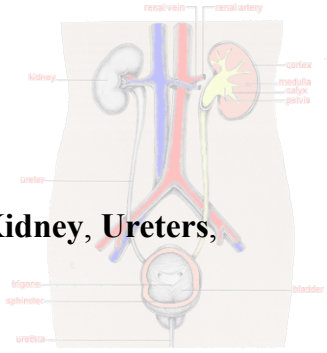

A 1 Anatomy of the genitourinary tract

The Genitourinary Tract consists of the **Kidney**, **Ureters**, **Bladder**, **Urethra**.

Genitourinary Tract vs Genitourinary system

The genitourinary tract refers specifically to the organs involved in the production, storage, and elimination of urine, which includes the kidneys, ureters, urinary bladder, and urethra. The genitourinary system, on the other hand, includes not only the urinary tract but also the reproductive organs. Here is a more detailed overview of the anatomy of the genitourinary tract

Anatomy Of Kidney

1. **Kidneys**: **bean-shaped paired** organs located **retroperitoneal space**.
2. Both kidneys are found **between** the **11th** and **12th ribs**. The **Right** kidney is **slightly lower** than the left due to the liver displacing it.
3. Both Kidneys **extend between T11-T12**.
4. The kidneys are **covered by** a **renal fascia**, **perirenal fat** and renal **capsule**
5. **On cross section**, the kidneys **consists** of an **outer renal cortex and** inner **medulla**.
6. Renal **Cortex contains** the **glomerulus**, **proximal and**

distal convoluted tubules and **histologically** contains an **outer cortical zone and inner juxtamedullary zone**.

7. Renal **medulla contains** the **pyramids** (8-18 of them), **separated by** renal **columns** which filter into **major calyxes** à **Minor calyxis** à **renal pelvis** à **ureters**. The proximal and distal straight tubules along with the collecting ducts are located here too.
8. **Renal artery derived from abdominal aorta supply** the **kidneys**, **drainage** is **to** the **renal vein**, vessels site of entry is the renal hilum.

Anatomy of Ureters

1. **Ureters**: The ureters **are two muscular tubes** that **connect** the **kidneys to** the **urinary bladder**, **urine is transported via peristaltic contractions** of their smooth muscle walls.
2. **Each** aprox. **25cm long**

Anatomy of Urinary bladder

1. **Urinary Bladder**: The urinary bladder **is** a **hollow muscular organ** that **serves as** a **temporary reservoir** for urine. It is **located in** the **pelvis**, **behind** the **pubic bone**, and its **capacity varies depending on the age and sex of the individual**. The bladder has a neck that connects to the urethra.
2. **Contains** smooth muscle (**Detrusor muscle**) which **contain receptors** that **respond** to **sympathetic/parasympathetic stimuli**.

3. **Innermost mucosal layer contains transitional epithelium allowing dispensability** of the **bladder** and **gives** the bladder a **rugae appearance** from the inside.
4. **Covered** in **adventitia**
5. **Position is anterior to rectum in males. In females is anterior to the uterus, vesicouterine pouch is between these two organs and contains a small amount of fluid under normal conditions**.
6. **Trigone** of the bladder is **unique**, in that it **has** the **two uretreral opening** and a **single internal sphincter opening** (to the urethra), is **composed** of **different type** of **smooth muscle** then the rest of the bladder and an **important clinical landmark** as **it** is **commonly involved** in **conditions** such as **urinary tract infections** (**UTIs**), **bladder stones**, **bladder tumors**, and **vesicoureteral reflux** (**VUR**).

Anatomy of Urethra

1. **Urethra**: **Carries urine from** the **bladder to** the **outside** of the body.
2. In males, the urethra also serves as a passageway for semen during ejaculation.
3. **In females, the urethra is shorter and only carries urine, 3-5cm**
4. **In males, the urethra is composed of 4 parts, periprostatic, prostatic, membranous and spongy part**
5. **Is on average** 20-25 cm
6. The **female urethral meatus** (the external opening of the urethra) is **located** just **above** the **vaginal opening** and **below** the **clitoris**, in the **midline** of the **vulva**.

A 2 Urological imaging

Urological imaging is **used** to **evaluate** the **structure**, **function**, and **pathology** of the **urinary system**, and **plays** a **critical role in diagnosing** and managing various **urological conditions**.

There are several imaging modalities commonly used in urological imaging, including:

1) X-rays

1. **Renal anatomy:** X-rays **provide information about** the **position**, **shape**, and **size** of the **kidneys** and can **provide morphological information** about **conditions such as renal agenesis** (absence of one or both kidneys), renal **ectopia** (abnormal location of the kidneys), or renal **cysts** (fluid-filled sacs in the kidneys).

2. **Urinary tract obstruction:** using X-ray imaging, **intravenous pyelography (IVP)**, can be **used** to **assess** for **urinary tract obstruction**. IVP **involves injecting** a **contrast dye into** a **vein**, which is **then filtered by** the **kidneys and excreted** into the urinary tract. **X-ray images** are **taken** at **different time intervals** to **visualize** the **flow** of **contrast dye through** the **kidneys**, **ureters**, and **bladder**, and can **help identify** any **obstructions**, such as **stones**, **tumors**, or **other conditions**.

3. **Bladder abnormalities:** X-ray imaging can be used to **assess** the **bladder** for **abnormalities**, such as **bladder**

stones, **bladder tumors**, or **bladder diverticula** (outpouchings of the bladder wall). **Voiding cystourethrography (VCUG)**, can **also be used** to **evaluate bladder function and assess** for **conditions such** as **urinary incontinence or bladder reflux.**

4. **Ureteral abnormalities: retrograde pyelography**, can be **used** to **assess** for **abnormalities** in the ureters, **such** as **ureteral stones**, **strictures** (narrowing), **or tumors**.

5. **Post-operative evaluation:** X-ray imaging **can be used** to **assess** the **urinary tract after** urological **surgeries**, **such** as **nephrostomy tube placement**, **ureteral stent placement**, or **bladder augmentation procedures**. X-rays can help **evaluate** the **positioning** and **function** of **these devices**, **assess for complications**, and **monitor** the **progress** of the **post-operative recovery**.

6. **Follow-up imaging:** X-ray imaging **may be used** for **follow-up evaluation** of **known urological conditions**, such as **kidney stones** or **urinary tract abnormalities**, to monitor treatment response or disease progression.

2) **<u>Ultrasound</u>**

Lower frequencies 2-5Mhz are used for deeper structures
Higher frequencies 7-12Mhz are used for superficial structures

1. **Kidney evaluation: Ultrasound** can be **used** to **assess** the **kidneys** for **size, shape**, and **position** It can also **help detect various conditions**, such as **kidney stones**, renal **cysts**, **tumors**, **abscesses**, and **congenital abnormalities**(horseshoe kidney). **Doppler ultrasound** can be **used** to **evaluate** the **kidney blood flow**.

2. **Bladder evaluation: Ultrasound** can be **used** to **assess** the **bladder** for **size**, **shape**, and **wall thickness**. It can help **detect bladder tumors**, **bladder stones**, **bladder diverticula,** and other abnormalities. **Ultrasound** can also be **used** to **assess bladder function**, **such** as **bladder emptying** and **urine volume measurement**.

3. **Ureteral evaluation:** Although difficult, ultrasound can infact can help detect ureteral stones, ureteral dilatation (enlargement), ureteral strictures (narrowing), and other abnormalities.

4. **Post-operative evaluation:** Ultrasound can be used to **evaluate surgical sites** for **complications**, and **monitor** the **progress** of the post-operative **recovery**.

5. **Guidance for procedures: Ultrasound** can be **used** as a **guidance tool** for various **urological procedures**, such as **kidney biopsies**, **bladder aspirations**, and **placement** of **ureteral stents** or **nephrostomy tubes**. **It can help visualize the target area, guide needle placement, and monitor the procedure in real-time.**

6. **Evaluation of scrotal and penile abnormalities: Ultrasound** can be **used** to **assess** the **scrotum** and **penis**

for **conditions** such as **testicular tumors**, **epididymal cysts**, **penile masses**, and other abnormalities

7. **Prostate volume assessment:** although heavily variable, **normal prostate values** are **around 20-30cm**^{3}. MRI can also be used to evaluate prostate volume.

3) **CT** (This part wont be as long as the rest, if you say the above you've pretty much passed this topic.)

CT can be used to obtain detailed anatomical information about the urinary system. Its highly specific in detecting stones. It can give indirect information about infections such as thickening of walls. It can be used to characterise and asses depth of invasion of tumours. It can aid in visualising the anatomical consequence of trauma. It can be used to assess congenital disease. It can be used to for preoperative planning.

4) **MRI**

Honestly just say that it's used if the others are contraindicated idk this topic is long enough already.

5) **Nuclear scintigraphy,**

Say that there is static and dynamic studies of the kidneys each having their own radiopharmaceuticals. As a whole with nuclear scintigraphy we're able to detect renal hypertension, congenital abnormalities, obstructions.

A 3 Abnormal development of the kidney and ureter

Abnormal development of kidney

1. **Renal agenesis:** This is a **condition** where **one or both kidneys fail** to **develop**. It can be **unilateral**, where only one kidney is absent, **or bilateral**, where both kidneys are absent. Renal agenesis can **result** in **severe** kidney **dysfunction** or **complete absence** of kidney **function**, which **may require medical interventions such as kidney transplantation or dialysis.**

2. **Polycystic kidney disease:** This is a **genetic** disorder characterized by the formation of **multiple cysts** in the **kidneys**. It can occur in **infancy**, **childhood**, or **adulthood**, and can result in **enlarged kidneys**, **reduced kidney function**, and **complications** such as **high blood pressure** and **kidney failure**. There are **two** main **forms** of **PKD**: **autosomal dominant PKD (ADPKD)** and **autosomal recessive PKD (ARPKD)**.

    1. **Autosomal Dominant Polycystic Kidney Disease (ADPKD)**: **ADPKD** is the **most common form** of **PKD** and is **inherited** in an **autosomal dominant manner**, which means that an affected individual has a 50% chance of passing the mutated gene to each of their children. **ADPKD** usually **presents** in **adulthood**, **typically between the ages of 30 and 40**, although **symptoms may start earlier** in some cases. The **cysts** in **ADPKD** can **grow** in **size** and **number over time**, **leading** to an **enlarged kidney** and **gradually declining kidney function**. **Common symptoms** of **ADPKD** may include

abdominal or **flank pain**, **blood** in **the urine**, **high blood pressure**, and **kidney stones**. **ADPKD** can also be **associated with** other complications, such as **cysts** in **other organs**, **liver cysts**, and **cardiovascular problems**.

2. **Autosomal Recessive Polycystic Kidney Disease** (**ARPKD**): **ARPKD** is a less common form of **PKD** and is inherited in an **autosomal recessive manner**, which means that both parents must carry a copy of the mutated gene for their child to be affected. **ARPKD usually presents** in **infancy** or **early childhood**, and the **severity** of the **disease** can **vary widely**. In **ARPKD**, the **cysts** are typically **smaller** and **more numerous** compared to **ADPKD**, and they can affect **not only** the **kidneys** but also **other organs** such as the **liver**, **lungs**, and **pancreas**. **Common symptoms** of **ARPKD** may **include enlarged kidneys**, **high blood pressure**, **liver fibrosis** or **cirrhosis**, and **respiratory difficulties**. **ARPKD** can be a **severe condition**, and **affected individuals** may **require early medical intervention**, **including supportive care** and sometimes even **kidney transplantation**.

3. **Multicystic dysplastic kidney:** This is a **condition where** the **kidney develops abnormally** during **fetal development**, **resulting** in **multiple cysts** of varying sizes **in** the **kidney**. These **cysts disrupt** the **normal kidney tissue architecture** and can **lead to impaired kidney function**.

4. **Horseshoe kidney:** This is a **condition where** the **two kidneys are fused together at the lower ends, forming** a **horseshoe shape**. **Horseshoe kidney** is the **most common fusion anomaly** of the **kidneys** and can **cause increased risk of** kidney **stones**, **urinary tract infections**, and **other complications**.

5. **Renal hypoplasia:** This is a **condition where** the **kidneys** are **smaller** than **normal due** to **incomplete development**. **Renal hypoplasia** can **result** in **reduced kidney function** and may be **associated** with **other urinary tract abnormalities**.

6. **Renal ectopia:** This is a **condition where** the **kidneys** are **located outside** their **normal position**. **For example**, the **kidneys may** be **located** in the **pelvis**, **abdomen**, or **even** in the **chest**. Renal ectopia can **sometimes** be **associated with other urinary tract abnormalities** and **may require medical management**.
7. **Supernumerary kidneys: Multiple kidneys**

Abnormal development of Ureters

1. **Ureteropelvic junction obstruction (UPJ obstruction):** This is a **congenital abnormality** where the **junction between** the **ureter** and the **renal pelvis** (the part of the kidney that collects urine) is **narrowed or blocked**, **causing obstruction** to the **flow of urine from** the **kidney to** the **ureter**. **UPJ obstruction** can **cause urine** to **back up** in the **kidney**, **leading** to **kidney enlargement** (**hydronephrosis**) and **potential kidney damage over time**.
2. **Vesicoureteral reflux (VUR):** This is a **congenital**

abnormality where the **valve-like mechanism** that **normally prevents urine from flowing backward from** the **bladder into the ureters** (vesicoureteral junction) is **faulty**, **allowing urine to reflux or flow backward** into the **ureters during bladder emptying**. **VUR** can **increase** the **risk** of **urinary tract infections** and may **lead** to **kidney damage if** left **untreated**.

3. **Ureteral duplication:** This is a **congenital abnormality where** one or **both ureters** may be **duplicated**, **resulting** in **two ureters draining** a **single kidney** or each ureter draining a separate part of the kidney. **Ureteral duplication** can **increase the risk** of **complications** such as **infection**, stone formation, and obstruction.
4. **Ureteral atresia or stenosis:** These are congenital abnormalities where a portion of the ureter may be **absent** (atresia) or **narrowed** (stenosis), leading to obstruction of **urine flow** and **potential kidney damage**.
5. **Ureterocele:** This is a **congenital abnormality** where the **lower end** of the **ureter balloons** out, forming a **cyst-like structure** that can **obstruct urine flow** and **cause symptoms** such as **pain**, **infection**, or **difficulty emptying the bladder**.
6. **Ureteral fistula:** This is an **acquired abnormality where** an **abnormal connection** or **passageway** may **form between** the **ureter and another organ** or **structure**, such as the **bladder**, **bowel**, or **vagina. Ureteral fistulas** can **cause urine** to **leak** into the **wrong location** and may **require surgical intervention** for **repair**.

A 4 Abnormal development of the bladder, male urethra, penis and testis

Abnormal development of the bladder

1. **Bladder exstrophy:** This is a **congenital abnormality** where the **bladder** does **not develop normally**, and the **lower abdominal wall** and **anterior bladder wall** do **not close properly during** fetal **development**. **As** a **result**, the **bladder** is **exposed outside** the **body**, **and** the **urethra may be short or absent**. Bladder exstrophy is a rare condition and **requires surgical intervention** to **repair** the **bladder** and associated structures.
2. **Bladder diverticula:** This is an **acquired abnormality where outpouchings** or **sac-like structures form in** the **wall of** the **bladder**. **Bladder diverticula can develop due** to **increased pressure** in the **bladder**, **weakened bladder wall muscles**, or other **underlying conditions**, and can **cause urinary retention**, **infections**, or **other complications**.
3. **Neurogenic bladder:** This is a **functional abnormality** of the **bladder** that **can be congenital** or **acquired** and is **caused by nerve damage or dysfunction** that **affects** the **normal coordination** and **control** of **bladder function**. **Neurogenic bladder** can **result** in **various bladder dysfunctions**, **such** as **overactive bladder**, **underactive bladder**, or **problems** with **bladder emptying**, and may be **associated with** conditions such as **spinal** cord **injury**, **spina bifida**, or other **neurological disorders**.
4. **Bladder outlet obstruction:** This is an **acquired**

abnormality where the **flow of urine from** the **bladder** is **obstructed** due to **various causes**, such as **enlarged prostate**, **bladder stones**, or **tumors**. **Bladder outlet obstruction** can **cause symptoms** such as **difficulty urinating**, **weak urine stream**, **frequent urination**, or **incomplete bladder emptying**.

5. **Bladder wall thickening or thinning:** The **walls of** the **bladder** can **become abnormally thick** or thin **due to various factors**, **such as inflammation**, **infection**, **or chronic** bladder **irritation**. **Thickening** or **thinning** of the **bladder** wall **can affect bladder function** and may **require medical management** or **surgical intervention**, depending on the underlying cause.
6. **Bladder tumors:** **Tumors** or **abnormal growths** can **develop** in the **bladder**, which **can** be **benign** or **malignant** (**cancerous**). **Bladder tumors** can **interfere** with **normal bladder** function **and** may **require surgical removal** or other treatments depending on their type, size, and location.

Abnormal development of the male urethra

1. **Hypospadias:** This is a **congenital abnormality where** the **opening of** the **urethra** is **located** on the **underside** of the **penis instead of** at the **tip**. **Hypospadias** can **vary** in **severity**, with the **urethral opening located anywhere** from **near** the **tip to** the **base** of the penis. It can **cause difficulties with urination**, and **may require surgical correction to reposition** the **urethral opening to** the **tip** of the penis.
2. **Epispadias:** This is a **rare congenital abnormality where** the **opening** of the **urethra** is **located** on the **upper side** of the **penis instead** of at **the tip**.

Epispadias can also be **associated** with **other abnormalities** of the **urinary tract** and may **require surgical correction**.

