HEALTH TECH ACADEMY

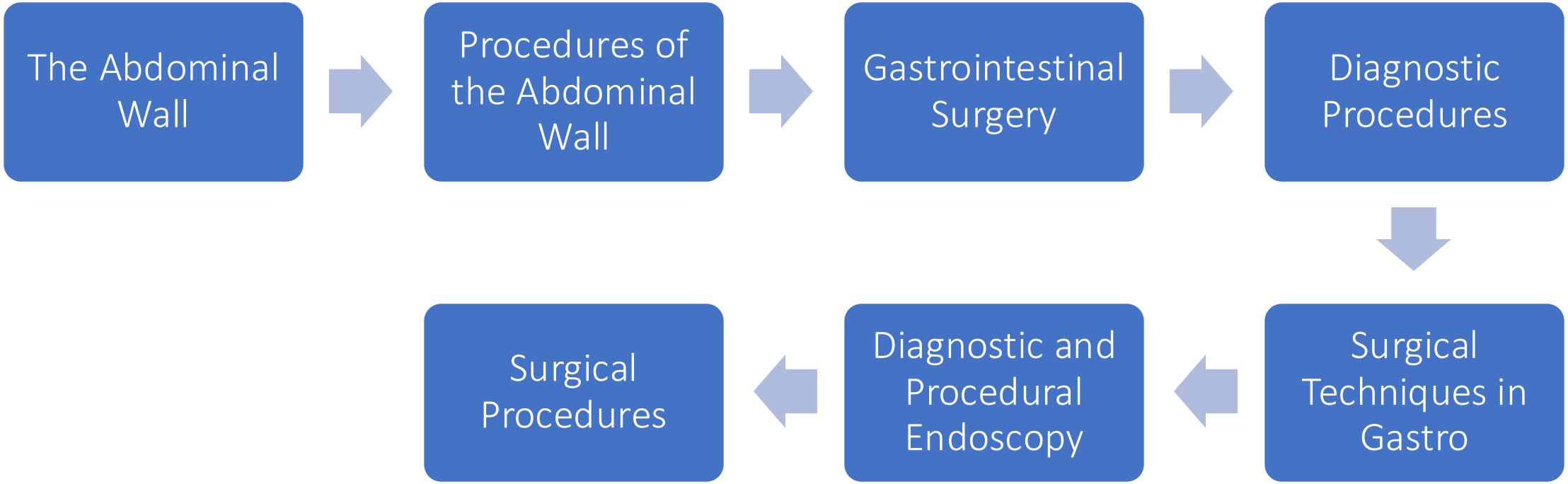
General Surgery

Surgical Techniques and Considerations

Lesson Objectives:

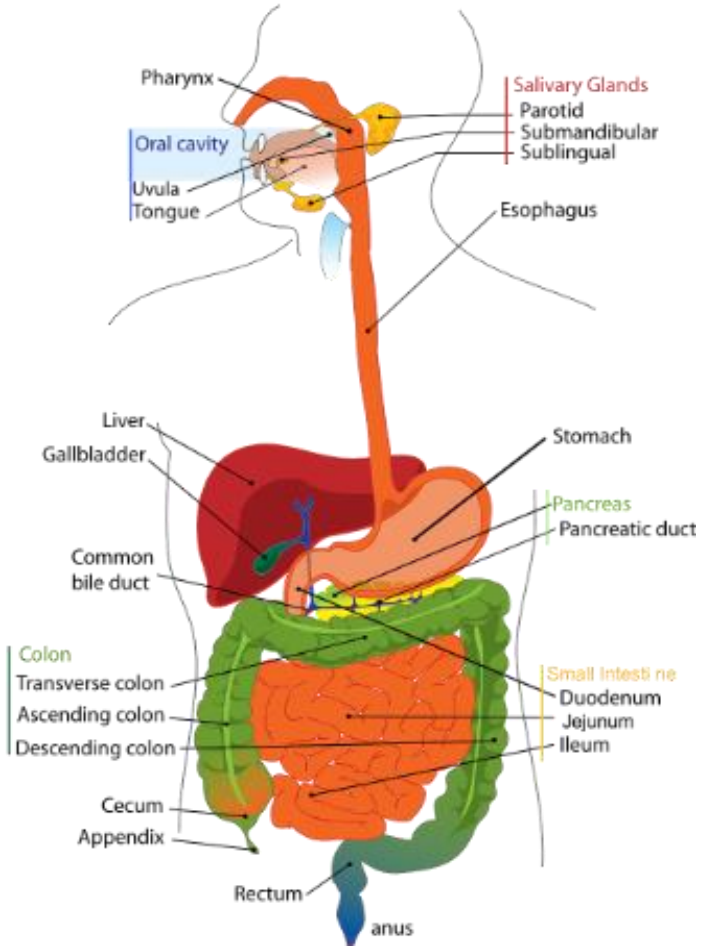
1. Identify the anatomical regions and structures of the abdominal wall
2. Discuss specific elements of case planning for abdominal wall hernias, including instruments and repair materials
3. Discuss specific elements of case planning for gastrointestinal surgery
4. Discuss the purpose and procedure of isolation technique
5. Discuss specific elements of case planning for general surgery procedures

Content Snapshot

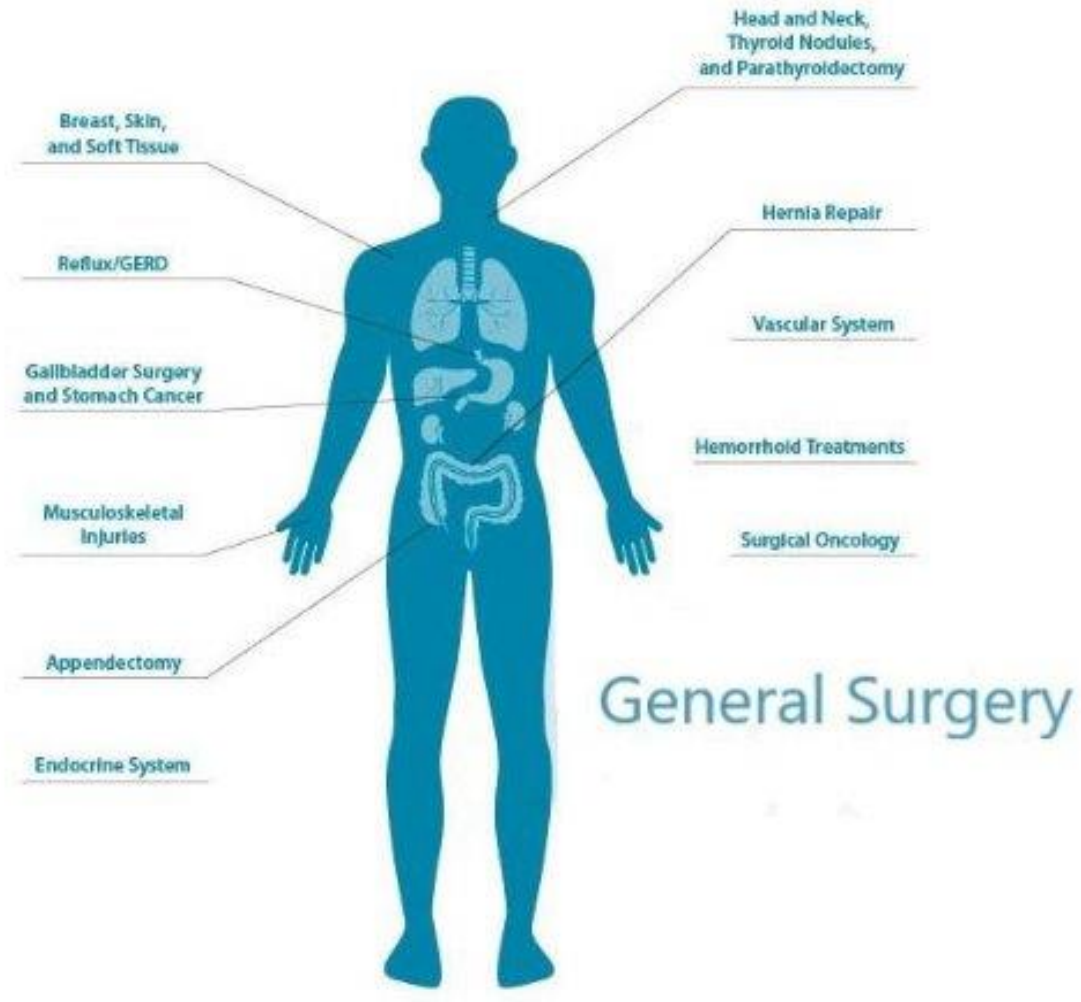


General Surgery

- General surgical procedures include those of the abdomen and its viscera, the thyroid, and some procedures of the breast
- The **organs and organ systems** involved include the following:
  - Abdominal wall
  - Gastrointestinal (GI) system
  - Biliary system (the gallbladder and associated structures)
  - Spleen
  - Pancreas
  - Hepatic system
  - Breast
  - Thyroid

