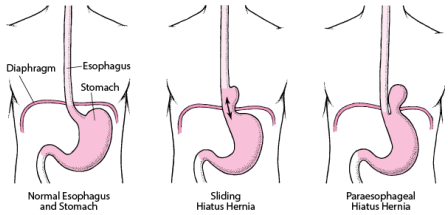
Review Chapters 29,30

1

Hiatal hernia (a very common disorder)

- **A hiatal hernia is** when your stomach bulges up into your chest through an opening in the diaphragm, the muscle that separates the two areas. The opening is called the hiatus, so this condition is also called a hiatus hernia.

- There are **two main types** of hiatal hernias: sliding and paraesophageal.



1. Ordinarily, the esophagus (food pipe) goes through the hiatus and attaches to the stomach. In **a sliding hiatal hernia**, the stomach and the lower part of the esophagus slide up into the chest through the diaphragm. Most people with hiatal hernias have this type.

2. **A paraesophageal hernia** is more dangerous. The esophagus and stomach stay where they should be, but **part of the stomach squeezes through the hiatus** to sit next to the esophagus. The stomach can become squeezed and lose its blood supply. It might called strangulated hernia.

2

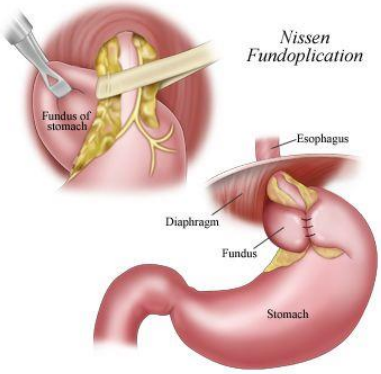
Hiatal hernia (a very common disorder)

Signs and Symptoms (Clinical manifestations):

- **Sliding hiatal hernia**→Symptoms of esophagitis or GERD = dysphagia, substernal burning, belching, and epigastric discomfort.
- A ***paraesophageal*** **hernia** rarely has symptoms associated with reflux because the gastroesophageal junction remains below the diaphragm.
  - The pain is associated with strangulation of the hernia and presents as acute chest pain or dysphagia.

Treatment:

→ Treatment aims to prevent reflux and accumulation of acid contents in the esophagus:

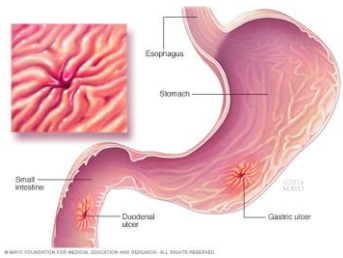


- **Lifestyle changes:**
  - weight loss, small meals, coffee limitation, and smoking cessation)
  - Avoid lying down after eating
  - Sleep with the head of the bed elevated or the use of two pillows (to help decrease gastric reflux)
- **Pharmacological:**
  - histamine-2 blockers (e.g., ranitidine) or PPIs (e.g., omeprazole)
- **Surgery:** laparoscopic fundoplication

3

Peptic Ulcer Disease

A peptic ulcer is a sore in the lining of the stomach or duodenum. The acids that help to digest food damage the walls of the stomach or duodenum.



Causes:

- The most frequent causes are the bacterium *H. pylori* and the use of *NSAIDs* or aspirin.

Complications of peptic ulcer → bleeding and perforation.

Clinical manifestations: (Approximately 70 % are asymptomatic)

- A burning stomach pain is the most common symptom. The pain occurs when the stomach is empty. The pain is described as an intense, burning, and gnawing sensation
- The pain starts between meals, about 2 to 3 hours after eating
- The pain can be relieved slightly by food and can be strong enough to awaken a person from sleep.

If peptic ulcer ruptures (If the ulceration progresses to perforation)

- PAIN: sudden, excruciating abdominal pain that radiates to the back, abdominal rigidity, pale skin, hematemesis, and cold sweat.
- nausea, hematemesis (bright-red or coffee-ground emesis), and melena (black, tarry stools).

4

Peptic Ulcer Disease – Bleeding

Complications of peptic ulcer include bleeding and perforation.

- **Upper GI bleeding (**Acute gastrointestinal (GI) bleeding) → is often caused by **esophageal varices** or **perforated peptic ulcer**

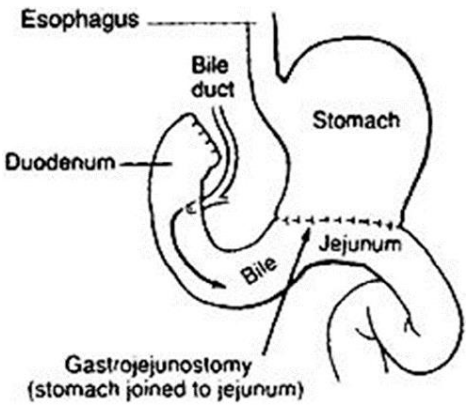
Clinical manifestations:

- nausea, hematemesis (bright-red or coffee-ground emesis), and melena (black, tarry stools).
- **If peptic ulcer ruptures**: sudden, excruciating abdominal pain that radiates to the back, abdominal rigidity, pale skin, hematemesis, and cold sweat.
- Older adults and individuals on NSAIDs or aspirin are more likely to endure ulcer complications.

Treatment: (various treatment options, depending on the case):

Drug therapy, Lifestyle changes, Vagotomy,

Surgery → A **gastrojejunostomy**, also known as Billroth II, is the removal of the lower stomach, with the remaining portion of the stomach connected to the jejunum. This surgery eliminates the gastrin-producing properties of the lower stomach and the duodenum.



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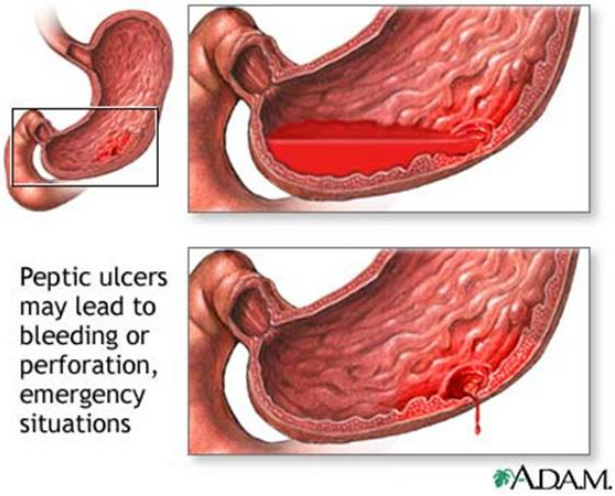
Peptic Ulcer Disease

- If Peptic Ulcer Disease goes untreated, there is the possibility of acute GI bleeding.
- This potentially life-threatening abdominal emergency is a common cause of hospitalization, affecting 100,000 individuals annually in the United States.



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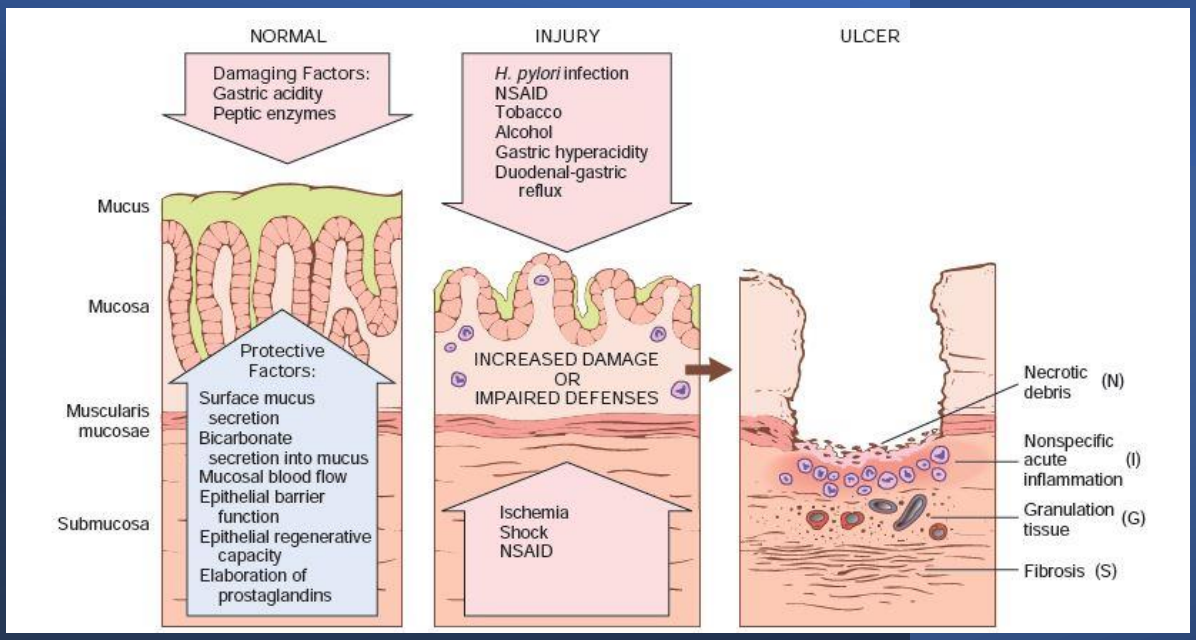

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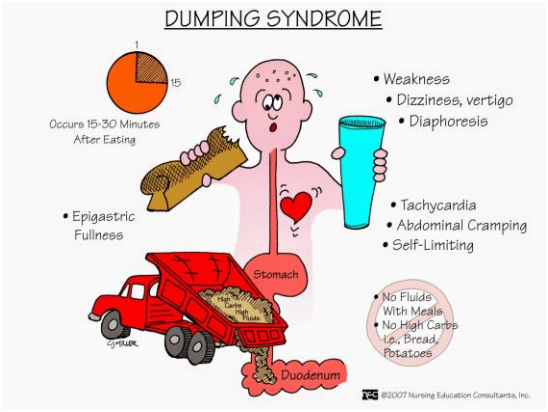
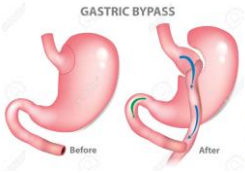
Dumping syndrome

- **caused by** rapid gastric emptying.
- common complication following any surgical procedure that removes part or all of the stomach, such as bariatric surgery.

