

Radiology of Urinary System Disorders

Color Index:

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objectives:

- To know the principle disease entities of the urinary system organs and how they look in imaging.
- To correlate the clinical manifestations with radiological images

Sources

Lecturer:



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Same 436 lecture Slides:

YES + extra IMPORTANT slides

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Urinary Diseases:

- Renal Colic.
- Infections.
- Urosepsis.
- Masses.
- Renal Failure.
- Trauma.

Renal Colic:

- Caused by renal calculi.
- **Classic presentation** (if the calculus is obstructing the urinary tract the following symptoms will appear):
 - **sudden onset of severe flank pain.**
 - **Radiating inferiorly and anteriorly to groin area**
 - **+/- nausea and vomiting.**
- Diagnosis often made clinically.
- **Imaging: to confirm and evaluate calculi.**

The common sites for stone obstruction:

- 1) **Ureteropelvic junction.**
- 2) **Cross of iliac artery.**
- 3) **Vesicoureteral junction.**

Questions to ask:

- Are urinary stones present? If so, what is the level and size?

Depending on the size the management will be different either conservative (medically) or interventional (surgery).

- Are obstructions present? If so, what is the level and severity?

Severity: is it completely occluding the ureter and causing severe hydronephrosis? (we can see it on US and CT). If yes, it can cause severe sepsis which is fatal if it's ignored.

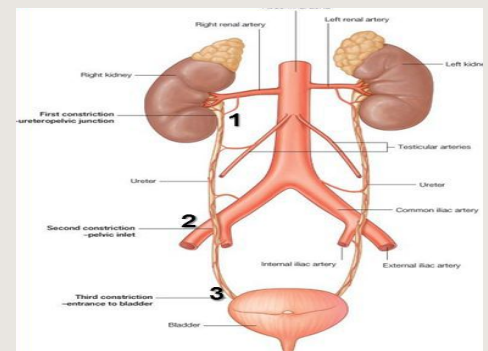
- Is urgent intervention required? Think about intervention if the patient have the following symptoms:

Factors include:

1. **Urosepsis** (increased creatinine - hyperkalemia, it must be treated fast to prevent septic shock).
2. **Solitary kidney** (should be treated fast and taken seriously because the patient have only one kidney and you want to save it to save the patient's renal function).
3. **Severe pain** not respond to analgesics.

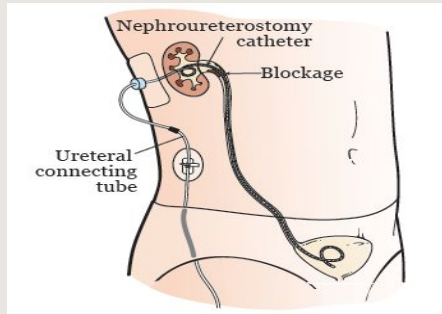
This pain has been described by the patient as the most excruciating pain ever felt. The experienced ER physician could diagnose it just from the first moment after seeing the patient.

- Small, non obstructing or staghorn calculi may be asymptomatic or cause mild to moderate symptoms which are tolerable.

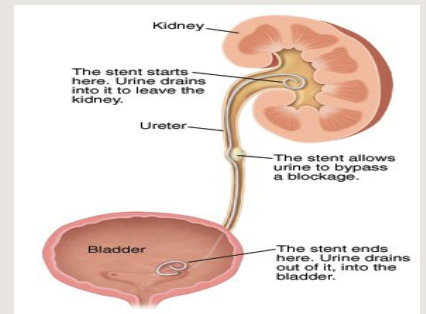


Treatment:

- Percutaneous nephrostomy.
- insertion of a catheter through the skin and into the renal pelvis
- Ureteric stent.



Percutaneous nephrostomy



Ureteric stent

If there is obstruction we need to relieve this obstruction. For example; if there is renal obstruction like a mass or a calculus we need to remove it, how? We go percutaneously and 1- by fluoroscopy guidance we insert nephrostomy catheter so the hydronephrosis will be relieved. or 2- by ureteric stent where we can go percutaneously through nephrostomy under fluoroscopic guidance and put JJ stent (it has J shape on the upper and lower ends, the first J will be fixed on the bladder and the other J will be fixed on renal pelvis) or we can put the ureteric stent by cystoscopy.

Renal Colic (cont') :



KUB: to assess total stone burden, size, shape, location
Often US or CT is required in conjunction.

Left radiopaque opacity, and it is about 9 mm or 1 cm.
(is it on the pelvis, mid ureter, bladder?)



Radiolucent renal stones are not seen in case of uric acid stones.
Here you only see the bowel gas (air=black).



Here in the IVP we see filling defect due to mild obstruction and dilation of the superior calyces (arrow) but middle and inferior calyces are normal.

Bladder Calculi:



Multiple radiopaque opacities in the bladder.
An example of bladder calculi in KUB

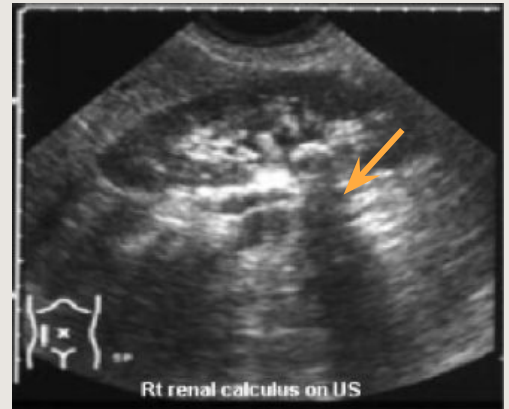
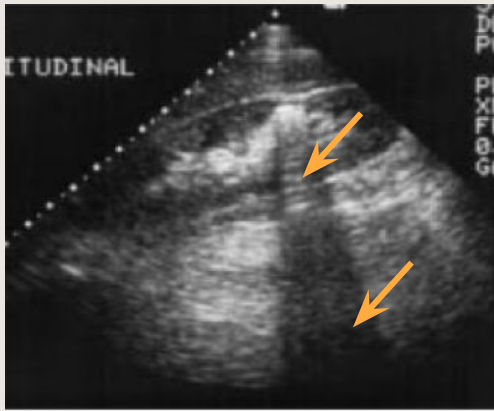


