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Nakhon Pathom Rajabhat University

Chapter 5-4

Nursing Care of Patients with Liver, Gallbladder, Pancreatic Dysfunction

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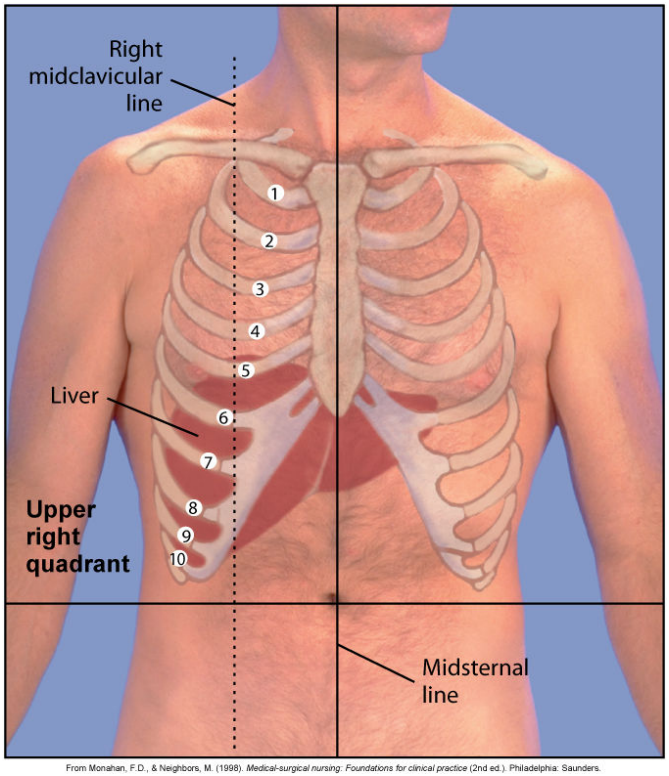
Learning Objectives

At the end of this chapter, the student should be able to:

- Identify nursing assessment data related to the liver, gallbladder, and pancreas functions.
- Identify the nurse's role in tests and procedures to diagnose liver, gallbladder, and pancreas disorders.
- Describe the care of the patient who has an esophageal balloon tube in place.
- Explain the pathology, signs and symptoms, diagnosis, complications, and medical treatment of selected liver, gallbladder, and pancreas disorders.
- Assist in developing a nursing care plan for the patient with liver, gallbladder, or pancreatic dysfunction.

The Liver



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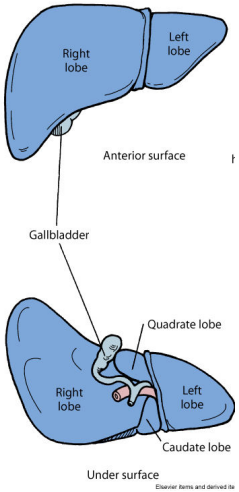
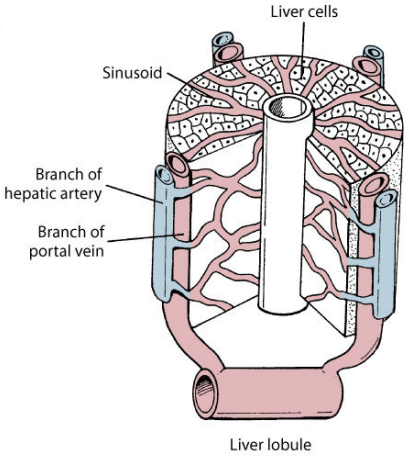
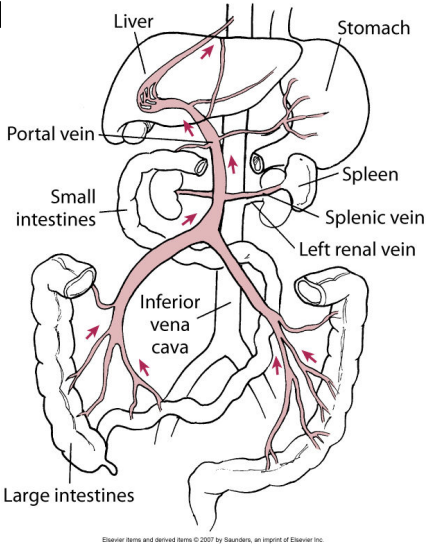
- The largest internal organ in the body
- Located under the diaphragm in the upper right abdomen
- The word *hepatic* refers to the liver

Anatomy and Physiology of the Liver





- Divided into four lobes made up of many lobules
- Blood from the aorta is delivered to the liver via the hepatic artery
- Portal vein delivers blood from the intestines to the liver
- Portal blood circulates through the liver; transported to the inferior vena cava by the hepatic veins
- Specialized hepatic cells allow the liver to carry out many critical functions



Bile Production and Excretion

- Bilirubin
  - Product of the normal breakdown of old red blood cells in the liver
  - Initial breakdown product is unconjugated or indirect bilirubin
  - The liver then converts unconjugated bilirubin into conjugated bilirubin and secretes it into the bile
- Bile produced in the liver passes through the cystic duct into the gallbladder for storage
- When fats pass into the duodenum, the gallbladder and the liver respond by delivering bile through the common bile duct into the small intestine to emulsify fat