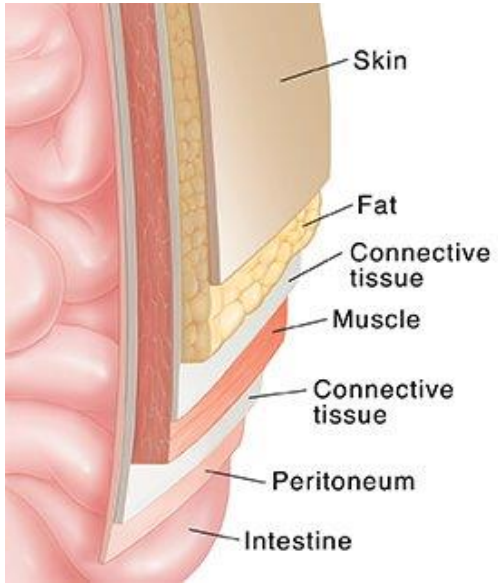


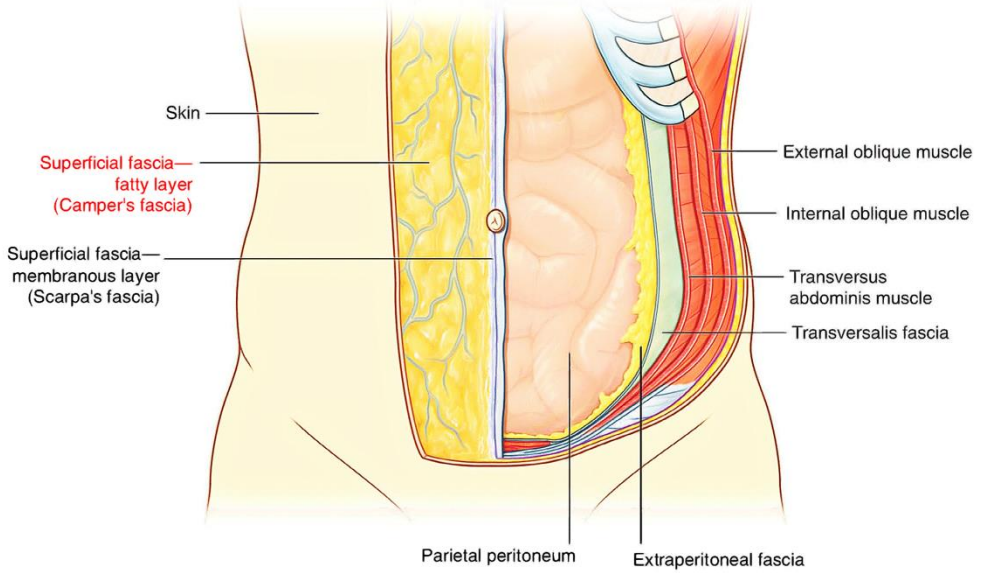
General Surgery



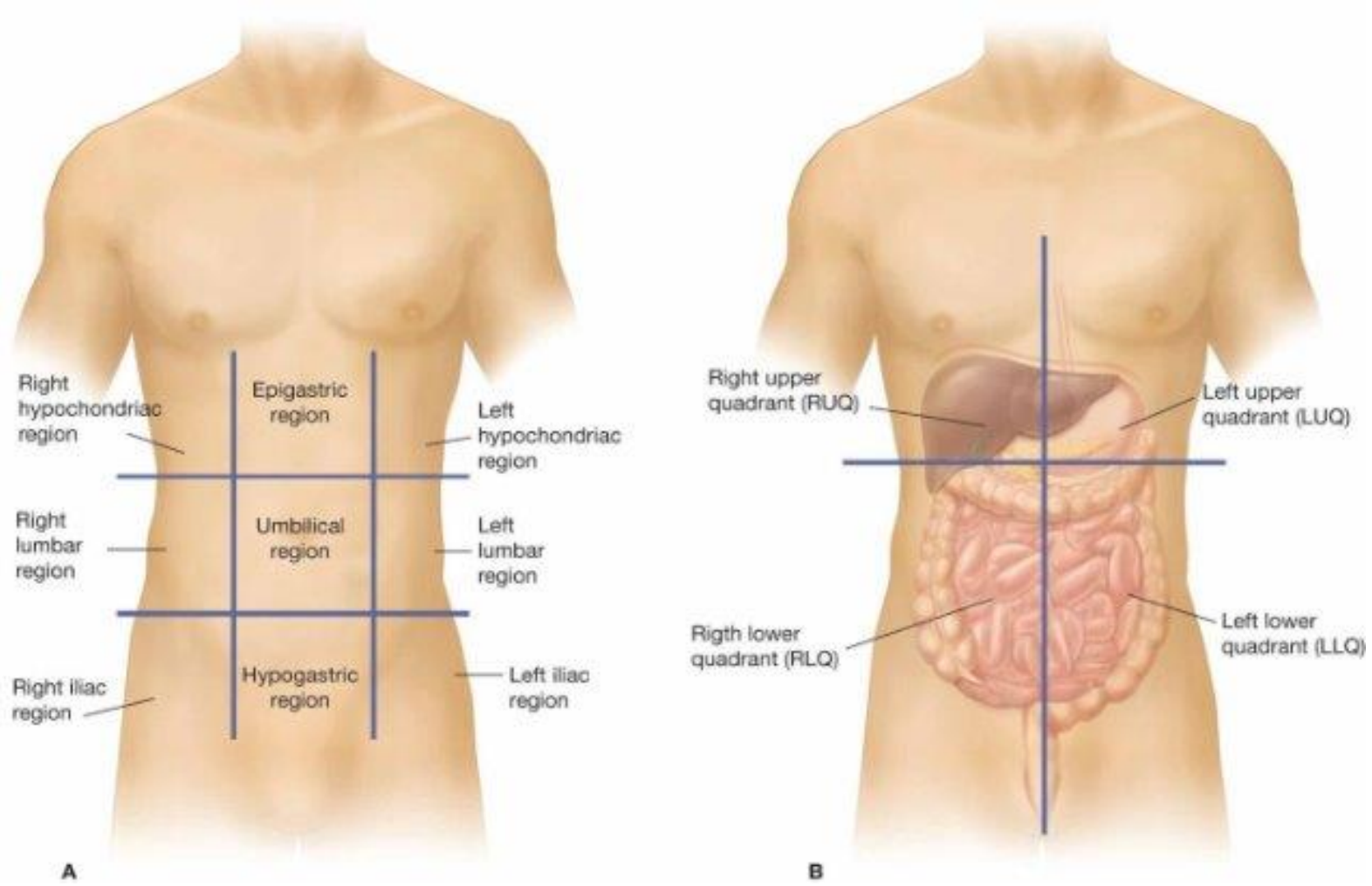
The Abdominal Wall - Anatomy

- Body divided into **cavities**: abdominal, pelvic, retroperitoneal.
- Abdomen divided into **quadrants**: RUQ, LUQ, RLQ, LLQ.
- Further division into **nine regions.**
- Abdominal wall layers: skin, subcutaneous tissue, fascia, muscle, peritoneum.

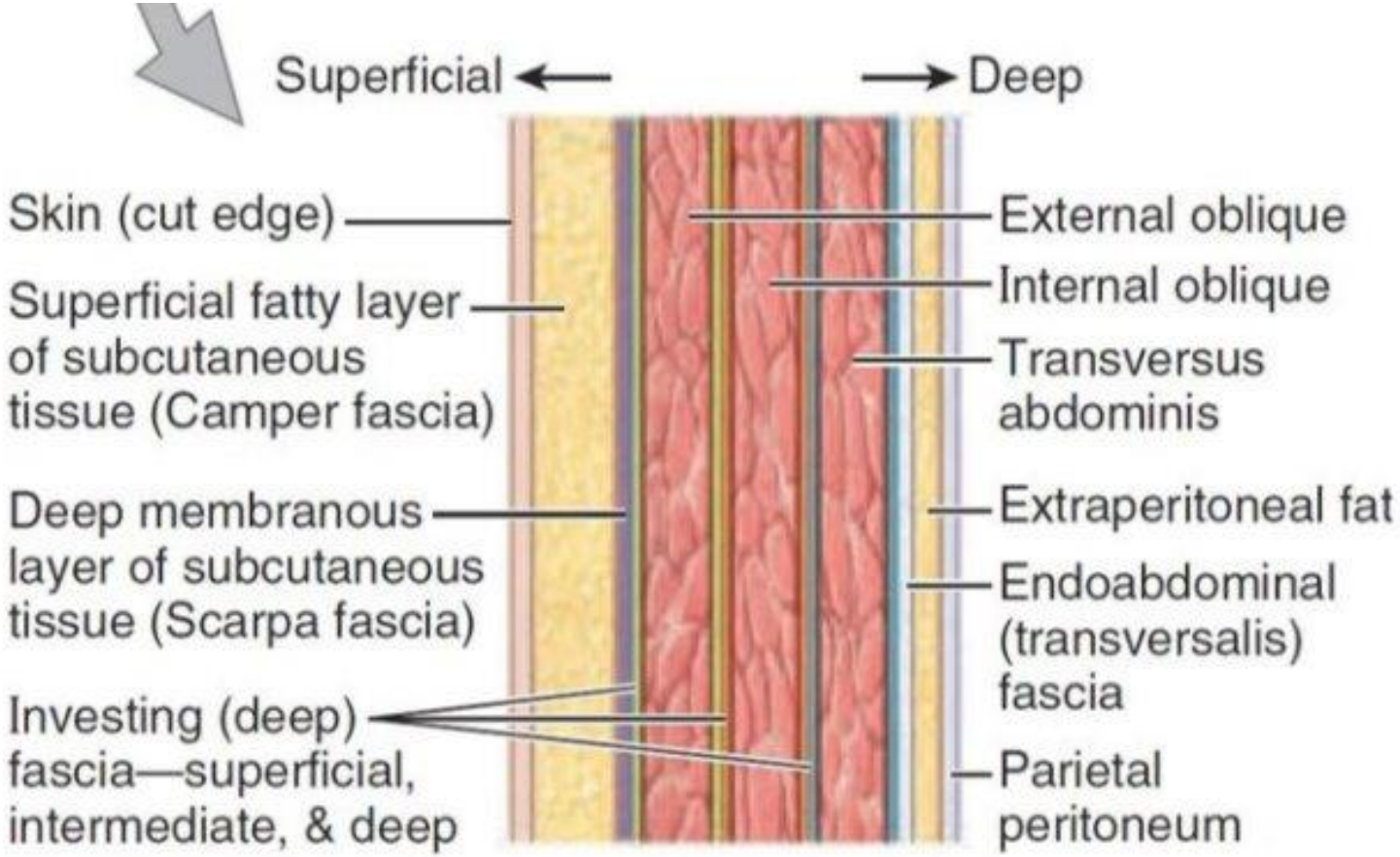




Abdominal Cavity Regions



Layers of Abdominal Wall

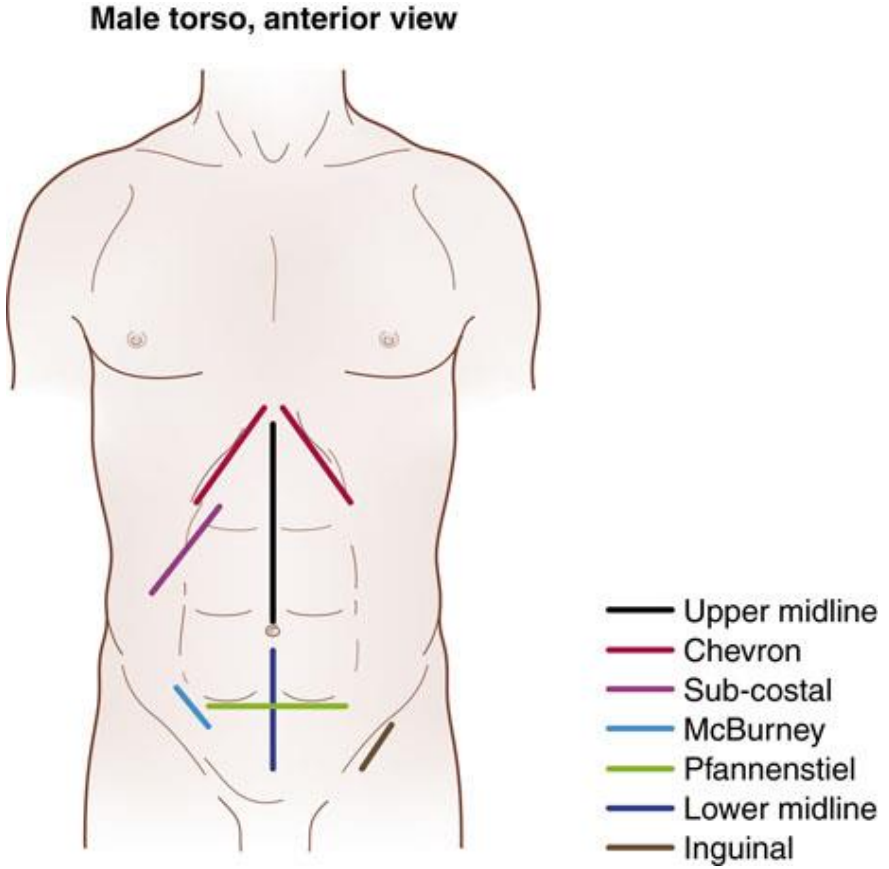


(B) Longitudinal section

Abdominal Incisions

- Named according to anatomical location

- Incision Names:
  - Chevron (inverted V and part of the Mercedes-Benz incision)
  - Midline (upper and lower)
  - Paramedian (right and left)
  - Subcostal right and left (also called Kocher)
  - Inguinal right and left
  - Right oblique (also called McBurney or appendectomy)
  - Right lower transverse (Rocky Davis)
  - Lower transverse (also called suprapubic or Pfannenstiel)

