



432
Surgery
Team

1 **Adult urinary tract disorders**



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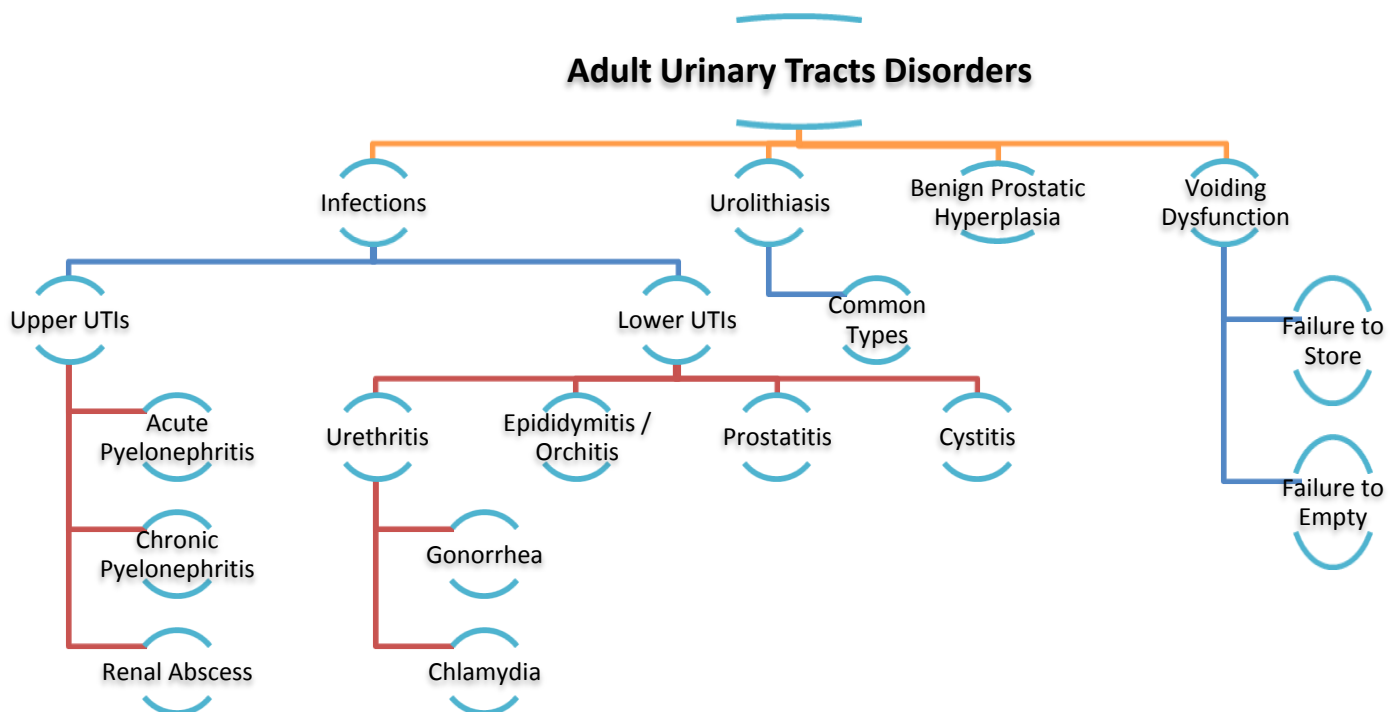


COLOR GUIDE: • Females' Notes • Males' Notes • Important • Additional

Objectives

Not Given

* According to the doctor, lecture's PPT isn't enough for studying and you should go over other sources. For that, at the end of this teamwork, you will find some important notes for further understanding and to make sure that you cover almost everything about the topic. Make sure you go through them 😊



UROLOGICAL DISORDERS:

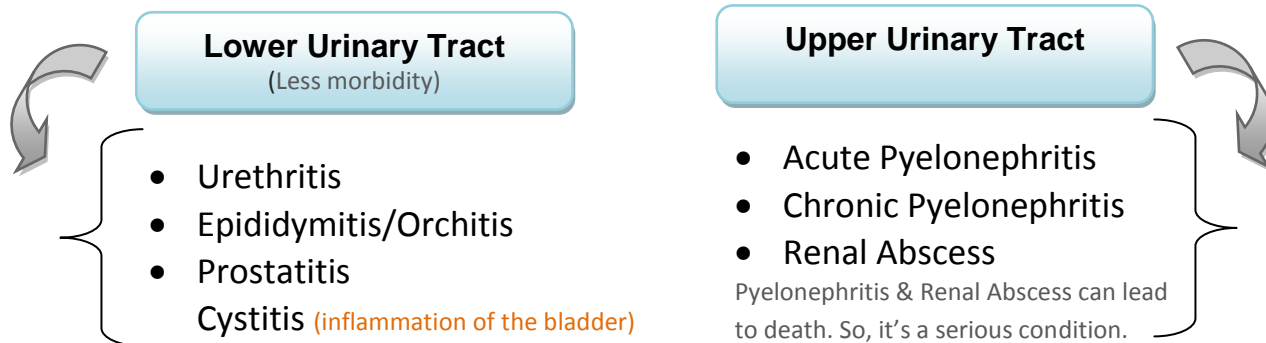
1. Urinary Tract infections

2. Urolithiasis

3. Voiding dysfunction

4. Benign Prostatic Hyperplasia

1-Urinary Tract infections



Route of UTI:

- ❖ Ascending infection; 95%.
- ❖ Haematogenous spread.
- ❖ Adjacent invasion, imagine you have colon with diverticulum and diverticulum would rupture in bladder so u will have UTI
- ❖ Lymphatics; rare.

