Liver, biliary, and pancreatic needs

Therapeutic nursing interventions
NSG 4037 Adult Nursing III 2007

Liver, pancreas, biliary system

Normal Pancreas

Disorders of the exocrine pancreas

- Acute pancreatitis
  - Inflammation of the pancreas
  - Autodigestion of pancreas
  - Fat necrosis
  - Hemorrhage

Acute pancreatitis

Pancreatitis

- Gallstone lodges in duct blocking lumen and aggravating pancreas
- Inflamed pancreas
- Gallstone in duct
- Duodenum
#ADAM
**Pancreatitis**

Disorders of the exocrine pancreas

- **Risk factors of Acute pancreatitis**
  - Alcohol abuse-major cause
  - Cholelithiasis
  - Abdominal trauma

- **Etiology of Acute pancreatitis**
  - Exact cause unknown
  - Proteins may plug the small pancreatic ductules.
  - Hyperlipidemia
  - Hypercalcemia
  - Pancreatic trauma
  - Pancreatic ischemia
  - Drugs (antibiotics, anticonvulsants, thiazides, sulfonamides, valproic acid, diuretics)

- **Pathophysiology of pancreatitis**
  - When protease and lipase are activated before secreted into the intestine then pancreatic tissue damage occurs
  - Once inflammation begins, a vicious circle of further tissue damage continues.

- **Clinical manifestations of A. pancreatitis**
  - Mild, nonspecific abdominal pain progressing to severe pain
  - Local peritonitis
  - Pain in mid-epigastrum radiating to back as well as the chest, flanks, and lower abdomen
  - Nausea & vomiting due to pain

- **Typical features of client w/ pancreatitis**
  - Distressed, anxious
  - Abdominal distention and tenderness
  - Fever r/t paralytic ileus
  - Turners sign- bluish discoloration of left flank
  - Cullen’s sign- bluish discoloration of the periumbilical area
  - Jaundice-uncommon
Disorders of exocrine pancreas

- Severe circulatory complications in A. pancreatitis
  - Hypotension
  - Pallor
  - Cool, clammy skin
  - Hypovolemia

Disorders of the exocrine pancreas

- Other findings
  - Cerebral abnormalities, belligerence, confusion, psychosis, and coma
  - Transient hyperglycemia and diabetes may develop
  - High serum amylase and lipase
  - Chest films show left atelectasis, left pleural effusion, elevated left hemidiaphragm
  - Abdominal films show air in duodenal loop, distention of the colon, gallstones

Disorders of the exocrine pancreas

- Medical management of A. pancreatitis
  - Reduce pain
  - Maintain volume status, electrolyte balance, and nutrition
  - Maintain pancreatic rest
  - Treat complications
  - Other measures

Disorders of the exocrine pancreas

- Nursing management
  - Assess and manage pain
  - Use non pharmacologic measures for pain relief
  - Keep NPO and provide oral hygiene
  - Monitor vital signs for hemodynamic changes
  - Monitor urine output
  - Monitor respirations and breath sounds
  - Monitor anxiety

Disorders of the exocrine pancreas

- Surgical management
  - Indicated in uncertainty of diagnosis
  - Treatment of secondary pancreatic infections, necrosis or abscess
  - Correction of associated biliary tract disease
  - Progressive deterioration despite optimal supportive care

Disorders of the exocrine pancreas

- Postoperative nursing management
  - Understand the procedure that was performed
  - Know location and purpose of all drains
  - Continually assess tubes and drains.
  - If T tube becomes nonfunctional alert the MD ASAP.
Disorders of the exocrine pancreas

- Discharge planning
  - Verbalize disease process and how to prevent recurrence
  - Discuss medication regimen
  - Diet modification
  - Manifestations of recurrence

- Chronic pancreatitis
  - Progressive fibrosis and degeneration of pancreas
  - Destruction occurs by repeated attacks of pancreatitis
  - Damage is irreversible involving both endocrine and exocrine functions

- Clinical manifestations
  - Pain may be continuous, intermittent
  - Vomiting
  - Constipation
  - Fever
  - Jaundice
  - Abdominal distention
  - Foul, fatty stools
  - Diabetes

- Pancreatic pseudocysts
  - Localized collections of pancreatic secretions in a cystic structure usually adjacent to the pancreas
  - Clinical picture is abdominal pain, early satiety N & V.