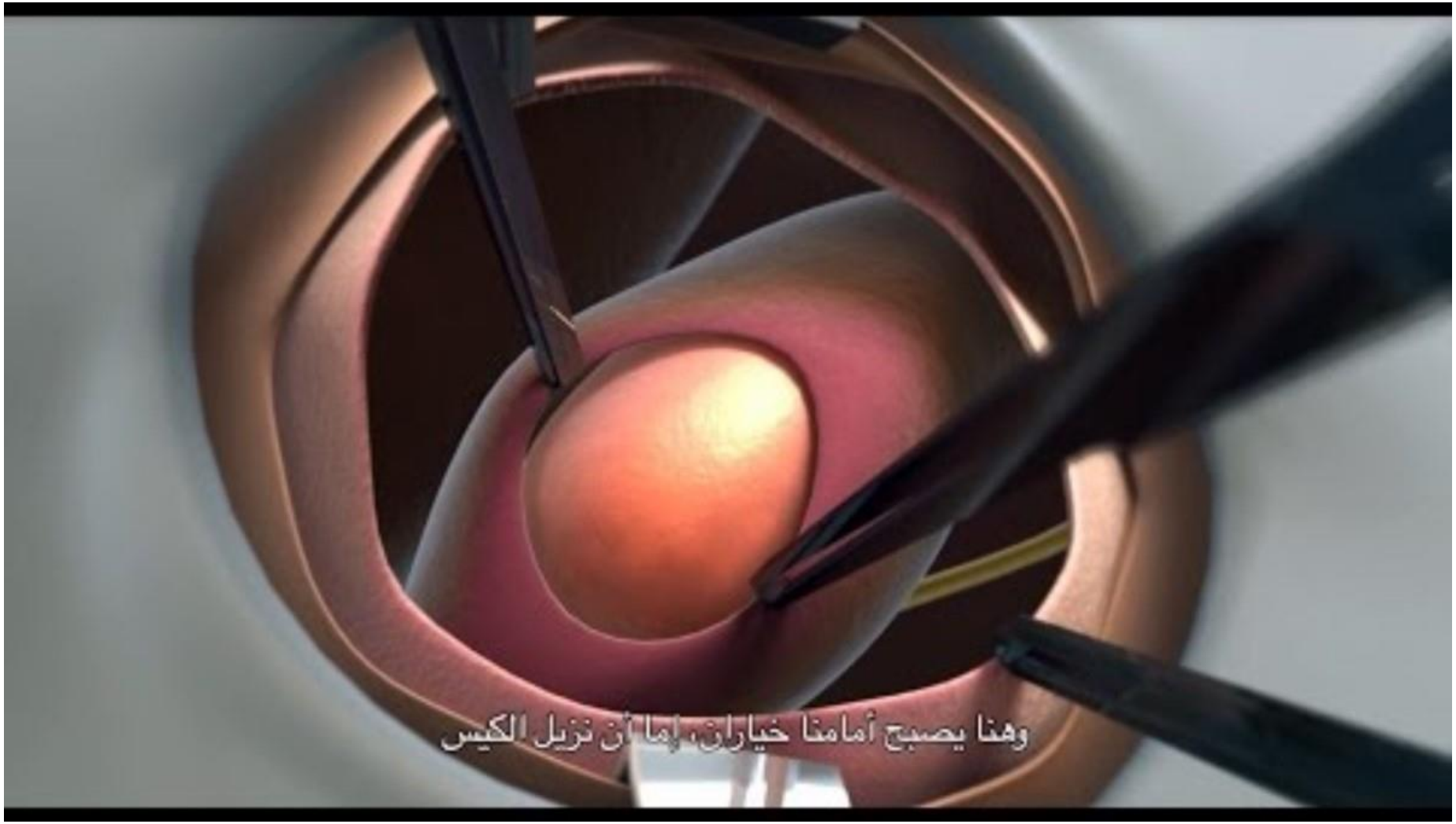


Procedures of Abdominal Wall

- Hernia repair
- Open repair of an indirect inguinal hernia
- Laparoscopic repair of a direct inguinal hernia (TAPP approach)
- Robotic repair of an indirect inguinal hernia
- Open repair of incisional hernia
- Incisional hernia repair (laparoscopic)
- Umbilical hernia repair (open)

Watch the "Inguinal Hernia Repair Video" for an explanation of Hernia procedures

Inguinal Hernia Repair Video



Inguinal Hernia Repair Video

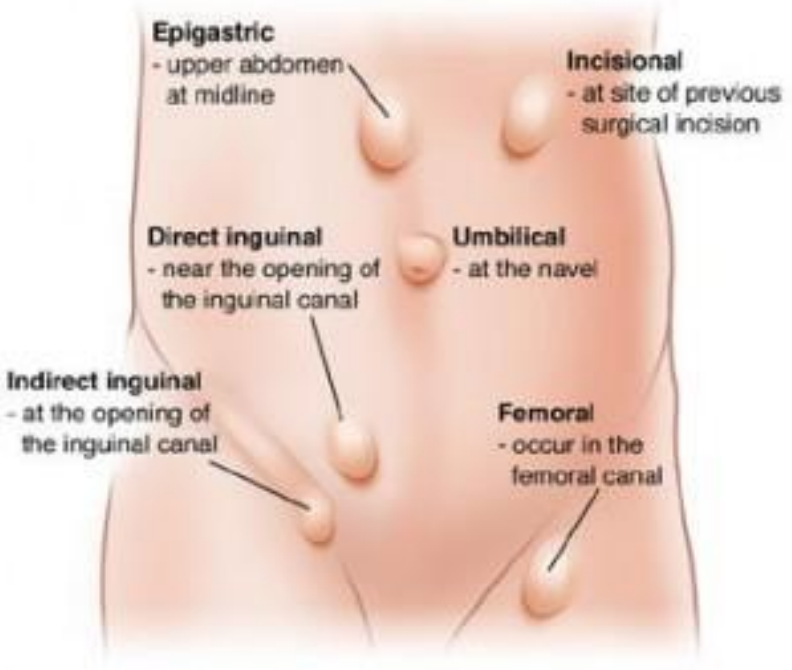
Summary of Video:

- Hernias are common – bulge of internal organs through muscle in abdomen
- Laparoscopic vs Open approach
- Reduce hernia by pushing protrusion back inward, or remove hernia sac
- Mesh creates "scaffolding" for body to repair, and prevent recurrence

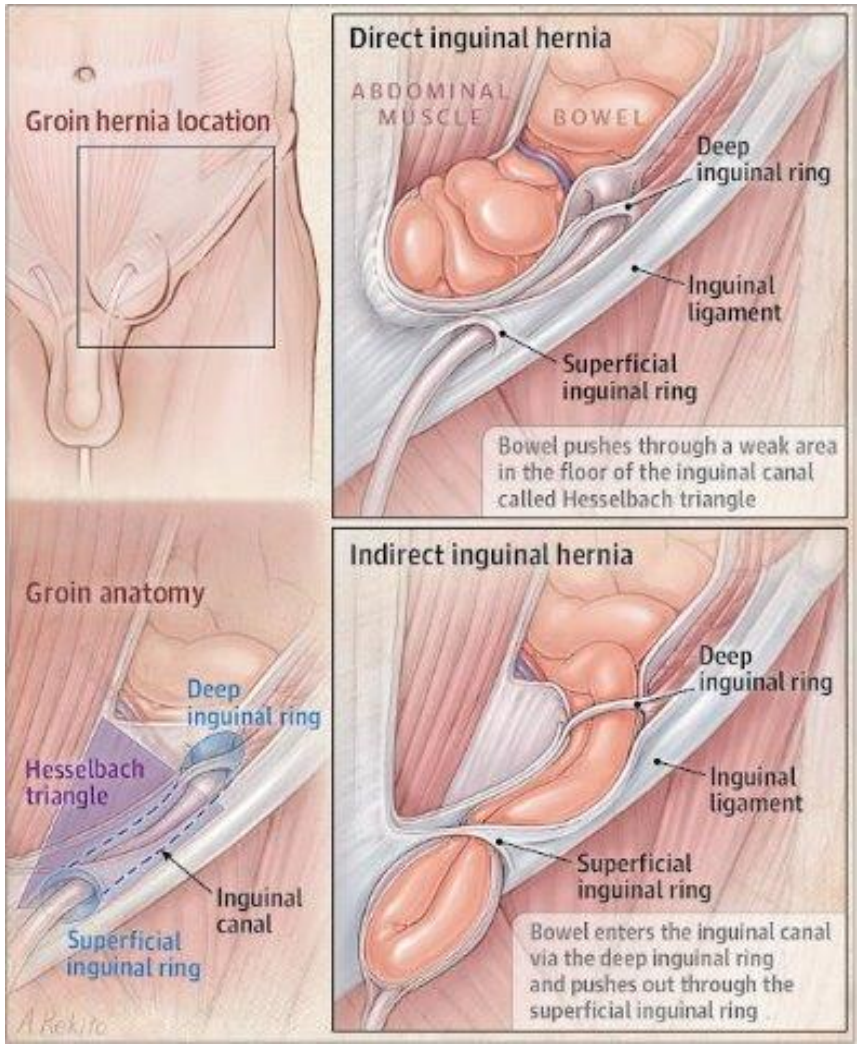
Abdominal Wall Procedure - Hernia

- **Hernia**: internal tissue, usually abdominal organs, bulge through an opening or weakened muscle. Most Hernias require surgical repair

- **Types of Hernia**
  - Inguinal (direct or indirect hernia)
  - Femoral hernia
  - Incisional or ventral hernia
  - Umbilical hernia
  - Spigelian hernia (Rare, spigelian fascia in lower abdomen)
  - Strangulated hernia – Ischemia due to poor blood flow
  - Incarcerated hernia – cannot be "reduced" or pushed back