Note(s):

Haematogenous spread: e.g. tooth abscess > pyelonephritis

In the past, they used to see more Hematogenous spread like in TB> secondary TB in kidney.

-Adjacent invasion: e.g. Diverticulum ruptured in bladder > UTI.

• URETHRITIS

*Common in men; in young men usually the cause is STDs.

Signs & Symptoms :

- Urethral discharge
- LUTS in the form of dysuria
- Burning on urination
- Asymptomatic; 25% "esp. in women".

Diagnosis :

- **Incubation period***: (3-10 days vs 1-5 wks)
- **Urethral swab**; send it to be cultured to identify the proper antibiotics which are affecting the organism.
- **Serum marker & antigen**: Chlamydia-specific ribosomal RNA (usually done in chronic forms of disease)

Gonorrhoea

Chlamydia

Organism	Neisseria gonorrhoea	Chlamydia trachomatis
Organism Type	Gram (-) diplococci	Intracellular facultative organism
Incubation Period *	3-10 days	1-5 weeks
Urethral Discharge	Usually profuse, purulent	Usually Scant
Asymptomatic Carrier	40%-60%	40%-60%
Diagnostic Test	Ligand chain reaction, Gram stain Culture	Polymerase/ligand chain reaction, Culture, Immunoassay
Treatment	Ceftriaxone + Azithromycin or Doxycycline	Ceftriaxone or Azithromycin

• EPIDIDYMITIS *secondary to ascending infection

Acute: Pain, swelling, of the epididymis <6wk.

Chronic: Longstanding pain in the epididymis and testicle, usually no swelling.

❖ Young boy comes with bad testicular pain, **must differentiate** between 2 conditions:

- 1) **Testicular torsion** → urological emergency; patient should go to OR.
- 2) **Epididymitis**

Note(s):

Young male has untreated urethritis, the consequences → blood flows up to urethra → ejaculatory duct → epididymis.

Epididymitis is caused by retrograde ascent of urinary pathogens from the urethra and bladder, via the ejaculatory ducts and vas deferens, leading to colonization and inflammation of the epididymis.

Very important!

Epididymitis

Torsion

History	Older patient - Longer history Gradual onset With urinary symptoms like burningsensation – hematuria e.g the patient may say I had blood in my urine 2 weeks ago.	Usually young boys, just reached adolescence Acute pain – sudden in onset Usually without urinary symptoms (organ threatening condition)
Physical Examination	Inflammatory sign (redness-warmth and swelling of the scrotum)	High riding testis, (testis is kidney shaped, bean-shape, Horizontal lie) - Loss of cremasteric reflex
Ultra Sound (Doppler to detect flow)	Hyperemia "infection > increases blood flow"	No blood flow
Testicular Scan	Increased radiotracer uptake; Hyper-scan photogenic (black)	Photopenia (white area)
Urine for Culture	Younger: N. gonorrhoeae or C. trachomatis Older: E. coli (gram -ve rods)	
Extra notes	It needs oral antibiotics and Supportive therapy	OR directly. Otherwise, testis and spermatogenesis will be lost.

Note(s):

Cremasteric reflex is elicited by lightly stroking the superior and medial (inner) part of the thigh. The normal response is a contraction of the cremaster muscle that pulls up the scrotum and testis on the side stroked.

Table 17-3. TREATMENT OF ACUTE EPIDIDYMO-ORCHITIS

Epididymo-Orchitis Secondary to Bacteriuria

1. Do urine culture and sensitivity studies
2. Promptly administer broad-spectrum antimicrobial agent (e.g., tobramycin, trimethoprim-sulfamethoxazole, quinolone antibiotic)
3. Prescribe bed rest and perform scrotal evaluation
4. Strongly consider hospitalization
5. Evaluate for underlying urinary tract disease

Epididymo-Orchitis Secondary to Sexually Transmitted Urethritis

1. Do Gram stain of urethral smear
2. Administer ceftriaxone, 250 mg IM once; then tetracycline, 500 mg PO qid for at least 10 days, or doxycycline, 100 mg PO bid for at least 10 days
3. Prescribe bed rest and perform scrotal evaluation
4. Examine and treat sexual partners

Adapted from Berger RE: Urethritis and epididymitis. Semin Urol 1983;1:143.

Note(s):

Examining a patient with torsion is very painful, but in epididymitis, raising the scrotum makes it better because it increases drainage → "Prehn's sign": pain relieved by elevation of the testicle.

● PROSTATITIS “common”

It's important to ensure the patient that it doesn't cause malignances.

- Prostate: produces about 80% of the semen.
- Syndrome that presents with inflammation ± infection of the prostate gland “characterized by voiding and storing symptoms”.
- Symptoms:
 - Dysuria, frequency
 - Dysfunctional voiding
 - Perineal pain “between scrotum and anus, it bothers”
 - Painful ejaculation “may cause infertility because the ejaculatory duct could be blocked”.

Note(s):

The root of an ascending infection may go through ejaculatory duct to prostate and that's why some people get the infection.

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

Table 15-1. CLASSIFICATION SYSTEM FOR THE PROSTATITIS SYNDROMES

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
Nonbacterial prostatitis	Category IIIA (inflammatory CPPS)	Significant number of white blood cells in expressed prostatic secretions, postprostatic massage urine sediment (VB3), or semen
Prostatodynia	Category IIIB (noninflammatory CPPS)	Insignificant number of white blood cells in expressed prostatic secretions, postprostatic massage urine sediment (VB3), or semen
N/A	Category IV asymptomatic inflammatory prostatitis (AIP)	White blood cells (and/or bacteria) in expressed prostatic secretions, postprostatic massage urine sediment (VB3), semen, or histologic specimens of prostate gland

It isn't required to know the categories of Prostatitis. This table just to show that there's more than one type. Some are due to bacteria and some are not. Types 3 and 4 are difficult to treat.