What happens?

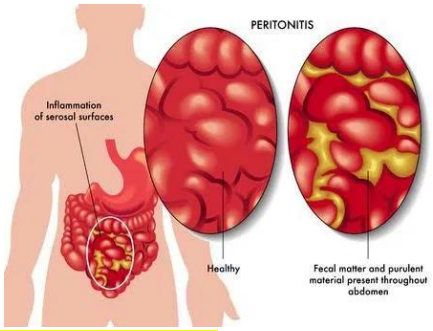
- Poorly digested material enters the intestine before its breakdown in the stomach.
- The material tends to be hypertonic, causing a shift of fluid out of the intestinal cells into the intestinal lumen.
- The fluid shift reduces blood volume, creates hypotension, and stimulates the sympathetic nervous system to increase heart rate.
- The abdomen becomes distended because of the ingested contents and the fluid shift into the jejunum.
- Peristalsis and intestinal motility increase in response to the abdominal distention.
- The pancreas releases excess insulin in response to gastric fullness and increased peristalsis, creating a risk for hypoglycemia.





8

PERITONITIS



PERITONITIS is the inflammation of the peritoneal membrane

PRIMARY peritonitis = just the inflammation of the peritoneum; there is no perforation of any organ.

SECONDARY peritonitis

- An organ rupture introduces bacteria, bile, acids, or enzymes into the sterile peritoneal environment → causing inflammation
- associated with trauma or is secondary to an infection from surrounding organs, such as **appendicitis**, **pancreatitis**, **bowel obstruction**, **ischemic bowel disease**, or the **perforation of a peptic ulcer**.

→ **Pathophysiology:**

- bacterial infection or leakage of intestinal contents into the peritoneal cavity. It often occurs as a complication of another condition or surgical complication
- A rupture from these areas will release bacteria into the peritoneal cavity. The contamination of the bacteria into the peritoneum causes a movement of fluid from intravascular spaces into the peritoneal cavity, called a peritoneal fluid shift.

The excess fluid creates peritoneal edema but decreases blood volume and increases the risk of hypovolemic shock. In addition, these fluid shifts can lead to electrolyte imbalances.

9

PERITONITIS

Clinical manifestation:

classic triad of symptoms in peritonitis:

- abdominal pain
- abdominal rigidity
- rebound tenderness.

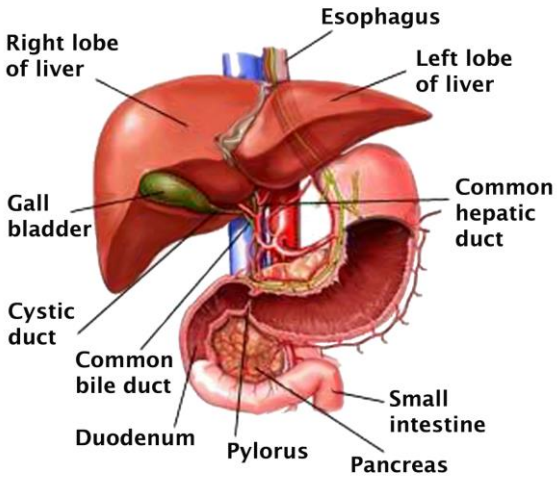
Diagnosis:

- physical examination, laboratory findings, and an x-ray.
- WBC count will be markedly elevated (greater than 11,000 cells/mcL) with a high neutrophil count
- x-ray will show air or fluid in the abdominal cavity.
- PARACENTESIS is a procedure where a sample of peritoneal fluid is withdrawn and analyzed.
- → Peritoneal fluid with neutrophil count greater than 500 cells/mcL is an indicator of peritonitis.

10

THE LIVER

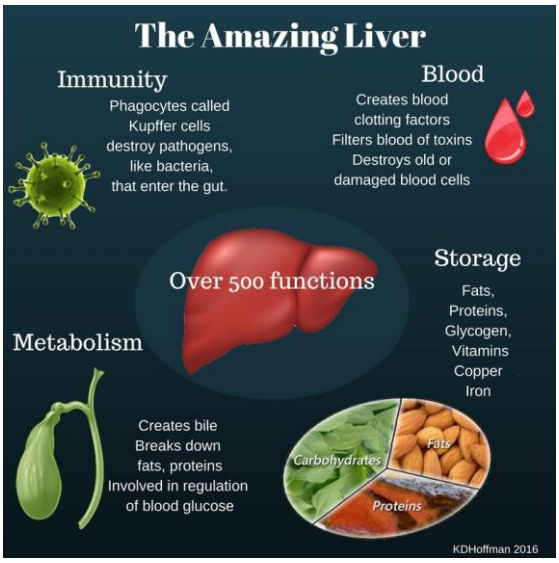
- the largest gland of the body
- a major organ
- a chemical factory:
  - manufactures, stores, alters, and excretes a large number of substances involved in metabolism



11

Functions of the Liver

- **Metabolism:**
  - **Glucose**
  - **Protein**
  - **Fat**
- **Ammonia Conversion**
- **Storage: glucose, vitamins, Iron**
- **Produces:**
  - **Albumin,**
  - **Bile**
    - **Bilirubin Excretion**
- **Metabolizes Drugs**
  - **Gerontologic considerations:** decreases: careful medication administration and monitoring to prevent medication toxicity.



12

ESOPHAGEAL VARICES

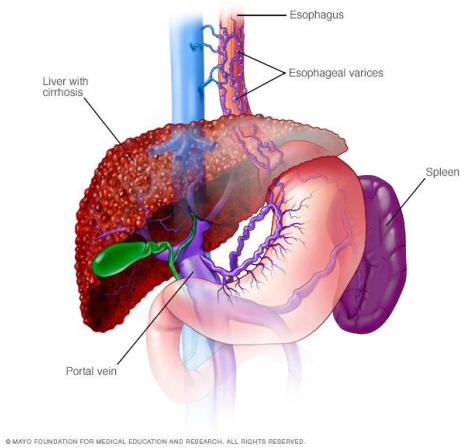
Esophageal varices are enlarged veins in the lower esophagus.

Causes:

- Cirrhosis of the liver is the major cause of esophageal varices.
- They're often due to obstructed blood flow through the portal vein (**portal hypertension**), which carries blood from the intestine and spleen to the liver.

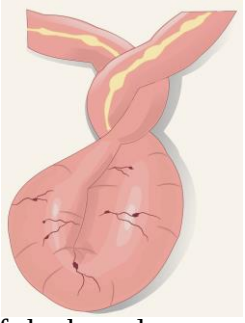
Clinical manifestation:

- No symptoms if unruptured; However, other **signs of portal hypertension** are frequently present, such as **ascites and enlarged liver**, and
- **Symptoms of cirrhosis of the liver** → jaundice, nausea, vomiting, weight loss, dark urine, and abdominal distention because of liver dysfunction
- **If the varices rupture (bleeding) - signs and symptoms are:**
  - **Hematemesis** = blood in vomitus, sometimes referred to as "coffee-ground" emesis.
  - **Melena**= tarry, dark stool caused by blood in stool.
  - **Hypotension**, **Tachycardia**, **pallor**, **dizziness** - (because of blood loss)



13

MELENA - Dark tarry stool with or without visible blood



- Melena is occult blood in the stool that causes a black, tarry appearance.
  - the production of melena follows internal bleeding

VOLVULUS - twisting of the large intestine

- The sigmoid colon is most susceptible to volvulus
- Volvulus of the intestine results in **bowel obstruction** and **ischemia** of the bowel → This can lead to ischemia and infarction of the intestinal wall. → Perforation and necrosis of the affected intestinal wall can occur.

Symptoms

- bilious vomiting, abdominal pain cramping in nature and going in waves (colicky at first, then steady), anorexia, blood and mucus in the stool, swollen abdominen, abdominal tenderness, and, eventually, shock.

