Chapter 39
Disorders of the Liver, Gallbladder, and Pancreas
The Liver

• The largest internal organ in the body
• Under the diaphragm in the upper right abdomen
• The word hepatic refers to the liver
• Liver functions
  • Carbohydrate metabolism
  • Amino acid metabolism
  • Lipid metabolism
  • Synthesis of plasma proteins
  • Formation of bilirubin
  • Phagocytosis
  • Storage
  • Detoxification
  • Formation of bile
Health History

• Changes due to liver dysfunction vary
  • Changes in skin, urine or stool color
  • Abdominal pain, nausea, vomiting
  • Fatigue
  • Joint pain
  • Itching
  • GI bleeding
  • Edema
Health History

• 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
Diagnostic Tests and Procedures

• Laboratory studies
  • Serum and urine bilirubin, urinary and fecal urobinogen, serum proteins, ammonia, prothrombin time, vitamin K production, International Normalized Ratio (INR), and serum enzymes. Examples of serum enzymes: 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)
Diagnostic Tests and Procedures

• Imaging studies
  • Hepatobiliary scintigraphy (HIDA)
  • Computed tomography (CT) and magnetic resonance imaging (MRI)
  • Ultrasonography

• Liver biopsy
Hepatitis

• Pathophysiology
  • Locally, inflammatory process causes the liver to swell
    • Bile channels compressed; damage the cells that produce bile
    • Then 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

• Signs and symptoms
  • Preicteric 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
  • Posticteric phase
    • Fatigue, malaise, and liver enlargement
Hepatitis

• Complications
  • Chronic persistent hepatitis,
  • Chronic active hepatitis
  • Fulminant hepatitis
  • Cirrhosis
  • Liver Cancer
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
Hepatitis

• 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

• Nursing Diagnoses
  • 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
Fatty Liver Disease

• **Nonalcoholic fatty liver**
  • Fat build up in the liver

• **Nonalcoholic steatohepatitis.**
  • Fat build up causes inflammation in the liver

• **Nonalcoholic fatty liver disease-associated cirrhosis**
  • Liver inflammation leads to scarring
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
  • Postnecrotic
  • 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
Figure 39-5

Neurologic
- Hepatic encephalopathy
- Peripheral neuropathy
- Asterixis

Integumentary
- Jaundice
- Spider angioma
- Palmar erythema
- Purpura
- Petechiae
- Caput medusae

Gastrointestinal
- Anorexia
- Dyspepsia
- Nausea, vomiting
- Change in bowel habits
- Dull abdominal pain
- Fetur hepaticus
- Esophageal and gastric varices
- Hematemesis
- Hemorrhoidal varices
- Congestive gastritis

Hematologic
- Anemia
- Thrombocytopenia
- Leukopenia
- Coagulation disorders
- Splenomegaly

Metabolic
- Potassium deficiency
- Hyponatremia
- Hypoalbuminemia

Reproductive
- Amenorrhea
- Testicular atrophy
- Gynecomastia (male)
- Impotence

Cardiovascular
- Fluid retention
- Peripheral edema
- Ascites

Cirrhosis

• 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

• 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
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

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

• Nursing Diagnoses
  • 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
Liver Transplantation

• 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
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
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
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

• Risk Factors
  • Fat
  • Female
  • Ethnicity
  • Diet
  • Age
  • Hormones
Figure 39-10

Liver
Gallbladder
Gallstone
Cystic duct
Common bile duct
Pancreas
Duodenum

Cholecystitis and Cholelithiasis

• 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 retrograde cholangiopancreatography with sphincterotomy
  • Cholecystectomy
Cholecystitis and Cholelithiasis

• Nursing diagnoses
  • Acute Pain
  • Deficient Fluid Volume
  • Risk for Impaired Skin Integrity
  • Anxiety
  • Risk for Injury
Cholecystitis and Cholelithiasis

• Postoperative interventions
  • Acute Pain
  • Ineffective Breathing Pattern
  • Impaired Skin Integrity
  • Deficient Fluid Volume
  • Risk for Infection
Figure 39-12

- Abdominal wall
- Gallbladder removed at this site
- To gravity drainage
- Common bile duct
- Duodenum
- Hepatic ducts
- Cystic duct
- T-tube

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
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

• 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
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 mechanism 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
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

• 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

- Nursing Diagnoses
  - 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
• Patients with liver disease are at increased risk for drug:
  • 1. incompatibilities
  • 2. toxicities
  • 3. indiosyncrasies
  • 4. synthesis
Clay colored stools are characteristic of:

1. Bile obstruction
2. Pancreatities
3. Gastritis
4. Crohn’s disease
• The diet prescribed for patients with hepatitis usually contains:
  • 1. high carbohydrates and vitamins, low protein, low to moderate fat
  • 2. low carbohydrates, moderate to high protein, low to moderate fat
  • 3. high carbohydrates and vitamins, moderated to high proteins, low to moderate fat
  • 4. low carbohydrates, low protein, low to moderate fat