* ACUTE BACTERIAL PROSTATITIS:

- Rare “only 10% get ABP”.
- Acute pain.
- Irritative and obstructive voiding symptoms.
- **Fever, chills, malaise** “typical urosepsis”, N/V.
- Perineal and suprapubic pain.
- Tender swollen hot prostate.

Rx: antibiotics and urinary drainage.

Note(s):

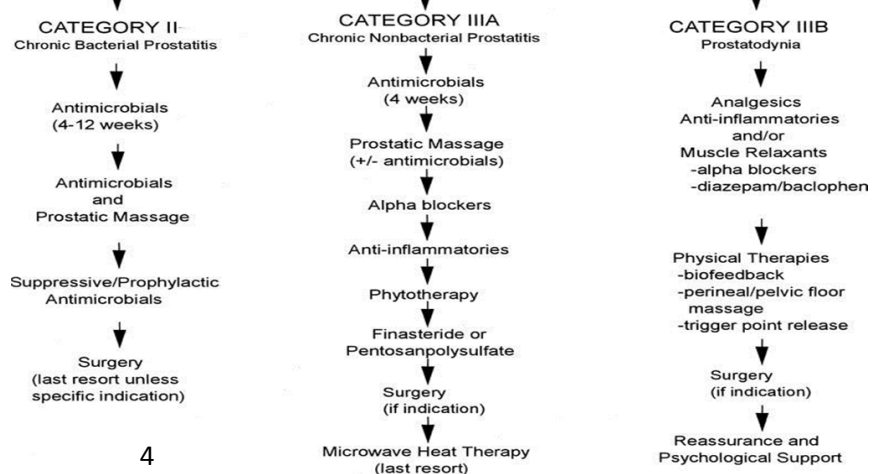
Acute bacterial prostatitis: Patient should get admitted b/c it's a **serious problem**. He may get hypotension 90/40 (**urosepsis – septic shock**). It's a rare clinical emergency condition that maybe life threatening! BUT chronic prostatitis is more common.

✓ They may go into urinary retention “patient can't void”.

✓ Sometimes there is a prostatic abscess “one of the complication of ABP”, so when you do a rectal examination and palpate the prostate, you can feel fluctuation “a wavelike motion”.

FYK!

Chronic Prostatitis/Chronic Pelvic Pain Syndrome



● CYSTITIS “Inflammation of the bladder”

Note(s):

Cystitis is more common in women than men, why? B/c women have shorter urethra (4.5 cm). Some of them are genetically predisposed to bacteria as the lining of the bladder is more susceptible to E.coli.

Signs and symptoms:

- Dysuria, frequency, urgency, voiding of small urine volumes
- Some patients come with incontinence “loss of bladder control”
- Suprapubic/lower abdominal pain
- ± Hematuria
- **No fever** even if it’s severe “Unless elderly or young patient waiting for a long time without treatment, because the infection reaches the kidney through ureters causing pyelonephritis”.

Diagnosis

- **Dipstick:** When **nitrate** is (+), it indicates an infection “bacterial conversion of endogenous nitrates to nitrites”.
- **Urinalysis**
- **Urine culture;** is the gold standard. It takes 2 days. Start treatment before waiting for results b/c we know what are the commonest organisms.

Treatment

Usually treatment of UTI in women is just for **3 days** “for normal patient that doesn’t have any congenital problem or prolonged symptoms” ,to avoid any effect on normal bowel flora. In men, the treatment is usually for a week.

It’s better to give a drug that is concentrated in the urine such as: Nitrofurantoin “90% secreted in the urine”.

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		7
		or	As above	As above		
Symptoms for >7 days, recent urinary tract infection, age >65 yr, diabetes, diaphragm use	Oral	Fluoroquinolone			7	
		Amoxicillin	250	Every 8 hr		
		Cephalexin	500	Four times a day		
		Microcrystalline nitrofurantoin	100	Four times a day		
Pregnancy	Oral	TMP-SMX	160–800	Every 12 hr	7	
Men						
Healthy and <50 years old	Oral	TMP-SMX	160–800	Every 12 hr	7	
		or Fluoroquinolone	As above	As above		

● PYELONEPHRITIS “Killer ! 20% mortality”

- inflammation of the kidney and renal pelvis

- Signs and symptoms:

- **Chills** “patient comes with sensation of coldness although the weather is hot!”
- **Fever** “high grade”
- **Costovertebral angle tenderness (flank pain)** “an angle made by the vertebral column and the costal margin”. Renal capsule stretched out > very sensitive to any movement.
- GI: Abdominal pain “if the infection is so severe”, N/V and diarrhea.
- Gram -ve sepsis - mild flank pain
- Dysuria, frequency
- **Low BP > urosepsis > Shock ! • Tachycardia:** because of the pain and fever.