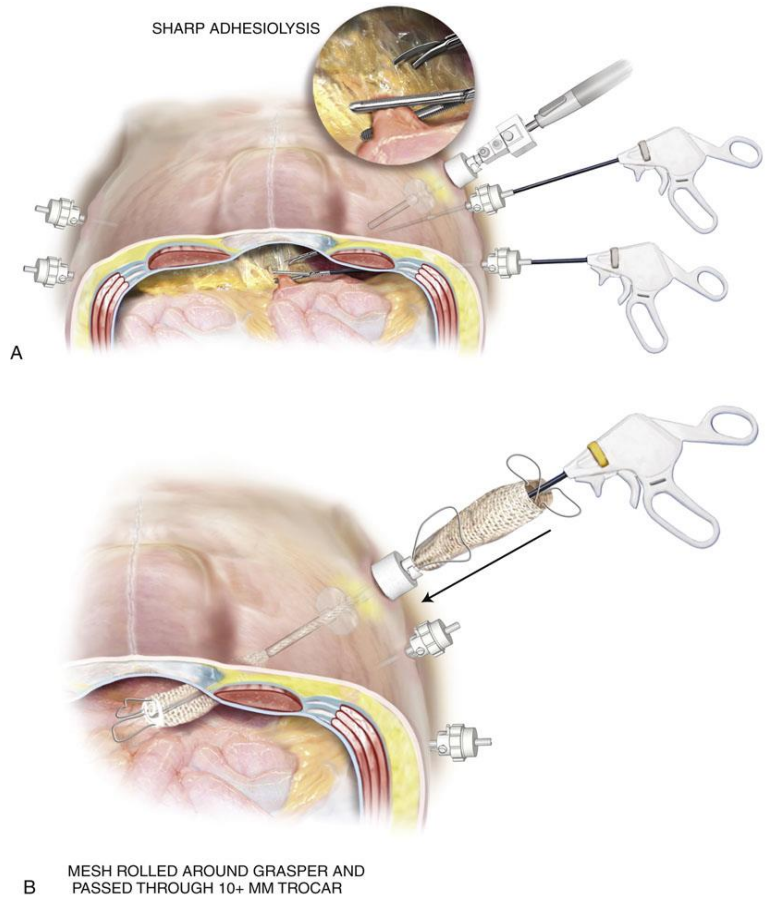


Direct vs Indirect Hernia



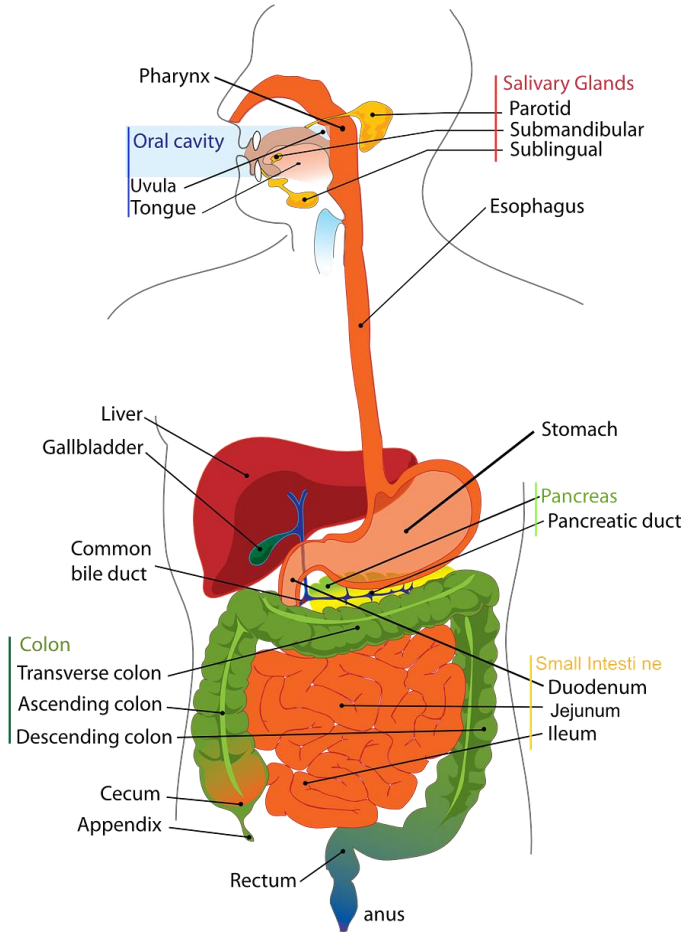
Case Planning—Abdominal Surgery

- **Open vs. minimally invasive**
  - Remember to plan for Open conversion of MIS procedures
- **Position**
  - Usually supine, but may have alterations based on site
- **Instrument set**
  - Minor General Sets and Laparoscopic sets will be most common
- **Suture**
  - Both for closure of wound and repair of hernia
- **Mesh**
  - Surgical implant that strengthens the repair and prevents recurrence



Introduction to Gastrointestinal Surgery - Anatomy

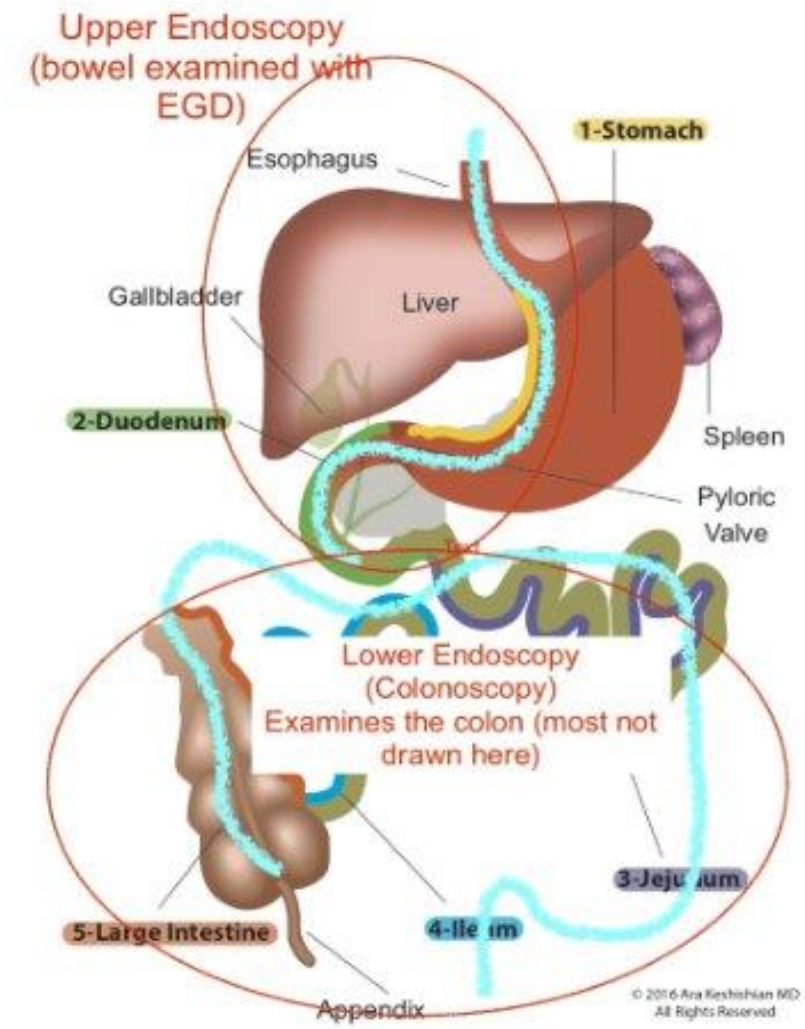
- **Esophagus:** Tubular structure from pharynx to stomach.
- **Stomach**: Located in left upper abdomen; has fundus, body, antrum.
- **Small intestine:**
  - Divisions: duodenum, jejunum, ileum.
  - Duodenum receives chyme; pancreatic and bile ducts drain here.
  - Jejunum (9 feet) and ileum (13½ feet) suspended by mesentery.
- **Large intestine (colon)**
  - Sections: ascending, transverse, descending, sigmoid colon, rectum.
  - Forms haustra; cecum with appendix; rectum terminates at anus.
- **Rectum and anus**
  - Rectum (4 to 5 inches) terminates at anal canal.
  - Anal canal has two sphincters: internal (involuntary), external (voluntary).



Diagnostic Procedures of Gastrointestinal Surgery

- Gastrointestinal Surgery is done using the following:
  - Imaging studies
    - Abdominal X-Ray
    - Abdominal CT
    - Barium Swallow
  - Blood and metabolic studies
  - Physical exam
  - Endoscopy – Upper GI (EGD, ERCP, etc), Lower GI (Colonoscopy, etc)

Endoscopy of GI Tract



Case Planning for Gastrointestinal Surgery

- **Thermoregulation**
  - Crucial to prevent hypothermia
- **Compression device**
  - Used for DVT prevention
- **Position**
  - Usually supine. Lithotomy for many lower GI procedures. Kraske or Lithotomy for Rectal procedures.
- **Instrument set**
  - Minor and Major General Sets. Laparotomy sets and retractors. Laparoscopy Sets.
- **Stapling devices**
  - Especially useful for bowel resections/revisions
- **Suture**
  - Abdominal Closure. Bowel Anastomosis. Ostomy Creation When applicable

Special Gastrointestinal Procedures

- Diagnostic and procedural endoscopy
  - These are done diagnostically, but are often done in conjunction with surgery
- Esophagoduodenoscopy (EGD, Upper GI Scope)
- Colonoscopy (Lower GI Scope)
- Sigmoidoscopy (Lower GI into the Sigmoid Colon)

Gastrointestinal Surgical Procedures

- Laparotomy
- Laparoscopy
- Gastrectomy, Billroth I and II (Open)
- Laparoscopic band gastroplasty
- Roux-en-Y gastric bypass (laparoscopic)
- Nissen fundoplication (laparoscopic)
- Segmental resection of the small intestine (open)
- End ileostomy
- Right hemicolectomy (open)
- Robotic-assisted low anterior resection (LAR)
- Appendectomy (laparoscopic)
- Excisional hemorrhoidectomy
- Surgical treatment for anal fistula

Pathology of Gastrointestinal System

- Knowledge of key anatomical structures and pathology of the gastrointestinal system contributes to the surgical technologist's ability to anticipate the need for
  - Instruments
  - Sutures
  - Other equipment

Watch the "Major Abdominal Instrument Set" Video for an overview of Instruments

Major Abdominal Instrument Set Video

Major Abdominal Instrument Set Video

Summary of Video:

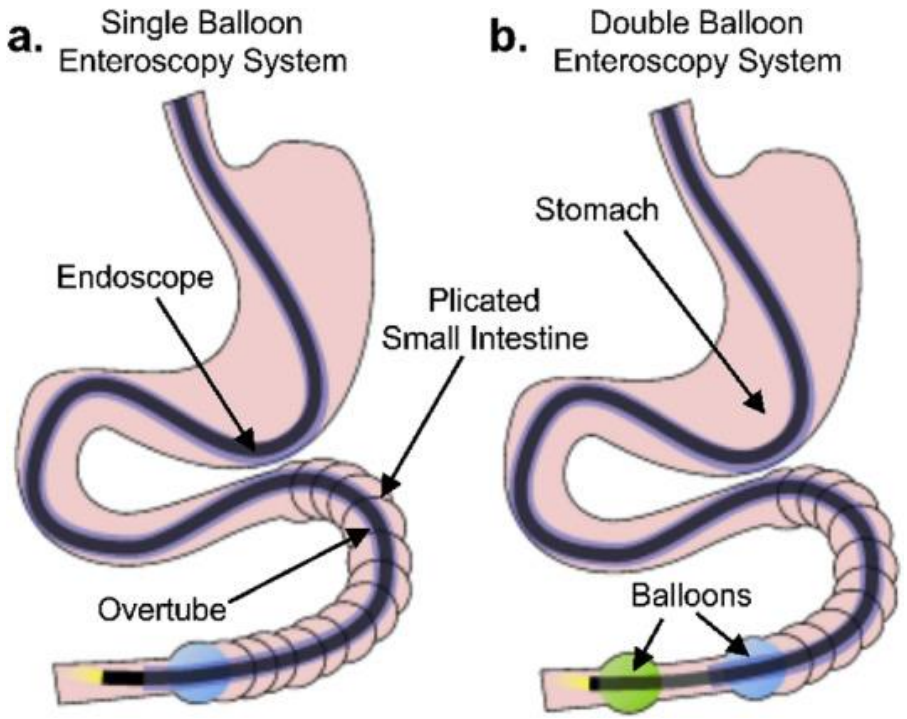
- Major Sets used in Laparotomy surgery. Available on Laparoscopic procedures
- Long Instruments are useful in the abdomen
- Atraumatic Clamps for Bowel – Babcocks and Allis
- Bowel Clamps – Different types, but many appear similar
- Abdominal Handheld retractors – Army/Navy, Richardson, Kelly Sidewall, Deavors, Malleables, Harringtons (Sweetheart)
- Balfour Retractor – different blade lengths, bladder blade
- Bed Mounted Abdominal retractors – Bookwalter, Thompson, Omni

Surgical Techniques in Gastrointestinal Procedures

- **Surgical Techniques in Gastrointestinal Procedures**
  - Special techniques in GI procedures.
  - Mobilization: Clamping, cutting, maintaining hemostasis.
  - Anastomosis: Joining hollow structures.
  - Importance of familiarity with surgical stapling instruments.
- **Isolation Technique**
  - Prevention of bacterial contamination.
  - Implementation during bowel procedures and metastatic tumor resection.
  - Double setup vs. single setup.

