



Adult Health Nursing-I

Medical Surgical Nursing

Comprehensive Coverage of

- Intraoperative Care
- Nursing Care of Patients with Common Signs and Symptoms and Management
- Nursing Management of Patients with Respiratory Problems
- Nursing Management of Patients with Disorders of Digestive System
- Nursing Management of Patients with Cardiovascular Problems
- Nursing Management of Patients with Disorders of Blood
- Nursing Management of Patients with Disorders of Endocrine System
- Nursing Management of Patients with Disorders of Integumentary System
- Nursing Management of Patients with Musculoskeletal Problems
- Nursing Management of Patients with Communicable Diseases



As per the Revised INC Syllabus for BSc Nursing

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1. Introduction.....1

- Evolution and Trends of Medical and Surgical Nursing 1
- International Classification of Diseases 3
- Roles and Responsibility of a Nurse in Medical and Surgical Settings 5
- Introduction to Medical and Surgical Asepsis 9
- Inflammation 17
- Immunity 19
- Wound 19
- Care of Surgical Patient 22
- Nursing Management of Postoperative Patient 25

2. Intraoperative Care 39

- Organization and Physical Setup of the Operation Theater 39
- Staffing in Operation Theater 44
- Position and Draping for Common Surgical Procedures 46
- Draping 50
- Disinfection and Sterilization of Equipment 59
- Operation Theater Attire 62
- Monitoring the Patient during the Procedures 64
- Maintenance of the Therapeutic Environment in OT 68
- Assisting in Major and Minor Operation, Handling Specimen 68
- Suture 69
- Prevention of Accidents and Hazards in OT 70
- Anesthesia 74
- American Society of Anesthesiologists Physical Status Classification 78
- Characteristics of Ideal Anesthetic Agents and Adjuncts 78
- Factors Influencing the Development of Postoperative Problems 78
- Complications during Intraoperative Period 78
- Legal Aspects in OT 79

3. Nursing Care of Patients with Common Signs and Symptoms and Management..... 81

- Fluid and Electrolyte Imbalance 81
- Dehydration 85
- Vomiting 88
- Dyspnea 92
- Cough 94
- Respiratory Obstruction 95
- Hemoptysis 101
- Fever 103
- Shock 106
- Unconsciousness 114
- Syncope 115
- Pain 118
- Incontinence 123
- Edema 127

4. Nursing Management of Patients with Respiratory Problems 133

- Review of Anatomy and Physiology of the Respiratory System 133
- Respiratory Assessment 134
- Upper Respiratory Tract Infections 140
- Pharyngitis 141
- Laryngitis 142
- Tonsillitis 144
- Sinusitis 145
- Chronic Obstructive Pulmonary Disease 147
- Chronic Bronchitis 149
- Emphysema 150
- Pleural Effusion 153
- Empyema 157
- Bronchiectasis 159
- Pneumonia 163
- Lung Abscess 167
- Asthma 170
- Atelectasis 174
- Pneumothorax 175
- Pulmonary Embolism 178
- Tuberculosis 181
- Common Terms used in Treatment of TB 183
- Respiratory Failure 185
- Chest Physiotherapy 192
- Mechanical Ventilation 195
- Oxygen Therapy 197

5. Nursing Management of Patients with Disorders of Digestive System 202

- Review of Anatomy and Physiology of GIT System 202
- Gastrointestinal System Assessment 204
- Barium Swallow and Barium Meal 207
- pH Monitoring Test 210
- Colonoscopy 211
- Barium Enema 213
- Dental Caries 215
- Gingivitis 217
- Oral Sub-mucous Fibrosis 218
- Leukoplakia 219
- Esophagitis 221
- Esophageal Obstruction 225
- Esophageal Bleeding 225
- Pyloric Stenosis 231
- Gastric Cancer 233
- Peptic Ulcer Disease 244
- Gastrointestinal Perforation 249
- Cirrhosis of Liver 250
- Portal Hypertension 256
- Hepatic Failure 258
- Hepatic Tumor 266
- Pancreatitis 267

- Biliary Obstruction 271
- Gallbladder Stone 275
- Intestinal Obstruction 280
- Appendicitis 287
- Peritonitis 291
- Malabsorption Syndrome 294
- Hernia 297
- Hemorrhoid 303
- Fissures 307
- Fistula in Ano 308
- Anal Malignant Lesions 308
- Ulcerative Colitis 309
- Gastric Decompression 315
- Gavage 315
- Stoma Care 318

6. Nursing Management of Patients with Cardiovascular Problems..... 327

- Review of Anatomy and Physiology of Cardiovascular System 327
- Assessment of Cardiovascular System 330
- Hypertension 333
- Hypertensive Crisis 337
- Hypotension 337
- Ischemic Heart Disease 339
- Atherosclerosis 339
- Coronary Artery Disease 341
- Angina Pectoris 341
- Myocardial Infarction 344
- Raynaud's Phenomenon 350
- Aneurysm 351
- Peripheral Artery Disease 354
- Varicose Veins 355
- Cardiac Arrhythmia 357
- Heart Block 358
- Venous Thrombosis 363
- Deep Vein Thrombosis 363
- Congestive Cardiac Failure 365
- Cor Pulmonale 375
- Nursing Process for Critically Ill Patients 376
- Cardiac Tamponade 380
- Cardiogenic Shock 381
- Sudden Cardiac Death 383
- Cardiac Arrest 383
- Aortic Regurgitation 384
- Aortic Stenosis 386
- Atrial Septal Defect 387
- Atrioventricular Canal Defect 387
- Cardiopulmonary Resuscitation 388
- Cardiomyopathy 392
- Coarctation of Aorta 394
- Mitral Valve Stenosis 396
- Patent Ductus Arteriosus 397
- Ventricular Septal Defect 398
- Congenital Heart Disease 398
- Ebstein's Anomaly 399
- Eisenmenger's Syndrome 400
- Transposition of Great Artery 401
- Tetralogy of Fallot 401
- Endocarditis 402
- Mitral Regurgitation 403
- Myocarditis 404
- Pericarditis 406

- Rheumatic Heart Disease 407
- Thrombolytic or Fibrinolytic Therapy 410
- Cardiac Defibrillation and Cardioversion 411
- Pacemaker 412
- Cardiac Catheterization 414
- Percutaneous Coronary Intervention 415
- Intra-Aortic Balloon Pump (IABP) 417
- Cardiac Transplantation 418

7. Nursing Management of Patients with Disorders of Blood 421

- Anatomy and Physiology of Blood 421
- Assessment of the Hematologic System 424
- Anemia 426
- Polycythemia 436
- Disseminated Intravascular Coagulation 438
- Leukemia 441
- Leukocytosis 444
- Leukopenia 444
- Agranulocytosis 445
- Thalassemia 447
- Thrombocytopenia 449
- Lymphoma 452
- Myeloma 454
- Chemotherapy 455
- Bone Marrow Transplantation 457
- Blood Transfusion 459
- Case Scenarios 464
- Organ Donation 465
- Eye Donation 466

8. Nursing Management of Patients with Disorders of Endocrine System 468

- Review of Anatomy and Physiology of Endocrine System 468
- Endocrine Assessment 470
- Diabetes Mellitus 475
- Diabetes Insipidus 489
- Hyperthyroidism 491
- Goiter 493
- Hypothyroidism 494
- Adrenal Tumors 496
- Pituitary Tumor 497

9. Nursing Management of Patients with Disorders of Integumentary System 503

- Review of Anatomy and Physiology of Skin 503
- Nursing Assessment—History and Physical Assessment 503
- Dermatitis 504
- Dermatoses 508
- Acne Vulgaris 509
- Pemphigus 513
- Psoriasis 514
- Melanoma 518
- Alopecia 519
- Hair Transplant 519

10. Nursing Management of Patients with Musculoskeletal Problems 522

- Review of Anatomy and Physiology of Musculoskeletal System 522
- Orthopedic Assessment 524