Investigations:

- ✓ **Urine C&S (culture & sensitivity):** +VE (80%)
the most common: **Enterobacteriaceae (E. coli)**, followed by **Enterococcus**
- ✓ **Urinalysis:** ↑ WBCs, RBCs, Bacteria, PH
- ✓ **Blood test for renal function:**
(±) ↑ serum Creatinine
- ✓ **CBC: Leukocytosis.**
- ✓ **Urine dipstick, microscopy:** To get rapid results
- ✓ **Imaging:** To rule out any possible obstruction
 - IVP (Intravenous Pyelogram) “Not done any more”
 - U/S
 - **CT** “frequently used nowadays”

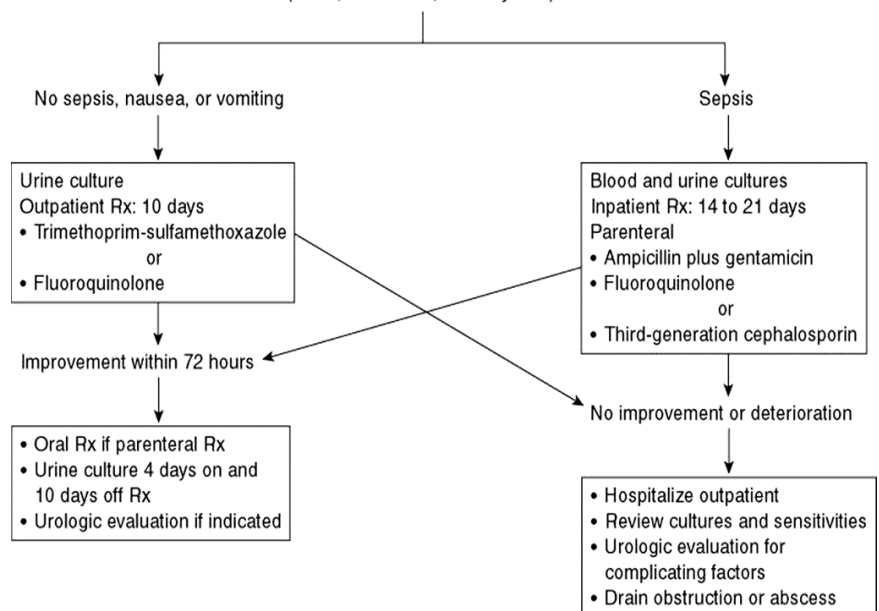
Note(s):

Pyelonephritis complicated by obstruction:

- Renal stones complicated by ovary cancer that is blocking the kidney; in this case, we have to drain kidney. We don't only give antibiotics b/c there is a collection of pus by putting the tube in the kidney “**Nephrostomy Tube**”, under local anesthesia > used in obstructive infective kidney especially if patient is very sick.
- **In U/S**, we will see hydronephrosis; dilated kidney.
- Another option: If patient is better than the first example, we can do “**Double J**”, which is a tube placed inside the ureter during surgery to ensure drainage of urine from the kidney into the bladder. Stent is temporary treatment to bypass the blockage > b/c if we manipulate the stones, the patient may have bacteremia and die.

Treatment

Symptoms and Signs of Pyelonephritis
(Fever, Flank Pain, Leukocytosis)

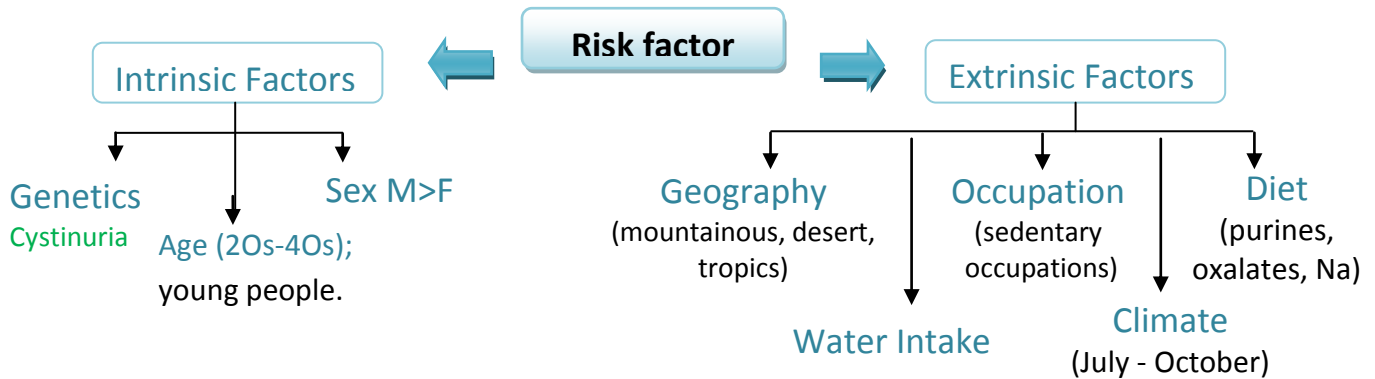


- If the patient is a pregnant woman having chills and fever, urine dipstick is + for pyuria and nitrate you should ADMIT HERE to avoid abortion or premature labor.
- If the patient comes with urosepsis, unable to take orally or old or diabetic > Admit him.
- If the patient is normal and his vital signs are stable, has fever & chills > give oral treatment, do urine culture, send him home and follow him up within 2 weeks. If he notices any dizziness or nausea he should come earlier.

2-UROLITHIASIS

The presence of calculi in the urinary system.

- Common disease in Saudi Arabia • Egyptian mummies 4800 BC
- Prevalence of 2% to 3% • Lifetime risk: Male : 20%, Female: 5-10%
- Recurrence rate 50% at 10 years “Now the incidence in females is increasing”



- How do stones form?

Supersaturated (patient doesn't drink enough water) → solute will concentrate → Crystal Growth.
Aggregation of crystals → stone.

- Most people have crystals in their urine, so why doesn't everyone get stones?

- Anatomic abnormalities.
- Modifiers of crystal formation: Inhibitors/promoters

Note(s):

Cystinuria is an autosomal recessive disease: So it affects children (it's hard to tell if a child is drinking water). And, in general, if not treated, it can lead to death b\c of the complications like renal failure. When you do transplantation for them: new kidneys > disease is gone.

