HEALTH TECH ACADEMY

Genitourinary Surgery

Surgical Techniques and Considerations

Lesson Objectives:

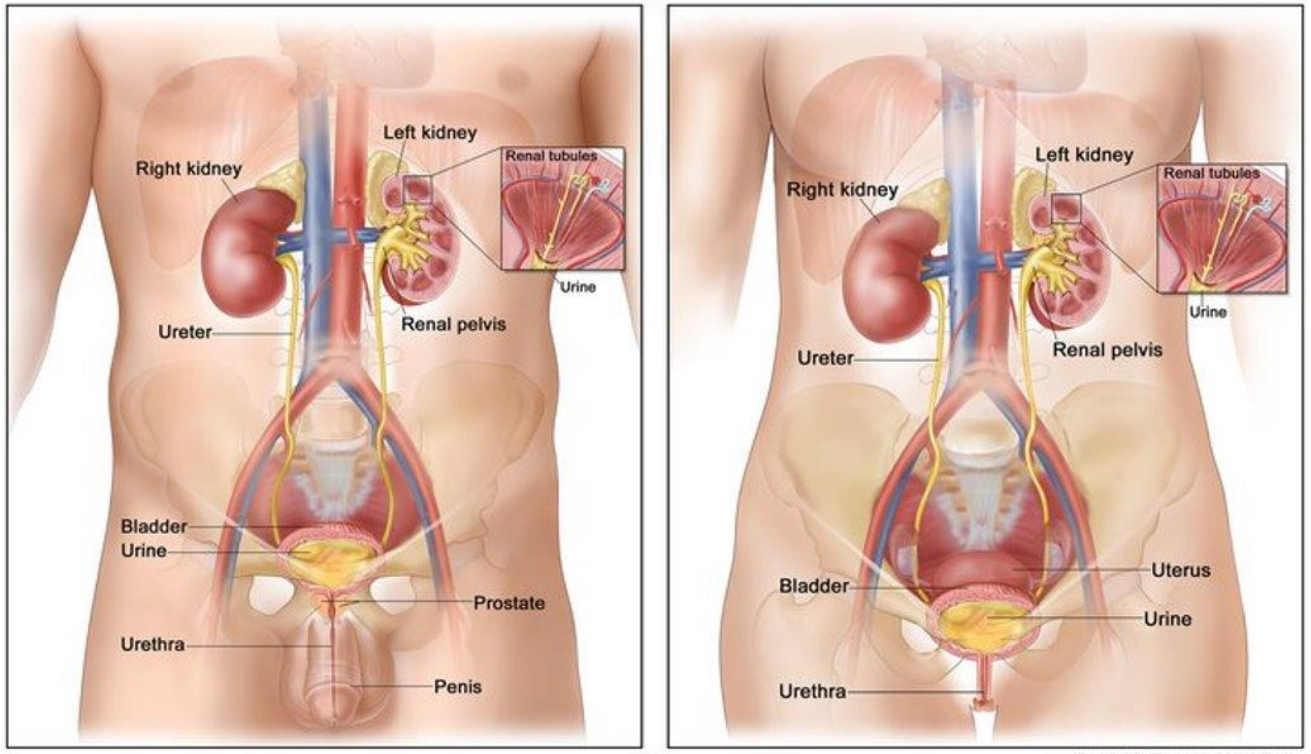
1. Identify key anatomical structures of the genitourinary system
2. Discuss common diagnostic tests and procedures of the genitourinary system
3. Discuss specific elements of case planning for genitourinary surgery
4. Describe common pathology of the genitourinary system
5. List and describe common genitourinary procedures

Genitourinary (GU) Surgery

- **Includes procedures of the urethra, bladder, ureters, kidneys, and male reproductive system**
- **Common Approaches** used in GU Surgery:
  - **Transurethral** surgery:
    - Performed through a flexible or rigid fiber-optic endoscope inserted through the urethra
  - **Open** Surgery:
    - Performed through an open incision in the abdomen or flank.
  - **Minimally Invasive** Surgery:
    - Performed using percutaneous (through the skin) endoscopic techniques

Surgical Anatomy (Slide 1 of 4)

- Retroperitoneal Cavity
- Kidney
- Adrenal glands
- Ureters
- Bladder
- Urethra



Surgical Anatomy
(Slide 2 of 4)

Retroperitoneal Cavity

- Retroperitoneal cavity lies posterior to the peritoneal cavity.
- Organs embedded in dense muscle, fascia, and fatty tissue.
- Covered anteriorly by serous membrane (retroperitoneum).
- Surgical access through abdominal peritoneum or flank.

