACS, 2020). Screening for high-risk people should begin earlier, based on their individual risk profile. The ACS offers information and guidelines for high-risk screening (see Resources). Whether or not to continue screening adults after the age of 75 years should be made based upon each patient's preference and overall health status. Adults older than 85 years of age should not continue to be screened (see [Chapter 12, Table 12-3](#), for summary of colorectal cancer screening guidelines). Because colonoscopy is the only screening test that can also simultaneously remove precancerous polyps, thus preventing colorectal cancer, other experts recommend colonoscopies every 5 to 10 years beginning at the age of 50 years as the major screening test for colorectal cancer, including the American College of Gastroenterology and the National Comprehensive Cancer Network (see [Chapter 38](#) for discussion of colonoscopies) (Cabebe, 2020).

A patient who has a tumor found on screening colonoscopy should have the tumor biopsied and tattooed during the colonoscopy to facilitate further workup. For the patient whose tumor was found on a diagnostic test other than a colonoscopy (e.g., flexible sigmoidoscopy, FIT), a colonoscopy is indicated to biopsy and tattoo the tumor (Rex, 2018).

The patient is referred to a colorectal surgeon. The preoperative workup consists of a focused history, to determine if there are any symptoms suggestive of colorectal cancer (see previous discussion in Clinical Manifestations). A family history is done to screen for a genetic predisposition (e.g., Lynch syndrome, FAP). Laboratory studies are done, including a CBC (may or may not reveal anemia), chemistry panel (to determine baseline status), and liver function tests (to screen for possible liver metastasis). A baseline carcinoembryonic antigen (CEA) level is also obtained. CEA is a

tumor marker that is recommended for assessing the presence of colorectal cancer, as well as its progression or recurrence, although it does yield both false positives and false negatives. However, at present there is no other readily available tumor marker test. Therefore, CEA is not used as the sole predictor of tumor status, including progression or recurrence. Other tests indicated include contrast CT scans of the abdomen, pelvis, and chest, to screen for extent of the tumor and any metastases (Macrae & Bendell, 2020).

Complications

Tumor growth may cause partial or complete bowel obstruction or perforation. Extension of the tumor and ulceration into the surrounding blood vessels can result in hemorrhage. Each of these complications can be treated surgically. Obstruction may be resected without anastomosis (e.g., Hartmann procedure) (see [Fig. 41-4](#)) or with anastomosis (e.g., colectomy or partial colectomy). Perforation typically carries a grim prognosis; it is typically treated with an ostomy. Acute hemorrhage is a rare complication; when it occurs, it is most effectively treated with surgical resection.



Gerontologic Considerations

Carcinomas of the colon and rectum are common malignancies in advanced age. In men, only the incidence of prostate cancer and lung cancer exceeds that of colorectal cancer. In women, only the incidence of breast cancer and lung cancer exceeds that of colorectal cancer (ACS, 2020). Symptoms are often insidious. Patients with colorectal cancer may report fatigue, which can be caused by iron deficiency anemia. In early stages, minor changes in bowel patterns and occasional bleeding may occur. The later symptoms most commonly reported by the older adult are abdominal pain, obstruction, tenesmus, and rectal bleeding.

Colon cancer in the older adult has been closely associated with dietary carcinogens. Lack of fiber is a major causative factor because the passage of feces through the intestinal tract is prolonged, which extends exposure to possible carcinogens. Excess dietary fat, high alcohol consumption, and smoking all increase the incidence of colorectal tumors. Physical activity and NSAIDs and aspirin have protective effects (ACS, 2020).

Prevention

Several primary prevention strategies might thwart the onset of colorectal cancer. Use of tobacco products is implicated in one third of all cancers, including colorectal cancer (see [Chapter 23](#) for discussion of smoking cessation programs). Physical activity, dietary modification, and weight

reduction strategies mirror those for other cancers (see previous discussion of Life Style Factors in [Chapter 12](#)) (ACS, 2020). In addition to these strategies, the USPSTF recommends that adults between the ages of 50 and 59 who are also at risk for developing cardiovascular disease, and who have no contraindication to aspirin, take daily or alternate-day aspirin (dosage ≥ 75 mg) for 5 to 10 years, as an effective primary prevention strategy for both cardiovascular disease and colorectal cancer (Chubak, Kamineni, Buist, et al., 2015). To date, there is no expert consensus guideline that advocates routine prescription of aspirin postcolorectal cancer diagnosis.

Medical Management

Treatment for colorectal cancer depends on the stage of the disease (see [Table 41-8](#)) and consists of surgery to remove the tumor, supportive therapy, and adjuvant therapy. Definitive staging can only be done after surgical excision.

Surgical Management

Surgery is the mainstay of initial treatment for colorectal cancer. The goal is removal of the primary tumor with clean margins, including lymph nodes (Dragovich, 2020). It may be curative or palliative. Advances in surgical techniques can enable the patient with rectal cancer to have sphincter-sparing devices that restore continuity of the GI tract. The type of surgery recommended depends on the location and size of the tumor (Dragovich, 2020).

Patients who have Stage 0 tumors typically have endoscopic or laparoscopic excision of their tumors. Laparoscopic surgery for stage I, II, and III colorectal tumors achieves equivalent oncologic outcomes to surgery done by traditional open laparotomy (Dragovich, 2020). In addition, laparoscopic surgery is associated with shorter hospital lengths of stay, fewer postoperative complications, improved pain control, and earlier progression to a normal diet. Possible surgical procedures include the following (note that only segmental resections with anastomoses may be done by laparoscope):

- Segmental resection with anastomosis (i.e., removal of the tumor and portions of the bowel on either side of the growth, as well as the blood vessels and lymphatic nodes) (see [Fig. 41-10](#))
- Abdominoperineal resection with permanent sigmoid colostomy (i.e., removal of the tumor and a portion of the sigmoid and all of the rectum and anal sphincter, also called *Miles resection*) (see [Fig. 41-11](#))
- Temporary colostomy followed by segmental resection and anastomosis and subsequent reanastomosis of the colostomy,

- allowing initial bowel decompression and bowel preparation before resection
- Permanent colostomy or ileostomy for palliation of unresectable obstructing lesions
- Construction of a coloanal reservoir called a *colonic J-pouch*, which is performed in two steps. A temporary loop ileostomy is constructed to divert intestinal flow, and the newly constructed J-pouch (made from 6 to 10 cm of colon) is reattached to the anal stump. About 3 months after the initial stage, the ileostomy is reversed and intestinal continuity is restored. The anal sphincter and therefore continence are preserved

TABLE 41-8 Staging of Colorectal Cancer: American Joint Committee on Cancer (AJCC) Stage Groupings