Inhibitors	Promoters
<p>Citrate found in lemon, Mg, Urinary proteins (nephrocalcin)</p>	<ul style="list-style-type: none"> • Oxalate; is a promoter for stone formation such as: coffee, chocolate and soda drinks, except some of them which also contain citrate that will inhibit stone formation. • Sodium • Uric acid "red meat consumption"

Note(s):

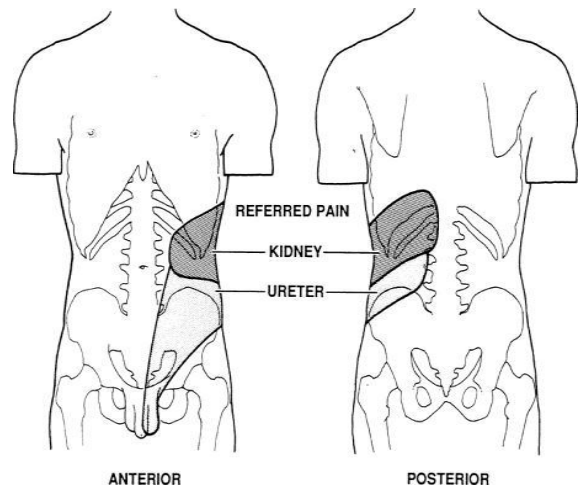
Anatomic abnormalities: Presence of certain abnormalities of the urinary tract like hydronephrosis or obstruction in the urinary tract leads to stasis (stoppage) of the urine and then the supersaturation of minerals that eventually leads to formation of stones. There are some organisms split urea and cause stones, E.coli doesn't split urea so you won't get infection stones. Pseudomonas can do.

Common stone types :

Calcium stones	Uric acid stones	Cystine stones	Struvite stones
<p>"most common" 75% (Ca Ox) calcium oxalate</p>	<p>uric acid is found in animal protein & it's the commonest cause of radiolucent kidney stones.</p>	<p>"least type" Cystine is an amino acid. Remember them by COLA: cystine, oxalate, lysine and arginine; the proximal tubules are unable to reabsorb these amino acids. All of them are water soluble <u>except Cystine, that's why it forms stones</u></p>	<p>Struvite stones form in response to an infection, such as a urinary tract infection*</p>

Signs and symptoms:

- Renal or ureteric colic
- Frequency, dysuria
- Hematuria
- GI symptoms: N/V, ileus, or diarrhea
- **Restless** :
 - ↑HR, ↑BP
 - Fever (If UTI)
 - Tender costovertebral angle



- Differential Dx:

- Gastroenteritis “more N/V”
- Acute appendicitis *
- Colitis
- Salpingitis “an infection and inflammation in the fallopian tubes”

- INVESTIGATIONS:

Urinalysis	• RBCs • WBCs • Bacteria • Crystals	
Imaging	Plain Abdominal Films (KUB);	It shows only radiopaque stones. “ pure uric acid stones can't be seen ”
	Intravenous Pyelogram (IVP);	“ Rarely used ”. It shows radiolucent (uric acid stone) & radiopaque stones (calcium stones) “ All Types ”.
	Ultrasonography (U/S);	“ Rarely used ”. It shows hyper-echoic stones + <u>acoustic shadow</u> .
	Computed Tomography (CT);	The gold standard ; most <u>sensitive and specific</u> & shows the radiolucent stones. So it's the first step .

Note(s):

Taking History of renal colic: You have to memorize the signs and symptoms.

Renal colic comes with flank pain. So you should ask about PAIN which has 8-10 questions that you should cover. And when you take Hx of renal colic, you should form some differentials for flank pain such as:

-If pain is worse with bowing and improves by lying down – **MSK pain**

-If the pain radiates to right or left lower quadrant – **Renal stone**

-Radiates to labia in women and to scrotum in men – **Renal stone**

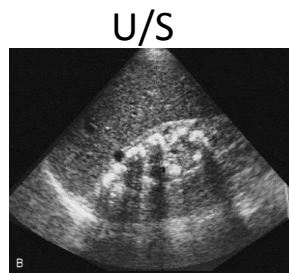
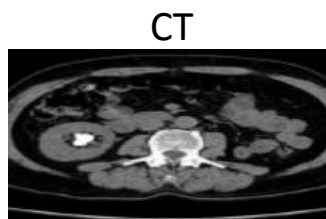
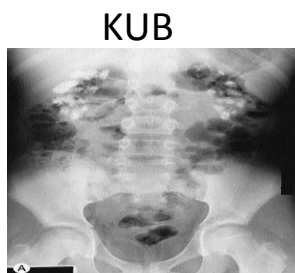
-Pain when coughing – **Cholecystitis**

-Pain with movement and goes to leg – **Prolapsed disk**.

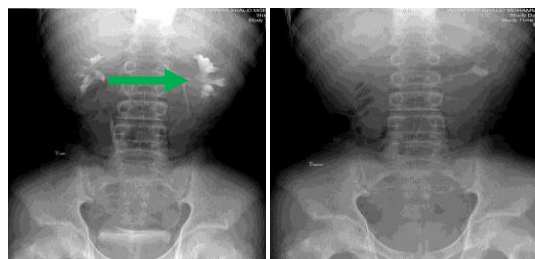
-If the pain comes after eating – **Cholecystitis** (and may also vomit)

-The pain is in the periumbilicus then goes to the right lower quadrant – **Appendicitis***

-Young married female with Hx of no period for 2 months – **Ectopic pregnancy**.



