GASTROINTESTINAL SYSTEM

DEFINITION

- 23-26 foot long pathway that the:
  - Mouth
  - Esophagus
  - Stomach
  - Small intestines
  - Large intestines
  - Rectum
  - Anus

ESOPHAGUS

- Located in the mediastinum, anterior to the spine and posterior to the trachea
- Approximately 25cm in length
- Tube connecting the mouth to the stomach

STOMACH

- Distensible pouch into which the food bolus passes to be ingested by gastric enzymes
- Hollow muscular organ with a capacity of approximately 1500mL
- Stores food during eating

SMALL INTESTINE

- Longest segment of the GI tract where the process of absorption of nutrients takes place
- Consisting of three parts:
  - Duodenum
  - Jejunum
  - Ileum

LARGE INTESTINE

- The portion of the GI tract into which waste material from the small intestine passes as absorption continues and elimination begins
- Consists of several parts:
  - Ascending colon
  - Transverse colon
  - Descending colon
  - Sigmoid colon
  - Rectum

FUNCTIONS OF THE DIGESTIVE SYSTEM

Digestion

- Occurs when digestive enzymes and secretions mix with ingested food and when proteins, fats and sugars are broken down into their component smaller molecules**.**

Absorption

- Occurs when small molecules, vitamins, and minerals pass through the walls of the small and large intestine and into the bloodstream

Elimination

- Occurs after digestion and absorption, when waste products are evacuated from the body
- **Chewing and swallowing**
  - 1st process of digestion
  - Approximately 1.5 L of saliva is secreted daily from the parotid, the submaxillary, and the sublingual glands
  - Salivary amylase
    - ✓ Is an enzyme that begins the digestion of starches
  - Swallowing begins as a voluntary act that is regulated by the swallowing center in the medulla oblongata of the central nervous system.
- **Gastric Function**
  - Secretes highly acidic fluid in response to the presence of anticipated ingestion of food (hydrochloric acid)
  - Intrinsic Factor
    - ✓ Secreted by the gastric mucosa, combines w/ dietary vitamin B12
  - Pepsin
    - ✓ An important enzyme for protein digestion.

- ✓ End-product of the conversion of pepsinogen from the chief cells.
- Food remains in the stomach for variable length of time, from 30 minutes to several hours, depending on the:
  - ✓ Volume
  - ✓ Osmotic pressure
  - ✓ Chemical composition of the gastric contents.

❖ **Small Intestine Function**

- Secretions contain digestive enzymes:
  - ✓ **Amylase**
    - ➢ Aids in digesting starch
  - ✓ **Lipase**
    - ➢ Aids in digesting fats
  - ✓ **Trypsin**
    - ➢ Aids in digestion of protein
  - ✓ **Bile**
    - ➢ Secreted by the liver and stored in the gallbladder
    - ➢ Aids in emulsifying ingested fats
    - ➢ Making them easier to digest and absorb.
- Intestinal secretions total approximately 1L/day of pancreatic juice, 0.5 L/day of bile, and 3 L/day of secretions from the glands of small intestine.
- Two types of contractions occur regularly in the small intestines:

✓ **Segmentation contractions**

➢ Produce mixing waves that move the intestinal contents back and forth in a churning motion.

✓ Intestinal peristalsis

➢ Propels the contents of the small intestine toward the colon

❖ **Colonic Function**

- Bacteria assist in completing the breakdown of waste material, especially of undigested or unabsorbed pro and bile salts.
- The slow, weak peristaltic activity along the tract allows for efficient reabsorption of water and electrolytes, which is the primary purpose of the colon.
- Intermittent, strong peristaltic waves propel the contents and eventually reach the rectum, usually in about 12 hours

❖ **Physical examination:**

- Inspection
- Auscultation
- Percussion
- Palpation

❖ **Order of Palpation**

- Right Lower Quadrant
- Right Upper Quadrant
- Left Upper Quadrant
- Left Lower Quadrant

❖ **Right Hypochondriac**

- Right lobe of the liver
- Gallbladder
- Part of the duodenum
- Hepatic flexure of colon
- Upper half of the right kidney
- Suprarenal gland

❖ **Epigastric**

- Aorta
- Pyloric end of stomach
- Pancreas
- Part of live

❖ **Left hypochondriac**

- Stomach
- Spleen

- Tail of pancreas
- Splenic flexure of the colon
- Upper half of the left kidney
- Suprarenal gland

❖ **Right Lumbar**
- Ascending colon
- Lower half of right kidney
- Part of duodenum and jejunum

❖ **Umbilical**
- Omentum
- Mesentery
- Lower part of duodenum
- Part of jejunum and ileum

❖ **Right Inguinal**
- Cecum
- Appendix
- Lower end of the ileum
- Right ureter
- Right spermatic cord
- Right ovary

❖ **Hypogastric**
- Ileum
- Bladder (if enlarged)
- Uterus (if enlarged)

❖ **Left Inguinal**
- Sigmoid colon
- Left ureter
- Left spermatic cord
- Left ovary

Diagnostic Studies

UPPER GI SERIES

❖ Delineates the entire GI tract after the introduction of a contrast agent (Barium swallow)
❖ Enables the examiner to detect or exclude anatomic or functional derangement of the upper GI organs or sphincters.
❖ Also aids in the diagnosis of ulcers, varices, tumors, regional enteritis, and malabsorption syndromes

Nursing Interventions:
- Clear liquid diet with NPO from midnight the night before the study.
- Smoking, chewing gum, and mints can stimulate gastric motility, so the nurse advises against these practices
- Increase fluid intake to facilitate evacuation of stool and the radiopaque liquid
- Typically, oral medications are withheld on the morning of the study and resumed that evening, but each patient's medication regimen is evaluated on an individual basis

LOWER GI SERIES

❖ Visualization of the lower GI tract
❖ With introduction of barium enema
❖ The procedure usually takes about 15 to 30 minutes, during which time x-ray images are obtained
❖ The patient must be assessed for allergy to iodine or contrast agent.