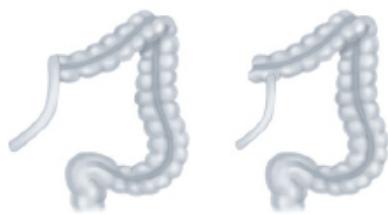
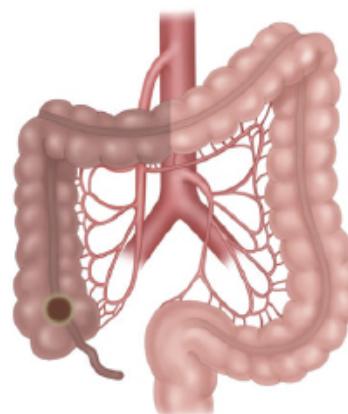
Stage	TNM	Description
Stage 0	Tis, N0, M0	Tis: carcinoma <i>in situ</i> ; intraepithelial or invasion of lamina propria N0: no regional lymph node spread M0: no distant metastasis
Stage I	T1–2, N0, M0	T1: Tumor invades submucosa T2: Tumor invades muscularis propria
Stage II A	T3, N0, M0	T3: Tumor invades through the muscularis propria into pericolorectal tissues arriving at colorectal fat tissue
Stage II B	T4, T4a, N0, M0	T4: Tumor directly invades other organs T4a: Tumor directly penetrates visceral peritoneum
Stage II C	T4b, N0, M0 Nx	T4b: Tumor directly invades or is adherent to other organs or structures Nx: Regional lymph nodes cannot be assessed
Stage III A	T1–T2, N1– N1c, M0 T1, N2a, M0	N1: Metastases in 1–3 regional lymph nodes N1a: Spread to 1 regional lymph node N1b: Spread to 2–3 regional lymph nodes N1c: Tumor deposit(s) in the subserosa, mesentery, or nonperitonealized pericolic or perirectal tissues without regional nodal metastasis N2: Spread to ≥4 regional lymph nodes N2a: Spread to 4–6 regional lymph nodes
Stage III B	T3–T4a, N1– N1c, M0 T2–T3, N2a, M0 T1–T2, N2b, M0	N2b: Spread to ≥7 regional lymph nodes
Stage III C	T4a, N2a, M0 T3–T4a, N2b, M0 T4b, N1– N2, M0	
Stage IV A	Any T, Any N, M1a	M1a: Metastasis confined to 1 organ or site (e.g., liver, lung, ovary, nonregional node)
Stage IV B	Any T, Any N, M1b	M1b: Metastasis in >1 organ/site or the peritoneum
Stage	Any T,	M1c: Metastases to peritoneum with or without metastases to other

IVC Any N, organs
 M1c

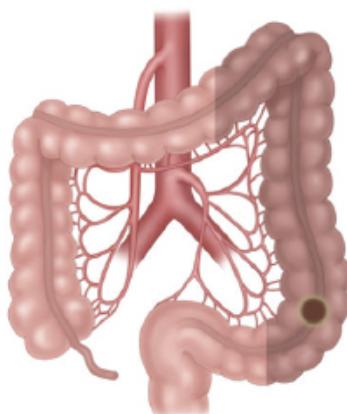
Note: This is based upon AJCC 8th Edition and National Cancer Institute (NCI) recommendations that at least 12 regional lymph nodes are examined in patients with colorectal cancer to confirm staging.

T, primary tumor; N, regional lymph nodes; M, distant metastasis. Not listed on table: Tx: tumor cannot be assessed, T0: No evidence of primary tumor

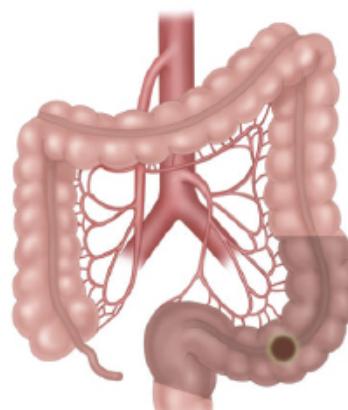
Adapted from Tong, G. J., Zhang, G. Y., Lui, J., et al. (2018). Comparison of the eighth version of the American Joint Committee on Cancer manual to the seventh version for colorectal cancer: A retrospective review of our data. *World Journal of Clinical Oncology*, 9(7), 148–161.



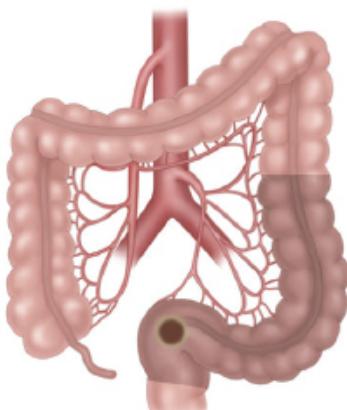
Cecum and lower ascending colon



Descending colon and upper sigmoid



Low sigmoid and upper rectum



Rectal sigmoid resection

Figure 41-10 • Examples of areas where cancer can occur, the area that is removed, and how the anastomosis is performed (*small diagrams*).

The colostomy can be created as a temporary or permanent fecal diversion. It allows the drainage or evacuation of colon contents to the outside of the body. The consistency of the drainage is related to the placement of the colostomy, which is dictated by the location of the tumor and the extent of invasion into surrounding tissues (see Fig. 41-8).

Adjuvant Therapy and Ongoing Management

Patients diagnosed with colorectal cancer are referred to a medical oncologist for further management after they are discharged from the hospital after surgery. Patients at the lowest risk for recurrence (i.e., those with Stage 0 or I disease) do not require chemotherapy or radiation therapy. Those with Stage 0 disease do not require specific follow-up. Patients with stage I colorectal cancer should have follow-up colonoscopies 1-year postoperatively, then again in another 3 years, and then every 5 years.

Most patients with stage II disease do not require any adjuvant chemotherapy. However, some patients with stage II tumors have mutations in their DNA mismatch repair genes (MMR) that are classified as proficient (MMR-P). Patients in this subset have improved survival and less disease recurrence if they take the antimetabolite chemotherapeutic drug capecitabine for 6 months. In order to screen for the MMR-P gene, the tumor should be analyzed by a multigene assay (i.e., genetic test). Patients with stage II disease who may also benefit from capecitabine are those who had inadequately sampled lymph nodes, with T4-sized tumors, or with poorly differentiated tumors. Capecitabine is equivalent to the dual chemotherapeutic drugs 5-fluorouracil and leucovorin. It may be given either orally or intravenously. The most common adverse effects of capecitabine include anemia, neutropenia, fatigue, diarrhea, and palmar-plantar erythrodysesthesia (i.e., hand-foot syndrome), which manifests by reddening, pain, and swelling of the palms of the hands and soles of the feet (NCI, 2020).

Patients with stage III tumors are typically prescribed the combination chemotherapeutic drug of 5-fluorouracil, leucovorin, and oxaplatin. This combination chemotherapeutic drug is usually given over 6 months, but there is some debate whether 3 months of treatment is as effective (Lee & Chu, 2018; Sougklakos, Boukovinas, Xynogalos, et al., 2019). The 3-month treatment regimen is associated with less neurotoxicity (Dragovich, 2020). The adverse effects mirror those of capecitabine, plus patients frequently experience cold sensitivity and paresthesias of their hands and feet, which typically cease after the chemotherapy is completed. An alternative treatment is now available, and consists of a combination drug of capecitabine and oxaliplatin for 3 or 6 months of therapy (Dragovich, 2020).