- Dislocation 528
- Fracture 528
- Sprain and Strain 531
- Contusion 532
- Amputation 532
- Osteomyelitis 538
- Bone Tumor 541
- Orthopedic Modalities 543
- Bursitis 562
- Synovitis 563
- Arthritis 564
- Rheumatoid Arthritis 565
- Osteomalacia 572
- Osteoporosis 574
- Paget's Disease 582
- Congenital Deformities of Bone 583
- Congenital Hip Dysplasia 584
- Spine Tumor 586
- Prolapsed (Herniated) Disc/Intervertebral Disc 587
- Pott's Spine 589
- Spinal Deformities 592

11. Nursing Management of Patients with Communicable Diseases..... 594

- COVID-19 594
- Diarrheal Diseases 596
- Cholera 599
- Overview of Infectious Diseases 601
- Hepatitis A-E 603

- Hepatitis A 604
- Hepatitis E 605
- Hepatitis B 606
- Hepatitis C 608
- Hepatitis D 609
- Typhoid 610
- Herpes Simplex Virus Infections 612
- Chickenpox 615
- Smallpox 617
- Measles 618
- Mumps 621
- Influenza 622
- Gangrene 627
- Leprosy 630
- Dengue 634
- Plague 637
- Malaria 638
- Chikungunya 643
- Swine Flu 645
- Filariasis 647
- Diphtheria 650
- Pertussis 651
- Tetanus 653
- Poliomyelitis 655
- Special Infection Control Measures: Notification, Isolation, Quarantine, Immunization 657

<i>Suggested Reading</i>	661
<i>Index</i>	665

Nursing Management of Patients with Disorders of Digestive System

5

UNIT

CHAPTER OUTLINES

- Review of Anatomy and Physiology of Gastrointestinal (GI) System
- Nursing Assessment – History and Physical Assessment
- GI Investigations
- Common GI Disorders:
 - ✦ Oral Cavity—Lips, Gums and Teeth
 - ✦ GI—Bleeding, Infections, Inflammation, Tumors, Obstruction, Perforation and Peritonitis
 - ✦ Peptic and Duodenal Ulcer
 - ✦ Malabsorption, Appendicitis, Hernias
 - ✦ Hemorrhoids, Fissures, Fistulas
 - ✦ Pancreas—Inflammation, Cysts, and Tumors
 - ✦ Liver—Inflammation, Cysts, Abscess, Cirrhosis, Portal Hypertension, Hepatic Failure, Tumors
 - ✦ Gallbladder—Inflammation, Cholelithiasis, Tumors
- Gastric Decompression, Gavage and Stoma Care, Different Feeding Techniques
- Alternative Therapies, Drugs used in Treatment of Disorders of Digestive System

REVIEW OF ANATOMY AND PHYSIOLOGY OF GIT SYSTEM

The gastrointestinal tract (GIT) also known as the alimentary canal length about 7.62 meters (25 feet) in life. This tube begins at the mouth and terminates at the anus (**Fig. 5.1**).

- **Mouth** functions to break down food into smaller parts. Its include tongue, salivary glands, teeth.
- **Tongue** which is a muscle that is covered by taste buds. It helps chewing process, and helps to maneuver food to a position and assist easily to swallow.

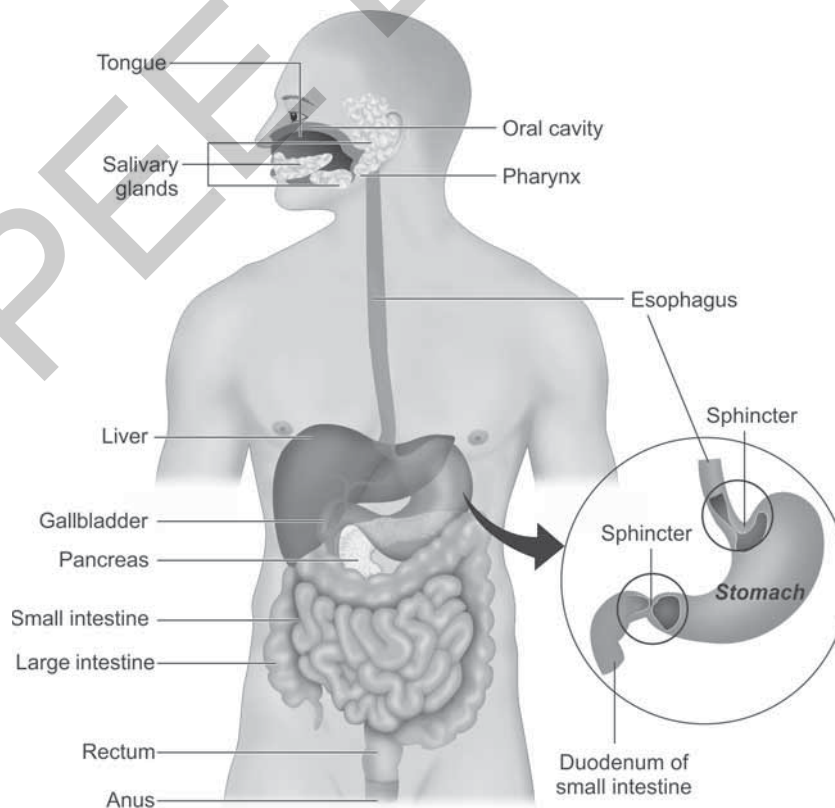


Fig. 5.1: Gastrointestinal system.

- **Salivary glands** produce saliva, which moistens food to assist with swallowing and also begin the process of chemical digestion through the secretion of the enzyme, salivary amylase, which begins the process of breaking down carbohydrates.
- **Teeth** mechanically break food down into smaller particles for easier swallowing and ingestion pharynx- allows the passage of both food and air.

Esophagus allows the passage of the food bolus from the mouth to the stomach. Its main function to facilitate the passage of food, lubricate and protect the esophagus at the lower end of the esophagus is the gastroesophageal or cardiac sphincter which prevents reflux of gastric contents into the esophagus. Cigarettes and alcohol decrease the sphincter's tone and increase the potential for reflux here as well. Blood supply to the esophagus comes via the left gastric artery.

Stomach is the uppermost region it has the cardiac region and the fundus, which lead into the body of the stomach. The antrum is the lower segment of the stomach, leading into the most distal of the pylorus sphincter, which allows the passage of chyme into the small intestine. The stomach functions are digestion of fats and starches begin in the mouth with the action of salivary enzymes, and continues in the stomach, protein digestion begins in the stomach and gastric acid is produced in the stomach which destroys most bacteria that is ingested with food.

Liver is a very large organ located in the upper right abdomen. There are right, left, and caudate lobes of the liver. Blood supply to the liver arises from both the portal vein and hepatic artery. Nearly one-quarter of cardiac output is delivered through the liver per minute, most of which travels through the portal vein. The blood is filtered through the Kupffer cells of the liver, which destroy debris and unwanted organisms.

Functions of the Liver are:

- **Conjugation of bilirubin:** Bilirubin is typically formed from the destruction of red blood cells. Conjugation or conversion to the water-soluble form of bilirubin occurs in the liver. The kidneys can excrete this form of bilirubin. Patients with liver dysfunction are often jaundiced due to the accumulation of bilirubin in the body.
- **Synthesis and deactivation of clotting factors:** Produces all vitamin K dependent clotting factors including II, VI, VII, IX, and X. Removes activated clotting factors and produces heparin which prevents too much clot formation in the body. Patients with nutritional problems have abnormal clotting mechanisms and may develop thrombocytopenia.
- **Detoxification of hormones, ammonia, and drugs:** Converts many fat-soluble drugs and substances into a water-soluble form that can be excreted from the body in the urine. Patients with liver dysfunction may manifest inability to excrete certain drugs, ammonia, and hormones.
- **Phagocytosis:** Seventy percent of the body's total macrophages are in the liver in the form of Kupffer Cells. Patients with liver dysfunction have a poor immune response.
- **Carbohydrate, protein, and fat metabolism:** Maintains normal serum glucose levels by carbohydrate synthesis, metabolism, and transport. The liver allows the body to use essential nutrients effectively, even if the nutrients are artificially supplied through partial parental nutrition (PPN) or total parental nutrition (TPN). So, giving a patient with liver failure TPN or PPN may not correct their nutritional deficits. Patients with liver dysfunction have extreme nutritional deficits.