Nursing Interventions:
- Emptying and cleansing the lower bowel prior to the procedure
- Low residue diet 1 to 2 days before the test
- Clear liquid diet, NPO after midnight; and cleansing enemas until returns are clear the following morning.
- Laxative is given before and after the procedure.
- Increased fluid intake after the procedure.
- Evaluation of bowel movement for evacuation of barium

ESOPHAGO-GASTRO-DUODENOSCOPY (EGD)

- Direct visualization
  - Esophageal
  - Gastric
  - Duodenal mucosa through a lighted endoscope
- After the patient is sedated, the endoscope is lubricated with a water-soluble lubricant and passed smoothly and slowly along the back of the mouth and down into the esophagus
- The procedure usually takes about 30 minutes.
- The patient may experience:
  - Nausea
  - Gagging
  - Choking
- Use of topical anesthetic agents and moderate sedation makes it important to monitor and maintain the patient's oral airway during and after the procedure.
- Precautions must be taken to protect the scope, because the fiberoptic bundles can be broken if the scope is bent at an acute angle.
- The patient wears a mouth guard to keep from biting the scope.
- **Nursing Interventions**:
  - The patient should be NPO for 8 hours prior to the examination.
  - Before the introduction of the endoscope, the patient is given a local anesthetic gargle or spray.
  - Midazolam (Versed), a sedative that provides moderate sedation and relieves anxiety during the procedure
  - Atropine may be administered to reduce secretions, and glucagon may be administered to relax smooth muscle.
  - The patient is positioned in the left lateral position to facilitate clearance of pulmonary secretions and provide smooth entry of the scope.
  - After gastroscopy, assessment includes
    - ✓ Level of consciousness
    - ✓ Vital signs
    - ✓ Oxygen saturation
    - ✓ Pain level
  - Monitor for signs of perforation
  - ✓ Pain
  - ✓ Bleeding
  - ✓ Unusual difficulty swallowing
  - ✓ Rapidly elevated temperature
  - After the patient's gag reflex has returned, lozenges, saline gargle, and oral analgesic agents may be offered to relieve minor throat discomfort
  - Patients who were sedated for the procedure must remain in bed until fully alert

Endoscopic Retrograde Cholangio-pancreatography (ERCP)

- Visualization of the common bile duct, the Pancreatic, hepatic ducts through the Ampulla of Vater in the duodenum
- Uses the endoscope in combination with X-ray techniques to view the ductal structures of the biliary tracts.

COLONOSCOPY

- Direct visual inspection of the large intestine (anus, rectum, sigmoid, transverse, descending and ascending colon)
- Therapeutically, the procedure can be used to remove all visible polyps with a special snare and cautery through the colonoscope.

LAPAROSCOPY

- Direct visualization of the organs and structures within the abdomen, permitting visualization and identification of any growths, anomalies, and inflammatory processes.
- A pneumoperitoneum (injecting carbon dioxide into the peritoneal cavity to separate the intestines from the pelvic organs) is created

- ❖ Biopsy samples can be taken from the structures and organs as necessary
- ❖ Laparoscopy usually requires general anesthesia and sometimes requires that the stomach and bowel be decompressed

ESOPHAGEAL DISORDERS

GASTROESOPHAGEAL REFLUX DISEASE (GERD)

- ❖ Excessive back-flow of gastric and duodenal contents into the esophagus due to incompetent lower esophageal sphincter
- ❖ Clinical Manifestation:
- Burning sensation in the esophagus (Pyrosis)
- Dyspepsia (Indigestion)
- Dysphagia
- Hypersalivation
- Esophagitis

Note: The symptoms may mimic those of a heart attack. The patient's history aids in obtaining an accurate diagnosis**.**

- ❖ **Diagnostic Procedures**:
  - ✓ Endoscopy or barium swallow Ambulatory 12 to 36 hour esophageal pH monitoring
  - ✓ Bilirubin Monitoring (Bilitec)
- ❖ **Pharmacologic Management**:
  - ✓ **Antacids**- neutralize acid
- ❖ **H2 receptor antagonist**
  - ✓ Decreases amount of HCI produced by stomach by blocking action of histamine on histamine receptors of parietal cells in the stomach
- **Proton Pump Inhibitors**
  - ✓ Decreases gastric acid secretion by slowing the ATPase pump on the surface of the parietal cells
  - ✓ More potent than H2 receptor antagonists
- **Prokinetic agents**
  - ✓ Enhancing colonic transit by increasing propulsive motor activity
- ❖ **Nursing Management:**
  - ✓ Teaching the patient to avoid actions that decrease lower esophageal sphincter pressure or cause esophageal irritation
  - ✓ Low fat diet
  - ✓ Maintain normal body weight
  - ✓ Avoid caffeine, tobacco, beer, milk, and carbonated drinks, spicy foods
  - ✓ Avoid eating/drinking 2hours before bedtime.
  - ✓ Avoid tight fitting clothes
  - ✓ Elevate head of bed on 6 to 8 inches.
  - ✓ Avoid lying after meals
- ❖ **Surgical Management**:
  - ✓ Nissen Fundoplication
  - ✓ Wrapping of a portion of the gastric fundus around the sphincter area of the esophagus.

BARRETT'S ESOPHAGUS

- ✓ A condition in which the lining of the esophageal mucosa is altered.
- ✓ Associated with GERD
- ✓ Reflux causes changes in the lining of the lower esophagus.
- ✓ The cells that are laid to cover the exposed area are no longer squamous in origin
- ✓ Precursor to esophageal cancer
- ❖ **Clinical Manifestation**:
  - ✓ Burning sensation in the esophagus (Pyrosis)
  - ✓ Dyspepsia (Indigestion)
  - ✓ Dysphagia
  - ✓ Hypersalivation
  - ✓ Esophagitis

- ❖ **Diagnostic Procedure**:
  - ✓ Esophagogastroduodenoscopy (EGD)
  - ✓ Biopsy
- ❖ **Management:**
  - **Photodynamic therapy**
  - ✓ Laser thermal ablation; destroy the metaplastic cells
  - **Esophagectomy**
  - ✓ Total resection of the esophagus with removal of the tumor plus a wide tumor-free margin of the esophagus and the lymph nodes the area.

