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Medical Surgical NURSING I & II

As per the INC Syllabus

Dipak Sethi
Lt Col Kirti Sethi

Foreword
Brig KK Ashta



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UNIT

9

Nursing Management of Patient with Gastrointestinal System

LEARNING OBJECTIVES

At the end of this unit, the students will be able to learn about:

- Gastroesophageal reflux disease (GERD)
- Hiatal hernia
- Peptic ulcer
- Appendicitis
- Hemorrhoids
- Ulcerative colitis
- Crohn's diseases
- GI bleeding
- Portal hypertension
- Liver cirrhosis
- Cholelithiasis
- Cholecystitis
- Irritable bowel syndrome
- Esophageal varices
- Pancreatitis
- Abdominal hernia
- Hepatitis

KEY TERMS

- **Achalasia:** Failure of the lower esophageal sphincter, a valve that separates the stomach and the esophagus, to open.
- **Barium:** A metallic, chemical, chalky, liquid used to coat the inside of organs so that they will show up on an X-ray.
- **Celiac disease:** An allergic reaction of the lining of the small intestine in response to the protein gliadin.
- **Colonoscopy:** Colonoscopy is a fiberoptic (endoscopic) procedure in which a thin, flexible, lighted viewing tube (a colonoscope) is threaded up through the rectum for the purpose of inspecting the entire colon and rectum.
- **Crohn's disease:** A form of inflammatory bowel disease.
- **Diarrhea:** Passing frequent and loose stools that can be watery. Acute diarrhea goes away in a few weeks, and becomes chronic when it lasts longer than 4 weeks.
- **Endoscope:** A thin, flexible tube with a light and a lens on the end used to look into the esophagus, stomach, duodenum, small intestine, colon, or rectum.
- **H_2-blockers:** A class of medicines that reduce the amount of acid the stomach produces.
- **Intestinal pseudo-obstruction:** Symptoms and signs of intestinal blockage, but no actual blockage.

REVIEW OF ANATOMY AND PHYSIOLOGY

Introduction to the Gastrointestinal System

The gastrointestinal tract (GIT) consists of a hollow muscular tube starting from the oral cavity, where food enters the mouth, continuing through the pharynx, esophagus, stomach and intestines to the rectum and anus, where food is expelled. There are various accessory organs that assist the tract by secreting enzymes to help break down food into its component nutrients. Thus the salivary glands, liver, pancreas and gallbladder have important functions in the digestive system. Food is propelled along the length of the GIT by peristaltic movements of the oral cavity.

The oral cavity or mouth is responsible for the intake of food. It is lined by a stratified squamous oral mucosa with keratin covering those areas subject to significant abrasion, such as the tongue, hard palate and roof of the mouth. Mastication refers to the mechanical breakdown of food by chewing and chopping actions of the teeth. The tongue, a strong muscular organ, manipulates the food bolus to come in contact with the teeth. It is also the sensing organ of the mouth for touch, temperature and taste using its specialized sensors known as papillae.

JAYPEE BROTHERS

In salivation refers to the mixing of the oral cavity contents with salivary gland secretions. The mucin (a glycoprotein) in saliva acts as a lubricant. The oral cavity also plays a limited role in the digestion of carbohydrates. The enzyme serum amylase, a component of saliva, starts the process of digestion of complex carbohydrates. The final function of the oral cavity is absorption of small molecules, such as glucose and water, across the mucosa. From the mouth, food passes through the pharynx and esophagus via the action of swallowing.

Salivary Glands (Fig. 9.1)

Three pairs of salivary glands communicate with the oral cavity. Each is a complex gland with numerous acini lined by secretory epithelium. The acini secrete their contents into specialized ducts. Each gland is divided into smaller segments called lobes. Salivation occurs in response to the taste, smell or even appearance of food. This occurs due to nerve signals that tell the salivary glands to secrete saliva to prepare and moisten the mouth. Each pair of salivary glands secretes saliva with slightly different compositions.

Esophagus

The esophagus is a muscular tube of approximately 25 cm in length and 2 cm in diameter. It extends from the pharynx to the stomach after passing through an opening in the diaphragm. The wall of the esophagus is made up of inner circular and outer longitudinal layers of muscle that are supplied by the esophageal nerve plexus. This nerve plexus surrounds the lower portion of the esophagus. The esophagus functions primarily as a transport medium between compartments.

Stomach

The stomach is a J-shaped expanded bag, located just left of the midline between the esophagus and small intestine

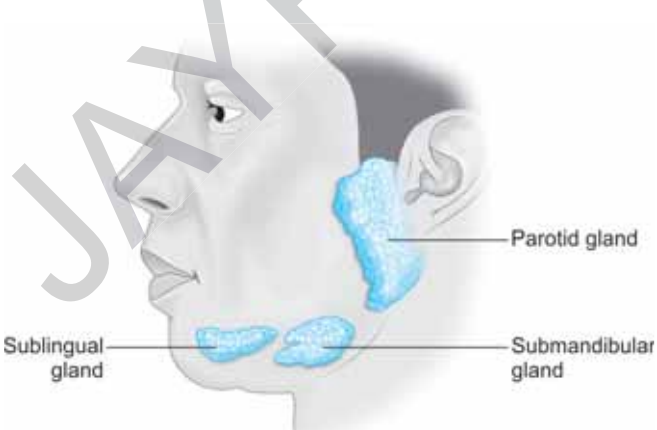


Fig. 9.1: Salivary gland.

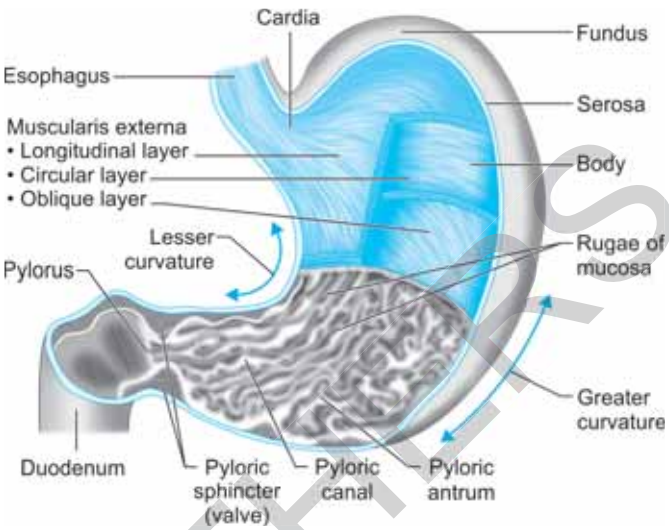


Fig. 9.2: Structure of stomach.