Kidney

- Primary organs for blood filtration.
- Normally two kidneys in retroperitoneal cavity.
- Positioned at the level of 12th thoracic vertebra.
- Supported by dense fascia and fatty tissue.
- Composed of cortex and medulla layers.
- Medulla contains renal pyramids; cortex covered by Gerota’s capsule

Surgical Anatomy
(Slide 3 of 4)

Adrenal Glands

- Paired organs near upper kidneys.
- Outer cortex and inner medulla layers.
- Secrete glucocorticoids, mineralocorticoids, and sex hormones.
- Important for norepinephrine and epinephrine production.

Ureters

- About 12 inches long, 5 mm diameter.
- Three-layered structure: fibrous, muscular, mucosal.
- Peristalsis moves urine along ureters.
- Enter bladder at ureterovesical junction.

Surgical Anatomy
(Slide 4 of 4)

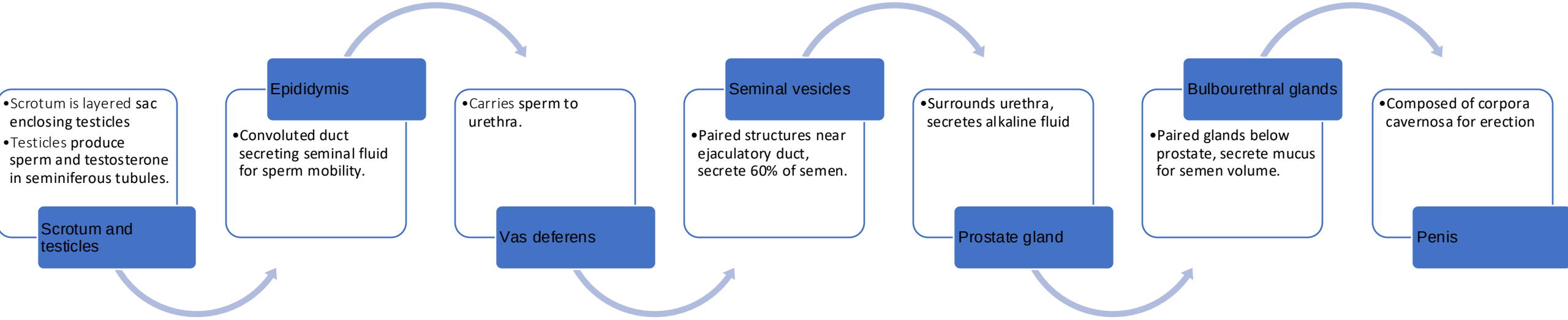
Urinary Bladder

- Located behind symphysis pubis in pelvic cavity.
- Four tissue layers: serosa, muscular, submucosa, mucosa.
- Trigone region with superficial and deep muscle layers.
- Micturition controlled by sphincter muscles.