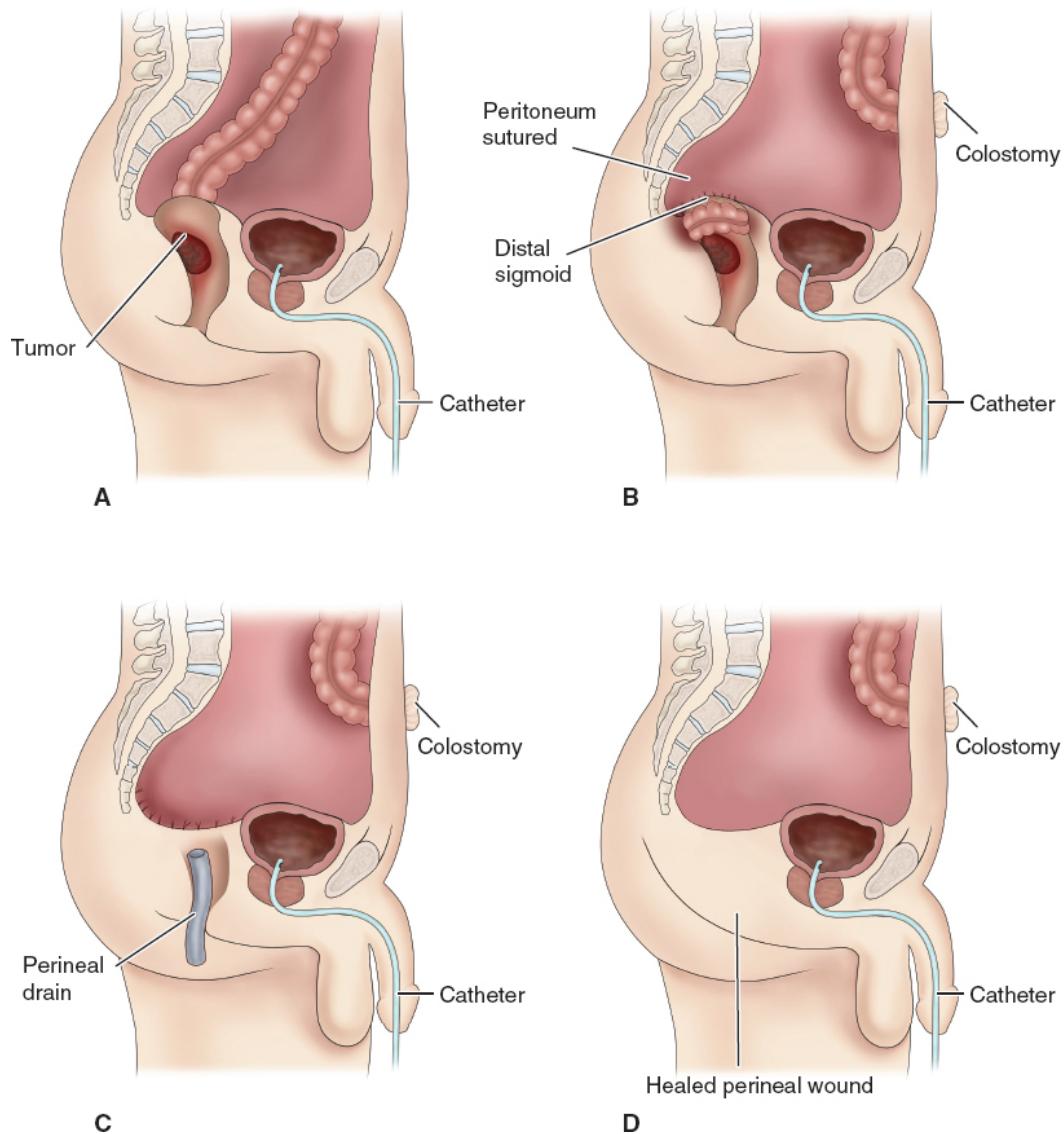


Figure 41-11 • Abdominoperineal resection for carcinoma of the rectum. **A.** Prior to surgery. Note tumor in rectum. **B.** During surgery, the sigmoid is removed and the colostomy is established. The distal bowel is dissected free to a point below the pelvic peritoneum, which is sutured over the closed end of the distal sigmoid and rectum. **C.** Perineal resection includes removal of the rectum and free portion of the sigmoid from below. A perineal drain is inserted. **D.** The final result after healing. Note the healed perineal wound and the permanent colostomy.

Patients with stage II or stage III tumors should have routine follow-ups and CEA testing every 3 to 6 months for 5 years. CT scans of the abdomen and chest should be done each year for 3 years. Colonoscopy should also be done 1-year postoperatively, and then every 5 years (NCI, 2020).

Patients with stage IV or recurrent colorectal tumors have metastases to distant organs. The treatment is highly variable and individualized, based upon the extent of the tumor mass(es), and the health status and wishes of the patient. Treatment might consist of targeted therapy aimed at possible cure, or palliative care (see [Chapter 13](#)). Chemotherapeutic drugs that might be tried include those previously described for treating stage II or stage III disease, as well as other categories of agents, including monoclonal antibodies (e.g., cetuximab, panitumumab), and anti-vascular endothelial growth factor (anti-VEGF) agents (e.g., bevacizumab, afibbercept), to name a few. When metastasis occurs, the liver is implicated half the time. Therapy targeted to treat metastases to the liver can include surgical resection, radiofrequency ablation, and intra-arterial chemotherapy (Dragovich, 2020). Maintaining quality of life is an important goal for many patients with cancer, particularly those receiving palliative care (Rohde, Kersten, Vistad, et al., 2017) (see Chart 41-11: Nursing Research Profile).

Chart 41-11



NURSING RESEARCH PROFILE

Spiritual Well-Being Among Patients with Metastatic Colorectal Cancer

Rohde, G., Kersten, C., Vistad, I., et al. (2017). Spiritual well-being in patients with metastatic colorectal cancer receiving noncurative chemotherapy: A qualitative study. *Cancer Nursing*, 40(3), 209–216.

Purpose

Enhancing quality of life (QOL) for patients with noncurative cancer is an important treatment goal. The purpose of this study was to explore spiritual well-being, an important component of QOL, in patients with metastatic colorectal cancer receiving palliative chemotherapy.

Design

Twenty patients ages 34 to 75 with metastatic colorectal cancer receiving palliative chemotherapy were enrolled in this qualitative study in Norway. Researchers conducted semi-structured, in-depth interviews over a 1-year period with hermeneutic editing for analyses. The European Organisation for Research and Treatment of Cancer (EORTC) QOL group's subthemes of spiritual well-being were used as a framework. Inclusion criteria were patients 18 years or older with metastatic colorectal cancer referred for first- or second-line noncurative chemotherapy with an expected life expectancy that exceeded 6 months. Patients unable to read or understand Norwegian, or those with significant comorbidities or being treated with an investigational drug were excluded from the study. Participants varied in terms of sociodemographic data such as age, marital status, education level, and religious beliefs. Some examples of the interview questions included "How do you experience your life after you became ill?" "How is your relationship with your nearest family and friends?" Nineteen participant interviews were done in the hospital and 1 in the participant's home.

