



Adult urinary tract disorders

Objectives:

- Introduction to common urologic disorder
- To know the presentation and clinical manifestation of the following:
 - Urinary tract infection
 - Urolithiasis
 - BPH
 - Voiding dysfunction
- Overview of the manifestation of these common investigation and treatment of these disorders

Resources:

- Davidson.
- Slides.
- Surgical recall.
- Raslan's notes.

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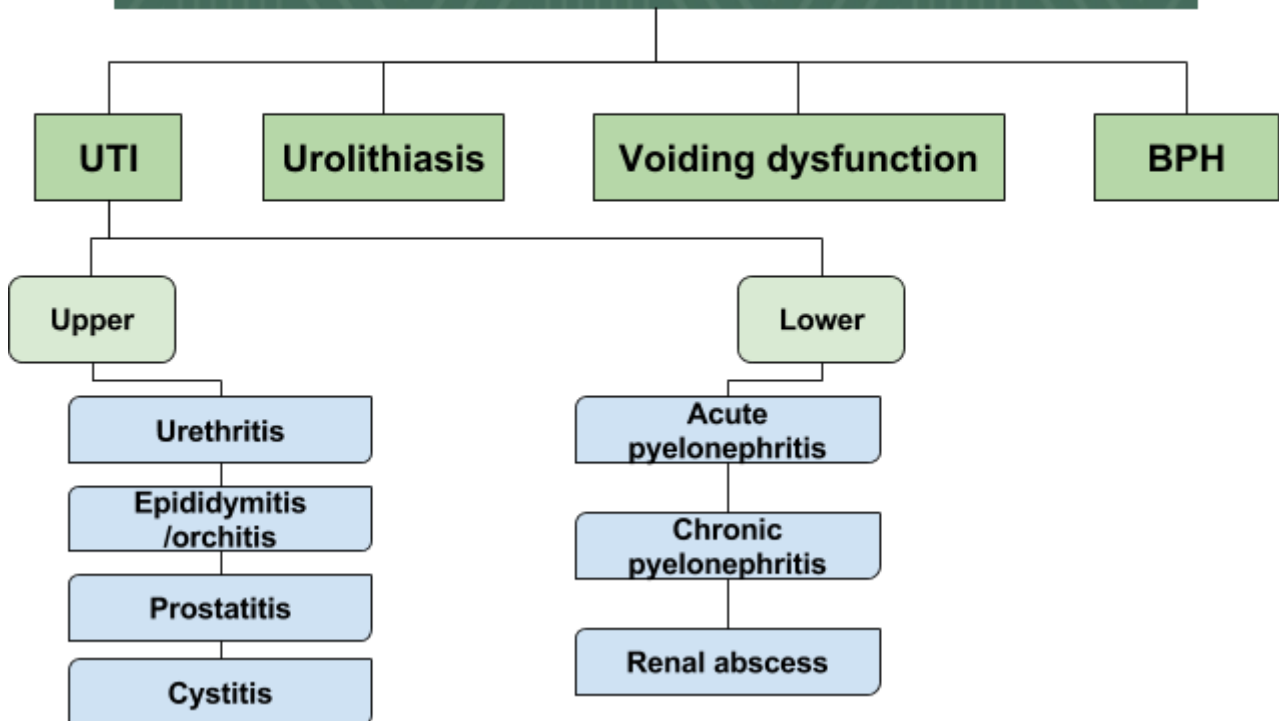
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Once you stop learning
you start dying.

Urological Disorders



You need to know the difference between upper and lower urinary tract infection symptoms?

Upper urinary tract infection	Lower urinary tract infection
<p>Systemic manifestation (more serious problems):</p> <ul style="list-style-type: none"> - Fever - Chills or shivering - Vomiting - Nausea - Abdominal ach - Flank pain 	<p>-Dysuria</p> <p>-Storage (irritative) symptoms:</p> <ul style="list-style-type: none"> - Frequency - Urgency - Nocturia - Incontinence <p>-Voiding symptoms:</p> <ul style="list-style-type: none"> - Hesitancy - Poor stream initiation, intermittent stream. - Dribbling - Urine retention - Reduced flow - Sensation of incomplete emptying

Urethritis^{1 2}

Signs and symptoms:

- Urethral discharge. Usually in Male, due to sexual intercourse
- **Dysuria** usually in LUTS.
- Burning on urination.
- Asymptomatic; 25% especially in women.

If a male pt came to the clinic complaining of urethral discharge, we initially think of sexually transmitted diseases (the most common cause).³

So ask the pt about unprotected sex, and it's important to know the duration (the incubation period differs from one bacteria to another (imp exam Q)

Gonococcal vs. Nongonococcal :

- **Neisseria Gonorrhoeae** and **Chlamydia Trachomatis** are the most common organisms.
- 40-60% are asymptomatic carriers.
- The most common nonspecific urethritis is due to chlamydia.

	Gonorrhea	Chlamydia
Organism	Neisseria gonorrhoea	Chlamydia trachomatis
Organism type	Gram -ve diplococci	Intracellular facultative organism
IP (incubation period)	3-10 days	1-5 weeks
Urethral discharge	Usually profuse, purulent	Usually scant
Asymptomatic carriers	40% - 60%	
Diagnostic test	Ligand chain reaction, Gram stain culture	Polymerase/ligand chain reaction, culture immunoassay
Treatment	Ceftriaxone +(Azithromycin or Doxycycline; for possible chlamydial coinfection)	Doxycycline or Azithromycin + (ceftriaxone; for possible gonorrhoeal coinfection)

Diagnosis:

- **Urethral swab and culture⁴** (chlamydia needs cell culture)
- **Serum marker & antigen:** Chlamydia-specific ribosomal RNA⁵

*bacteria are gaining resistance, so it's important to know where the pt has been and review your guidelines of your local infectious disease body, like in the US a lot of gonorrhoea that's coming from Mexico are resistant to **ciprofloxacin**

¹ An infection-induced inflammation of the urethra. usually caused by an STD, and normally categorized into either **gonococcal urethritis (GU)** or **nongonococcal urethritis (NGU)**

² Mostly it's sexually transmitted disease, in the age of being sexually active

³ And remember, once the patient presents with one STD, you should check for all the others (co-infections are common)

⁴ To know the most proper antibiotics against the organism.