Urethra Anatomy

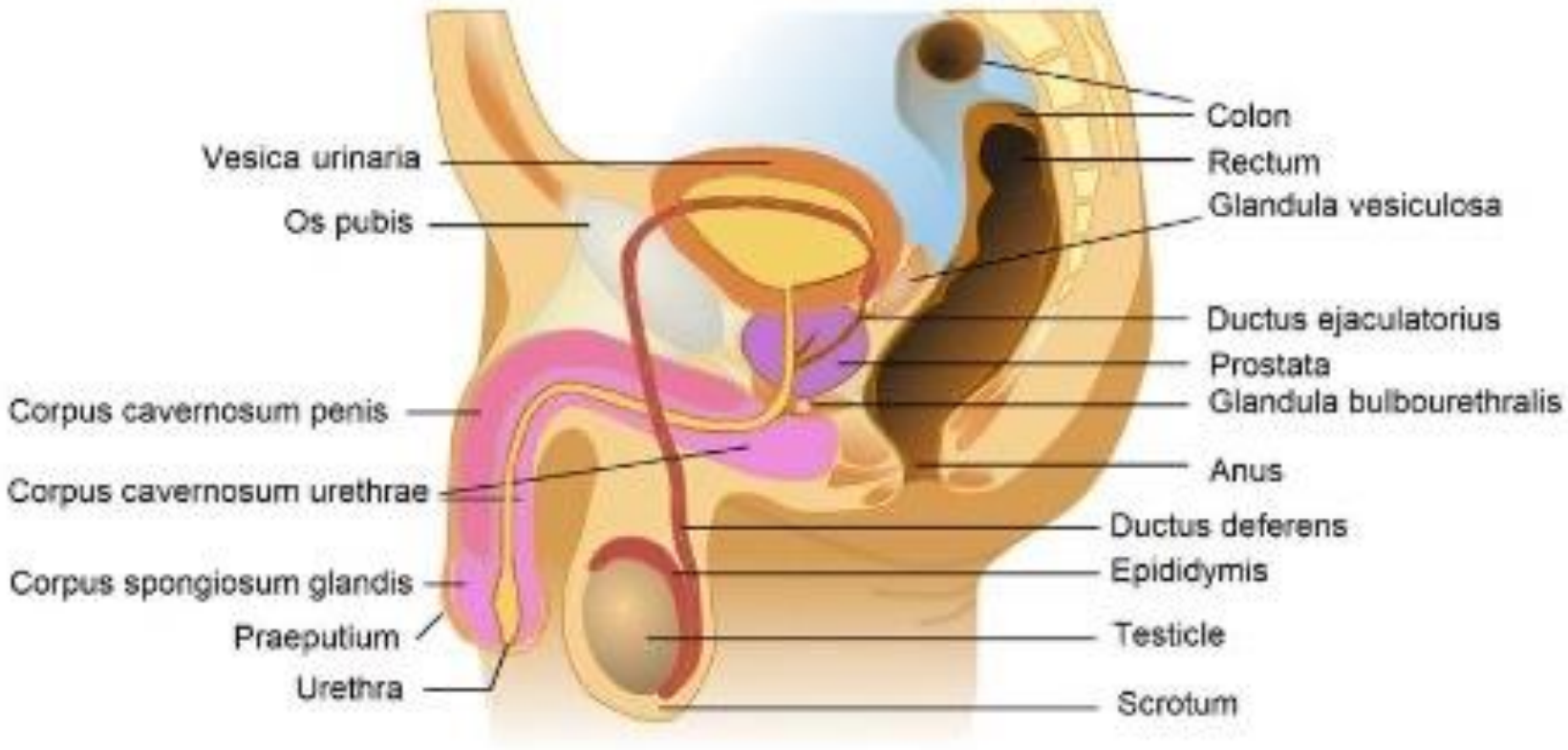
- Female urethra exits at trigone, embedded in pelvic floor muscles.
- Male urethra extends to end of penis.
- Prostatic, membranous, and cavernous urethra segments in males.