Pancreas is both an endocrine and exocrine gland. The endocrine functions include the production of insulin, glucagon, somatostatin. The exocrine function of the pancreas is mainly digestive in nature, and involves the secretion of pancreatic enzymes and bicarbonate. The pancreas secretes trypsin, lipase and amylase. These enzymes help digest carbohydrates, proteins, and fats. They are normally secreted into the duodenum in their inactive form. Once in the duodenum they are converted to their active form and begin the digestive process. Bicarbonate is necessary to neutralize these and other enzymes located in the duodenum. Bicarbonate is secreted by the exocrine pancreas to prevent duodenal ulceration and irritation.

Gallbladder is a pear-shaped, sac-like organ attached to the liver that serves as a storage facility for bile. It can hold and concentrate approximately 50 mL of bile. The cystic duct connects the gallbladder to the common bile duct, which terminates at the Sphincter of Oddi in the duodenum of the small intestine. When a large or fatty meal is consumed, nerve and chemical signals cause the gallbladder to contract. This contraction releases bile into the digestive system. The gallbladder receives blood from the cystic and hepatic artery and is innervated by the splanchnic nerve and the right branch of the vagus nerve.

Small intestine extends from the pylorus to the ileocecal valve. The small intestine is composed of the duodenum, jejunum, and ileum. The ligament of Treitz divides the duodenum from the jejunum. Upper gastrointestinal bleeding occurs above this ligament and lower gastrointestinal bleeding occurs below this ligament. The primary function of the small intestine is the absorption of vitamins and nutrients, including electrolytes, iron, carbohydrates, proteins, and fats. Most digestion of nutrients happens here. The small intestine also absorbs approximately 8,000 milliliters (mL) of water per day. Three thousand milliliters of digestive enzymes are secreted in the small intestine daily.

These enzymes include:

- Lipase – splits fats into monoglycerides, glycerol, and fatty acids
- Amylase – converts starch to maltose
- Maltase – converts maltose to glucose
- Lactase – converts lactose into galactose and glucose
- Sucrase – converts sucrose into fructose and glucose
- Dextrinase – converts specific dextrans into glucose

Intestinal hormones: The mucosa in the intestines also contains hormones. Blood supply to the small intestine is derived from the celiac artery, the superior mesenteric artery. These include:

- **Enterogastrone:** Found in the duodenal mucosa. Inhibits gastric acid secretion and gastric motility.

- **Gastric inhibitory polypeptide (GIP):** Found in the duodenal and jejunal mucosa. Inhibits gastric acid secretion, pepsin secretion, and gastric motility.
- **Secretin:** Found in the duodenal mucosa. Stimulates pepsinogen secretion, secretions of pancreatic digestive enzymes, and secretion of bile from the liver. Also decreases gastric acid secretion.
- **Cholecystokinin (CCK):** Found in the jejunal mucosa. Stimulates contraction of the gallbladder and secretion of pancreatic enzymes, and inhibits gastric motility.
- **Vasoactive intestinal peptide (VIP):** Found in intestinal mucosa. Similar effects as secretin, stimulates production of intestinal secretions that decrease chyme acidity, and inhibits gastric secretion.
- **Somatostatin:** Found in the intestines. Inhibits secretion of gastric acid, saliva, pepsin, intrinsic factor, and pancreatic enzymes. Inhibits gastric motility, gallbladder contraction, intestinal motility, and blood flow to the liver and intestine.
- Also inhibits secretion of insulin and growth hormone.
- **Serotonin:** Found in the intestines. Inhibits gastric acid secretion.

Peristalsis is the process of wave-like muscular contractions that move digested material through the intestine. The process of digestion is completed in the small intestine. At this stage the nutrients that the body needs are absorbed through the walls of the small intestine. Peristalsis occurs via the autonomic nervous system and is coordinated by the myenteric plexi. Peristaltic activity is generally weak, but can be increased by laxatives and certain kinds of illness or toxicity.

The large intestine extends from the terminal ileum at the ileocecal valve to the rectum. At the terminal ileum, the large intestine becomes the ascending colon, the transverse colon, and then the descending colon. Following the descending colon is the sigmoid colon and the rectum.

The main function of the large intestine is water absorption. Typically, the large intestine absorbs about one and one-half liters of water per day. It can, however, absorb up to six liters.

The large intestine also absorbs potassium, sodium, and chloride. It produces mucus which lubricates the intestinal wall and holds the produced feces together for elimination.

The superior and inferior mesenteric arteries and the hypogastric arteries supply the blood supply to the large intestine.

Table 5.1 shows the effects of the nervous system on the gastrointestinal tract. **Table 5.2** depicts the contribution of other body systems to the digestive system.

GASTROINTESTINAL SYSTEM ASSESSMENT

The processes that the gastrointestinal tract and its accessory organs play in the body are essential for life. The process of digestion supplies nutrients to each and every cell in our body. If there is a disruption in any of these mechanisms, the whole body suffers.

This assessment will discuss specific gastrointestinal history questions and exam techniques and physical exam

TABLE 5.1: Effects of the nervous system on the gastrointestinal tract.

Stimulation of SNS	Stimulation of PNS
Vasoconstriction of blood vessels supplying internal viscera	Vasodilation of blood vessels supplying internal viscera
Inhibition of gastrointestinal motility and peristalsis	Stimulation of gastrointestinal motility and peristalsis
Inhibition of gastrointestinal secretions	Stimulation of gastrointestinal secretions
Stimulation of glycogen breakdown in the liver to release glycogen stores	Inhibition of glycogen breakdown in the liver to preserve glycogen stores
Decreased pancreatic enzyme production	Increased pancreatic enzyme production
Decreased insulin release	Increased insulin release

TABLE 5.2: Contribution of other body systems to the digestive system.

Body system	Benefits received by the digestive system
Cardiovascular	Blood supplies digestive organs with oxygen and processed nutrients
Endocrine	Endocrine hormones help regulate secretion in digestive glands and accessory organs
Integumentary	Skin helps protect digestive organs and synthesizes vitamin D for calcium absorption
Lymphatic	Mucosa-associated lymphoid tissue and other lymphatic tissue defend against entry of pathogens; lacteals absorb lipids; and lymphatic vessels transport lipids to bloodstream
Muscular	Skeletal muscles support and protect abdominal organs
Nervous	Sensory and motor neurons help regulate secretions and muscle contractions in the digestive tract
Respiratory	Respiratory organs provide oxygen and remove carbon dioxide
Skeletal	Bones help protect and support digestive organs
Urinary	Kidneys convert vitamin D into its active form, allowing calcium absorption in the small intestine

techniques such as inspection, palpation, percussion and auscultation.

Patient History

- Change in appetite
- Weight gain or loss
- Dysphagia
- Intolerance to certain foods
- Nausea and vomiting
- Change in bowel habits
- Abdominal pain

History Collection

- **Past abdominal or gastrointestinal history:** Ask about any past history of gastrointestinal disorders such as ulcers,

gallbladder disease, hepatitis, appendicitis, hernias, past abdominal surgeries, any abdominal problems after the surgery, and abdominal X-rays or tests.

- **Medication history:**
 - Ask about the history of taking aspirin and nonsteroidal anti-inflammatory drugs (increase the gastrointestinal bleeding)
 - Frequency and duration of alcohol and cigarette consumption if any (alcohol can cause liver cirrhosis and esophageal varices. Cigarette smoking leads to gastric reflux and gastric ulcers).
- **Nutritional status:** Will identify individuals at risk for malnutrition and provide baseline information. It includes:
 - Recent unintentional weight loss
 - Chemotherapy or radiation
 - Recent weight gain
 - Food allergies or intolerance
 - Decreased appetite
 - Multiple medications
 - Taste alterations
 - Dieting history
 - Difficulty in chewing or swallowing
 - Vomiting
 - Mobility problems
 - Diarrhea
 - Inability to feed self
 - Recent surgery or major illness or injury
 - Substance abuse
 - Chronic conditions
 - Potential for social isolation
 - Low income

Table 5.3 shows the focused gastrointestinal assessment.

Figure 5.2 illustrate the nine regions in abdomen.