Findings

Low spiritual well-being is associated with low QOL in patients with cancer. Positive spiritual coping strategies may contribute to improved adjustment to illness, although evidence is mixed. Using the EORTC's model, the researchers identified subthemes of spiritual well-being, including *relationship with others* (strategies for inner harmony, sharing feelings with significant others), *existential issues* (coping with end-of-life thoughts) and *religious and/or spiritual beliefs and practices* (seeking faith as inner support). Participants identified and focused on short-term, positive, and achievable goals. Many reported an ability to live a good life, despite the prognosis. Some felt the ability to speak openly about their illness was a positive change and made relationships better. However, those who did not have good relationships before their illness did not see an improvement in relationships after their diagnosis. Some participants withheld information about their diagnosis and prognosis from their families by choice in an attempt to spare their feelings. When discussing end-of-life issues, trust

between the provider and patient was very important. Some participants would have welcomed a provider initiating a discussion on existential issues, while others thought it would be intrusive.

Nursing Implications

Patients with metastatic colorectal cancer use cognitive, affective, and behavioral strategies to adjust to health-related changes in their QOL and spiritual well-being. In the process of seeking inner harmony, most participants in this study underwent a response shift when learning of their diagnosis and shift in what was important in their lives. They tried to find a balance between sadness and grief and positive feelings; others were less able to adjust to their illness and focused more on negative feelings and sadness. The participants in this study did not expect health care providers to initiate a conversation about spiritual well-being or other existential issues, although many would have appreciated the provider listening without being intrusive. Understanding QOL and spiritual well-being issues that patients with colorectal cancer face may allow the nurse to identify patients in need of developing positive coping strategies or to act as facilitator for communication between the patient and family.

NURSING PROCESS

The Patient Having Surgery for Colorectal Cancer

Assessment

The nurse obtains a health history about the presence of fatigue, abdominal or rectal pain (e.g., location, frequency, duration, association with eating or defecation), past and present elimination patterns, and characteristics of stool (e.g., color, odor, consistency, presence of blood or mucus). Additional information includes a history of IBD or colorectal polyps, a family history of colorectal disease, Lynch syndrome, or FAP, and current medication therapy. The nurse assesses dietary patterns, including fat and fiber intake, as well as amounts of alcohol consumed and history of smoking. The nurse describes and documents a history of weight loss and feelings of weakness and fatigue.

Assessment includes auscultation of the abdomen for bowel sounds and palpation of the abdomen for areas of tenderness, distention, and solid masses. Stool specimens are inspected for character and presence of blood.

Diagnosis

NURSING DIAGNOSES

Based on the assessment data, major nursing diagnoses may include the following:

- Impaired nutritional intake associated with nausea and anorexia
- Risk for infection associated with surgery on bowel and disruption of colonic bacteria
- Risk for hypovolaemia associated with vomiting and dehydration
- Lack of knowledge concerning the diagnosis, the surgical procedure, and self-care after discharge
- Anxiety associated with impending surgery and the diagnosis of cancer
- Impaired skin integrity associated with the surgical incisions (abdominal or perianal)

COLLABORATIVE PROBLEMS/POTENTIAL COMPLICATIONS

Potential complications may include the following:

- Intraperitoneal infection
- Complete large bowel obstruction
- GI bleeding
- Bowel perforation
- Peritonitis, abscess, and sepsis

Planning and Goals

The major goals for the patient may include attainment of optimal level of nutrition; prevention of infection; maintenance of fluid balance; knowledge about the diagnosis, surgical procedure, and self-care after discharge; reduction of anxiety; maintenance of optimal tissue healing; and avoidance of complications.

Nursing Interventions

The patient awaiting surgery for colorectal cancer has many concerns, needs, and fears. They may be physically debilitated and emotionally distraught with concerns about lifestyle changes after surgery, prognosis, ability to perform in established roles, and finances. Priorities for nursing care include preparing the patient physically for surgery; providing information about postoperative care; and supporting the patient and family emotionally. An Enhanced Recovery After Surgery (ERAS) Society pathway, first developed in 2005 and last revised in 2018, provides a care path developed for patients undergoing elective colorectal surgery (i.e., colorectal surgery that is planned in advance, rather than done emergently) to reduce perioperative stress, reduce length of stay, and optimize patient outcomes (Gustafsson, Scott, Hubner, et al., 2018). Multidisciplinary strategies included in the pathway are evidence-based and are associated with a reduction in morbidity, comparable or reduced 30-day hospital readmission rates, faster recovery, earlier discharge, and decreased costs (Riccardi, MacKay, & Joshi, 2019). Despite advanced age, patients over 70 years managed with the ERAS pathway experienced similar benefits in terms of length of stay and postoperative outcomes as did younger patients who underwent colorectal surgery (Joris, Hans, Coimbra, et al., 2019). (See Chapter 15 for further discussion of ERAS pathways.)

PROVIDING PREOPERATIVE CARE

Maintaining Optimal Nutrition. Physical preparation for surgery involves building the patient's stamina in the days preceding surgery. If the patient's condition permits, the nurse recommends a diet high in calories, protein, and carbohydrates and low in residue for several days before surgery to provide adequate nutrition and minimize cramping by decreasing excessive peristalsis. If the patient is hospitalized in the days preceding surgery, parenteral nutrition may be required to replace depleted nutrients, vitamins, and minerals. In some instances, parenteral nutrition is given at home before surgery (Gustafsson et al., 2018).

Preventing Infection. Postoperative infection is a major cause of morbidity and mortality following colorectal surgery (Rollins, Javanmard-Emamghissi, & Lobo, 2018). Preoperative mechanical bowel preparations (e.g., enemas, oral laxatives) traditionally have been prescribed to reduce fecal bulk and colonic bacteria. It had been posited that these measures

would prevent postoperative complications of infection. However, findings from a meta-analysis suggest that these interventions do not reduce the rates of postoperative infectious complications among patients having colorectal surgery (Rollins et al., 2018). Nonetheless, there is a lack of consensus regarding best practices that might reduce the rates of infections. The American Society of Colon and Rectal Surgeons supports the use of mechanical bowel preparations for elective colorectal surgery only when accompanied by preoperative oral antibiotics (Migaly, Bafford, Francone, et al., 2019). Antibiotics typically prescribed may include kanamycin, ciprofloxacin, neomycin, metronidazole, and cephalaxin to be administered orally the day before surgery. IV antibiotics such as cefazolin and metronidazole are usually given within 60 minutes of the surgical incision (Gustaffsson et al., 2018).

Maintaining Fluid Volume Balance. For the patient who is very ill and hospitalized, the nurse measures and records intake and output, including vomitus, to provide an accurate record of fluid balance. The patient's intake of oral food and fluids may be restricted to prevent vomiting. The nurse administers antiemetic agents as prescribed. Full or clear liquids may be tolerated, or the patient may be NPO. An NG tube may be inserted to drain accumulated fluids and prevent abdominal distention. The nurse monitors the abdomen for increasing distention, loss of bowel sounds, and pain or rigidity, which may indicate obstruction or perforation. It also is important to monitor IV fluids and electrolytes. Monitoring serum electrolyte levels can detect the hypokalemia and hyponatremia that occur with GI fluid loss. The nurse observes for signs of hypovolemia (e.g., tachycardia, hypotension, decreased pulse volume); assesses hydration status; and reports decreased skin turgor, dry mucous membranes, and concentrated urine.

Providing Preoperative Education. The nurse assesses the patient's knowledge about the diagnosis, prognosis, surgical procedure, and expected level of functioning after surgery. Education is provided about the preparations for surgery, the expected appearance and care of the wound, dietary restrictions, pain control, and medication management. All procedures are explained in language the patient understands. If the patient is going to have a colostomy, the nurse manages the plan of care as described previously (see *Nursing Management of the Patient Requiring an Ostomy*).