3. **Urethral stricture:** This is an **acquired abnormality where** the **urethra narrows** or **becomes obstructed due** to **scarring** or inflammation. **Urethral stricture** can **cause difficulties** with **urination**, **weak urine stream**, and **other urinary symptoms**. It can be **caused by trauma**, **infection**, **inflammation**, or other factors, and may require surgical intervention to widen or repair the narrowed segment of the urethra.
4. **Urethral valves:** This is a **rare congenital abnormality where** there are **abnormal folds** of tissue **in** the **urethra** that can **obstruct urine flow**. **Urethral valves** are usually **diagnosed** in infancy or childhood and can cause urinary retention, urinary tract infections, and other complications. **Treatment typically involves surgical intervention** to **remove** or **bypass** the **obstructing valves**.
5. **Congenital urethral fistula:** This is a rare abnormality where there is an abnormal connection between the urethra and other nearby structures, such as the skin, rectum, or bladder. Congenital urethral fistulas can cause urinary leakage, infections, and other problems, and may require surgical correction.
6. **Meatal stenosis:** This is a **condition where** the **opening** of the **urethra**, also **known as** the **meatus**, **becomes narrowed** or **scarred**, **often as** a result of **previous circumcision**. **Meatal stenosis** can **cause difficulty** with **urination**, **spraying** of **urine**, or other urinary symptoms, and may require surgical correction to widen the meatal opening.

Abnormal development of the penis

1. **Micropenis:** This is a **condition where** the **penis** is **smaller** than the **average size** for **age** and **development**. Micropenis is usually diagnosed at birth or during childhood and may be caused by **hormonal imbalances**, **genetic factors**, or other unknown causes. Treatment depends on the underlying cause and may include hormonal therapy or other interventions to promote normal penile growth and development.
2. **Congenital chordee:** This is a **condition where** the **penis** has a **downward curvature due** to an **abnormal attachment** of the **skin** on the **underside** of the **penis**. Congenital chordee can **cause difficulties with urination, sexual function**, and **aesthetics**, and may **require surgical correction to straighten** the **penis and restore normal function**.
3. **Duplicated urethra:** This is a rare **abnormality where** the **urethra**, which carries urine from the bladder, is **duplicated**, **resulting** in **two urethral openings** on the penis. Duplicated urethra can cause urinary symptoms, complications with sexual function, and may require surgical correction to fuse the duplicated urethra into a single, normal urethra.
4. **Penile agenesis:** This is an **extremely rare condition where** the **penis** is **absent** or **severely underdeveloped** due to **failure** of **normal development during fetal development**. **Penile agenesis** can have significant **physical** and **psychological impacts** and may **require specialized medical** and **psychological support**.
5. **Penile hypospadias:** This is a **condition where** the **opening** of the **urethra** is **located** on the **underside** of the **penis instead** of at the **tip**. Penile hypospadias can

cause difficulties with **urination**, **sexual function**, and **aesthetics**, and **may require surgical correction** to **reposition** the **urethral opening** to the **tip** of the **penis**.

6. **Penile epispadias:** This is a rare **condition where** the **opening** of the **urethra** is **located** on the **upper side** of the **penis instead** of at the **tip**. **Penile epispadias** can also be **associated** with other **abnormalities** of the **urinary** tract and **may require surgical correction**.
7. **Phimosis:** **Inability** to **retract foreskin**.

Abnormal development of the testis

1. **Cryptorchidism (undescended testis):** This is a **condition where** one or both **testes fail** to **descend into** the **scrotum during fetal development**. **Cryptorchidism is** one of the most **common developmental abnormalities of** the **testis** and **can** be **unilateral** (affecting only one testis) **or bilateral** (affecting both testes). It can **cause infertility**, **increased risk** of **testicular cancer**, and **hormonal imbalances**. **Treatment** may **include hormonal therapy**, **surgical correction**, or observation depending on the age of the patient and the severity of the condition.
2. **Testicular agenesis or aplasia:** This is an **extremely rare condition where** one or both **testes** are **absent** or **severely underdeveloped due** to **failure** of **normal development** during **fetal development**. **Testicular agenesis or aplasia can result** in **infertility** and may **require specialized medical** and **psychological support**.
3. **Testicular dysgenesis syndrome:** This is a **condition**

where there is **abnormal development** of the **testes during fetal development**, **resulting** in **reduced fertility**, **increased risk** of **testicular cancer**, and **hormonal imbalances**. **Testicular dysgenesis syndrome** is thought to be **related** to **genetic** and **environmental factors**, and **management** may involve **hormonal therapy**, **surgical interventions**, or other treatments depending on the specific manifestations and severity of the condition.

4. **Testicular torsion:** This is a **condition where** the **testis twists** on **its own blood vessels**, **leading** to **decreased blood flow and potential damage to** the **testicular tissue**. Testicular torsion **can occur during fetal development or after birth**, and it **is** a **medical emergency** that **requires prompt surgical intervention to untwist** the **testis and restore blood flow** to prevent testicular damage.
5. **Testicular ectopia:** This is a **condition where** the **testis** is **located outside** the **scrotum** and **may be found** in various **abnormal locations**, **such as** the **inguinal canal**, **abdomen**, or **perineum**. Testicular **ectopia can result** in **increased risk** of **testicular torsion**, **infertility**, **and hormonal imbalances**, and may **require surgical correction** to **relocate the testis to** its **normal anatomical position in** the **scrotum**.

Testicular ectopia vs Cryptorchidism

Testicular ectopia refers to the abnormal positioning of one or both testes outside their normal location, while cryptorchidism specifically refers to the failure of one or both testes to descend into the scrotum during fetal development.

A 5 Specific urogenital infections (tuberculosis, schistosomiasis)

TB

Tuberculosis (TB) **is** a **chronic infectious disease caused** by the bacterium **Mycobacterium tuberculosis**, which **primarily affects** the **lungs** but can **also** affect **other organs**, **including** the **urogenital tract**. **In** the **context** of a **specific urogenital infection**, TB **can manifest** as **genitourinary tuberculosis**, which **refers to** the **involvement of** the **urinary tract and/or** the **genital organs by Mycobacterium tuberculosis**.

Genitourinary tuberculosis typically occurs as a **result of hematogenous spread** of **M. tuberculosis from** a **primary infection site**, **usually the lungs**, **to** the **urogenital tract through** the **bloodstream**. It can **affect various parts** of the **urogenital tract**, **including** the **kidneys**, **ureters**, **bladder**, **prostate**, **epididymis**, and **testes**. **Genitourinary tuberculosis** is **more common in males than females**.

Symptoms of **genitourinary tuberculosis** may **include lower urinary tract symptoms** such as **frequent urination**, **urgency**, **dysuria** (painful urination), and **hematuria** (blood in urine), **as well as symptoms specific to the affected organs**. For example, **renal tuberculosis** can cause **flank pain**, **renal dysfunction**, and **renal abscesses**, **while tuberculosis** of the **epididymis** and **testes** can **cause swelling**, **pain**, and **infertility**. In some cases, **genitourinary tuberculosis** may **present** with **nonspecific symptoms**, making diagnosis challenging.

Diagnosis of genitourinary tuberculosis **typically involves** a **combination** of **clinical evaluation**, **imaging studies** such as **X-rays**, **CT scans,** or **MRI**, **laboratory tests** including **acid-fast staining and culture** of **urine** or **tissue samples** for M**.**

tuberculosis, and sometimes **biopsy** of **affected organs**. **Treatment** for **genitourinary tuberculosis usually involves** a **long-term course** of **anti-tuberculosis** medications, such as **isoniazid**, **rifampin**, **pyrazinamide**, and **ethambutol**, **for several months** to effectively treat the infection. Surgery may also be required in some cases, such as to drain abscesses or to manage complications.

Pathoprogression of TB in the kidneys

1. **Primary infection:** **Mycobacterium tuberculosis**, the **bacterium that causes TB**, **enters** the **kidneys through** the **bloodstream** during the **primary infection**. The bacteria may **reach** the **kidneys** from the **lungs**, where **TB commonly starts**, through **hematogenous spread**. In the kidneys, **M. tuberculosis initially infects the renal cortex**, which is the outer part of the kidney.
2. **Granuloma formation:** The **immune system responds** to the **presence** of **M. tuberculosis** in the **kidneys** by **mounting** an **inflammatory response**. **Immune cells**, **such** as **macrophages**, **attempt to contain the infection by forming granulomas**, which are organized clusters of immune cells that surround and attempt to wall off the bacteria. Granulomas can be seen as small nodules in the kidneys and **may be visible on imaging studies**.
3. **Caseous necrosis:** **Over time**, the granulomas may **undergo caseous necrosis**, **which** is a **form** of **tissue death characterized** by a **soft**, **cheese**-like **appearance**. **Caseous necrosis** can **lead to** the **formation** of **cavities** or **abscesses** in the **renal tissue**, which may be seen as areas of destruction and liquefaction on imaging studies.
4. **Renal damage:** The **ongoing inflammatory response** and **tissue destruction caused** by **TB** can **result in**

various **degrees** of renal **damage**, **ranging** from **mild inflammation** to **severe destruction** of renal tissue. This can **lead to renal dysfunction**, such as **impaired renal function**, **decreased urine production**, and other **symptoms** like **flank pain**, **hematuria** (blood in urine), and **renal abscesses**.

5. **Scarring and fibrosis:** In response to the ongoing inflammation and tissue damage, the kidneys may **develop scarring and fibrosis**, which are processes of tissue repair characterized by the accumulation of scar tissue. Scarring and fibrosis **can further impair renal function** and may result in **chronic kidney disease** (CKD) or **end-stage renal disease** (ESRD) in severe cases.

Schistosomiasis

Schistosomiasis, also **known as bilharzia**, is a **parasitic infection caused** by **Schistosoma species**, which are **trematode worms**. **Schistosomiasis** can **affect** the **genitourinary system**, specifically the **urinary tract** and **genital organs**, and can **result** in **various urogenital manifestations**. Overview of Schistosomiasis infection:

1. **Transmission:** Schistosomiasis is **transmitted through contact with contaminated water bodies**, such as **rivers**, **lakes**, or **ponds**, **where** the **larvae** of **Schistosoma worms**, called **cercariae**, are **released** from **infected freshwater snails**. **When individuals** come into contact with contaminated water, **the cercariae can penetrate their skin, leading to infection.**
2. **Migration to genitourinary organs: Once inside** the

human **body**, the **Schistosoma larvae migrate through** the **bloodstream to various organs**, including the **genitourinary system**. In the case of **urogenital schistosomiasis**, the **worms typically lodge** in the **blood vessels** of the **urinary tract**, **including** the **bladder**, **ureters**, and, in some cases, the **genital organs**, such as the **vagina**, **cervix**, **prostate**, or seminal **vesicles**, **depending** on the **species** of **Schistosoma**.

3. **Inflammatory response and egg deposition:** **The** presence of **Schistosoma worms in** the **genitourinary system triggers** an **inflammatory response**, as **the worms release eggs** that **become lodged** in the walls of the **urinary tract** or **genital organs**. The **eggs provoke** an **immune response**, **leading** to **inflammation**, **tissue damage**, and the **formation** of **granulomas**, which are **organized clusters** of **immune cells**.
4. **Urogenital manifestations:** The **chronic inflammation** and tissue damage caused by Schistosoma eggs can result in various **urogenital manifestations**, depending on the **severity** and **duration** of the **infection**. Common manifestations include **hematuria** (blood in urine), **dysuria** (painful urination), urinary **frequency**, **urgency**, and **lower** abdominal or **pelvic pain**. In some cases, urogenital schistosomiasis can also lead to complications such as bladder or ureteral obstruction, urinary tract infections, urinary tract calculi (stones), and infertility due to damage to the genital organs.
5. **Risk factors and complications:** **Risk factors** for **urogenital schistosomiasis** include **living in** or visiting **areas where** the **disease** is **endemic**, **contact** with **contaminated water**, and **lack** of **access** to **clean water** and **sanitation facilities**. **Chronic** and **untreated urogenital schistosomiasis** can **result** in **severe**

complications, including bladder and kidney damage, chronic kidney disease (CKD), and increased susceptibility to other infections.

6. **Diagnosis and treatment:** **Diagnosis** of **urogenital schistosomiasis** is typically **based on clinical symptoms**, **travel history**, and **detection** of **Schistosoma eggs in urine or stool samples through microscopic examination**. **Treatment usually involves anti-schistosomal medications**, such as **praziquantel,** which can **effectively kill** the **worms** and **alleviate symptoms**. In some cases, additional management may be needed for complications or sequelae of urogenital schistosomiasis.

Summer's itch (also known as cercarial dermatitis):
This is a localized skin reaction that occurs when the cercariae (larval stage) of Schistosoma parasites come into contact with the skin during freshwater exposure. The cercariae penetrate the skin, but they cannot complete their life cycle in humans and therefore die, leading to an allergic reaction that manifests as a rash, itching, and redness on the skin.

Katayama fever:
This is an acute febrile illness that can occur in the early stages of schistosomiasis infection, usually 4-8 weeks after initial exposure to the parasites. It is characterized by symptoms such as fever, chills, headache, muscle aches, and cough. Katayama fever is an immune response to the migrating schistosome larvae in the body, and it typically resolves spontaneously

Hydronephrosis:
Chronic schistosomiasis infection, particularly with Schistosoma haematobium, can lead to urinary tract complications, including hydronephrosis. Hydronephrosis is the swelling of the kidneys due to obstruction of the urinary tract, usually by the accumulation of scar tissue and fibrosis caused by chronic inflammation in response to schistosome eggs deposited in the urinary tract. Hydronephrosis can cause renal dysfunction, renal failure, and other complications.

It's important to note that urogenital schistosomiasis is a preventable and treatable disease. Preventive measures, such as avoiding contact with contaminated water and promoting clean water and sanitation practices, are crucial in reducing the risk of infection. Early diagnosis and appropriate treatment can help prevent complications and improve outcomes for individuals with urogenital schistosomiasis. Medical evaluation, diagnosis, and management should be carried out by qualified healthcare professionals with expertise in tropical medicine or infectious diseases

A 6 Non-specific infections of the urine collecting tract (pyelonpehritis, cystitis, urethritis)

Pyelonephritis is a **type of urinary tract infection** (**UTI**) that **specifically affects** the **kidneys**. It is an **inflammation** of the **renal parenchyma**, which includes the **cortex** and **medulla**, usually caused by a **bacterial infection**.
Bacteria, **typically Escherichia coli** (**E. coli**), which **normally reside** in the **lower urinary tract**, **can ascend from** the **bladder or urethra into** the **kidneys**, **leading** to **pyelonephritis**. Other bacteria, **such as Klebsiella**, **Proteus**, and **Enterococcus**, can also **cause pyelonephritis**, although less commonly. **Indwelling catheters should be mentioned Less commonly haematogenous spread it possible**.

Pyelonephritis can **occur** as **either acute** (sudden onset) **or chronic** (long-term) forms. **Acute pyelonephritis typically presents** with **sudden symptoms**, **while chronic pyelonephritis** may **develop as a result** of **recurrent** or **persistent urinary tract infections**, **leading** to **ongoing**

inflammation and **scarring** of the **renal tissue**.

Acute pyelonephritis is a **sudden** and **severe** form of kidney infection, **typically caused by** a **bacterial infection** that **ascends** from the lower urinary tract into the kidneys. It is characterized by **inflammation** of the **renal parenchyma**, which includes the **renal cortex** and **renal medulla**.

Acute pyelonephritis usually presents with symptoms such as:

1. **Fever:** A **high-grade** fever is a **common symptom** of **acute pyelonephritis**. The fever may be accompanied by chills and rigors.
2. **Flank pain:** **Pain** or **discomfort** in the lower back or side of the abdomen, known as **flank pain**, is a hallmark symptom of acute pyelonephritis. The pain is often sharp or throbbing and may be accompanied by **tenderness over** the **affected kidney**.
3. **Urinary symptoms:** **Urinary symptoms** may include **frequent** and **urgent urination**, burning or **pain during urination**, and **cloudy or bloody** urine. There may also be an increased frequency of urination at night.
4. **General symptoms of infection:** Symptoms such as **fatigue**, **malaise**, and **feeling generally unwell** may also be present in acute pyelonephritis, as it is an infection that can affect the whole body.

Chronic pyelonephritis is **often associated** with **structural abnormalities of** the **urinary tract**, such as **vesicoureteral reflux** (VUR), which is a condition where urine flows backward from the bladder into the ureters and potentially into the kidneys, or urinary tract obstructions, which can obstruct the normal flow of urine and **predispose the kidneys**

to infections. Other risk factors for chronic pyelonephritis include recurrent UTIs, **diabetes**, and conditions that **impair the immune system**.
The **pathophysiology** of **chronic pyelonephritis** involves repeated episodes of infection and inflammation in the kidneys, which **can lead** to **scarring**, **fibrosis**, and **loss** of **renal function**. Over time, the renal tissue may become scarred and distorted, leading to chronic kidney damage and impaired kidney function. **The damage can be irreversible and may progress to end-stage renal disease (ESRD),** which is the final stage of kidney failure requiring renal replacement therapy, such as dialysis or kidney transplantation.

Cystitis
is a **common urinary tract infection (UTI)** that **specifically affects the bladder**. It is an inflammation of the bladder wall, typically caused by a bacterial infection. **Cystitis is more common in women than in men**, as the female urethra is shorter and closer to the anus, which makes it easier for bacteria to enter the bladder.

The most common cause of cystitis is bacterial infection, **usually by Escherichia coli** (E. coli), which normally resides in the intestines. Other bacteria, such as **Klebsiella**, Proteus, and Staphylococcus, may also cause cystitis, although less frequently.

Risk factors for developing cystitis include sexual activity, use of certain types of birth control (such as diaphragms or spermicides), menopause (which can cause changes in the urinary tract that increase the risk of infection), urinary tract abnormalities, and impaired immune function.

The typical symptoms of cystitis may include:

1. **Urinary urgency:** Feeling a sudden, strong urge to urinate.
2. **Urinary frequency:** Needing to urinate more frequently than usual.
3. **Burning or pain during urination:** Discomfort or pain during urination, often described as a burning sensation.
4. **Lower abdominal or pelvic pain:** Dull or crampy pain in the lower abdomen or pelvic region.
5. **Hematuria:** Presence of blood in the urine, which may cause the urine to appear pink, red, or brown.
6. **Cloudy or strong-smelling urine:** Urine may appear cloudy and have a strong, unpleasant odor.
7. **Feeling of incomplete bladder emptying:** Sensation of not fully emptying the bladder after urination.