Causes of Key Abnormalities

- Jaundice—liver failure, gallstones
- Abdominal distension—ascites, bowel obstruction, bleeding, sepsis, air (e.g. due to non-invasive ventilation without a nasogastric tube)
- Abdominal pain—abnormality of underlying structure
- Dullness on percussion—fluid, mass, feces
- Absent bowel sounds—bowel obstruction
- Hypoactive bowel sounds—bowel obstruction, opioids

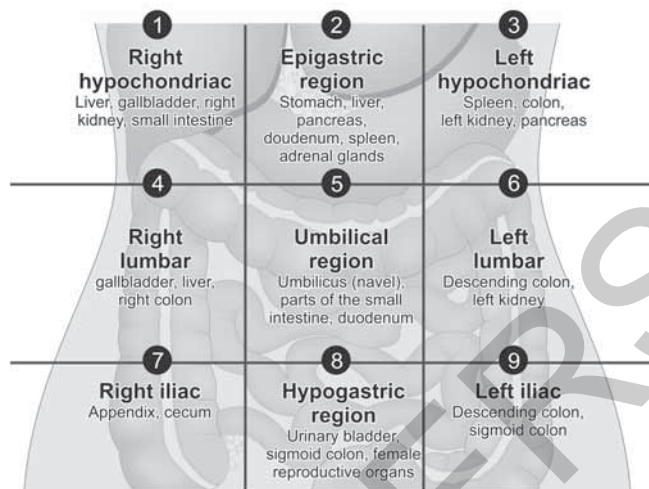


Fig. 5.2: Nine region in abdomen.

- High-pitched, tinkling bowel sounds—partial bowel obstruction.

Physical Examination

- **Inspection of mouth:** For symmetry, color, cyanosis, cracking, ulcers, buccal mucosa and lesions.
- **Inspection of pharynx:** Pharynx is inspected by head tilting and depressing the tongue. Inspect for tonsils, uvula and ask the patient to say ‘ah’. The uvula and soft palate should rise and remain in the midline.
- **Palpation:** For nodules, ulcers and areas of tenderness and should be noted. Dentures to be removed during oral examination.
- **Abdomen:** Inspection, auscultation, percussion, palpation.
 - Inspection
 - ◆ Assess the abdomen for skin changes (color, texture, scars, striate, dilated veins, rashes and lesions).
 - ◆ Inspect umbilicus for symmetry, contour, masses.
 - ◆ Look across the abdomen for peristalsis, is not visible normally in adult but may visible in thin person.
 - Auscultation
 - ◆ It is done immediately after the inspection to prevent alterations in bowel sounds.

TABLE 5.3: Gastrointestinal-focused assessment.

Assessment	Normal findings	Abnormal findings
Inspection	<ul style="list-style-type: none"> ➢ Pink, moist mucous membranes ➢ White sclera ➢ Symmetrical, nondistended abdomen 	<ul style="list-style-type: none"> ➢ White sclera ➢ Symmetrical, nondistended abdomen ➢ Pallor jaundice dry mucous membranes ➢ Abdominal distension ➢ Abdominal asymmetry ➢ Abdominal wounds, drains, scarring, bruising
Palpation	<ul style="list-style-type: none"> ➢ Soft abdomen ➢ Non-tender abdomen 	<ul style="list-style-type: none"> ➢ Firm abdomen ➢ Painful abdomen ➢ Mass
Percussion	Tympanic abdominal percussion note	Dullness on abdominal percussion
Auscultation	Bowel sounds present	<ul style="list-style-type: none"> ➢ Absent bowel sounds ➢ Hypoactive bowel sounds ➢ High-pitched, tinkling bowel sounds

- ◆ It includes listening for increased or decreased bowel sounds and vascular sounds.
- ◆ Gently warm up the stethoscope in the hands to prevent abdominal muscle contraction.
- ◆ The diaphragm of the stethoscope is used to auscultate high pitched sounds and bell to detect lower pitched sounds.
- ◆ Normally 5 to 35 times the bowel sound is heard per minute like high pitched clicks or gurgles.
- ◆ Listen in the epigastrium and in all four quadrants for bowel sounds for 2 to 5 minutes.
- ◆ Normally the sounds will be high pitched and gurgling and loud gurgles indicate hyperperistalsis.
- ◆ If the intestines are under tension, such as intestinal obstruction the bowel sounds will be rushes and tinkling
- ◆ Listen for decreased or absence of bowel sounds.
- ◆ Present, absent, increased, decreased, high pitched, tinkling, gurgling and rushing are the terms used to describe the bowel sounds.
- ◆ Normally no aortic bruits should be heard and it is best heard with the bell of stethoscope the sound will be swishing or buzzing and it indicates turbulent blood flow.
- Percussion (**Fig. 5.3**)
 - ◆ It is done to determine the presence of fluid, distention and masses.
 - ◆ The presence of air produces a higher pitched, hollow sound it is termed as tympany.
 - ◆ The presence of fluid or masses a short, high pitched sound with little resonance it is termed as dullness.
 - ◆ Liver percussion should start below the umbilicus in the right mid-clavicular line and percuss downward between the ribs to the area of dullness indicating the upper border of the liver.
 - ◆ The height or vertical space between the two areas should be measured to determine the size of the liver. The normal line is 2.4 to 5 inches (6 to 12 cm).

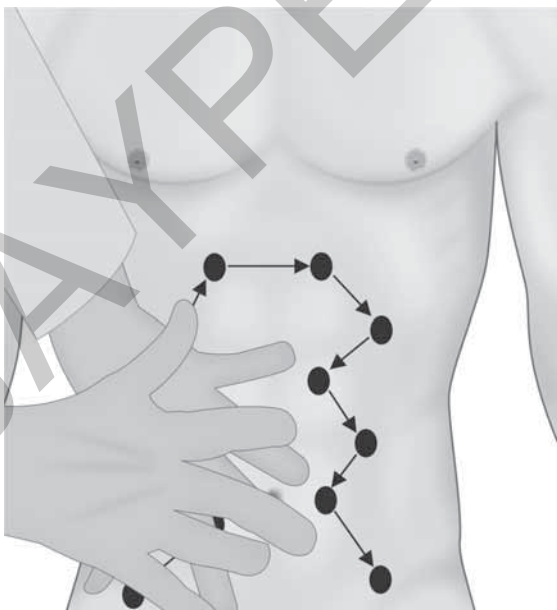


Fig. 5.3: Abdomen percussion.

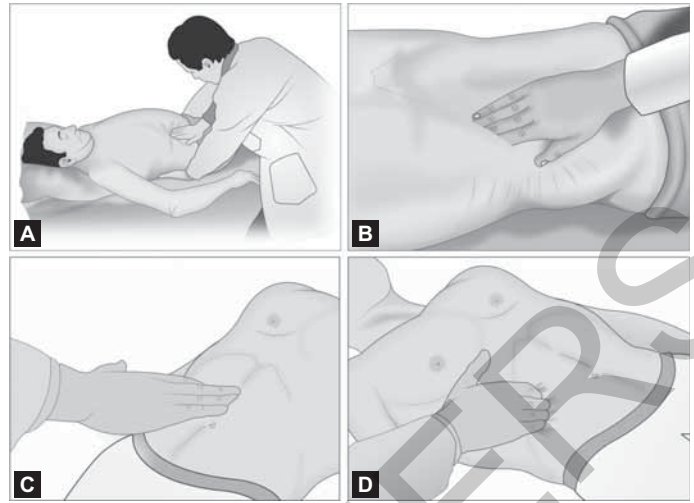


Fig. 5.4: Methods of palpation of the liver. The importance of placing the left hand posteriorly, to palpate anteriorly (A); Accurate application of finger tips along the edge that needs to be felt in the right hypochondrium (B) and epigastrium (C); and the hooking method (D), seldom used, but one that needs thoughtful practice are demonstrated.

- ◆ Percuss lightly in all four quadrants to assess for tympany and dullness, move clockwise.
- ◆ Tympany should predominate because air in the intestines rises to surface when patient is supine.
- Palpation (**Figs. 5.4 and 5.5**)
 - ◆ The pads of the fingertips is used for palpation depressing the abdominal wall up to 0.4 inch (1cm)
 - ◆ Light palpation is used to detect tenderness, muscular resistance, masses and swelling.
 - ◆ Smooth movements should be used and all quadrants palpated.
 - ◆ Deep palpation is used to delineate abdominal organs and masses, the pads of fingertips used to press more deeply in all the quadrants.
 - ◆ During palpation note the location, size, shape and presence of tenderness.
 - ◆ The patient's facial expression should be noted to know the nonverbal cues of pain or discomfort.
 - ◆ To palpate liver, the left hand is placed behind patient to support the right 11th and 12th ribs, then press the left hand forward and place the right hand on the patient's right abdomen lateral to rectus muscle, gently press in and up.
 - ◆ To palpate spleen, move to left side of the patient, place right hand under the patient's lower rib cage forward (**Fig. 5.6**).