⁵ usually done in chronic forms of the disease

EPIDIDYMITIS⁶⁷

Etiology:

- Young patients due to: **N.gonorrhoea, C.trachomatis**
- Elderly due to: **E.coli**

Epididymitis can be classified as follows:

Acute	Characterized by: Pain & swelling of the epididymis <6 weeks
Chronic	Characterized by: Long-standing pain ⁸ in the epididymis, usually no swelling
Epididymo\orchitis	When the inflammation extends up to the testicles.

Diagnosis:

Epididymitis VS testicular torsion

	Epididymitis	Torsion⁹
Family History	<p>Older patient</p> <p>Gradual onset (along 2 weeks)</p> <p>With urinary symptoms like burning sensation – hematuria e.g patient may say doctor I had blood in urine for 2 weeks now.</p>	<p>Usually young boys, who just reached adolescence¹⁰</p> <p>sudden in onset</p> <p>Acute pain</p> <p>Usually without urinary symptoms</p>
Physical Examination	<p>Inflammatory sign:</p> <ul style="list-style-type: none"> • Redness • warmth • swelling of the scrotum • Testis attached to the skin • Sometimes local abscess • Elevation of the scrotum relief the pain • Painful ejaculation (not specific) 	<ul style="list-style-type: none"> • High riding testis • Red & swollen¹¹ hemiscrotum (usually too Tender to palpate) • Bean-shape, • Transverse (horizontal) lie¹² • Loss of cremasteric reflex • Severe tenderness • Elevation of the scrotum causes more pain
U/S dupler	Hyperemia ¹³ (Due to the inflammation)	No blood flow
Testicular Scan Radionuclide image	Photogenic (black) (Due to increased radiotracer uptake)	Photopenia (white area) (no radiotracer uptake)
Urine Culture	Younger: N. gonorrhoeae or C.trachomatis Older: E.coli ¹⁴ (gram -ve rods)	No causing agent
Urinalysis dipstick (faster) if there's blood, nitrate and WBC (signs of infection) if not then torsion rush him to the OR		

⁶ An inflammation of the epididymis, a significant cause of morbidity and is the fifth most common urologic diagnosis in 18-50 year-old males.

⁷ **Untreated urethritis gives prostatitis if untreated give epididymitis (anatomical)**

⁸ **Pt will say he have been having painful urination from a week but now there's pain in his testis.**

⁹ Twisting of the spermatic cord leading to decreased blood flow to the testicle resulting in ischemia, infarction and potentially, tissue necrosis. **PICTURE**

¹⁰ Rapid growth during puberty may cause this condition.that's why it's common in adolescent male.

¹¹ Not seen usually.

¹² Normally it lies vertically.

¹³ an excess of blood in the vessels supplying an organ or other part of the body.

¹⁴ Usually due to prostate enlargement and causing urine stasis

Treatment of acute Epididymo-orchitis: [just read it](#)

Secondary to bacteriuria	Secondary to sexually transmitted urethritis
<ol style="list-style-type: none">1. Do urine culture & sensitivity studies.2. Promptly administer broad-spectrum antimicrobial agent.3. Prescribe bed rest & perform scrotal evaluation.4. Strongly consider hospitalization.5. Evaluate for underlying urinary tract disease.	<ol style="list-style-type: none">1. Do gram stain of urethral smear.2. Administer ceftriaxone IM then tetracycline or doxycycline for at least 10 days.3. Prescribe bed rest & perform scrotal evaluation.4. Examine & treat sexual partners.

Recall :

What is it Epididymitis?

Infection of the epididymis

What are the signs/symptoms?

Swollen, tender testicle; dysuria; scrotal ache/pain; fever; chills; scrotal mass.

What is the cause?

Bacteria from the urethra.

What are the common bugs in the following types of patients:

- **Elderly patients/children?** Escherichia coli
- **Young men?** STD bacteria: Gonorrhoea, chlamydia

What is the major differential diagnosis?

Testicular torsion.

What is the workup?

U/A, urine culture, swab if STD suspected, U/S with Doppler or nuclear study to rule out torsion.

What is the treatment?

Antibiotics.

PROSTATITIS

A syndrome that presents with inflammation ± infection of the prostate gland.

Signs and symptoms:

- Dysuria, frequency
- Dysfunctional voiding
- Perineal pain [pt describes it as sitting on a tennis ball](#)
- Painful ejaculation

Classification System for the Prostatitis Syndromes [read it for your knowledge](#)

Traditional	National institutes of health	description
Acute bacterial prostatitis	Category I	Acute infection of the prostate gland
Chronic bacterial prostatitis	Category II	Chronic infection of the prostate gland
N/A	Category III chronic pelvic pain syndrome (CPPS)	Chronic genitourinary pain in the absence of uropathogenic bacteria localized to the prostate gland with standard methodology
Non bacterial prostatitis	Category IIIA (inflammatory CPPS)	Significant number of white blood cells in expressed prostatic secretion, post prostatic massage urine sediment (VB3), or semen
Prostatodynia ¹⁵	Category IIIB (inflammatory CPPS)	Insignificant number of white blood cells in expressed prostatic secretion, post prostatic massage urine sediment (VB3), or semen
N/A	Category IV asymptomatic inflammatory prostatitis (AIP)	White blood cells (and/or bacteria) in expressed prostatic secretion, post prostatic massage urine sediment (VB3), semen or histologic specimen of prostate gland

Acute Bacterial Prostatitis : [Emergency with high mortality](#)

- Rare. [we see it once or twice a year](#)
- Acute pain.
- Storage and voiding urinary symptoms
- Fever, chills, malaise, N/V
- Perineal and suprapubic pain
- Tender swollen hot prostate.