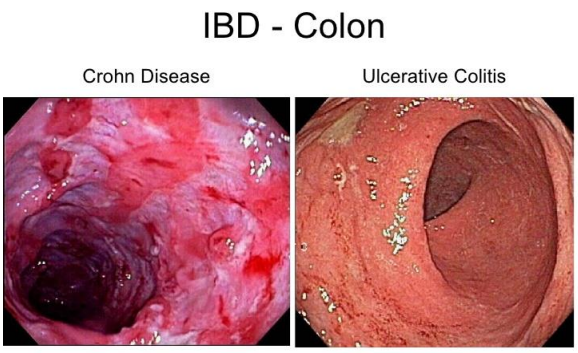
Diagnosis: CT scan., abdominal x-ray sigmoidoscopy

Treatment: Surgery may be needed

14

Inflammatory Bowel Disease (IBD)

- Crohn's Disease
- Ulcerative Colitis



- **-- Dx:** x-ray, colonoscopy, biopsies, CT, MRI, USCT scan, MRI

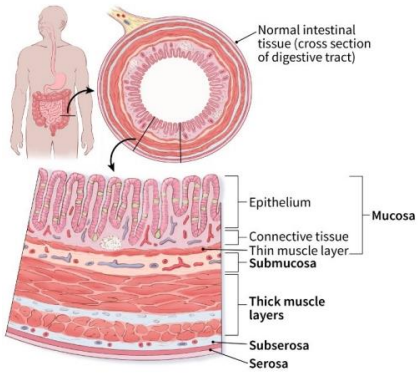
  CROHN's: Discontinuous lesions, narrowing of colon, mucosal edema, stenosis

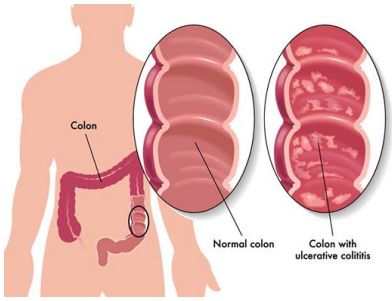
  ULCERATIVE COLITIS: Long-term condition that results in inflammation and ulcers of the colon and rectum. Diffuse involvement, shortening of colon.

15

ULCERATITE COLITIS

- Only affects the <u>large intestine</u>
- Affects from rectum continually upward into colon
- Only affects upper layers of intestinal wall (mucosa and submucosa) →
- Pseudopolyps seen on examination of the colon
- No fistula or anal fissure formation
- Predisposes to colon cancer





16

CROHN'S DISEASE

TREATMENT:

- In Crohn's disease medications with different mechanisms of action are used to suppress the disease and induce and maintain remission:
  - Oral 5-aminosalicylates (e.g., sulfasalazine, mesalamine)
  - Glucocorticoids (e.g., prednisone, budesonide)
  - Immunomodulators (e.g., azathioprine, 6-mercaptopurine, methotrexate)
  - Biological therapies (e.g., infliximab, adalimumab, certolizumab pegol, natalizumab, vedolizumab, ustekinumab)
- Patients with terminal ileal disease may not absorb bile acids normally, which can lead to secretory diarrhea in the colon. These patients may benefit from bile acid sequestrants, such as cholestyramine.
  - Cholestyramine is a bile acid–sequestering agent, which is prescribed for clients with terminal ileal disease, which exists in clients with Crohn's disease. This helps the client to absorb bile salts normally. This statement by the nurse is true and indicates understanding.

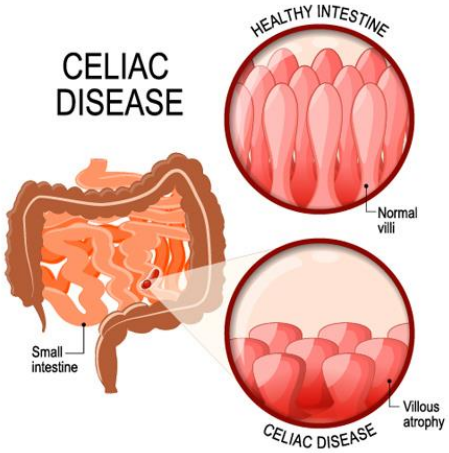
17

Celiac disease

- also known as **gluten-sensitive enteropathy**

Diagnosis:

- **Serology celiac panel** → to determine if an immune reaction to gluten is present.
  - positive antibody titer of IgA antitissue transglutaminase (IgA TTG).
  - If the results of this test are positive, a biopsy of the duodenum or jejunum is necessary.
- Those suffering from celiac disease develop an autoimmune response, indicated by the presence of antibodies, to the protein gluten.
- Damage to the small intestinal villi results and this can be seen on biopsy.



18

LARGE BOWEL OBSTRUCTION

Signs and Symptoms

depend on the position and amount of bowel involved in the obstruction, as well as the interference with the blood supply.

- abdominal pain
- abdominal distention
- Tenderness
- rigidity upon examination.
- With a partial obstruction, bowel sounds are high pitched or tympanic; patients may continue to have flatus or diarrhea.
- With a complete obstruction, bowels sounds are absent.
- In the presence of bowel perforation, signs of infection and shock become evident as the bowel contents contaminate the peritoneal cavity.

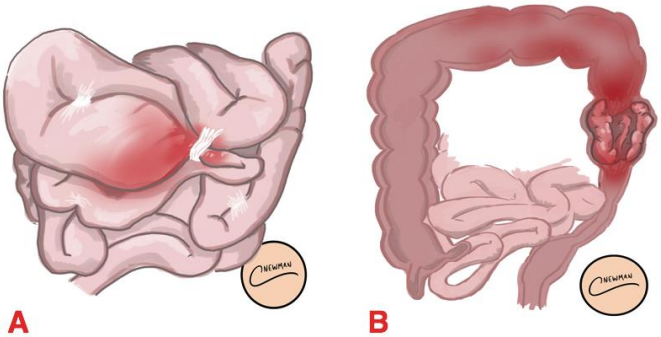
19

LARGE BOWEL OBSTRUCTION

TREATMENT

The overall management of LBO includes fluid replacement, prophylactic antibiotic therapy, **intestinal decompression**, and surgical consultation.

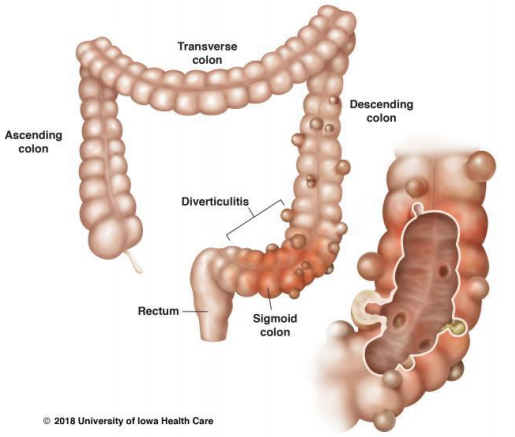
For intestinal decompression, a **nasogastric tube** is inserted into the stomach or a colorectal tube through the rectum to relieve pressure from the obstruction.



20

DIVERTICULAR DISEASE

- The two disorders associated with diverticular disease are **diverticulosis** and **diverticulitis**.
- In DIVERTICULOSIS, the bowel wall has multiple **weakened areas** that form small outpouchings called diverticula.
- Most diverticula are found in the sigmoid and descending colon.
- Diverticula can collect intestinal contents and form a colonic obstruction → Diverticula often become inflamed, at which point the condition becomes DIVERTICULITIS.



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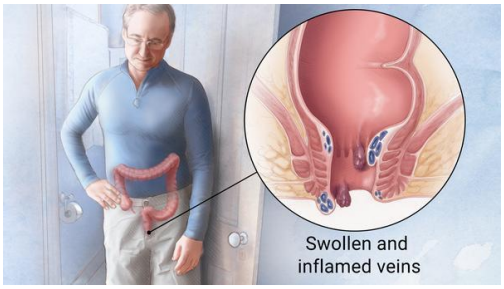
Hemorrhoid (varicose veins in the perianal region)

- Dilated, swollen venous blood vessels in the lower rectum.
- A common cause of lower intestine pathology.

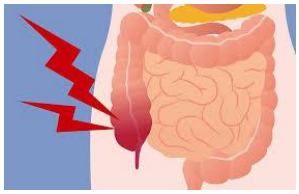


Symptoms:

- depend on the location, whether they are internal or external blood vessels.
- **Internal hemorrhoids** lie inside the rectum.
  - Straining or irritation when passing stool can damage the hemorrhoid's fragile surface and cause it to bleed.
  - Bleeding from hemorrhoids, exhibited as small amounts of bright-red blood from the rectum, is called hematochezia.
- **External hemorrhoids** are more superficial, just under the skin around the anus.
  - When irritated, external hemorrhoids can itch or bleed (hematochezia)
  - Sometimes blood may pool in an external hemorrhoid and form a thrombosed hemorrhoid, resulting in severe pain, swelling, and inflammation.

22

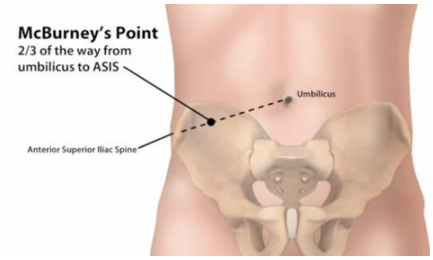
APPENDICITIS



- Appendicitis causes peritoneal inflammation, demonstrated by rebound tenderness at McBurney's point in the RLQ.
- Appendicitis—inflammation of a vestigial part of the intestine-can lead to perforation if not diagnosed promptly. Perforation of the bowel and peritonitis are the major concerns of clinicians treating disorders of the large intestine.

TREATMENT:

- Early treatment with antibiotics that are effective against gram-negative bacteria should be initiated preoperatively and administered up to at least 48 hours postoperatively. Laxatives should be avoided;
- pain medications should be avoided before diagnosis of appendicitis, as these can mask diagnostic signs.
- Continuous monitoring for **peritonitis** and IV therapy to restore or maintain **fluid and electrolyte balance** is essential.