- Pancreatic cancer
  - Fourth common cause of death from cancer
  - 90% die within first year
  - Linked to diabetes mellitus, alcohol use, smoking, high fat diet, obesity
Pancreatic cancer

Disorders of the exocrine pancreas

Pancreatic cancer
- Medical treatment: radiation therapy
- Chemotherapy
- Surgical management: Whipple’s procedure

Disorders of the exocrine pancreas

Pancreatic trauma
- Rare
- High morbidity, mortality
- Injuries to surrounding tissues likely

Cystic fibrosis
- Hereditary, chronic disease
- Autosomal recessive
- Childhood disease but many people are surviving into adulthood
- Malabsorption of lipids due to decrease lipase formation

Bile Ducts

Bile flow
Biliary ducts

Biliary tract disorders
- Cholelithiasis (gallstones)
- Cholecystitis - inflammation of gall bladder
- Infections
- Tumors
- Congenital malformations

Cholelithiasis
- Cholesterol Gallstones (cholelithiasis)

Biliary tract disorders-risk factors
- Cholelithiasis - gallstones
  - Increasing age
  - Women more than men
  - Diabetes mellitus
  - Obesity
  - Crohn’s disease
  - Cirrhosis

Gallstones
- Gallstones are crystalline structures formed by hardening and adhering of bile constituents.
Gangrenous gallbladder and stones

Biliary tract disorders
- Gallstone formation involves several factors
  - Bile must become supersaturated with cholesterol or calcium
  - Solute must precipitate from solution as solid crystals
  - Crystals must come together and fuse to form stones

Biliary tract disorders
- Clinical manifestations
  - Similar to other disorders
  - Most specific and characteristic is pain or biliary colic.
  - Starts in the upper midline area
  - Radiate to the back and right shoulder blade.
  - Nausea and vomiting may occur

Biliary tract disorders
- Chronic cholecystitis
  - Angina pectoris
  - Chronic pancreatitis
  - Esophagitis
  - Hiatal hernia
  - Peptic ulcer
  - Pyelonephritis
  - Spastic colitis
- Acute Cholecystitis
  - Acute appendicitis
  - Acute hepatitis
  - Acute myocardial infarct
  - Acute pancreatitis
  - Acute pyelonephritis
  - Perforated ulcer
  - Pleurisy
  - Right lower lobe pneumonia

Biliary tract disorders
- Confirming diagnosis
  - Abdominal ultrasound is test of choice
  - ERCP can also detect stones in the common bile duct as well as tumors, strictures.
Biliary disorders

- Stone extraction

Biliary tract disorders

- Medical management
  - Reduce pain
  - Monitor fluid and electrolytes
  - Endoscopy
  - Gallstone dissolution
  - Extracorporeal shock wave lithotripsy
  - Monitor for complications

- Nursing management
  - Assess and manage pain
  - Comfort measures
  - Insert NG tube if ordered
  - Administer IV fluids
  - Assess lab values
  - Observe for injury post procedure

- Self-care
  - The client will need to learn about diet changes, drugs, ways to prevent recurrence

- Surgical management
  - Lap cholecystectomy
    - Contraindications- stones present in common bile duct
    - Complications- damage to biliary tract, hemorrhage. Lap choie. carries a two fold increase in risk of complications compared to open.

- Cholecystectomy
  - Open procedure- removal of gallbladder through abdominal incision
  - T-tube placed in common duct after removing stones. Drains bile while duct is healing
  - Monitor respiratory status closely
  - Assess CV status
  - Monitor pain frequently.
### Biliary tract disorders

**Acute cholecystitis**
- Acute inflammation of gallbladder wall
- 90% due to stone in gallbladder and obstruction of cystic duct
- 5% of cases no stones found
- Due to obesity and sedentary lifestyle

**Chronic Cholecystitis**
- Sometimes occurs following acute episode
- Can occur independently
- Pain is less severe
- Leukocyte count is higher
- Usually repeated attacks

**Nursing management**
- Assessment is critical because several other disease processes produce the same manifestations.
- These patients will receive antibiotics.