IVP



Hydronephrosis because of obstruction

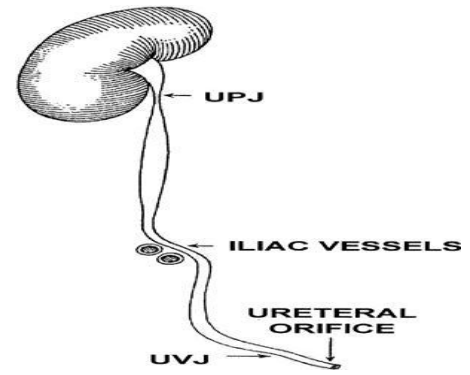
TREATMENT:

1- Conservative:

- Hydration
- Analgesia
- Antiemetics
- Stones (<5mm) >90% undergo spontaneous passage.

2-Indications for admission:

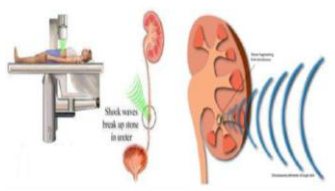
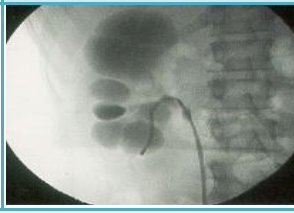
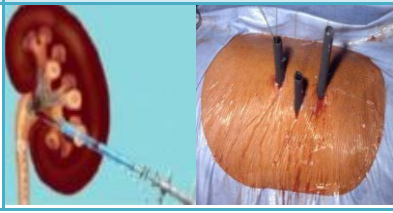
- Renal Impairment
- Refractory Pain
- Pyelonephritis; patient has 3 mm stones with fever and chills> pyelonephritis.
- Intractable "Hard to control" N/V; can't take oral analgesia.
- Solitary kidney (increase creatinine)
- High fever
- Coming to ER more than once



Note(s):

The 3 normal narrowings in the ureters:

- **UPJ:** Ureteropelvic Junction leads to stasis and hydronephrosis.
- **Iliac vessels.**
- **UVJ:** Ureterovesical Junction.

Shock Wave lithotripsy(SWL)	Ureteroscopy	Percutaneous Nephrolithotripsy (PNL)	Open surgery
Good for kidney stones and small stones ; potential injury to ovary .	Breaks up large stones by laser	For huge stones	Not used anymore.
			

3-VOIDING DYSFUNCTION

	Failure to Store	Failure to Empty
Bladder Problems	<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. • Hypersensitivity 	<ul style="list-style-type: none"> • Neurologic • Myogenic • Idiopathic
Outlet Problem	<ul style="list-style-type: none"> • Stress Incontinence: With pregnancies and deliveries, the pelvic wall muscles is gone (?), the support is gone so with a little increase in abdominal pressure> leakage • Sphincter Deficiency 	<ul style="list-style-type: none"> • Benign Prostatic Hyperplasia • Urethral Stricture <ul style="list-style-type: none"> • Sphincter Dyssynergia
Combination		

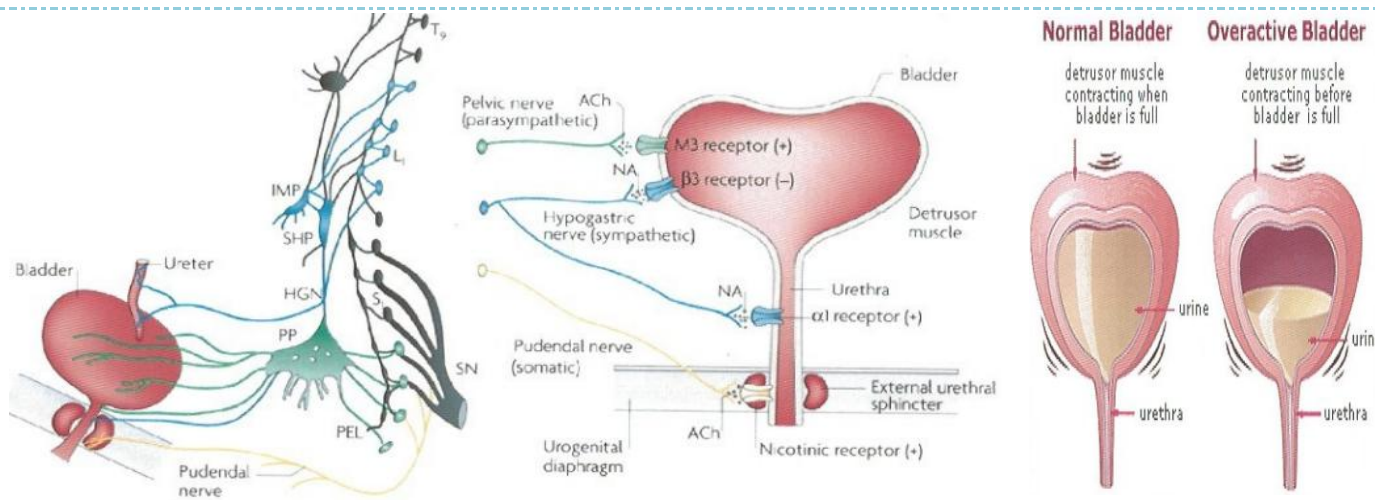
Note(s):

Urgency: severe distress when bladder wants to empty.

Urge incontinence: when urine actually leaks, patient has to wear pads.

Treatment:

- *fluid moderation
- *Give medication to decrease sensation of bladder.
- *Botox injection.