23

BIO315
Chapter 31 to 35

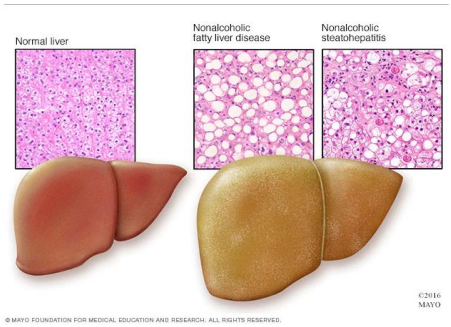
Review

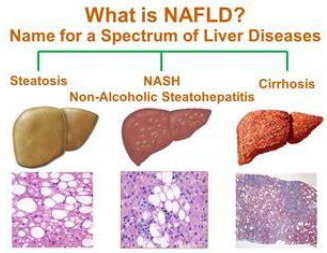
24

CHAPTER 31

LIVER - Non-Alcoholic Fat Liver Disease

- **Nonalcoholic fatty liver disease (NAFLD) and nonalcoholic steatosis (NASH)** are common pathophysiological conditions of the liver. Etiology is unclear, the patient usually has comorbidities of obesity, hypertriglyceridemia, or diabetes. The liver becomes infiltrated with fat and fibrotic tissue. NAFLD is a major cause of cirrhosis.
- **NAFLD is caused by the accumulation of fatty acids in the liver.**
- **NAFLD is linked to metabolic syndrome -** Metabolic syndrome is characterized by insulin resistance, obesity, and hyperlipidemia. It can lead to excess fat accumulation in the liver.
- **NAFLD can be caused by** drugs such as amiodarone, tamoxifen, and methotrexate.
- **NAFLD can results from decreased adiponectin→** Adiponectin reduces the accumulation of glucose and fats in the liver by inhibiting gluconeogenesis and suppressing lipogenesis. Therefore, decreased adiponectin results in NAFLD

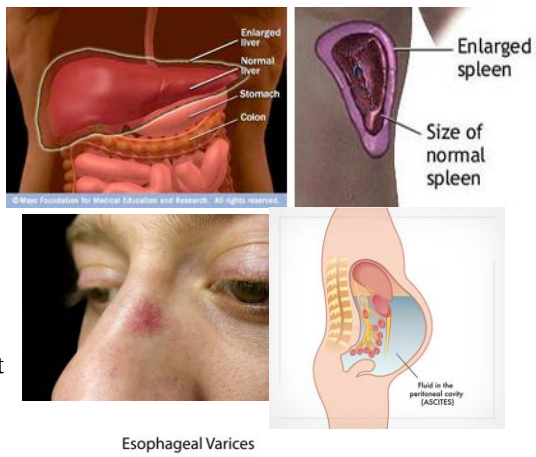




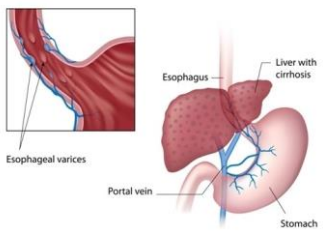
25

Alcoholic Liver Diseases

- Liver disease caused by chronic alcohol abuse is common.
- Patients exhibit signs of liver impairment, such as **hepatomegaly** and **splenomegaly**, and **signs of portal hypertension**, such as **esophageal varices** and **ascites**. **Spider angiomata**, **proximal muscle wasting**, **altered hair distribution**, and **gynecomastia** may also be observed.
- **Shifting dullness** is a clinical sign that is an indication of ascites (**fluid buildup in the abdomen)**
- For clients with **splenomegaly**, physical examination of the left upper abdomen shows an enlargement of the spleen
- **Spider angiomata** is characterized by the central red arteriole representing the body of a spider. It is surrounded by a radial pattern of thin-walled capillaries, which appears on the skin of clients with portal hypertension
- Clients with **esophageal varices** show symptoms such as melena and hematuria. Its diagnosis is confirmed by performing endoscopic examination.



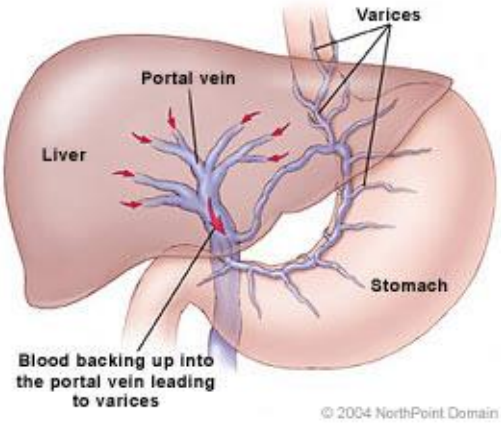
Esophageal Varices



26

Portal hypertension

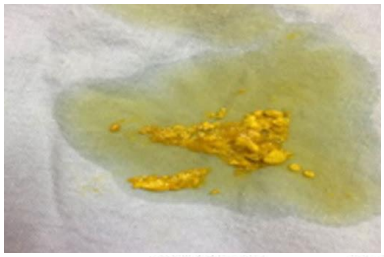
- In portal hypertension, the increased pressure within the portal vein causes a backup of pressure to the gastrointestinal veins and collaterals, leading to the appearance of **dilated and superficial veins around the umbilicus** (**caput medusa**).
- Portal hypertension leads to the development of **esophageal varices**, which are fragile and prone to bleeding. Due to esophageal variceal bleeding, clients may experience **hematemesis**
- Portal hypertension increases pressure in the portal blood vessels and causes protein-containing **fluid** from the surface of the liver and intestine to **leak and accumulate within the abdomen**, thus leading to **ascites**
- **Liver cirrhosis** leads to **coagulation abnormalities** because of **impaired clotting factor synthesis**. However, portal hypertension does not specifically cause any coagulation abnormalities.

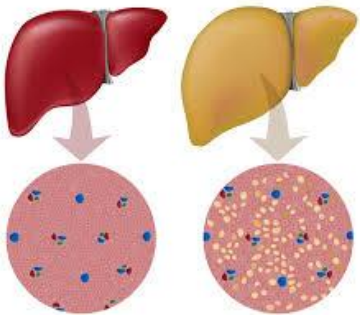


27

Liver disease

- When the liver does not secret bile for fat digestion, **steatorrhea** occurs. It is characterized by light-colored and soft stools
- The **urine is dark** in clients with liver disease because of the backup of bilirubin into the bloodstream. Therefore, the nurse suspects that the accumulation of bilirubin in the bloodstream is responsible for a change in the urine color.
- Accumulation of bile salts in the blood leads to **itching or pruritus** in a client with liver disease.
- The liver becomes **infiltrated with fats** in nonalcoholic fatty liver disease (NAFLD) and nonalcoholic steatohepatitis (NASH).

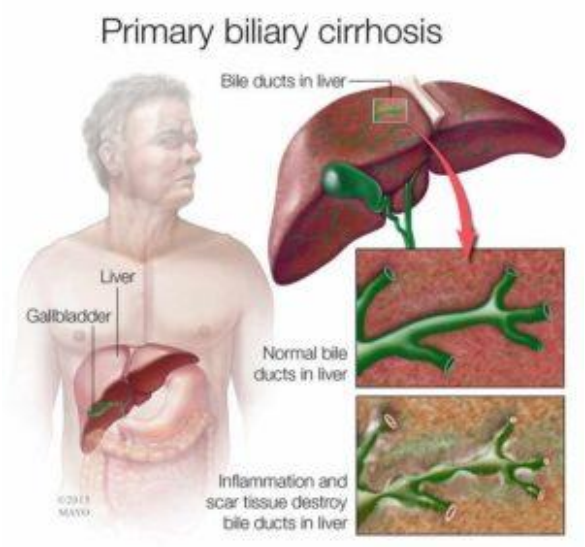




28

Biliary cirrhosis

- The process of primary biliary cirrhosis:
- 1) Begins with the inflammation of the portal triads, leading to the destruction of small and medium bile ducts.
- 2) The inflammation continues progressing, causing destruction of the liver cells.
- 3)The destruction of the cells leads fibrotic tissue taking over hepatic cells, and loss of intralobular bile ducts
- 4) This leads to the development of micronodular or macronodular cirrhosis.



29

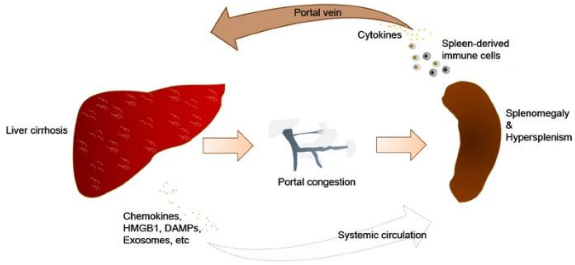
Liver

- **Liver Function** – Among other functions →**Hematologic Role** - As part of its hematologic function, the liver synthesizes fibrinogen and coagulation factors I, II, VI, IX, and X for clotting. With the exception of factor VIII, all of the elements of clotting are made by the hepatocytes.
- Prothrombin is produced by the liver with the assistance of vitamin K and bile. **Vitamin K, which is essential for clotting, is a fat-soluble vitamin. Without any of these components, there is great risk of bleeding.**
- **Treatment of Alcoholic Liver Disease** - Cessation of alcohol use and proper nutrition constitute the treatment for alcoholic hepatitis. Patients should be on a high-protein, low-fat, low-sodium diet. However, if hepatic encephalopathy is present, the diet should not be high in protein. Supplemental vitamins and minerals, including folate and thiamine, are recommended. Patients with coagulation dysfunction should receive vitamin K parenterally. Short-term use of glucocorticoids may be part of treatment.
- The lack of synthesis of the coagulation factors occurs in the case of liver diseases, resulting in prolonged prothrombin time. Therefore, the client experiences bruising, nosebleed, and hematemesis. The nurse suspects vitamin K to be useful in this client because it helps in the synthesis of the clotting factors.