(Fig. 9.2). It is divided into four main regions and has two borders called the greater and lesser curvatures. The first section is the cardia which surrounds the cardiac orifice where the esophagus enters the stomach. The fundus is the superior, dilated portion of the stomach that has contact with the left dome of the diaphragm. The body is the largest section between the fundus and the curved portion of the J.

This is where most gastric glands are located and where most mixing of the food occurs. Finally, the pylorus is the curved base of the stomach. Gastric contents are expelled into the proximal duodenum via the pyloric sphincter. The inner surface of the stomach is contracted into numerous longitudinal folds called rugae. These allow the stomach to stretch and expand when food enters. The stomach can hold up to 1.5 liters of material. The functions of the stomach include:

- The short-term storage of ingested food.
- Mechanical breakdown of food by churning and mixing motions.
- Chemical digestion of proteins by acids and enzymes.
- Stomach acid kills bugs and germs.
- Some absorption of substances, such as alcohol.

Small Intestine

The small intestine is composed of the duodenum, jejunum, and ileum. It averages approximately 6 m in length, extending from the pyloric sphincter of the stomach to the ileocecal valve separating the ileum from the cecum. The small intestine is compressed into numerous folds and occupies a large proportion of the abdominal cavity.

The duodenum is the proximal C-shaped section that curves around the head of the pancreas. The duodenum serves a mixing function as it combines digestive secretions from the pancreas and liver with the contents expelled

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from the stomach. The start of the jejunum is marked by a sharp bend, the duodenojejunal flexure. It is in the jejunum where the majority of digestion and absorption occurs. The final portion, the ileum, is the longest segment and empties into the cecum at the ileocecal junction **(Fig. 9.3)**.

The small intestine performs the majority of digestion and absorption of nutrients. Partly digested food from the stomach is further broken down by enzymes from the pancreas and bile salts from the liver and gallbladder. These secretions enter the duodenum at the Ampulla of Vater. After further digestion, food constituents, such as proteins, fats, and carbohydrates are broken down to small building blocks and absorbed into the body's blood stream.

The lining of the small intestine is made up of numerous permanent folds called plicae circulares. Each plica has numerous villi (folds of mucosa) and each villus is covered by epithelium with projecting microvilli (brush border). This increases the surface area for absorption by a factor of several hundred. The mucosa of the small intestine contains several specialized cells. Some are responsible for absorption, whilst others secrete digestive enzymes and mucous to protect the intestinal lining from digestive actions.

Large Intestine

The large intestine is horseshoe shaped and extends around the small intestine like a frame. It consists of the appendix, cecum, ascending, transverse, descending and sigmoid colon, and the rectum. It has a length of approximately 1.5 m and a width of 7.5 cm.

The cecum is the expanded pouch that receives material from the ileum and starts to compress food products into fecal material. Food then travels along the colon. The wall of the colon is made up of several pouches (haustra) that are held under tension by three thick bands of muscle (*Taenia coli*).

The rectum is the final 15 cm of the large intestine. It expands to hold fecal matter before it passes through the anorectal canal to the anus. Thick bands of muscle, known as sphincters, control the passage of feces.

Liver

The liver is a large, reddish-brown organ situated in the right upper quadrant of the abdomen. It is surrounded by a strong capsule and divided into four lobes namely the right, left, caudate and quadrate lobes. The liver has several important functions. It acts as a mechanical filter by filtering blood that travels from the intestinal system. It detoxifies several metabolites including the breakdown of bilirubin and estrogen. In addition, the liver has synthetic functions, producing albumin and blood clotting factors. However, its main roles in digestion are in the production of bile and metabolism of nutrients. All nutrients absorbed by the intestines pass through the liver and are processed before traveling to the rest of the body. The bile produced by cells of the liver, enters the intestines at the duodenum. Here, bile salts break down lipids into smaller particles so there is a greater surface area for digestive enzymes to act **(Fig. 9.4)**.

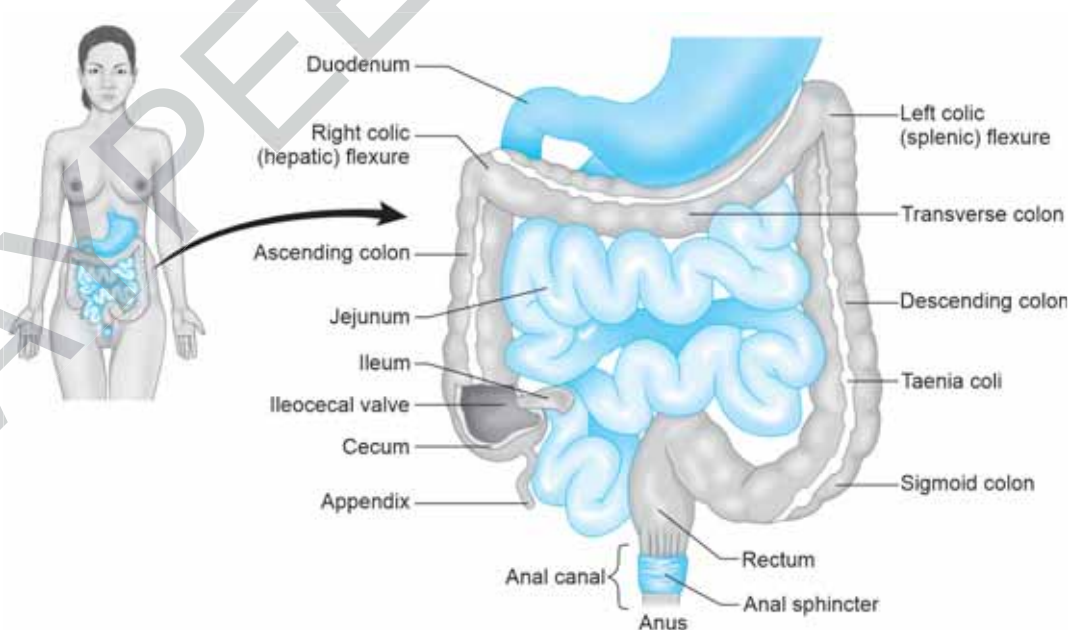


Fig. 9.3: Structure of intestine.

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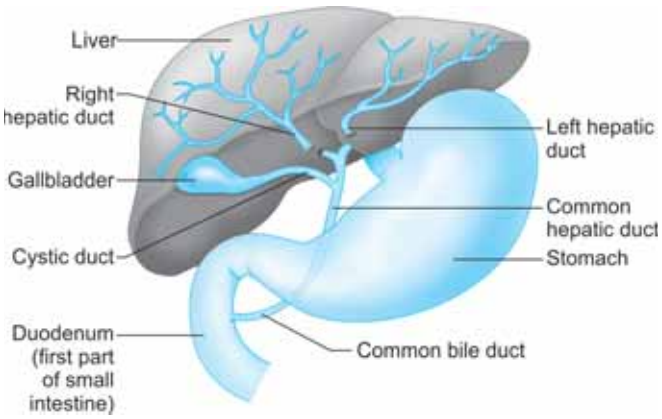


Fig. 9.4: Structure of liver and gallbladder.