Metabolism

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- Glucose metabolism
  - Glycogenesis
    - After a meal, excess glucose molecules are taken up by the liver, combined, and then stored as glycogen
  - Glycogenolysis
    - When blood glucose level falls, the process is reversed, and the glucose molecules are returned to the blood
  - Gluconeogenesis
    - Fats and protein broken down in response to low blood glucose levels, and molecules are used to make new glucose

Metabolism

- Protein metabolism
  - Some nonessential amino acids, plasma proteins, and clotting factors are synthesized in the liver
  - Another liver function: converting ammonia to urea
    - Ammonia is a byproduct of the metabolism of amino acids
    - If ammonia accumulates in the blood, it has toxic effects on brain tissue
- Lipid metabolism
  - Synthesizes lipids from glucose, pyruvic acid, acetic acid, and amino acids
  - Also synthesizes fatty acids, breaks down triglycerides, synthesizes and breaks down cholesterol

Metabolism

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- Blood coagulation
  - Normal blood coagulation (clotting) is a complex process. Two essential elements for coagulation, prothrombin and fibrinogen, are synthesized by the liver
- Detoxification
  - Liver filters the blood and inactivates many chemicals, including most medications
- Immunity
  - Development of antibodies to resist pathogens
  - Antibodies produced in the liver
- Hormone metabolism
  - Important role in metabolism of adrenocortical hormones, estrogen, testosterone, and aldosterone
  - If these hormones are not metabolized, they accumulate, causing an exaggerated effect on target organs

Health History

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- Patient's chief complaint
  - Change in the color of skin, urine, or stools; abdominal pain, nausea, and vomiting; and fatigue
- Past medical history
  - Document any previous or chronic liver disorders
  - Recent surgical procedures, injuries, or blood transfusions sometimes expose the patient to the hepatitis virus
  - Compile a complete list of medications
- Family history
  - Document whether any of the patient's family members have had cancer of the liver or colon, hepatitis, or alcoholism

Health History

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- Review of systems
  - Patient's general health status; systematically assess for signs and symptoms related to liver dysfunction
  - Changes in weight or skin color, itching, easy bruising, headaches, enlarged lymph nodes, breast enlargement in men, or dyspnea
  - Anorexia, abdominal pain, nausea and vomiting, diarrhea, or gastrointestinal bleeding
  - Clay-colored stools: bile obstruction; black stools can indicate GI bleeding
  - Urine color: with liver disease often dark urine
- Functional assessment
  - Dietary intake and patterns of activity and rest
  - Exposure to chemicals, potentially toxic drugs such as acetaminophen, and alcohol use
  - Use of street drugs, especially those taken intravenously
  - Identify stressors, usual coping strategies, and sources of support

Physical Examination

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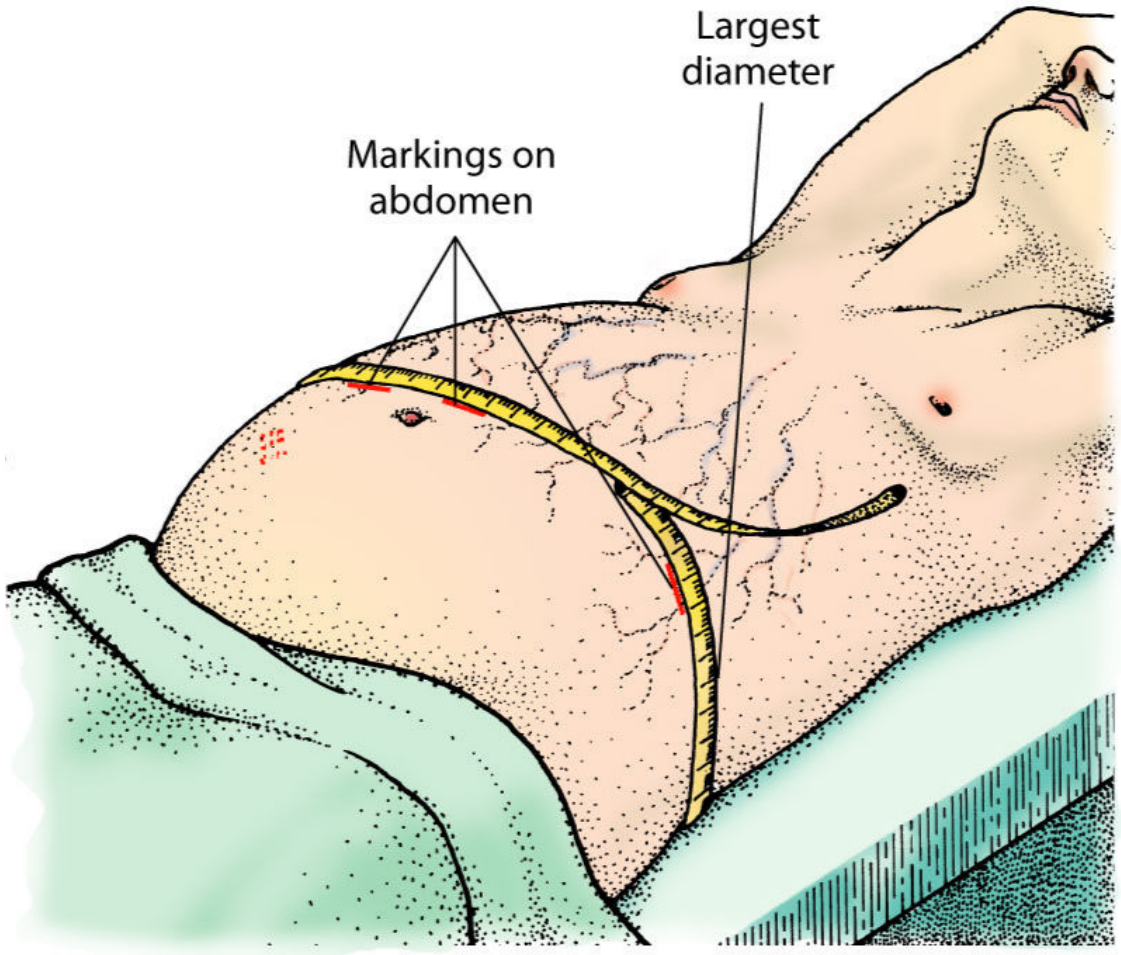
- Vital signs, height, weight: observe general appearance
- Skin color; assess for jaundice
- Inspect the sclera of the eyes
- Enlargement of breast tissue in men
- Spider angiomas
- Shape of the abdomen; presence of prominent veins
- Measure the abdomen at the largest circumference to compare measurements later
- Examine the extremities for bruising, edema, muscle wasting, and impaired sensation
- Inspect the hands for palmar erythema