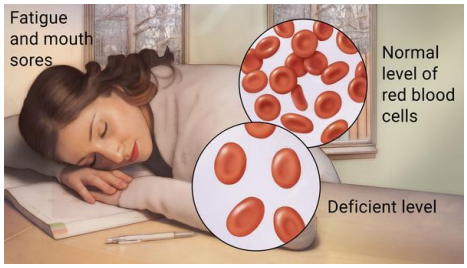
30

Alcoholic liver disease

- HYPERSPLENISM (overactive spleen)
  - Hypersplenism occurs **due to portal hypertension** in clients with alcoholic liver disease. It is a disorder that causes the **spleen to prematurely destroy the red blood cells** (hemolysis), leading to anemia. Low hemoglobin levels cause anemia.

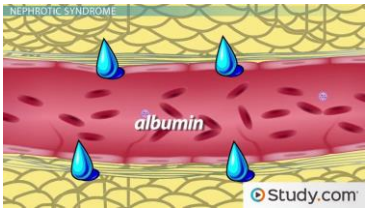


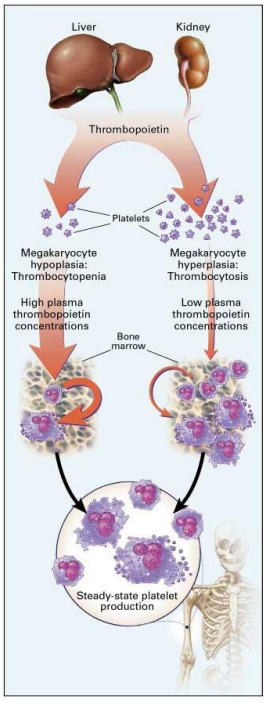
- FOLIC ACID DEFICIENCY
- Clients with liver disease will have disturbed folic acid metabolism, resulting in folic acid deficiency and anemia.



31

- A person with liver dysfunction can have **ANEMIA** (low hemoglobin levels) and **THROMBOCYTOPENIA** (low levels of platelets). Anemia may result from folate deficiency, hemolysis, or hypersplenism. Thrombocytopenia usually is secondary to hypersplenism and decreased levels of thrombopoietin.
- **Thrombopoietin** is a glycoprotein hormone produced by the liver and kidneys, which helps in the production of platelets. Decreased levels of thrombopoietin cause thrombocytopenia
- **Hypoalbuminemia** is caused by a decrease in the synthesis of albumin by the liver. This decreases the colloid oncotic pressure, which allows the hydrostatic pressure to go unbalanced, causing ascites.





32

Hepatitis

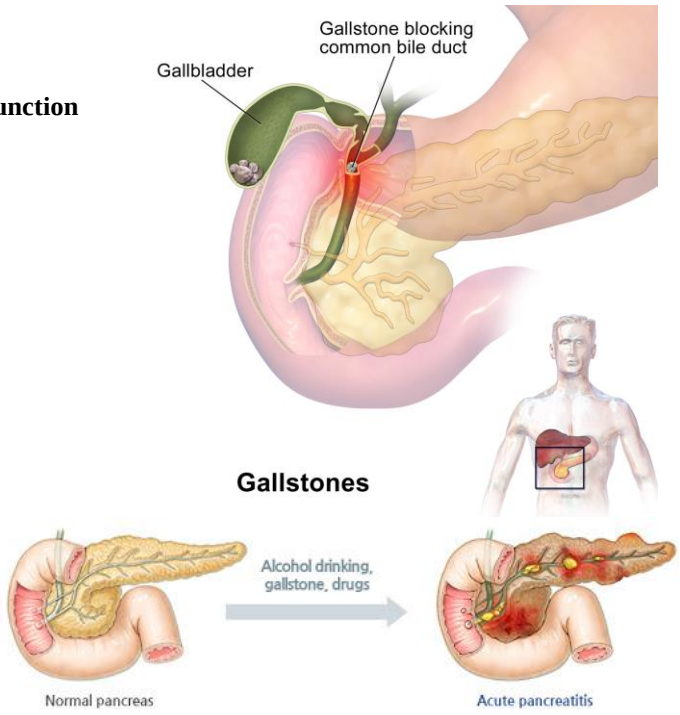
- **HAV** is usually caused by ingestion of contaminated food or water or contracted from person to person by the fecal–oral route.
- **HBV** is a virus spread by blood products, body fluids, or sexual contact.
- **HCV** is a virus that targets hepatocytes and B lymphocytes. The mode of transmission is via blood, as in IV drug use; sexual transmission is not as likely.
- **HDV** is a defective RNA virus that requires the helper function of HBV for its replication, expression, and duration. It accelerates the progress of liver disease in those with HBV. HDV can either infect a person simultaneously with HBV or superinfect a person who is already infected with HBV. Similar to HBV, its mode of transmission is parenteral drug use or sexual contact.
- **Chronic hepatitis** occurs as a result of the progression of acute hepatitis. Hepatitis is considered chronic when inflammation and necrosis of hepatic tissue continue for 6 months or longer.

33

CHAPTER 32

Gallbladder, Pancreatic, and Bile Duct Dysfunction

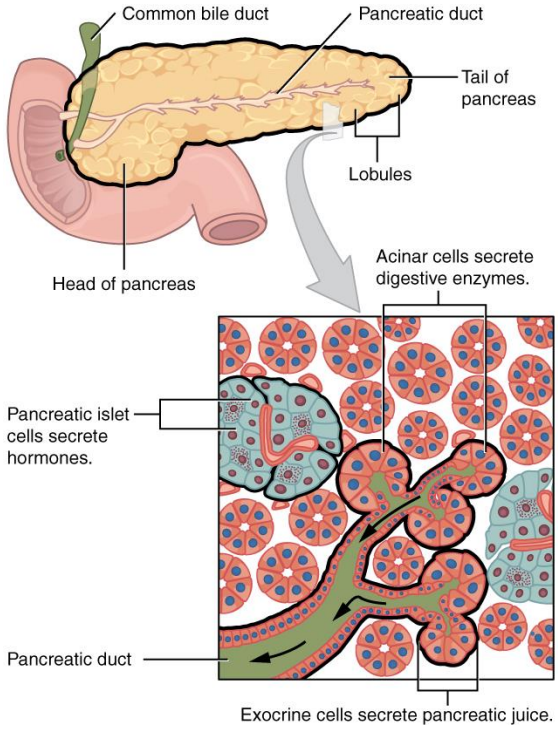
- **Calculous biliary colic** is pain caused by an irritation of the gallbladder in which the pain lasts for several hours. Clients who have calculous biliary colic will exhibit nausea, vomiting, and pain in the right upper quadrant and right flank.
- **Cholecystitis** is an inflammation of the gallbladder due to gallstones. Clients who have cholecystitis will exhibit epigastric pain in the right upper quadrant, which radiates to the shoulder. These clients may experience heartburn, anorexia, nausea, vomiting, and Murphy's sign.
- **Acute pancreatitis** is an inflammation of the pancreas. The client exhibits a dull and steady pain in the epigastric region radiating to back, as well as hypotension and tachycardia.



34

Pancreas

- In addition to producing the hormones glucagon and insulin, the pancreas creates and secretes several digestive enzymes.
- Normally, these enzymes are released into the small intestine where they are activated.
- In the case of pancreatitis, cell damage may result in the release of these enzymes into the bloodstream.
- Thus, a key sign for pancreatitis is the elevation in the serum of the digestive enzymes from the pancreas, amylase and lipase.



35

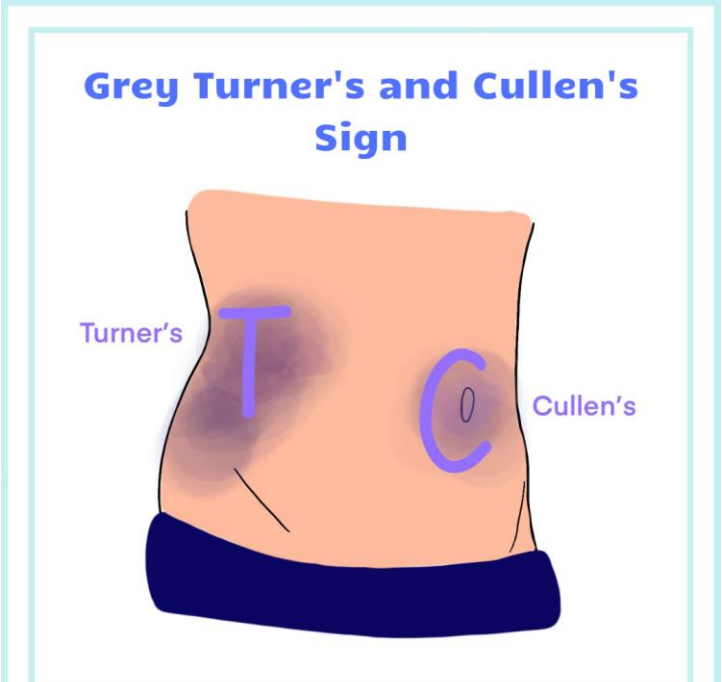
Pancreatitis

- The most common causes of pancreatitis are biliary tract disease and alcohol abuse.
- In biliary tract disease (in case of, for instance), the causative factor is obstruction of the pancreatic duct by a gallstone (cholelithiasis) or other cause, with release of digestive enzymes that back up into the pancreatic gland parenchyma, followed by autodigestion (the enzymes digest the pancreas itself)
- Also, In the case of pancreatitis, cell damage may result in the release of these enzymes into the bloodstream.
- Thus, a key sign for pancreatitis is the elevation in the serum of the digestive enzymes from the pancreas, amylase and lipase.