Gallbladder

The gallbladder is a hollow, pear-shaped organ that sits in a depression on the posterior surface of the liver's right lobe. It consists of a fundus, body and neck. It empties via the cystic duct into the biliary duct system. The main functions of the gallbladder are storage and concentration of bile. Bile is a thick fluid that contains enzymes to help dissolve fat in the intestines. Bile is produced by the liver but stored in the gallbladder until it is needed. Bile is released from the gallbladder by contraction of its muscular walls in response to hormone signals from the duodenum in the presence of food.

Pancreas

Finally, the pancreas is a lobular, pinkish-gray organ that lies behind the stomach. Its head communicates with the duodenum and its tail extends to the spleen. The organ is approximately 15 cm in length with a long, slender body connecting the head and tail segments. The pancreas has both exocrine and endocrine functions. Endocrine refers to production of hormones which occurs in the Islets of Langerhans. The Islets produce insulin, glucagon and other substances and these are the areas damaged in diabetes mellitus. The exocrine (secretory) portion makes up 80–85% of the pancreas and is the area relevant to the gastrointestinal tract.

It is made up of numerous acini (small glands) that secrete contents into ducts which eventually lead to the duodenum. The pancreas secretes fluid rich in carbohydrates and inactive enzymes. Secretion is triggered by the hormones released by the duodenum in the presence of food. Pancreatic enzymes include carbohydrates, lipases, nucleases and proteolytic enzymes that can break down different components of food. These are secreted in an inactive form to prevent digestion of the pancreas itself. The enzymes become active once they reach the duodenum.

GASTROESOPHAGEAL REFLUX DISEASE (GERD)

Gastroesophageal reflux (GER) occurs when stomach contents flow back up into the esophagus. GER is also called acid reflux or acid regurgitation. Which is characterized by heartburn, burning feeling in the mid chest, behind the breastbone, or in the upper part of the abdomen **(Fig. 9.5)**.

Gastroesophageal reflux disease results when the lower esophageal sphincter, becomes weak or relaxes when it should not, causing stomach contents to rise up into the esophagus called GERD.

Etiology

- Obesity
- Pregnancy
- Certain medications, such as asthma medications, calcium channel blockers, and many antihistamines, pain killers, sedatives, and antidepressants
- Smoking, or inhaling secondhand smoke
- Use of spicy foods
- Sudden fall of sleep after meal
- Congenital weakness of LES

Signs and Symptoms

- Dry, chronic cough
- Wheezing
- Asthma and recurrent pneumonia
- Nausea
- Vomiting
- Sore throat, hoarseness, or laryngitis—swelling and irritation of the voice box
- Difficulty swallowing or painful swallowing
- Pain in the chest or the upper part of the abdomen
- Dental erosion and bad breath

Pathophysiology

Refer **Flowchart 9.1**.

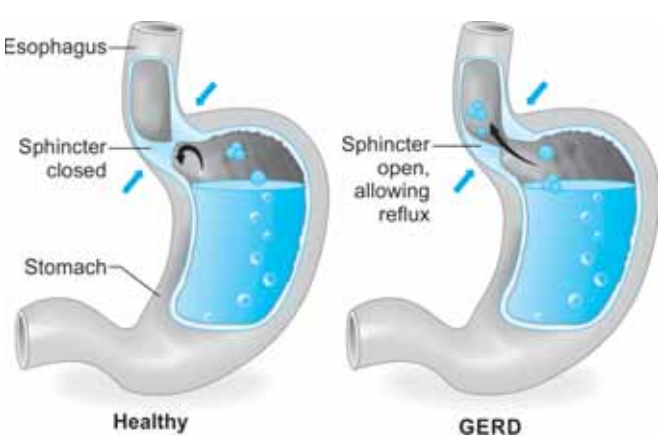
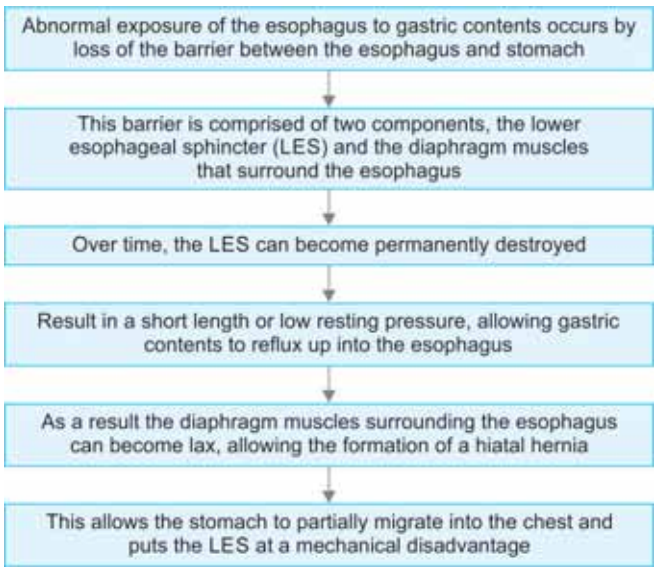


Fig. 9.5: Mechanism of GERD.

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Flowchart 9.1: Pathophysiology of peptic ulcer.



Diagnostic Evaluation

- **Upper GI series**: An X-ray, during the procedure, the person will stand or sit in front of an X-ray machine and drink barium, a chalky liquid. Barium coats the esophagus, stomach, and small intestine so the radiologist and gastroenterologist can see theses organs' shapes more clearly on X-rays. The barium shows problems related to GERD, such as hiatal hernias.
- **Upper endoscopy, also known as an esophagogastroduodenoscopy:** This procedure involves using an endoscope, a small, flexible tube with a light, to see the upper GI tract. The person may receive a liquid anesthetic that is gargled or sprayed on the back of the throat. After the person receives sedation, the gastroenterologist carefully feeds an endoscope through the mouth and down the esophagus, then into the stomach and duodenum. A small camera mounted on the endoscope transmits a video image to a monitor, allowing close examination of the intestinal lining.
- **Esophageal pH monitoring:** The most accurate test to detect acid reflux, esophageal pH monitoring measures the amount of liquid or acid in the esophagus. A gastroenterologist will pass a thin tube, called a nasogastric probe, through the person's nose or mouth to the stomach. The gastroenterologist will then pull the tube back into the esophagus, where it will be taped to the person's cheek and remain in place for 24 hours. The end of the tube in the esophagus has a small probe to measure when and how much liquid or acid comes up into the esophagus. The other end of the tube, attached to a monitor outside the body, shows the measurements taken.
- **Esophageal manometry:** Esophageal manometry measures muscle contractions in the esophagus.