HIATAL HERNIA

- ❖ The opening in the diaphragm through which the esophagus passes becomes enlarged and part of the upper stomach tends to Move up into the lower portion of the thorax.
- ❖ **Types:**
- **Sliding**
  - ✓ Upper stomach and the gastroesophageal junction are slide displaced upward and out of the thorax.
- **Paraesophageal**
  - ✓ All or part of the stomach pushes through the diaphragm beside the esophagus

❖ **Clinical Manifestation**
- Heartburn
- Regurgitation
- Dysphagia
- Sense of fullness after eating or chest pain

❖ **Diagnostic Procedure**:
- Xray studies
- Barium swallow
- Fluoroscopy

❖ **Management:**
- Same pharmacological management with GERD
- Small frequent feedings
- Patient is advised not to recline for 1 hour after eating
- Elevate head of bed
- Surgery is indicated in about 15% of patients.

❖ **Surgical management:**
- Nissen Fundoplication

GASTRITIS

❖ Inflammation of the gastric mucosa

Causes:
- Repeated exposure to irritating agents (e.g. highly seasoned foods)
- Overuse of aspirin and other non-steroidal anti-inflammatory drugs Excessive alcohol intake
- Bile reflux
- Radiation therapy
- Ingestion of strong acid or alkali
- Bacteria (helicobacter pylori)

DUODENAL ULCER	**GASTRIC ULCER**
INCIDENCE -Age 30-60 -80% of peptic ulcers	-usually 50 and over -15% of peptic ulcers
SIGNS, SYMPTOMS, AND CLINICAL FINDINGS	
Hypersecretion of HCI	Normal to hyposecretion of HCI
May have weight gain	Weight loss may occur
Pain occurs 2-3 hrs after meal	Pain occurs ½ -1 hr after meals
Vomiting uncommon	Vomiting common
Hemorrhage less likely than gastric ulcer	Hemorrhage more likely to occur

Melena more common than hematemesis	Hematemesis more common than melena
Relieved by eating	Aggravated by eating
MALIGNANCY POSSIBILITY -rare	-occasionally
RISK FACTORS -alcohol -smoking -stress -H. pylori	-H. pylori -gastritis -alcohol -use of NSAID's -stress

- ❖ **Clinical Manifestation:**
  - Abdominal discomfort
  - Headache
  - Lassitude
  - N/V and hiccupping
  - Heartburn after eating
  - Intolerance to spicy or fatty foods
  - Vitamin deficiency (Vit. B12)
  - Belching
- ❖ **Assessment and Diagnostic:**
  - Achlorhydria or hypochlorhydria (Absence or low levels of HCI)
  - Can be determined by an upper GI series or endoscopy
  - Tissue specimen (Biopsy)
- ❖ **Medical Management**:
  - H2 blockers
  - Antibiotics (Amoxicillin, Clarithromycin)
  - Proton Pump Inhibitors
- ❖ **Surgical Management:**
  - **Gastrojejunostomy**
  - ✓ Anastomosis of jejunum to stomach to detour around the pylorus.
- ❖ **Nursing Management:**
  - Avoidance to gastric irritating agents
  - ✓ Alcohol
  - ✓ Spicy
  - ✓ Fatty foods
  - ✓ Aspirin
  - ✓ NSAID's until symptoms subside.
- Discourage caffeinated beverages.
- Be alert for indicator of hemorrhagic gastritis (hematemesis, tachycardia, hypotension.)
- Notify the physician if signs of hemorrhagic gastritis are present.

PEPTIC ULCER DISEASE

- ❖ Excavation that forms in the mucosa wall of
- ❖ The stomach, in the pylorus, or in the duodenum.
- ❖ Causes:
- Gram-negative bacteria (H. Pylori)
- Excessive secretion of HCL in the
- Stomach due to ingestion of caffeinated beverages, spicy foods, smoking, and alcohol

Zollinger-Ellison Syndrome

- Consists of severe peptic ulcers, extreme gastric hyperacidity, and gastrin-secreting benign or malignant tumors.

Medical Management:

- ❖ **Pharmacologic Therapy**
  - H2 Blockers (Ranitidine, Cimetidine)
  - Antibiotics
  - Proton Pump Inhibitors (Omeprazole)
  - Antacid
  - Cytoprotectants

- ✓ Creates a viscous substance in the presence of gastric acid that forms a protective barrier, binding to the surface of the ulcer, and prevents digestion by pepsin
- ✓ Misoprostol, Sucralfate

❖ **Surgical Management**

- Vagotomy and Pyloroplasty
- ✓ Transecting nerves that stimulate acid secretion and opening the Pylorus
- Billroth I (Gastroduodenostomy)
  - ✓ Removal of the lower portion of the antrum of the stomach (which contains the cells that secrete gastrin) as well as a small portion of the duodenum segment.
  - ✓ Upper portion of stomach anastomosed to duodenum.
- Billroth II (Gastrojejunostomy)
  - ✓ Removal of lower portion (antrum) of stomach with anastomosis to jejunum. A duodenal stump remains and is oversewn.

❖ **Nursing Management**

- Stress reduction and rest
- Smoking cessation
- Dietary modification
- ✓ Avoidance to the food and beverages that irritate the gastric mucosa (alcohol, coffee, milk spicy foods, soft drinks, tea, NSAID's, Aspirin)

DUMPING SYNDROME

❖ It is partially the result of rapid gastric emptying, which prevents adequate mixing with pancreatic and biliary secretions.