Reproductive Structures of the Male

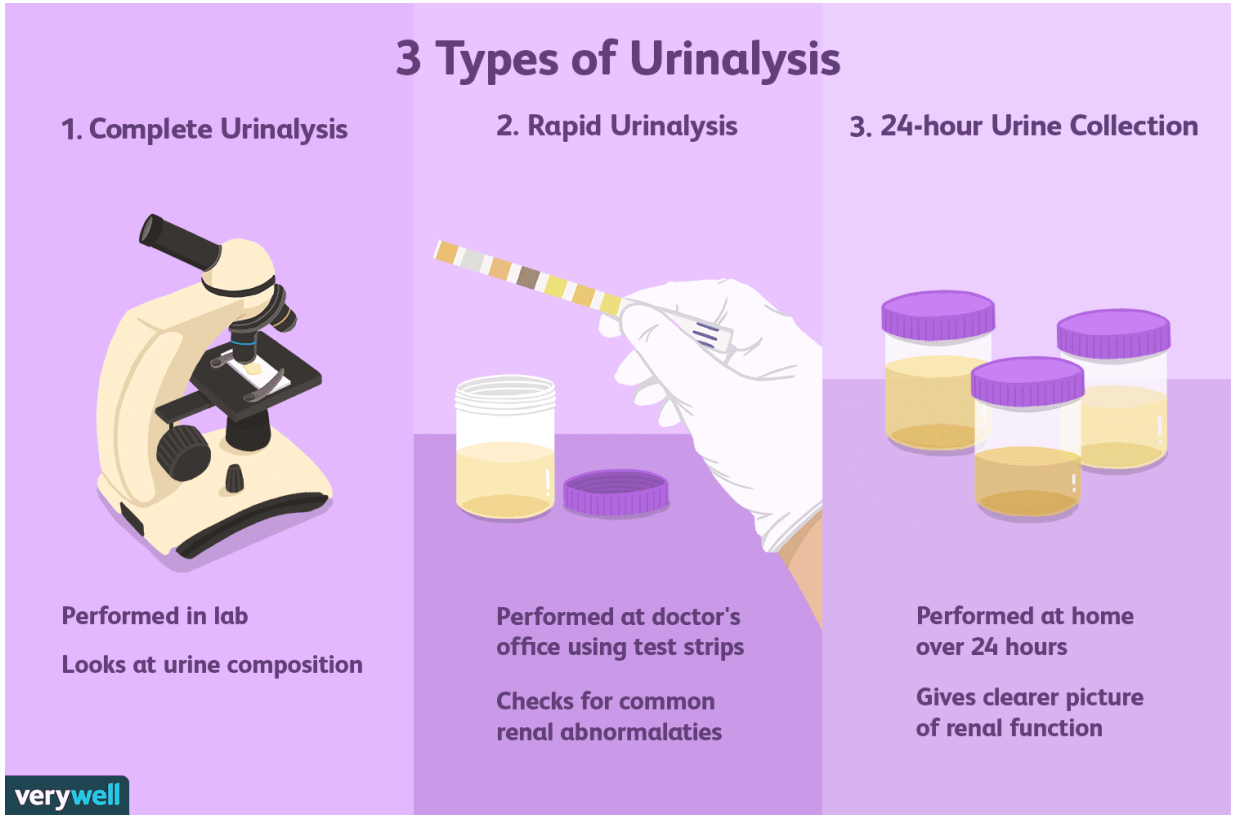


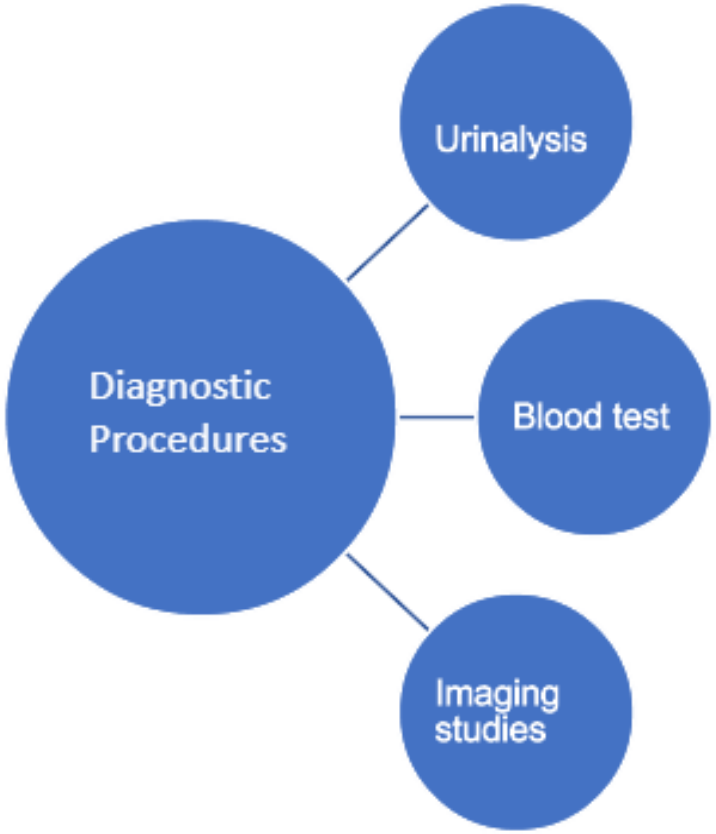
Pictorial Representation of Female Reproductive System

Pictorial Representation of Male Reproductive System



Pre-operative Diagnostic Procedures





Self - Diagnosis

- Disorders of the GU tract
  - Diagnosed through many stan dard procedures
- History and physical
  - Detailed history
  - Routine testicular self-examination
  - Digital rectal examination for men over 40

Laboratory Tests

- **Microscopic examination**
  - Accurate method for determining blood and urine composition
- **Chemical reagent strips**
  - Available for fast general results f or some tests
- **Home/office test strips**
  - Not highly accurate

Laboratory Tests

- Hematology findings
  - Specific hematologic examinations will require a patient to comply with certain prerequisites
- Urinalysis
  - Most important laboratory examination used in
  - Diagnosing problems affecting the urinary tract

Kidney Dialysis

Removal of waste products from the blood of the patient with chronic kidney disease or end-stage renal disease

- Hemodialysis
  - Blood is circulated through a machine (dialyzer) to remove toxins and excess fluids.
  - Helps maintain electrolyte balance and control blood pressure in renal failure patients.