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Diagnostic Tests and Procedures

- Laboratory studies
  - Serum and urine bilirubin, urinary and fecal urobilinogen, serum proteins, ammonia, prothrombin time, vitamin K production, International Normalized Ratio (INR), and serum enzymes. Examples of serum enzymes are alkaline phosphatase (ALP), alanine aminotransferase (ALT), gamma-glutamyl transpeptidase (GGT), serum glutamic-pyruvic transaminase (SGPT), aldolase (ALS), aspartate aminotransferase (AST), serum glutamic-oxaloacetic transaminase (SGOT), and lactate dehydrogenase (LDH)
- Imaging studies
  - Hepatobiliary Iminodiacetic Acid Scan: HIDA Scan (HIDA)
  - Computed tomography (CT) and magnetic resonance imaging (MRI)
  - Ultrasonography
- Liver biopsy

Disorders of the Liver

Hepatitis

- Pathophysiology
  - Locally, an inflammatory process causes the liver to swell
    - Bile channels compressed; damage the cells that produce bile
    - Then the blood flow through the liver is impaired, causing pressure to rise in the portal circulation
  - Systemic effects related to altered metabolic functions performed by the liver and to the infectious response in viral hepatitis
    - Signs and symptoms: rash, angioedema, arthritis, fever, malaise
  - Types of hepatitis
    - Infectious: A, B, C, D, and E
    - Noninfectious: caused by exposure to toxic chemicals; drugs

Hepatitis

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- Signs and symptoms
  - Pre-icteric phase
    - Malaise, severe headache, right upper quadrant abdominal pain, anorexia, nausea, vomiting, fever, arthralgia (joint pain), rash, enlarged lymph nodes, urticaria, liver enlargement and tenderness
  - Icteric phase
    - Jaundice, light or clay-colored stools, dark urine
  - Post-icteric phase
    - Fatigue, malaise, and liver enlargement

Hepatitis

- Complications
  - Chronic persistent hepatitis, chronic active hepatitis, and fulminant hepatitis

- Medical diagnosis
  - Detection of the virus or its antibodies in the blood
  - Elevated levels of serum enzymes (AST, ALT, GGT), serum and urinary bilirubin, and urinary urobilinogen

Hepatitis

- Medical treatment
  - No cure: treat to promote healing and manage symptoms
  - Antipyretics, corticosteroids, and antiemetics
  - Diet: high calorie, high carbohydrate, moderate to high protein, and moderate to low fat with supplementary vitamins

- Prevention
  - Vaccines; immune globulin (IG); hepatitis B immune globulin (HBIG)

Hepatitis

- Assessment
  - General health state, drug and alcohol use, chemical exposure, dietary habits, blood transfusions, recent travel, gastrointestinal disturbances, and changes in skin, urine, or stools
  - Vital signs, skin, weight changes, and mental status

Hepatitis

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- Interventions
  - Activity Intolerance and Impaired Physical Mobility
  - Imbalanced Nutrition: Less Than Body Requirements
  - Deficient Fluid Volume
  - Risk for Impaired Skin Integrity
  - Disturbed Body Image
  - Anxiety
  - Deficient Knowledge
  - Staff Protection