❖ It is an unpleasant set of and GI symptoms that sometimes occur in patients who have had gastric surgery or a form of vagotomy.

❖ **Clinical Manifestations:**

- Symptoms occurring 30 minutes after eating
- Nausea and vomiting
- Feelings of abdominal fullness and
- Abdominal cramping
- Diarrhea
- Palpitations and tachycardia
- Perspiration
- Weakness and dizziness
- Borborygmi Sound
- Steatorrhea- "fats in the stool"

❖ **Management:**

- Lie down after meals
- Avoid sugar, salt, and milk
- Take anti-spasmodic medications as prescribed to delay gastric emptying
- Fluid intake with meals is discouraged, instead fluids may be consumed up to 1 hour before or 1 hour after mealtime.
- Meals should contain more dry items than liquid items.
- The patient can eat fat as tolerated but should keep carbohydrate intake low and avoid concentrated sources of carbohydrate

INTESTINAL AND RECTAL DISORDERS

DIVERTICULAR DISEASE

- A sac-like herniation of the lining that of the bowel that extends through a defect in the muscle layer
- Most commonly occur in the sigmoid colon.

❖ **Diverticulosis**

- Multiple diverticula are present w/o inflammation or symptoms

❖ **Diverticulitis**

- Diverticulosis with inflammation
- Results when food and bacteria retained in a diverticulum produce infection.

❖ **Clinical Manifestations**:

- Bowel irregularity with intervals of diarrhea

- Nausea and anorexia
- Bloating or abdominal distention
- Narrow stools
- Increased constipation or at times intestinal obstruction
- Signs and symptoms of infection

❖ **Diagnostic Procedure**:

- Colonoscopy
- Barium enema
- CT Scan (test of choice for diverticulitis, and can also reveal fiber abscesses)
- Abdominal x-rays

❖ **Management:**

- Antibiotics, analgesics and anticholinergics to reduce bowel spasms as prescribed
- An opioid (eg, Meperidine [Demerol]) is prescribed for pain relief.
- Morphine is contraindicated because it can increase intraluminal pressure in the colon, exacerbating symptoms.
- Instruct the client to refrain from lifting, straining, coughing, or bending to avoid increased intra-abdominal pressure
- Diet:
  - ✓ For diverticulosis, soft, high fiber foods are indicated for diverticulosis.
  - ✓ For diverticulitis, a low fiber diet may be necessary until signs of infection decrease.
  - ✓ Monitor for perforation, hemorrhage, fistulas, and abscesses
  - ✓ Avoid gas forming foods

❖ **Surgical Interventions:**

- Colon resection with primary anastomosis
- Temporary or permanent colostomy may be required for increased bowel inflammation

INFLAMMATORY BOWEL DISEASES

CROHN'S DISEASE (REGIONAL ENTERITIS)

❖ Description:

- Subacute and chronic inflammation of the GI tract wall that extends through all layers, (transmural lesion)
- Most common in ileum and colon but can occur anywhere along the GI tract.
- Leads to thickening and scarring, a narrowed lumen, fistulas, ulcerations, and abscesses
- (Classic cobblestone appearance)

❖ **Clinical Manifestation:**

- Fever and leukocytosis
- Cramp-like and colicky pain after meals
- Diarrhea (Semi solid), which may contain mucus or pus
- Abdominal Distention
- Anorexia, nausea, and vomiting
- Weight loss
- Anemia
- Dehydration
- Electrolyte imbalances

ULCERATIVE COLITIS

❖ Recurrent ulcerative and inflammatory disease of the mucosal and submucosal layers of the colon and rectum

Risk Factors:

- Prevalence is highest in Caucasians and Jewish
- NSAIDs exacerbate IBD

Clinical Manifestations:

- Anorexia
- Weight loss
- Diarrhea (10 to 20 liquid stools per day)
- Malaise
- Left lower quadrant abdominal
- Tenderness and cramping
- Rectal Bleeding
- Dehydration and electrolyte imbalances

- Anemia and hypocalcemia
- Vitamin K deficiency

Diagnostic Procedures:

- Colonoscopy
- Sigmoidoscopy
- Barium Enema
- CBC
- Abdominal X-ray
- Stool Examination

Management for Inflammatory Bowel Diseases:

- **Pharmacologic Therapy**
  (Priority: Relieve inflammation.)
  - ✓ **Salicylate Compounds**
    - ➢ Effective for mild or moderate inflammation and are used to prevent or reduce recurrences in long-term maintenance regimens
  - ✓ **Corticosteroids**
    - ➢ Are used to treat severe and fulminant disease and can be administered orally in outpatient treatment or parenterally in hospitalized patients
  - ✓ **Immunosuppressants**
    - ➢ Have been used to alter the immune response. The exact mechanism of action of these medications in treating IBD is unknown
  - ✓ **Anti—diarrheal drugs**
    - ➢ Are used to minimize peristalsis to rest the inflamed bowel. They are continued until the patient's stools approach normal frequency and consistency.
  - ❖ **Nursing Interventions:**
    - NPO status and administer fluids and electrolytes for acute episodes
    - Diet
      - ✓ Low residue
      - ✓ High protein
      - ✓ High calorie diet
      - ✓ Supplemental vitamin therapy
      - ✓ Iron replacement.
    - IV or via parenteral nutrition as prescribed
    - Monitor for bowel perforation, peritonitis, and hemorrhage
    - Avoid gas-forming food
  - ❖ **Surgical Interventions**:
    - Proctocolectomy with permanent ileostomy
      - ✓ An ileostomy, the surgical creation of an opening into the ileum or small intestine (usually by means of an ileal stoma on the abdominal wall), is commonly performed after a total colectomy (ie, excision of the entire colon).
    - Continent Ileostomy (Kock ileostomy)
      - ✓ Creation of a continent ileal reservoir (ie, Kock pouch) by diverting a portion of the distal ileum to the abdominal wall and creating a stoma
    - Restorative Proctocolectomy
      - ✓ Surgical procedure of choice in cases where the rectum can be preserved in that it eliminates the need for a permanent ileostomy. It establishes an ileal reservoir that functions as a "new" rectum, and anal sphincter control of elimination is retained
    - Ileoanal Anastomosis (Ileorectostomy)
      - ✓ Involves connecting the ileum to the anal pouch (made from a small intestine segment), and the surgeon connects the pouch to the anus in conjunction with removing the colon and the rectal mucosa

APPENDICITIS

- ❖ Inflammation of the appendix
- ❖ Appendix
  - Small, fingerlike appendage about 10 cm (4 in) long that is attached to the cecum just below the ileocecal valve.