In US: hyperechogenic structure (stone) with shadow behind

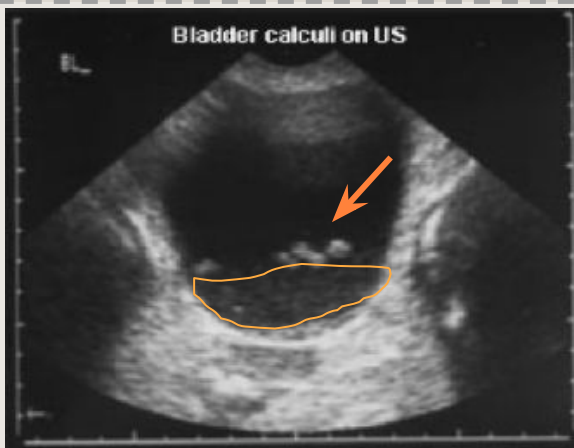


In CT: axial section; multiple bladder stones

Renal Calculus (US) :

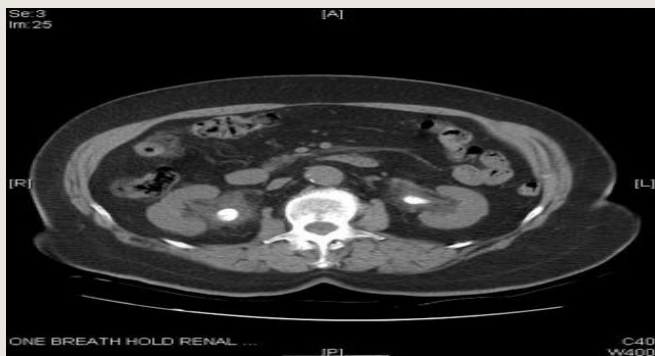


Renal stones in US (hyperechoic structure) with a shadow behind.
The shadow is important because we can't say it's stone without the shadow.
(no obstruction = no dilation)



- Bladder stone with some turbulent urine that could be infected.
- Stones will appear white, The reason of the absence of shadow is (the urine in the bladder is dark and the shadow is dark).
- Fluid (urine) will appear black (it appears grey instead of black because it is turbid due to inflammation).

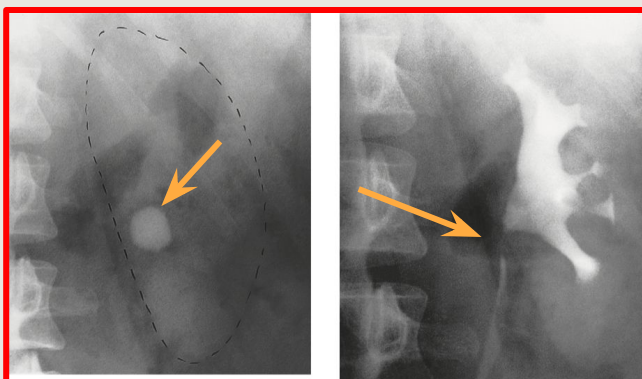
Renal Calculus (CT) :



Bilateral multiple hyperdense structure (stone) with some dilation which means there is obstruction



Non obstructive renal stone with no dilation of renal calyceal system "pelvicalyceal"



- A rounded calcification is seen overlying the left kidney in the anteroposterior plain film.
- Post contrast film in the same patient. As the contrast medium and the calculus have the same radiographic density, the calculus is hidden by the contrast medium.

Renal Calculus :

Causes of dilated calyces:

important

Due to obstruction, with dilatation down to a specific point of hold-up

Within the lumen

- Calculus
- Blood clot
- Sloughed papilla

Within the wall of the collecting system

- Intrinsic pelviureteric junction obstruction
- Transitional cell tumour
- Infective stricture (e.g. tuberculosis or schistosomiasis)

Extrinsic compression

- Retroperitoneal fibrosis
- Pelvic tumors, e.g. cervical, ovarian or rectal carcinoma
- Aberrant renal artery or retrocaval ureter

Due to papillary atrophy or destruction

- Reflux nephropathy
- Papillary necrosis
- Tuberculosis

Infections:

1. Acute Pyelonephritis:

- Acute pyelonephritis is a sudden and severe kidney infection. It causes the kidneys to swell and may permanently damage them. Pyelonephritis can be life-threatening.
- Life threatening infection & medical emergency it can cause urosepsis and septic shock.
- Bacteria can be sent through lower urinary tract (ascending upper urinary tract infection).
- Early diagnosis and management has significant impact on patient outcome.
- Risk factor: obstruction, diabetes, obesity, female anatomy (short urethra).
- Presentation: (Fever, loin pain, nausea/vomiting, sometimes microscopic hematuria).
- Pregnant women are more prone to acute pyelonephritis, why? because they have short urethra.
- The diagnosis of pyelonephritis is based on clinical diagnosis but we do CT just to confirm the diagnosis and to exclude other diseases.
- In case of Acute Pyelonephritis, the functions of the kidney are decreased; that's why it doesn't take the contrast and we can confirm that the patient has pyelonephritis. The correlation always with clinical picture will rule out other infections.



the changes in the hormones slows the flow of the urine, as a result, bacteria have more time to grow in the urine before being flushed out. Also, as the uterus grows, the increased weight can block the flow of urine from the bladder, causing an infection.

CT with contrast injection
pyelonephritis

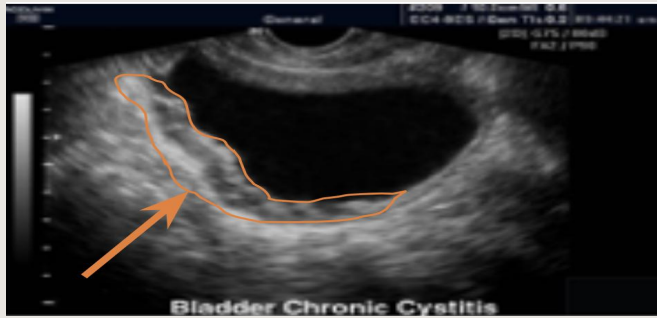
Wedge shape hypoperfused lesion
and the kidney is enlarged.

Why there is hypoperfused area?
because the the kidney is sub-functional
doesn't take the contrast like the normal
kidney.

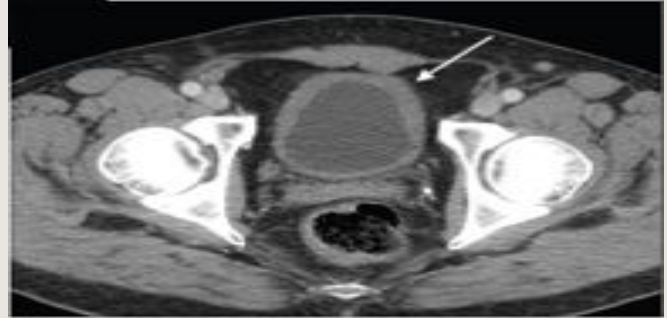
Infections:

2. Cystitis:

- Presentation: (Fever, suprapubic pain, frequent urination, sometimes hematuria, dysuria, need to urinate even if there is no urine in the bladder).
- As upper UTI, more common in females because of short urethra.
- E-coli is the most common causative organism.