Rectum and Anus

- Inspect the perianal and anal areas for color, texture, lumps and rashes, scars, erythema, fissures and external hemorrhoids.
- If there is any lump or unusual areas should be palpated with a gloved hand.
- For the digital examination of the rectum, the gloved, lubricated index finger is placed against the anus while the patient strains.

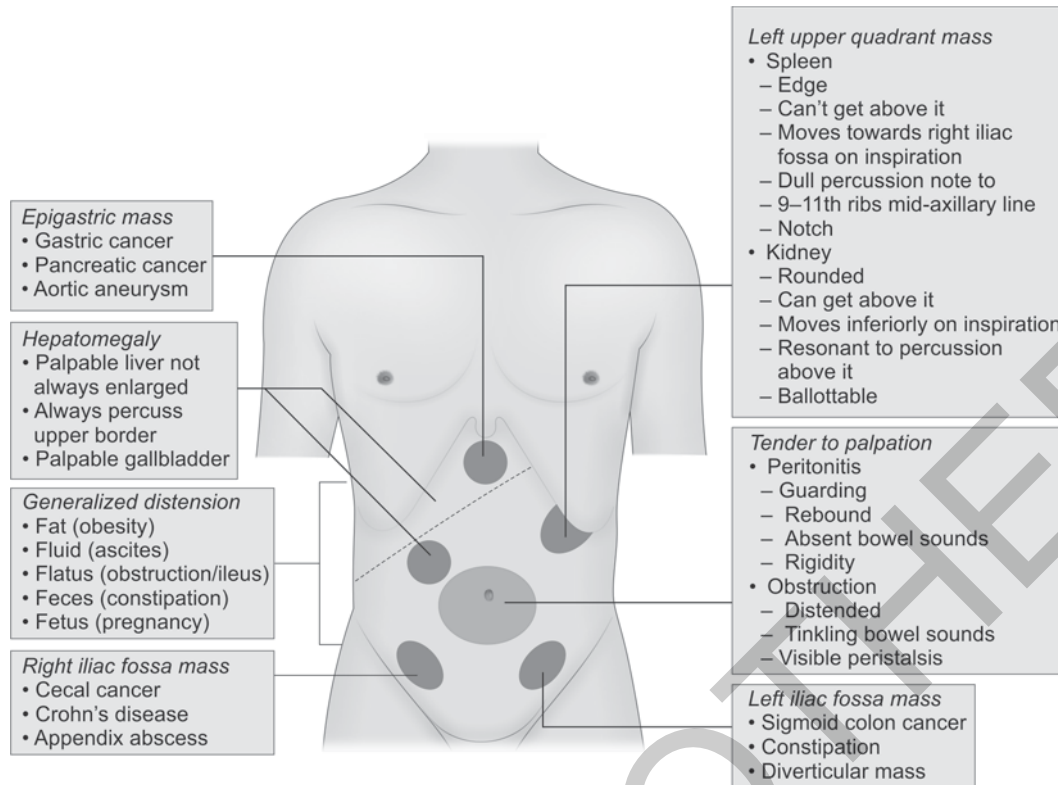


Fig. 5.5: Palpable abnormalities in the abdomen.

Source: Macleods clinical examination, 13th Ed. (2013).

<https://www.grepped.com/images/3967/abnormalities-physicalexam-abdominal-palpable-abdomen-signs>



Fig. 5.6: The left hand in the left costal margin and press it in towards the spleen and ask the patient to breathe deeply, if the spleen is enlarged will be felt by the finger tips.

- Then as the sphincter relaxes, the finger is inserted as possible and is pointed towards the umbilicus and all surfaces are palpated.
- A sample of stool can be removed and check for occult blood.

BARIUM SWALLOW AND BARIUM MEAL

Barium meal is the radiological study of esophagus, stomach, duodenum and proximal jejunum. It is done by oral administration of contrast media. **It is use to detect problems in the upper gastrointestinal tract such as difficulty or pain while swallowing, pain in the throat or esophagus, upper abdominal pain, or unexplained vomiting.** In some cases the problems in below the esophagus, such as

vomiting, abdominal pain, diarrhea, or bloody stools, while the patient required a barium meal.

Indications

- Hiatal hernia
- Inflammation
- Blockages
- Muscle disorders that could lead to difficulty swallowing or spasms
- Gastroesophageal reflux disease (GERD)
- Ulcers
- Both cancerous and noncancerous tumors.

Contraindications

- An esophageal or bowel perforation
- Bowel obstruction
- Difficulty swallowing
- Severe constipation.

Nursing Care

- Nil per oral for six hours before procedure and sip of little water may be consider if necessary.
- Remove metal and jewelry because these pieces of metal get in the way of a clear X-ray image and change into the hospital gown.
- Eat a low-fiber diet in the days, not to eat, drink, smoke, or chew gum after midnight the night before the procedure to ensure that food does not obstruct the imaging.
- Pre-procedure patient education
- Inform to the patients to wear loose-fitting clothing that's easy to remove and put back on.

- Remove all jewelry at home before go in for procedure.
- Be sure to eat and drink enough the night before starting fast at midnight. It may help to schedule the barium swallow for first.
- Be prepared for the barium to taste unpleasant.
- Bring something to eat and drink after the procedure. Foods that are high in fiber — including fruits like apples, bananas, and raspberries — can help prevent constipation as well as get rid of the taste.
- Make sure drink eight 8- glasses of water a day after the procedure.
- This procedure will takes about 30 minutes.
- Instruct the patient to drink a thick, chalky mixture of barium and water.
- A technician will take X-ray images of the upper digestive tract while drink a thick, chalky mixture of barium and water.
- This mixture coats the walls of the digestive tract and appears white on an X-ray, or pass a fluoroscopy to watch the barium moves. Its allowing to look for any abnormalities in the structure of the gastrointestinal tract (GIT), as it travels through esophagus, stomach, and the upper portion of the small intestine.

Complications: Constipation and end up with bowel movements that stool appear chalky and white for a few days. It will relieve by drinking plenty of fluids and eating high-fiber foods after the procedure.

Gastrosocopy/Endoscopy

A **gastrosocopy** otherwise called as **an upper gastrointestinal endoscopy**. It is a procedure using a small thin, flexible tube attached with camera called an endoscope is used to look inside the esophagus, stomach and duodenum.

Types of Gastrointestinal (GI) Endoscopy

- Esophagogastroduodenoscopy (upper GI endoscopy)
- Small bowel enteroscopy (Jejunoscopy)
- Colonoscopy (lower GI endoscopy)
- Sigmoidoscopy
- Endoscopic retrograde cholangiopancreatogram (ERCP)

Indications

- Crohn's disease
- GERD
- Gastric ulcers
- Hiatus hernia
- Celiac disease
- Cancers
- Chronic or recurring heartburn, nausea or vomiting
- Nausea over a longer period of time
- Stomach pain
- Trouble swallowing
- Black stool or blood in your stool
- Weight loss for no apparent reason
- Suspected peptic ulcer
- Suspected cancer of the esophagus or stomach
- A check-up after stomach surgery.

Table 5.4 shows the indications and contraindications for upper gastrointestinal endoscopy. **Figure 5.7** illustrates the therapeutic techniques in endoscopy.

TABLE 5.4: Indications and contraindications for upper GI endoscopy.