Urethritis

is an inflammation of the urethra, which is the tube that carries urine from the bladder out of the body. Urethritis can be caused by various factors, including infections, trauma, and certain medical conditions.

Infectious urethritis is **most commonly caused** by **sexually transmitted infections** (STIs), such as **Neisseria gonorrhoeae** (gonococcal urethritis) and **Chlamydia trachomatis** (chlamydial urethritis). These infections are typically **transmitted through sexual contact**, and **urethritis** may be one of the **first symptoms to appear**. Other bacteria, such as Mycoplasma genitalium, Ureaplasma urealyticum, and Trichomonas vaginalis, can also cause urethritis.

Non-infectious urethritis can be **caused by trauma** or **irritation** to the urethra, such as from the use of catheters, urinary tract instrumentation, or **harsh soaps or chemicals**. Additionally, certain medical conditions, such as urinary tract abnormalities, autoimmune disorders, and allergic reactions, may also cause urethritis.

The symptoms of urethritis can vary depending on the cause, but common symptoms may include:

1. **Urethral discharge**: Discharge from the urethra that may be clear, white, yellow, or greenish in color.
2. **Pain or discomfort during urination**: Burning or stinging sensation when urinating.
3. **Frequent urination**: Feeling the need to urinate more often than usual.
4. **Urgency**: Sudden, strong urge to urinate.
5. **Pain or discomfort in the urethra or genital area:** Pain, itching, or discomfort in the urethra, penis, or surrounding genital area.
6. **Fever**

A 7 Specific infections (prostatitis, urethritis, cystitis, epididymitis, orchitis)

Prostatitis

Prostatitis is inflammation of the **prostate gland**, which is a small gland located below the bladder in males that produces semen. Prostatitis **can be acute** (sudden onset**) or chronic** (long-term), and it can be **caused by various factors**, **including bacterial infections**, **non-bacterial inflammation**, and other underlying conditions.

There are four types of prostatitis:

1. **Acute bacterial prostatitis:** This is a **sudden onset** of **prostatitis caused by** a **bacterial infection**. It is **relatively** rare but **can be severe** and **may require immediate medical attention**. **Symptoms** may **include fever**, **chills**, **severe pain** or discomfort **in** the lower abdomen or **pelvic area**, **frequent** and **urgent urination**, **painful** urination, **difficulty starting or stopping** urination, and **pain** or **discomfort during ejaculation**.
2. **Chronic bacterial prostatitis**: This is a recurrent or **persistent bacterial infection** of **the prostate gland**. It may **develop as** a **complication** of **acute bacterial prostatitis**, or it may have a more insidious onset. Symptoms may be less severe than acute bacterial prostatitis and may include lower abdominal or pelvic pain, frequent and urgent urination, painful urination, discomfort or pain in the perineum (the area between the scrotum and anus), and pain or discomfort during ejaculation.
3. **Chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS):** This is the most common form of prostatitis, accounting for the majority of cases. It is **characterized** by **persistent** or **recurrent pain** or discomfort **in** the **prostate gland and surrounding pelvic area**, **without evidence** of **bacterial infection**. Symptoms may include pain or discomfort in the lower abdomen, pelvis, or lower back, frequent urination, painful urination, pain or discomfort in the perineum, pain or discomfort during ejaculation, and erectile dysfunction.
4. **Asymptomatic inflammatory prostatitis:** This form of prostatitis is diagnosed incidentally during evaluation for

other conditions, and it typically does not cause any noticeable symptoms.

Urethritis

Urethritis is a medical condition that refers to inflammation of the urethra, which is the tube that carries urine from the bladder to the outside of the body. Urethritis can be caused by various factors, including infections, irritation, and inflammation.

Causes of Urethritis:

1. **Infections:** The most common cause of urethritis is a bacterial infection, with sexually transmitted infections (STIs) being the most frequent culprits. These may include gonorrhea, chlamydia, and Mycoplasma genitalium, among others. Non-sexually transmitted infections, such as urinary tract infections (UTIs), can also cause urethritis.
2. **Irritation**: Urethritis can also be caused by irritation from substances that come into contact with the urethra, such as soaps, bubble baths, and spermicides.
3. **Trauma**: Trauma to the urethra, such as from catheterization or injury, can also lead to urethritis.
4. **Autoimmune conditions:** In rare cases, autoimmune conditions such as Reiter's syndrome or Behcet's disease can cause urethritis.

Symptoms of Urethritis: The most common symptoms of urethritis include:

1. **Pain or discomfort during urination** (dysuria)
2. **Increased frequency of urination**

3. **Discharge from the urethra** (which may be clear, white, or yellow)
4. **Itching or burning sensation in the urethra**
5. **Pain or discomfort in the penis or urethra**
6. **Blood in the urine** (hematuria)
7. **In some cases, urethritis may be asymptomatic, particularly in women**.

Cystitis

Cystitis is a medical condition that refers to **inflammation of** the **bladder**, which is a part of the urinary tract responsible for storing urine. It is a common type of urinary tract infection (UTI) that primarily affects the bladder, but it can also involve other parts of the urinary tract, such as the urethra and kidneys.

Causes of Cystitis:

1. **Bacterial infection:** The most common cause of cystitis is a bacterial infection, usually caused by bacteria such as Escherichia coli (E. coli) that normally reside in the intestines. These bacteria can enter the urethra and travel up to the bladder, leading to infection and inflammation.
2. **Interstitial cystitis**: Interstitial cystitis, also known as painful bladder syndrome, is a chronic condition characterized by inflammation of the bladder wall without a clear bacterial infection. The exact cause of interstitial cystitis is unknown, but it is believed to involve a combination of genetic, immune, and environmental factors.
3. **Radiation cystitis:** Radiation therapy used to treat certain cancers, such as pelvic cancers, can cause inflammation of the bladder lining, leading to radiation cystitis.

4. **Chemical-induced cystitis**: Exposure to certain chemicals or irritants, such as those found in some feminine hygiene products, bubble baths, or spermicides, can cause irritation and inflammation of the bladder lining, leading to cystitis.

Symptoms of Cystitis: The most common symptoms of cystitis include:

1. **Increased urgency and frequency of urination**
2. **Pain or discomfort during urination** (dysuria)
3. **Feeling of incomplete emptying of the bladder**
4. **Lower abdominal or pelvic pain or discomfort**
5. **Cloudy, dark, bloody, or strong-smelling urine**
6. **Pain or pressure in the lower abdomen or back**
7. **Pain or discomfort during sexual intercourse** (dyspareunia)
8. **In some cases, interstitial cystitis may also cause pelvic pain and discomfort outside of urination.**

Epididymitis

Epididymitis is a medical condition that refers to **inflammation of** the **epididymis**, which is a tube-like structure located at the back of the testicles. The epididymis is responsible for carrying and storing sperm. Epididymitis can be acute or chronic, and it is commonly caused by bacterial infection.

Causes of Epididymitis:

1. **Bacterial infection:** The most common cause of epididymitis is a bacterial infection, usually **transmitted through** the **urethra or** the **vas deferens** (the tube that carries sperm from the testicles to the urethra). **Common bacteria** that can cause epididymitis **include**

Escherichia coli (E. coli), which normally reside in the intestines, **as well** as sexually transmitted infections (**STIs**) **such** as **Chlamydia** and **Gonorrhea**.

2. **Non-infectious causes**: In some cases, epididymitis can also be caused by non-infectious factors, such as trauma or injury to the scrotum, urinary reflux (when urine flows backward into the epididymis), or certain medications.

Symptoms of Epididymitis: The most common symptoms of epididymitis include:

1. **Pain and swelling in the scrotum**, particularly in the epididymis.
2. **Tenderness or discomfort in the testicles, usually on one side.**
3. **Redness and warmth in the scrotal area.**
4. **Pain or discomfort during urination (dysuria).**
5. **Increased frequency or urgency of urination.**
6. **Discharge from the penis (in cases caused by STIs).**
7. **Pain or discomfort during ejaculation.**
8. **Enlarged lymph nodes in the groin area (in some cases).**

Orchitis

Orchitis is a **condition characterized by inflammation of** one or both **testicles**, which are the male reproductive organs responsible for producing sperm and testosterone. Orchitis **can be acute or chronic** and can be **caused by various factors**, **including bacterial or viral** infections, **trauma**, **and other** underlying medical **conditions**.

Causes of Orchitis:

1. **Bacterial infection**: Bacterial orchitis is usually caused by bacteria that enter the testicles through the

bloodstream or the urinary tract. Common bacteria that can cause orchitis include **Escherichia coli** (E. coli), which normally reside in the intestines, as well as other bacteria such as Staphylococcus and Streptococcus.

2. **Viral infection**: Viral orchitis is most commonly caused by the **mumps virus**, a highly contagious virus that can cause swelling and inflammation of the testicles as a complication of mumps infection. **Other viruses, such as Coxsackie virus,** may also cause viral orchitis.
3. **Trauma:** Trauma or injury to the testicles, such as from sports injuries or accidents, can lead to orchitis.
4. Other underlying conditions: Orchitis can also be a result of other underlying medical conditions, such as autoimmune diseases, vasculitis, or systemic infections.

Symptoms of Orchitis: The most common symptoms of orchitis include:

1. **Pain and swelling in one or both testicles.**
2. **Tenderness or discomfort in the testicles.**
3. **Redness and warmth in the scrotal area.**
4. **Enlarged lymph nodes in the groin area.**
5. **Fever and chills (in cases caused by bacterial infection).**
6. **Flu-like symptoms (in cases caused by viral infection).**
7. **Discharge from the penis (in some cases).**
8. **Pain or discomfort during urination (in some cases).**

□

A 8 Benign prostatic hyperplasia assessment

BPH (Benign Prostatic Hyperplasia) **assessment** typically **involves** a thorough **medical history**,
physical examination, and additional tests to evaluate the

size and function of the prostate gland, as well as to rule out other possible conditions.

1. **Medical history:** including any symptoms may be experiencing related to urination, such as frequent urination, difficulty starting or stopping urination, weak urine flow, or waking up at night to urinate (nocturia). overall health, past medical conditions, and any medications are currently taking.
2. **Physical examination**: A physical examination may be conducted, including a **digital rectal examination (DRE),** where the healthcare provider inserts a gloved, lubricated finger into the rectum to feel the size, shape, and consistency of the prostate gland. This can help assess for any abnormalities or enlargement of the prostate gland.
3. **Urine tests**: Urine tests may be done to rule out urinary tract infections or other conditions that may be causing urinary symptoms.
4. **Prostate-specific antigen (PSA) blood test:** A PSA blood test may be done to measure the level of PSA, a **protein produced by the prostate gland, in the blood. Elevated PSA levels may indicate an increased risk of BPH** or other prostate conditions, although PSA levels **can also be elevated due to other factors, such as age, infection, or inflammation.**
5. **Imaging tests:** Imaging tests, such as ultrasound or magnetic resonance imaging (MRI), may be ordered to assess the size, shape, and structure of the prostate gland, as well as to rule out other conditions, such as prostate cancer.

6. **Urodynamic tests:** Urodynamic tests may be conducted to evaluate the function of the bladder and urethra, which are involved in urine storage and elimination. These tests may include uroflowmetry, which measures the rate and volume of urine flow, and cystometry, which measures the pressure and capacity of the bladder during filling and emptying.
7. **Symptom assessment**: Your healthcare provider may use a **standardized symptom assessment tool, such as the International Prostate Symptom Score (IPSS),** to evaluate the severity of your urinary symptoms and their impact on your quality of life.

A 9 Benign prostatic hyperplasia medical and surgical treatment

Benign Prostatic Hyperplasia (BPH) is a condition characterized by the **non-cancerous enlargement of the prostate gland**, which can cause urinary symptoms such as frequent urination, difficulty starting or stopping urination, weak urine flow, and incomplete bladder emptying. BPH treatment options vary depending on the severity of symptoms, the impact on quality of life, and individual patient factors. Here are some common medical and surgical treatment options for BPH:

1. **Medical Treatment:**
   - **Alpha-blockers:** Alpha-blockers are medications that relax the smooth muscles of the prostate and bladder neck, improving urine flow and relieving urinary symptoms. Examples of alpha-blockers used for BPH include **tamsulosin, doxazosin, and alfuzosin.**

- **5-alpha reductase inhibitors: 5-alpha reductase inhibitors are medications that reduce the production of a hormone called dihydrotestosterone (DHT), which contributes to prostate growth.** These medications can help shrink the prostate gland and improve urinary symptoms over time. Examples of 5-alpha reductase inhibitors used for BPH **include finasteride and dutasteride**.
- Combination therapy: Some patients may be prescribed a combination of alpha-blockers and 5-alpha reductase inhibitors for more effective symptom relief.

2. **Minimally Invasive Procedures:**
   - **Transurethral resection of the prostate (TURP):** TURP is a surgical procedure in which the excess prostate tissue is removed using a **resectoscope inserted through the urethra**. It is a common and effective procedure for relieving urinary symptoms caused by BPH.
   - **Transurethral incision of the prostate (TUIP):** TUIP is a surgical procedure in which small incisions are made in the prostate to relieve pressure on the urethra, improving urine flow. It is typically used for smaller prostate glands.
   - **Laser prostate surgery**: Various types of laser prostate surgery, such as **holmium laser enucleation of the prostate (HoLEP)** and **photoselective vaporization of the prostate** (PVP), can be used to remove or ablate prostate tissue, providing symptom relief with less bleeding and shorter recovery times compared to traditional surgery.

3. **Other Surgical Procedures:**

- **Open prostatectomy:** Open prostatectomy is a traditional surgical procedure in which the prostate gland is removed through an abdominal incision. It is typically reserved for very large prostates or in cases where other treatment options are not suitable.
- **Prostatic artery embolization (PAE):** PAE is a minimally invasive procedure that involves blocking the arteries that supply blood to the prostate, leading to shrinkage of the prostate tissue and symptom relief.

A 10 Obsturction in the urine collectiong tract, causes and treatment

Causes

Obstruction in the urine collecting tract can be **caused by various factors**, including:

1. **Urinary stones**: Urinary stones, also known as calculi, **can form in** the **kidneys**, ureters, bladder, or urethra, **and obstruct the flow** of urine. Stones may be **composed** of **calcium**, **oxalate**, **phosphate**, **uric acid**, **or other** substances. When stones become too large or too numerous, they can block the normal passage of urine and cause obstruction.
2. **Benign prostatic hyperplasia (BPH)**: BPH is a **non-cancerous enlargement of the prostate gland** that commonly occurs in older men. The prostate gland surrounds the urethra, and when it becomes enlarged, it **can compress the urethra** and cause obstruction of urine flow.

3. **Tumors**: Both **benign and malignant tumors can develop** in the urinary tract and cause obstruction. Tumors may arise from the kidneys, ureters, bladder, prostate gland, or other parts of the urinary tract, and can grow and compress the urinary tract, obstructing the flow of urine.
4. **Urinary tract infections (UTIs): Inflammation and swelling** of the urinary tract due to UTIs **can cause obstruction**. For example, inflammation and swelling of the urethra, bladder, or ureters due to infection can reduce the diameter of the urinary tract and restrict the flow of urine.
5. **Congenital abnormalities: Structural abnormalities** that **are present at birth**, such as **urethral strictures** (narrowing of the urethra), **vesicoureteral reflux** (backflow of urine from the bladder into the ureters), or other congenital anomalies, can cause obstruction in the urinary tract.
6. **Trauma**: Trauma to the urinary tract, such as from accidents, injuries, or surgical procedures, can result in obstruction. For example, scar tissue formation from surgical procedures or injuries can narrow or block the urinary tract, impeding urine flow.
7. **Blood clots:** Blood clots, also known as **urinary tract thrombosis**, can form in the urinary tract due to various conditions, such as blood disorders or postoperative complications. These clots can block the flow of urine and cause obstruction.
8. **Neurogenic causes:** Neurogenic causes, such as **nerve damage or dysfunction**, can affect the normal functioning of the urinary tract and cause obstruction. Neurological conditions like spinal cord injuries, multiple sclerosis, or other nerve-related disorders can

disrupt the normal coordination of urinary tract muscles, leading to obstruction.

The **treatment of obstruction** in the urine collecting tract **depends** on the **underlying cause** of the obstruction, **the severity** of the obstruction, **and** the **overall health of** the **patient**. Treatment options may include:

1. **Medical management:** Depending on the cause of the obstruction, medications may be used to manage symptoms or address the underlying condition. For **example**, **antibiotics** may be prescribed **for** urinary tract infections (**UTIs**), **alpha-blockers** or 5-alpha reductase inhibitors may be used **for** benign prostatic hyperplasia (**BPH**), and **corticosteroids** may be prescribed for **inflammation** or **swelling**.
2. **C**atheterization: **If** the **obstruction** is **temporary** or partial, a **catheter may** be **inserted** to **relieve** the **blockage** and allow urine to flow. Catheterization can be done using different types of catheters, **such** as a **Foley catheter**, **which** is a **flexible** tube that is inserted into the bladder through the urethra.
3. **Ureteral stenting: In cases where** the **obstruction** is **located in** the **ureters** (the tubes that connect the kidneys to the bladder), a **ureteral stent may be placed** to help keep the ureters open and allow urine to flow freely. Ureteral stents are usually inserted using a minimally invasive procedure.
4. **Endoscopic procedures:** Endoscopic procedures, such as **cystoscopy** or **ureteroscopy**, may be used to **directly visualize and treat** the **obstruction**. These procedures involve using a thin, flexible tube with a light and camera to access the urinary tract and remove or bypass

the obstruction.

5. **Surgical intervention**: In some cases, surgical intervention may be necessary to treat the obstruction. This may involve **removing tumors** or **other growths**, repairing **structural abnormalities**, or **removing obstructions caused by stones** or other blockages. Surgery may be done using traditional open surgery or minimally invasive techniques, such as laparoscopy or robotic-assisted surgery.
6. **Other interventions**: In certain cases, **other interventions may be needed**, **such as embolization to block blood vessels supplying** a **tumor**, **lithotripsy** to **break up urinary stones**, or other specialized procedures depending on the specific cause of the obstruction.