Thick urinary bladder wall normally it's 3mm here it's 6-7mm

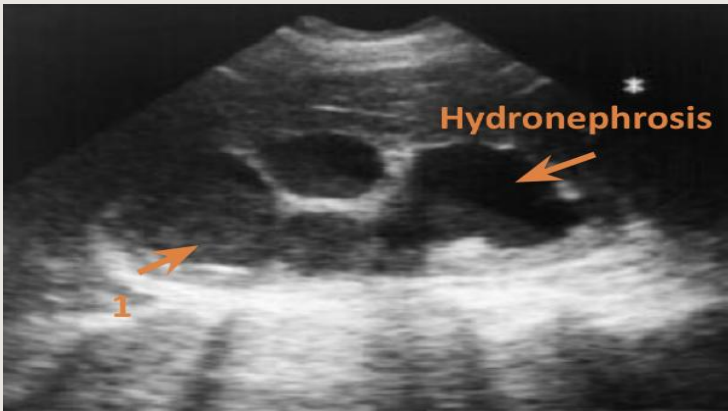


Thick regular (well circumscribed) urinary bladder wall with infection. If there is irregular focal thickening we suspect tumor

Urosepsis:

- sepsis from obstruction of infected urine.
- Risk factors: if the UTI left untreated and immunocompromised patients.
- Establish a clinical diagnosis (you need to know where did the infection came from): Pyelonephritis, cystitis, prostatitis.
- Urosepsis and obstructed ureter is **urologic emergency!** (If the obstruction is causing persistent dilatation, it can lead to urosepsis which is an emergency case).
- Renal US is performed to rule out :
 - 1) Renal obstruction (need to be removed immediately). Obstruction in US (we see dilatation). How to rule out renal obstruction? by checking for hydronephrosis which appears as dilatation on ultrasound.
 - 2) Renal or perirenal abscess (need to be drained).

Urosepsis(cont`):



Left pyonephrosis

Pyo=pus, nephrons=kidney. So it's an infection of kidneys' collecting system. We see severe dilated pelvic calyces with echogenic content which should be black., but here the echogenicity (not completely black) means there is pus (1) "calciuric sepsis". Also there is severe obstruction and it seems like long-standing that's why it is sepsis.



right UPJ stone
causing
hydronephrosis

UPJ = ureteropelvic
junction.

Labels:

1- Stone.

2- Hydronephrosis
hydroureter.

Renal Masses:

- Most solitary renal masses are either:

- 1) malignant tumor
- 2) simple cyst

- In adult, a malignant tumor is almost certain to be a renal cell carcinoma (RCC) whereas in young children it is usually Wilm's tumor

- Other causes of renal mass include: renal abscess, benign tumor (Oncocytoma, angiomyolipoma), metastasis

-Multiple renal masses include:

- Multiple simple cysts
- Polycystic disease
- Malignant lymphoma
- Metastases
- Inflammatory masses

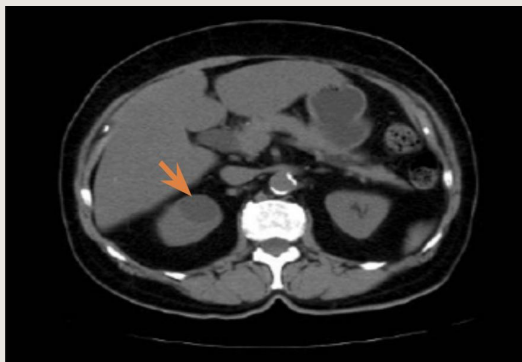
Renal Masses (cont')

a. Approach to renal mass:

- Most renal masses are simple cysts and we find them by coincidence when we do the US for other reasons.
- Use the US to characterize the mass.
- 1) Simple cyst: **STOP** don't do anything it's completely benign, unless it causes compression symptoms we will drain it. The best way to diagnose it is ultrasound and CT.
- 2) Solid mass or atypical cyst: **CT with contrast**.
 - US and CT characterize > 90% of masses > 1.5 cm
 - In CT if there is renal or liver mass < 1.5 cm it's difficult to characterize.
 - Biopsy is rarely warranted. We can diagnose it with CT (CT + US is enough for diagnosis unless the mass is small).
- Solid mass in the kidney is always suspicious (mostly malignant).

b. Renal Cysts:

- US will determine if the lesion is cystic or solid, There are two types of cysts:
- 1) Simple cyst: **Important**
 - Spherical, regular.
 - **Echo-free** in US= anechogenic structure inside = black.
 - Fluid collection within a thin surrounding wall (no thickening, no calcification, no septation).
 - Will show good sound wave transmission.
- 2) Complicated cyst:
 - Will show the presence of echoes within the cyst it's not only a simple fluid.
 - Will have thick wall.
 - And /or calcification in the wall.



Spherical rounded region. If we measure the density of the content it will be fluid the wall is not thick, no calcification, so it is simple cyst.

Simple Cyst
Fluid inside the cyst

Left renal mass on IVP
IVP showing mass in the kidney (the contrast doesn't look organized) we don't know whether it is cystic or solid.

Renal Masses (cont')

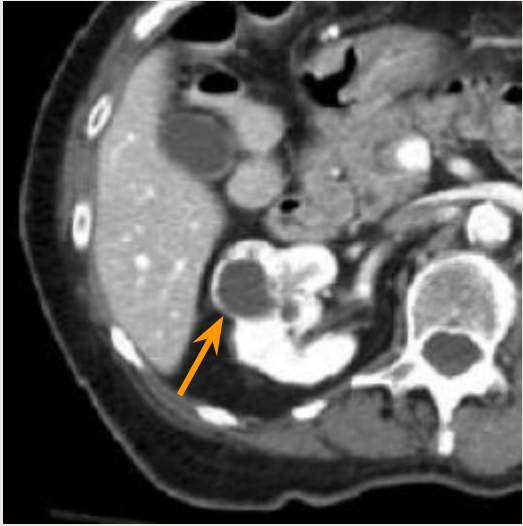
C. Renal Carcinoma:

If US indicates that the mass is solid, **we must do CT with contrast** that can characterize the tumor in greater details: delineate extent, show;

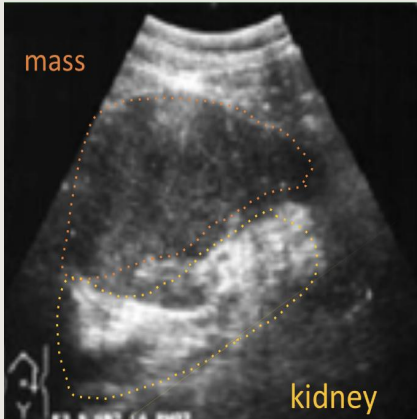
- 1) Degree of the vascularity.
- 2) Relationship with other organs.
- 3) Presence/absence of the necrotic tissue center.
- 4) Presence/absence of local invasion of adjacent structures "renal vein or IVC".