Diagnostic indications	Therapeutic indications
<ul style="list-style-type: none"> ➤ Heartburn ➤ Dysphagia or odynophagia ➤ Hematemesis or melena ➤ Dyspepsia or upper abdominal pain ➤ Unexplained weight loss or anemia ➤ Evaluation of abnormal barium meal X-ray ➤ Suspected malabsorption 	<ul style="list-style-type: none"> ➤ Control of bleeding ➤ Dilation of stricture ➤ Removal of foreign Bodies ➤ Removal of polyps ➤ Tumor ablation
Contraindications to upper gastrointestinal endoscopy	
<ul style="list-style-type: none"> ➤ Uncooperative patient ➤ Hemodynamically unstable patient such as recent acute myocardial infarction, unstable angina or arrhythmia, severe respiratory distress ➤ Suspected perforation ➤ Severe cervical spine ➤ Sever shock 	

Nursing Care

- Avoid consuming any food or liquids for six to eight hours before the procedure. It is important that you follow all preparation instructions carefully, because any food in the stomach or upper small intestine will block the image.
- May be provide mild sedative to make the scope more comfortable, benzodiazepine, which induces relaxation, and an opioid, which reduces pain.
- The nurse might spray a topical anesthetic lightly into the back of the throat to reduce any pain or discomfort from the insertion of the endoscope.
- Then, monitor the vitals during the sedation and procedure.
- Inform to patient to stop taking any medications in the days leading up to the scope, to avoid adverse interactions as per order.
- Physician will insert scope through mouth and then into the esophagus, stomach, and upper portion of the small intestine.
- A screen for the team to view by the camera picks up, will observe the tissue and structures abnormality
- The procedure will only take about five minutes, but need to wait for an additional 30 minutes following safely.

Complications: Tears to digestive tissue from the scope are possible.

Endoscopic Retrograde Cholangiopancreatography

Endoscopic retrograde cholangiopancreatography (ERCP) is a technique that combine the use of endoscopy and fluoroscopy to diagnose, treat and examine bile and pancreatic ducts problems in digestive system. If there is any obstruction in the tract, it can be remove the obstruction, or tissues may be taken for examine after the procedure.

Table 5.5 shows the indications and contraindications of ERCP.

Procedure

- The patient should be screen complete blood count and clotting time, respiratory and CVS assessment.

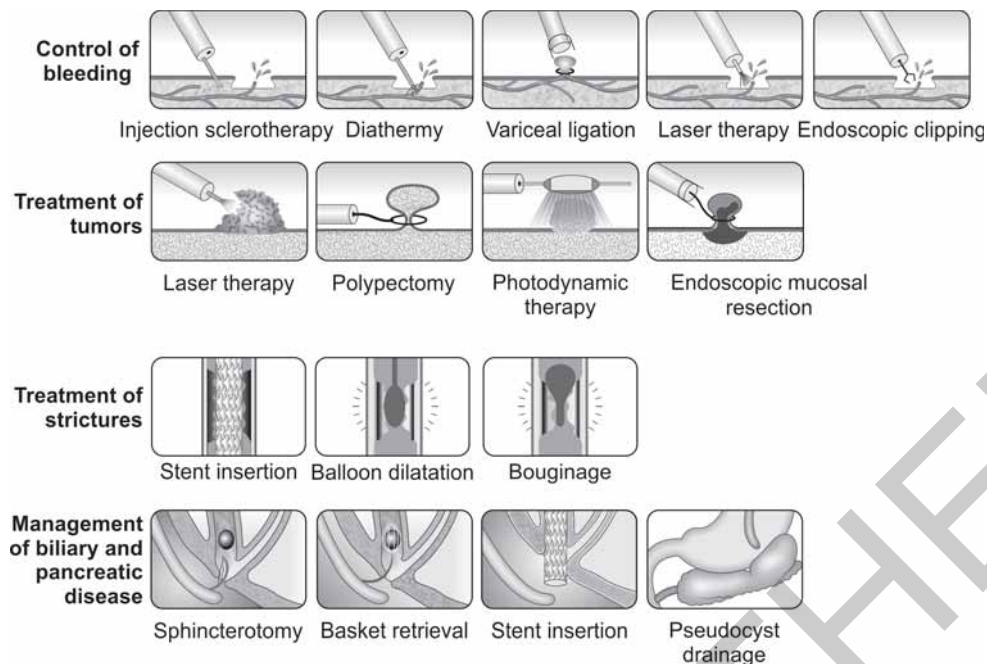


Fig. 5.7: Therapeutic techniques in endoscopy.

TABLE 5.5: Indications and contraindications of ERCP.

Diagnostic indications	Therapeutic indications
<ul style="list-style-type: none"> ➤ Obstructive jaundice ➤ Chronic pancreatitis ➤ Gallstones with dilated bile ducts on ultrasonography ➤ Bile duct tumors ➤ Pancreatic tumors ➤ Suspected injury to bile ducts either as a result of trauma or iatrogenic 	<ul style="list-style-type: none"> ➤ Endoscopic sphincterotomy (biliary and pancreatic sphincters) ➤ Removal of stones ➤ Insertion of stent ➤ Dilatation of strictures (primary sclerosing cholangitis, anastomotic strictures after liver transplantation)
Contraindications of ERCP	
<ul style="list-style-type: none"> ➤ Acute pancreatitis ➤ Previous pancreatoduodenectomy ➤ Coagulation disorder if sphincterotomy planned ➤ Recent myocardial infarction ➤ History of contrast dye anaphylaxis 	

- The patient need to avoid high-fiber foods in the days leading up to the exam and make sure are not wearing any metal jewellery, as this interferes with the X-ray images.
- Prophylactic antibiotics should be administered to patient with biliary obstruction and the patient should be fasting overnight.
- The patient will be under general anesthesia and lied on his left side.
- A side-viewing duodenoscopy is passed through the pylorus and into the second part of duodenum to visualize ampulla of Vater, it is then cannulated into it. By adjusting the angle of the endoscopy it can be either cannulated into the common bile duct or into the pancreatic duct which is then visualized with a fluoroscopy.
- Physician will insert a endoscope into the mouth and through esophagus, stomach, and small intestine to view liver, gallbladder, pancreas, and bile ducts.

- A technician will take X-rays of the area for later inspection.
- The test will take approximately 30 minutes to an hour, but you will remain at the hospital for one to two hours following the procedure.

Advantages

It is safe and highly effective diagnostic technique, accurate method of diagnosing and treating conditions of the bile and pancreatic ducts, simpler than exploratory surgery. It can prevent the need for major abdominal surgery and it may help with planning for surgery.

Disadvantages

Risk of perforation or hemorrhage is increased when polyps are removed via the endoscope. The procedure requires a hospital stay, sedation is required, with a small risk of adverse reactions to medications used, and there is a degree of patient discomfort. Common complications are pancreatitis, bleeding, infection, perforation.

Endoscopic Ultrasound

It is an alternative for ERCP, to examine the digestive system for blockages or other physical complications in the esophagus, stomach, pancreas, gallbladder, and liver. Its advantages are a good view of the anatomy and the ability to take biopsies, but does not carry the risk of radiation from X-rays.

Indications

- Cancer of the colon, esophagus, lung, pancreas or stomach, and ampullary and rectal cancers
- Lymphoma
- Barrett’s esophagus
- Neuroendocrine tumors
- Pancreatitis and pancreatic cysts

- Bile duct stones
- Sarcoidosis

Procedure

- The patient should avoid consuming any foods or liquids for six to eight hours before the procedure.
- The procedure will be done under conscious sedation, which involves combining a benzodiazepine for relaxation and an opioid for reduces pain administered via injection.
- In this procedure, endoscopic ultrasound uses a miniature ultrasound device attached to the endoscope. This allows for a much clearer view of structures in the intestinal tract.
- The procedure will take approximately 20 minutes, and the patient will need to wait at the hospital for an additional 30 minutes to relieve from the sedative.
- Endoscopic ultrasound is a relatively safe diagnostic test.

pH MONITORING TEST

This diagnostic test can help establish whether the patient's current acid suppression or antacid therapy is working effectively or needs updating or modification. Patients may be experiencing chest pain, sore throat, cough, or hoarseness, this can help physician figure out if it is due to heartburn or other causes.