- ❖ **Risk factors:**
  - Between the ages of 10 and 30 years
- ❖ **Causes:**
  - Kinked or occluded by a fecalith
  - Tumor
  - Foreign body
- ❖ **Clinical Manifestations:**
  - Vague epigastric or periumbilical pain
  - Right lower quadrant pain (ie, parietal pain that is sharp, discrete, and well localized)
  - Low-grade fever
  - Nausea and Vomiting
  - Loss of appetite
  - Rebound tenderness (ie, production or intensification of pain when pressure is released)
  - **Rovsing's sign** may be elicited by palpating the left lower quadrant; this paradoxically causes pain to be felt in the right lower quadrant
- ❖ **Diagnostic Procedures:**
  - Complete blood cell count- Increase WBC
  - Abdominal x-ray films
  - Ultrasound studies
  - CT scans- right lower quadrant density
  - Pregnancy test- to rule out ectopic pregnancy
- ❖ **Complications:**
  - Perforation of the appendix
  - Peritonitis
  - Abscess formation (collection of purulent material)
  - Portal pylephlebitis- septic thrombosis of the portal vein caused by vegetative emboli that arise from septic intestines
- ❖ **Pharmacologic Management**
  - IV fluids are administered
  - Antibiotic therapy to prevent infection
  - Morphine sulfate: prescribed to relieve pain.
- ❖ **Surgical Management**
  - Appendectomy (ie, surgical removal of the appendix) is performed as soon as possible to decrease the risk of perforation
    - ✓ Low abdominal incision (laparotomy)
    - ✓ Laparoscopy
  - Perforation- place a drain in the abscess
- ❖ **Nursing Management:**
  - Post-operatively, the nurse places patient in a high- Fowler's position.
    - ✓ Reduces the tension on the incision and abdominal organs, helping to reduce pain.
- Discharge teachings:
  - ✓ Have the surgeon remove the sutures between the 5th and 7th days after surgery.
  - ✓ Incision care
  - ✓ Heavy lifting is to be avoided postoperatively
  - ✓ Normal activity can usually be resumed within 2 to 4 weeks.

HEMORRHOIDS

- ❖ Dilated portions of veins in the anal canal.
- ❖ **Causes:**
  - 50 years of age
  - Shearing of the mucosa during defecation
  - Increased pressure in the hemorrhoidal tissue due to pregnancy
- ❖ Types:
  - Internal hemorrhoids
    - ✓ Above the internal sphincter
  - External hemorrhoids
    - ✓ Appearing outside the external sphincter

- **Clinical manifestations**:
  - Itching
  - Pain
  - Bright red bleeding
  - External hemorrhoids severe pain from the inflammation and edema caused by thrombosis
  - Internal hemorrhoids are not usually painful until they bleed or prolapse when they become enlarged.
- **Pharmacologic Management**:
  - Hydrophilic bulk-forming agents (Psyllium)
  - Analgesic ointments and suppositories
  - Astringents (eg, witch hazel)
- **Non-Surgical & Surgical Management**:
  - Infrared photocoagulation
  - Bipolar diathermy
  - Laser therapy
  - Injection of sclerosing agents
  - Rubber-band ligation procedure
  - Cryosurgical hemorrhoidectomy
  - Hemorrhoidectomy
- **Nursing Management:**
  - Good personal hygiene
  - Avoiding excessive straining during defecation
  - High-residue diet that contains fruit and bran
  - Increase fluid intake
  - Warm compresses/Sitz baths
  - Bed rest

HEPATOBILIARY SYSTEM

- **Liver**
  - Largest gland of the body
  - Divided into four lobes
    - ✓ Left
    - ✓ Right
    - ✓ Caudate
    - ✓ Quadrate
  - Contains several cell types, including hepatocytes and Kupffer's cells
  - Regulating blood glucose level by
  - Making glycogen, which is stored in hepatocytes
  - Converting ammonia produced from gluconeogeneticby-products and bacteria to urea
- **Gall Bladder**
  - Pear-shaped organ attached to the liver under the right lobe.
  - Normally holds 30-50m1 of bile and can hold up to 70 ml when fully distended
- **Pancreas**
  - A slender, fish-shaped organ, that lies horizontally in the abdomen behind the stomach and extends roughly from the duodenum to the spleen
  - Endocrine and exocrine functions Has pancreatic juice:
    - ✓ Amylase
    - ✓ Lipase
    - ✓ Trypsin

DISORDERS OF THE LIVER, GALLBLADDER, AND PANCREAS

HEPATITIS

- Inflammatory disorder of the liver parenchyma
- Occurring in Hepatitis A, B, C, D, E, and toxic or drug-induced hepatitis
- Hepatocellular damage results from the body's immune response to the virus or toxin and is characterized by diffuse inflammatory infiltration with local necrosis

- **Clinical Manifestation:**
  - **Pre-Icteric Stage**

- ✓ Earliest symptoms are not specific
- ✓ Flu-like symptoms
- ✓ Malaise
- ✓ Fatigue
- ✓ Headache
- ✓ Myalgias
- ✓ Anorexia
- ✓ Nausea & vomiting
- ✓ Diarrhea