*If the patient with renal failure we should hydrate the patient and he must undergo dialysis after the procedure.

PIC: exophytic renal mass with cystic content.



The lesion is exophytic the wall is thickened wall which is enhanced by the contrast



- Distortion of left Pelvicalyceal System in IVP. because usually patient presents with hematuria. we don't see the contrast The right kidney is normal.

- Solid left renal mass in a patient with micro hematuria.
- US shows echogenic structure in the left kidney with hypoechoic on the center.
- CT with contrast shows in left kidney a mass with cystic content, and thick irregular wall enhanced with contrast. This is "malignant" renal cell carcinoma, patient presents with microhematuria.

Renal Masses (cont')

D. Renal adenocarcinoma:

- 90% of all renal malignancies.
- 15-30% metastatic at diagnosis. It has good prognosis if discovered in (stage 1), 5 years survival rate is more than 80%.
- Hematogenous and lymphatic spread, the first thing you should look for in case of carcinoma look for the regional lymph nodes to exclude metastasis, because any metastasis starts with lymph nodes.
- 10% have venous invasion (renal vein or IVC).

Treatment:

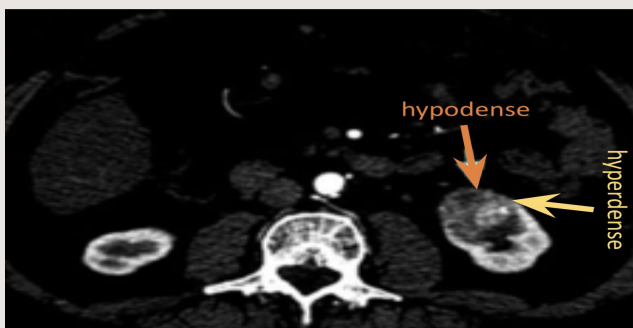
- 1) Radical Nephrectomy (mostly it's the treatment of choice).
- 2) Partial Nephrectomy.

Appropriate imaging workup: After we discover renal cell carcinoma we should do work up to see if there is metastasis.

- Chest X-ray: pulmonary metastases or (Pulmonary CT is more accurate).
- CT abdomen: local invasion, lymphadenopathy, venous extension.
- MRI abdomen: renal failure, Contrast allergy. MRI is used if the patient is allergic to the contrast or have renal failure.

70 y/o female presented with painless hematuria:

she is old + painless hematuria (we don't take this easy, think of malignancy)



Upper pole malignant mass lesion of the Left anterior part of the Kidney with heterogeneous enhancement (some area taking contrast other area doesn't)



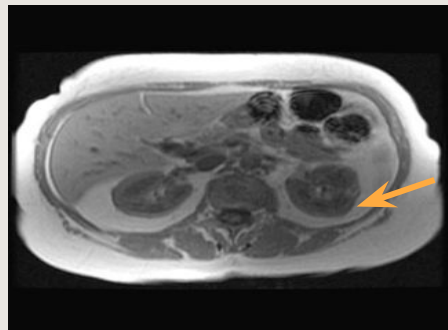
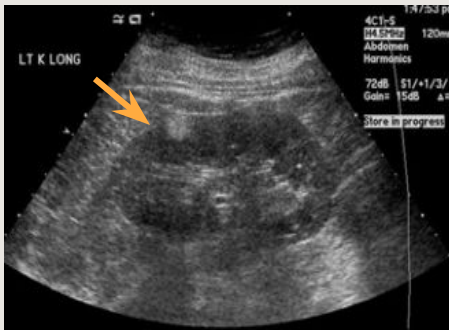
On the coronal view we see a heterogeneous with enhanced part in lower pole so this is:

- * Renal cell carcinoma.
- * No invasion.
- * Some effective mass on the left psoas.

Renal Masses (cont'):

E. Renal Angiomyolipoma:

- Benign hamartomatous tumor composed of **fat**, smooth muscle and vessels.
- Angio= vessels, myo= muscle, lipo= fat & oma= benign tumor. **if we can determine the fat in renal lesion we can say this is Angiomyolipoma.**
- Usually asymptomatic.
- Occasionally present with **retroperitoneal hemorrhage** when large or multiple **and we have to embolize it to control this hemorrhage.**
- Embolization is a minimally invasive treatment that occludes, or blocks, one or more blood vessels or vascular channels of malformations (abnormalities).
- **Fat detected in 96% by CT** and ultrasound (usually do not need surgical intervention).
- diagnostic key to angiomyolipoma is detection of fat surrounding the kidney.



Example of angiomyolipoma in US: hyperechogenic cortical rounded regular structure which is **fatty** (fat is hyperechoic)

MRI: hypersignal lesion

CT: Hypodense lesion (so contains fat) of the left kidney on the cortex

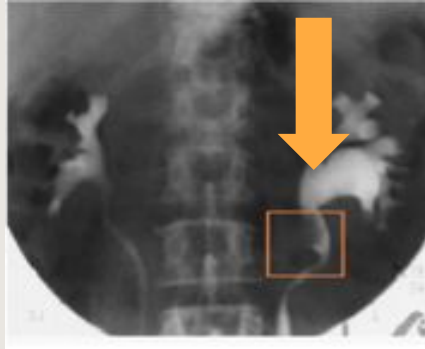
F. Transitional Cells Carcinoma (TCC):

- Most common malignancy of ureter and bladder.
- <10% of renal malignancies.
- Typically present with **gross hematuria.**
- CT for staging and surgical planning.
- Treatment: radical nephrectomy.

Renal Masses (cont')

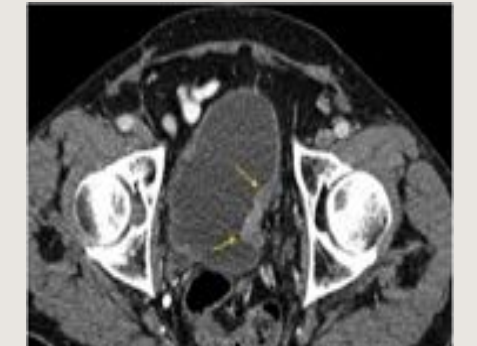
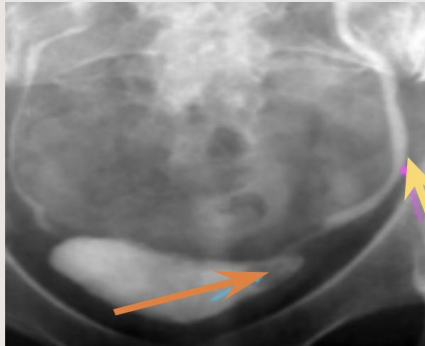
IVP shows distortion of part of the ureter with ureteropelvic junction obstruction and dilatation. TCC was discovered here in left proximal ureter as filling defect.