Indications of Esophageal pH Recording

- To quantify and characterize gastroesophageal reflux in patients who have a minimal or lack of response to acid-suppressive therapy with a proton pump inhibitor (PPI) and who have normal endoscopic findings
- To evaluate patients with atypical gastroesophageal reflux symptoms
- To evaluate patients with reflux symptoms and achlorhydria (i.e., atrophic gastritis)
- To evaluate patients with reflux symptoms after surgical gastrectomy
- To evaluate patients with primary postprandial symptoms
- To evaluate patients with reflux symptoms and frequent meal ingestion (i.e., infants)

Contraindications of pH Recording

- Esophageal pH recording not indicated to detect or verify reflux esophagitis.
- Esophageal pH recording not indicated to evaluate "alkaline reflux".

Procedure

Patient Preparation

- Instructed to fast 4 to 6 hours before probe insertion
- Record the time of the meal, the content of the meal, time of upright and recumbent periods, time of administration of acid-suppressing medication, time of symptom occurrence
- Patients are encouraged to continue their usual eating habits or engage in ordinary activities that are known to induce symptoms.

Testing on/off Proton Pump Inhibitor (PPI) Therapy

- The decision to perform testing on or off PPI therapy depends on the indication for testing.
- If a patient has a known history of gastroesophageal reflux disease (GERD) that is refractory to treatment, and the indication for multichannel intraluminal impedance (MII)-pH testing is to diagnose weakly acidic (non-acid) reflux, PPI therapy continues.
- Usually, patients remain on high-dose acid-suppressive therapy for at least one week before testing and on the day of testing.
- If it is unclear whether or not GERD is the cause of a patient's symptoms, MII-pH testing is done off PPI therapy to detect acid reflux events.

Insertion Technique

- The physician will guide a thin, plastic catheter, with a sensor at the end, down through nose and into the throat, and leave it there for the next 24 hours.
- The MII-pH probe placement is trans-nasally into the esophagus.
- The probes are 2.1 mm in diameter and allow for pH sensors to be placed 5 cm superior to the lower esophageal sphincter (LES) and 10 cm below the LES.
- Impedance measurements are taken at various segments throughout the esophagus with four impedance-measuring segments in the distal esophagus (3, 5, 7, and 9 cm above the LES) and two segments in the proximal esophagus (at 15 and 17 cm above the LES).
- The testing usually lasts 24 hours, and once the study is complete, the recording unit is returned to the provider.
- The patient feels some discomfort from the catheter, and uncomfortable with their appearance because part of the catheter is visible.
- There is subsequent data analysis using a software system.
- Wireless pH monitoring is also available, which involves placing a small capsule with a transmitter in the esophagus.

Esophageal Manometry

Esophageal manometry helps to test movement and pressure in the esophagus, and stomach.

Indications of Esophageal Manometry

- Evaluation for achalasia or another type of non-obstructive dysphagia.
- Preoperative evaluation for patients undergoing corrective surgery for GERD.
- Postoperative evaluation of dysphagia in patients who underwent corrective surgery for reflux or after treatment of achalasia.
- Prior to esophageal pH monitoring to assess the location of the lower esophageal sphincter for proper electrode positioning.
- Evaluation of esophageal motility problems associated with systemic diseases.

Contraindications

- Patient with mental disorder
- Patient unable to understand the instructions

- Pharyngeal or upper esophageal obstruction like tumors
- Patient with clotting disorders
- Patient with esophageal problems like esophageal ulcer, varices, strictures.

Procedure

- The patient need to avoid eating any food for eight hours leading up to the procedure.
- Health care professional will provide a local anesthetic in the nostril.
- The physician will take a long, slender tube and insert this through nose, esophagus, and into stomach.
- It is done by passing a multi-lumen catheter with three to eight recording orifices through nose, esophagus and into the stomach.
- Medical technician will ask the patient to swallow water at various points.
- Catheter is withdrawn progressively up the esophagus, and recordings are taken at intervals of 0.5 to 1.0 cm to measure the length and pressure and motility of esophagus and stomach during swallowing.
- The tube picks up vibrations that occur when the muscles in the esophagus or in the stomach contract and relays this information to a machine that graphs the data.
- The process will take approximately 30 to 45 minutes.

Complications

It can cause coughing or vomiting, rhinorrhea, epistaxis, severe complications include arrhythmias, vasovagal episodes, bronchospasm, aspiration and esophageal perforation.

COLONOSCOPY (FIG. 5.8)

Colonoscopy is a diagnostic and therapeutic procedure that utilizes a flexible fiberoptic colonoscope inserted into the rectum to allow visual examination of the inner lining of the large intestine using with a camera at its tip and remove small polyps.

Indications

- Screen for colon and rectal cancer
- Detect and evaluate inflammatory and ulcerative bowel disease
- Locate the source of lower GI bleeding and perform hemostasis by coagulation
- Determine the cause of lower GI disorders, especially when barium and proctosigmoidoscopy results are inconclusive
- Assist diagnose colonic strictures and benign or malignant lesions
- Evaluate the colon postoperatively for recurrence of polyps and malignant lesions
- Investigate iron-deficiency anemia of unknown origin
- Remove colon polyps
- Remove foreign objects and sclerosing strictures by laser.

Contraindications

- Pregnant women near term
- Patients with bleeding disorders

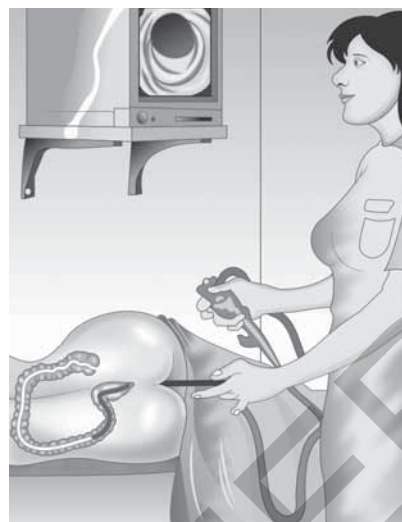


Fig. 5.8: Colonoscopy.

- Patients who had a recent acute myocardial infarction or abdominal surgery
- Patients with ischemic bowel disease, acute diverticulitis, peritonitis, fulminant granulomatous colitis, perforated viscus, or fulminant ulcerative colitis.

Table 5.6 shows the Indications and contraindications of lower GI endoscopy.

Procedure

- The patient will undergo conscious sedation which benzodiazepine to help for relax and an opioid to decrease pain, administer through intravenously.
- The patient is placed on his left side with his knees flexed and draped.
- Physician will insert a colonoscopy into the rectum to view the inside of bowel

TABLE 5.6: Indications and contraindications of lower GI endoscopy.

Diagnostic indications	Therapeutic indications
<ul style="list-style-type: none"> ➢ Chronic diarrhea ➢ Rectal bleeding ➢ Iron deficiency anemia ➢ Unexplained abdominal pain ➢ Constipation, changes in bowel habits or stool caliber ➢ Unexplained weight loss ➢ Evaluation of abnormal barium enema X-ray ➢ Personal or family history of colon cancer ➢ Personal history of inflammatory bowel disease 	<ul style="list-style-type: none"> ➢ Control of bleeding ➢ Removal of polyps ➢ Tumor ablation ➢ Dilation of stricture ➢ Colonic decompression ➢ Reduction of sigmoid volvulus

Contraindications of lower gastrointestinal endoscopy

- Uncooperative patient
- Hemodynamically unstable patient
- Suspected perforation
- Suspected colonic obstruction
- Suspected diverticulitis
- History of recent myocardial infection

- Vital signs are monitored throughout the procedure. For risky patients monitor electrocardiographic, pulse oximetry.
- The patient is instructed to breathe deeply and slowly through mouth as the practitioner palpates the mucosa of the anus and rectum and inserts, under direct vision, the lubricated colonoscope through the patient's anus into the sigmoid colon.
- Abdominal palpation or fluoroscopy may be used to help guide the colonoscopy through the large intestine.
- Suction may be used to remove blood and secretions that obscure the vision. The physician will be visualizing location for the formation of gastrointestinal conditions such as Crohn's disease.
- Biopsy forceps or a cytology brush may be passed through the colonoscope to obtain specimens for histologic or cytologic examination; an electrocautery snare may be used to remove polyps.
- A colonoscopy can last between 20 and 45 minutes, but the patient need to stay additional 2 to 3 hours in the hospital to monitored after the procedure.