Providing Emotional Support. Patients anticipating bowel surgery for colorectal cancer may be very anxious. They may grieve about the diagnosis and the impending surgery. The nurse's role is to assess the patient's anxiety level and coping mechanisms and suggest methods for reducing anxiety, such as deep-breathing exercises and visualizing a successful recovery from surgery and cancer. The nurse can arrange a

meeting with a spiritual advisor if the patient desires or with the primary provider if the patient wishes to discuss the treatment or prognosis. To promote patient comfort, the nurse projects a relaxed, professional, and empathetic attitude.

PROVIDING POSTOPERATIVE CARE

Postoperative nursing care for patients undergoing colon resection is similar to nursing care for any abdominal surgery patient (see [Chapter 16](#)), including pain management during the immediate postoperative period. The nurse also monitors the patient for complications. The nurse assesses the abdomen for returning peristalsis and assesses the initial stool characteristics. It is important to help patients out of bed on the first postoperative day to prevent atelectasis, VTE, and accelerate the return of peristalsis (Chan, LeRoux, Stutzman, et al., 2019; Kaff, Wehner, & Litkouhi, 2018).

Maintaining Optimal Nutrition. The nurse educates the patient having surgery for colorectal cancer about the health benefits to be derived from consuming a healthy diet. The diet is individualized as long as it is nutritionally sound and does not cause diarrhea or constipation. The return to normal diet is rapid.

Providing Wound Care. The nurse frequently examines the abdominal dressing during the first 24 hours after surgery to detect signs of hemorrhage or infection. It is important to help the patient splint the abdominal incision during coughing and deep breathing to lessen tension on the edges of the incision. The nurse monitors temperature, pulse, and respiratory rate for elevations that may indicate an infectious process.

If the malignancy has been removed using the perineal route, the perineal wound is observed for signs of hemorrhage. This wound may contain a drain or packing that is removed gradually. Bits of tissue may slough off for a week. This process is hastened by mechanical irrigation of the wound or with sitz baths performed two or three times each day initially. The condition of the perineal wound and any bleeding, infection, or necrosis is documented.

Monitoring and Managing Potential Complications. The patient is observed for signs and symptoms of complications. The nurse monitors vital signs for increased temperature, pulse, and respirations and for decreased blood pressure that may indicate an intra-abdominal infectious process. It is important to frequently assess the abdomen, including bowel sounds and abdominal girth, to detect bowel obstruction. Rectal bleeding must be reported immediately because it indicates hemorrhage. The nurse monitors hemoglobin and hematocrit levels and administers blood component therapy as prescribed. Any abrupt change in abdominal pain is reported promptly. Elevated white blood cell counts and temperature or symptoms of shock are reported because they may indicate sepsis. The

nurse administers antibiotics as prescribed. [Table 41-9](#) lists additional potential postoperative complications.

TABLE 41-9 Potential Complications and Nursing Interventions After Colorectal Surgery

Complication Nursing Interventions

General Complications

Paralytic ileus	Initiate or continue nasogastric intubation if prescribed (typically only indicated with vomiting or abdominal distention). Prepare patient for x-ray study or CT scan of abdomen. Ensure adequate fluid and electrolyte replacement; monitor serum electrolytes for abnormalities (e.g., hypokalemia, hyponatremia, hypomagnesemia). Prepare to institute or discontinue prescribed drugs or therapies that can increase motility (e.g., chewing gum increases motility, opioid analgesics can decrease motility).
Mechanical obstruction	Assess patient for intermittent colicky pain, nausea, and vomiting. Initiate or continue nasogastric intubation if prescribed. Prepare patient for x-ray study or CT scan of abdomen. Prepare patient for surgery.

Intra-abdominal Septic and Ischemic Conditions

Peritonitis	Evaluate patient for nausea, hiccups, chills, spiking fever, tachycardia, rigid, boardlike abdomen. Administer antibiotics as prescribed. Prepare patient for drainage procedure. Administer parenteral fluid and electrolyte therapy as prescribed. Prepare patient for surgery if condition deteriorates.
Abscess formation	Administer antibiotics as prescribed. Apply warm compresses as prescribed. Prepare patient for surgical or percutaneous drainage.
Acute mesenteric ischemia	Assess patient for sudden onset of severe, colicky pain, abdominal distention, and sepsis. Prepare patient for x-ray study or CT scan of abdomen. Administer antibiotics as prescribed. Prepare patient for surgery.

Surgical Wound Complications

Infection	Monitor temperature; report temperature elevation. Observe for redness, tenderness, induration (hardening), and pain around the surgical wound. Assist in establishing local drainage. Obtain specimen of drainage material for culture and sensitivity studies.
Wound dehiscence	Observe for sudden drainage of profuse serous fluid from wound. Cover wound area with sterile moist dressings.
Wound evisceration	Observe for wound dehiscence with protrusion of abdominal organs (e.g., intestines) through wound. Prepare patient immediately for surgery.
Abdominal wound	Monitor for evidence of constant or generalized abdominal pain, rapid pulse, and elevation of temperature.

infection	Prepare for tube decompression of bowel. Administer fluids and electrolytes by IV route as prescribed. Administer antibiotics as prescribed.
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Anastomotic Complications

Dehiscence of anastomosis	Prepare patient for surgery.
Fistulas	Prepare for tube decompression of bowel. Administer parenteral fluids as prescribed to correct fluid and electrolyte deficits.

Adapted from: Moyle, S. (2017). Postoperative complications: Clinical guidelines for nurses. *Ausmed*. Retrieved on 3/9/2020 at:

www.ausmed.com/cpd/articles/postoperative-complications

Promoting Home, Community-Based, and Transitional Care

 *Educating Patients About Self-Care.* Patient education and discharge planning require the combined efforts of the primary provider, nurse, social worker, and dietitian. Patients are given specific information about wound care and signs and symptoms of potential complications that is individualized to their needs. Dietary instructions are essential to help patients identify and eliminate irritating foods that can cause diarrhea or constipation. It is important to educate patients about their prescribed medications (i.e., action, purpose, and possible side and toxic effects).

Some patients who are older with multiple comorbid conditions may need referral to a home care agency and the telephone number of the local chapter of the ACS. The home health nurse provides further care and education and assesses the patient's and family's adjustment. The home environment is assessed for adequacy of resources that allow the patient to manage self-care activities. A family member may assume responsibility for purchasing the equipment and supplies needed at home.

Patients need very specific directions about when to call their primary provider. They need to know which complications require prompt attention (i.e., bleeding, abdominal distention and rigidity, diarrhea, fever, wound drainage, and disruption of suture line). If chemotherapy is planned, the possible side effects (e.g., diarrhea, fatigue, palmar-plantar erythrodysesthesia, neuropathies) are reviewed.

Continuing and Transitional Care. Ongoing care of the patient with cancer extends well beyond the initial hospital stay. Transitional care nurses who work in cancer care infusion centers manage follow-up care and coordinate adjuvant therapy and surveillance follow-ups. Some patients are interested in and can benefit from involvement in colorectal cancer support groups (see Resources section at the end of this chapter).