We did IVP and we saw the right kidney is ok but on the left kidney we can see ureteropelvic junction obstruction and dilatation, so we inject the contrast retrograde and we saw there is filling defect in left proximal ureter, so this is Transitional Cells Carcinoma.



IVP (left radiograph) and retrograde pyelogram (right radiograph) TCC proximal left ureter

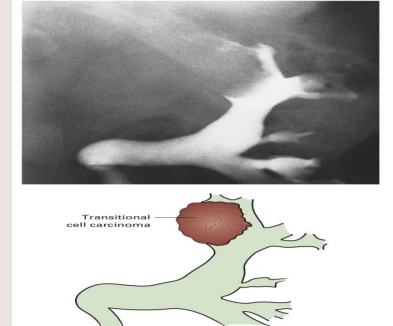
Irregular TCC at the ureteropelvic junction



CT + contrast in the excretion phase
Large TCC on the right renal pelvis seen as filling defect (the arrow) of proximal ureter, the contrast in the collecting system

- Small TCC of bladder in patient with hematuria.
- Small bladder mass with dilatation of the ureter.

Irregular thickening (malignant)



Filling defect which suggests TCC

Filling defect which suggests TCC

P.S. if we suspect renal cancer it is better to do CT with contrast in excretory phase (8-10 min after the IV contrast injection) to see the contrast in the collecting system.

Renal Failure:

Acute and Chronic Renal Failure:

- Clinical categories:

- Prerenal (dehydration, shock, cardiac failure).
- Renal (parenchyma, diabetes, GN, drugs, renovascular e.g. renal stenosis, renal thrombosis).
- Postrenal (obstruction, by chronic mass or chronic stone or malignancy) the only thing we can see on US is small kidney, undifferentiated kidney thin cortex, corticomedullary undifferentiation which are signs for non-functional kidney.

- IV contrast **contraindicated** if creatinine >200 mmol/dl or the clearance is less than 30 ml/min. Sometimes if patient is 90 years old they should be careful when they give the contrast because may develop renal failure so we should do dialysis after the contrast and hydrate very well and give HCO₃ to protect the kidney.

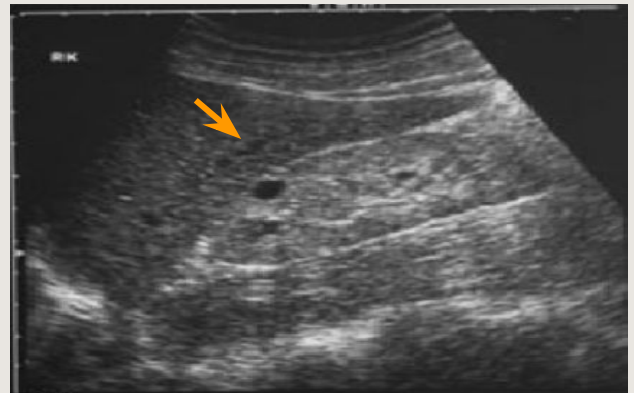
- Use US to assess:

- Renal size (with chronic renal failure the kidney is atrophic & thinning in the cortex).
- Parenchymal thickness (no differentiate between the cortex and the medulla (sometimes it gives indirect sign for non-functioning kidney)).
- US guided renal biopsy to establish diagnosis by taking part of the kidney with biopsy needle percutaneously under ultrasound guidance.



Hydronephrosis post-renal

- Acute, surgically treated.
- Post-renal obstruction will lead to renal failure, and since there is dilation, it means there is obstruction which is a post renal cause.



- No differentiation between the cortex and medulla (Undifferentiated kidney = non functioning kidney).
- The arrow is pointing at a simple cyst.
- Medical renal disease (not surgical, treat underlying disease e.g. DM, HTN, glomerulonephritis, congenital disease...).

Acute

- Kidney is enlarged in size.
- Oedematous.
- Obstruction.

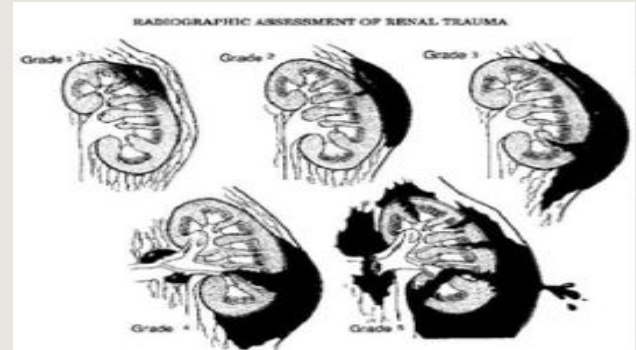
Chronic

- Kidney is small in size.
- No darkness in the cortex.
- Bright echo pattern.
- cysts can be seen.

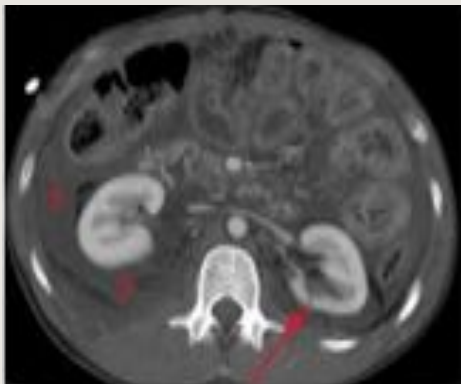
GU Trauma:

Penetrating Trauma (gunshot, stab):

- Unstable? do surgery or angiography (if there is extravasation of contrast we should embolize).
- Stable? do CT with contrast (used to grade the trauma).



Grade 1	Hematoma, only contusion (a bruise) of the kidney.
Grade 2	Hematoma enter cortex, laceration in the cortex <1cm.
Grade 3	>1 cm but not extending into collecting system.
Grade 4	- Extend to renal pelvis. - Extending to the collecting duct the patient will have severe hematuria.
Grade 5	Shattered kidney completely around the kidney.



Grade 1-2 injury
Filling defect means less than 1 cm laceration.



Grade 3 injury
Not extending to the collecting system, hypodense non enhanced area in patient with trauma history.