Management

Lifestyle Changes

- Loss weight
- Wearing loose-fitting clothing around the stomach area
- Remaining upright for 3 hours after meals
- Raising the head of the bed 6 to 8 inches by securing wood blocks under the bedposts
- Avoiding smoking

Pharmacological Management

- Antacids, which include over-the-counter medications, recommend relieving heartburn and other mild GERD symptoms.
- H_2 blockers, such as Cimetidine, Famotidine and Ranitidine, decrease acid production.
- PPIs include Omeprazole, Pantoprazole.
- Prokinetics, which include Bethanechol and Metoclopramide, help make the stomach empty faster.
- Antibiotics, including one called erythromycin, have been shown to improve gastric emptying.

Surgical Management

- **Fundoplication** is an operation to sew the top of the stomach around the esophagus to add pressure to the lower end of the esophagus and reduce reflux. A surgeon performs fundoplication using a laparoscope, a thin tube with a tiny video camera attached used to look inside the body **(Fig. 9.6)**.
- **Endoscopic techniques**, such as endoscopic sewing and radiofrequency, endoscopic sewing uses small stitches to tighten the sphincter muscle. Radiofrequency creates heat lesions that help tighten the sphincter muscle.

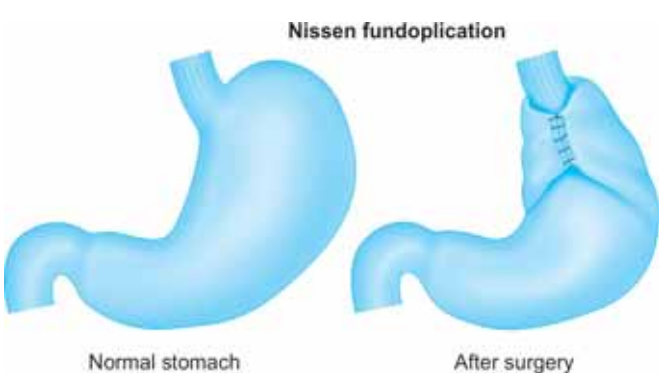


Fig. 9.6: Fundoplication.

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Nursing Interventions

- Develop a diet for the patient that takes his food preferences into account while helping to minimize reflux symptoms.
- To reduce intra-abdominal pressure, encourage the patient to sleep in reverse Trendelenburg's position with the head of the bed elevated 6" to 12".
- Encourage the patent to avoid lying down immediately after meals and late-night snacks.
- Monitor the patient's response to therapy and compliance with treatment.
- If surgery was performed, monitor his intake and output and vital signs.
- Monitor for complication of the disease and of surgery, if appropriate.
- Teach the patient about the causes of gastroesophageal reflux, and review his antireflux regimen for medication, diet, and positional therapy.
- Discuss the recommended dietary changes.
- Instruct the patient to avoid situations or activities that increase intra-abdominal pressure.
- Encourage the patient compliance with his drug regimen.
- Administer prescribed medications.
- Avoid aspirin, which is an anticoagulant, and foods and beverages that contain acid enhancing caffeine (colas, tea, coffee, chocolate), along with decaffeinated coffee.
- Encourage patient to eat regularly spaced meals in a relaxed atmosphere, obtain regular weights and encourage dietary modifications.
- Encourage relaxation techniques.
- Assess what patient wants to know about the disease, and evaluate level of anxiety, encourage patient to express fears openly and without criticism.
- Explain diagnostic tests and administering medications on schedule.
- Interact in a relaxing manner, help in identifying stressors, and explain effective coping techniques and relaxation methods.

Contd...

Contd...

- Encourage family to participate in care, and give emotional support.
- Assess for faintness or dizziness and nausea, before or with bleeding, test stool for occult or gross blood, and monitor vital signs frequently (tachycardia, hypotension, and tachypnea).
- Insert an indwelling urinary catheter and monitor intake and output, insert and maintain an IV line for infusing fluid and blood.
- Monitor laboratory values (hemoglobin and hematocrit).
- Insert and maintain a nasogastric tube and monitor drainage, provide lavage as ordered.
- Monitor oxygen saturation and administering oxygen therapy.
- Place the patient in the recumbent position with the legs elevated to prevent hypotension, or place the patient on the left side to prevent aspiration from vomiting.
- Treat hypovolemic shock as indicated.

HIATAL HERNIA

A hiatal hernia occurs when part of stomach pushes upward through diaphragm. Diaphragm normally has a small opening (hiatus) through which esophagus passes on its way to connect to stomach. The stomach can push up through this opening and cause a hiatal hernia **(Fig. 9.7)**.

Etiology

- Injury to the area
- Born with an unusually large hiatus
- Persistent and intense pressure on the surrounding muscles, such as when coughing, vomiting, or straining during a bowel movement or while lifting heavy objects.

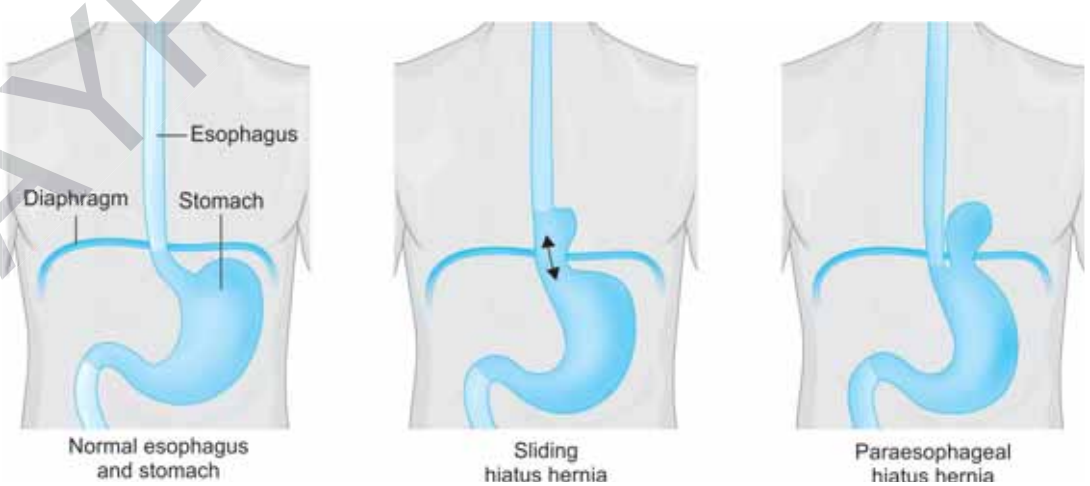


Fig. 9.7: Hernia.