Cirrhosis

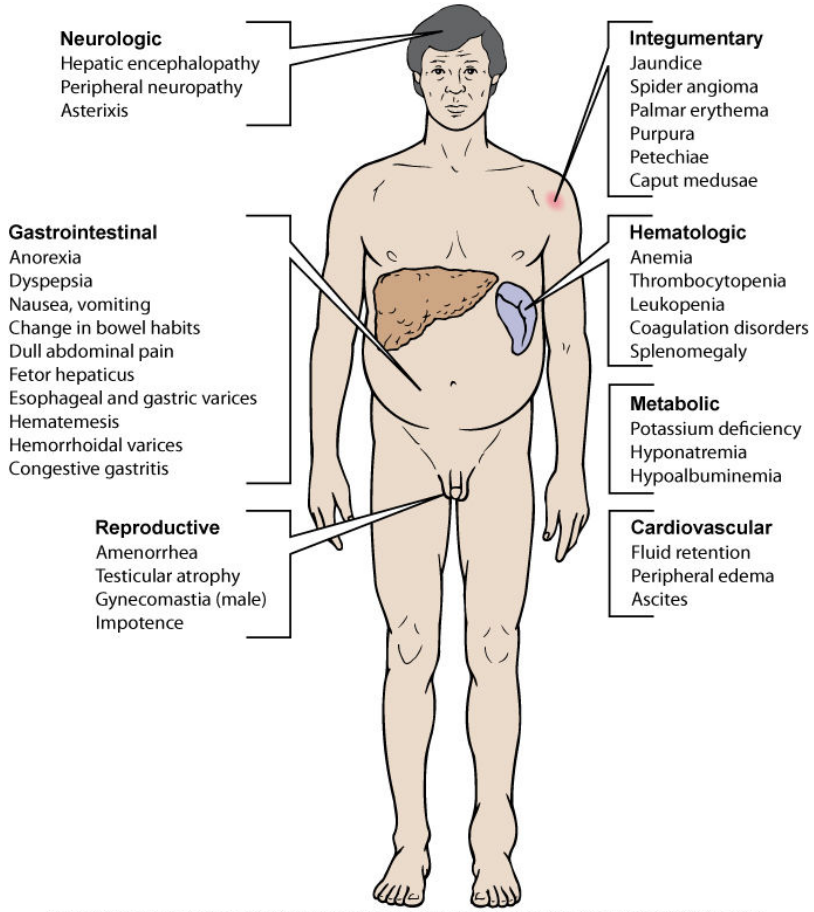
- Pathophysiology
  - Chronic, progressive disease
  - Degeneration and destruction of liver cells
  - Fibrotic bands of connective tissue impair the flow of blood and lymph and distort the normal liver structure
- Incidence
  - Fifth leading cause of death in ages 40 to 60 in the United States
  - More common in men than in women
  - Related to alcoholic liver disease or chronic viral infection

Cirrhosis

- Types
  - Alcoholic
  - Post-necrotic
  - Biliary
  - Cardiac

Cirrhosis

- Signs and symptoms
  - Early: slight weight loss, unexplained fever, fatigue, and dull heaviness in the right upper abdomen
  - Progresses: anorexia, nausea, vomiting, diarrhea or constipation, flatulence, dyspepsia, esophageal varices, infections, and epistaxis
  - Later: jaundice; testicular atrophy, impotence, and gynecomastia, amenorrhea; palmar erythema and spider angiomas; confusion and decreasing consciousness; ascites; peripheral neuropathy



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Cirrhosis

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- Complications
  - Portal hypertension, esophageal varices, ascites, hepatic encephalopathy, and hepatorenal syndrome
- Medical diagnosis
  - History and physical examination
  - Liver function tests, CBC, prothrombin time, protein, electrolytes, albumin, bilirubin, urine bilirubin, urobilinogen, liver biopsy, liver scan, ultrasonography, angiography, CT, and MRI
  - Liver biopsy

Cirrhosis: Medical Treatment

- Bed rest
- Diet high in carbohydrates and vitamins with moderate to high protein unless blood ammonia level is elevated
- Intravenous fluids
- Anemia may require blood transfusions
- Water and sodium likely to be restricted
- Cathartics and antibiotics for hepatic encephalopathy

Cirrhosis: Medical Treatment

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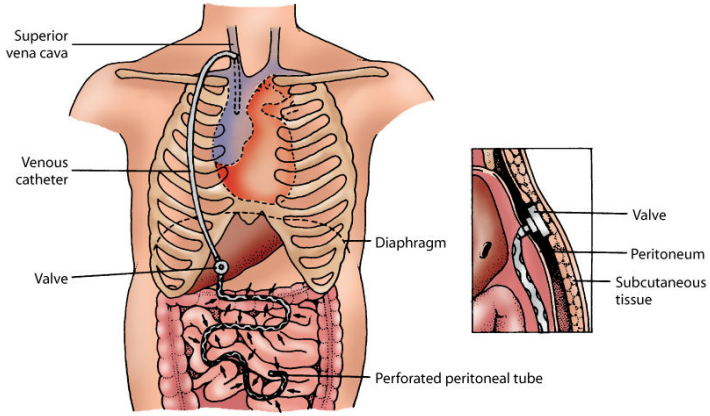
- Ascites
  - Various types of diuretics
  - Salt-poor albumin may be given intravenously
  - Paracentesis
  - Peritoneal-venous shunt of the transjugular intrahepatic portosystemic shunt
- Bleeding esophageal varices
  - Drug therapy, sclerotherapy, surgical ligation, and placement of an esophageal-gastric balloon tube



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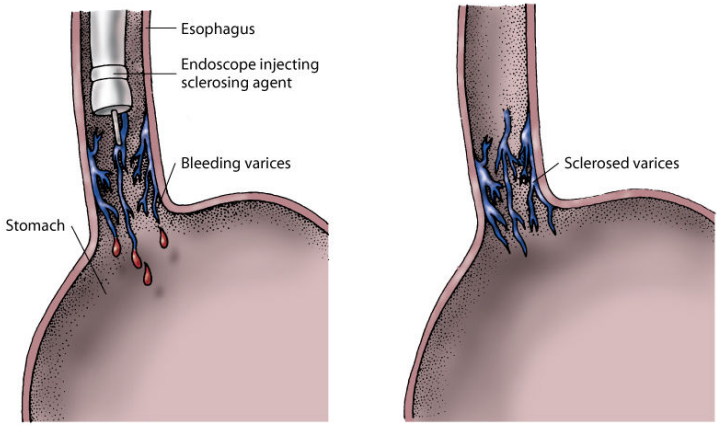