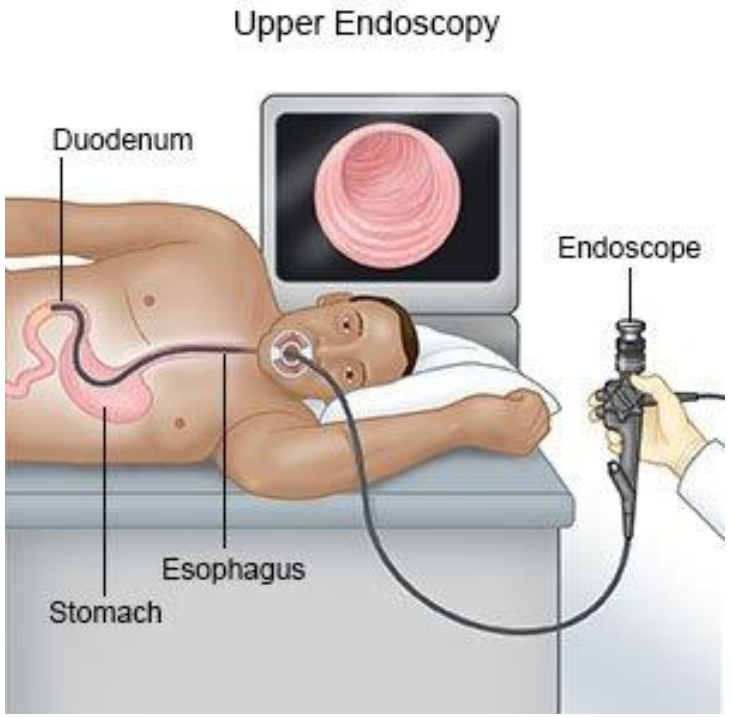
Single Setup vs Double Setup

- **Single Setup**
  - One set of instruments and supplies.
  - Contaminated items isolated in a basin.
  - Re-draping after resection.
- **Double Setup**
  - Two sterile setups: one for surgery, one for closure.
  - Preparation before surgery begins.
  - Closure performed in a separate setup.



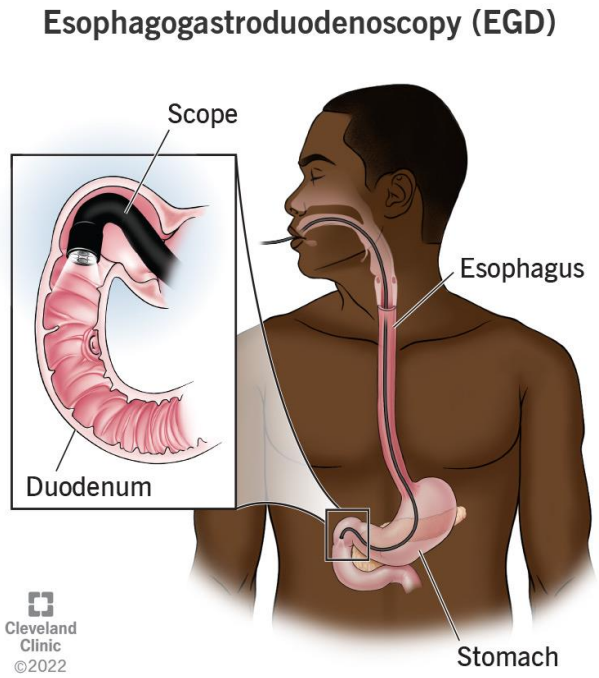
Diagnostic and Procedural Endoscopy

- Gastrointestinal endoscopy is indicated for the following:
  - To establish or confirm a diagnosis by direct visualization and biopsy
  - To perform selected surgical procedures (restricted to surgery in which bleeding is minimal and the risk for technical complications is low)
  - To allow postoperative inspection of the surgical site from within the lumen of the GI tract and for screening



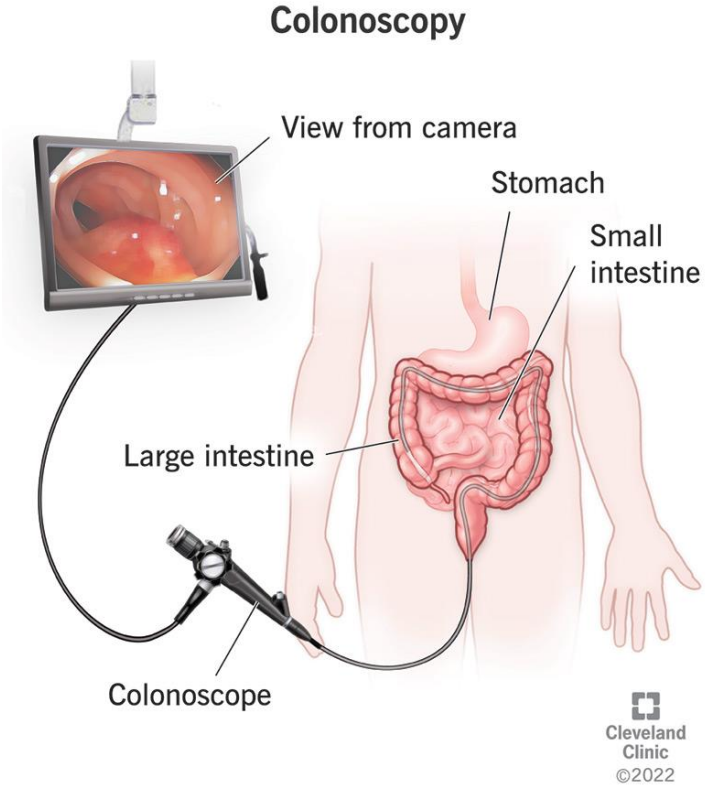
Esophagoduodenoscopy

- **Goals:**
  - Direct diagnostic observation of the inside of the esophagus and duodenum, with biopsy
  - Treatment of varices (varices are prone to frequent bleeding and sometimes require emergency treatment)
  - Polyp removal (polyps are small, benign mucosal outgrowths in the lumen of the esophagus)
  - Endoscopic gastrostomy for insertion of a feeding tube
  - Placement of a stent for an esophageal stricture
  - Dilatation of the esophagus to treat a stricture using gastric bougies such as the Maloney, Savary, and balloon-type dilators



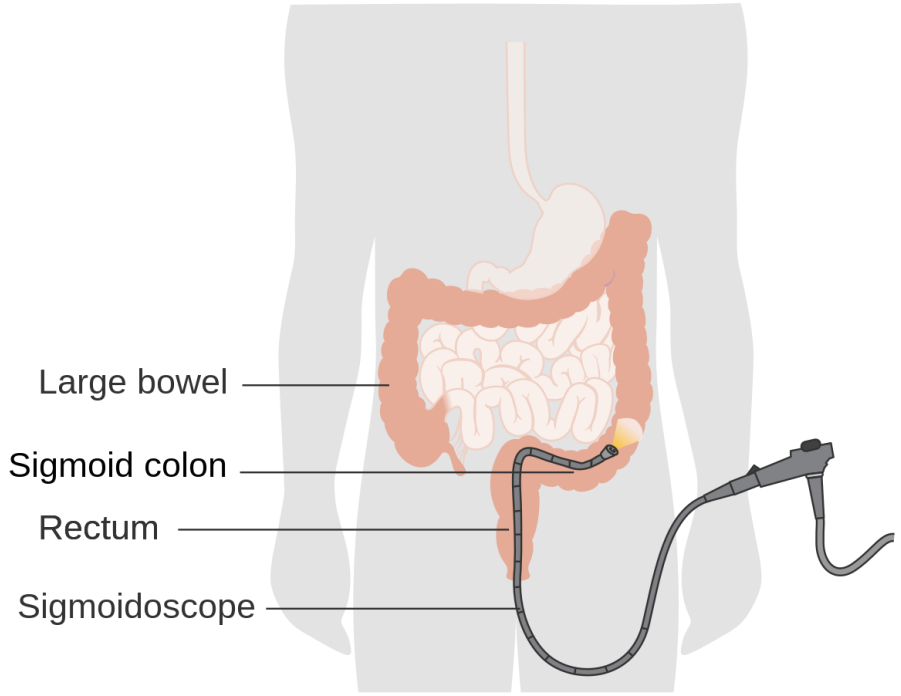
Colonoscopy

- Colonoscopy is endoscopy of the large intestine. The procedure is used for diagnostic purposes and for minor surgery, such as the following:
  - Removal of polyps
  - Biopsy or removal of lesions
  - Coagulation of small bleeding diverticula
  - Laser treatment of small tumors
  - Routine screening for colon cancer



Sigmoidoscopy

- Sigmoidoscopy is performed to examine tissue and/or obtain a biopsy specimen of the sigmoid colon and rectum.
- The patient is placed in the prone or lithotomy position, and the scope is introduced.
- Biopsy tissue can be obtained, or rectal polyps can be removed with cup biopsy forceps.



Case Planning—General Surgery

- **Instruments**
  - Wide range of instruments and sets will generally fall into 3 categories:
    - Major Abdominal/Laparotomy Setup
      - Bed Mounted Abdominal Retractors:
    - Minor General (IE Superficial and Minor procedures) Setup
    - Laparoscopic (MIS) Setup
- **Special equipment and supplies**
  - Endomechanical Supplies – Staplers, Laparoscopic Supplies
  - Ultrasonic Dissectors and Generators: Harmonic, Sonicision
  - Specialty Bipolar Cautery, Sealers and Ligators: Ligasure, Aquamantys
  - Argon Beam Coagulation – Rapid Hemostasis
  - Ostomy Supplies – Bowel Resections
  - Fluorescence Imaging Equipment – Contrast dye for ischemia, can help evaluate ischemic bowel. Angiographic procedures may be done intraoperatively, such as a Cholangiogram

Surgical Procedures—General Surgery

- Laparoscopy
- Laparotomy
- Gastrectomy and Billroth I & II (Open)
- Roux-En-Y Gastric Bypass (Laparoscopic)

Laparotomy

- Open surgery of the abdominal cavity for access to organs.
- Includes exploratory laparotomy for confirming pathological conditions.
- **Procedure**
  - Incision through all layers using #20 knife blade.
  - Fascia incised, peritoneum visible.
  - Exploration of abdominal cavity.
  - Wound edges covered, self-retaining retractor inserted.
  - . Wound irrigated, drains inserted.
  - Layers closed with appropriate sutures.