**Choledocholithiasis**
- Stones in the common duct
  - Can occur in the absence of a gallbladder

**Cholangitis**
- Inflammation of bile duct
- Lab tests - wbc elevated
  - Bilirubin and alk. phosphatase-elevated
  - Amylase- check to determine pancreatitis

**Sclerosing cholangitis**
- Inflammatory disease of bile ducts that cause fibrosis and thickening of walls and strictures
- Important complications of AIDS.
Biliary tract disorders
- Carcinoma of gallbladder
  - 5% of all cancers but most common of biliary tract
  - 70% of patients have gallstones
  - Unrelenting RUQ pain, weight loss, jaundice and palpable mass (RUQ)
  - Prognosis poor

Hepatic disorders
- The liver
  - Central role in many essential physiologic processes
  - Lipid synthesis, detoxifies endogenous and exogenous substances

Hepatic disorders
- Jaundice (icterus)
  - Yellow pigmentation of the sclerae, skin and deeper tissues caused by the excessive accumulation of bile pigments in the blood.
  - Common manifestation in many liver and biliary disorders

Hepatic disorders
- Unconjugated hyperbilirubinemia
  - Result from overproduction of bilirubin as a result of hemolysis
- Conjugated hyperbilirubinemia- impaired excretion of bilirubin from the liver resulting from hepatocellular disease, drugs, sepsis, hereditary disorders or extrahepatic biliary obstruction.
Hepatic disorders

- Clinical manifestations
  - Yellow sclerae, yellowish orange skin, clay-colored feces, tea-colored urine, pruritus, fatigue, and anorexia.

- Medical management
  - Determine cause, reduce pruritus and maintain skin integrity

Jaundice

Hepatic disorders

- Nursing management
  - Observe for jaundice, assess taste, and assess pruritus
  - Administer oral antihistamines as ordered, cholestyramines (Questran), frequent application of lotion
  - Soft bed linen, keep room cool

Hepatic Disorders

- Disturbed body image
  - Reassure client that the discoloration is usually temporary, encourage personal hygiene
  - Explain about jaundice, and how long it will last

Hepatic disorders

- Hepatitis
  - Inflammation of liver
  - Caused by viruses, toxins, or chemicals
  - Viral hepatitis
  - Toxic hepatitis
  - Chronic
  - Alcoholic

Viral Hepatitis

- Viral hepatitis
  - Occurs worldwide
  - Most common blood borne infection in US and most of world
  - Most common types-Hepatitis A, B, C, D, and E
  - Hepatitis F and G not considered serious health threats
Viral Hepatitis transmission

- **Hepatitis A** - infectious hepatitis
  - Caused by infected water, milk, and food
  - Especially raw shellfish from contaminated waters
- **Hepatitis B**
  - Contact with serum of an infected person is the major mode of transmission. Other body fluids can also transmit.

Viral hepatitis

- **Hepatitis B**
  - HBV for active immunity, 3 IM injections given at 0, 1, and 6 months.
- **Hepatitis C**
  - Transmission and prevention similar to HBV
  - Treated with interferon injections

Viral Hepatitis transmission

- **Hepatitis C** - drug use 60% of cases
  - Tattooing or body piercing can allow transmission
  - Parenterally transmitted like Hep.B
- **Hepatitis D** transmitted through blood
- **Hepatitis E** - rare in US. Short incubation and does not become chronic

Viral hepatitis

- **Hepatitis A** - vaccine available
  - Household contacts of persons with HAV should be given immune globulin to prevent spread.
  - Inactivated vaccine should be given to persons traveling to endemic areas and also those with risk factors.

- **Hepatitis D** must coexist with HBV, the vaccine for HBV helps to prevent HDV
- **Hepatitis E,F and G**
  - Hygiene precautions are necessary for prevention of E. No vaccines as yet
**Viral Hepatitis**

- Pathophysiology
  - Inflammation of the liver with areas of necrosis occur and the damage leads to function impairment
- Clinical manifestations
  - Early-jaundice, lethargy, irritability, pruritis, myalgia, anorexia, n & v, abd. pain, diarrhea or constipation, fever, flu-like manifestations

**Viral hepatitis**

- Irritability and drowsiness are signs of hepatic encephalopathy when severe
- Deterioration of handwriting is an early sign of hepatic encephalopathy.

**Viral hepatitis**

- Liver is larger and is tender to palpation
- Bleeding tendencies due to reduced absorption of vitamin K.

**Prognosis**

- 8-10 weeks liver function tests return to normal

**Medical management**

- Reduce fatigue
- Maintain fluid and nutritional balance
- Reduce effects of hepatitis
- Medications to avoid- chlorpromazine, aspirin, acetaminophen, and sedatives.