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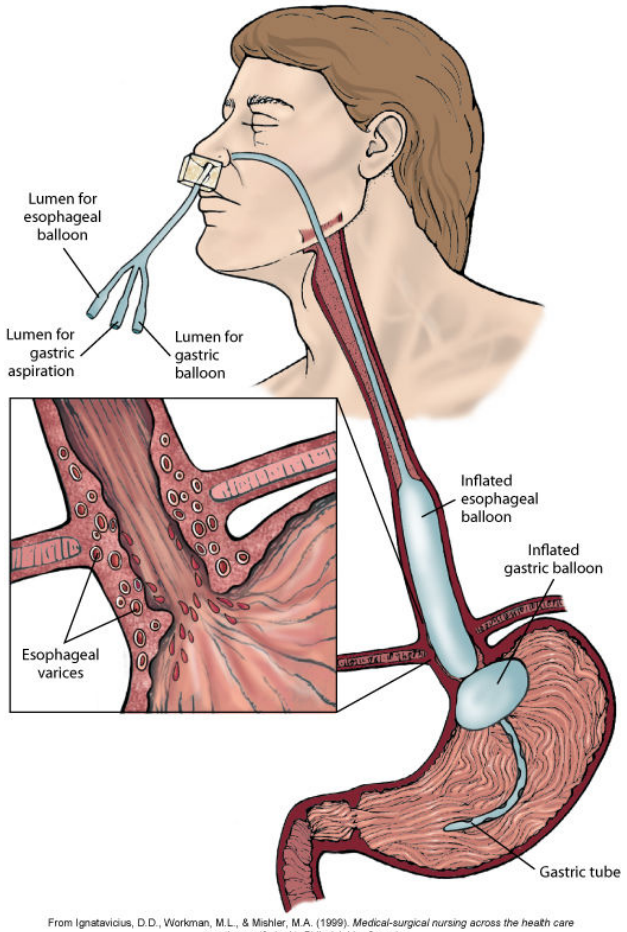

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Cirrhosis: Medical Treatment

- Hepatic encephalopathy
  - Lactulose or neomycin
  - Very low-protein or protein-free diet
- Hepatorenal syndrome
  - Salt-poor albumin, diuretics, and sodium and water restriction

Cirrhosis

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- Assessment
  - Daily measurement of weight, intake and output, and abdominal girth
  - Monitor for signs and symptoms of complications—bleeding, ascites, encephalopathy, and renal failure

- Interventions
  - Imbalanced Nutrition: Less Than Body Requirements
  - Activity Intolerance
  - Risk for Impaired Skin Integrity
  - Ineffective Breathing Pattern
  - Risk for Injury
  - Disturbed Thought Processes
  - Deficient or Excess Fluid Volume
  - Risk for Infection
  - Fear

End-Stage Liver Disease

- From injury or chronic disease
- Injury from acute hepatitis, drug toxicity, or obstruction of the hepatic vein
- Liver failure associated with injury: fulminant liver failure

Cancer of the Liver

- Rarely begins in the liver but frequent site of metastasis
- Cirrhosis is a predisposing factor
- Signs/symptoms: liver enlargement, weight loss, anorexia, nausea, vomiting, dull pain in upper right quadrant of abdomen
- As disease progresses, signs and symptoms are essentially the same as those of cirrhosis

Cancer of the Liver

- Because early signs and symptoms of liver cancer are vague, the condition often not diagnosed until advanced
- Tests: liver scan and biopsy, hepatic arteriography, endoscopy, and measurement of alpha-fetoprotein levels
- If the cancer is confined to one area, a lobectomy may be done; otherwise chemotherapy is the primary treatment
- Only cure for end-stage liver disease
- Transplantation for cancer confined to the liver; for patients with congenital disorders
- Ranked by acuity and need and entered into a national computer network
  - When a liver becomes available by donation, the best recipient can be identified

Liver Transplantation

- Patient often has a T-tube, wound drainage devices, a nasogastric tube, and a central line for total parenteral nutrition (TPN); mechanical ventilation used initially
- Assessments focus on neurologic status, vital signs, central venous pressure, respiratory status, and indicators of bleeding
- Lifelong drug therapy needed to prevent rejection
- Recipient must be monitored for signs of rejection
  - Fever, anorexia, depression, vague abdominal pain, muscle aches, and joint pain

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Anatomy and Physiology of the Biliary Tract

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Bile

- Yellow-green liquid with important functions
  - It contains bile salts, which are essential for the emulsification and digestion of fats
  - Provides a medium for the excretion of bilirubin from the liver
- Biliary tract is made up of the gallbladder and the bile ducts