Treatment:

- Antibiotics
- Urinary drainage.

Difficult to treat because of the capsule and configuration of prostate, So you may give patients antibiotics for months

[In case of ACUTE inflammation the pt will come with fever dysuria and on rectal exam the prostate very tender, urine culture positive for e-coli, what should we do? We admit give iv ab until they settle down \(very dangerous\).](#)

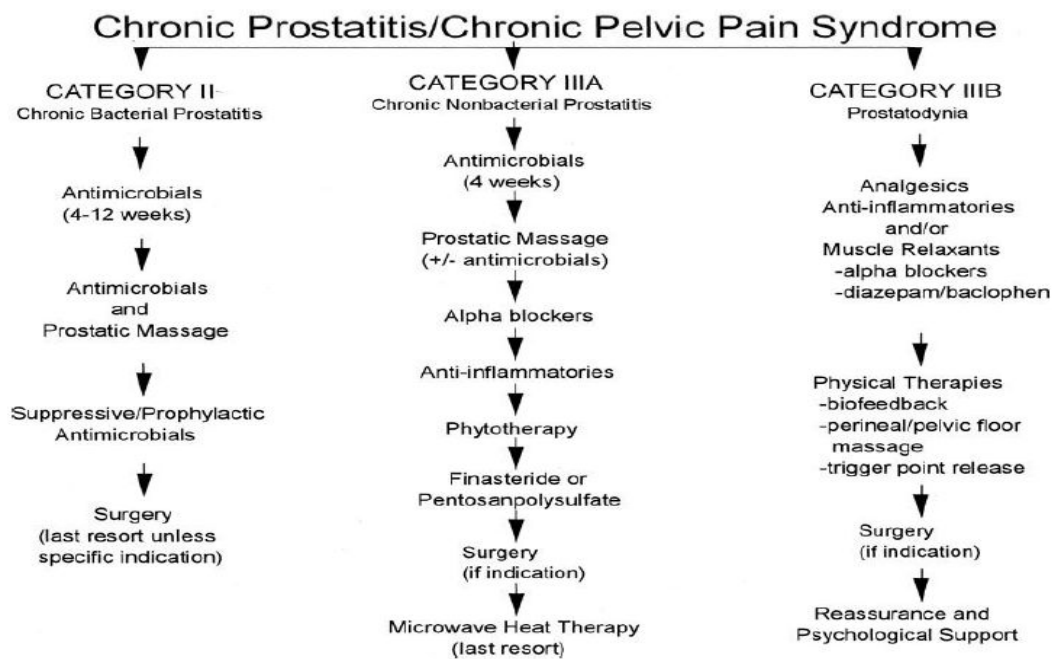
¹⁵ A type of inflammation of the prostate **not** due to bacterial infection and in which there are no objective findings.

In cases of, **Chronic nonbacterial prostatitis** the pt has symptoms> we do urinalysis> urine culture will be **negative**; then we do something called **expressed prostatic secretion** we do prostatic massage to get secretion and culture it but still negative?!

It's a clinical dilemma we still don't know.

We give a course of 6w or 3m of antibiotic its ongoing research

This diagram is just for your information



CYSTITIS¹⁶

Why **females** have more cystitis than men?

Due to: their short urethra

The organism comes from the rectum, the vagina is clean has lactobacilli vaginal so you may get fungal infection if the female is abusing antibiotics and can change the vaginal flora which will cause an ascending infection from the GI tract

Signs and symptoms:

- Dysuria, frequency, urgency, voiding of small urine volumes
- Suprapubic/lower abdominal pain, and tenderness
- \pm Hematuria المريضة ممكن تقول فيه دم باخر البول terminant hematuria
- **No fever** (even if it's severe)

in history colorate the pain with the act of voiding, may be worse with filling the bladder and better by emptying the bladder or at least related (to rule out other causes of suprapubic and lower abdomen pain)

Diagnosis:

- Dipstick¹⁷
- Urinalysis
- Urine culture; the Gold standard.¹⁸

¹⁶ Ascending infection from the urethra to the bladder

¹⁷ When **nitrate is (+)**, it indicates an infection

¹⁸ It takes 2 days. Start treatment before waiting for results b/c we know what are the commonest organisms.

Treatment:

Usual treatment of UTI: (**nitrofurantoin is secreted in the urine, but don't give it to a pt that has fever because it has poor tissue penetration**)

- In **female** is just for **3 days**, to avoid any effect on normal bowel flora.
- In **male**, the treatment is usually for a **week**.

Table 14–10. TREATMENT REGIMENS FOR ACUTE CYSTITIS

Circumstances	Route	Drug	Dosage (mg)	Frequency per Dose	Duration (days)
Women					
Healthy	Oral	Ciprofloxacin	500	Every 12 hr	3
		Enoxacin	400	Every 12 hr	
		Levofloxacin	500	Every day	
		Lomefloxacin	400	Every day	
		TMP-SMX	160–800	Every 12 hr	
		TMP	100	Every 12 hr	
		Microcrystalline nitrofurantoin	100	Four times a day	
		Norfloxacin	400	Every 12 hr	
		TMP-SMX	160–800	Every 12 hr	
		TMP-SMX or Fluoroquinolone	As above	As above	
Symptoms for >7 days, recent urinary tract infection, age >65 yr, diabetes, diaphragm use	Oral	Amoxicillin	250	Every 8 hr	7
		Cephalexin	500	Four times a day	
		Microcrystalline nitrofurantoin	100	Four times a day	
		TMP-SMX	160–800	Every 12 hr	
Pregnancy	Oral	Amoxicillin	250	Every 8 hr	7
		Cephalexin	500	Four times a day	
Men					
Healthy and <50 years old	Oral	TMP-SMX	160–800	Every 12 hr	7
		or Fluoroquinolone	As above	As above	

PYELONEPHRITIS¹⁹²⁰

It's a life threatening in old pt with 20% of mortality. (Ask about previous urinary symptoms (mostly ascending inf))