36

Pancreatitis

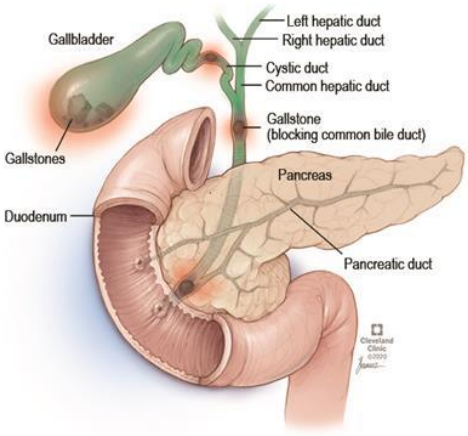
- The Cullen sign is a bluish discoloration that is present around the umbilicus, and the Grey-Turner sign is a reddish-brown discoloration that is present along the flanks.
- The Cullen sign and Grey-Turner sign would be observed during the physical examination of clients who have acute pancreatitis.



37

Cholecystitis and Cholelithiasis

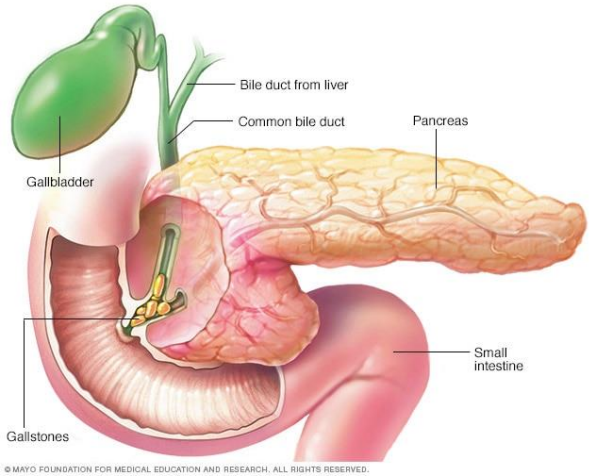
- **Cholecystitis** refers to inflammation if the gallbladder, whereas **cholelithiasis** is the presence of gallstones.
- Gallstones are the most common cause of inflammation in the gallbladder.
- Being female, older than 40, and obese increases the risk of gallstone formation.



38

Gallbladder and Pancreas

- Both the gallbladder and pancreas have ducts that enter the duodenum near the opening from the stomach.
- Because of the proximity of these structures, problems in either the gallbladder or pancreas may affect the other organ.
- Gallbladder issues may eventually compromise pancreatic functioning.



39

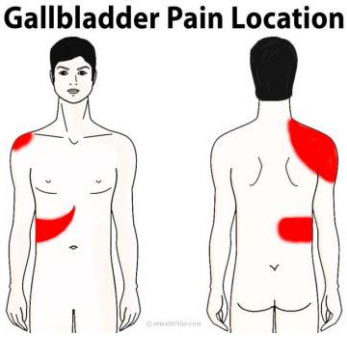
- **Murphy's sign** is elicited in patients with acute cholecystitis by asking the patient to take in and hold a deep breath while palpating the right subcostal area. If pain occurs on inspiration, when the inflamed gallbladder comes into contact with the examiner's hand, **Murphy's sign** is positive.
- **Murphy's sign** is considered positive if pain is elicited on the right side, but not the left side.
- A positive test may indicate cholecystitis.

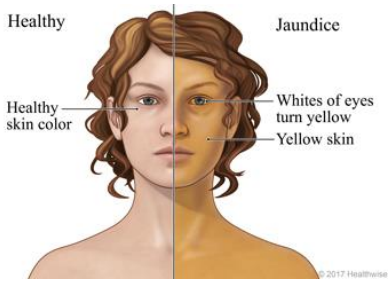
40

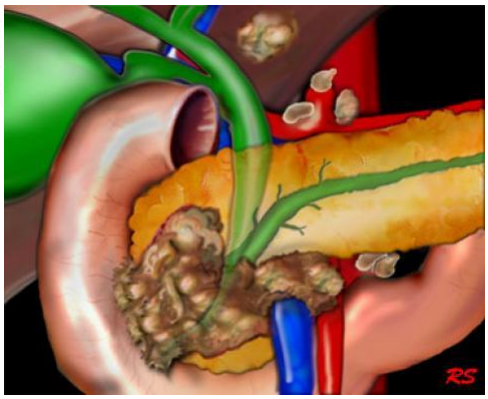
Pain from the gallbladder often refers to the shoulder area, commonly the right shoulder.

Cancer that arises in the head of the pancreas leads to bile duct obstruction, which causes jaundice, an early warning sign of pancreatic cancer.

ALERT! Patients with pancreatic cancer classically presents with painless jaundice.



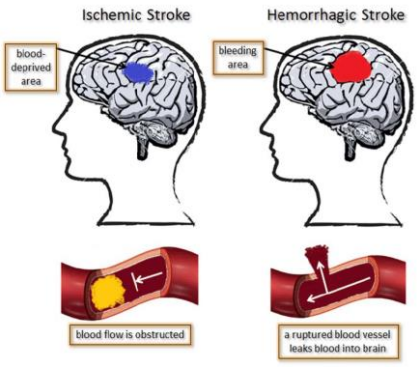


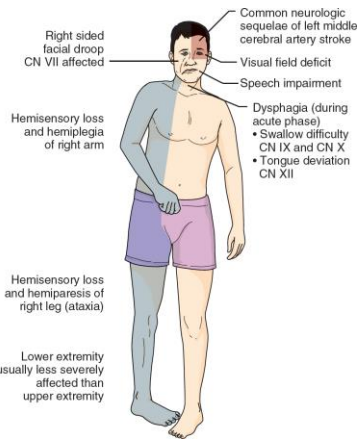


41

CHAPTER 33 – Cerebrovascular disorders

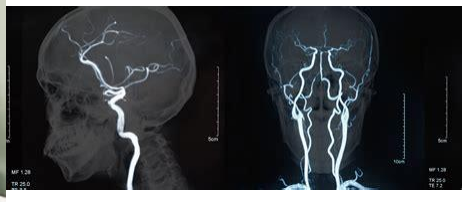
- Patients who suffer either ischemic or hemorrhagic stroke present with similar signs and symptoms.
  - Because both types of stroke cause damage to the brain, neurological deficits are demonstrated.





The tests used to differentiate between ischemic and hemorrhagic stroke are:

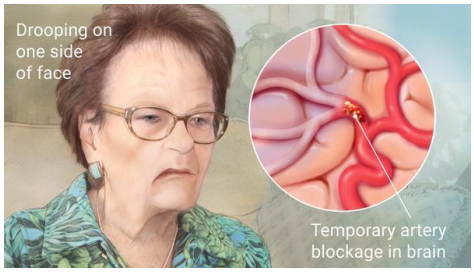
- Computed tomography
- Magnetic resonance angiography



42

Transient Ischemic Attack (TIA)

- *TIA* stands for transient ischemic attack, which is a transient disruption in cerebral blood flow.
- Initial signs and symptoms may go unnoticed by the patient and will resolve within 24 hours.
- **Common symptoms of stroke** include hemiparesis (weakness of extremities on one side of the body) or hemiplegia (paralysis; complete loss of function of extremities on one side of the body), loss of sensation in an extremity on one side of the body, slurred speech, and facial droop with weakness. Some patients have disorientation, confusion, and drowsiness, which can become stupor or coma.

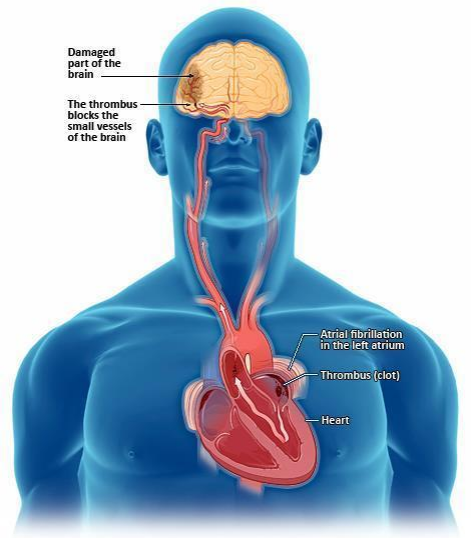


43

Risk factors for stroke (cerebrovascular accident):

- Men have a higher risk for stroke.
- Atrial fibrillation,
- high blood pressure,
- diabetes,
- family history of cardiovascular disease

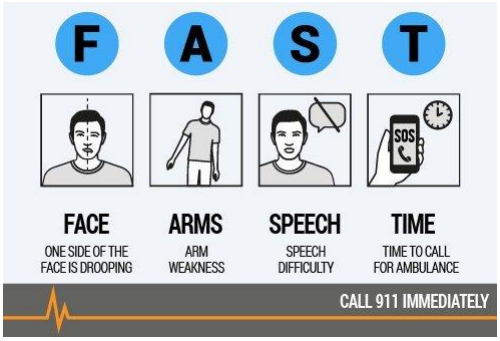
- Atrial fibrillation causes quivering of the atria, resulting in stasis of blood flow. Blood flow stasis increases the risk for clot formation and subsequent stroke.