- **Icteric Stage**
  - ✓ Few days to weeks after pre-icteric stage
  - ✓ Jaundice
  - ✓ Dark-colored urine
  - ✓ Light-colored stool
  - ✓ Steatorrhea
  - ✓ Enlarged liver

Viral hepatitis	Mode of transmission	Incubation	Outcome
Hepatitis A	Fecal-oral route	In: 15-50 days	Usually mild with recovery
Hepatitis B	Parenterally; perinatal: sexual	In: 28-160 days	May be severe
Hepatitis C	Blood transfusion: sexual transmission	In: 15-160 days	Frequent occurrence of chronic hepatic cancer carrier state and chronic liver disease.
Hepatitis D	Same as HBV	In: 21-140 days	Similar to HBV but greater likelihood of carrier state
Hepatitis E	Fecal-oral route	In: 15 to 65 days	Similar to HAV except very severe in pregnant women

- Post- Icteric Stage
- ✓ Convalescent stage lasting a few weeks
- ✓ Fatigue decreases
- ✓ Appetite returns

❖ **Diagnostic Procedures:**
- Liver function test results are elevated
- Serum bilirubin level is increased
- Urinalysis reveals increased bilirubin levels

❖ Management:
- Administer prescribed medications, which may include:
  - ✓ Immunoglobulins
  - ✓ Immunizations
  - ✓ Antiviral
- Prevent transmission of infection
- Promote adequate rest without complications
- Encourage proper nutrition

LIVER CIRRHOSIS

❖ Chronic liver disease marked by diffuse destruction and fibrotic regeneration of hepatic cells
❖ Classifications:
- Laennec's Cirrhosis
  - ✓ Commonly caused by alcoholism and
  - ✓ Chronic nutritional deficiencies
- Biliary cirrhosis
  - ✓ Caused by bile duct disorders that suppress bile flow
- Post- hepatic cirrhosis
  - ✓ Caused by various types of hepatitis

❖ **Clinical Manifestation:**
- Enlarged, firm liver
- Chronic dyspepsia
- Constipation or diarrhea

- Gradual weight loss
- Ascites
- Splenomegaly
- Spider telangiectasis
- Caput Medusae
  - ✓ Dilated abdominal blood vessels
- Portal Hypertension
- Mental deterioration

❖ **Laboratory and Diagnostic Findings**:
- Liver biopsy
- Liver Scan
- Liver function test (ALT, AST)
- Serum protein levels
- Prothrombin time

❖ **Management:**
- Administer diuretics to decrease ascites.
- Promote adequate nutrition (Vitamins and nutritional supplements promote healing of damaged liver cells.)
- Prevent threats to skin integrity
- Minimize risk of bleeding
  - ✓ Antacid/ H2 antagonist to minimize possibility of GI bleeding
- Limit visitors, and orient the client to date, time, and place
- Avoid drinking alcoholic beverages Institute safety measures, such as raising side rails and assisting with ambulation
- **Diet:**
  - ✓ Early Phase: High protein diet- to promote healing of the liver
  - ✓ Late Phase: Low protein diet- to decrease ammonia levels in the

PORTAL HYPERTENSION

❖ Elevated pressure in the portal vein associated with increased resistance to blood flow through the portal venous system

❖ Obstruction of portal venous flow through the liver lead to:
- Formation of esophageal, and hemorrhoidal varicosities due to
  - ✓ Increased venous pressure
  - ✓ Accumulation of fluid in the abdominal cavity

❖ **Clinical Manifestation:**
- Ascites
- Rapid weight gain
- Shortness of breathing
- Fluid wave on abdominal percussion
- Liver dullness
- Dilated abdominal vessels radiating from umbilicus (caput medusa)
- Enlarged, palpable spleen
- Fluid and electrolyte imbalance

❖ **Management:**
- Bed rest
- Administering medications which may include diuretics
- Measure & record abdominal girth & body weight daily
- Promote measures to prevent or reduce edema
- Assist the health care provider with paracentesis
- Monitor serum ammonia and electrolyte levels.

ESOPHAGEAL VARICES

❖ Hemorrhagic process involving dilated, tortuous veins in the submucosa of the lower esophagus

❖ Caused by portal hypertension

❖ **Clinical Manifestations:**
- Hematemesis and melena
- Massive hemorrhage occurs

- Signs of hepatic encephalopathy
- Dilated abdominal veins
- Ascites
- History of Alcohol Abuse

❖ **Diagnostics:**
- Endoscopy
- Lab. Tests: ALT, AST,Bilirubin (increased)
- Portal Hypertension Measurements

❖ **Management:**
- Assess for ecchymosis, epistaxis, petechiae, and bleeding gums
- Monitor level of consciousness, vital signs, and urinary output to evaluate fluid balance
- Monitor the client during blood transfusion
- Provide nursing care for the client undergoing prescribed tamponade to control bleeding balloon
  - ✓ Sengstaken-Blakemore Tube
  - ✓ Four openings:
    - ➢ Gastric aspirations
    - ➢ Esophageal aspiration
    - ➢ Gastric balloon inflation
    - ➢ Esophageal balloon inflation
  - ✓ Instrument at the bedside- Scissors (Cut the tube in case of respiratory distress.)
  - ✓ The patient being treated with balloon tamponade must remain under close observation in the ICU because of the risk of serious take complications. Precautions must be taken to ensure that the patient not pull on or inadvertently displace the tube.