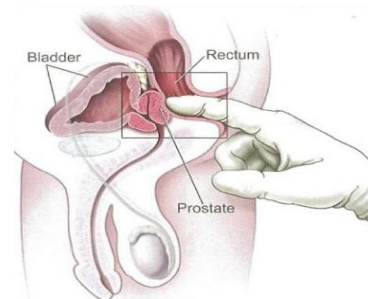
4- BENIGN PROSTATIC HYPERPLASIA

CLINICAL FEATURES

- LUTS (Irritative/Obstructive)
- Poor bladder emptying
- Urinary retention
- Urinary tract infection
- Hematuria
- Renal insufficiency

* PHYSICAL EXAMINATION :

- DRE (**Digital rectal Examination**): If it's hard to palpable the nodules, it means Cancer. **men > 50 should do rectal examination**
- Focused neurologic exam
- Prostate Ca "usually it's hard"
- Rectal Ca
- Anal tone
- Neurologic problems
- Abdomen: **Distended bladder** ⓘ



* INVESTIGATIONS:

1. Urinalysis, Culture (UTI - Hematuria)
2. Serum Creatinine
5. U/S (kidney, bladder and prostate).

3. Serum Prostate-Specific Antigen; it is elevated in prostatic cancer.

4. Flow rate "voiding in a machine to measure the flow rate". Usually women have a higher flow rate than men because of short urethra and no prostate.

* MANAGMENT:

Medical therapy		Surgical Rx	
<p>α-Adrenergic Blockers</p> <p>Selective α1 blocker that opens the prostate.</p> <ul style="list-style-type: none"> • Tamsulosin • Alfuzosin • Terazosin 	<p>AndrogenSuppression</p> <p>5α reductase inhibitor > shrinks prostate 60% in 6 months</p> <ul style="list-style-type: none"> • Finasteride 	<p>Endoscopic</p> <p>(e.g: Transurethral resection of the prostate TURP, laser ablation, prostatic stent); Cut adenoma that blocks the passage.</p>	<p>Open prostatectomy</p> <p>If the prostate is so big.</p>

EXTRA NOTES FROM EXTERNAL RESOURCES

From **Principles & Practice of Surgery** Davidson

Mechanism of stone formation

A solute dissolves in a solvent to form a solution but when the concentration of solute in solution reaches a certain level, termed the solubility product, the compound precipitates out to form crystals. This initial crystal formation (nucleation) may progress such that crystals clump together (aggregation) to form calculi. There are substances in urine that act to keep compounds in solution by inhibiting nucleation (inhibitors) but, above a certain concentration of solute, nucleation will occur despite their presence (formation product). Where the concentration of a compound lies between the solubility product and the formation product, being kept in solution solely by the action of inhibitors, it is described as being metastable. A solution with a concentration above the formation product is described as being supersaturated. The ability of urine to keep compounds in solution, and prevent calculus formation is a balance between forces keeping the solute in solution and those that promote nucleation. Therefore, stones form when the amount of solute increases (e.g. hypercalcaemia), the amount of solvent decreases (e.g. dehydration) or the concentration of inhibitors falls (e.g. decreased citrate excretion). Foreign bodies, anatomical abnormalities, and calculi can all act as a nidus for nucleation and promote further stone formation.

Types and causes of stone formation

The commonest stone types are; **calcium oxalate (85%)**, uric acid (10%), mixed calcium phosphate/calcium oxalate (10%), magnesium ammonium phosphate (5–15%) and cystine (1%). Calcium oxalate stones are commonly caused by hypercalcaemia, hypercalcaemia, hyperoxaluria or hypocitraturia. Uric acid stones are formed due to increases in uric acid formation either through gout or myeloproliferative disorders. Approximately 50% of patients with urate stones have gout but only 20% of patients with gout develop urate stones. Calcium phosphate stones are generally secondary to renal tubular acidosis. **Magnesium ammonium phosphate (struvite) stones are usually due to urinary tract infection by pathogens that can break urea down into CO₂ and ammonia**, thereby alkalinizing the urine.

Neurological control of micturition

Detrusor "a muscle in the wall of urinary bladder" contraction is mediated through cholinergic parasympathetic nerves arising from the nerve roots S2–S4, and relaying through ganglia lying predominantly within the detrusor. Sympathetic nerves arise from T10 to L2 and relay via the pelvic ganglia. Their exact role in the control of micturition is unclear. It is known that α -adrenergic receptors and their nerve terminals are found mainly in the smooth muscle of the bladder neck and proximal urethra. The α -receptors respond to noradrenaline (norepinephrine) by stimulating contraction, thereby maintaining closure of the bladder neck

EXTRA NOTES FROM EXTERNAL RESOURCES

From **Principles & Practice of Surgery** Davidson

The micturition cycle

The micturition cycle has two phases.

- **Storage (or filling) phase**

Due to the high compliance (elasticity) of the detrusor muscle, the bladder fills steadily without a rise in intravesical pressure. As urine volume increases, stretch receptors in the bladder wall are stimulated, resulting in reflex bladder relaxation and reflex increased sphincter tone. At three-quarters of bladder capacity, sensation produces a desire to void. Voluntary control is now exerted over the desire to void, which temporarily disappears. Compliance of the detrusor allows further increase in capacity until the next desire to void. Just how often this desire needs to be inhibited depends on many factors, not the least of which is finding a suitable place in which to void.

- **Emptying (or micturition) phase**

The act of micturition is initiated first by voluntary and then by reflex relaxation of the pelvic floor and distal sphincter mechanisms, followed by reflex detrusor contraction. These actions are coordinated by the pontine micturition centre. Intravesical pressure remains greater than urethral pressure until the bladder is empty.

The normal control of micturition requires coordinated reflex activity of autonomic and somatic nerves, as described above. These responses depend on normal anatomical structures and normal innervation. There are thus two main types of disorders of micturition: structural and neurogenic. Examples are extensive carcinoma of the prostate that has damaged the sphincter mechanism (structural), and spinal cord injury that has damaged the innervation (neurogenic).

Disorders of micturition - incontinence

Incontinence is defined as the involuntary leakage of urine. It may be due to problem in storage, resulting in urge and stress incontinence, or to problem in emptying, resulting in chronic retention with overflow incontinence.