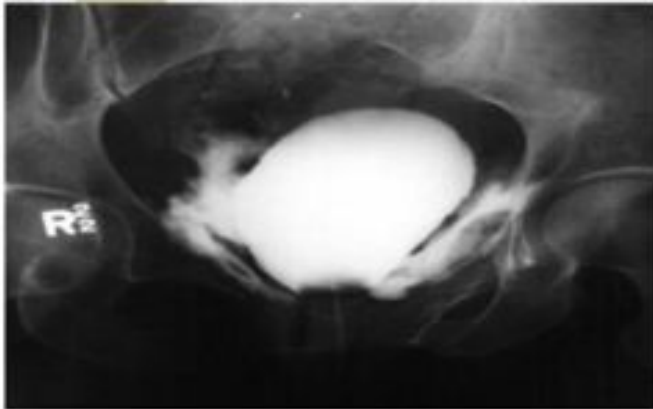
Grade 4 injury
Deep laceration with perirenal hemorrhage, injury extends to the collecting system and there is perirenal hemorrhage and hematoma.



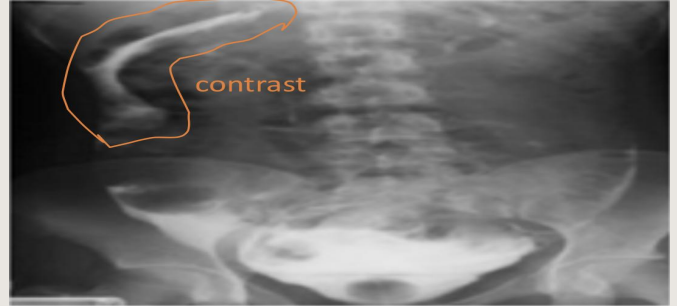
Grade 5 injury
Thrombosed renal artery In CT scan, the kidney is non enhanced at all, there is thrombosis of the right renal artery which completely cut down. In angiography, we don't see the right kidney at all.

Bladder Injury:

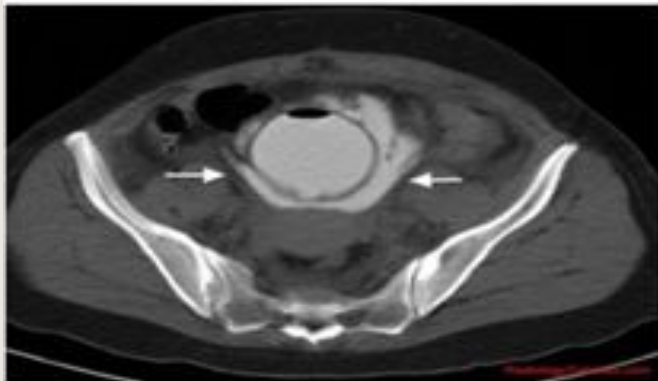
Bladder injury is either extraperitoneal or intraperitoneal. In trauma patient we see blood at urethral meatus we should do retrograde cystography "Inject contrast by retrograde catheter" then can see whether the contrast extra or intra peritoneal.



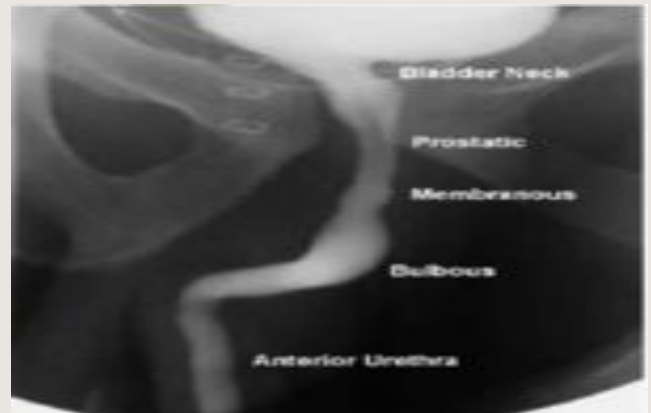
Extraperitoneal bladder rupture
Just apply catheter to drain, until the body heals the injury.



Intraperitoneal bladder rupture
- Surgical management.
- Intraperitoneal we see the contrast over the peritoneum and intraperitoneal bladder rupture usually in pediatric age group when bladder still in the abdomen.



CT showing bladder injury with contrast all over Around the bladder and this is extraperitoneal so its limited



Normal retrograde urethrogram
We see all parts of urethra



Traumatic rupture of bulbous urethra
The contrast drained out of the urethra (extravasation of the contrast)

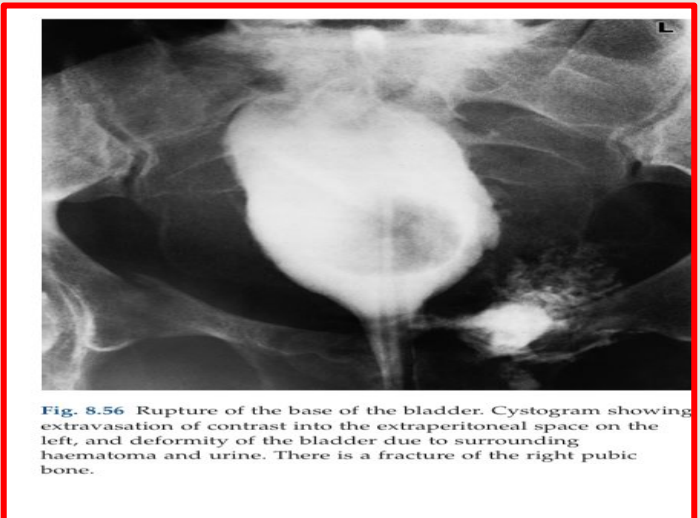


Fig. 8.56 Rupture of the base of the bladder. Cystogram showing extravasation of contrast into the extraperitoneal space on the left, and deformity of the bladder due to surrounding haematoma and urine. There is a fracture of the right pubic bone.