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Signs and Symptoms

- Most small hiatal hernias cause no signs or symptoms.
- Heartburn
- Belching
- Difficulty swallowing
- Fatigue

Diagnostic Evaluation

- **Barium X-ray:** During a barium X-ray, patient is asked to drink chalky liquid containing barium that coats upper digestive tract. This provides a clear view of esophagus, stomach and the upper part of small intestine.
- **Endoscopy:** During an endoscopy examination, a thin, flexible tube equipped with a light and video camera (endoscope) down in throat and into esophagus and stomach to check for inflammation.

Management

- Antacids that neutralize stomach acid include magnesium hydroxide, aluminum hydroxide.
- H_2-receptor blockers, cimetidine, famotidine and ranitidine.
- Proton pump inhibitors block acid production lansoprazole and omeprazole.

Surgical Management

Surgery to repair a hiatal hernia, an operation for a hiatal hernia may involve pulling stomach down into abdomen and making the opening in diaphragm smaller, reconstructing a weak esophageal sphincter, or removing the hernia sac. (Also see surgical management of GERD).

Nursing Management

- Prepare the patient for diagnostic tests, as needed.
- Administer prescribed antacids and other medications.
- To reduce intra-abdominal pressure and prevent aspiration, have the patient sleep in a reverse Trendelenburg position with the head of the bed elevated.
- Assess the patient's response to treatment.
- Observe for complications, especially significant bleeding, pulmonary aspiration, or incarceration or strangulation of the herniated stomach portion.
- After endoscopy, watch for signs of perforation, such as falling blood pressure, rapid pulse, shock, and sudden pain caused by endoscope.
- To enhance compliance, teach the patient about the disorder. Explain significant symptoms, diagnostic tests, and prescribed treatments.
- Review prescribed medications, explaining their desired actions and possible adverse effects.
- Teach the patient dietary changes to reduce reflux.
- Encourage the patient to delay lying down for 2 hours after eating.

PEPTIC ULCERS (FIG. 9.8)

Peptic ulcers are open sores that develop on the inside lining of esophagus, stomach and the upper portion of small intestine. They are characterized by abdominal pain.

Classification of Peptic Ulcer

- **By Region:**
  - Duodenal ulcer
  - Esophageal ulcer
  - Gastric ulcer
  - Meckel's diverticulum
- **Modified Johnson Classification:**
  - **Type I:** Ulcer along the body of the stomach, most often along the lesser curve.
  - **Type II:** Ulcer in the body in combination with duodenal ulcers.
  - **Type III:** In the pyloric channel within 3 cm of pylorus.
  - **Type IV:** Proximal gastroesophageal ulcer.
  - **Type V:** Can occur throughout the stomach.

Etiology

- **Lifestyle:** These factors include cigarettes, foods and beverages containing caffeine, alcohol, and physical stress.
- **Smoking:** Smoking slows the healing of existing ulcers and also contributes to ulcer recurrence.
- **Caffeine:** Coffee, tea, colas, and foods that contain caffeine seem to stimulate acid secretion in the stomach, aggravating the pain of an existing ulcer. However, the amount of acid secretion that occurs after drinking decaffeinated coffee is the same as that produced after drinking regular coffee.

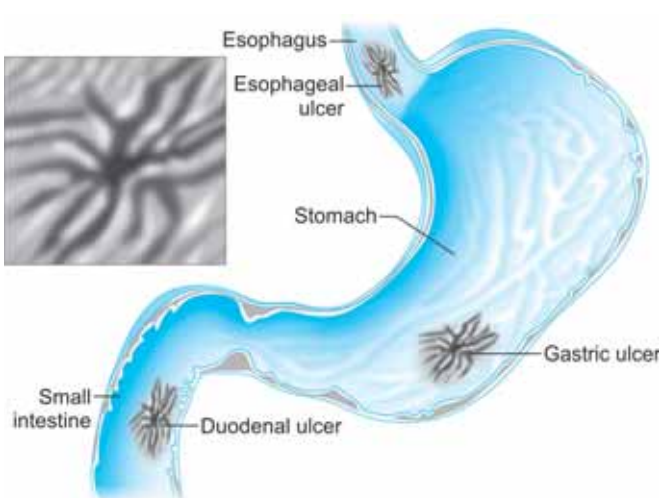


Fig. 9.8: Peptic ulcer.

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- **Alcohol:** Ulcers are more common in people who have cirrhosis of the liver.
- **Stress:** Emotional stress increases ulcer pain. Physical stress increases the risk of developing ulcers particularly in the stomach.
- **Acid and pepsin:** The stomach's inability to defend itself against the powerful digestive fluids, acid and pepsin, contributes to ulcer formation.
- **Nonsteroidal anti-inflammatory drugs (NSAIDs)** make the stomach vulnerable to the harmful effects of acid and pepsin.
- ***Helicobacter pylori*:** *H. pylori* is a spiral-shaped bacterium found in the stomach and damage stomach and duodenal tissue, causing inflammation and ulcers.

Differences between Gastric Ulcer and Duodenal Ulcer (Table 9.1)

Table 9.1: Differences between gastric ulcer and duodenal ulcer.

Characteristics	Gastric ulcer	Duodenal ulcer
Incidence	**Age** = 50 years or above Male: Female = 1:1 15% of peptic ulcer are gastric	**Age** = 30–60 years Male: Female = 2–3: 1 80% of peptic ulcer are duodenal
Definition	Ulcers that occur in the stomach are called gastric ulcers	The duodenum ulcer refers to the upper region of the small intestine
Causes	*Helicobacter pylori* infection or consumption of nonsteroidal anti-inflammatory drugs (NSAIDS)	Excess stomach acid *Helicobacter pylori* bacteria
Signs and symptoms	Gastric ulcers cause stomach pain immediate and 1–2 hours after eating	Duodenal ulcers cause pain 3–4 hours later
	Gastric ulcers cause hematemesis or vomiting of blood	Duodenal ulcers cause melena or blood in the stool
	Located in epigastric area (area between belly button and rib cage)	Pain below the ribs and just below the breastbone
	Gastric ulcers cause an aching, burning	Duodenal ulcers cause an aching, burning, hunger-like pain in the upper-middle portion of the abdomen
	Vomiting is common	Vomiting is uncommon
	Normal and hyposecretion of HCl	Hypersecretion of HCl
	No Telltale sign of a duodenal ulcer is pain that occurs during the middle of the night	Telltale sign of a duodenal ulcer is pain that occurs during the middle of the night
	This pain tends to develop or worsen when the stomach is full	This pain tends to develop or worsen when the stomach is relatively empty
Malignancy possibility	Rare	Occasionally
Risk factors	Alcohol, smoking, cirrhosis, stress	Use of NSAIDs, gastritis, alcohol, smoking
Diet	A gastric ulcer has a special diet	Duodenal ulcers do not