- **Vasopressin**- initial mode of therapy
- **Sclerotherapy**
  - ✓ After treatment for acute hemorrhage, the patient must be observed for bleeding, perforation of the esophagus, aspiration pneumonia, and esophageal stricture
- **Variceal Band Ligation**
  - ✓ A modified endoscope loaded with an elastic rubber band is passed through a band directly onto the varix (or varices) to be banded.
  - ✓ Complications:
    - ➢ Superficial ulceration
    - ➢ Dysphagia
    - ➢ Transient chest discomfort
    - ➢ Esophageal strictures

HEPATIC ENCEPHALOPATHY

❖ Neurologic syndrome that develops as a complication of liver disease
❖ It may be acute and self –limiting and progressing or chronic
❖ Incidence is similar to cirrhosis

Due to:
- Severe liver damage
- Hepatocellular failure

❖ Increased serum ammonia levels from:
- GI bleeding
- High-protein diet
- Bacterial growth in the intestine Uremia

❖ **Pathophysiology**:

Hepatic Insufficiency
↓
Inability to detoxify toxic by-products of metabolism (ammonia)
↓
Ammonia enters the brain
↓

Excites peripheral benzodiazepine-type receptors on astrocyte cells
↓
Stimulates GABA
↓
Depression of Central Nervous System
↓
Encephalopathy

❖ **Clinical Manifestations:**
- Neurological dysfunction progressing from minor mental aberrations and motor disturbances to coma
- **Flapping tremors/Liver flap (Asterixis)**
  - ✓ The patient is asked to hold the arm out with the hand held upward (dorsiflexed). Within a few seconds, the hand falls forward involuntarily and then quickly returns to the dorsiflexed position.
- **Fetor hepaticus**
  - ✓ A sweet, slightly fecal odor to the breath that is presumed to be of intestinal origin,
- **Constructional Apraxia**
  - ✓ Deterioration of handwriting and inability to draw a simple star figure occurs with progressive hepatic encephalopathy.
- Serum ammonia level is elevated
- Serum bilirubin level is elevated
- Prothrombin time is prolonged

❖ **Management:**
- Administer prescribed medications which may include laxatives (Lactulose)
  - ✓ Ammonia is kept in the ionized state, resulting in a decrease in colon pH
  - ✓ Evacuation of the bowel takes place, which decreases the ammonia absorbed from the colon
  - ✓ The fecal flora are changed to organisms that do not produce ammonia from urea
- Administer antibiotics (Neomycin)
  - ✓ Reduce levels of ammonia-forming bacteria in the colon
- Closely monitor neurologic status for any changes
- Evaluate serum ammonia values daily
- Monitor for signs of impending coma.
- Reduce or eliminate the client's dietary protein intake if you detect evidence of impending coma.
- Monitor the client closely, and administer a conservative dose of prescribed sedative or analgesic medication, because liver damage alters drug metabolism.

GALL BLADDER DISORDERS

❖ **Risk Factors:**
- Obesity
- Women especially who have had
- Multiple pregnancies or who are of Native American or U.S. Southwestern Hispanic Ethnicity
- Frequent changes on weight
- Rapid weight loss
- High dose estrogen
- Ileal resection or disease
- Cystic Fibrosis
- Diabetes mellitus

❖ **Cholelithiasis**
- Formation of calculi in the gallbladder
- **Causes:**
  - ✓ Result from changes in bile components or bile stasis, which may be associated with such factors as infection, cirrhosis, and pancreatitis

❖ **Cholecystitis**
- Acute or chronic inflammation of the gallbladder
- **Causes**

- ✓ Obstruction of the cystic duct by impacted gallstone
- ✓ Tissue damage due to trauma, massive burns, or surgery
- ✓ Gram-negative septicemia
- ✓ Overuse of opioid analgesics

❖ **Clinical manifestations:**

- **Cholelithiasis**
  - ✓ Episodic, cramping pain in the RUQ of the abdomen or the epigastrium, possibly radiating to the back near the right scapular tip
  - ✓ Nausea and vomiting
  - ✓ Fat intolerance
  - ✓ Fever and leukocytosis
  - ✓ Jaundice
  - ✓ Epigastric distress

❖ **Cholecystitis**

- ✓ Biliary colic
- ✓ Tenderness and rigidity in the RUQ elicited on palpation
- ✓ Murphy's sign- Pain on taking a deep breath when the examiner's fingers are on the approximate location of the gallbladder.
- ✓ Fever
- ✓ Nausea and vomiting
- ✓ Fat intolerance
- ✓ Heart burn
- ✓ Flatulence
- ✓ Vitamin deficiency

❖ **Diagnostic Tests:**

- **Abdominal X-ray**
- **Ultrasonography**- diagnostic procedure
- of choice
- **Cholescintigraphy**- radioactive agent is administered intravenously
- **Cholecystography**- iodide containing contrast agent is administered before xray
- **Endoscopic Retrograde**
- **Cholangiopancreatography (ERCP)**
  - ✓ Permits direct visualization of structures that previously could be seen only during laparotomy
  - ✓ A fiberoptic duodenoscope, with side-viewing apparatus is inserted into the duodenum. The ampulla of Vater is catheterized, and the biliary tree is injected with contrast agent

❖ **Management:**

- Pharmacologic Management

✓ Ursodeoxycholic acid (UDCA [URSO, Actigall]) - dissolve small radiolucent gall stone
✓ Administer prescribed medication, which may include analgesic {morphine sulfate} and antacids

- **Nutritional therapy**
  - ✓ Low-fat liquids
  - ✓ High in protein and carbohydrates

- **Non-surgical Approach**

✓ Intra-corporeal Lithotripsy
➢ Stones in the gallbladder or common bile duct may be fragmented by means of laser pulse technology
✓ Extracorporeal Shockwave Lithotripsy
➢ Non-invasive procedure; uses repeated shock waves directed at the gallstones in the gallbladder or common bile duct to fragment the stones.

- **Surgical Approach**

✓ **Laparoscopic Cholecystectomy**
➢ Performed through a small incision or puncture made through the abdominal wall at the umbilicus
✓ **Cholecystectomy**
➢ Gall bladder is removed through an abdominal incision after the cystic duct and artery are ligated.
➢ A drain is placed close to the gall bladder if there is a bile leak, removed after 24 hours
➢ Bile duct injury-serious complication
✓ **Choledochostomy**
➢ Making an incision in the common bile duct for removal of stones.