Signs and symptoms: clinical triad: **chills, fever and costovertebral angle tenderness.**

- Chills
- Fever
- **Costovertebral angle tenderness (flank pain)**
- GI: Abdominal pain, N/V, and diarrhea (need to be aware that pyelonephritis can present differently)
- Gram -ve sepsis - mild flank pain
- Dysuria, frequency

Costovertebral angle tenderness



جاتك عجوز عمرها 80 سنة جالسه تنتفض و ضغطها 40\80 و حرارتها 39 probably going to go into **septic shock**

Investigations:

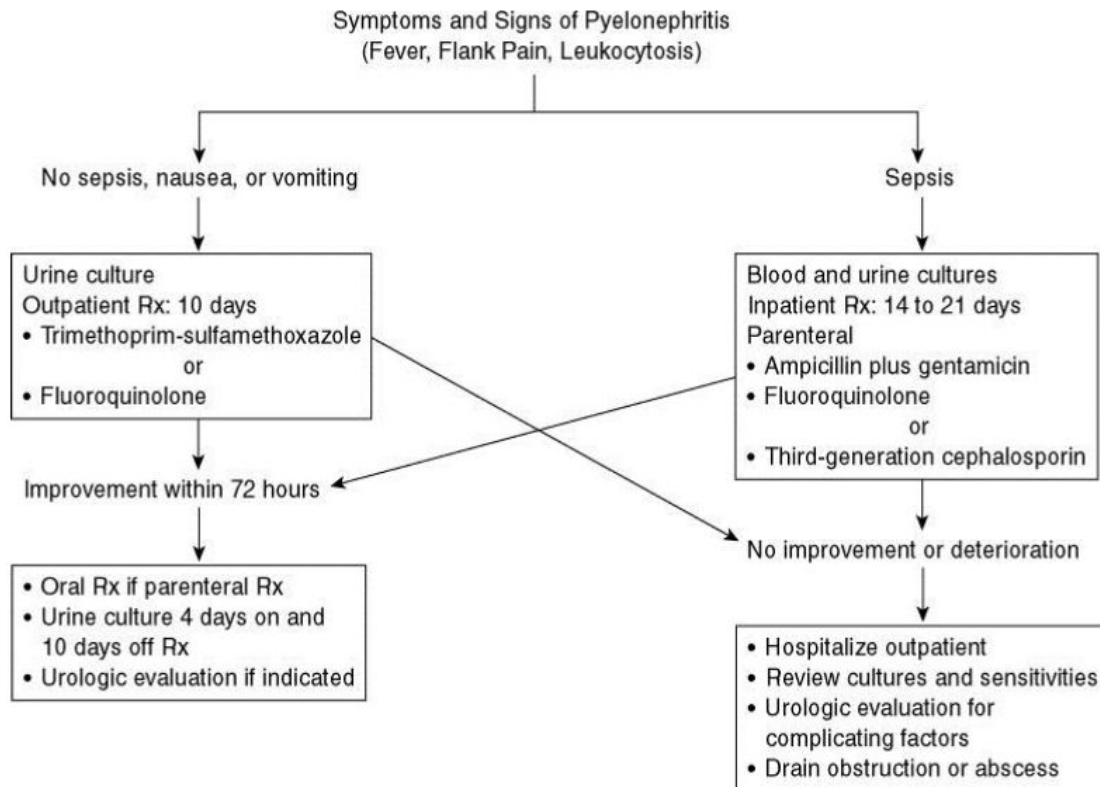
- **Urine C&S** (culture & sensitivity): +VE (80%)
 - **Enterobacteriaceae (E. coli), Enterococcus** need to know the common causative organisms in your area because we're gonna treat empirically. E.coli first, Enterococcus second
- **Urinalysis:** ↑WBCs, RBCs, Bacteria
- **Blood test for renal function:** (±) ↑serum Creatinine to check if the pt doesn't have renal failure
- **CBC:** Leukocytosis.
- **Urine dipstick microscopy** (to get rapid results)
- **Imaging:** To rule out any possible obstruction
 - IVP (Intravenous Pyelogram)
 - U/S with pregnant women and to rule out hydronephrosis
 - **CT** (best) !! the most sensitive instrument to detect stone (we wanna rule out stones)

¹⁹ the untreated cystitis will descend to the kidney and cause pyelonephritis which is more serious.

²⁰ Inflammation of the kidney and renal pelvis.

Treatment:

when do we treat as a in pt or as a out pt?



إذا جانا واحد عمره 30 سنة بحرارة ونفضه عنده حرقان بالبول, سوينا urine dipstick وطلع فيه nitrate +ve and pus cells, المريض يقدر ياخذ الدواء orally, ايش نسوي؟

نعطيه مضاد quinolone لمدة 14 يوم ونقول له إذا ما راحت الحرارة بعد يومين ارجع لنا (ما ندخله ونعطيه IV ab وهو stable وموب في urosepsis

Recall :

What is the etiology of UTI?

- Ascending infection
- Instrumentation
- Coitus in females

What are the three common organisms?

1. E. coli (90%)
2. Proteus²¹
3. Klebsiella, Pseudomonas

What are the predisposing factors?

Stones, obstruction, reflux, diabetes mellitus, pregnancy, indwelling catheter/stent

What are the symptoms?

- Lower UTI— frequency, urgency, dysuria, nocturia.
- Upper UTI—back/ ank pain, fever, chills.

How is the diagnosis made?

Symptoms, urinalysis (>10 WBCs/HPF, >10⁵ CFU)

When should workup be performed?

- After first infection in male patients (unless Foley is in place)
- After first pyelonephritis in prepubescent female patients

What is the treatment?