Evaluation

Expected patient outcomes may include:

1. Consumes a healthy diet
 - a. Avoids foods and fluids that cause diarrhea, constipation, and obstruction
 - b. Substitutes nonirritating foods and fluids for those that are restricted
2. Does not exhibit any signs or symptoms of infection
 - a. Is afebrile
3. Maintains fluid balance
 - a. Experiences no vomiting or diarrhea
 - b. Experiences no signs or symptoms of dehydration
4. Acquires information about diagnosis, surgical procedure, preoperative preparation, and self-care after discharge
 - a. Discusses the diagnosis, surgical procedure, and postoperative self-care
 - b. Demonstrates techniques of ostomy care
5. Feels less anxious
 - a. Expresses concerns and fears freely
 - b. Uses coping measures to manage stress
6. Maintains clean wound(s)
7. Recovers without complications
 - a. Regains normal bowel activity
 - b. Exhibits no signs and symptoms of perforation or bleeding
 - c. Identifies signs and symptoms that should be reported to the health care provider

Polyps of the Colon and Rectum

A polyp is a mass of tissue that protrudes into the lumen of the bowel. Polyps can occur anywhere in the intestinal tract and rectum. They can be classified as neoplastic (i.e., typically adenocarcinomas) or non-neoplastic (i.e., mucosal and hyperplastic). Non-neoplastic polyps, which are benign epithelial growths, are common in the Western world. They occur more commonly in the large intestine than in the small intestine. Because polyps might develop into malignant neoplasms, they should be removed when they are identified, typically during screening colonoscopy (Enders, 2020). Adenomatous polyps are more common in men. The proportion of these polyps arising in the proximal part of the colon increases with age. The prevalence among adults over 60 years of age is estimated to be 10% (Enders, 2020).

Clinical manifestations depend on the size of the polyp and the amount of pressure it exerts on intestinal tissue. Most commonly, there are no symptoms. When there are clinical manifestations, the most common is rectal bleeding. Lower abdominal pain may also occur. If the polyp is large enough, symptoms of obstruction occur. The diagnosis is based on history and digital rectal examination, double-contrast barium enema studies, sigmoidoscopy, or colonoscopy (NIDDK, 2017a).

After a polyp is identified, it should be removed. Several methods are used: colonoscopy with the use of special equipment (i.e., biopsy forceps and snares), laparoscopy, or colonoscopic excision with laparoscopic visualization. The latter technique enables immediate detection of potential problems and allows laparoscopic resection and repair of the major complications of perforation and bleeding that may occur with polypectomy. Microscopic examination of the polyp then identifies the type of polyp and indicates what further surgery is required, if any (NIDDK, 2017a).

DISORDERS OF THE ANORECTUM

Anorectal disorders are common. Patients with anorectal disorders seek medical care primarily because of pain, rectal bleeding, or change in bowel habits. Other common complaints are protrusion of hemorrhoids, anal discharge, perianal itching, swelling, anal tenderness, stenosis, and ulceration. Constipation results from delaying defecation because of anorectal pain.

Proctitis

Proctitis refers to inflammation of the mucosa of the rectum, which may be secondary to infection, IBD, celiac disease, rectal instrumentation, antibiotic treatment, or radiation. Infectious diseases are the most frequent cause of proctitis; these etiologies may be either from enteric organism (e.g., *Shigella*, *Salmonella*) or from sexually transmitted infections (STIs; also called *sexually transmitted diseases*, or STDs).

Proctitis secondary to an STI may occur in any gender but is more prevalent among gay men who practice anorectal intercourse. It is commonly associated with recent anal-receptive intercourse with an infected partner. Symptoms include mucopurulent discharge or bleeding, rectal pain, and diarrhea. The pathogens most frequently involved are *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, syphilis, herpes simplex virus, and *Clostridium difficile*. These infections may progress into proctocolitis and enteritis. Proctocolitis involves the rectum and lowest portion of the descending colon. Symptoms are similar to proctitis but may also include watery or bloody diarrhea, cramps, pain, and bloating. Enteritis involves more of the descending colon, and symptoms

include watery, bloody diarrhea; abdominal pain; and weight loss. The most common pathogens causing enteritis are *E. histolytica*, *Giardia lamblia*, and *Shigella*, and *Campylobacter* species (Irizarry, 2018).

Sigmoidoscopy is performed to identify portions of the anorectum involved. Samples are taken with rectal swabs, and cultures are obtained to identify the pathogens involved. Antibiotics (e.g., ceftriaxone, doxycycline) are the treatment of choice for gonorrheal proctitis. Acyclovir is given to patients with viral infections. Antiamoebic therapy (i.e., metronidazole) is appropriate for infections with *E. histolytica* and *G. lamblia*. Metronidazole or oral vancomycin is recommended for patients with proctitis due to *C. difficile* infection (Irizarry, 2018).

Anorectal Abscess

An anorectal abscess is caused by obstruction of an anal gland with dried debris, resulting in retrograde infection. People with Crohn's disease or immunosuppressive conditions such as AIDS are particularly susceptible to these infections. Many of these abscesses result in fistulas (Hebra, 2018).

An abscess may occur in a variety of spaces in and around the rectum, usually in the path of least resistance, where anatomic structures are in close proximity without hard or thick structures to separate them. Most patients with anorectal abscesses will complain of dull perianal discomfort and itching, and increased pain with defecation. Approximately half will present with perianal edema; only one quarter will report any abnormal fecal discharge, such as pus, mucous, or blood. Only 21% report fever or chills (Hebra, 2018).

Prompt surgical treatment to incise and drain the abscess is the treatment of choice, to prevent complications such as fistula formation, fecal incontinence, and sepsis. This may be done in the emergency department or in an outpatient clinic office setting. The wound may be packed with an absorptive dressing (e.g., calcium alginate or hydrofiber) and allowed to heal by granulation (Hebra, 2018).

Anal Fistula

An anal fistula is a tiny, tubular, fibrous tract that extends into the anal canal from an opening located beside the anus in the perianal skin (see Fig. 41-12A). Fistulas usually result from an abscess. They may also develop from trauma, fissures, or Crohn's disease. Purulent drainage or stool may leak constantly from the cutaneous opening. Other symptoms may be the passage of flatus or feces from the vagina or bladder, depending on the location of the fistula tract.

Untreated fistulas may cause systemic infection with related symptoms (Hebra, 2018).

Surgery is recommended because few fistulas heal spontaneously. A fistulectomy (i.e., excision of the fistulous tract) is the recommended surgical procedure. The lower bowel is evacuated thoroughly with several prescribed enemas. The fistula is dissected or laid open by an incision from its rectal opening to its outlet. The wound is packed with gauze. Postoperative medications include analgesics and antibiotics. Fistulas recur in up to half of patients (Hebra, 2018).

Anal Fissure

An anal fissure is a longitudinal tear or ulceration in the lining of the anal canal usually just distal to the dentate line (see Fig. 41-12B). Fissures are usually caused by the trauma of passing a large, firm stool or from persistent tightening of the anal canal because of stress and anxiety (leading to constipation). Other causes include childbirth, trauma, and or anal intercourse.