A 11 Urinary incontience (epidemiology, patophysiology, types, diagnosis)

Epidemiology

Urinary incontinence is a **common condition** that **affects people** of **all ages**, **genders**, **and races**. Here are some key points about the epidemiology of urinary incontinence:

1. **Prevalence**: Urinary incontinence is a prevalent condition, with estimates varying depending on the population studied and the definition used**. It is estimated that approximately 25-45% of women and 10-30% of men experience urinary incontinence at some point in their lives**. The prevalence increases with

age, with higher rates seen in older individuals.

2. **Gender**: Urinary incontinence is **more common in women than in men**, primarily due to factors such as pregnancy, childbirth, and hormonal changes associated with menopause. However, it can occur in men as well, especially in older age groups.
3. **Age**: **The prevalence of urinary incontinence increases with age**. It is more common in older individuals due to age-related changes in the urinary system, such as decreased bladder capacity, weakened pelvic floor muscles, and increased incidence of comorbid conditions.
4. **Risk factors**: Several risk factors can increase the likelihood of developing urinary incontinence, **including obesity, chronic coughing, constipation, certain medical conditions such as diabetes and neurological disorders, and previous pelvic surgery or radiation therapy.**
5. **Impact on quality of life:** Urinary incontinence can significantly impact an individual's quality of life, causing embarrassment, social isolation, decreased mobility, and psychological distress. It can also result in increased healthcare utilization and economic burden.
6. **Underreporting**: Urinary incontinence is often underreported, with many individuals reluctant to seek medical help due to embarrassment or a belief that it is a normal part of aging. This can result in the condition being underdiagnosed and undertreated.
7. **Treatment-seeking behavior**: Despite the high prevalence of urinary incontinence, many individuals do not seek medical help or receive appropriate treatment. This may be due to lack of awareness, stigma, or access to healthcare resources.

8. **Public health impact:** Urinary incontinence has a significant public health impact in terms of healthcare costs, lost productivity, and reduced quality of life for affected individuals and their caregivers. It highlights the need for increased awareness, education, and access to appropriate care for those affected by this condition.

Pathophysiology

The pathophysiology of urinary incontinence is complex and can involve various factors related to the normal functioning of the urinary tract. Here are some key points:

1. **Bladder Dysfunction**: The bladder is a muscular organ that stores and empties urine. Dysfunction of the bladder can result in urinary incontinence. **Overactive bladder (OAB)**, characterized by **increased urgency** and **frequency** of **urination**, can lead to **urge incontinence**, where a person may have a **sudden urge** to **urinate** and **may not be able** to **reach** the **toilet in time**. **Underactive bladder**, **on the other hand**, can **result** in **overflow incontinence**, **where the bladder does not empty completely, causing urine to overflow.**
2. **Weak Pelvic Floor Muscles**: The pelvic floor muscles play a crucial role in maintaining urinary continence by supporting the bladder and urethra. Weakness or dysfunction of these muscles, often resulting from factors such as pregnancy, childbirth, aging, or nerve damage, can lead to stress urinary incontinence. This is characterized by involuntary leakage of urine during

physical activities such as coughing, sneezing, laughing, or exercising, which increase intra-abdominal pressure and put stress on the weakened pelvic floor muscles.

3. **Urethral Dysfunction:** The urethra is a tube that carries urine from the bladder to the outside of the body. Dysfunction of the urethra can contribute to urinary incontinence. For example, a weak or hypermobile urethra may not be able to effectively close during increased intra-abdominal pressure, leading to stress urinary incontinence. Additionally, impaired urethral sphincter function, such as due to nerve damage or certain medications, can also result in urinary incontinence.
4. **Neurological Disorders**: Neurological disorders that affect the central nervous system, such as spinal cord injury, stroke, multiple sclerosis, and Parkinson's disease, can disrupt the normal functioning of the urinary tract and lead to urinary incontinence. These conditions can affect the nerves that control the bladder and pelvic floor muscles, resulting in bladder dysfunction and loss of urinary control.
5. **Other Factors:** Other factors that can contribute to urinary incontinence include bladder outlet obstruction (e.g., due to benign prostatic hyperplasia or urethral stricture), certain medications (e.g., diuretics, alpha-blockers, sedatives), chronic coughing or constipation, obesity, hormonal changes (e.g., menopause), and genetic predisposition.

types

Urinary incontinence is a condition characterized by the involuntary leakage of urine. There are several types of

urinary incontinence, which can be classified based on their underlying causes and symptoms. The main types of urinary incontinence include:

1. **Stress Urinary Incontinence (SUI):** This is the **most common type of urinary incontinence** and is **characterized by** the **leakage** of **urine during physical activities that increase intra-abdominal pressure**, such as coughing, sneezing, laughing, lifting, or exercising. SUI is usually **caused by weakened pelvic floor muscles** and/or a weakened or hypermobile urethra, which results in the inability to adequately support the bladder and urethra during these activities.
2. **Urge Urinary Incontinence**: Also known as **overactive bladder (OAB)** or "urgency incontinence", this type of incontinence is characterized by a **sudden and strong urge to urinate**, often followed by an **involuntary loss of urine**. OAB is caused by an **overactive detrusor muscle**, which is the muscle of the bladder that contracts to empty urine. The exact cause of OAB is not always clear, but it can be related to nerve or muscle dysfunction in the bladder.
3. **Mixed Urinary Incontinence**: Mixed urinary incontinence is a combination of stress urinary incontinence (SUI) and urge urinary incontinence (OAB), where a person may experience symptoms of both types of incontinence. This can involve a combination of stress-related leakage of urine during physical activities as well as sudden urges to urinate and involuntary loss of urine.
4. **Overflow Urinary Incontinence**: This type of incontinence occurs when the bladder does not empty completely, causing urine to "overflow" and leak out. It is typically **caused by bladder outlet obstruction**,

which can be due to conditions such as benign prostatic hyperplasia (BPH), urethral stricture, or neurological disorders that affect the nerves controlling the bladder.

5. **Functional Urinary Incontinence:** Functional incontinence occurs when a person is unable to reach the toilet in time **due to physical or cognitive impairments**, such as **mobility issues**, **cognitive disorders**, or other medical conditions that limit their ability to control their urinary function.
6. **Total Urinary Incontinence:** This is a rare and severe form of incontinence where there is continuous and complete loss of urinary control, resulting in a constant leakage of urine. It can be caused by anatomical abnormalities, nerve damage, or other underlying conditions.

diagnosis

The diagnosis of urinary incontinence typically involves a comprehensive evaluation by a qualified healthcare provider, such as a urologist, urogynecologist, or primary care physician. The evaluation may include the following:

1. **Medical History:** The healthcare provider will take a detailed medical history, including the duration and severity of the symptoms, any triggering factors or aggravating factors, and any history of prior surgeries, medical conditions, or medications that could contribute to urinary incontinence.
2. **Physical Examination**: A physical examination may be conducted, which may include a pelvic examination for women to assess for any pelvic organ prolapse, and a digital rectal examination for men to assess the prostate

gland.

3. **Urinalysis**: A urinalysis may be performed to check for any signs of infection, blood in the urine, or other abnormalities.
4. **Voiding Diary**: Keeping a voiding diary, which involves recording the frequency, volume, and circumstances of urination and episodes of urinary leakage, can provide valuable information about the pattern of urinary incontinence and help identify any triggers or underlying causes.
5. **Bladder Function Tests**: Various bladder function tests may be performed to assess the capacity, compliance, and stability of the bladder. These tests may include urodynamic testing, which involves measuring pressure and flow during bladder filling and emptying, and may also include cystometry, uroflowmetry, and post-void residual measurement.
6. **Imaging Studies**: Imaging studies such as ultrasound, cystoscopy, or radiographic imaging (such as X-rays or MRI) may be performed to visualize the urinary tract, bladder, and surrounding structures for any structural abnormalities or signs of obstruction.
7. **Specialized Tests**: In some cases, specialized tests may be needed based on the suspected underlying cause of urinary incontinence. For example, if neurological dysfunction is suspected, nerve conduction studies, electromyography (EMG), or other specialized tests may be ordered.
8. **Other Assessments**: Depending on the individual case, additional assessments such as assessment of cognitive function, mobility, and overall functional status may be necessary to evaluate for functional urinary incontinence.

A 12 Urinary incontinence (treatment)

Treatment of urinary incontinence depends on the type of incontinence.
The main types of urinary incontinence are

- **stress incontinence,**
- **urge incontinence,**
- **overflow incontinence,**
- **mixed incontinence**

1. **Stress incontinence:** When the muscles that control the **bladder become weakened** and cannot support the bladder during physical activities like coughing, sneezing, or exercising.
   Treatment includes:
   - **pelvic floor muscle exercises (Kegel exercises),**
   - **bladder training,**
   - **weight loss, surgery,**
   - **Using a pessary (a device that supports the bladder).**

2. **Urge incontinence:** This occurs when the **bladder muscle contracts too often**, causing a sudden and intense urge to urinate, which may lead to urine leakage.
   Treatment options for urge incontinence include
   - **bladder training,**
   - **medication (such as anticholinergics or beta-3 agonists),**
   - **pelvic floor muscle exercises,**

- **nerve stimulation.**

3. **Overflow incontinence:** This occurs **when** the **bladder becomes full and overflows**, often **due** to an **obstruction** in the urinary tract or weak bladder muscles. **Treatment options for overflow incontinence include**
   - **catheterization (emptying the bladder with a tube),**
   - **surgery to remove the obstruction,**
   - **medication to relax the bladder muscles.**

4. **Mixed incontinence:** This is a combination of different types of incontinence, such as stress and urge incontinence. Treatment options depend on the specific types of incontinence present and may include a combination of the above treatments.

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A 13 Endoscopy and laparoscopy

Endoscopy involves the use of an **endoscope**, (long, thin, flexible tube with a light and camera at the end), to examine the inside of the body.
Used to diagnose & treat a wide range of conditions in various parts of the body, including the digestive system, respiratory system, urinary system, and
reproductive system.

During an **endoscopy**, the **endoscope** is **inserted through** a **natural opening** in the body, such as the mouth, nose, anus, or urethra, or through **a small incision** in the skin. **The**

camera on the end of the endoscope **allows** the healthcare provider **to see** the **inside** of the **body on** a **video monitor**, and the light on the endoscope helps to illuminate the area being examined.

Endoscopy is generally a safe procedure with few risks. Some possible risks may include bleeding, infection, and perforation of the organ being examined. However, these risks are relatively rare and can usually be managed with prompt medical attention

There are several endoscopic procedures that can be performed in urology to diagnose or treat various conditions. Here are some of the most common endoscopic procedures performed in urology:

1. **Cystoscopy:** This is a procedure in which an endoscope is used to examine the inside of the bladder. Cystoscopy can help diagnose conditions such as urinary tract infections, bladder cancer, and bladder stones. It can also be used to perform procedures such as bladder biopsies or to remove bladder stones.
2. **Ureteroscopy:** This is a procedure in which an endoscope is used to examine the inside of the ureters, which are the tubes that connect the kidneys to the bladder. Ureteroscopy can be used to diagnose and treat conditions such as kidney stones, ureteral strictures, and tumors in the urinary tract.
3. **Nephroscopy:** This is a procedure in which an endoscope is used to examine the inside of the kidneys. Nephroscopy can be used to diagnose and treat conditions such as kidney stones, tumors, and cysts.
4. **Transurethral resection of the prostate (TURP):** This

is a procedure in which an endoscope is used to remove excess tissue from the prostate gland in men with an enlarged prostate. TURP can help relieve symptoms such as difficulty urinating and urinary retention.

5. **Percutaneous nephrolithotomy (PCNL):** This is a procedure in which an endoscope is used to remove large kidney stones through a small incision in the back. PCNL is often used when other treatments for kidney stones, such as shock wave lithotripsy or ureteroscopy, are not effective.

Laparoscopy is a **minimally invasive surgical procedure** that **allows** a **surgeon** to **examine** and **operate** on the **inside** of the **abdomen or pelvis using** a **laparoscope**, which is a thin, lighted tube with a camera on the end. The **laparoscope** is **inserted through** a **small incision** in the **abdomen**, **and** the **camera allows the surgeon** to **view** the **organs and tissues on** a **video monitor**.

During a laparoscopic procedure, the surgeon makes several small incisions in the abdomen and inserts other specialized instruments to perform the necessary surgical procedures. The instruments are controlled by the surgeon and allow for a range of surgical procedures to be performed, including biopsies, removal of organs, and repair of damaged tissues.

There are several laparoscopic procedures that can be performed in urology to diagnose or treat various conditions.

Here are some of the most common laparoscopic procedures performed in urology:

1. **Laparoscopic radical prostatectomy:** This is a minimally invasive surgery used to treat prostate cancer. During the procedure, the surgeon removes the prostate gland, along with any nearby tissues or lymph nodes that may be affected by cancer.
2. **Laparoscopic pyeloplasty**: This is a surgery used to treat ureteropelvic junction (UPJ) obstruction, a condition where the kidney becomes blocked at the point where it connects to the ureter. The surgeon uses laparoscopic instruments to remove the obstruction and reattach the kidney to the ureter.
3. **Laparoscopic nephrectomy:** This is a surgery used to remove all or part of a kidney. The surgeon uses laparoscopic instruments to make small incisions in the abdomen and remove the kidney through one of the incisions.
4. **Laparoscopic adrenalectomy:** This is a surgery used to remove one or both of the adrenal glands. The surgeon uses laparoscopic instruments to remove the gland through small incisions in the abdomen.
5. **Laparoscopic ureteral reimplantation**: This is a surgery used to correct vesicoureteral reflux, a condition where urine flows backward from the bladder into the ureters. The surgeon uses laparoscopic instruments to reposition the ureter and reattach it to the bladder.
6. **Radical Cystectomy**
7. **Varisectomy**

A 14 Male infertility

Causes

1. **Low sperm count**: A low sperm count can be caused by a variety of factors, including hormonal imbalances, genetic factors, infections, and certain medications. In some cases, the testes may not produce enough sperm, while in other cases, the sperm may not be able to travel from the testes to the penis. Additionally, some sperm may be malformed or die before reaching the egg.
2. **Abnormal sperm function:** Even if a man has a normal sperm count, his sperm may not function properly. Abnormal sperm function can be caused by genetic factors, infections, exposure to toxic substances, and certain medications. Sperm may have difficulty penetrating the egg, or the sperm may not be able to swim properly.
3. **Blockages in the reproductive system**: Blockages in the tubes that carry sperm from the testes to the penis can prevent sperm from reaching the egg. Blockages can be caused by infections, injury, or congenital abnormalities. When the tubes are blocked, sperm cannot be ejaculated during sex.
4. **Varicocele**: This is a condition in which the veins in the scrotum become enlarged, causing a decrease in sperm quality and quantity. The exact mechanism by which varicocele affects sperm production is not fully understood, but it is believed that the increased temperature in the scrotum may affect sperm production.
5. **Erectile dysfunction:** Erectile dysfunction can make it difficult or impossible to achieve and maintain an

erection, which can make it difficult to conceive. Erectile dysfunction can be caused by a variety of factors, including hormonal imbalances, blood flow problems, nerve damage, and psychological factors.

6. **Retrograde ejaculation:** This is a condition in which semen flows backwards into the bladder instead of out of the penis during ejaculation. Retrograde ejaculation can be caused by medications, nerve damage, and certain medical conditions.
7. **Genetic factors:** Some genetic disorders, such as Klinefelter syndrome and Y chromosome microdeletions, can cause male infertility. These disorders can affect sperm production, sperm function, or both.
8. **Environmental factors:** Exposure to toxins, radiation, and certain chemicals can damage sperm and cause infertility. These substances can cause genetic mutations, disrupt hormone production, or damage the cells that produce sperm.
9. **Immunological infertility: Anti-sperm antibodies**
10. **Hormonal imbalances**

Diagnosis

Diagnosis of male infertility typically involves a thorough medical history, physical examination, and semen analysis. During the medical history, the healthcare provider will ask about any medical conditions, medications, or lifestyle factors that may be contributing to infertility. The physical examination may include a genital exam to check for abnormalities or signs of infection.

A semen analysis is a critical component of male infertility diagnosis, and involves analysing a sample of semen to evaluate the quality and quantity of sperm. The analysis

may include measures of sperm count, motility (the ability of the sperm to swim), morphology (the shape of the sperm), and other factors.

In addition to these basic tests, other diagnostic tools may be used to evaluate male infertility. These may include:

1. **Hormonal testing**: Blood tests may be used to measure hormone levels, which can provide information about the function of the testes and other reproductive organs.
2. **Genetic testing:** Genetic testing may be used to identify any genetic factors that may be contributing to infertility.
3. **Testicular biopsy:** In some cases, a small sample of testicular tissue may be taken to evaluate sperm production and quality.
4. **Imaging tests:** Imaging tests, such as ultrasound or MRI, may be used to evaluate the reproductive organs and identify any structural abnormalities.

Treatment

1. **Hormone therapy:** If infertility is caused by hormonal imbalances, hormone therapy may be used to restore normal hormone levels. This may involve testosterone replacement therapy or other medications to regulate hormone production.
2. **Surgery**: In some cases, surgery may be needed to correct structural abnormalities, such as blockages in the reproductive system or varicocele. Surgery may also be used to correct congenital abnormalities, such as undescended testicles.
3. **Assisted reproductive techniques**: Assisted reproductive techniques, such as intrauterine insemination (IUI) or in vitro fertilization (IVF), may be

used to overcome infertility. In IUI, sperm are placed directly into the uterus during ovulation. In IVF, eggs are fertilized outside of the body and then transferred to the uterus. Other techniques, such as intracytoplasmic sperm injection (ICSI), may be used to directly inject sperm into the egg.

4. **Medications:** Certain medications may be used to improve sperm production or quality. For example, clomiphene citrate may be used to increase testosterone levels and improve sperm production.
5. **Lifestyle changes:** Making certain lifestyle changes, such as quitting smoking, reducing alcohol intake, and losing weight, may help improve fertility.