- Lower: 1 to 4 days of oral antibiotics
- Upper: 3 to 7 days of IV antibiotics

²¹ Urease +ve, which breaks urea into ammonia and CO₂ thereby alkalinizing the urine making the patient more susceptible to develop struvite stones

UROLITHIASIS²²

- Formation of urinary calculi (stones)
- Common disease in Saudi Arabia (50% of emergencies are stone)
- Were found in Egyptian mummies 4800 BC
- Prevalence of 2% to 3%
- **Lifetime risk:** Male 20% , Female: 5-10%
- Recurrence rate 50% at 10 years

Risk factors:

Intrinsic Factors	Extrinsic Factors
<ul style="list-style-type: none"> ● Genetics eg:(cystine,urine tubular acidosis) u may be asked in exam about cystine. ● Age: 20s-40s; young people ● Sex: M>F 	<ul style="list-style-type: none"> ● Geography (mountainous, desert, tropics) ● Climate (July - October) ● Decrease in water Intake²³ ● Diet (purines, oxalates, Na) ● Occupation (sedentary occupations)

How do stones form?

Supersaturated urine ⇒ Crystal growth²⁴ ⇒ Aggregation of crystals ⇒ Stone formation.

زي السكر اذا ذوبت كثير بموية ويتشبع ويسوي كرسنالات

Most people have Crystals in their urine, so why don't everyone gets stones?

Some mechanisms by which stones may develop:

- Anatomic abnormalities.²⁵
- Imbalance between Inhibitors/promoters: either by decrease in inhibitors or by increase in promoters levels
 1. **Inhibitors:** Citrate, Mg, pyrophosphate, and urinary proteins (nephrocalcin).
 2. **Promoters:** Oxalate, red meat (which contains animals proteins)²⁶, hypercalciuria.

We don't tell pt to stop drinking this or eating that after at episode of stone, so what do we do?

We take the stone and analyze it, do infratroscope then we know if his stone 80% ca 20% uric acid

Then we do a fully metabolic work up نعطيه عليه يجمع فيها بول ٢٤ ساعة نوديه للمختبر ونشوف الستون بروموترز والانهيترز

This is one of my pt, 14 yo girl came with a stage horse stone and !unfortunately I couldn't save the kidney because she presented with pyelonephritis and a poorly functioning kidney so we needed to do a nephrectomy So you can see how damaging effect the stone can do to the kidney



Common stone types: (Calcium stones are the most common and Cystine are the least common)

²² The process of forming stones in the kidney, bladder, and/or urethra (urinary tract).

²³ Dehydration increases solutes concentration in the body, thereby increasing the risk of developing crystals.

²⁴ when the concentration of a solute reaches certain level, it precipitates forming crystals.

²⁵ Presence of certain abnormalities of the urinary tract like hydronephrosis or obstruction may lead to stasis of the urine. Then, supersaturation of minerals may lead to formation of stones.

²⁶ Increases uric acid production through purine degradation

type	Calcium 75%		Struvite ²⁷ (ammonium magnesium phosphate)	Uric acid ²⁸ احمها	cystine
	oxalate	phosphate			
Cause	Hypocitraturia	-	urease +ve bacteria ²⁹	Myeloproliferative disorders, Excessive blood purine ³⁰	hereditary ³¹
pH changes that increases their risks	↓ in pH,	↑ in pH	↑ in pH	↓ in pH	↓ in pH
On X-ray	radioopaque ³²			radiolucent	

Signs and symptoms: (are similar to pyelonephritis that's why we do CT to rule out)

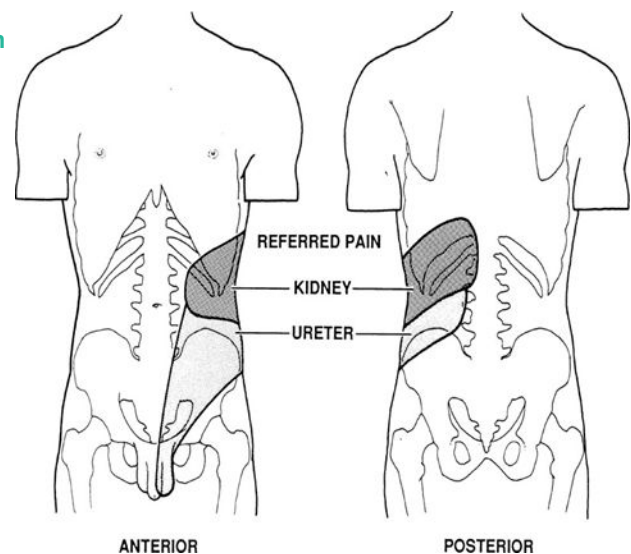
- Renal or ureteric colic
- Frequency, dysuria
- Hematuria
- GI symptoms: N/V, ileus³³, or diarrhea.
- Restless:
 - ↑HR, ↑BP
 - Fever (If UTI) (differs from pyelonephritis with fever, but can have fever if the stone caused obstruction (pyelonephritis) so we do urinalysis)
 - Tender costovertebral angle.

Differential diagnosis: can be anything under the site of pain

- Gastroenteritis
- Acute appendicitis
- Colitis
- Salpingitis

Investigation: urine, blood, imaging and other (in Conrad Fischer's voice :)

- **Urinalysis**
 - RBCs, WBCs, Bacteria, Crystals
- **Imaging:**
 - Plain Abdominal Films (KUB)
 - Intravenous Pyelogram (IVP) (rarely used now)
 - Ultrasonography (U/S) (used for pregnant)
 - Computed Tomography (CT) (The gold standard)



²⁷ Usually it's the common causes staghorn stones

²⁸ Associated with red meat and gout (not usually)

²⁹ Proteus, klebsiella, and staphylococcus saprophyticus (seen in newly sexually active women)


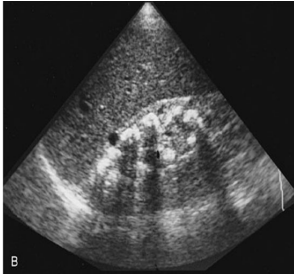


³⁰ Particularly with gout

³¹ Autosomal recessive disease; defect in PCT reabsorption of Cystine, Ornithine, Lysine, Arginine (COLA), which increases their urine concentration. All of these compounds are water soluble except cystine, that is why cystine causes stones formation.