Signs and Symptoms

Pain is the most common symptom: Burning pain is the most common peptic ulcer symptom. The pain is caused by the ulcer and is aggravated by stomach acid coming in contact with the ulcerated area. The pain typically may:

- Be felt anywhere from navel up to breastbone
- Be worse when stomach is empty
- Flare at night
- Often be temporarily relieved by eating certain foods that buffer stomach acid or by taking an acid-reducing medication
- Disappear and then return for a few days or weeks
- Blood in vomiting (hemoptysis)
- Dark blood in stools or stools that are black or tarry (Melena)
- Nausea or vomiting
- Unexplained weight loss
- Appetite changes

Pathophysiology

Duodenal Ulcer

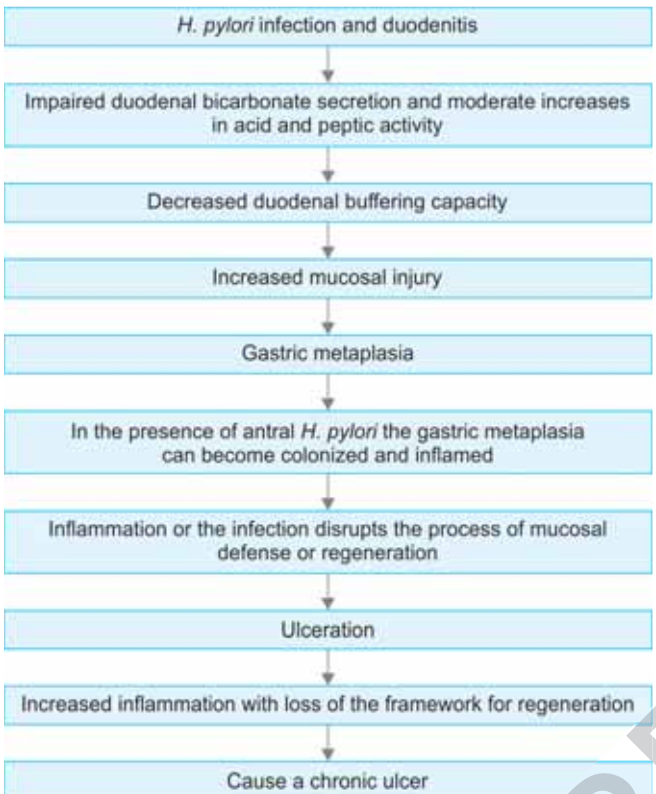
Refer **Flowchart 9.2.**

Gastric Ulcer

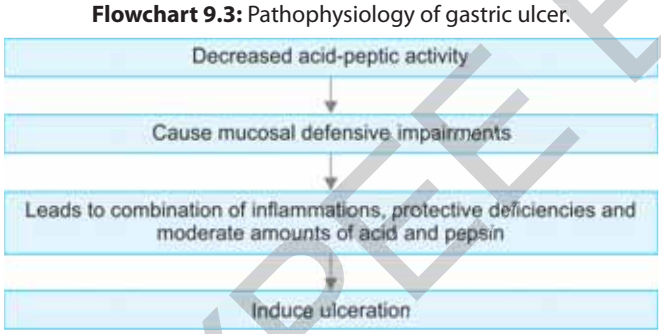
Refer **Flowchart 9.3.**

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Flowchart 9.2: Pathophysiology of duodenal ulcer.



Flowchart 9.3: Pathophysiology of gastric ulcer.



Complications

- **Internal bleeding:** Bleeding can occur as slow blood loss that leads to anemia or as severe blood loss that may require hospitalization or a blood transfusion. Severe blood loss may cause black or bloody vomit or black or bloody stools.
- **Infection:** Peptic ulcers can create a hole through the wall of stomach or small intestine, putting at risk of serious infection of abdominal cavity (peritonitis).
- **Scar tissue:** Peptic ulcers can also produce scar tissue that can block passage of food through the digestive tract, causing to become full easily, to vomit and to lose weight.

Diagnostic Evaluation

Blood Test

The body produces antibodies against *H. pylori* in an attempt to fight the bacteria. The disadvantage is the possibility of false positive results in patients previously treated for ulcers since the levels of *H. pylori* antibodies fall slowly.

Breath Tests

Breath tests measure carbon dioxide in exhaled breath. Patients are given a substance called urea with carbon to drink. Bacteria break down this urea and the carbon is absorbed into the blood stream and lungs and exhaled in the breath. By collecting the breath, doctors can measure this carbon and determine whether *H. pylori* are present or absent.

Tissue Tests

A rapid urease test detects the bacteria's enzyme urease. Histology involves visualizing the bacteria under the microscope. Culture involves specially processing the tissue and watching it for growth of *H. pylori* organisms.

Management

Medical Management

- **Antacids:** Antacids neutralize existing acid in the stomach. Antacids, such as Maalox, Mylanta, and Amphojel are safe and effective treatments. The neutralizing action of these agents is short-lived, and frequent dosing is required. Magnesium containing antacids, such as Maalox and Mylanta, can cause diarrhea, and aluminum containing agents like Amphojel can cause constipation.
- **H_2 blockers:** Histamine antagonists (H_2 blockers) are drugs designed to block the action of histamine on gastric cells and reduce the production of acid.
  Examples of H_2 blockers:
  - Cimetidine
  - Ranitidine
  - Nizatidine
  - Famotidine
- **Proton-pump inhibitors:** These are more potent than H_2 blockers in suppressing acid secretion. Proton-pump inhibitors are comparable to H_2 blockers in effectiveness in treating gastric and duodenal ulcers, they are superior to H_2 blockers in treating esophageal ulcers. Esophageal ulcers are more sensitive than gastric and duodenal ulcers to minute amounts of acid. Therefore, more complete acid suppression accomplished by proton-pump inhibitors is important for esophageal ulcer healing. Proton-pump inhibitors do not have any effect on a person's ability to digest and absorb nutrients.

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Example:
- Omeprazole
- Pantoprazole
- Esomeprazole
- Rabeprazole

❖ **Sucralfate and misoprostol:** Sucralfate coats the ulcer surface and promotes healing. Sucralfate has very few side effects. The most common side effect is constipation and the interference with the absorption of other medications.
Misoprostol is a prostaglandin-like substance commonly used to counteract the ulcerogenic effects of NSAIDs.
***H. pylori* treatment:** Treatment requires a combination of several antibiotics, sometimes in combination with a proton-pump inhibitor, H_2 blockers.