Function

- Ducts deliver bile from the liver to the duodenum
  - Bile produced in the liver and channeled into the common hepatic duct
  - The common hepatic duct joins the cystic duct to form the common bile duct
  - Cystic duct leads to the gallbladder, a saclike organ beneath the liver
  - Bile flows from the liver to the gallbladder, where it is stored and concentrated
  - When fats enter the duodenum, the gallbladder contracts and delivers bile to the intestine through the common bile duct

Health History

- Digestive disturbances and pain
- Complete description of these symptoms
- Factors that bring on or relieve the symptoms
- The use of estrogen or oral contraceptives
- Ask if patient has had dry skin, indigestion, fat intolerance, dyspepsia, nausea, vomiting, light-colored stools, or dark urine

Physical Examination

- Significant findings on the physical examination include dry skin, fever, jaundice, tachycardia, tachypnea, and abdominal guarding and distention

Diagnostic Tests and Procedures

- Ultrasonography
- Oral cholecystography
- Intravenous cholangiography
- T-tube cholangiography
- Endoscopic retrograde cholangiopancreatography (ERCP)
- Percutaneous transhepatic cholangiography
- Laboratory studies
  - Liver function tests, serum and urine bilirubin measurements, and a complete blood cell count

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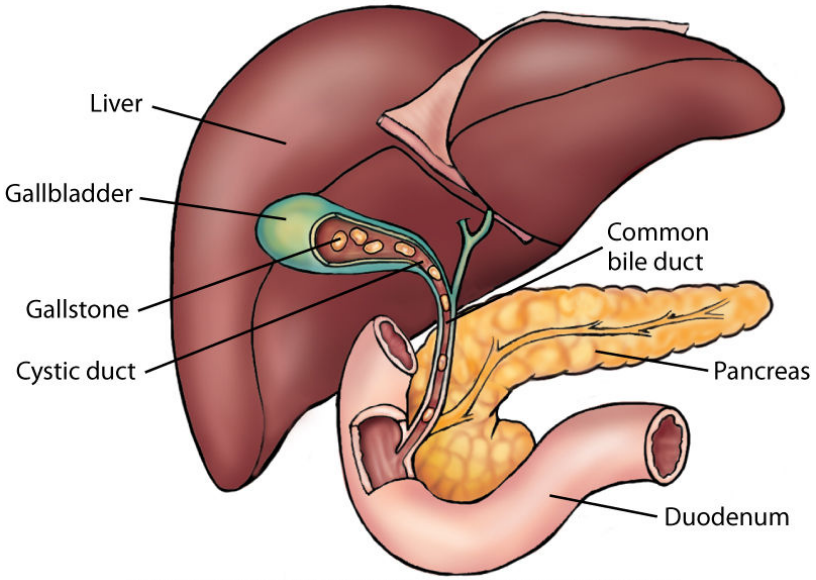
Disorders of the Gallbladder

Cholecystitis

- Inflammation of the gallbladder
- Caused by gallstones but can be due to bacteria, toxic chemicals, tumors, anesthesia, starvation, and opioids

Cholelithiasis

- Gallstones present
  - May be found anywhere in the biliary tract: the gallbladder, the cystic duct, or the common bile duct



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Cholecystitis and Cholelithiasis

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- Signs and symptoms
  - From mild indigestion to severe pain, fever, jaundice
  - Also nausea, eructation, fever, chills, and right upper quadrant pain that radiates to the shoulder
  - If bile flow obstructed, bile production decreases and serum bilirubin rises; leads to obstructive jaundice
  - Some excess bilirubin is excreted in the urine, creating a dark, amber color
  - Digestion of fats is impaired, causing intolerance of fatty foods and steatorrhea

Cholecystitis and Cholelithiasis

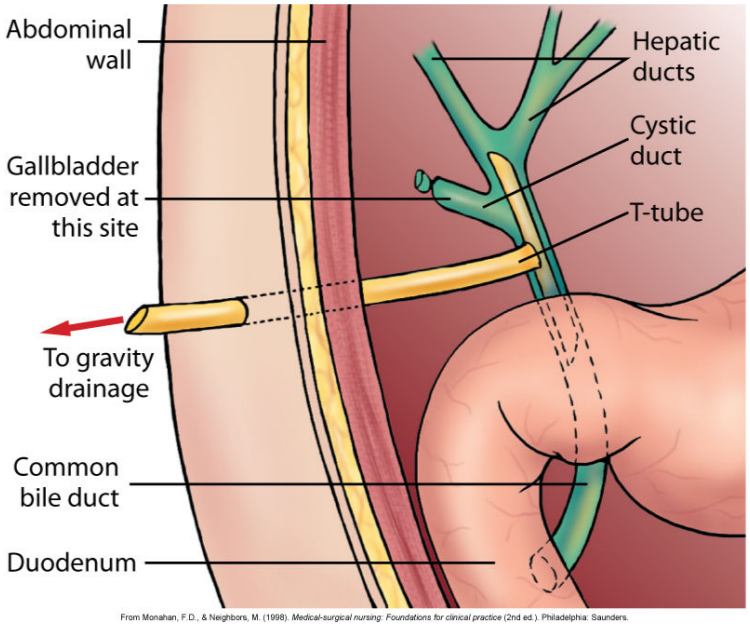
- Complications
  - Pancreatitis, abscesses, cholangitis, and rupture of the gallbladder
- Medical diagnosis
  - History and physical examination
  - Fluoroscopy using contrast medium injected directly into the biliary tree
  - Radiographs, radionuclide imaging, ultrasonography, and oral or intravenous cholangiography
  - White blood cell count, serum and urinary bilirubin, and serum enzymes