Painful defecation, burning, and bleeding characterize fissures. Bright red blood may be seen on the toilet tissue after a bowel movement. Most of these fissures heal if treated by conservative measures that include dietary modification with addition of fiber supplements, stool softeners and bulk agents, an increase in water intake, and sitz baths (Poritz, 2018). Anal dilation under anesthesia may be required. Therapies such as perianal or intra-anal application of nitroglycerin ointment, calcium channel blockers, minoxidil, or botulinum toxin injections have increased the rate of healing and lowered pain levels in chronic anal fissures; these therapies should be tried before surgery. These agents work by increasing blood supply to the region and relaxing the anal sphincter (Poritz, 2018).

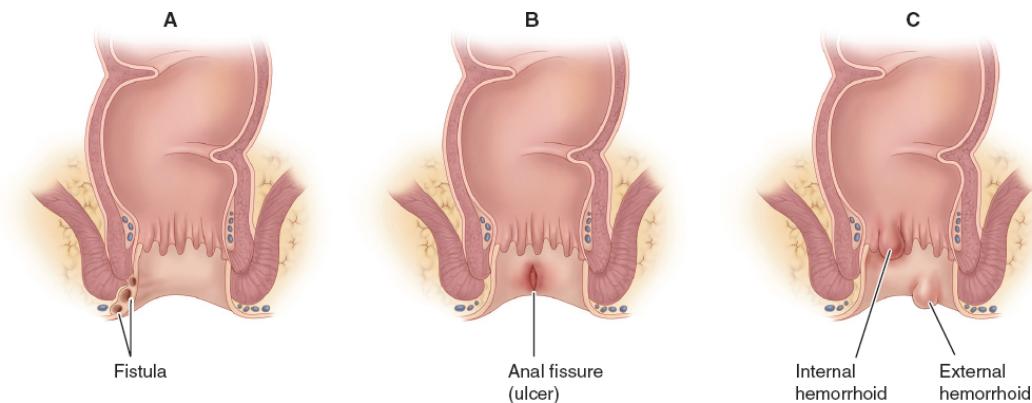


Figure 41-12 • Various types of anal lesions. **A.** Fistula. **B.** Fissure. **C.** External and internal hemorrhoids.

If fissures do not respond to conservative treatment, surgery is indicated. The procedure of choice is the lateral internal sphincterotomy with excision of the fissure.

Hemorrhoids

Hemorrhoids are dilated portions of veins in the anal canal. In the United States, approximately 10 million people have hemorrhoids; of these, nearly one third seek medical treatment for hemorrhoids annually (Perry, 2019). Shearing of the mucosa during defecation results in the sliding of the structures in the wall of the anal canal, including the hemorrhoidal and vascular tissues. Increased pressure in the hemorrhoidal tissue due to pregnancy may initiate hemorrhoids or aggravate existing ones. Hemorrhoids are classified into two types: those above the internal sphincter are called *internal hemorrhoids*, and those appearing outside the external sphincter are called *external hemorrhoids* (Perry, 2019) (see Fig. 41-12C). Internal hemorrhoids are classified by their degree of prolapse (Soweld, 2018):

- First degree—do not prolapse and protrude into anal canal
- Second degree—prolapse outside the anal canal during defecation but reduce spontaneously
- Third degree—prolapsed to the extent that they require manual reduction
- Fourth degree—prolapsed to the extent that they may not be reduced and are at risk for strangulation and thrombosis

Hemorrhoids cause itching and pain and are the most common cause of bright red bleeding with defecation. External hemorrhoids are associated with severe pain from the inflammation and edema caused by thrombosis (i.e., clotting of blood within the hemorrhoid). This may lead to ischemia of the area and eventual necrosis. Internal hemorrhoids are not usually painful until they bleed or prolapse when they become enlarged.

Hemorrhoid symptoms and discomfort can be relieved by good personal hygiene and by avoiding excessive straining during defecation. A high-residue diet that contains fruit and bran along with an increased fluid intake may be all the treatment that is necessary to promote the passage of soft, bulky stools to prevent straining. If this treatment is not successful, the addition of hydrophilic bulk-forming agents such as psyllium may help. Warm compresses, sitz baths, analgesic ointments and suppositories, and astringents (e.g., witch hazel) reduce engorgement (Perry, 2019).

There are several types of nonsurgical treatments for hemorrhoids. Infrared photocoagulation, bipolar diathermy, and laser therapy are used to affix the mucosa to the underlying muscle. Injection of sclerosing agents is also effective for small, bleeding hemorrhoids. Sclerotherapy involves injecting a

sclerosing agent (5% phenol in saline) into the base of the hemorrhoid to cause blood vessel thrombosis. These procedures help prevent prolapse (Perry, 2019).

A conservative surgical treatment of internal hemorrhoids is the rubber band ligation procedure. The hemorrhoid is visualized through the anoscope, and its proximal portion above the mucocutaneous lines is grasped with an instrument. A small rubber band is then slipped over the hemorrhoid. Tissue distal to the rubber band becomes necrotic after several days and sloughs off. Fibrosis occurs; the result is that the lower anal mucosa is drawn up and adheres to the underlying muscle. Although this treatment has been satisfactory for some patients, it has proven painful for others and may cause secondary hemorrhage. It has also been known to cause perianal infection (Soweld, 2018).

Stapled hemorrhoidopexy uses surgical staples to treat prolapsing hemorrhoids and is associated with less postoperative pain and fewer complications. If it is not successful, hemorrhoidectomy, or surgical excision, may be performed to remove all of the redundant tissue involved in the process. During surgery, the rectal sphincter is usually dilated digitally, and the hemorrhoids are removed with a clamp and cautery or are ligated and then excised. After the surgical procedures are completed, a small tube may be inserted through the sphincter to permit the escape of flatus and blood; pieces of absorbable gelatin sponge (Gelfoam) or oxidized cellulose (Oxycel) gauze may be placed over the anal wounds (Perry, 2019).

Pilonidal Sinus or Cyst

A pilonidal sinus or cyst is found in the intergluteal cleft on the posterior surface of the lower sacrum (see Fig. 41-13). Current theories suggest that it results from local trauma, causing penetration of hairs into the epithelium and subcutaneous tissue. It may also be formed congenitally by an infolding of epithelial tissue beneath the skin, which may communicate with the skin surface through one or several small sinus openings. Hair frequently is seen protruding from these openings, and this gives the cyst its name, *pilonidal* (i.e., a nest of hair). The cysts rarely cause symptoms until adolescence or early adult life, when infection produces an irritating drainage or an abscess. Perspiration and friction easily irritate this area (Koyfman, 2019).