**Nursing management**

- Manage fatigue- encourage rest but also encourage some activity to diminish muscle loss due to bedrest. Bed exercises.
- Modify diet- encourage breakfast, avoid fatty foods, optimum protein, multiple small meals.
- Avoid alcohol
- Provide vitamin supplements
- Relieve N & V
- Relieve anxiety
Viral hepatitis

- Complications of hepatitis
  - Typically recover completely from the illness in 3-16 weeks.
  - Clients with HBV tend to experience more complications, could lead to destruction of liver
  - Cirrhosis or chronic active hepatitis could result

Hepatic disorders

- Chronic hepatitis
  - Liver inflammation continues beyond a period of 3-6 months
  - Chronic hep B follows acute in 5% of cases
  - Chronic hep C follows in 70% of case

- Toxic hepatitis
  - Most commonly, the causative agent is a toxic metabolite formed by the drug-metabolizing enzymes within the liver
  - Liver necrosis occurs within 2-3 days after acute exposure to a dose-related hepatotoxin

- Alcoholic hepatitis
  - Acute or chronic
  - Most frequent cause of cirrhosis
  - Anorexia, nausea, abdominal pain, hepatomegaly, splenomegaly, jaundice, ascites, fever, and elevated bilirubin
  - Liver biopsy reveals fatty hepatic tissue

- Cirrhosis
  - Chronic, progressive disease characterized by widespread fibrosis and nodule formation.
  - Normal flow of blood, bile is altered by fibrosis
  - Four major types
    - Alcoholic
    - Postnecrotic- toxin induced
    - Biliary
    - Cardiac
Cirrhosis

Etiology and risk factors
- Excessive alcohol ingestion
- Genetic predisposition
- Biliary cirrhosis
- Use of drugs (acetaminophen, methotrexate, isoniazid)
- Nutritional deficits r/t jejunal bypass
- Hepatic congestion from R-sided heart failure

Pathophysiology
- Nodular consistency with bands of fibrosis
- Alters flow of bile and blood thru liver
- Portal vein hypertension

Medical management
- Monitor for complications: Ascites, bleeding esophageal varices, renal failure, hepatic encephalopathy
- Maximize liver function: A nutritious diet with adequate calories and protein
- Restrict sodium and fluids in ascites
- Adequate rest
- Treat underlying cause
- Prevent infection

Nursing management
- Assess for early signs: Liver enlargement and lab data
- Assess psychosocial status to guide planning
- Monitor for hemorrhage
- Prevent hemorrhage: falls, abrasions
- Provide client teaching
- Monitor diet and provide teaching

A close up view of micronodular cirrhosis in a liver with fatty changes
Cirrhosis

- Complications of cirrhosis
  - Portal hypertension
    - Portal vein is likely to be obstructed by a thrombus or tumor
    - Altered blood flow in liver is responsible for portal hypertension
    - Cirrhosis is most common cause
    - Right-sided heart failure

- Portal hypertension
  - Manifestations: tortuous epigastric vessels that branch off the umbilicus and lead toward the sternum and ribs.
  - Enlarged palpable spleen, internal hemorrhoids, bruits, and ascites

- Portal hypertension
  - Medical management
    - Preventing/controlling hemorrhage esp. in esophageal varices and spleen
      - Sclerotherapy: sclerosing agent flows into varices
      - Transjugular intrahepatic portosystemic shunt
      - Vasopressin in light of variceal bleeding
      - Balloon tamponade

- Portal hypertension
  - Surgical management
    - Endoscopic band ligation
    - Portosystemic shunt

- TIPS - shunt

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This figure is provided courtesy of Dr. J Llach.
Cirrhosis

- **Nursing management**
  - Assess for presence of hemorrhage
  - Teach patient to reduce risk
    - Avoid straining
    - Avoid rough foods
  - Develop emergency plan in case of rupture
    - List of all emergency numbers ready and discuss plan with family members

- **Ascites**
  - With increase in portal pressure, plasma leaks directly from the liver capsule and the congested portal vein into the peritoneal cavity.
  - Liver’s ability to synthesize albumin leads to low levels in blood and then leakage of protein into the peritoneal cavity. This decreases the osmotic pressure and secretion of aldosterone stimulates the kidneys to retain sodium and water. Thus increasing ascitic fluid

- **Ascites**
  - Medical management
    - Correct fluid and electrolyte imbalance
    - Paracentesis
    - Albumin
    - Diet modifications
    - Promote effective breathing patterns
    - Maintain skin integrity

Cirrhosis

- **Monitor for hemorrhage**
  - Assess vital signs, urine output, assess with restoration of circulating blood volume

- **Ascites**
  - Abdominal distention, bulging flanks, and downward protruding umbilicus
  - Tests to confirm - paracentesis, abdominal xrays, ultrasound and CT scan

- **Ascites**
  - Medical management
    - Correct fluid and electrolyte imbalance
    - Paracentesis
    - Albumin
    - Diet modifications
    - Promote effective breathing patterns
    - Maintain skin integrity
### Cirrhosis