44

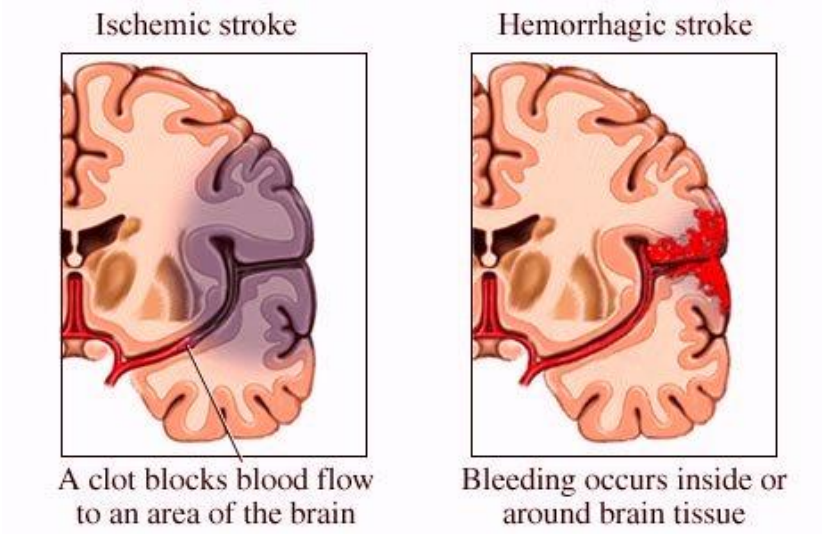
- The FAST acronym was created to alert people to the signs of a stroke: Facial droop, Arm weakness, Speech difficulty, and Time to call 911.

- **F**acial droop
- **A**rm weakness
- **S**peech difficulty
- **T**ime to call 911 and check the time when the symptoms began



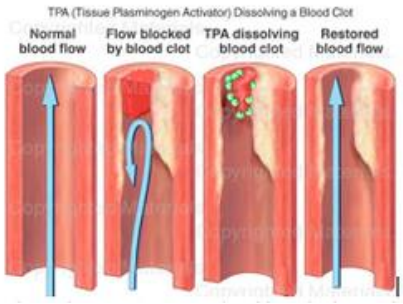
45

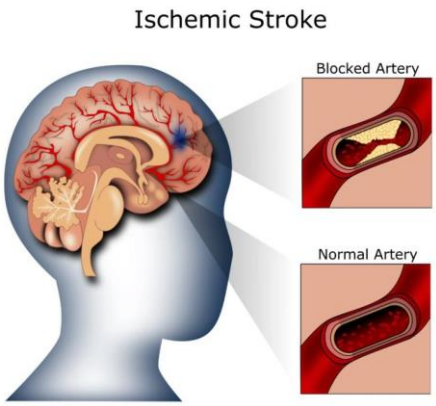
- A stroke caused by bleeding is known as a hemorrhagic stroke.
- In a stroke developed not from bleeding, it is developed by an obstruction of blood flow, disrupting oxygen delivery.
- Without cerebral bleeding detected, a client is likely suffering from an ischemic stroke.



46

- FOR THE TREATMENT OF ISCHEMIC STROKE:
- rt- PA is Recombinant Tissue Plasminogen Activator, otherwise known as a "clot buster." (THROMBOLYTIC TREATMENT)
- Specific guidelines exist for usage of this agent, but it can be a treatment used for ischemic stroke.

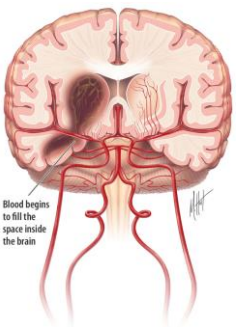




47

- A **lacunar infarct** is a small blood vessel infarction associated with hypertension.

- A thrombus is frequently the **cause of an ischemic stroke**.
  - Thrombi arise from arteriosclerotic plaque;
  - they commonly develop in either the neck or the heart's left atrium and travel up the carotid artery and into the brain.
  - The left atrium undergoes atrial fibrillation with stasis of blood and clot formation in an **ischemic stroke.**

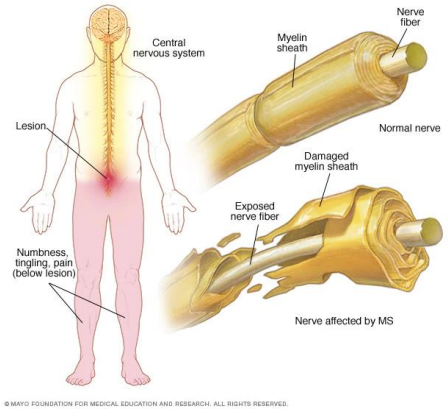


- The **ischemia of the brain** can be caused by a thromboembolism from a carotid stenosis in a transient ischemic attack.
  - A clot or thrombus that causes ischemic stroke commonly arises from one of three mechanisms:
    - arteriosclerosis of a cerebral artery, atrial fibrillation which causes a cardioembolic event, or carotid stenosis that can also cause an embolic event.
- If a **cerebral artery ruptures**, causes a large amount of blood to compress the brain tissue in hemorrhagic shock.

48

Chapter 34, Chronic and Degenerative Neurologic Disorders

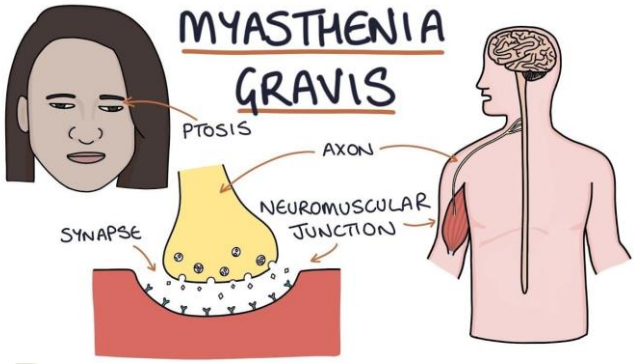
- **MULTIPLE SCLEROSIS**
- MS is an autoimmune disease and is not inherited.
- The cause of MS is not clearly understood or identified. However, MS is considered to be an autoimmune disease
- In demyelinating diseases, the myelin sheath around some axons is targeted. Antibodies created by the body attack the myelin on varying sensory and motor axons.
- As a result of myelin destruction, gliotic plaques (scar tissue) form and disrupt the flow of electrical impulses that flow through the axons of nerves.



49

Myasthenia Gravis

- The **respiratory rate** of a client with myasthenic crisis should be constantly monitored because of the respiratory failure. Heart rate need **not** be monitored constantly.
- The **forced vital capacity** and **negative inspiratory force** of the client with myasthenic crisis should be monitored every 2 to 4 hours because of the respiratory failure present in myasthenic crisis.
- Monitoring arterial blood gases is **not** a sensitive measure for respiratory muscle weakness. It is not the most important intervention by the nurse in clients with myasthenia gravis
- Myasthenic crisis is caused by a tapered immunosuppressant dose in the client. Complete withdrawal of immunosuppressants will further exacerbate the symptoms of myasthenic crisis.



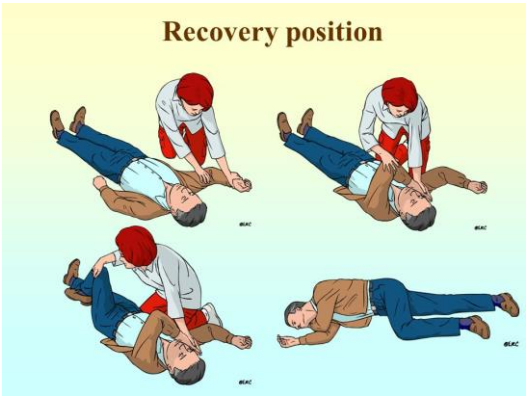
50

- ALZHEIMER'S DISEASE → Depletion in the level of acetylcholine is associated with Alzheimer's disease.
- DEPRESSIVE SYNDROME → Depletion of serotonin occurs in clients with severe depressive syndrome.
- PARKINSON'S DISEASE → Dopamine levels are decreased in clients with Parkinson's disease due to the progressive loss of dopamine-producing cells in the substantia nigra of the brain.