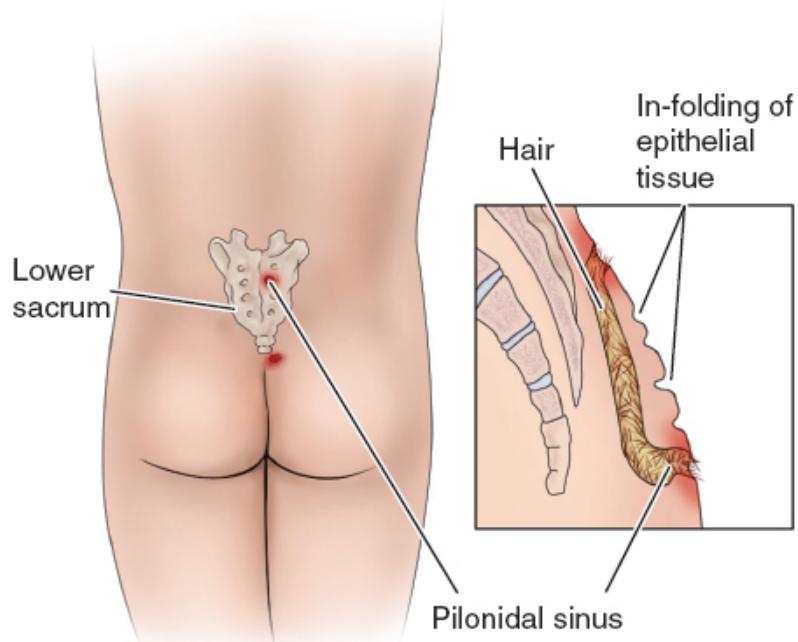


Figure 41-13 • (Left) Pilonidal sinus on lower sacrum about 5 cm (2 inches) above the anus in the intergluteal cleft. **(Right)** Hair particles emerge from the sinus tract, and localized indentations (pits) can appear on the skin near the sinus openings.

The abscess is incised and drained under local anesthesia. After the acute process resolves, further surgery might be indicated to excise the cyst and any secondary sinus tracts. The wound is allowed to heal by granulation. Absorptive dressings are placed in the wound to keep its edges separated while healing occurs (Koyfman, 2019).

Nursing Management of Patients with Anorectal Disorders

Most patients with anorectal disorders are not hospitalized. Those who undergo surgical procedures to correct the condition often are discharged directly from the outpatient surgical center. If they are hospitalized, it is for a short time, usually only 24 hours.

Promoting Home, Community-Based, and Transitional Care



Educating Patients About Self-Care

Patient education is essential to facilitate recovery at home.

The nurse instructs the patient to keep the perianal area as clean as possible by gently cleansing with warm water and then drying with absorbent cotton wipes. The patient should avoid rubbing the area with toilet tissue. Instructions are provided about how to take a sitz bath and how to test the temperature of the water.

During the first 24 hours after rectal surgery, painful spasms of the sphincter and perineal muscles may occur. The nurse instructs the patient that ice and analgesic ointments may decrease the pain. Warm compresses may promote circulation and soothe irritated tissues. Sitz baths taken three to four times each day can relieve soreness and pain by relaxing sphincter spasm. Twenty-four hours after surgery, topical anesthetic agents may be beneficial in relieving local irritation and soreness. Medications may include topical anesthetics (i.e., suppositories), astringents, antiseptics, tranquilizers, and antiemetic agents. Patients are more adherent and less apprehensive if they are free of pain.

Wet dressings saturated with equal parts of cold water and witch hazel help relieve edema. When wet compresses are being used continuously, petrolatum is applied around the anal area to prevent skin maceration. The patient is instructed to assume a prone position at intervals because this position reduces edema of the tissue.

Continuing and Transitional Care

Sitz baths may be given in the bathtub or plastic sitz bath unit three to four times each day. Sitz baths should follow each bowel movement for 1 to 2 weeks after surgery. The nurse encourages intake of at least 2 L of water daily to provide adequate hydration and recommends high-fiber foods to promote bulk in the stool and to make it easier to pass fecal matter through the rectum. Bulk laxatives such as psyllium may be recommended, and stool softeners (e.g., docusate) may be prescribed. The patient is advised to set aside a time for bowel movements and to heed the urge to defecate as promptly as possible, in order to prevent constipation. The diet is modified to increase fluids and fiber. Moderate exercise is encouraged, and the patient is taught about the prescribed diet, the significance of proper eating habits and exercise, and the laxatives that can be taken safely.

CRITICAL THINKING EXERCISES

1 ipc You are a home health nurse making a first post-discharge visit for a 42-year-old female discharged home following a proctocolectomy with ileostomy. The patient has a 20-year history of Crohn's disease with multiple exacerbations, as well as a history of depression, anemia, malnutrition, and arthritis primarily affecting the metacarpal phalangeal (MCP) and proximal interphalangeal (PIP) joints of both hands. She is married and lives with her husband; an adult daughter lives out of state. The patient is a self-employed attorney. What interdisciplinary and community resources would you consider mobilizing that can facilitate the patient's recovery from surgery, help her to manage her ileostomy over the long-term, and improve her quality of life?

2 pq As a staff nurse on a hospital surgical unit, you are caring for a 68-year male admitted from the postanesthesia care unit (PACU) following emergent laparotomy for repair of an anastomotic leak of a segmental bowel resection done 10 days ago for stage II colon cancer. In addition to his history of colon cancer, the patient also has a history of hypertension, obstructive sleep apnea, and obesity (with a body mass index [BMI] of $36/m^2$). The patient is drowsy, oriented to person, place, and time; he reports an abdominal pain score of "6" on a 0 to 10 numeric pain intensity scale. The patient's vital signs include: temperature 36.6°C (97.8°F), heart rate 82 bpm, respiratory rate 12/min, blood pressure 138/78, and SpO_2 of 99% on 2 L/min of O_2 by nasal cannula. The patient has a midline abdominal wound with staples with a small amount of serosanguinous drainage on the dressing and a Jackson-Pratt drain to bulb suction with scant bloody drainage, a Foley catheter to gravity drainage, and sequential compression devices in place bilaterally to his lower extremities. A peripheral IV line in his left forearm is infusing normal saline at 100 mL/h. What are your assessment priorities? Discuss the patient's risk for postoperative complications, and identify appropriate preventive interventions.

2 ebp You work in an outpatient gastroenterology clinic. The clinic manager asks you to develop an educational program for patients with inflammatory bowel disease. Describe your learning objectives for this program. What evidence-based health promotion strategies would you include? How might you monitor the effectiveness of your program?

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*Asterisk indicates nursing research.

**Double asterisk indicates classic reference.

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Resources

- American Cancer Society, www.cancer.org
 American College of Surgeons, Ostomy Home Skills Program, www.facs.org/education/patient-education/skills-programs/ostomy-program
 American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.), www.nutritioncare.org
 American Society of Colon and Rectal Surgeons (ASCRS), www.fascrs.org
 Beyond Celiac Disease, www.beyondceliac.org
 Celiac Disease Foundation, celiac.org
 Colorectal Cancer Alliance, www.ccalliance.org
 Crohn's and Colitis Foundation of America (CCFA), crohnscolitisfoundation.org
 Gluten Free Drugs, www.glutenfreedrugs.com
 International Foundation for Gastrointestinal Disorders (IFFGD), www.iffgd.org
 J-Pouch Group (source for J-Pouch surgery support), www.j-pouch.org

Meet an OstoMate, www.meetanostomate.org
National Cancer Institute, National Institutes of Health, www.cancer.gov
National Celiac Association, nationalceliac.org
National Colorectal Cancer Roundtable, nccrt.org
National Comprehensive Cancer Network Guidelines for Patients with Colon
Cancer, www.nccn.org/patients/guidelines/colon/index.html#114
National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK),
www.niddk.nih.gov
The Colon Club, colonclub.org
The Rome Foundation, theromefoundation.org
United Ostomy Associations of America (UOAA), www.ostomy.org
Wound Ostomy and Continence Nurses Society, www.wocn.org