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<td>Percussion of abdomen-dull with ascites</td>
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<td>Measurement of girth</td>
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<td>Assess for ascites</td>
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<tr>
<td>Assess distress caused by ascites</td>
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<tr>
<td>Restrict fluids</td>
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<tr>
<td>Monitor intake and output</td>
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<tr>
<td>Administer albumin and diuretics</td>
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<tr>
<td>Avoid hepatotoxins</td>
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<tr>
<td>Monitor after paracentesis</td>
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### Hepatic encephalopathy

- Liver cannot metabolize ammonia
- Ammonia is CNS depressant
- Reduced mental alertness, confusion and restlessness.
- Loss of consciousness, seizures, and irreversible coma in terminal stage

### Fatty liver (hepatic stenosis)

| Lipid infiltration- metabolic disease |
| Causes |
| Chronic alcoholism |
| Protein malnutrition in early life |
| Diabetes mellitus |
| Obesity |
| Jejunileal bypass |
| Chronic illness that impairs nutrition |
| Reye’s syndrome in children |

### Medical management

- ID and treat precipitating causes.
- Reduce ammonia in blood and bacteria in colon
- Maintain fluid volume balance

### Fatty liver

| Manifestations |
| Causes |
| Moderate to severe infiltration- asymptomatic |
| Massive infiltration- anorexia, abdominal pain, and sometimes jaundice |
| Fat embolism can occur and cause death |
Fatty liver

Nursing interventions
- Help direct patients to correct cause
- Prepare for diagnostic procedures
- Giving emotional support
- Giving supportive physical care
- Designing teaching guidelines that promote proper diet and prevent recurrence

Liver neoplasms
- Primary
- Metastatic
  - Arise from lungs, GI tract, and breasts

Benign hepatic tumors
- Found in women 20-30 y/o
- Associated with oral contraceptive use
- Risk for rupture and hemorrhage
- Diagnosed with CT scan, US
- May be surgically excised

Malignant hepatic tumors
- Primary hepatocellular cancer
  - Rising due to high prevalence of hepatitis C
  - Cirrhosis
  - Chronic liver disease
  - Anabolic steroid use

Metastatic hepatic cancers
- Common site for metastasis
  - High rate of blood flow
  - Spread by direct extension from adjacent organs
  - Via hepatic arterial system
  - Via portal venous system
Metastatic liver disease

Metastatic hepatic cancers

- Clinical manifestations
  - Early indicators - vague
  - Only specific to primary tumor
  - Anorexia, diaphoresis, fever, weight loss, weakness
  - Active liver disease, such as abdominal pain, ascites, and hepatomegaly
  - Elevated serum alkaline phosphatase
  - Abnormal US, CT, MRI

Metastatic hepatic cancer

- Medical management
  - Relief of manifestations and promote palliation
    - Chemotherapy
    - Radiation therapy
    - Biliary drainage

Metastatic hepatic cancer

- Nursing management
  - Assess for metabolic malfunctions, pain, bleeding, ascites, edema
  - Prepare client for diagnostic testing
  - Offer support for them to cope with uncertainty and fear

Liver transplantation

- Surgical management
  - Indications - severe, irreversible liver disease
    - Primary and secondary biliary cirrhosis
    - Hepatitis-chronic with cirrhosis
    - Primary sclerosing cholangitis
    - Billary atresia (pediatric)
    - Confined hepatic malignancy
    - Wilson’s disease
    - Alcoholic cirrhosis

Liver transplantation

- Nursing management
  - Postop care is to monitor for rejection, infection, and occlusion of vessels
  - Immunosuppressive therapy
  - Constant monitoring of respiratory, cardiovascular, neurologic and hemodynamic status
Liver abscess
- Localized collection of pus and organisms within the parenchyma of liver
- Develops for 3 reasons
  - Bacterial cholangitis
  - Portal vein bacteremia
  - Amebiasis

Rare disorders
- Hemochromatosis-disorder of iron metabolism
- Amyloidosis- a proteinaceous, starch-like substance that can infiltrate the liver and other organs.

Congenital conditions
- Wilson’s disease- related to copper accumulation in tissues of the liver, brain, and kidney. May be fatal
- Caroli’s syndrome- dilated bile ducts and cyst formations
- Congenital hepatic fibrosis- portal hypertension from portal vein fibrosis

Liver trauma
- Penetrating injury or blunt trauma
- Either cause hemorrhage
- Control hemorrhage