³² Radiopaque objects block radiation rather than allow it to pass through like bones, metal and calcium stones which appears white on x-ray

³³ ileus can occur when the normal movement of your intestines are interrupted.

In MCQs you will get a picture asking you about the findings.(identify the abnormalities)

KUB	US	IVP (rarely used)	CT
			
shows only radiopaque stones.	shows hyperechoic stones + acoustic shadow.	shows radiolucent (uric acid stone) & radiopaque stones (calcium stones).	shows both radiopaque and radiolucent stones. (So it's the first step)

The most likely places for ureteral stones to lodge are at the site of constrictions:

- At ureteropelvic junction
- At pelvic inlet (site of crossing of common iliac artery)
- At site of entrance to bladder **the narrowest**

Treatment:

1. Conservative:

- Hydration
- Analgesia, (intramuscular diclofenac, a NSAID, is the most effective analgesic)
- Antiemetics
- **Stones (<5 mm) >90% undergo spontaneous passage.**

2. Indications for admission:

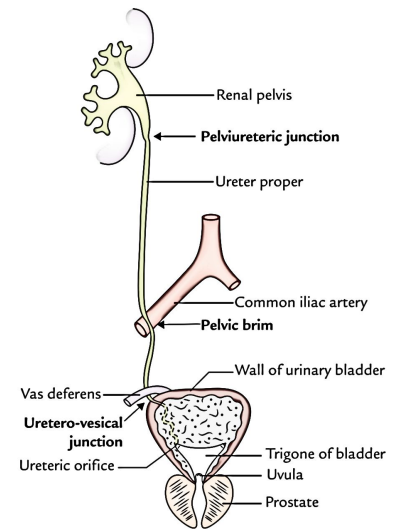
- Renal Impairment (high creatinine)
- Refractory Pain
- Pyelonephritis³⁴; patient has 3 mm stones with fever and chills> pyelonephritis.
- Intractable N/V; can't take oral analgesia.

3- Shock Wave lithotripsy (SWL)³⁵ useful with small stones

4- Uretroscopy³⁶ laser (do it if SWL fails or with larger stones), there's a little chance of damage

5- Percutaneous nephrolithotripsy (PNL)³⁷ (done with staghorn stones)

6- Open surgery. (rare)



جاك مريض سويتي له CT ولقينا حصاة 3 مل أسفل الحالب

how would you manage it?

Hydration >> analgesia >> antiemetic هذي كفيله تطيح 75% من الحصوات أصغر من 5 مل

admit the pt !! renal impairment او creatinine عالي او ما عنده الاكلية وحدة

³⁴ Stones may act as a nidus, so if the patient shows signs of infection consider antibiotic therapy

³⁵ least invasive, for small stones

³⁶ enter from the urethra and goes up and use laser to destroy the stone

³⁷ enter from the flank, for Staghorn stones

Recall :

What is the incidence of calculus disease?

1 in 10 people will have stones (10%)

What are the risk factors?

Poor uid intake, IBD, hypercalcemia (“CHIMPANZEES”), renal tubular acidosis, small bowel bypass

What are the four types of stones?

Calcium oxalate/calcium PO₄ (75%)— secondary to hypercalciuria (↑ intestinal absorption, ↓ renal reabsorption, ↑ bone reabsorption)

1. Struvite (Mg AmPh)(15%)—infection stones; seen in UTI with urea-splitting bacteria (Proteus); may cause staghorn calculi; high urine pH
2. Uric acid (7%)—stones are radiolucent (think: **U**ric = **U**nseen); seen in gout, Lesch-Nyhan, chronic diarrhea, cancer; low urine pH
3. Cystine (1%)—genetic predisposition

What type of stones are not seen on AXR?

Uric acid (think: **U**ric = **U**nseen)

What stone is associated with UTIs?

Struvite stones (think: **S**truvite = **S**epsis)

What stones are seen in IBD/ bowel bypass?

Calcium oxalate

What are the symptoms of calculus disease?

Severe pain; patient cannot sit still: renal colic (typically pain in the kidney/ureter that radiates to the testis or penis), hematuria (remember, patients with peritoneal signs are motionless)

What are the classic findings/ symptoms?

Flank pain, stone on AXR, hematuria

Diagnosis?

KUB (90% radiopaque), IVP³⁸, urinalysis and culture, BUN/Cr³⁹, CBC

What is the significance of hematuria and pyuria?

Stone with concomitant infection

Treatment?

- Narcotics for pain, vigorous hydration, observation
- Further options: ESWL (lithotripsy), ureteroscopy, percutaneous lithotripsy, open surgery; metabolic workup or recurrence

What are the indications for intervention?

- Urinary tract obstruction
- Persistent infection
- Impaired renal function

What are the contraindications of outpatient treatment?

Pregnancy, diabetes, obstruction, severe dehydration, severe pain, urosepsis/ fever, pyelonephritis, previous urologic surgery, only one functioning kidney

What are the three common sites of obstruction?

1. **U**retero**P**elvic **J**unction (**UPJ**)
2. **U**retero**V**esicular **J**unction (**UVJ**)
3. Intersection of the ureter and the iliac vessels

³⁸ IVP = intravenous pyelogram is an X-ray test that provides pictures of the urinary tract.

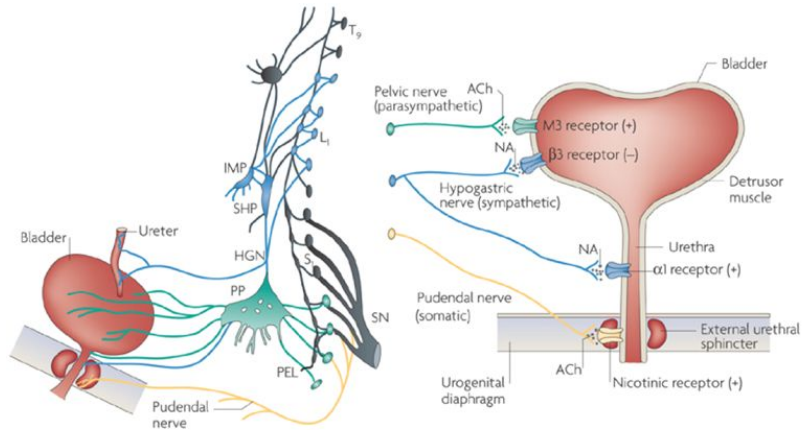
³⁹ The blood urea nitrogen or BUN test is primarily used, along with the creatinine test, to evaluate kidney function

VOIDING DYSFUNCTION

The bladder has 2 functions:

- Store
- Empty

If the pt has a spinal cord injury he will have problems in storing or emptying or both.