- Peritoneal dialysis
  - Helps maintain electrolyte balance and control blood pressure in renal failure patients.
  - Dialysis solution is instilled into the catheter
  - Solution slowly extracts metabolic wastes using the peritoneum

Watch the "Hemodialysis vs Peritoneal Dialysis" Video

Hemodialysis vs Peritoneal Dialysis Video

Click Here to watch the video!

Hemodialysis vs Peritoneal Dialysis Video

Summary of the Video:

- **Hemodialysis Procedure**
  - Blood filtered outside the body in a dialysis machine.
  - Vascular access created via surgery or catheter.
  - Dialysate contains solutes similar to healthy blood.
- **Peritoneal Dialysis**
  - Dialysis fluid introduced into abdominal cavity.
  - Peritoneum acts as natural filtering membrane.
  - Less effective but comparable to hemodialysis.

Indwelling Urinary Catheters

- Catheter is hollow tube of flexible synthetic material
- Variety may be used during genitourinary (GU) procedures

Watch the "How a Bladder Catheter Works" Video

How a Bladder Catheter Works Video

Click Here to watch the video!

How a Bladder Catheter Works Video

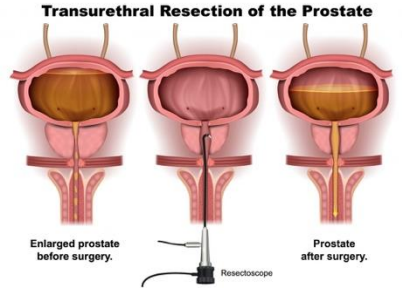
Summary of Video:

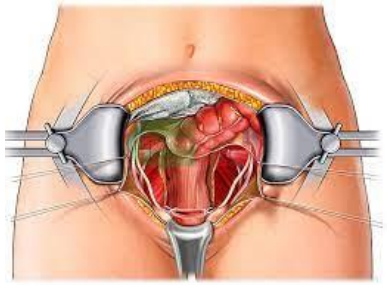
- Indwelling catheter may be necessary for helping to drain the bladder
  - Necessary for longer surgical procedures and those where fluid balance is important
- Different Types – Foley is the most common
- Inserted through the Urethra, Balloon keeps catheter in place
- Drains via gravity to a collection bag

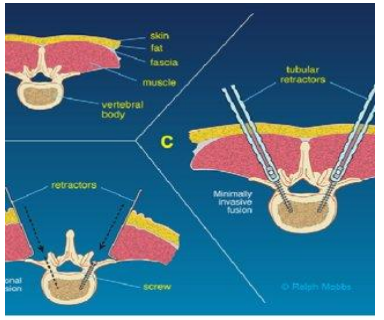
Common Surgical Approaches in GU Surgery

- **Surgical Approaches**
  - Transurethral
    - Cystoscopy
    - Ureteroscopy
  - Open surgery – Lower Abdominal
  - Minimally invasive – Laparoscopy/Cystoscopy

- **Equipment used in these procedures:**
  - Electrosurgical unit
  - Laser
  - Ultrasound – Lithotripsy uses soundwaves to break stones