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A 15 Male sexual dysfunction (erectile dysfunction)

Types

1. **Primary ED:** Primary ED refers to a man who has never been able to achieve an erection sufficient for sexual intercourse. This may be due to physical factors, such as hormonal imbalances, nerve damage, or vascular problems.
2. **Secondary ED:** Secondary ED refers to a man who has previously been able to achieve erections but is currently experiencing difficulty. This may be due to physical or psychological factors, such as cardiovascular disease, diabetes, anxiety, or relationship issues.

Or

1. **Organic ED:** Organic ED is caused by physical factors that affect blood flow to the penis, such as cardiovascular disease, diabetes, high blood pressure, and hormonal imbalances. Organic ED may also be caused by nerve damage, as in the case of multiple sclerosis or spinal cord injuries.
2. **Psychogenic ED:** Psychogenic ED is caused by psychological factors, such as anxiety, depression, stress, and relationship issues. In some cases, performance anxiety or a fear of sexual failure can contribute to psychogenic ED.

Causes

1. **Medical conditions:** Several medical conditions can cause ED, including diabetes, high blood pressure, heart disease, neurological disorders, and hormonal imbalances.
2. **Medications**: Certain medications, such as antidepressants, antihypertensives, and antipsychotics, can cause ED as a side effect.
3. **Lifestyle factors:** Unhealthy lifestyle factors, such as smoking, excessive alcohol consumption, drug use, and obesity, can contribute to ED.
4. **Psychological factors:** Psychological factors, such as stress, anxiety, depression, and relationship issues, can contribute to ED.
5. **Aging:** As men age, the risk of ED increases due to age-related changes in the body, such as decreased

testosterone levels and decreased blood flow to the penis.

6. **Injury or surgery:** Injury to the penis, prostate, or bladder, or surgery in these areas, can damage nerves and blood vessels involved in the erection process and cause ED.
7. **Peyronie's disease:** Peyronie's disease is a condition in which scar tissue forms inside the penis, causing curvature and pain during erections. This can result in ED.

Diagnostic work-up

1. **Medical history:** A healthcare provider will ask questions about the patient's medical history, including any medications or supplements they are taking, past surgeries, and any symptoms they are experiencing.
2. **Physical examination:** A physical examination may include an assessment of the patient's overall health, blood pressure, and a genital examination to assess for any abnormalities.
3. **Laboratory tests:** Laboratory tests may include blood tests to assess for hormonal imbalances or diabetes, lipid profiles, and liver and kidney function tests.
4. **Penile ultrasound:** A penile ultrasound can evaluate blood flow to the penis and can help determine if there are any physical abnormalities that may be contributing to ED.
5. **Psychological evaluation:** A psychological evaluation may be recommended to assess for any psychological

factors that may be contributing to ED.

FOR THE LOVE OF GOD DON'T JUST ASK THE PATIENT "HAVE YOU EVER CONSIDERED YOU MIGHT BE GAY?"

6. **Nocturnal penile tumescence (NPT) test:** An NPT test involves wearing a special device overnight that measures the frequency and duration of erections during sleep. This can help determine if ED is caused by physical or psychological factors.

Treatment

1. **Oral medications:** Medications such as sildenafil (Viagra), tadalafil (Cialis), and vardenafil (Levitra) are often prescribed to treat ED. These medications work by increasing blood flow to the penis, allowing for an erection to occur.
2. **Penile injections:** Injection therapy involves the injection of medication directly into the penis. This medication causes the blood vessels to dilate, allowing for an erection to occur.
3. **Penile implants:** Penile implants involve surgically placing an inflatable or malleable device into the penis. This allows the patient to achieve an erection whenever they desire.
4. **Vacuum erection devices:** A vacuum erection device is a mechanical device that creates a vacuum around the penis, drawing blood into the penis and allowing for an erection to occur.
5. **Lifestyle changes:** Lifestyle changes such as quitting smoking, losing weight, and increasing exercise can help improve ED.

6. **Psychotherapy:** Psychotherapy, including cognitive behavioral therapy (CBT), may be recommended for men with psychogenic ED.

A 16 Male sexual dysfunction (hypogonadism)

Hypogonadism is a condition in which the testes do not produce enough testosterone, which can lead to male sexual dysfunction. There are two types of hypogonadism that can cause male sexual dysfunction:

1. **Primary hypogonadism:** Primary hypogonadism occurs when there is a problem with the testes themselves, which can result in decreased testosterone production. Causes of primary hypogonadism may include genetic disorders, chemotherapy, radiation therapy, or injury to the testes.

   High FSH & LH , Low Testosterone!

2. **Secondary hypogonadism:** Secondary hypogonadism occurs when there is a problem with the hypothalamus or pituitary gland, which regulate testosterone production. Causes of secondary hypogonadism may include pituitary tumors, head trauma, or use of certain medications.

   Low FSH & LH AND Low Testosterone!

Symptoms

The symptoms of hypogonadism causing male sexual

dysfunction can vary depending on the age of onset. Here are some common symptoms associated with hypogonadism based on age:

1. **Congential onset**: May occur in 1st, 2nd or 3rd trimester. If occurs in 1st then inadequate male sexual differentiation leading to total absence of testosterone and normal appearing female external genitals. If in 2nd or 3rd then it results in microphallus and undescended testes.
2. **Childhood or puberty onset**: In boys, hypogonadism that occurs during childhood or puberty can lead to delayed puberty, which may include lack of muscle development, delayed growth of body hair, and delayed development of the penis and testes, and gynecomastia.
3. **Adulthood onset:** In adult men, hypogonadism can lead to a variety of symptoms, including decreased libido, erectile dysfunction, fatigue, decreased muscle mass, decreased bone density, and depression and gynecomastia.

Diagnosis
As well as the history taking and physical history part of the diagnostic work up
Critical laboratory analysis of FSH and LH and testosterone levels indiciate if it is primary or secondary hypogonadism.
Treatment
Give medication to correct the hormonal imbalance.

A 17 Urinary stones (diagnosis)
Types

1. **Calcium stones**: Calcium stones are the most common type of urinary stone, accounting for approximately 80% of all cases. These stones are made up of calcium oxalate and/or calcium phosphate, and can be caused by a variety of factors including dehydration, high levels of calcium in the urine, and certain medications.
2. **Struvite stones:** Struvite stones, also known as infection stones, are caused by a urinary tract infection. These stones are made up of magnesium, ammonium, and phosphate and can grow very quickly.
3. **Uric acid stones:** Uric acid stones are caused by high levels of uric acid in the urine. They are often associated with conditions such as gout, a type of arthritis that causes joint pain and inflammation.
4. **Cystine stones**: Cystine stones are a rare type of urinary stone caused by a genetic disorder called cystinuria. This disorder causes the amino acid cystine to leak into the urine, which can lead to the formation of stones.

Causes

Pre-renal /renal causes causes

1. **Dehydration:** Dehydration is a common cause of pre-renal urinary stones. When the body is dehydrated, urine becomes more concentrated, which can lead to the formation of crystals and stones.
2. **Low urine output:** If a person is not producing enough urine, the concentration of minerals in the urine can increase, leading to the formation of stones.
3. **Certain medications:** Certain medications can increase the risk of pre-renal urinary stones. For example,

diuretics, which are commonly used to treat high blood pressure, can increase urine output and lead to dehydration if not taken properly.
4. **High protein diet:** A diet high in protein can lead to an increase in uric acid production, which can increase the risk of uric acid stones.
5. **Other medical conditions:** Certain medical conditions such as hyperparathyroidism, renal tubular acidosis, and cystinuria can also increase the risk of pre-renal urinary stones.

Post-renal causes
Post-renal urinary stones are stones that form in the urinary tract outside of the kidneys, such as in the ureters or bladder. These stones can be caused by a variety of factors, including:

1. **Urinary tract obstruction:** Blockages in the urinary tract can cause urine to back up and create a buildup of minerals, leading to stone formation. Causes of obstruction can include tumors, strictures (narrowing of the ureters or urethra), or enlarged prostate in men.
2. **Urinary tract infection:** Infection in the urinary tract can cause changes in the pH level of the urine, leading to the formation of stones. Infection stones, also known as struvite stones, are typically composed of magnesium, ammonium, and phosphate.
3. **Urinary diversion surgery:** People who have undergone urinary diversion surgery, which reroutes urine away from the bladder, may be at increased risk of stone formation.
4. **Foreign objects:** Occasionally, objects such as sutures or

stents can become lodged in the urinary tract and cause stone formation.

Diagnostic workup

1. **Medical history**: Your doctor may ask about your medical history, including any prior episodes of urinary stone formation, family history, and any underlying medical conditions that may contribute to stone formation.
2. **Physical exam**: A physical exam may be performed to check for signs of urinary tract obstruction, such as tenderness in the flank region.
3. **Imaging tests**: Imaging tests, such as X-rays, ultrasound, or CT scans, may be used to identify the location and size of the stone. These tests can also help determine the appropriate treatment for the stone.
4. **Urine analysis**: A urine sample may be collected to check for signs of infection or other abnormalities that may contribute to stone formation.
5. **Stone analysis**: If a stone is passed or removed, it may be sent to a laboratory for analysis to determine its composition. This information can help guide treatment and prevent future stone formation.
6. **Blood tests:** Blood tests may be performed to check for abnormalities in kidney function and to rule out other potential causes of symptoms.

Radiopaque	Poor radiopacity	Radiolucent
Calcium oxalate dihydrate	Magnesium ammonium phosphate	Uric acid
Calcium oxalate monohydrate	Apatite	Ammonium urate
Calcium phosphates	Cystine	Xanthine
		2,8-dihydroxyadenine
		'Drug-stones' (Section 11.11)

A 18 Urinary stones (treatment)

The treatment of urinary stones depends on the size, location, and composition of the stone, as well as the severity of symptoms. Treatment options may include:

1. **Pain management:** Pain caused by urinary stones can be managed with over-the-counter pain medications, such as ibuprofen or acetaminophen. In severe cases, stronger pain medications may be prescribed.
2. **Increased fluid intake:** Drinking plenty of fluids, such as water or lemonade, can help flush out smaller stones and prevent new stones from forming.
3. **Medical management:** Some types of stones can be treated with medications that help break down the stone or prevent new stone formation.
   Medical management also depends on the type of stone:

   Calcium stones: For calcium stones, thiazide diuretics, such as hydrochlorothiazide, may be prescribed to lower urine calcium levels. Allopurinol may be used to reduce uric acid levels in the urine. Potassium citrate may be prescribed to make the urine less acidic, which can help prevent calcium stones

from forming.
Uric acid stones: Allopurinol, which lowers uric acid levels in the urine, may be prescribed for uric acid stones. Potassium citrate may also be prescribed to make the urine less acidic.
Cystine stones: For cystine stones, medications such as tiopronin or penicillamine may be prescribed to reduce the amount of cystine in the urine.

4. **Lithotripsy:** This non-invasive procedure uses shock waves to break up stones into smaller pieces that can be passed more easily. Lithotripsy may be performed using an external device or through a minimally invasive procedure.
5. **Ureteroscopy:** A thin, flexible tube with a camera on the end is inserted into the urethra and passed up to the stone. The stone is then broken up or removed using special instruments.
6. **Percutaneous nephrolithotomy (PCNL):** A small incision is made in the back and a scope is passed through the incision to break up and remove larger stones.
7. **Open surgery:** In rare cases, open surgery may be necessary to remove very large or complex stones.

Relationship between stone size and treatment:

1. **Small stones (less than 5 mm):** Small stones may pass spontaneously without the need for intervention. Your doctor may prescribe pain medication and suggest drinking plenty of fluids to help facilitate the passage of the stone. In some cases, your doctor may also prescribe medication to relax the ureter and allow the stone to pass more easily.

2. **Intermediate-sized stones (5-10 mm):** Stones in this size range may require intervention, but they may still be able to pass spontaneously with the help of medication and increased fluid intake. Your doctor may also suggest watchful waiting with regular imaging to monitor the progress of the stone.
3. **Large stones (more than 10 mm):** Large stones are less likely to pass spontaneously and may require more invasive treatments such as shock wave lithotripsy, ureteroscopy, or percutaneous nephrolithotomy.

B 1 Renal tumors (renal cell carcinoma: epidemiology-, symptoms and diagnosis)

Epidemiology

Renal cell carcinoma (RCC) is the most common type of kidney cancer in adults, accounting for approximately 90% of all cases. Here are some key epidemiological facts about RCC:

- RCC is more common in men than women, with a male to female ratio of approximately 2:1.
- The incidence of RCC increases with age, with most cases diagnosed in individuals over the age of 60.
- Smoking is a significant risk factor for RCC, with smokers having a two-fold to four-fold increased risk compared to non-smokers.
- Other risk factors for RCC include obesity, hypertension, and occupational exposure to certain chemicals such as

cadmium, asbestos, and trichloroethylene.

- RCC is more common in developed countries, with the highest incidence rates reported in North America and Western Europe. This may be due in part to the increased use of diagnostic imaging in these countries, which leads to more frequent incidental detection of small RCCs.
- There is also a genetic component to RCC, with some inherited genetic syndromes such as von Hippel-Lindau disease and hereditary papillary renal cell carcinoma increasing the risk of developing RCC. However, these inherited syndromes account for only a small proportion of all cases of RCC.

Types

1. **Clear cell RCC:** This is the most common type of RCC, accounting for about 75% of cases. Clear cell RCC gets its name from the clear, pale appearance of the cancer cells under a microscope. It tends to grow and spread quickly and is often resistant to chemotherapy.
2. **Papillary RCC:** Papillary RCC accounts for about 10-15% of RCC cases. This subtype is characterized by the growth of finger-like projections (papillae) on the surface of the tumor. Papillary RCC can be further divided into type 1 and type 2, which have different genetic mutations and clinical features.
3. **Chromophobe RCC:** Chromophobe RCC is a rare subtype of RCC, accounting for about 5% of cases. It is characterized by large, pale cells with a distinctive halo around the nucleus.
4. **Collecting duct RCC:** Collecting duct RCC is a very rare subtype of RCC that accounts for less than 1% of cases. It is a particularly aggressive form of kidney

cancer and is often difficult to treat.

5. **Unclassified RCC:** Some cases of kidney cancer cannot be classified as a specific subtype of RCC because they do not fit the criteria for any of the established subtypes. These cases are classified as unclassified RCC.

Pathology

Renal cell carcinoma (RCC) is a type of cancer that originates in the cells of the kidney. The cancer cells can invade nearby tissues and organs, and in advanced cases, can spread to distant parts of the body through the bloodstream or lymphatic system.

Under the microscope, RCC is characterized by the presence of abnormal cells with varying degrees of differentiation. **The most common type of RCC, called clear cell carcinoma, is characterized by large, clear cells with distinct nuclei and prominent blood vessels**. Other types of RCC may have different histologic features.

In addition to histologic classification, RCC can also be classified based on molecular and genetic markers. For example, **mutations in the von Hippel-Lindau (VHL) gene are commonly associated with clear cell RCC.** Other genetic mutations and chromosomal abnormalities have also been identified in various subtypes of RCC.

Symptoms

Renal cell carcinoma (RCC) can often grow without causing any noticeable symptoms in the early stages. In fact, up to 25% of RCCs are found incidentally on imaging studies done

for other reasons. However, as the tumor grows and spreads, it may cause a variety of symptoms including:

- **Blood in the urine (hematuria), which may be visible or microscopic**
- **Flank or back pain, which may be constant or intermittent and may be worse on one side**
- **Palpable mass or swelling in the abdomen or flank**
- **Fatigue or weakness**
- **Unintentional weight loss**
- **Loss of appetite**
- **Fever or night sweats**
- **High blood pressure (hypertension)**
- **Anemia**

Diagnosis

The diagnosis of renal cell carcinoma (RCC) typically involves a combination of imaging studies, blood tests, and sometimes a biopsy. Here are some of the key diagnostic tests and procedures:

- **Imaging studies:** Imaging studies such as ultrasound, CT scan, MRI, or PET scan are commonly used to visualize the kidneys and detect any abnormalities. These tests can help identify the location, size, and characteristics of any tumors or masses in the kidney, as well as whether they have spread to nearby lymph nodes or other organs.
- **Blood tests:** Blood tests such as complete blood count (CBC), liver function tests, and serum creatinine level may be done to evaluate overall health and kidney function. RCC can sometimes cause anemia, abnormal liver function, or impaired kidney function, so these tests

can help identify any potential issues.

- **Biopsy:** A biopsy may be recommended if the imaging studies are inconclusive or if the doctor suspects that the mass in the kidney may be cancerous. A biopsy involves taking a sample of tissue from the kidney using a needle and examining it under a microscope to look for cancer cells.

If RCC is diagnosed, further tests may be done to determine the stage of the cancer and whether it has spread to other parts of the body. This can include imaging studies such as CT or MRI of the chest, abdomen, and pelvis, as well as bone scans or PET scans. The stage of the cancer will help guide treatment decisions and prognosis.

B 2 Renal tumors (renal cell carcinoma: treatment)

The treatment of renal cell carcinoma (RCC) depends on various factors such as the stage and extent of the cancer, the location of the tumor within the kidney, the overall health of the patient, and the presence of any other medical conditions.

Surgery is the primary treatment for localized RCC. The goal of surgery is to remove the tumor along with a margin of healthy tissue surrounding it. Depending on the location and size of the tumor, different surgical approaches may be used such as open surgery, **laparoscopic surgery**, or robotic-

assisted surgery. In some cases, **partial nephrectomy** (removal of only a portion of the kidney) may be performed to preserve kidney function.
For advanced or metastatic RCC, **systemic therapy** such as **targeted therapy** or **immunotherapy** may be used. **Targeted therapy involves** the use of drugs that target specific molecular pathways involved in the growth and spread of cancer cells. Immunotherapy uses drugs that stimulate the immune system to recognize and attack cancer cells. These treatments can be given alone or in combination and are usually administered by infusion or oral medication.

Radiation therapy may also be used for RCC, although it is less commonly used as a primary treatment. It may be used in certain situations such as when surgery is not possible or to relieve symptoms of metastatic disease.
Clinical trials may also be an option for some patients with RCC, as new treatments and therapies are continually being developed and tested.
Overall, the treatment of RCC is highly individualized and requires a multidisciplinary approach involving urologists, oncologists, and other specialists.