Watch the "Exploratory Laparotomy" Video for an overview of Abdominal anatomy and evaluation following trauma

Exploratory Laparotomy Video

Exploratory Laparotomy Video

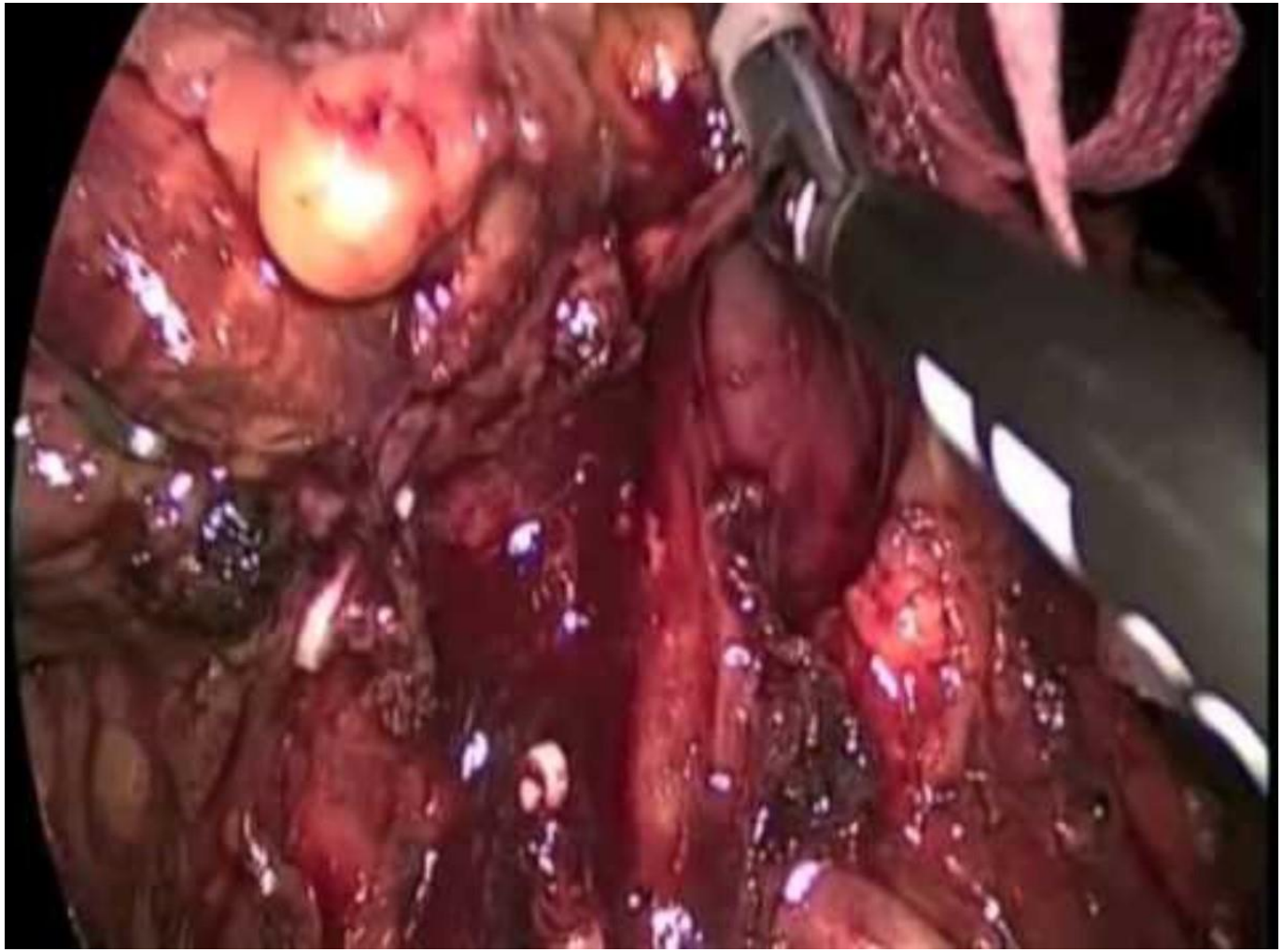
- **Summary of Video:**
  - Exploratory Laparotomy Evaluates structures within the abdomen
  - Surgeon Looks at all quadrants for anything abnormal:
    - Perforations
    - Hematomas
    - Bleeding
    - Ischemia
  - Evaluates Intestines, both sides in an organized manner

Laparoscopy

- Surgical instruments inserted through small incisions without opening the abdominal cavity.
- **Veress Technique:**
  - Hollow needle with spring-loaded obturator.
  - Obturator retracts to expose needle, preventing injury.
  - Needle replaced by trocar-cannula to maintain pneumoperitoneum.
- **Hasson Technique:**
  - Uses Hasson blunt trocar to establish pneumoperitoneum.
  - Incision made in skin and fascia layers.
  - Hasson sleeve and obturator inserted and secured with sutures.

Watch the "Laparoscopic Whipple" Video for a narrated summary of this procedure

- Laparoscopic Whipple Video (Start at 0:05)



Laparoscopic Whipple Video

Summary of Video:

- Port Placement
- Diagnostic Laparoscopy
- Pancreaticoduodenectomy
  - Removal of Head of the Pancreas
  - Removal of Duodenum (First portion of small intestine)
  - Cholecystectomy
  - Pancreas, Stomach, and Bile duct reconnect to small intestine

Gastrectomy and Billroth I & II (Open)

- Gastrectomy: Removal of a portion of the stomach with anastomosis to duodenum (Billroth I) or jejunum (Billroth II).
- **Pathology**
- Commonly for gastric carcinoma or obstructive ulcer disease caused by H. pylori bacteria and NSAID use.
- **Technical Points and Discussion**
  - **Laparotomy**: Upper right or midline incision.
  - **Mobilization**: Stomach and duodenum/jejunum from omentum.
  - **Intestinal Division**: Cross-clamped and divided into two sections.
  - **Anastomosis**: Two-layer suture closure or stapling instruments.
  - **Stomach Depression**: Percutaneous gastric tube insertion if needed.
  - **Closure**: Abdomen irrigated and closed in layers.

Watch the "Laparoscopic Distal Gastrectomy With Billroth I Reconstruction" Video for better understanding of the process

Laparoscopic Distal Gastrectomy With Billroth I Reconstruction Video

- Click Here to watch the video!

Laparoscopic Distal Gastrectomy With Billroth I Reconstruction Video

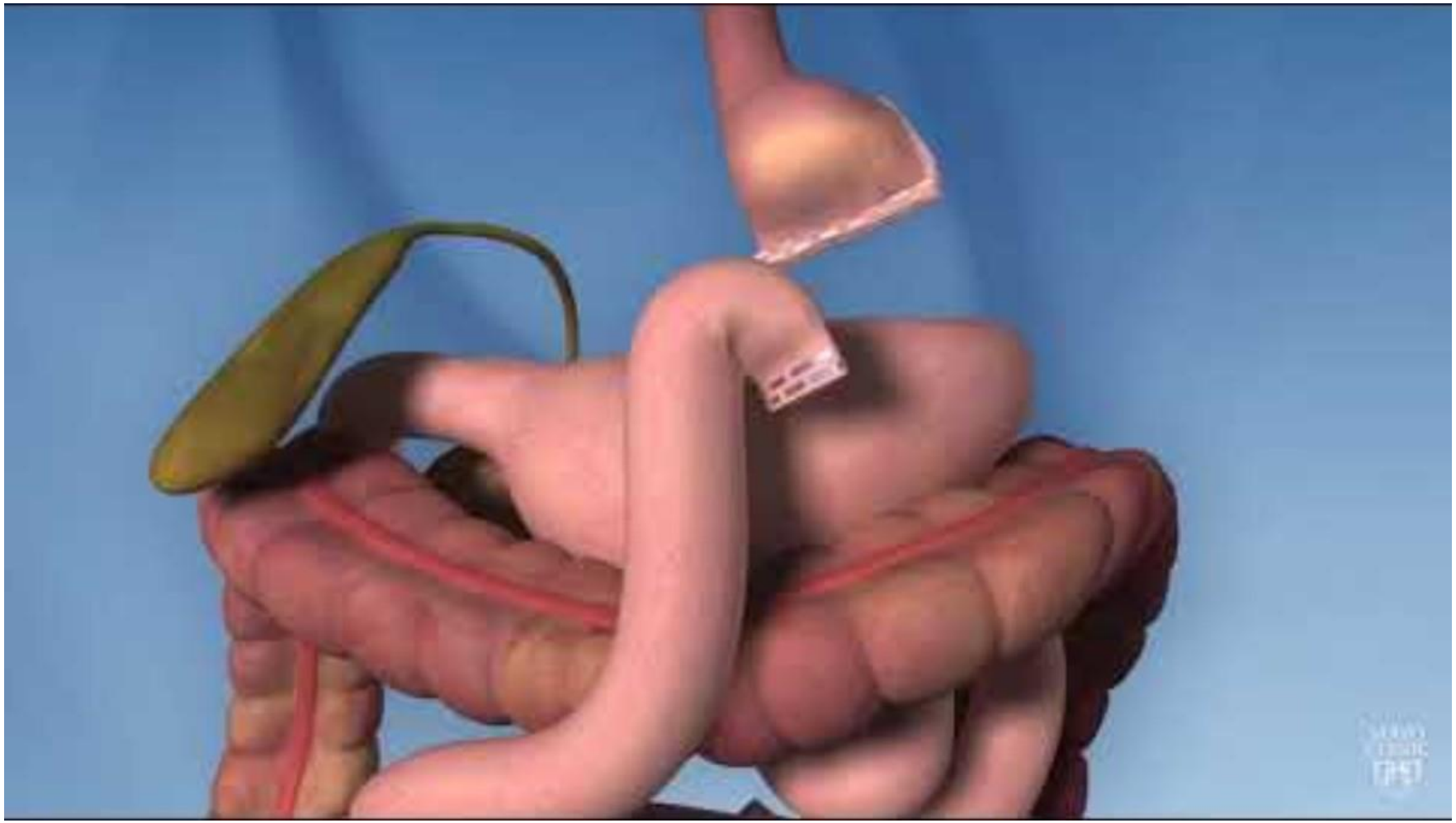
- **Summary of the Video**
- Patient: 71-year-old female with chronic NSAID-induced pyloric stenosis.
- Initial interventions: Upper GI confirmed high-grade pyloric stricture, dilated with TTS balloon during endoscopy, persistent symptoms led to surgery.
- Laparoscopic approach: Used four ports, Nathanson liver retractor, divided liver adhesions, dissected gastrocolic and gastrohepatic ligaments.
- Reconstruction: End-to-side duodenogastrostomy with circular stapler, faced anvil migration, retrieved endoscopically, reinforced anastomosis with Lambert stitches, leak test performed before port closure.

Roux-En-Y Gastric Bypass (Laparoscopic)

- Bypass most of the stomach, leaving a small stomach pouch. Jejunal transection and re-establishment facilitate food passage and gastric secretions.
- **Technical Points and Discussion**
  - **Establishing Pneumoperitoneum**: Veress needle or Hasson cut-down approach. Trocars placed: three 12-mm, two 5-mm. Shift from 0-degree to 30- or 45-degree laparoscope.
  - **Creation of Gastric Pouch**: Use of liver retractor, opening in lesser omentum, linear endostapler for pouch formation.
  - **Jejunum Transection**: Linear endostapler, mesentery openings, oversewn staple line.
  - **Gastrojejunostomy Creation**: Stab wounds, ultrasonic scalpel, GIA stapler for new opening, oversewn staple site.
  - **Wound Closure**: Irrigation, trocar incisions closure, skin closure with staples and Steri-Strips.