Failure to store	Failure to empty
<p>Bladder Problems:</p> <ul style="list-style-type: none"> • Overactivity: common in women or b/c of spinal cord injury, stroke > loss of control by causing damage to micturition inhibitory center. اذا جتتي البول له ماقدر امسك نفسي لين اروح للحمام • Hypersensitivity 	<p>Bladder Problems :</p> <ul style="list-style-type: none"> • Neurologic • Myogenic • Idiopathic
<p>Outlet Problem:</p> <ul style="list-style-type: none"> • Stress Incontinence: the most common Patients with weak pelvic floor muscles or weak sphincter muscles of bladder neck may lose some urine control (dribbling) following an increase in intra-abdominal pressure (sneezing, coughing, or running)⁴⁰ • Sphincter Deficiency 	<p>Outlet Problem:</p> <ul style="list-style-type: none"> • BPH: Benign Prostatic Hyperplasia – Urethral Stricture • Sphincter Dyssynergia.
Combination of both	Combination of both

⁴⁰ Multiparous women commonly lose some of the tone over pelvic floor muscles with each pregnancy. Thus, they are more prone to suffer from stress incontinence.

Recall :

What are the common types of incontinence⁴¹?

- Stress incontinence
- overflow incontinence,
- urge incontinence

Define the following terms:

- **Stress incontinence:** Loss of urine associated with coughing, lifting, exercise, etc.; seen most often in women, secondary to relaxation of pelvic floor following multiple deliveries
- **Overflow incontinence:** Failure of the bladder to empty properly; may be caused by bladder outlet obstruction (BPH or stricture) or detrusor hypotonicity
- **Urge incontinence:** Loss of urine secondary to detrusor instability in patients with stroke, dementia, Parkinson's disease, etc.
- **Mixed incontinence:** Stress and urge incontinence combined
- **Enuresis:** Bedwetting in children

How is the diagnosis made?

History (including meds), physical examination (including pelvic/rectal examination), urinalysis, postvoid residual (PR), urodynamics, cystoscopy/ vesicocystourethrogram (VCUG) may be necessary

What is the "Marshall test"?

Woman with urinary stress incontinence placed in the lithotomy position with a full bladder leaks urine when asked to cough

What is the treatment of the following disorders:

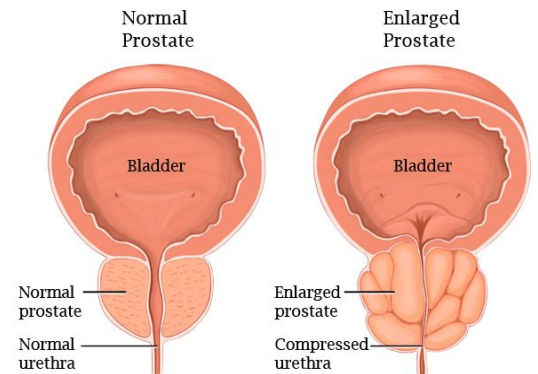
- **Stress incontinence?** Bladder neck suspension
- **Urge incontinence?** Pharmacotherapy (anticholinergics, α -agonists)
- **Overflow incontinence?** Self-catheterization, surgical relief of obstruction, α -blockers

⁴¹ Loss of bladder control.

Benign prostatic hyperplasia

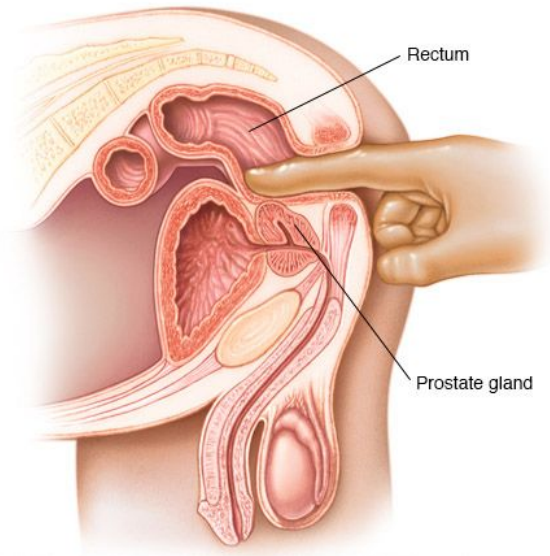
Clinical features:

- Lower urinary tract symptoms⁴² (Irritative **and/or** Obstructive)⁴³
- Poor bladder emptying
- Urinary retention
- Urinary tract infection (UTI)
- Hematuria
- Renal insufficiency



Physical examinations:

- DRE⁴⁴ (Digital rectal Examination) If it's hard to palpate the nodules, it most likely Cancer. (Check for tenderness, nodules and anal tone)
- Look for Prostate and Rectal Cancers
- Focused neurologic exam
 - Anal tone
 - Neurological examination some neurological disorders may cause bladder dysfunction (There is micturition center in the pons).
- Abdomen: Distended bladder



Investigations:

- Urinalysis, Culture
 - UTI
 - Hematuria
- Serum Creatinine
- Serum Prostate-Specific Antigen (PSA)⁴⁵
- Flow rate
- US → (kidney, bladder and prostate).

⁴² Prostate adenocarcinoma most commonly originates from the posterior aspect at the periphery. Therefore, it usually doesn't cause urinary symptoms until late in the course.

⁴³ If the patient presents with irritative symptoms only, usually there is no indication for prostatectomy.