- **Maintaining skin integrity and Promoting Biliary Drainage**
  - ✓ If bile is not draining properly, an obstruction is probably causing the bile to be forced back into the liver or bloodstream
  - ✓ To prevent loss of bile, the physician may want the drainage tube or collection receptacle elevated above the level of the abdomen
  - ✓ Every 24 hours, the nurse measures the bile collected and records the amount, color and character of drainage.
  - ✓ After several days of drainage, the tube may be clamped for 1 hour before and after each meal to deliver bile to the duodenum to aid in digestion
  - ✓ Within 7 to 14 days, the drainage tube is removed.

ACUTE PANCREATITIS

- ❖ Self- digestion of the pancreas by its own proteolytic enzymes, principally trypsin
- ❖ Inflammation of the pancreas ranging from a relative mild, self-limiting disorder to rapidly fatal, acute hemorrhagic pancreatitis
- ❖ Cause
  - ✓ Alcoholism
  - ✓ Cholecystitis
  - ✓ Surgery involving or near the pancreas
- ❖ **Clinical Manifestation:**
  - Abdominal Tenderness with back pain
  - GI problems, such as nausea, vomiting, diarrhea, and steatorrhea
  - Fever
  - Jaundice
  - Mental confusion
  - Flank or umbilical bruising
  - Hypotension
  - Signs of hypovolemia
  - Internal bleeding:
  - ✓ Cullen's sign- bluish discoloration around the umbilicus
  - ✓ Turner's sign- discoloration lateral of the trunk or posteriorly
- ❖ **Diagnostic Tests:**
  - Elevated amylase
  - Lipase
  - Increase WBC Levels
  - Hypocalcemia
- ❖ **Management:**
- Administer prescribed medications, which include opioid or non-opioid analgesics histamine receptor antagonist proton pump inhibitors
- Drug of Choice for pain: Morphine sulfate
- The client should avoid oral intake to inhibit pancreatic stimulation and secretion of pancreatic enzymes
- Maintain fluid and electrolyte balance
- Promote adequate nutrition

CHRONIC PANCREATITIS

- ❖ Progressive pancreatic inflammation resulting in permanent structural damage to pancreatic tissue
- ❖ Results from repeated episodes of acute pancreatitis
- ❖ More than half of chronic pancreatitis cases are associated with alcoholism
- ❖ Long term alcohol consumption causes hypersecretion of protein in pancreatic secretions, resulting in protein plugs and calculi within the pancreatic ducts.
- ❖ **Clinical Manifestations:**
  - Recurring attacks of severe upper abdominal and back pain
  - Weight loss
  - Steatorrhea
  - ✓ Stools become frequent, frothy, and foul-smelling because of impaired fat digestion, which results in stools with a high fat content
  - Anorexia

- ❖ **Assessment and Diagnostics:**
  - Serum lipase and amylase elevated
  - WBC elevated
  - Endoscopic retrograde
  - Cholangiopancreatography
    - ✓ Detects pancreatic calcification
- Glucose tolerance test values are abnormal
- ❖ **Management:**
  - Administer prescribed medications, which include pancreatic enzymes,
  - Non-opioid pain medications, antacids, histamine receptor antagonist, and proton-pump inhibitors
  - Provide symptomatic treatment focusing on relieving pain, promoting comfort, and treating new attacks
  - Emphasize the importance of avoiding alcohol, caffeine, and foods that tend to cause abdominal discomfort
  - Manage any endocrine insufficiency such as Diabetes Mellitus, by initiating dietary and insulin or oral hypoglycemic therapy.
- ❖ **Surgical Management:**
  - Pancreatic jejunostomy (Roux-en-Y)
    - ✓ Joining of the pancreatic duct to the jejunum.
    - ✓ Allows drainage of the pancreatic duct to the jejunum.
  - A Whipple resection (pancreaticoduodenectomy)
    - ✓ Can be carried out to relieve the pain of chronic pancreatitis

PERITONITIS

- ❖ Inflammation of the peritoneum, the serous membrane lining the abdominal cavity and covering the viscera.
- ❖ Cause:
  - Bacterial infection
  - Injury or trauma
  - Inflammation that extends from an organ outside the peritoneal area
  - Appendicitis
  - Perforated ulcer
  - Diverticulitis
  - Bowel perforation
  - Abdominal surgical procedures
  - Peritoneal dialysis
- ❖ **Clinical manifestations:**
  - Diffuse pain, becomes constant localized and more intense on the site of maximal peritoneal irritation
  - Muscles become rigid and tender
  - Rebound tenderness
  - Paralytic ileus
  - Anorexia
  - Nausea and vomiting
  - Pyrexia
  - Increased pulse rate
- ❖ **Diagnostic Findings:**
  - Increase WBC
  - Altered levels of Potassium, Sodium and Chloride
  - Abdominal Xray- distended bowel loops
- ❖ **Management:**
  - Fluid, colloid, replacement
  - Analgesics are prescribed for pain
  - Antiemetics
  - Intestinal intubation and suction
    - ✓ Relieves abdominal distention and promotes intestinal function
  - Oxygen therapy by nasal cannula or mask
  - Antibiotic therapy
- ❖ **Surgical Management**

- Removing the infected area
  - Excision (ie, appendix)
  - Resection (ie, intestine)
- Correcting the cause
  - Repair (ie, perforation)
  - Drainage (ie, abscess).

❖ **Nursing Management**

- Positioning the patient for comfort are helpful in decreasing pain
- Patient is placed on the side with knees flexed- decreases tension on the abdominal organs
- Drains are frequently inserted during the surgical procedure.
- Prevent dislodging of the drain