Cholecystitis and Cholelithiasis

- Medical treatment
  - Analgesics, anticholinergics, and antibiotics
  - Intravenous fluids
  - Nasogastric tube
  - Drug therapy
  - Shockwave lithotripsy
  - Endoscopic sphincterotomy
  - Cholecystectomy

Cholecystitis and Cholelithiasis

- Interventions
  - Acute Pain
  - Deficient Fluid Volume
  - Risk for Impaired Skin Integrity
  - Anxiety
  - Risk for Injury
- Postoperative interventions
  - Acute Pain
  - Ineffective Breathing Pattern
  - Impaired Skin Integrity
  - Deficient Fluid Volume
  - Risk for Infection



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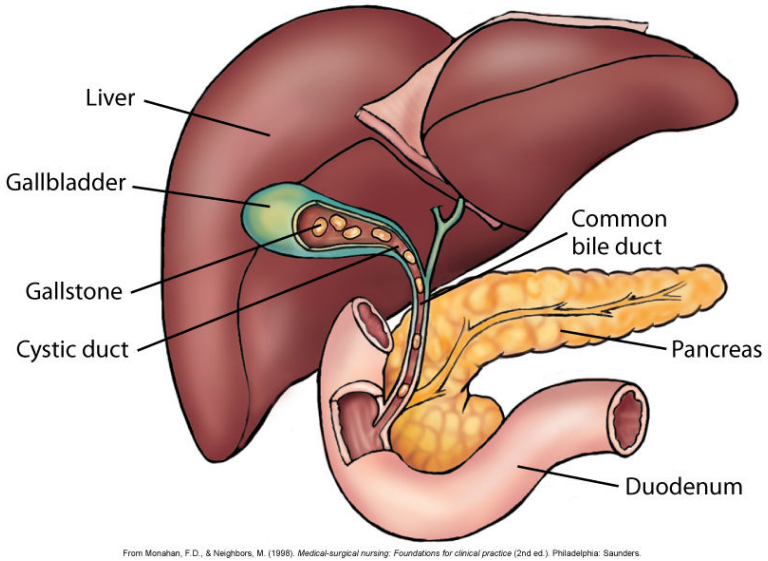
Cancer of the Gallbladder

- Rare; thought to be related to chronic cholecystitis and cholelithiasis
- Diagnosis often delayed: signs and symptoms are same as for cholecystitis and cholelithiasis
- Treatment options: surgery, chemotherapy, and radiation therapy, but prognosis generally poor
- Often only supportive, symptomatic care is given
- Nursing care is similar to that for other patients with gallbladder disease

Anatomy and Physiology of the Pancreas

- A fish-shaped organ located in the upper left quadrant of the abdomen behind the stomach
- Head of the pancreas lies against the duodenum, and the tail lies next to the spleen
- Ducts connect the pancreas to the duodenum
- One duct goes directly to the duodenum, and the other merges with the common bile duct



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Exocrine Function

- Carried out by acinar tissue
- Pancreatic fluid contains enzymes needed to digest proteins, fats, and carbohydrates
  - Trypsin, amylase, and lipase

Endocrine Function

- Islets of Langerhans
  - Alpha cells produce and secrete glucagon
  - Beta cells produce and secrete insulin
  - Delta cells produce somatostatin, which inhibits the release of glucagon and insulin

Health History

- General health status
- May reveal previous disorders of the biliary tract or duodenum, abdominal trauma or surgery, and metabolic disorders such as diabetes mellitus
- The medication history should be detailed
- Note family history of pancreatic disorders
- Obtain a complete description of any pain in the upper abdomen or epigastric area
- Functional assessment: dietary habits, alcohol use

Physical Examination

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- Restlessness, flushing, or diaphoresis during the examination
- Vital signs may disclose low-grade fever, tachypnea, tachycardia, and hypotension
- Inspect the skin for jaundice
- Assess the abdomen for distention, tenderness, discoloration, and diminished bowel sounds

Diagnostic Tests and Procedures

- Imaging studies
  - CT scan, endoscopic ultrasonography, MRI, PET, and ERCP
- Serum amylase, lipase, glucose, calcium, triglycerides
- Urine amylase and renal amylase clearance
- Stool specimens may be analyzed for fat content
- Secretin stimulation test
- If cancer is suspected, blood levels of CA 19-9, carcinoembryonic antigen, pancreatic oncofetal antigen, and others that are considered “markers” for cancer may be measured

Disorders of the Pancreas

Pancreatitis

- Inflammation of the pancreas
- May be acute or chronic
- Caused by biliary tract disorders or alcoholism
- Also viral infections; peptic ulcer disease; cysts; metabolic disorders; trauma from external injury, surgery, or endoscopy
- Digestive enzymes activated by unknown mechanisms begin to digest pancreatic tissue, fat, and elastic tissue in blood vessels
- Chronic pancreatitis related to alcohol abuse

Pancreatitis

- Signs and symptoms
  - Abdominal pain
    - Severe, with a sudden onset; centered in the upper left quadrant or the epigastric region and radiates to the back
  - Severe vomiting, flushing, cyanosis, and dyspnea often accompany the pain
  - Low-grade fever, tachypnea, tachycardia, hypotension
  - Abdomen may be tender and distended
  - Bowel sounds may be absent
  - Bleeding and shifting of fluid may lead to shock