⁴⁴ Examination reveals: little, rubbery, symmetrical and smooth prostatic enlargement, with a median groove between the two lateral 'lobes'

⁴⁵ Normal range (0-4 ng/mL); BPH (4-10 ng/mL); prostatic cancer (more than 10 ng/mL)

Although these ranges aren't very specific. For example, a patient may present to you with prostate cancer, and his PSA level is 3 ng/mL. So keep these ranges in your mind, but do not confirm a diagnosis with PSA level only.

Management:

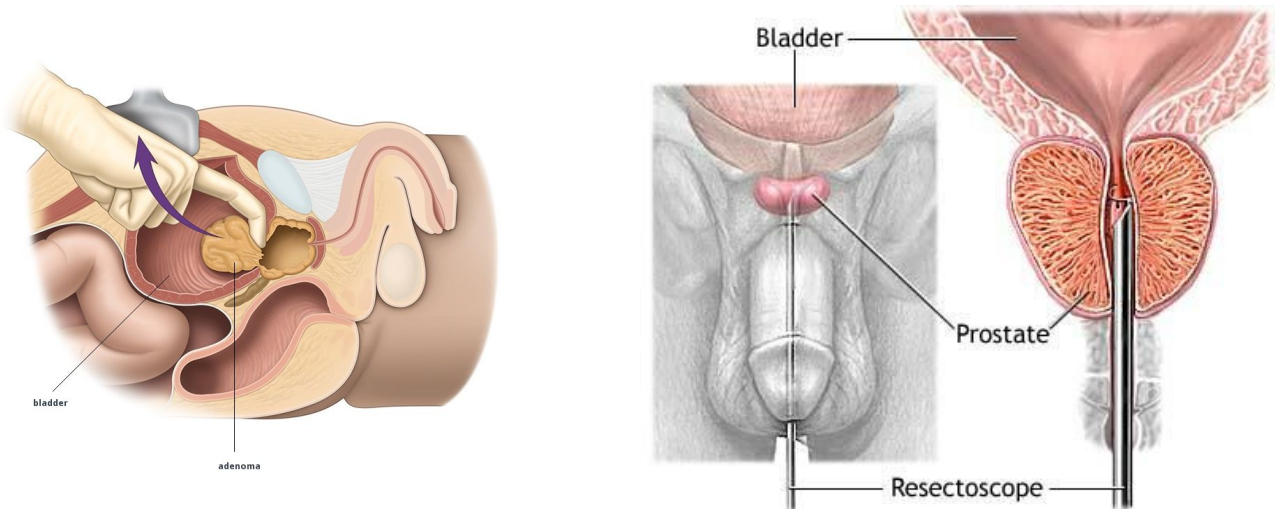
- **Medical therapy:**

- Selective α_1 -Adrenergic Blockers:⁴⁶ relax the bladder to void easily
 - Tamsulosin
 - Alfuzosin
 - Terazosin
- 5 α reductase inhibitor⁴⁷ (androgen suppression):
 - Finasteride

- **Surgical Rx⁴⁸:** by prostatectomy (removal of the whole or a part of prostate)

- **Endoscopic** (e.g. Transurethral resection of the prostate (TURP)⁴⁹, laser ablation, prostatic stent); Cut adenoma that blocks the passage. زي تقوير الكوسه
- **Open prostatectomy.** Reserved for very large adenomas

After prostatectomy, the bladder must be allowed to drain freely via a urethral catheter while the prostatic bed heals and bleeding stops.



Complication:

BPH may lead to obstruction → stasis → UTIs, bladder stones, tumor, or obstructive uraemia.

- **obstructive uraemia** which is characterized by:

- Azotemia and decreased GFR
- Oliguria
- Nausea and vomiting
- Weight loss
- Muscles cramps

⁴⁶ relax smooth muscles of bladder neck and prostate capsule

⁴⁷ blocks the conversion of testosterone to dihydrotestosterone → shrinks prostate 60% in 6 months

⁴⁸ If medical therapy failed

⁴⁹ [Picture](#)

Recall :

What is BPH?

Disease of elderly men (average age is 60 to 65 years); prostate gradually enlarges, creating symptoms of urinary outflow obstruction

What is the size of a normal prostate?

20 to 25 gm

Where does BPH occur?

Periurethrally (**Note:** prostate cancer occurs in the periphery of the gland)

What are the symptoms?

Obstructive-type symptoms: hesitancy, weak stream, nocturia, intermittency, UTI, urinary retention

How is the diagnosis made?

History, DRE, elevated **PostVoid Residual (PVR)**, urinalysis, cystoscopy, U/S

What lab tests should be performed?

Urinalysis, PSA, BUN, CR

What is the differential diagnosis?

- Prostate cancer (e.g., nodular)—biopsy
- Neurogenic bladder—history of neurologic disease
- Acute prostatitis—hot, tender gland
- Urethral stricture—RUG, history of STD
- Stone
- UTI

What are the treatment options?

- Pharmacologic— alpha-1 blockade
- Hormonal—antiandrogens
- Surgical—TURP, TUIP, open prostate resection
- Transurethral balloon dilation

Why do alpha-adrenergic blockers work?

1. Relax sphincter
2. Relax prostate capsule

What is Proscar?

Finasteride: 5-alpha-reductase inhibitor; blocks transformation of testosterone to dihydrotestosterone; may shrink and slow progression of BPH

What is Hytrin?

Terazosin: -blocker; may increase urine out ow by relaxing prostatic smooth muscles

What are the indications for surgery in BPH?

Due to obstruction:

- Urinary retention
- Hydronephrosis
- UTIs
- Severe symptoms

What is TURP?

TransUrethral Resection of Prostate: resection of prostate tissue via a scope

What is TUIP?

TransUrethral Incision of Prostate

What percentage of tissue removed for BPH will have malignant tissue on histology?

Up to 10%!

What are the possible complications of TURP? Immediate:

- Failure to void
- Bleeding
- Clot retention
- UTI
- Incontinence