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B 3 Renal tumors (angiomyolipoma, oncocytoma, nephroblastoma).

Angiomyolipoma

Epidemiology

Angiomyolipoma (AML) is a benign tumor that can occur in the kidneys. AML is the most **common benign tumor** of the **kidney**, and it is usually found incidentally on imaging studies done for other reasons.
AML can occur in people of all ages, but it is most commonly diagnosed in middle-aged women. AML is also associated with certain genetic disorders such as tuberous sclerosis complex (TSC) and lymphangioleiomyomatosis (LAM).
The incidence of AML is estimated to be about 0.3% in the general population, but it is much higher (up to 80%) in individuals with TSC. The prevalence of TSC is estimated to be about 1 in 6,000 to 1 in 10,000 individuals, while LAM is much rarer, affecting about 3-5 women per million.

Pathology

AML is composed of three types of cells: blood vessels, smooth muscle cells, and fat cells. These cells are usually arranged in a haphazard fashion, giving the tumor a characteristic appearance on imaging studies.
The smooth muscle cells in AML are abnormal and are thought to be derived from perivascular epithelioid cells (PECs). These cells are also found in other tumors such as lymphangioleiomyomatosis (LAM) and clear cell sugar tumor (CCST). The fat cells in AML are also abnormal and are thought to be derived from pluripotent mesenchymal cells.
AML can be classified into two subtypes based on the presence or absence of fat cells: classic AML (containing fat cells) and epithelioid AML (lacking fat cells). Classic AML is the more common subtype, accounting for about 80% of all AMLs, while epithelioid AML is rare.
AML can occur sporadically or can be associated with genetic

disorders such as tuberous sclerosis complex (TSC) and LAM. In individuals with TSC, AMLs tend to be larger and more numerous, and they can be associated with other kidney tumors such as renal cell carcinoma.

Types

There are two main types of angiomyolipoma (AML): classic AML and epithelioid AML.

1. **Classic AML**: This type of AML is the more common subtype and is composed of blood vessels, smooth muscle cells, and fat cells. It typically occurs in women of childbearing age and is usually asymptomatic. Classic AML can be associated with genetic disorders such as tuberous sclerosis complex (TSC) and lymphangioleiomyomatosis (LAM).
2. **Epithelioid AML:** This type of AML is rare and is composed of epithelioid cells instead of fat cells. It is more common in older individuals and tends to be larger and more aggressive than classic AML. Epithelioid AML is not usually associated with TSC or LAM.

In addition to these two main types, there are also mixed AMLs, which contain features of both classic and epithelioid AML. Mixed AMLs can be more difficult to diagnose and manage than the pure subtypes.

Symptoms:
Angiomyolipomas (AMLs) are usually asymptomatic, especially when small in size. However, symptoms may occur when the size of the tumor increases, and they may include:

1. Abdominal pain or discomfort, especially on the affected

side
2. Blood in the urine (hematuria)
3. Palpable mass or lump in the abdomen
4. High blood pressure (hypertension) in rare cases
5. Feeling of fullness in the abdomen
6. Nausea and vomiting
7. Fever in case of spontaneous bleeding into the tumor.

Diagnosis

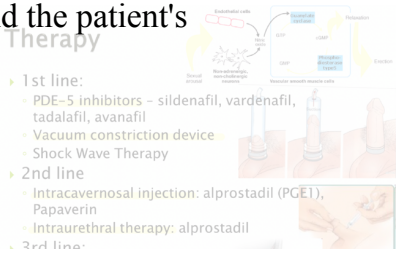
Angiomyolipomas (AMLs) are often discovered incidentally during imaging studies performed for other reasons, such as ultrasound, computed tomography (CT) scans, or magnetic resonance imaging (MRI). AMLs can appear as well-defined, round, or oval masses with fat density on CT or MRI.
If an AML is suspected, further imaging studies may be performed to determine its size, location, and other characteristics. This may include contrast-enhanced CT or MRI, which can help to determine if the AML is actively bleeding or if there is evidence of invasion into surrounding tissues.
If the diagnosis is still uncertain, a biopsy may be performed to confirm the presence of fat cells and smooth muscle cells characteristic of AMLs. However, biopsies are usually reserved for cases in which the diagnosis is unclear or the AML is suspected to be malignant.
In addition to imaging and biopsy, genetic testing may be recommended if there is a suspicion of tuberous sclerosis complex (TSC) or lymphangioleiomyomatosis (LAM), which are associated with the development of AMLs.

treatment

The treatment of angiomyolipoma (AML) depends on the size and location of the tumor, as well as the presence or absence of symptoms.
Small AMLs (less than 4 cm) that are asymptomatic and do not show signs of growth on imaging studies may not require any treatment, but they may be monitored periodically with imaging studies to assess for any changes.
For larger AMLs or those that are causing symptoms such as pain or bleeding, treatment may be necessary. Treatment options include:

1. **Surgery:** Surgical removal of the affected kidney (nephrectomy) may be necessary for larger AMLs that are causing symptoms or growing rapidly.
2. **Minimally invasive procedures:** For smaller AMLs, minimally invasive procedures such as embolization or radiofrequency ablation may be options. Embolization involves blocking the blood supply to the tumor, which can cause it to shrink and die. Radiofrequency ablation involves using heat energy to destroy the tumor.
3. **Medications:** In cases where the AML is associated with tuberous sclerosis complex (TSC), medications such as everolimus or sirolimus may be used to slow the growth of the tumor.

The treatment approach for AMLs is individualized based on the specific characteristics of the tumor and the patient's overall health.



Oncocytoma
Epidemiology

Oncocytoma is a rare type of kidney tumor, accounting for approximately 3-7% of all kidney tumors. It is most commonly diagnosed in individuals between the ages of 50 and 70, and it occurs more frequently in men than in women. Oncocytomas can occur in one or both kidneys, and they are usually non-cancerous (benign). However, they can sometimes be difficult to differentiate from renal cell carcinoma (RCC), which is a more common and aggressive type of kidney cancer.

Pathology

Oncocytomas are tumors that arise from the epithelial cells of the kidney tubules. The cells of an oncocytoma are usually uniform in size and shape, and they have a distinctive pink, granular appearance under the microscope. The tumor is typically well-circumscribed, meaning that it has a distinct boundary separating it from the surrounding kidney tissue. Oncocytomas are usually composed of a solid mass of cells, although they can sometimes have cystic or necrotic areas. Oncocytomas are characterized by the presence of numerous mitochondria within the tumor cells. Mitochondria are cellular organelles that are responsible for producing energy in the form of ATP. The abundance of mitochondria in oncocytomas is thought to be responsible for the distinctive granular appearance of the tumor cells, as well as their tendency to take up certain dyes used in laboratory staining procedures.
In rare cases, oncocytomas can be associated with a genetic condition called Birt-Hogg-Dube syndrome, which can cause the development of multiple oncocytomas and other types of kidney tumors.

Types

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In rare cases, oncocytomas can be associated with a genetic condition called Birt-Hogg-Dube syndrome, which can cause the development of multiple oncocytomas and other types of kidney tumors.

Symptoms:

1. Abdominal pain or discomfort: The tumor can cause pain or discomfort in the abdominal area, often felt on the side of the affected kidney.
2. Palpable mass: A lump or mass may be felt in the abdomen or side of the back during a physical examination.
3. Hematuria: Blood in the urine may be present, which may cause urine to be pink, red or brown.
4. Flank pain: The pain may be felt on the side or back of the affected kidney, and may be dull or sharp.

5. Fatigue: Feeling tired or weak can be a symptom of oncocytoma, as the tumor can cause the body to produce excess amounts of hormones.
6. Fever: Some patients may develop a fever as the tumor grows larger.

Diagnosis

The diagnosis of oncocytoma involves a combination of radiologic imaging and histopathologic examination of the tumor tissue.
Radiologic imaging, such as computed tomography (CT) or magnetic resonance imaging (MRI), can provide information about the size, location, and characteristics of the tumor. Oncocytomas typically appear as well-defined, round or oval masses on imaging studies, with a central scar that is highly suggestive of the diagnosis.
However, definitive diagnosis requires histopathologic examination of the tumor tissue. A biopsy or surgical excision of the tumor is performed, and the tissue is analyzed by a pathologist to confirm the presence of oncocytoma. The pathologic features of oncocytoma include large cells with abundant eosinophilic granular cytoplasm, small round nuclei with prominent nucleoli, and a central stellate scar composed of collagen fibers.
Immunohistochemistry can also be performed to confirm the diagnosis and distinguish oncocytoma from other renal tumors. The tumor cells of oncocytoma typically express markers such as CD117, CK7, and vimentin, but are negative for CD10 and RCC.
In some cases, imaging and histopathologic findings may not be definitive, and additional diagnostic tests such as genetic

analysis may be required to confirm the diagnosis.

Treatment

The primary treatment for oncocytoma is surgical removal of the tumor. Most oncocytomas are benign and can be completely removed with surgery, providing a complete cure. Depending on the size and location of the tumor, different surgical approaches can be used, including partial or complete nephrectomy, which involves removing either part or all of the affected kidney.
In some cases, where surgery is not an option, or for patients who have multiple oncocytomas or other medical conditions that make surgery too risky, active surveillance or periodic imaging may be recommended to monitor the growth of the tumor. Radiation therapy and chemotherapy are generally not effective for treating oncocytoma.
After treatment, patients will be monitored with periodic imaging and follow-up appointments to ensure the tumor does not recur or develop into a more aggressive form of cancer.

Nephroblastoma

Epidemiology
Nephroblastoma, also known as Wilms tumor, is a type of kidney cancer that primarily affects children. It is the most common type of kidney cancer in children and accounts for approximately 6% of all childhood cancers. It is typically

diagnosed in children between the ages of 2 and 5, but can occur in older children as well. Nephroblastoma is slightly more common in girls than in boys.

Pathology

Nephroblastoma, or Wilms tumor, is a malignant tumor that originates in the cells that form the kidneys during fetal development. The tumor typically arises from the cells in the kidney known as nephrogenic blastemal cells. These cells are undifferentiated and have the potential to become any of the specialized cell types that make up the kidney.
In addition to the blastemal cells, nephroblastoma can also contain elements of other kidney cell types, such as stromal cells and epithelial cells. These different cell types can form distinct patterns within the tumor, and the presence of these different patterns is used to classify the tumor into different subtypes.
The most common subtype of nephroblastoma is the triphasic subtype, which contains all three cell types (blastemal, stromal, and epithelial) and has a favorable prognosis. Other less common subtypes include the stromal-predominant subtype and the epithelial-predominant subtype, which have a less favorable prognosis. The histologic appearance of the tumor is an important factor in determining the prognosis and treatment approach.

Types

Nephroblastoma, also known as Wilms tumor, is a type of kidney cancer that is most commonly seen in children. There

are two types of nephroblastoma: favorable histology and unfavorable histology.

1. **Favorable Histology Nephroblastoma**: This type of nephroblastoma accounts for approximately 90% of all cases. The cells in favorable histology nephroblastoma look similar to the cells in a developing kidney. This type of nephroblastoma is generally responsive to treatment and has a good prognosis.
2. **Unfavorable Histology Nephroblastoma**: This type of nephroblastoma accounts for approximately 10% of cases. The cells in unfavorable histology nephroblastoma look different from the cells in a developing kidney, and may look more like cells from other types of cancer. This type of nephroblastoma is generally more aggressive and has a worse prognosis.

In addition to these two types, there are also several subtypes of nephroblastoma based on the appearance of the tumor cells under a microscope. These subtypes include blastemal, stromal, and epithelial-predominant nephroblastoma. Each subtype may have a different prognosis and may require a different treatment approach.

Symptoms:

1. Abdominal swelling or a mass: The most common symptom of nephroblastoma is a swelling or mass in the abdomen. This may be felt by the child or noticed by a parent or caregiver.
2. Abdominal pain: Nephroblastoma can cause pain in the abdomen, which may be a dull ache or a sharp pain. The pain may come and go or be constant.
3. Blood in the urine: In some cases, nephroblastoma can cause blood to appear in the urine. This may be seen as

red or pink urine, or there may be microscopic amounts of blood that are only detectable by a urine test.
4. Fever: Some children with nephroblastoma may develop a fever, which can be a sign of infection or inflammation.
5. High blood pressure: Nephroblastoma can cause high blood pressure in some children, which may cause headaches or other symptoms.
6. Weight loss: Children with nephroblastoma may lose weight, even if they are eating normally.

Diagnosis

Nephroblastoma, also known as Wilms tumor, is typically diagnosed in children between the ages of 2 to 5 years old. It is usually detected as a result of abdominal swelling or a mass that is found during a physical examination. The following diagnostic tests may be performed to confirm the presence of nephroblastoma:

1. Imaging tests: Imaging tests, such as ultrasound, CT scan, or MRI, may be used to identify the presence, size, and location of the tumor.
2. Biopsy: A tissue biopsy may be performed to confirm the diagnosis of nephroblastoma.
3. Blood and urine tests: Blood and urine tests may be performed to evaluate kidney function and to look for specific markers that may indicate the presence of nephroblastoma.
4. Staging: Once a diagnosis of nephroblastoma has been confirmed, further tests may be performed to determine the extent, or stage, of the cancer. These tests may include chest X-rays, bone scans, or additional imaging tests.

It is important to note that the diagnostic workup for nephroblastoma will vary depending on the individual case and the specific presentation of the tumor. A team of healthcare professionals, including a pediatric oncologist, will work together to develop an appropriate diagnostic and treatment plan for each child with nephroblastoma.

Treatment

Nephroblastoma, also known as Wilms' tumor, is a rare type of kidney cancer that primarily affects children. The treatment of Nephroblastoma depends on the stage of the tumor and other factors, such as the child's age and overall health.
The standard treatment for Nephroblastoma is surgery, where the tumor and surrounding tissue are removed. In many cases, the entire affected kidney is removed (nephrectomy). If the cancer has spread to nearby lymph nodes or other parts of the body, additional treatments such as chemotherapy or radiation therapy may also be recommended.
Chemotherapy is a type of cancer treatment that uses drugs to kill cancer cells. It is often used before surgery to shrink the tumor or after surgery to destroy any remaining cancer cells.
Radiation therapy uses high-energy radiation to destroy cancer cells. It may be used in conjunction with chemotherapy or after surgery to treat any remaining cancer cells.
In some cases, if the tumor is small and hasn't spread, it may be possible to remove it using minimally invasive procedures such as laparoscopic surgery. This approach may result in faster recovery times and fewer complications compared to traditional surgery.

Overall, the prognosis for Nephroblastoma is generally good, with high cure rates for early-stage tumors. However, the outcome can be less favorable if the tumor has spread to other parts of the body. Regular follow-up care and monitoring are important for children who have been treated for Nephroblastoma, as the cancer can sometimes recur.

B 4 Bladder cancer (symptoms and diagnosis)

Types

There are several types of bladder cancer, including:

1. **Transitional cell carcinoma (TCC):** This is the most common type of bladder cancer, accounting for about 90% of cases. TCC begins in the cells lining the inside of the bladder and can also occur in the lining of the ureters and urethra.
2. **Squamous cell carcinoma:** This type of bladder cancer accounts for about 4% of cases. It develops in the cells that form the thin, flat cells lining the bladder.
3. **Adenocarcinoma:** This type of bladder cancer is rare, accounting for less than 2% of cases. Adenocarcinoma begins in the glandular cells that produce mucus.

Less common types of bladder cancer include small cell carcinoma, sarcoma, and lymphoma.

Risk factors

1. **Smoking**: Cigarette smoking is the most significant risk factor for bladder cancer. Smokers are at least three times more likely to develop bladder cancer than non-smokers.
2. **Age**: Bladder cancer is more common in older adults,

with the highest incidence in people over the age of 60.

3. **Gender**: Men are more likely than women to develop bladder cancer.
4. **Exposure to certain chemicals**: Workers who are exposed to certain chemicals, such as aromatic amines, are at an increased risk of developing bladder cancer.
5. **Previous cancer treatment**: People who have had radiation therapy to treat other types of cancer are at an increased risk of developing bladder cancer.
6. **Chronic bladder inflammation**: Long-term bladder inflammation, such as that caused by recurrent urinary tract infections or long-term use of urinary catheters, may increase the risk of bladder cancer.
7. **Family history:** People with a family history of bladder cancer may be at an increased risk of developing the disease.
8. **Certain medications**: Some medications, such as pioglitazone (used to treat type 2 diabetes), have been associated with an increased risk of bladder cancer.

Symptoms

1. **Hematuria**: Blood in the urine is the most common symptom of bladder cancer, occurring in over 80% of cases. Blood may be visible or only detected under a microscope.
2. **Painful or frequent urination**: Bladder cancer may cause pain, discomfort or burning sensation during urination, or may cause you to feel the need to urinate more often.
3. **Back pain**: If the bladder cancer has spread beyond the bladder, it may cause back pain or pain in other areas of the body.
4. **Pelvic pain:** In advanced stages, bladder cancer may

cause pain in the pelvic area.

5. **Urinary tract infections**: Recurrent or persistent urinary tract infections may be a symptom of bladder cancer.

Diagnosis

The diagnostic workup for bladder cancer usually includes the following:

1. **Medical history and physical examination:** The doctor will ask about any symptoms you may have and perform a physical examination, which may include a rectal and/or vaginal exam.
2. **Urinalysis:** A urine sample will be tested for blood, bacteria, and abnormal cells.
3. **Imaging tests:** Imaging tests such as ultrasound, CT scan, or MRI may be used to look at the bladder and surrounding areas.
4. **Cystoscopy:** This procedure involves inserting a thin, flexible tube with a camera into the bladder through the urethra to look for signs of cancer.
5. **Biopsy:** If a suspicious area is seen during cystoscopy, a small piece of tissue (biopsy) may be removed for examination under a microscope to determine if it is cancerous.
6. **Staging**: If bladder cancer is diagnosed, additional tests may be performed to determine the extent (stage) of the cancer and if it has spread beyond the bladder.

These tests may include a bone scan, chest X-ray, CT scan, MRI, or PET scan. The stage of the cancer helps determine the appropriate treatment options.