Spot Diagnosis:

Ultrasound:



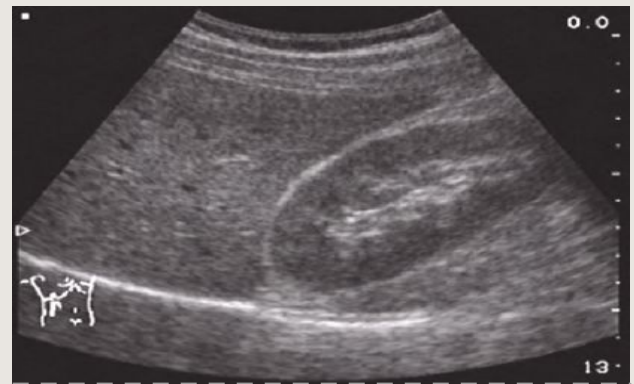
Normal



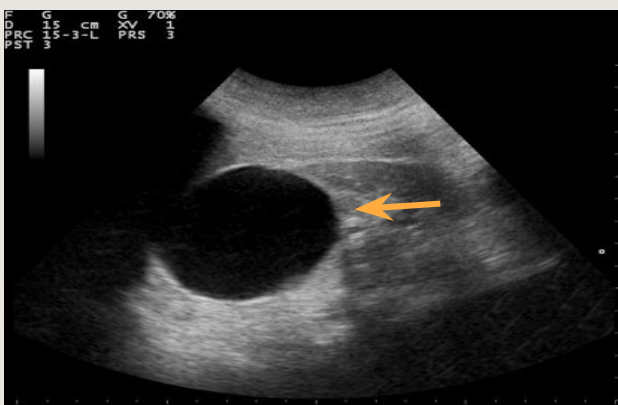
Normal



Normal



Normal



Simple cyst thin wall

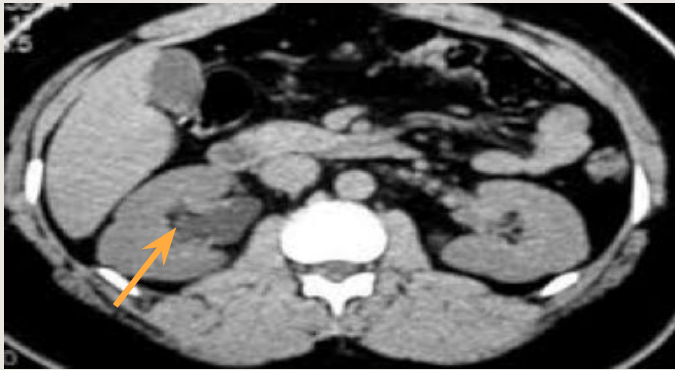


Stone with shadow
non-obstructive (if there is
obstruction the calyces will be
dilated and anechoic 'black')

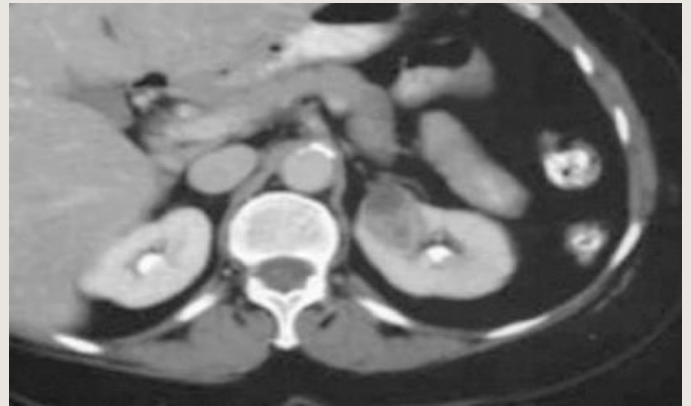


Normal filled bladder
Anechoic (black) content, not turbid
urine, regular walls, no thickening,
no mass, no diverticula

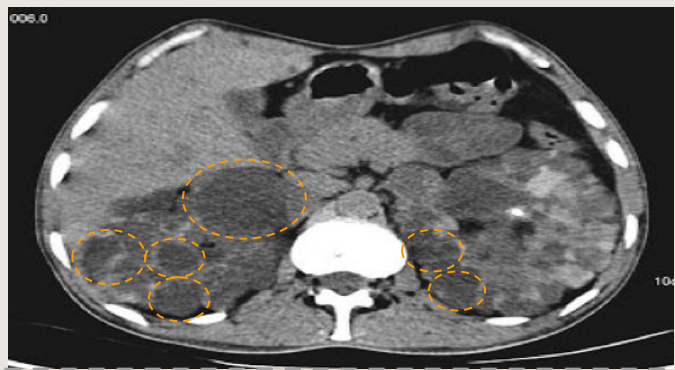
CT Scan:



Dilated calyces hydronephrosis on the right kidney



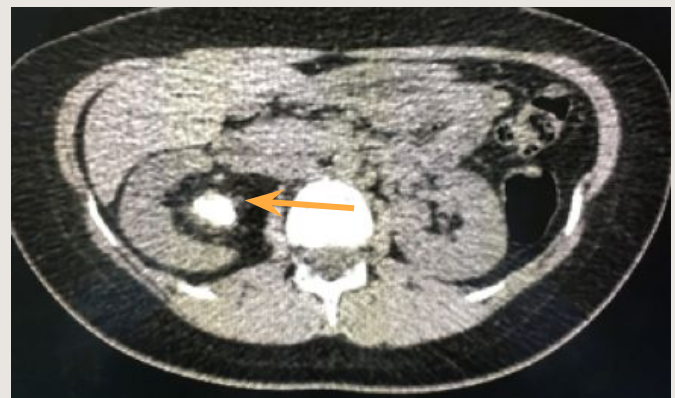
Mass



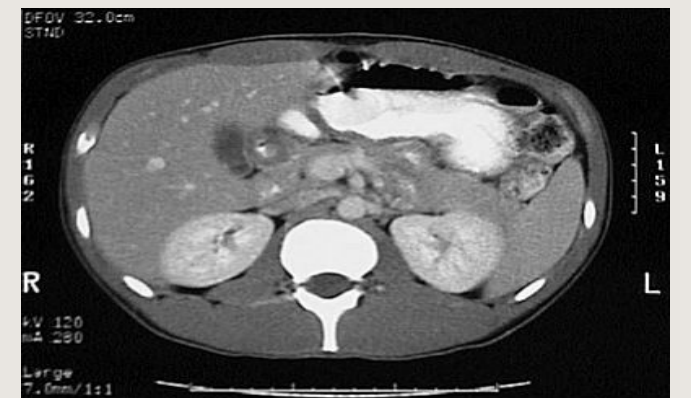
Polycystic kidney disease (multiple cysts, enlarged kidney)