Before the Procedure

- Secure an informed consent.
- Check for allergies, bleeding histories, medications, and information relevant to the current complaint.
- Explain about the procedure.
- Nil per oral after midnight.
- Explain the importance of bowel preparation that the large intestine must be thoroughly cleaned to be clearly visible.
- Give a laxative, as ordered
- Tell the patient to maintain a clear-liquid diet for 24 to 48 hours before the procedure.
- IV line will be started and a sedative will be administered before the procedure.
- The colonoscopy is well lubricated to ease insertion, that it initially feels cool, and that he may feel an urge to defecate when it's inserted and advanced.
- Inform to the patient empty the bladder immediately before the procedure and remove all metallic jewelry to change into the gown, robe, and foot coverings provided.
- Remove instruct the patient to remove all metallic objects from the area to be examined.
- Instruct patient to avoid unnecessary movement during the procedure because movement creates unreliable results.

During the Procedure

- Place the patient on the examination table in a left lateral decubitus position with a sheet draped over the body.
- Pain medication and sedative will be given to reduce discomfort and to promote relaxation.
- Instruct the patient to bear down as if having a bowel movement is advised as the fiberoptic tube is inserted through the rectum.
- When the scope is advanced through the sigmoid. The patient's position is changed to supine to allow passage into the transverse colon. Air is insufflated through the tube during the passage to help in visualization.

- Instruct the patient to take deep breaths to aid in the movement of the scope down through the ascending colon to the cecum and into the terminal portion of the ileum.

After the Procedure

- Observe the patient closely for signs of bowel perforations such as severe abdominal pain, nausea, vomiting, fever, and chills must be reported immediately.
- Monitor vital signs and neurological status every 15 minutes for 1 hour, then every 2 hours for 4 hours, or as ordered. Assess temperature every 4 hours for 24 hours.
- After the patient has recovered from sedation, allow him to resume his usual diet and activity unless any other indications.
- Inform that the patient may pass large amounts of flatus after insufflation.
- Monitor for any rectal bleeding. If a polyp has been removed, minimal rectal bleeding is expected for 2 days but an increasing amount of bleeding should be reported immediately.
- Encourage increased fluid intake.

Flexible sigmoidoscopy is used to evaluate the lower part of the large intestine. During a flexible sigmoidoscopy exam, a thin, flexible tube, which is sigmoidoscope is inserted into the rectum. A tiny video camera at the tip of the tube allows to view the inside of the rectum, the sigmoid colon and the descending colon just under the last 2 feet of the large intestine. The patient preparation and care similar like colonoscopy.

A **virtual colonoscopy** is similar to a traditional colonoscopy. The healthcare technician will perform a computerized tomographic (CT) scan and use the images to construct a 3-dimensional view of the intestine. Virtual colonoscopy is more effective than a standard colonoscopy, because the 3-dimensional images allow the physician to view parts of the intestine that might not be visible using a standard camera.

Capsule Endoscopy

It is a powerful diagnostic tool that has proved especially useful in imaging the small intestine.

Figure 5.9 illustrates the capsule endoscopy and **Table 5.7** depicts the indications and contraindications of capsule endoscopy. **Table 5.8** depicts the advantages and disadvantages of capsule endoscopy.

Procedure

- Fasting is necessary prior to swallowing capsule.
- Capsule glides smoothly through git.
- Wireless recorder worn on a belt around waist receives signals transmitted by capsule through sensors.
- The capsule is naturally excreted within 24–48 hours.
- The patient is swallowed the capsule with a glass of water.
- The pill travels through digestive tract, it takes a series of images, and then it wirelessly transmits the information to a data recording device, which has wear attached to a belt around the waist.
- The recorder records the video and it is received by the computer.

TABLE 5.7: Indications and contraindications of capsule endoscopy.**Indications of capsule endoscopy****Small bowel CE:**

- Obscure GIT bleeding
- Crohn's disease (diagnosis, evaluation of disease activity)
- Celiac disease (diagnosis, evaluation of refractory disease)
- Small bowel tumors
- Polyp surveillance in polyposis syndromes
- Surveillance for graft rejection after small bowel transplant
- Detection of graft versus host disease
- Unsolved abdominal pain/diarrhea

Esophageal CE:

- Screening for esophageal varices
- Screening for Barrett's esophagus
- Detection of esophagitis

Colonic CE:

- Polyp detection
- Incomplete colonoscopy
- Patients refusing colonoscopy
- Screening for colorectal cancer and follow-up evaluation for ulcerative colitis

Contraindications of capsule endoscopy

- Presence of known intestinal strictures, fistulas or obstruction
- Small children
- Pregnant females due to lack of safety data
- Patient with swallowing disorders
- Presence of pacemakers, ICD

TABLE 5.8: Advantages and disadvantages of capsule endoscopy.**Advantages**

- Painless, no side-effects
- Miniature size
- Accurate, precise (view of 150°)
- High quality images
- Efficient than X-ray, CT-scan, normal endoscopy
- High sensitivity and specificity
- Avoid risk in sedation and radiation
- Simple procedure
- Harmless material

Disadvantages

- Patients with pacemaker, pregnant women face difficulties
- Pill may stuck if there is partial obstruction in small intestine
- Impossible to control camera behavior
- Very expensive.

BARIUM ENEMA

Barium enema otherwise known as colon X-ray. It is a radiographic study of large bowel by administration of contrast medium through the rectum to detect changes or abnormalities in the large intestine.

Indications

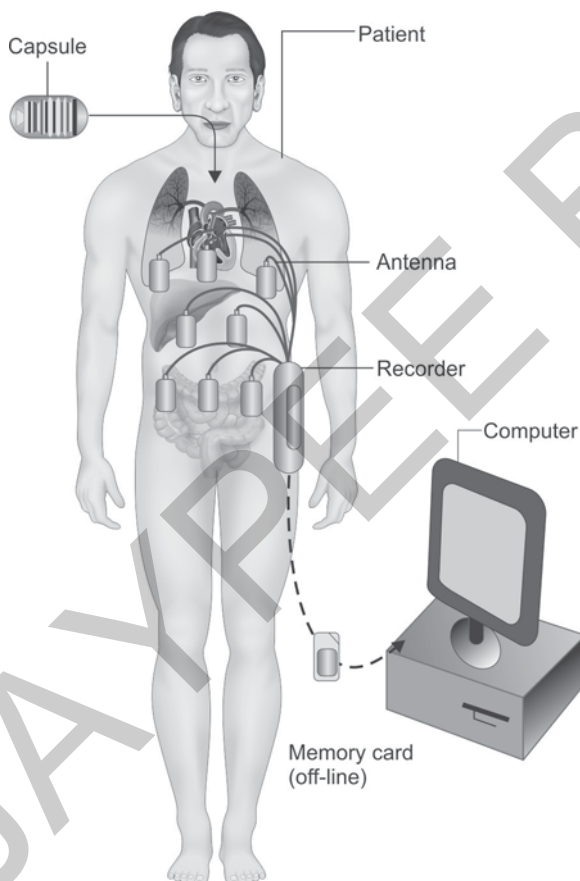
- Screening the colon
- Colorectal neoplasia
- Malabsorption
- Inflammatory bowel
- Large bowel obstruction
- Small bowel obstruction or disease
- Lower GI blood loss
- Polyposis
- Diverticulosis
- Check the patency of distal loop

Contraindications

- Allergy to barium
- Peritonitis
- Debilitated, unconscious, inability to cooperate
- History of recent rectal/colonic biopsy can be done after 6 weeks
- Pregnancy
- Toxic megacolon
- Recent biopsy such as rigid endoscope within 5 days and flexible endoscope within 24 hours

Before Procedure

- Advice to take low residue diet for two days
- Drink copious liquids on the day of examination
- Stop iron treatment for two days before procedure.
- Administer laxatives as per order
- Give bowel wash previous night and in the morning two hours prior.
- Normal water cleansing enema of 1500 mL on the morning of barium enema examination.
- Remove any metal jewellery or clothing with metal zippers or buttons during the procedure, because these interfere with the X-ray images.
- Wear the hospital clothe for procedure.

**Fig. 5.9:** Capsule endoscopy.

- After connecting the necessary things, the patient can do his/her day to day activities without any exception.
- The setup is removed after 8 hours.

Adult Health Nursing-I

Medical Surgical Nursing

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- Simple, concise, and point-wise text for easy reading and retention
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