Watch the Video "Roux-En-Y Gastric Bypass" for a brief overview of the procedure

Roux-En-Y Gastric Bypass (Laparoscopic) Video

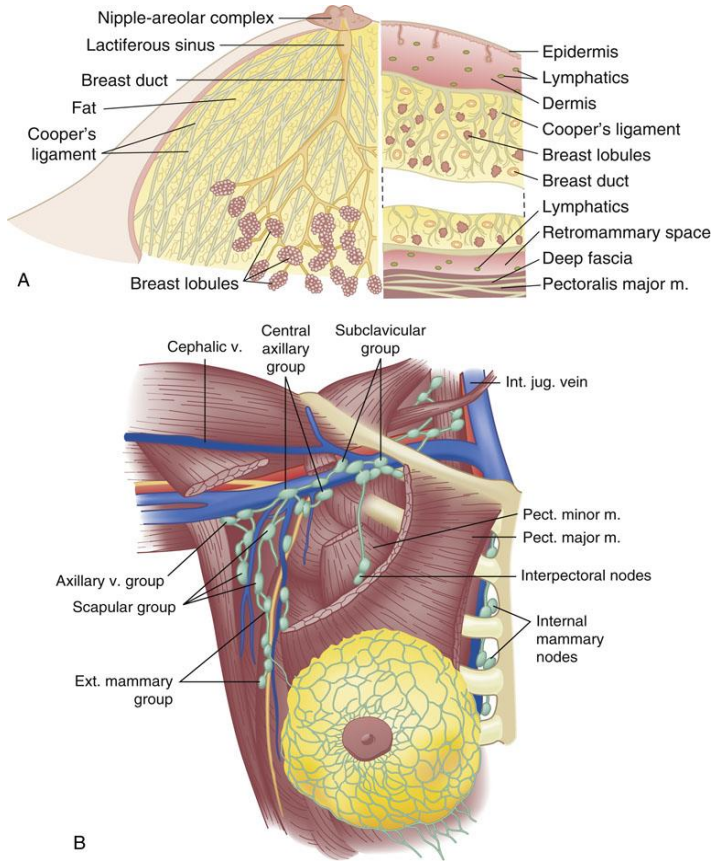


Roux-En-Y Gastric Bypass (Laparoscopic) Video

- **Summary of the Video**
  - Surgeon creates a small pouch at the top of the stomach.
  - This pouch is the sole recipient of food, significantly reducing intake capacity.
- **Surgical Procedure**:
  - Small intestine is cut below the main stomach and linked to the new pouch.
  - Direct flow of food from the pouch into this section of the intestine is established.

Breast Surgery

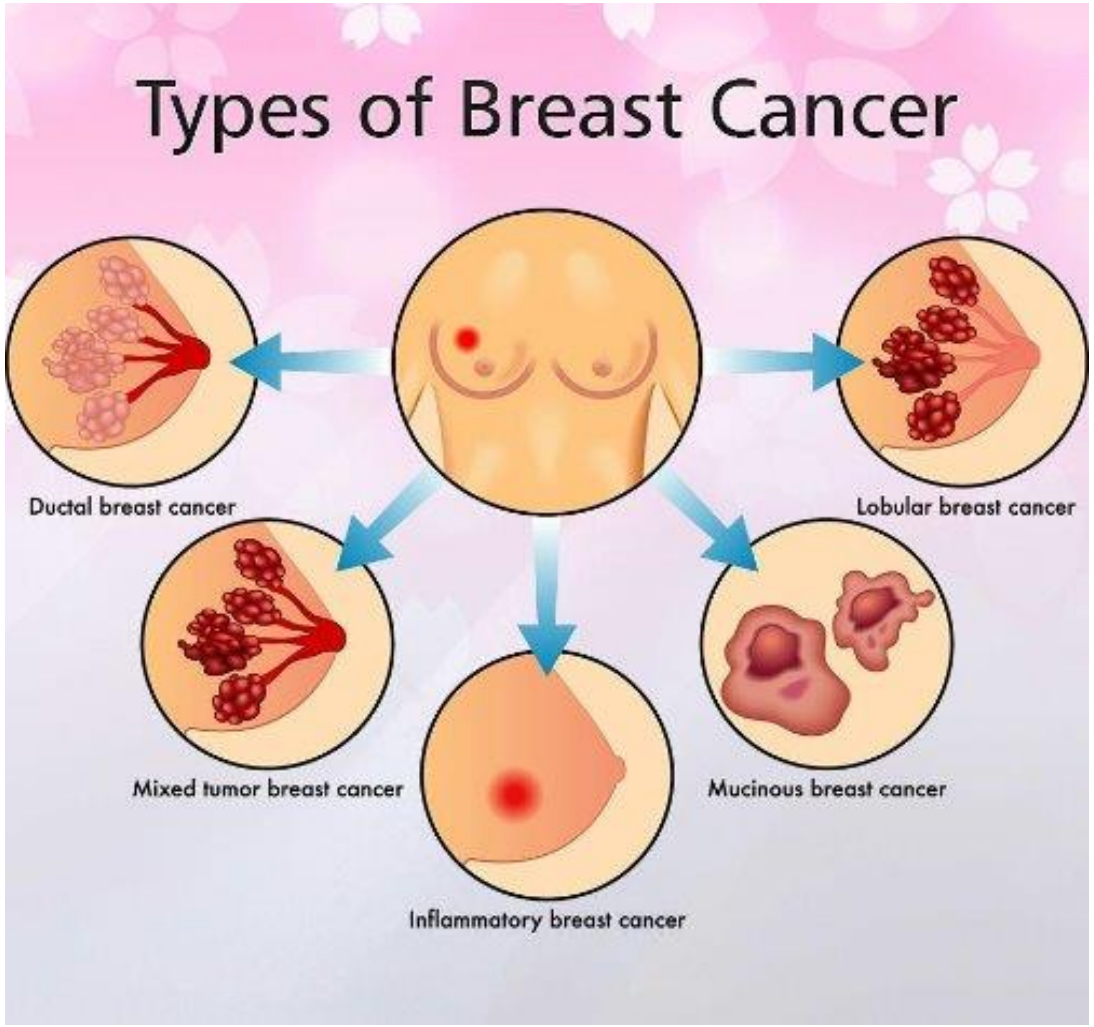
- **Surgical Anatomy**
  - Breasts within chest wall fascia (2nd-6th ribs).
  - Composed of glandular, connective, fat tissue.
  - Fibrous ligaments divide into sections.
  - Each breast: 15-25 sections.
  - Glandular tissue forms clusters with milk-secreting alveoli.
  - Lactiferous ducts connect to nipple.
  - Nipple contains various tissues.
  - Areola darkens with hormones.
  - Breast tissue changes with development, hormones.
  - Upper thoracic lymph drains to axillary nodes for cancer staging.



Breast Cancer

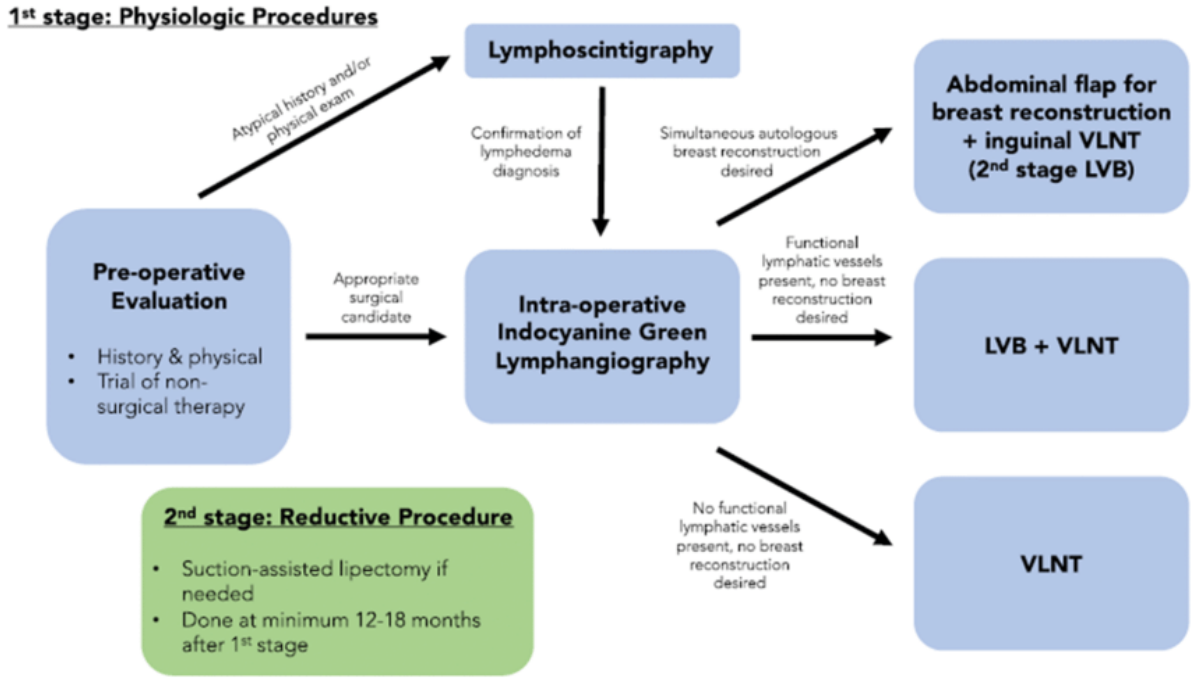
- Leading cause of death in women 20-59.
- Malignant and some benign neoplasms present as visible mass.
- Risk factors include family history and hormonal conditions.
- Male breast cancer accounts for 0.8%, with lower mortality.
- **Treatment and Staging**
  - Cancer staging determines treatment options.
  - Decision involves patient, specialists, surgeon, and oncologist.
  - Shift towards less radical surgery over 20 years.
  - Early detection and improved treatments improve outcomes.

Types of Breast Cancer



Surgical Management of Breast Cancer

- Procedures include needle aspiration biopsy, lumpectomy, mastectomy.
- Sentinel node detection and biopsy followed by breast-conserving surgery.
- Prognosis influenced by lymph node involvement more than tumor size.



Case Planning

- **Psychological considerations**
  - Altered body image
- **Position and draping**
  - Breast surgery often includes repositioning the patient in a "sitting" position to evaluate the breast tissue in a natural position under the effects of gravity
- **Instruments and supplies**
  - General surgery and plastic surgery instruments.
  - Retractors, sutures, ESU for hemostasis.
  - Vessel loops for retraction.
  - Various wound drains.
  - Nerve stimulator for dissection.

Surgical Procedures of Breast Cancer

Wire Localization and Breast Biopsy

- Insertion of wire into breast mass using guided imagery.
- Biopsy performed at wire site in operating room.
- **Technical points:**
  - Needle wire placed using imaging.
  - Patient draped for excisional biopsy.
  - Elliptical incision made around wire tip.
  - Specimen delivered to pathologist with wire.
  - Wound irrigated and closed.

Sentinel Lymph Node Biopsy

•Involves injection of dye or radioactive material.

•Tracks lymph nodes visually and by gamma ray emission.