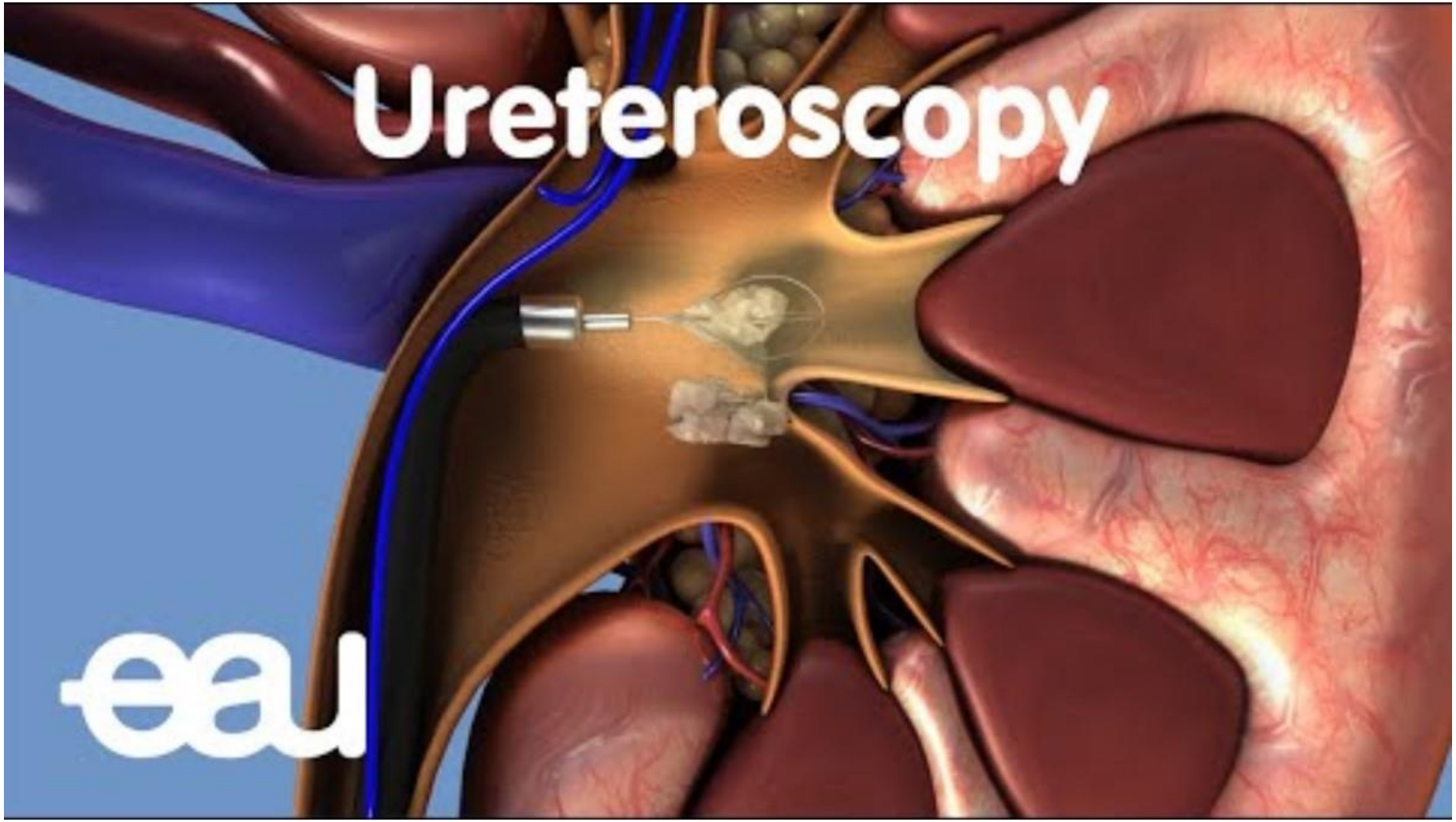
Transurethral Surgery – Cystocopy & Ureteroscopy

- **Cystoscopy**
  - Use of a rigid or flexible cystoscope
  - allows visualization of the interior of the bladder and urethra
  - Cystoscopy can be either diagnostic, allowing visualization for examination and biopsy, or therapeutic, involving procedures such as stone removal or tumor resection.

- **Ureteroscopy**
  - Use of a rigid or flexible ureteroscope
  - allows direct visualization of the ureter and renal pelvis,
  - aiding in the diagnosis of conditions such as ureteral strictures, tumors, stones, or anatomical abnormalities.
  - treat conditions such as kidney stones, ureteral strictures, tumors, or blockages by removing stones, performing biopsies, or placing stents.