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B 5 Superficial bladder tumor treatment

The treatment of superficial bladder tumors typically involves transurethral resection of the bladder tumor (TURBT), which is a minimally invasive surgical procedure used to remove the tumor from the bladder lining. After the tumor has been removed, the patient may receive intravesical therapy, which involves the instillation of chemotherapy or immunotherapy agents directly into the bladder to prevent tumor recurrence.

Ta

Ta (non-invasive papillary carcinoma) is a type of superficial bladder cancer that is limited to the inner lining of the bladder. Treatment for Ta stage bladder cancer typically involves a transurethral resection of the bladder tumor (TURBT), which is a surgical procedure to remove the tumor from the bladder wall using a special instrument called a cystoscope.
After TURBT, patients with Ta stage bladder cancer may receive intravesical therapy, which involves the instillation of chemotherapy or immunotherapy agents directly into the bladder to kill any remaining cancer cells and prevent recurrence. This is usually done for several weeks or months after the initial surgery.
Intravesical chemotherapy drugs used for Ta bladder cancer may include Mitomycin C and Gemcitabine, while Bacillus Calmette-Guérin (BCG) is a commonly used immunotherapy drug.

Regular follow-up appointments are also recommended to monitor for any signs of recurrence, which can be detected by cystoscopy and urine cytology testing.

T1

T1 stage bladder cancer is a type of bladder cancer that has invaded the connective tissue underneath the bladder lining but has not spread to the muscle layer. Treatment for T1 bladder cancer typically involves a combination of transurethral resection of bladder tumor (TURBT) and intravesical therapy.

During TURBT, the tumor is removed using a special instrument inserted through the urethra.

After the procedure, intravesical therapy may be recommended to help prevent recurrence of the cancer. This involves placing a liquid medication directly into the bladder through a catheter. The most common type of medication used for intravesical therapy is Bacillus Calmette-Guerin (BCG), a weakened form of the tuberculosis bacteria that helps to stimulate the immune system to attack cancer cells.

Depending on the size, location, and other characteristics of the tumor, additional treatments such as radiation therapy or chemotherapy may also be recommended. In some cases, a radical cystectomy (surgical removal of the bladder) may be necessary if the cancer is not responding to other treatments or if it has spread to the muscle layer of the bladder.

CIS

CIS (carcinoma in situ) is a type of non-muscle invasive bladder cancer, in which the cancerous cells are present on the surface layer of the bladder lining. CIS may appear as red patches or flat lesions on the bladder wall and can be difficult to detect on imaging tests.

The treatment of CIS stage bladder cancer usually involves a combination of surgery, intravesical therapy, and close

monitoring.
The initial treatment for CIS is transurethral resection of the bladder tumor (TURBT), which involves removing the cancerous tissue from the bladder lining using a special instrument inserted through the urethra. After TURBT, intravesical therapy is often recommended, which involves instilling medication directly into the bladder to destroy any remaining cancer cells.
The medications used in intravesical therapy include Bacillus Calmette-Guérin (BCG) vaccine, which is a weakened form of the tuberculosis bacteria that stimulates the immune system to attack cancer cells, and chemotherapy drugs such as mitomycin C or gemcitabine.
Patients with CIS stage bladder cancer require close monitoring to detect any recurrence or progression of the cancer. This may involve cystoscopy, imaging tests, and urine tests to look for cancer cells. Repeat TURBT may be necessary if the cancer recurs.
In some cases, radical cystectomy (removal of the entire bladder) may be recommended if the cancer does not respond to initial treatments or if it progresses to a higher stage.
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B 6 Invasive bladder tumor treatment

Invasive bladder cancer is cancer that has spread beyond the lining of the bladder and into the muscle layer. Treatment of invasive bladder cancer typically involves a combination of surgery, chemotherapy, and radiation therapy. The specific treatment approach depends on the stage and grade of the cancer, as well as the patient's overall health and preferences.
Surgery is the primary treatment for invasive bladder cancer.

The most common surgical procedure for invasive bladder cancer is a radical cystectomy, which involves removing the entire bladder and nearby lymph nodes. In men, the prostate and seminal vesicles are also removed, while in women, the uterus, ovaries, and part of the vagina may be removed as well. Depending on the location and extent of the tumor, surgery may be performed using an open approach, laparoscopic approach, or robot-assisted approach.
Chemotherapy is often given before or after surgery to help shrink the tumor, kill any remaining cancer cells, and prevent the cancer from spreading. Chemotherapy may also be given in combination with radiation therapy for patients who are not able to undergo surgery. The most common chemotherapy drugs used for bladder cancer include cisplatin, gemcitabine, and paclitaxel.
Radiation therapy may be used in combination with chemotherapy for patients who are not able to undergo surgery or who have residual cancer cells after surgery. External beam radiation therapy is the most common type of radiation therapy used for bladder cancer, and involves directing high-energy beams of radiation at the tumor from outside the body.
In some cases, bladder-sparing treatments may be an option for patients with invasive bladder cancer. These treatments typically involve a combination of chemotherapy and radiation therapy, with the goal of preserving the bladder while still achieving effective cancer treatment. Bladder-sparing treatments may be appropriate for patients with smaller tumors or tumors that have not spread to the lymph nodes or other organs. However, these treatments are typically reserved for patients who are not good candidates for surgery or who do not wish to undergo radical cystectomy.

B 7 Transitional cell cancer of the renal pelvis and ureter

Transitional cell cancer (TCC) of the renal pelvis and ureter is a type of cancer that develops in the lining of the renal pelvis and ureter. It arises from transitional cells, which are specialized cells that line the urinary tract, including the renal pelvis and ureter. TCC is the most common type of cancer affecting the renal pelvis and ureter.

The pathology of TCC involves the growth and spread of abnormal cells in the transitional cell lining of the renal pelvis and ureter. These cells can invade nearby tissues and organs, and can also spread to other parts of the body through the lymphatic system or bloodstream.

TCC is classified based on its grade and stage. The grade of TCC refers to how abnormal the cells look under a microscope and how quickly they are growing. The stage of TCC refers to the extent of the cancer and whether it has spread to nearby tissues or organs. Treatment for TCC depends on its grade, stage, and other factors such as the patient's age and overall health.

Risk factors

Transitional cell cancer of the renal pelvis and ureter (TCC-RPU) shares many of the same risk factors as bladder cancer, such as smoking, exposure to certain chemicals (such as those used in the dye industry), and long-term bladder catheterization. Other risk factors for TCC-RPU include chronic kidney disease, bladder cancer, hereditary nonpolyposis colorectal cancer (HNPCC), Lynch syndrome, and certain inherited genetic mutations. In addition, older age, male sex, and Caucasian race are also associated with an

increased risk of TCC-RPU.

Symptoms

Tansitional cell cancer of the renal pelvis and ureter can cause various symptoms including:

1. **Blood in the urine (hematuria):** This is the most common symptom of this type of cancer. Blood in the urine may be visible to the naked eye or may only be detected by a microscopic examination of the urine.
2. **Flank pain:** Pain in the side of the abdomen or back, usually on one side, may be present and can be severe.
3. **Urinary tract infections:** Recurrent or persistent urinary tract infections can be a symptom of transitional cell cancer of the renal pelvis and ureter.
4. **Urinary frequency or urgency:** Needing to urinate frequently or urgently can be a symptom of this cancer.
5. **Weight loss:** Unexplained weight loss can be a symptom of more advanced cases of this cancer.

It is important to note that these symptoms can also be caused by other conditions, and the presence of one or more of these symptoms does not necessarily mean a person has transitional cell cancer of the renal pelvis and ureter.

Diagnosis

The diagnosis of Transitional cell cancer (TCC) of the renal pelvis and ureter usually involves a combination of medical history, physical examination, and diagnostic tests.

Medical history: The doctor will take a detailed medical history, including information about any symptoms, risk factors, and family history of cancer.

Physical examination: A physical exam may be done to check for any signs of disease, such as lumps or swelling in the abdomen or flank.
Diagnostic tests: The following tests may be used to diagnose TCC of the renal pelvis and ureter:

1. **Imaging tests:** These may include ultrasound, computed tomography (CT) scan, magnetic resonance imaging (MRI), or intravenous pyelogram (IVP). These tests can help visualize the urinary tract and any tumors that may be present.
2. **Cystoscopy:** This is a procedure in which a thin, lighted tube (cystoscope) is inserted into the bladder through the urethra. The doctor can see any tumors that may be present in the bladder or ureter.
3. **Biopsy:** If a tumor is detected, a small tissue sample may be taken and examined under a microscope to confirm the diagnosis.
4. **Urine cytology:** In this test, a sample of urine is collected and examined under a microscope to look for cancer cells.
5. **Blood tests:** These tests may be done to check for any abnormalities in kidney function or other markers that may be associated with cancer.

Once a diagnosis of TCC of the renal pelvis and ureter is confirmed, the stage of the cancer will be determined to help guide treatment options.

Treatment

The treatment of Transitional cell cancer (TCC) of the renal pelvis and ureter depends on the stage and grade of the tumor as well as the patient's overall health. Treatment options may include surgery, chemotherapy, and radiation therapy.

1. **Surgery:** Surgery is the primary treatment for TCC of

the renal pelvis and ureter. The type of surgery depends on the size and location of the tumor. The following surgical options are available:

- **Radical nephroureterectomy:** This surgery involves removal of the entire kidney, ureter, and bladder cuff. It is the standard treatment for TCC of the renal pelvis and ureter. In some cases, a lymph node dissection may be performed along with the surgery.
- **Segmental resection:** This surgery involves removing only the affected segment of the ureter or renal pelvis. It may be an option for small tumors in patients who are not good candidates for radical nephroureterectomy.

2. **Chemotherapy:** Chemotherapy may be used before or after surgery to treat TCC of the renal pelvis and ureter. It may also be used to treat advanced or metastatic TCC that cannot be surgically removed. The chemotherapy drugs used for TCC of the renal pelvis and ureter may include cisplatin, gemcitabine, and paclitaxel.
3. **Radiation therapy:** Radiation therapy uses high-energy radiation to kill cancer cells. It may be used to treat TCC of the renal pelvis and ureter that cannot be surgically removed. Radiation therapy may be given alone or in combination with chemotherapy.

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B 8 Testicular tumors epidemiology, symptoms and diagnosis

Epidemiology

Testicular tumors are relatively rare and account for about 1% of all cancers in men. They are most common in younger men, with about half of all cases occurring in men between the ages of 20 and 34. The incidence of testicular tumors has

been increasing over the past few decades, particularly in developed countries. The exact reasons for this increase are not known, but may be related to changes in lifestyle or environmental factors. Men with a history of undescended testicle (cryptorchidism) or a family history of testicular cancer are at higher risk of developing the disease.

Types

Testicular tumors are broadly categorized into two main types: germ cell tumors and non-germ cell tumors.

1. **Germ cell tumors:** These tumors arise from the cells that form sperm in the testicles. Germ cell tumors are the most common type of testicular cancer and can be further classified into two subtypes:
    - Seminomas: These tumors are slow-growing and tend to occur in men aged between 25 to 45 years. They can be further categorized as classic seminomas, spermatocytic seminomas, and anaplastic seminomas.
    - Non-seminomas: These tumors are a group of cancers that grow more quickly and aggressively than seminomas. They include embryonal carcinomas, yolk sac tumors, choriocarcinomas, and teratomas.
2. **Non-germ cell tumors:** These tumors arise from other types of cells in the testicles such as Leydig cells and Sertoli cells. These types of tumors are much less common than germ cell tumors.

It's important to note that the majority of testicular tumors are malignant, meaning they have the potential to spread to other parts of the body.

Symptoms

The most common symptom of testicular tumors is a painless lump or swelling in the testicle, often discovered by the patient himself during self-examination or by a physician during a routine physical examination. Other symptoms may include:

1. Heaviness or aching in the lower abdomen, groin, or scrotum
2. Swelling or lumps in the lymph nodes in the groin
3. A dull ache in the lower back or abdomen
4. Enlargement or tenderness of the breast tissue (gynecomastia) in men
5. Pain or discomfort in the testicle or scrotum
6. A feeling of heaviness or pressure in the scrotum.

It is important to note that many of these symptoms can be caused by conditions other than testicular cancer.

Diagnosis

Diagnosis of testicular tumors usually starts with a physical exam, including a testicular self-examination, to look for any lumps or abnormalities in the testicles. If a tumor is suspected, further tests are required for confirmation. These may include:

1. **Ultrasound:** An ultrasound of the scrotum can detect the presence of a tumor and its size, location, and characteristics.
2. **Blood tests:** Blood tests for tumor markers such as alpha-fetoprotein (AFP), human chorionic gonadotropin

(HCG), and lactate dehydrogenase (LDH) may be performed. Elevated levels of these markers may indicate the presence of a testicular tumor.

3. **Biopsy:** A biopsy involves removing a small piece of the tumor and examining it under a microscope. This is typically done after surgery to remove the entire tumor.
4. **Imaging tests:** Imaging tests, such as CT scan or MRI, may be performed to determine if the cancer has spread beyond the testicle.

Once a diagnosis is confirmed, further testing is required to determine the stage of the cancer and develop an appropriate treatment plan.

B 9 Testicular tumors treatment

The treatment of testicular tumors depends on several factors such as the type and stage of the tumor, age and overall health of the patient, and the patient's preferences.

Surgery is the primary treatment for most types of testicular tumors, and it involves removing the affected testicle through a procedure called orchiectomy. In some cases, surgery may also involve removing lymph nodes in the abdomen or retroperitoneum.

Chemotherapy may be recommended for certain types of testicular tumors, such as germ cell tumors that have spread beyond the testicle or tumors that are resistant to radiation therapy. Chemotherapy drugs may be given alone or in combination, and the length and frequency of treatment will depend on the individual case.

Radiation therapy may also be used to treat certain types of testicular tumors, particularly seminomas. The radiation is

typically targeted to the lymph nodes in the abdomen or pelvis.
In some cases, a combination of surgery, chemotherapy, and radiation therapy may be used to treat testicular tumors. After treatment, patients will need to undergo regular follow-up exams to monitor for any signs of recurrence.

B 10 Penile cancer

Risk factors

Penile cancer is a rare type of cancer, and its exact cause is not known. However, some factors have been identified as possible risk factors for developing penile cancer. These risk factors include:

→ circumcision may be protective

1. **Lack of circumcision:** Men who have not been circumcised have a higher risk of developing penile cancer than men who have undergone circumcision.
2. **Phimosis**: A condition in which the foreskin is too tight, making it difficult or impossible to retract, has been associated with an increased risk of penile cancer.
3. **Human papillomavirus (HPV) infection**: Certain types of HPV have been linked to the development of penile cancer.
4. **Smoking**: Men who smoke cigarettes have a higher risk of developing penile cancer.
5. **Age**: Penile cancer is more common in older men, with the average age of diagnosis being in the 60s.
6. **Poor hygiene**: Poor hygiene can lead to the accumulation of smegma, a substance made up of dead

skin cells and other secretions that can increase the risk of penile cancer.
7. **Chronic inflammation**: Conditions such as balanitis, which is inflammation of the foreskin and glans penis, have been associated with an increased risk of penile cancer.

Types

The types of penile cancer are:

1. **Squamous cell carcinoma**: This is the most common type of penile cancer and it develops from the flat cells lining the surface of the penis.
2. **Basal cell carcinoma**: This type of penile cancer is rare and develops from the basal cells in the skin of the penis.
3. **Melanoma**: This is a rare type of penile cancer that develops from the pigment-producing cells in the skin.
4. **Adenocarcinoma**: This is a rare type of penile cancer that develops from the glandular cells in the skin of the penis.
5. **Sarcoma**: This is a rare type of penile cancer that develops from the connective tissue cells in the penis.

Symptoms

The symptoms of penile cancer may include:

1. A lump or sore on the penis that doesn't heal
2. Discharge from the penis
3. Bleeding or a rash on the penis
4. Change in color or thickening of the skin on the penis
5. Pain or discomfort in the penis
6. Enlarged lymph nodes in the groin area

It is important to note that these symptoms may also be caused by other conditions, such as infections or sexually transmitted diseases.

Diagnosis

The diagnosis of penile cancer typically involves a physical examination, medical history, and diagnostic tests. The doctor will first perform a physical exam, which includes examining the penis, lymph nodes, and surrounding area for any lumps, lesions, or abnormalities. They may also ask about the patient's medical history, including any risk factors for penile cancer.

If a suspicious lesion is found, a biopsy will be performed to confirm the presence of cancer cells. During a biopsy, a small piece of tissue is removed from the affected area and examined under a microscope.

Other diagnostic tests that may be performed include imaging tests such as CT scans, MRI, or ultrasound to determine the extent of the cancer and whether it has spread to other parts of the body. Additionally, a lymph node biopsy may be performed to see if the cancer has spread to the lymph nodes.

It is important to seek medical attention promptly if you notice any unusual symptoms in the genital area or have any concerns about penile cancer. Early diagnosis and treatment can significantly improve the prognosis for this type of cancer.

Treatment

The treatment for penile cancer depends on several factors, including the stage of the cancer, the location and size of the tumor, and the overall health of the patient. The treatment options for penile cancer include:

1. **Surgery**: Surgery is the primary treatment for most cases of penile cancer. The type of surgery depends on the stage and location of the cancer. For early-stage cancers, the surgeon may perform a partial or total removal of the penis (penectomy). In more advanced cases, surgery may involve removing the lymph nodes in the groin.
2. **Radiation therapy**: Radiation therapy uses high-energy X-rays to kill cancer cells. It is often used in combination with surgery for more advanced cases of penile cancer or for patients who cannot undergo surgery.
3. **Chemotherapy**: Chemotherapy uses drugs to kill cancer cells. It is usually reserved for advanced cases of penile cancer that have spread to other parts of the body.
4. **Topical treatments**: For early-stage penile cancer, topical treatments may be an option. These include creams or ointments that contain drugs that can kill cancer cells.
5. **Clinical trials**: Clinical trials may be available for patients with penile cancer who are not responding to other treatments or who have advanced cases of the disease.