Pancreatitis

- Complications
  - Pseudocyst, abscess, hypocalcemia, and pulmonary, cardiac, and renal complications
- Medical diagnosis
  - Elevated serum amylase, serum lipase, and urinary amylase levels
  - Elevated WBC count, elevated serum lipid and glucose level, and decreased serum calcium level
  - Ultrasonography and ERCP
  - Secretin stimulation test and fecal studies

Pancreatitis

- Medical treatment
  - Nothing by mouth
  - Nasogastric tube
  - Intravenous fluids
  - Blood or plasma expanders
  - Urine output should be at least 40 mL/hour
  - Jejunal feeding tube or total parenteral nutrition
  - Once food permitted, usually bland, low-fat, high-carbohydrate diet divided into frequent, small meals
  - Prophylactic antibiotics

Pancreatitis

- Medical treatment
  - Drug therapy
    - Analgesics, antispasmodics, anticholinergics, and gastric acid inhibitors
  - Surgical intervention
    - Endoscopic sphincterotomy followed by cholecystectomy
    - Debridement

- Assessment
  - Abdomen should be inspected for discoloration, distention, tenderness, and diminished bowel sounds

Pancreatitis

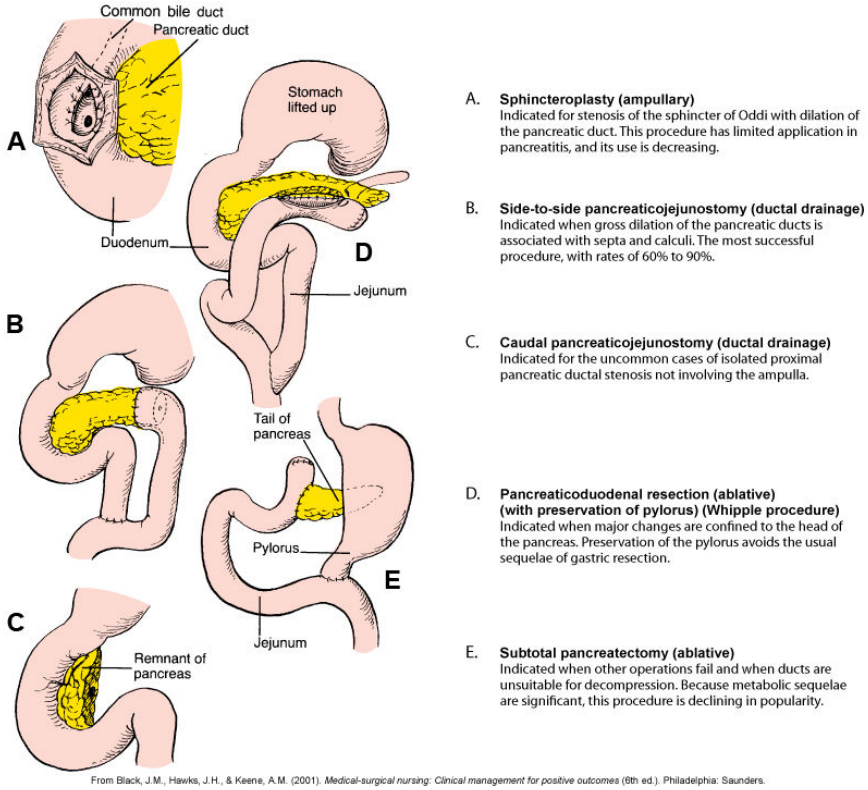
- Interventions
  - Acute Pain
  - Deficient Fluid Volume
  - Risk for Infection
  - Impaired Gas Exchange
  - Imbalanced Nutrition: Less Than Body Requirements
  - Anxiety
  - Deficient Knowledge

Cancer of the Pancreas

- Quickly spreads to the duodenum, stomach, spleen, and left adrenal gland
- Risk factors: chronic pancreatitis and smoking
- Also high-fat diet, exposure to toxic chemicals
- Signs and symptoms
  - Pain, jaundice with or without liver enlargement, weight loss, and glucose intolerance
  - Other signs and symptoms may be weight loss, upper abdominal pain, anorexia, vomiting, weakness, and diarrhea

Cancer of the Pancreas

- Medical diagnosis
  - Transabdominal ultrasound, computed tomography, ERCP, and endoscopic ultrasonography
  - Serum amylase, lipase, bilirubin, and enzyme levels; carcinoembryonic antigen and CA 19-9 titers
- Medical and surgical treatment
  - If tumor confined to head of pancreas, surgery an option
  - Postoperative radiation therapy and chemotherapy



Cancer of the Pancreas

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- Assessment
  - Assess gastrointestinal function, pain, and emotional state
  - If surgery planned, determine the patient's knowledge about pre- and postoperative care

Cancer of the Pancreas

- Interventions
  - Acute Pain
  - Fear and Anticipatory Grieving
  - Imbalanced Nutrition: Less Than Body Requirements
  - Impaired Skin Integrity
  - Disturbed Body Image
  - Deficient Knowledge
  - Surgical Complications and Postoperative Nursing Care

มหาวิทยาลัย
ราชภัฏนครปฐม