In stress incontinence, leakage occurs because passive bladder pressure exceeds normal urethral pressure (due to poor pelvic floor or weak urethral sphincter). while in **urge incontinence**, leakage usually occurs because detrusor overactivity produces an increase in bladder pressure that overcomes the urethral sphincter.

Benign Prostatic Hyperplasia

Adenomas with an epithelial preponderance can grow to form large masses and have a characteristic rubbery consistency, referred to as **benign prostatic hyperplasia**.

Bladder diverticulum is Balloon-like growths on the bladder commonly associated with a chronic outflow obstruction like BPH, bladder diverticula empty poorly and are liable to **the three main complications of urinary stasis**: infection, stones, and tumour. with progressive inability to empty the bladder completely (chronic retention)

Clinical features may be due to obstruction (slow stream and hesitance) and those due to detrusor instability (urgency and urge incontinence).

Medical therapy is contraindication in patients who present with renal failure secondary to BPH; these patients should be managed either by long-term catheter or TURP.

Think !

1- A 36-year-old man presents to the emergency room with renal colic. A radiograph reveals a 1.5-cm stone. Which of the following statements regarding this disorder is correct?

- a. Conservative treatment including hydration and analgesics will not result in a satisfactory outcome.
- b. Serial kidney, ureter, bladder (KUB) radiographs should be used to follow this patient.
- c. The urinalysis will nearly always reveal microhematuria.
- d. When the acute event is correctly treated, this disease seldom recurs.
- e. Elevated BUN and creatinine are expected.

2- Which of the following statements regarding benign prostatic hyperplasia (BPH) is true?

- a. The fibrostromal proliferation of BPH occurs mainly in the outer portion of the gland.
- b. Assuming a voided volume greater than 100 mL, a peak urine flow rate of 30 mL/s or less is good evidence of outflow obstruction.
- c. Suprapubic prostatectomy for BPH involves enucleation of the entire prostate and eliminates the risk of future prostate cancer.
- d. Indications for surgery include acute urinary retention and recurrent urinary tract infections (UTIs).
- e. BPH is a risk factor for the development of prostatic cancer.

Answers:

1- The answer is a. Initial management should include hydration and analgesics. However, as the stone is larger than 1 cm, it is unlikely to pass spontaneously, though stones smaller than 0.5 cm usually do pass spontaneously. The size of the stone also makes a high-grade obstruction more likely; therefore an intravenous pyelogram (IVP) must be urgently performed. A high-grade obstruction will require nephrostomy or the passage of a ureteral stent. If the stone is completely occluding the lumen of the ureter, the urinalysis may not show microhematuria and thus may be misleading. Approximately 15% of patients have a recurrence within 1 year, and almost 50% may have a recurrence within 4 years. Elevated BUN and creatinine are expected only in the setting of an obstructed single functioning kidney.

2- The answer is d. In contrast to prostate cancer, BPH arises first in the periurethral prostate tissue as a fibrostromal proliferation. As the periurethral prostate grows, the outer prostate glands are compressed against the true prostatic capsule, which results in a thick pseudocapsule. As the prostate enlarges, it encroaches on the urethra and causes urinary outflow obstruction. Obstructive symptoms include decreased force of stream, hesitancy, recurrent UTIs, and occasionally acute urinary retention; the latter two are indications for surgery. Uroflow is the best noninvasive method of estimating the degree of outlet obstruction. Flow less than 10 mL/s is good evidence of significant obstruction. The major treatments for BPH are surgical. Simple prostatectomy involves shelling out the prostate adenoma and leaving the pseudocapsule (true prostate) behind. Therefore, these patients are still at risk of developing prostate cancer although BPH in and of itself is not a risk factor for prostatic cancer.

Questions:

1- 13-year old boy presented to the Emergency Room with painful right scrotal swelling. It was gradual in onset over the last 5 days. He gave history of dysuria and suprapubic pain for the last 2 weeks. The most common cause of his symptoms is:

- a. Epididymitis
- b. Hydrocele
- c. Testicular Torsion
- d. Testicular Trauma

2. A 22-year old single male presented with dysuria and urethral discharge, 5 days after unprotected intercourse. On examination, there is erythema over his urethral meatus with yellowish discharge. The most likely causative organism for his presentation is:

- a. Chlamydia trachomatis
- b. Escherichia coli
- c. Herpes simplex virus
- d. Neisseria gonorrhoea

3. A 65-year old diabetic woman presented with right flank pain and fever for 2 days. She has been complaining of dysuria and suprapubic pain for more than one week. She is nauseated and had 3 episodes of vomiting. The most likely diagnosis is:

- a. Acute cholecystitis
- b. Acute pyelonephritis
- c. Pancreatitis
- d. Renal colic

4. Irritative urinary tract symptoms include all of the following except:

- a. Dysuria
- b. Hesitancy
- c. Frequency
- d. Urgency

5. Main causative organism for UTI is:

- a. E. Coli
- b. Chlamydia
- c. Proteus
- d. Gonorrhoea

6. The main symptoms of pyelonephritis are:

- a. Fever
- b. Flank pain
- c. Chills
- d. All of the above

7. The most common type of urinary tract stones is:

- a. Calcium stones
- b. Uric acid stones
- c. Cystine stones
- d. Struvite stones

8. All of the following are true about epididymitis except:

- a. It takes days or weeks to develop
- b. It can be diagnosed by US
- c. Dysuria and pain are the main complaints
- d. Testicular scan reveals ischemia of the testicles.

Answers Key:

1- a 2- d 3- b 4- b 5- a 6- d 7- a 8- d