51

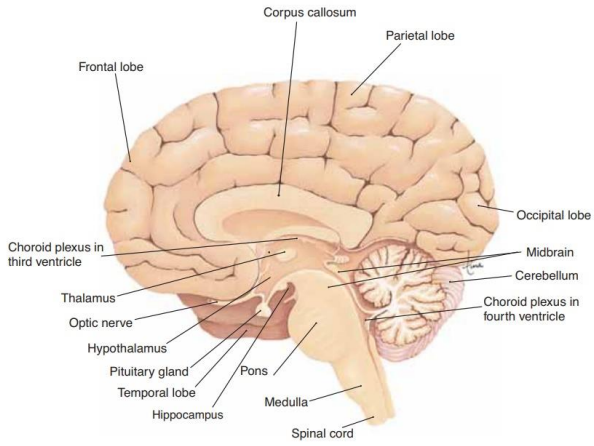
SEIZURES

- **Status epilepticus** is a seizure continuing for about 30 minutes or a series of three tonic-clonic seizures. Therefore, a client who is experiencing a series of three tonic-clonic seizures is expected to have status epilepticus.
- **Myoclonic seizure** = Rapid alternate contraction and relaxation of muscles is seen in the case of a myoclonic seizure.
- **Absence seizure** = A seizure where a client appears to be staring into space for a few moments is usually an absence seizure
- **Clonic seizure** = A rhythmic jerking movement of the arms and legs where consciousness is usually preserved occurs in clonic seizures.



52

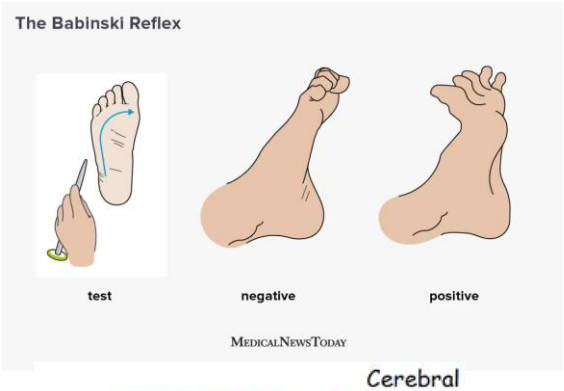
- CEREBRUM → The function of the cerebrum is associated with higher functions of the brain, such as thought and action.
- BRAINSTEM → The function of the brainstem is associated with basic vital life functions.
- DIENCEPHALON → The function of the diencephalon is associated with autonomic functions of the peripheral nervous system.
- CEREBELLUM → The cerebellum contributes to the coordination, precision, and accuracy of movement. Therefore, if the client complains of lack of coordination and imbalance, the nurse would suspect the cerebellum to have been damaged.

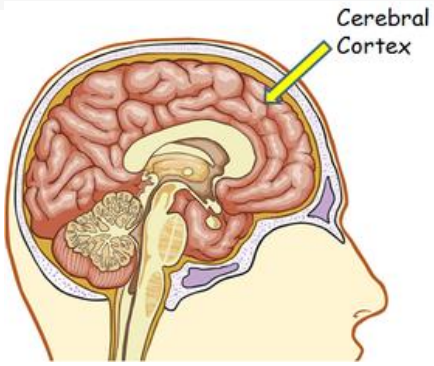


53

Babinski reflex

- A **positive Babinski** reflex indicates an upper motor neuron disorder.
- A **positive Babinski** reflex occurs when there is flaring of the toes in response to stimulation of the sole of the foot.
- A **positive Babinski** reflex, where the client has flaring of the toes in response to stimulation of the sole of the foot, indicates an upper motor neuron disorder
- ALERT! A positive Babinski's sign occurs when stimulation of the sole of the foot causes the toes to flare out. The Babinski's sign is normal in a newborn, but in the adult, it indicates upper neuron cortical dysfunction.
- A **negative Babinski** reflex occurs when the toes of the client flex inward upon stimulation of the sole of the foot.





54

Unconscious client assessment

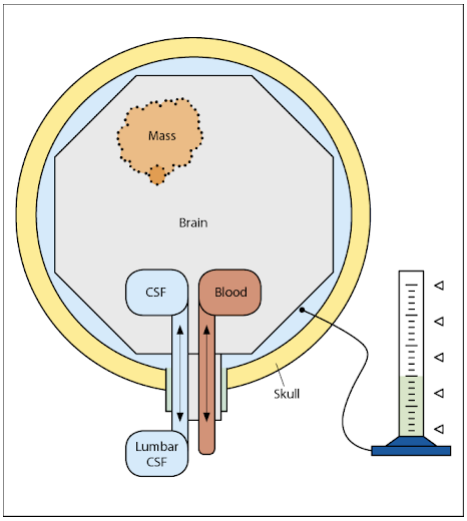
- The **vital signs** should be assessed in a client who lost consciousness. Therefore, the nurse would expect the health-care provider to prescribe the assessment of vital signs.
- The **pupil response** is assessed to know if the client's neurologic system is intact. Therefore, the nurse would expect the health-care provider to prescribe the assessment of pupil response
- The **Glasgow Coma Scale** is used to assess the conscious state of the client. Therefore, the nurse would expect the health-care provider to prescribe the Glasgow Coma Scale.

- ***(note that it is not possible to assess abilities such as hearing and orientation, for instance, since the client is unconscious)***

55

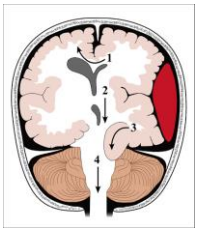
Chapter 35 – Brain and spinal cord injury

- The bones of the skull form a rigid cranial compartment that contains brain tissue (80%), CSF (10%), and blood volume (10%).
- The pressure of these three elements **must remain balanced** to maintain normal intracranial pressure (ICP).
- ICP—the pressure inside the skull, brain tissue, and CSF—is normally 5 to 15 mm Hg in the resting, supine adult.
- Changes in ICP occur because of volume changes in either the brain tissue, cerebral blood flow, or CSF.

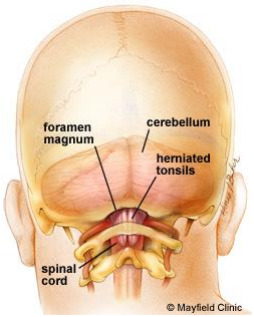


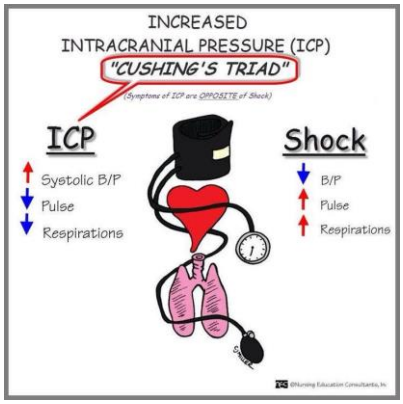
56

Intracranial Pressure



- If there is an increase in any of the three elements inside the skull (mass, or liquor, or blood), the intracranial pressure (ICP) will increase.
- The three elements need to be normal, in order to maintain a normal ICP.
- The elevation of the ICP is dangerous. The pressure can damage the brain or spinal cord by pressing on important structures and by restricting blood flow into the brain
- Cushing's triad of **hypertension**, **bradycardia**, and **bradypnea** are indicators of pressure on the brainstem – the ICP increases to the point of compressing the brain and push it down onto the **brain stem, through the foramen magnum → BRAIN HERNIATION (very serious condition. Potentially deadly side effect of very high ICP)**

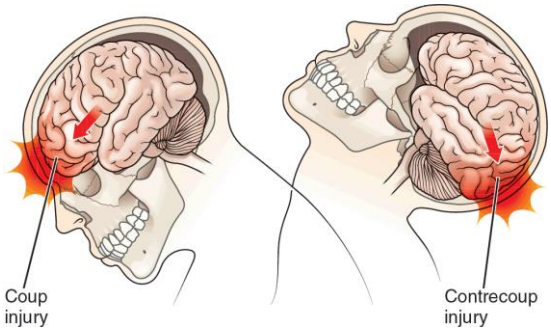




57

Diffuse Axonal Injury (DAI)

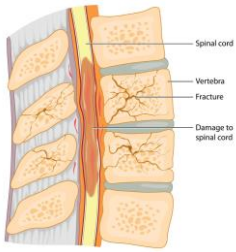
- Diffuse axonal injury (DAI) is a form of traumatic brain injury.
- It happens when the brain rapidly shifts inside the skull as an injury is occurring (called coup-contrecoup injury).
- The long connecting fibers in the brain called axons are stretched and sheared as the brain rapidly accelerates and decelerates inside the hard bone of the skull.
- Because this type of injury generally results from a **coup-contrecoup injury**, it is also referred by the same name.



58

Spinal Shock

- Trauma to the spinal cord (Spinal Cord Injury) results in loss of function to the area distal to the trauma (loss of function to the area of the shock and below) . Primary injury to the spinal cord results in a state of **areflexia (no reflex) =** which is demonstrated by flaccid muscles, paralysis, absence of sensation **at and below the level of injury**, and bowel and bladder dysfunction.
- Right after an insult to one section of the cord → the injuty leads to the development of **spinal shock**, which eventually resolves during the healing process.
- ***Spinal Shock*** occurs initially following a severe injury to the spinal cord. During this time, spinal cord functioning is depressed. At first, all reflexes below the level of injury are lost. Gradually, depending on the injury, some of this function may return.
- Loss of the anal reflex or bulbocavernosus reflex is the hallmark of spinal shock.
- Autonomic function (vasoconstriction and shivering) is also lost at the level of injury and below.
- The completeness of the SCI is indeterminable until spinal shock state abates. Therefore, until ***Spinal shock*** resolves, it is impossible to determine the extent of the spinal cord injury
- Return of the anal or bulbocavernosus reflex indicates the resolution of spinal shock, which usually occurs hours to weeks postinjury.
- The flaccidity of spinal shock is slowly replaced with spasticity and hyperreflexia in most patients.



59