❖ **Antibiotics:** Tetracycline, amoxicillin, metronidazole, clarithromycin and levofloxacin (Levaquin). Eradication of *H. pylori.*

❖ **Probiotic supplement** (containing *Lactobacillus acidophilus*), 5–10 billion CFUs (colony forming units) a day. Probiotics bacteria may help maintain a balance in the digestive system between good and harmful bacteria, such as *H. pylori*. Probiotics may help suppress *H. pylori* infection and may also help reduce side effects from taking antibiotics, the treatment for an *H. pylori* infection.

❖ **Vitamin C**: 500–1,000 mg 1–3 times daily. Taking vitamin C along with triple therapy allowed the dose of one antibiotic to be lower. Vitamin C may also be helpful in treating bleeding stomach ulcers caused by aspirin use.

❖ **Herbs:** Use herbs as dried extracts (capsules, powders, teas), glycerites (glycerin extracts), or tinctures (alcohol extracts). Unless otherwise, make teas with 1 tsp. herb per cup of hot water. Steep covered 5–10 minutes for leaf or flowers, and 10–20 minutes for roots. Drink 2–4 cups per day.

❖ Cranberry 400 mg twice daily. Cranberry may inhibit *H. pylori* growth in the stomach. Large amounts of cranberry may be inappropriate for people who are allergic to aspirin due to the fact that cranberry contains Salicylic Acid. Cranberry extracts also can contain high levels of a chemical called oxalate, which may increase the risk of developing kidney stones.

Surgical Management

Vagotomy

A vagotomy is a surgical procedure that involves resection of the vagus nerve. Vagus nerve, which transmits messages from the brain to the stomach, is cut. Interrupting these messages reduces acid secretion. However, there can be side effects, such as severe, persistent abdominal pain, vomiting, or diarrhea. The surgery may also interfere with stomach emptying. The newest variation of this surgery involves cutting the only parts of the nerve that control the acid-secreting cells of the stomach. This avoids the parts of the nerve that influence stomach emptying.

Types of Vagotomy

❖ **Truncal vagotomy:** It involves division of the anterior and posterior vagal trunks close to the abdominal esophagus and just below the diaphragm. This operation is very successful at reducing acid secretion and therefore it promotes ulcer healing.

❖ **Selective vagotomy:** It is one operative means of reducing gastric acid output. Vagal fibers passing to the stomach are divided, whilst those fibers passing to and from the abdominal viscera are preserved. This technique is particularly indicated where gastric drainage has to be employed, e.g., with pyloric stenosis, stenosing or bleeding duodenal ulcers.

❖ **High selective vagotomy:** A vagotomy for peptic ulceration is to reduce parietal cell acid output. Apart from targeting the cells themselves, the easiest way of doing this without disturbing parietal cell function distal to the site is to cut only the closest branches of the nerve. This is done with a highly selective vagotomy.

Other Surgical Interventions

❖ **Antrectomy:** In this surgery, the lower part of the stomach (antrum) is removed. This section of the stomach produces a hormone that stimulates the stomach to secrete digestive juices. Sometimes, a surgeon may also remove an adjacent part of the stomach that secretes pepsin and acid. A vagotomy is usually done in conjunction with an antrectomy.

❖ **Billroth-I (Gastroduodenostomy) (Figs. 9.9 and 9.10):** Removal of lower portion of the antrum of the stomach as well as a small portion of duodenum and pylorus. The remaining segment is anastomosed to the duodenum.

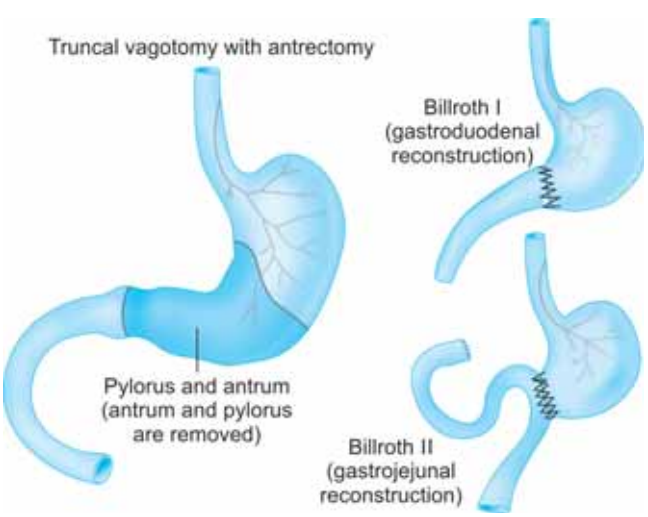


Fig. 9.9: Billroth I and Billroth II.

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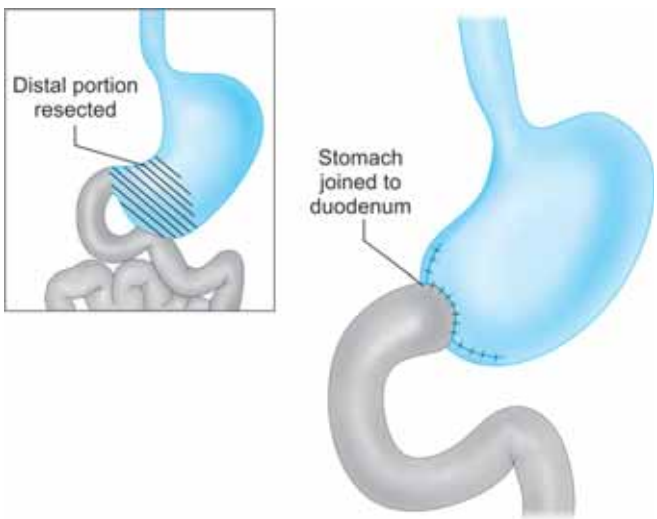


Fig. 9.10: Billroth I (gastroduodenostomy).

- **Billroth-II (Gastrojejunostomy):** Removal of lower portion of the antrum of the stomach as well as a small portion of duodenum and pylorus. The remaining segment is anastomosed to the jejunum.
- **Pyloroplasty:** This surgery enlarges the opening to the duodenum and small intestine (pylorus), which enables stomach contents to pass more freely out of the stomach. A vagotomy may also be performed along with a pyloroplasty.
- **Gastrectomy:** Gastrectomy is surgery to remove part or all of the stomach.
  - *Partial gastrectomy:* Removing part of the stomach called as partial gastrectomy.
  - *Complete gastrectomy:* Removing complete the stomach called as gastrectomy.