Watch the "Removal of Kidney Stones" Video to see a Ureteroscopy procedure

Removal of kidney stones Video



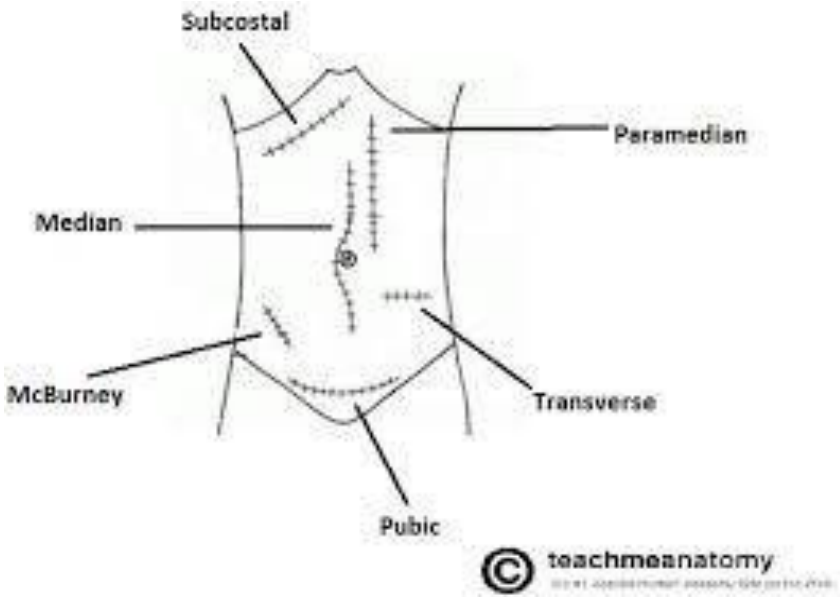
Removal of kidney stones Video

Summary of the Video:

- Procedure: Ureteroscopy for stone removal and visualization.
- Anesthesia: Typically under general anesthesia.
- Process: Insert tube, guide scope, locate and remove stone.
- Post-procedure: Check for residual stones, place stent or catheter if needed, discharge upon bladder comfort.

Incisional Options
(Slide 1 of 3)

- Inguinal incision
  - Often used to access the scrotal contents of an adult or child
- Scrotal incisions
  - Performed to access the scrotal contents
- Abdominal incisions
  - Gibson
  - Flank



Incisional Options (Slide 2 of 3)

- **Gibson incision**
  - Extraperitoneal abdominal approach
  - Designed for access to the lower portion of the ureter
  - Refer to Figure 20-7 Page 811
- **Flank incision**
  - Provides direct access to the adrenal gland, kidney, and proximal ureter
  - Subcostal- appropriate for kidney and upper ureter
  - Transcostal- used to expose entire kidney
  - Intercostal- between 11^{th} & 12^{th} Rib

Incisional Options (Slide 3 of 3)

- **Lumbar incision**
  - Provides limited exposure
  - Used for adrenalectomy, renal biopsy, or removal of a small low-lying kidney
  - May be done with the patient in lateral or prone position
  - Made below the 12th rib lateral to the sacrospinalis muscle and extends past the tip of the rib
  - This incision is closed like a subcostal incision

Common Surgical Procedures

- Lithotripsy
- Routine diagnostic cystoscopy
- Transurethral resection of a bladder tumor (TURBT)
- Open genitourinary procedures
- Cystectomy (open)
- Brachytherapy of the prostate
- Procedures of the ureters and kidney
- Percutaneous nephrolithotomy (PCNL)
- Simple nephrectomy (flank incision)
- Transurethral resection of the prostate
- Circumcision (adult)
- Partial penectomy
- Insertion of penile implant
- Hydrocelectomy
- Orchiectomy

Watch the "Robotic Partial Nephrectomy" Video for a brief summary of this procedure

Robotic Partial Nephrectomy Video

Robotic Partial Nephrectomy Video

- **Summary of Video:**
  - More procedures being done laparoscopic and robotically
  - Emphasis is now on removing only the mass, and leaving as much functioning kidney as possible
  - Control of the Renal Arteries and Veins important for safety

Kidney Transplantation

- **Procedure**: Surgical transplant of a healthy kidney into a recipient's body.
- **Donor Selection:** Screening for compatible donors, including tissue matching and health assessments.
- **Surgery:** Removal of the diseased kidney and implantation of the donor kidney.
- **Post-surgery Care:** Monitoring for organ rejection, managing immunosuppressant medications.
- **Long-term Management:** Regular follow-up, lifestyle adjustments, and ongoing medical care to ensure kidney function and overall health.

Watch the "Kidney Transplant" Video

Kidney Transplant Video

Kidney Transplant Video

Summary of Video:

- Kidneys do not last forever, sometimes reoperation is needed
- Existing kidneys are not explanted in transplants
- Transplanted organs need to be kept cold to preserve them when not receiving blood

Read Chapter 24 from the e-Book!

Read Chapter 24 from your E-Book to pass the upcoming quiz from **Surgical Technology - Elsevier eBook on VitalSource, 8th Edition.**

Click Here to read chapter 24!

Thank you!

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

Congratulations!

Lesson 24 is complete.