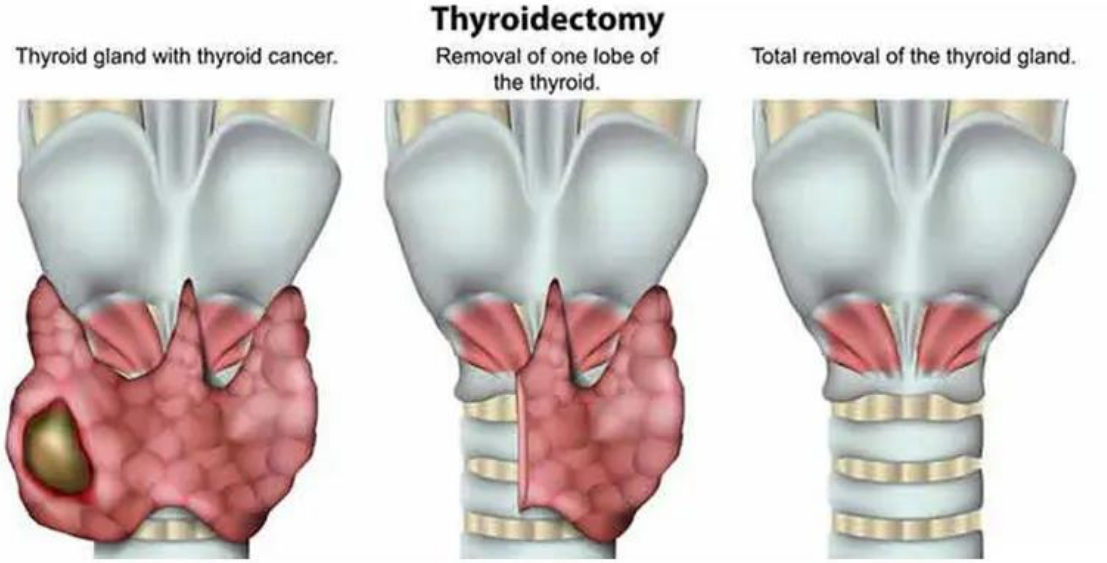
•Procedure performed before mastectomy.

•Materials injected before surgery or at time of surgery.

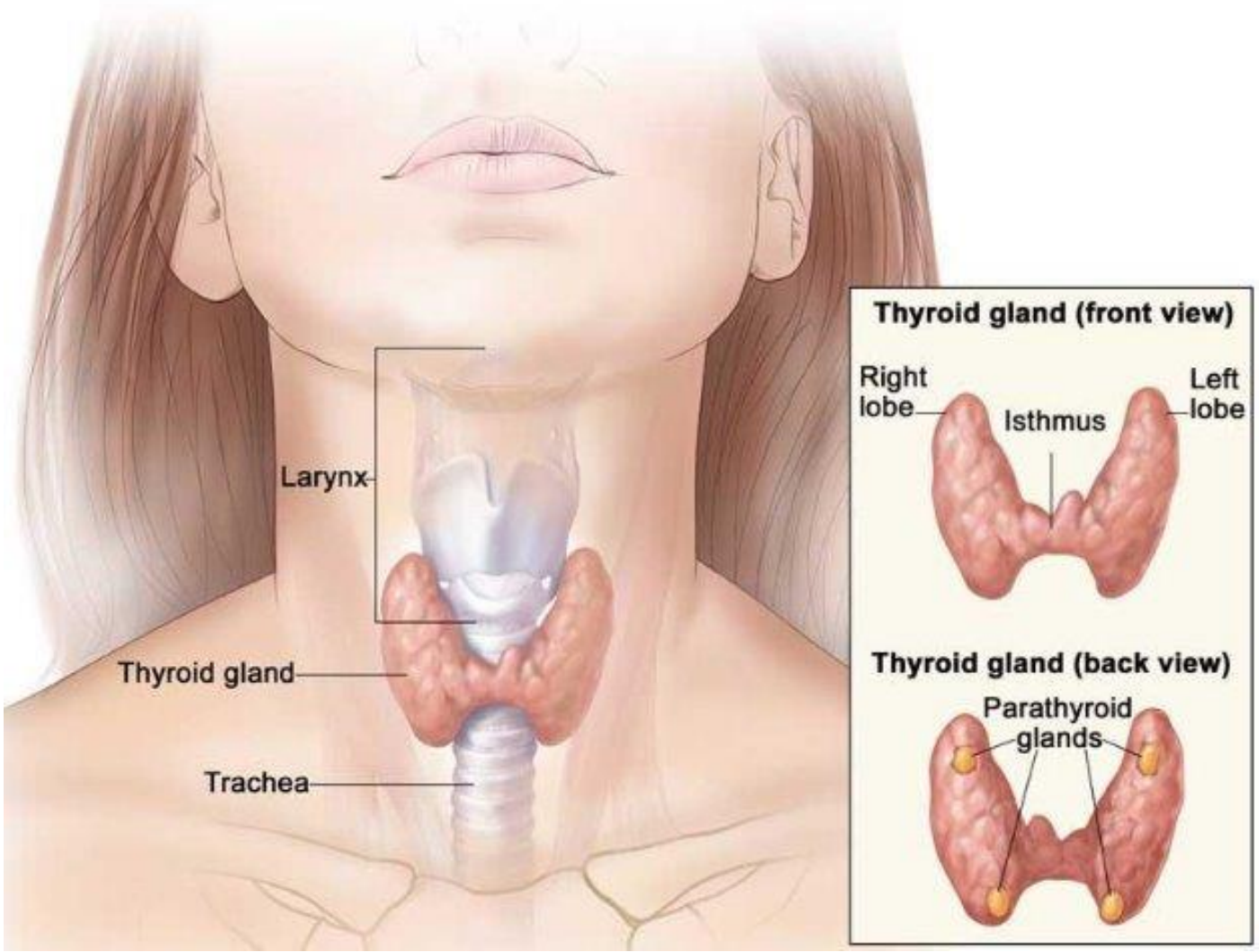
Thyroid and Parathyroid Glands

- Thyroid Procedures also commonly performed by ENT Surgery

- **Surgical procedures**
  - Minimally invasive video-assisted thyroidectomy (MIVAT)
  - Related procedure: parathyroidectomy
  - Thyroidectomy (open)



Thyroid and Parathyroid Anatomy



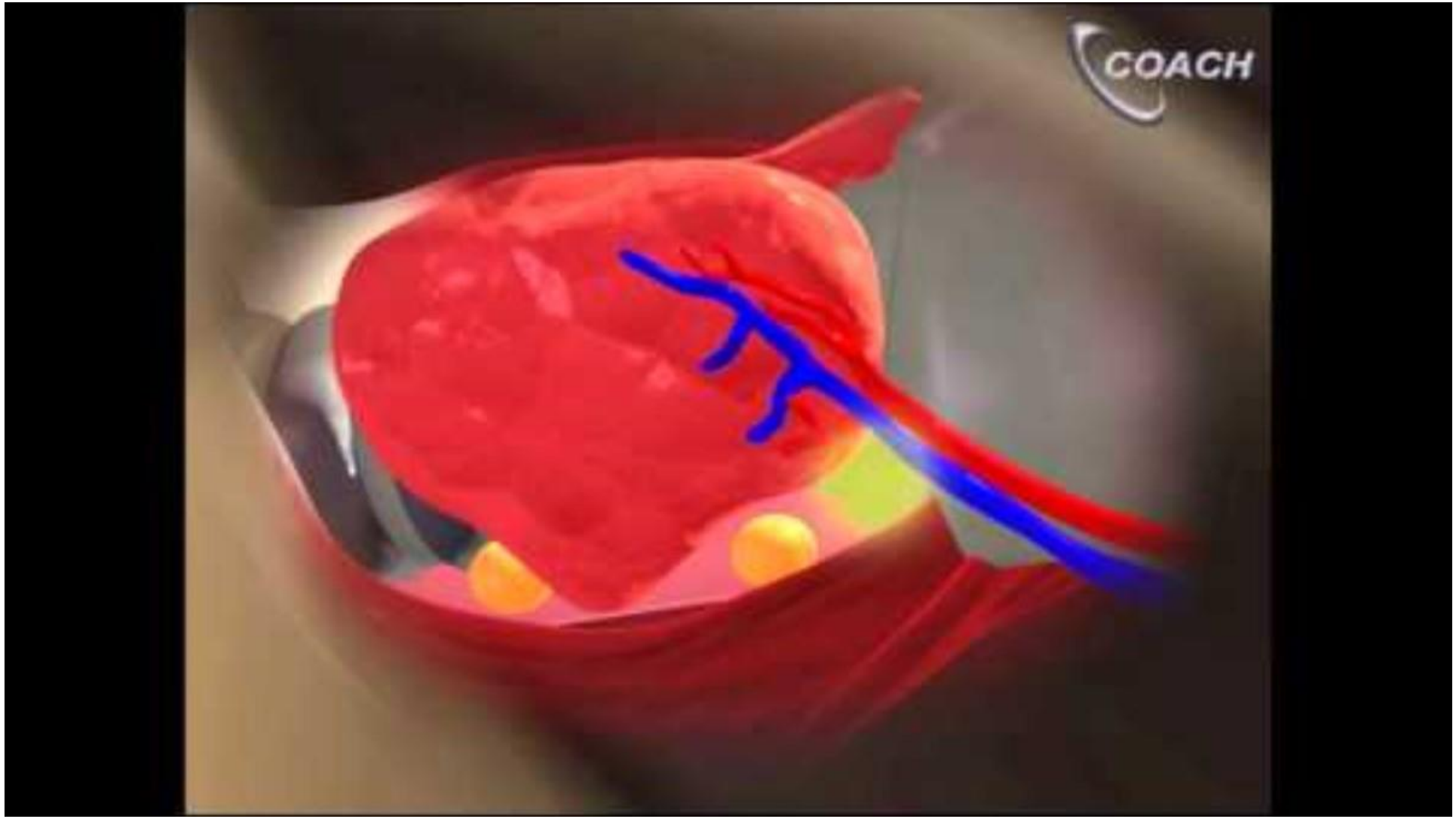
Minimally invasive video-assisted thyroidectomy (MIVAT)

- Standard procedure for thyroidectomy.
- Offers minimally invasive approach with various access points for cosmetic results.
- Surgical removal of thyroid lobes and possibly parathyroid glands.
- Utilizes video-assisted techniques for precision.

- **Technical Aspects:**
  - Can be performed with or without an endoscope.
  - Alternative access points available, including transoral and transaxillary.
- **Advantages:**
  - Minimally invasive approach reduces scarring and speeds up recovery.
  - Provides options for patients seeking cosmetic outcomes.

Watch the video "**Minimally Invasive Total Thyroidectomy Video**" for better understanding

Minimally invasive Total thyroidectomy Video



Thyroidectomy

- Seldom performed due to robotic and hybrid procedures, but still necessary for certain cases.
- Technical Points and Discussion:
  - Prepping and draping the patient.
  - Making a mid-neck incision.
  - Exposing the thyroid gland.
  - Maintaining hemostasis and removing the thyroid.
  - Irrigating and closing the wound.

Read Chapter 22 from the E-book

Read Chapter 22 from your E-Book to pass the upcoming quiz from **Surgical Technology - Elsevier eBook on VitalSource, 8th Edition.**

Click Here to access Chapter 22!

Thank you!

Get ready for your quiz and rest of the activities now. Best of luck!

Congratulations!

Lesson 22 is complete.