Nutritional Management

- Foods containing flavonoids, such as apples, celery, cranberries (including cranberry juice), onions, garlic, and tea may inhibit the growth of *H. pylori.*
- Eat antioxidant rich foods, including fruits (such as blueberries, cherries, and tomatoes), and vegetables (such as squash and bell peppers).
- Eat foods high in B vitamins and calcium, such as almonds, beans, whole grains (if no allergy), dark leafy greens (such as spinach and kale), and sea vegetables.
- Avoid refined foods, such as white breads, pastas, and sugar.
- Eat fewer red meats and more lean meats, cold water fish, tofu (soy, if no allergy) or beans for protein.
- Use healthy oils, such as olive oil or vegetable oil.
- Reduce or eliminate trans-fatty acids, found in commercially baked goods, such as cookies, crackers, cakes, French fries, onion rings, donuts, processed foods, and margarine.
- Avoid beverages that may irritate the stomach lining or increase acid production including coffee (with or without caffeine), alcohol, and carbonated beverages.
- Drink 6–8 glasses of filtered water daily.
- Exercise at least 30 minutes daily, 5 days a week.

Prevention

- Eat a diet rich in fiber, especially from fruits and vegetables. This may reduce risk of developing an ulcer in the first place and speed recovery.
- Foods containing flavonoids, such as apples, celery, cranberries (including cranberry juice), onions, garlic, and tea may inhibit the growth of *H. pylori.*
- Some people may find that spicy foods make existing symptoms worse.
- Quit smoking.
- Receive treatment for alcohol abuse.
- Cut down on coffee, including decaffeinated coffee, as well as carbonated beverages. All can increase stomach acid.
- Reduce stress with regular use of relaxation techniques, such as yoga, tai chi.

Complications

- **Gastrointestinal bleeding** is the most common complication. Sudden large bleeding can be life-threatening. It occurs when the ulcer erodes one of the blood vessels, such as the gastroduodenal artery.
- **Perforation** (A hole in the wall) often leads to catastrophic consequences. Erosion of the gastrointestinal wall by the ulcer leads to spillage of stomach or intestinal content into the abdominal cavity. Perforation at the anterior surface of the stomach leads to acute peritonitis, initially chemical and later bacterial peritonitis. The first sign is often sudden intense abdominal pain. Posterior wall perforation leads to bleeding due to involvement of gastroduodenal artery that lies posterior to the 1st part of duodenum.
- **Penetration** is when the ulcer continues into adjacent organs, such as the liver and pancreas.
- **Gastric outlet obstruction:** Scarring and swelling due to ulcers causes narrowing in the duodenum and gastric outlet obstruction. Patient often presents with severe vomiting.
- **Cancer** is included in the differential diagnosis (elucidated by biopsy), *Helicobacter pylori* as the etiological factor making it 3 to 6 times more likely to develop stomach cancer from the ulcer.
- **Dumping syndrome:** It occurs after gastrojejunostomy because ingested food rapidly enter the jejunum without

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proper mixing and without the duodenum digestive process. It is usually subside within 6–12 months.

Nursing Management

- **Acute pain related to irritation of the mucosa and muscle spasms.**
  - Give drug therapy according to the program
  - Instruct to avoid drugs are sold freely, especially those containing salicylates, medicines containing salicylates may irritate the gastric mucosa.
  - Encourage clients to avoid foods and drinks that irritate the gastric mucosa, such as caffeine and alcohol.
  - Encourage clients to use the meals and snacks at regular intervals. Schedule regular eating helps retain food particles in the stomach that helps neutralize the acidity of gastric secretions.
  - Instruct patient to stop smoking. Smoking can stimulate ulcer recurrence.
- **Anxiety related to the nature of the disease and long-term management.**
  - Encourage clients to express their problems and fears and ask questions as needed. Open communication helps clients develop trusting relationships that help reduce anxiety and stress.
  - Explain the reasons for the planned treatment schedule obey, such as pharmacotherapy, dietary restrictions, modification of activity levels, reduce or stop smoking.
  - Assist clients to identify situations that cause anxiety. Stressors need to be identified before it can be overcome.
  - Teach stress management strategies, e.g., drugs, distraction, and imagination. Decrease anxiety decreases the secretion of hydrochloric acid.
- **Imbalanced nutrition, less than body requirements related to pain.**
  - Encourage eating foods and drinks that do not irritate. Food and drinks are not irritating to help reduce epigastric pain.
  - Encourage eating on a regular schedule, avoid snacks before bedtime. Eating regularly helps neutralize gastric acid secretion, snack before bedtime increases the secretion of gastric acid.
  - Encourage eating food in a relaxed environment. Less relaxed environment cause anxiety. Decreased anxiety helps reduce the secretion of hydrochloric acid.
- **Knowledge deficit: The prevention and treatment of symptoms related to the condition of inadequate information.**
  - Assess the level of knowledge and readiness to learn from clients. Desire to learn depends on the physical condition of the client, the level of anxiety and mental readiness.
  - *Teach the required information:* Use words that correspond with the level of knowledge of the client. Choose a time when most convenient and interested clients. Limit counseling sessions to 30 minutes or less.
  - Assure the client that the disease can be overcome.

APPENDICITIS

Appendicitis is an inflammation of the appendix. The inflamed appendix becomes infected with bacteria from the intestine. The inflamed appendix gradually swells and fills with pus. Appendicitis is a medical emergency that requires prompt surgery to remove the appendix. Left untreated, an inflamed appendix will eventually burst, or perforate, spilling infectious materials into the abdominal cavity. This can lead to peritonitis.

Etiology

- **An obstruction:** Food waste or a hard piece of stool (fecal stone) can block the opening of the cavity that runs the length of appendix.
- **An infection:** Appendicitis may also follow an infection, such as a gastrointestinal viral infection, or it may result from other types of inflammation.

Signs and Symptoms

- Aching pain that begins around navel and often shifts to lower right abdomen (pain usually occur at **McBurney's point (Fig. 9.11)** over the right side of the abdomen that is one-third of the distance from the anterior superior iliac spine to the umbilicus).
- Pain that becomes sharper over several hours.
- Tenderness
- Sharp pain in lower right abdomen that occurs when the area is pressed on and then the pressure is quickly released (Aure-Rozanova's sign)
- Pain that worsens during coughing (Dunphy's sign)
- Nausea
- Vomiting
- Loss of appetite
- Low-grade fever
- Constipation
- Inability to pass gas
- Diarrhea
- Abdominal swelling

Diagnostic Evaluation

- **Physical examination:** A gentle pressure on the painful area. When the pressure is suddenly released, appendicitis pain will often feel worse, signaling that the adjacent peritoneum is inflamed.
- **Blood test:** High white blood cell count, which may indicate an infection.
- **Urine test:** Urinalysis to make sure that a urinary tract infection or a kidney stone isn't causing pain.

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