It is important to note that treatment for penile cancer can sometimes have side effects, including urinary and sexual dysfunction. Patients should discuss the risks and benefits of each treatment option with their healthcare provider to determine the best course of action for their individual case.

B 11 Prostate cancer (symptoms and diagnosis)

Risk Factors

There are several risk factors associated with prostate cancer, including:

1. **Age**: Prostate cancer is more common in men over the age of 50 and the risk increases with age.
2. **Family history**: Having a first-degree relative (father, brother, or son) with prostate cancer increases a man's risk of developing the disease.
3. **Race**: African American men have a higher risk of developing prostate cancer compared to men of other races. They also have a higher risk of developing more aggressive forms of the disease.
4. **Obesity**: Obese men have a higher risk of developing advanced prostate cancer and dying from the disease.
5. **Lifestyle factors**: Smoking, a diet high in red meat, and lack of physical activity have all been associated with an increased risk of prostate cancer. However, more research is needed to determine the exact role these factors play in the development of the disease.

Pathology

Prostate cancer is a malignant tumor that originates from the glandular epithelial cells of the prostate gland. The majority of prostate cancers are adenocarcinomas, which develop from the glandular tissue of the prostate. The cancer cells may grow slowly and remain confined to the prostate gland for many years, or they may grow more rapidly and spread to other areas of the body.

Prostate cancer cells are graded according to their histological appearance and behavior, using the Gleason grading system. The Gleason score ranges from 2 to 10 and is based on the degree of differentiation and growth patterns of the cancer cells. Higher scores indicate more aggressive and less differentiated tumors. In addition to adenocarcinomas, there are other rare subtypes of prostate cancer, such as neuroendocrine tumors, small cell carcinomas, and sarcomas, which are less common and have distinct pathological features.

Symptoms

In the early stages, prostate cancer may not cause any symptoms, which is why screening tests like PSA tests and digital rectal exams are important. However, as the cancer grows and spreads, it may cause the following symptoms:

1. Difficulty urinating or a weak urine flow.
2. Needing to urinate frequently, especially at night.
3. Pain or discomfort during urination.
4. Blood in the urine or semen.
5. Pain in the back, hips, or pelvis.
6. Difficulty achieving or maintaining an erection (erectile dysfunction).

These symptoms can also be caused by other conditions such as an enlarged prostate or a urinary tract infection, so it is important to consult a healthcare professional for a proper diagnosis.

Diagnosis

There are several methods used to diagnose prostate cancer. These may include:

1. **Digital rectal exam (DRE)**: During this exam, a healthcare provider inserts a gloved finger into the rectum to feel the prostate gland for any lumps or abnormalities.
2. **Prostate-specific antigen (PSA) blood test:** PSA is a protein produced by the prostate gland. High levels of PSA in the blood may be a sign of prostate cancer or other prostate conditions.
3. **Transrectal ultrasound (TRUS):** A probe is inserted into the rectum to bounce high-energy sound waves (ultrasound) off the prostate to create a picture.
4. **Prostate biopsy**: A small sample of prostate tissue is removed with a needle and examined under a microscope to determine if cancer is present.
5. **MRI and other imaging tests:** These tests may be used to determine the extent and spread of the cancer beyond the prostate gland.
6. **Genetic testing:** Genetic testing can be done to determine if a man has inherited genetic mutations that increase the risk of prostate cancer.

It is important to note that not all men with high PSA levels or abnormal findings on a DRE or imaging tests have prostate cancer. Further testing, such as a biopsy, is usually necessary to confirm the diagnosis.

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B 12 Prostate cancer (surgical treatment)

Surgical treatment of prostate cancer involves the removal of

the prostate gland and, in some cases, surrounding tissues that may be affected by the cancer. The most common surgical procedures for prostate cancer are:

1. **Radical prostatectomy:** This is the complete removal of the prostate gland, along with nearby tissues and lymph nodes. The most common approach to radical prostatectomy is through an incision in the lower abdomen.
2. **Laparoscopic prostatectomy:** This is a minimally invasive surgical procedure that involves the use of small incisions and specialized instruments to remove the prostate gland. This approach may result in less blood loss, pain, and scarring compared to radical prostatectomy.
3. **Robot-assisted laparoscopic prostatectomy:** This is a type of laparoscopic prostatectomy that uses a robotic system to assist with the surgery. The robotic system allows for greater precision and control during the procedure.
4. **Transurethral resection of the prostate (TURP):** This is a procedure in which a small instrument is inserted through the urethra to remove the part of the prostate that is blocking urine flow. TURP is not a curative treatment for prostate cancer, but it can relieve symptoms in some men with advanced prostate cancer.

Surgical treatment of prostate cancer may be recommended for men with localized prostate cancer that has not spread beyond the prostate gland. The choice of surgical procedure depends on several factors, including the size and location of the tumor, the stage of the cancer, the patient's age and overall health, and the surgeon's experience and expertise.

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B 13 Prostate cancer irradiation and hormonal treatment)

Radiation therapy is a common treatment for prostate cancer. It uses high-energy radiation to destroy cancer cells in the prostate gland. There are two main types of radiation therapy for prostate cancer:

1. **External beam radiation therapy:** This type of radiation therapy involves using a machine that directs radiation beams at the prostate gland from outside the body. The goal is to deliver a high dose of radiation to the prostate gland while minimizing radiation exposure to surrounding healthy tissues. Treatment is typically given five days a week for several weeks.
2. **Brachytherapy:** This type of radiation therapy involves placing radioactive seeds directly into the prostate gland. The seeds are inserted through small needles that are placed into the prostate gland through the skin between the scrotum and anus. The seeds give off radiation that destroys cancer cells in the prostate gland over time. Brachytherapy may be used alone or in combination with external beam radiation therapy.

Radiation therapy may also be used in combination with other treatments, such as hormone therapy or chemotherapy, depending on the stage and aggressiveness of the prostate cancer. The choice of treatment will depend on the individual patient and their specific case of prostate cancer.

Hormonal therapy, also known as androgen deprivation therapy (ADT), is a treatment for prostate cancer that works by reducing the levels of male hormones (androgens) in the body. Androgens, such as testosterone, can promote the

growth of prostate cancer cells. Hormonal therapy can be used in different settings, including:

1. **Early-stage prostate cancer:** In some cases, hormonal therapy may be used along with radiation therapy for men with intermediate- or high-risk prostate cancer to improve treatment outcomes.
2. **Advanced prostate cancer:** Hormonal therapy is often the main treatment for advanced prostate cancer that has spread beyond the prostate gland to other parts of the body (metastatic prostate cancer).

There are several types of hormonal therapy used for prostate cancer, including:

1. **Luteinizing hormone-releasing hormone (LHRH) agonists:** These drugs work by reducing the amount of testosterone produced by the testicles. Examples of LHRH agonists include leuprolide (Lupron), goserelin (Zoladex), and triptorelin (Trelstar).
2. **Anti-androgens:** These drugs block the effects of androgens on prostate cancer cells. They can be used alone or in combination with LHRH agonists. Examples of anti-androgens include bicalutamide (Casodex), flutamide (Eulexin), and nilutamide (Nilandron).
3. **Androgen biosynthesis inhibitors:** These drugs block the production of androgens by the adrenal glands and other tissues. Examples of androgen biosynthesis inhibitors include abiraterone acetate (Zytiga) and ketoconazole (Nizoral).

Hormonal therapy can cause side effects, such as hot flashes, decreased sex drive, erectile dysfunction, fatigue, and osteoporosis. It is important to discuss the potential benefits and risks of hormonal therapy with your doctor.

B 14 Acute diseases in the scrotum (differential diagnosis and treatment)

Acute diseases in the scrotum refer to sudden and severe conditions that affect the testicles, epididymis, or scrotum. These conditions may include:

1. **Testicular torsion:** It occurs when the spermatic cord twists, cutting off the blood supply to the testicle, which can cause sudden and severe pain in the scrotum. It requires emergency surgical intervention to save the testicle.

Testicular torsion is a condition characterized by an acute and severe onset, which commonly occurs during early puberty. The affected testis may become swollen, tender, and larger than the unaffected testis. Additionally, a negative cremasteric reflex, which can be elicited by gently pinching or stroking the upper skin of the upper thigh while observing the scrotum, may be present. To study blood flow, color doppler sonography is typically used. The recommended treatment for this condition is surgical intervention.

2. **Epididymitis**: It is the inflammation of the epididymis, a coiled tube at the back of the testicle that stores and carries sperm. It can cause pain and swelling in the scrotum, and it is usually caused by bacterial infections.

Epididymitis is a condition that typically has a gradual onset and is commonly observed in adolescence. One of the characteristic symptoms of this condition is tenderness of the epididymis, while the testis itself is usually not tender. In contrast to testicular torsion, a positive cremasteric reflex is often present. The recommended treatment for epididymitis usually involves antibiotics, bed rest, and scrotal elevation.

3. **Orchitis**: It is the inflammation of the testicle, which can cause pain, swelling, and redness in the scrotum. It can be caused by viral or bacterial infections.
4. **Torsion of the appendix testis**: It occurs when the appendix of the testis twists and causes sudden pain in the scrotum. It is a self-limiting condition, and no surgical intervention is required.

Appendiceal torsion typically has a subacute onset and is commonly observed during pre-puberty. The characteristic symptom of this condition is localized pain, usually located in the upper pole where a hard, tender nodule can be felt. Additionally, a small bluish discoloration known as the 'blue dot sign' is typically visible through the skin in the upper pole. Unlike in testicular torsion, a positive cremasteric reflex is often present. The recommended treatment for appendiceal torsion is bed rest and scrotal elevation.

5. **Inguinal hernia**: It occurs when a part of the intestine or fatty tissue bulges through a weak spot in the abdominal wall, causing pain and swelling in the scrotum.Inguinal hernia can cause acute or subacute pain, and a strangulated hernia requires immediate surgical intervention.
6. **Hematocele**: It is the accumulation of blood in the scrotum, usually caused by trauma.
7. **Varicocele**: It is the enlargement of the veins within the scrotum, which can cause pain and swelling.
8. **Fournier's gangrene**: It is a rare but life-threatening infection of the scrotum and perineum, which can cause severe pain, fever, and tissue necrosis.
9. **Scrotal trauma**: occurs when the testis is forcefully

compressed against the pubic bones, and the resulting symptoms are similar to those of epididymitis.

Diagnosis of acute scrotal conditions typically involves a physical examination, imaging tests such as ultrasound, and sometimes blood tests or cultures to identify any infection. Treatment depends on the underlying cause and may involve antibiotics, pain management, surgery to correct testicular torsion or drain fluid or blood, or supportive measures such as ice packs and rest.

B 15 Injuries of the kidneys and ureter

Injuries to the kidneys and ureters can be caused by trauma, such as blunt force or penetrating injuries. The severity of the injury can range from minor contusions to complete disruption of the kidney or ureter. Injuries to the kidney and ureter can also be caused by medical procedures, such as surgeries or diagnostic tests.

Symptoms of kidney and ureteral injuries may include abdominal or flank pain, blood in the urine, and decreased urine output. In severe cases, there may be signs of shock, such as low blood pressure, rapid heart rate, and confusion.

Diagnosis of kidney and ureteral injuries may involve imaging tests, such as CT scans, ultrasounds, or MRI scans. These tests can help identify the extent of the injury and determine the best course of treatment.

Treatment of kidney and ureteral injuries depends on the

severity of the injury. Minor injuries may be treated with pain management and close monitoring, while more severe injuries may require surgery to repair or remove the damaged tissue. In some cases, a temporary stent may be placed to keep the ureter open and allow urine to flow. Antibiotics may also be prescribed to prevent infection.

Causes of urotrauma

1. **Blunt trauma:** This can be caused by falls, sports injuries, motor vehicle accidents, or physical assault.
2. **Penetrating trauma:** This can be caused by gunshot wounds or stab wounds.
3. **iatrogenic trauma:** This can occur during medical procedures such as surgery, catheterization, or endoscopy.
4. **Radiation:** Radiation therapy can cause damage to the urinary tract, particularly the bladder.
5. **Chemical injury:** Exposure to certain chemicals, such as those used in industrial settings, can cause damage to the urinary tract.
6. **Foreign body:** Insertion of foreign objects into the urinary tract can cause trauma and damage

Symptoms

The symptoms of urotrauma depend on the type and severity of the injury. Common symptoms include:

1. **Pain**: Pain in the abdomen, back, or genital area is a common symptom of urotrauma. The pain may be dull, sharp, or throbbing.
2. **Blood in urine:** Hematuria or blood in the urine is a common symptom of urotrauma. In severe cases, the urine may be dark or red in color.
3. **Difficulty urinating:** Urotrauma may cause difficulty

urinating, including pain or discomfort during urination, urinary urgency or frequency, and a weak or interrupted stream of urine.

4. **Swelling:** Swelling or bruising of the genitals or lower abdomen may occur after a urotrauma.
5. **Nausea and vomiting:** These symptoms may occur in severe cases of urotrauma.
6. **Inability to urinate:** In rare cases, a severe urotrauma can cause an inability to urinate, which requires urgent medical attention.

Diagnosis

Diagnosis of urotrauma involves a thorough medical history and physical examination of the patient. Imaging studies are often used to confirm the diagnosis and assess the extent of the injury. These may include:

1. **X-rays:** X-rays may be used to evaluate for the presence of fractures or dislocations.
2. **CT scan:** CT scans are often the imaging test of choice for evaluating urotrauma, as they can provide detailed images of the urinary tract and surrounding structures.
3. **MRI:** MRI may be used to evaluate for soft tissue injuries, such as tears or contusions.
4. **Ultrasound:** Ultrasound may be used to evaluate for the presence of fluid collections, such as hematomas or urinomas.
5. **Cystoscopy:** Cystoscopy may be performed to evaluate for injury to the bladder or urethra.

Treatment

The treatment of urotrauma depends on the severity and extent of the injury. In some cases, conservative management such as bed rest, pain management, and observation may be

sufficient. However, more severe cases may require surgical intervention.
The initial treatment for urotrauma often involves stabilizing the patient's condition and addressing any life-threatening injuries. This may involve the administration of fluids and blood products, as well as the use of a catheter to relieve urinary retention.
Surgical management may be required in cases where the injury is severe or where there is significant damage to the urinary tract. Surgery may involve repairing the damaged tissue or organ, removing any necrotic tissue, and draining any abscesses.
In cases where there is significant damage to the kidney or ureter, a nephrectomy (removal of the kidney) or ureterectomy (removal of the ureter) may be necessary.
In addition to surgical intervention, patients with urotrauma may also require antibiotics to prevent or treat infection, and may benefit from pain management and physical therapy to aid in their recovery. Follow-up imaging studies and urologic evaluation may also be necessary to assess the extent of the injury and ensure proper healing.

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B 16 Injuries to the bladder, urethra

Pretty much same as Topic 15
As in the causes are similar, the diagnostics are similar and so are the management priorities all you need to do is swap some nouns and you're good to go. □

B 17 Injuries to the male genitalia

Pretty much same as topic 15

As in the causes are similar, the diagnostics are similar and so are the management priorities all you need to do is swap some nouns and you're good to go.

B 18 Priapism

Priapism is a prolonged and painful erection that lasts for more than four hours without sexual stimulation.

There are two types of priapism: ischemic and non-ischemic.

1. **Ischemic priapism:** It is also known as low-flow or veno-occlusive priapism. In this type, the blood flow to the penis is reduced or blocked, leading to the accumulation of deoxygenated blood in the penis. This results in a painful, rigid erection that can last for several hours.
2. **Non-ischemic priapism:** It is also known as high-flow or arterial priapism. In this type, the blood flow to the penis is not obstructed, but the blood is trapped in the penis due to a ruptured blood vessel. It is usually painless and the erection is not as rigid as in ischemic priapism. Non-ischemic priapism is less common than ischemic priapism.

Causes

Priapism is a condition in which the penis remains erect for an abnormally long period of time without sexual stimulation. There are two main types of priapism: ischemic and non-ischemic.

Ischemic priapism, which is also known as low-flow priapism,

occurs when the blood is unable to leave the penis after an erection. This can be caused by various factors, including:

1. Sickle cell anemia and other blood disorders that affect the flow of blood
2. Certain medications used to treat erectile dysfunction or other medical conditions
3. Trauma to the penis or perineum (the area between the anus and scrotum)
4. Spinal cord injuries
5. Illicit drug use, such as cocaine or methamphetamine

Non-ischemic priapism, which is also known as high-flow priapism, is usually caused by an injury to the penis or perineum, which results in the rupture of the artery that supplies blood to the penis. This causes a continuous flow of blood to the penis, leading to an erection that can last for hours. It is less common than ischemic priapism.

Diagnosis

Priapism is typically diagnosed based on a physical examination, medical history, and possibly some additional tests. During the physical exam, the healthcare provider will assess the appearance and feel of the penis and check for blood flow. They will also ask questions about the duration and type of erection and any accompanying symptoms. Additional tests that may be used to diagnose priapism include blood tests to check for medical conditions that may be causing the condition, imaging tests such as ultrasound or MRI to check blood flow and rule out any underlying

conditions, and a cavernosogram, which involves injecting a dye into the penis to visualize blood flow and help determine the cause of the priapism.
It is important to seek medical attention promptly if priapism is suspected, as early diagnosis and treatment can help prevent complications and improve outcomes.

Treatment

1. **Aspiration**: In cases of low-flow or ischemic priapism, aspiration of the blood from the corpora cavernosa can relieve the erection. The procedure involves inserting a needle into the penis and aspirating the blood.
2. **Injection**: Injection of a vasoconstrictor medication, such as phenylephrine or etilefrine, into the corpus cavernosum can help reduce blood flow to the penis and relieve the erection.
3. **Shunting**: In cases of high-flow or non-ischemic priapism, shunting can help reduce blood flow to the penis. The procedure involves creating a bypass or shunt between the corpus cavernosum and a nearby vein.
4. **Surgery**: In rare cases, surgery may be necessary to treat priapism. Surgery may involve placing a shunt or removing the blood from the corpus cavernosum.
5. **Management of underlying conditions:** Priapism caused by underlying medical conditions, such as sickle cell disease or leukemia, requires management of the underlying condition.