Normal



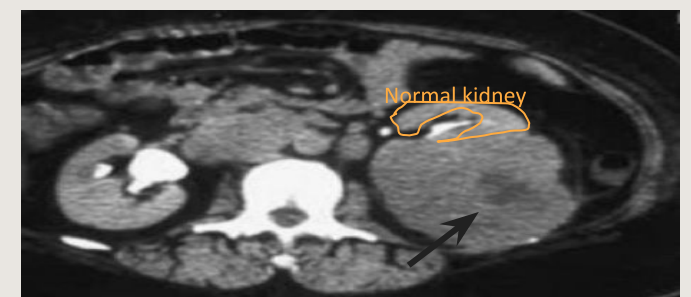
Stone



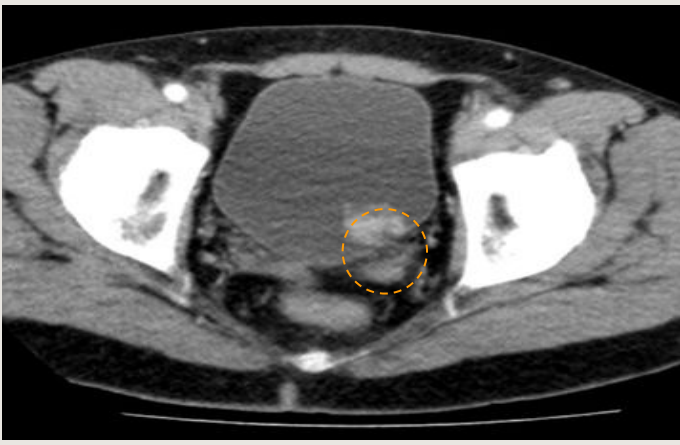
Normal



Horseshoe kidney



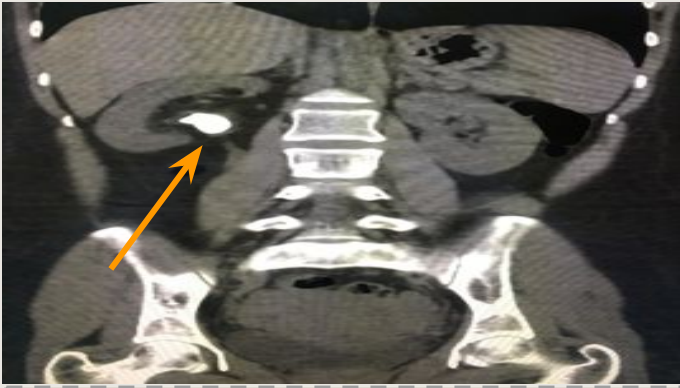
Left renal mass irregular border with necrosis on the center, hypodense and heterogeneously enhanced by contrast, most likely renal cell carcinoma



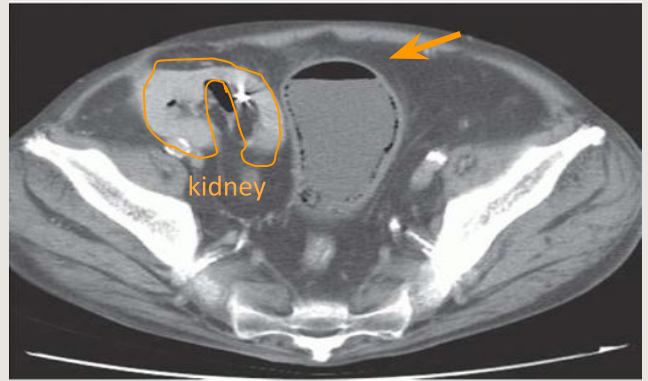
Mass lesion in the bladder



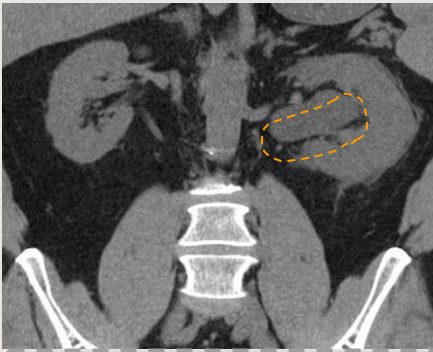
Normal
Regular wall, no masses



Non-obstructive kidney stone



- Regular thickening wall.
- Emphysematous cystitis (the black area between fluid and the wall).



Hydronephrosis on the left kidney and enlarged kidney with fat stranding around, so this could be long standing obstruction.



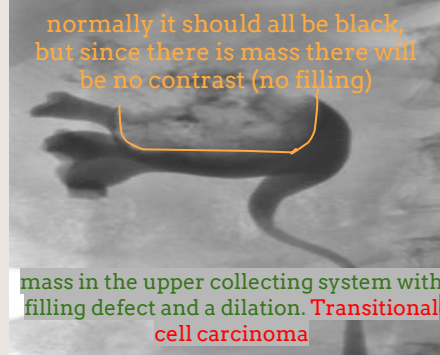
Normal (good differentiation between cortex and medulla)



Simple cyst with enhanced CT (you can differentiate between the cortex and the medulla of the kidney + the aorta looks white and IVC looks grey)



KUP



normally it should all be black, but since there is mass there will be no contrast (no filling)
mass in the upper collecting system with filling defect and a dilation. Transitional cell carcinoma

IVP



3D reconstruction CT
Mild dilation of pelvicalyceal system (hydronephrosis)

Renal calculi

- the diagnosis of renal calculi is often made clinically, common symptoms of renal calculi include: sudden onset of flank pain radiating to the ipsilateral groin and sometimes associated with hematuria, nausea and vomiting.
- the diagnosis of renal calculi is confirmed and evaluated using various imaging techniques (KUB, CT, US)
- Renal calculi can be radiopaque (visible on x-ray and CT) or radiolucent (invisible)

Infections

1- Acute pyelonephritis

- Mainly due to an ascending bacterial infection (eg. E.coli, enterococcus and proteus)
- Individuals are usually presented with fever, loin pain, nausea and vomiting.
- On CT with contrast a wedge shaped hypoperfused lesion is seen in acute pyelonephritis.

2- Cystitis

- Infection of the urinary bladder. symptoms include fever, suprapubic pain and polyuria.
- More common in females
- The wall of urinary bladder is thick and regular on CT and US

3- Urosepsis

- Urosepsis: sepsis due to UTI
- Renal US is performed to rule out renal obstruction or renal/perirenal abscess.

Acute and chronic renal failure

- 1) Prerenal (Renal hypoperfusion)
 - 2) Renal (GN, ATN, AIN, Diabetes.. etc)
 - 3) Postrenal (Obstruction of urine outflow)
- IV contrast is contraindicated if creatinine > 200mmol/d.
 - US is used to assess renal size and parenchymal thickness.

Renal masses

- Most solitary renal masses are either malignant tumor or simple cyst (benign).
- US and CT characterise >90% of renal masses >1.5cm (biopsy is rarely warranted)
- US will determine if the lesion is cystic or solid. If solid, CT with IV contrast can characterise the mass in greater detail.

1- Renal cysts

- There are two types of renal cysts
 - 1) Simple cyst: Spherical, anechogenic, no thickening wall, regular wall
 - 2) Complicated cyst: Echogenic, thick wall +/- calcification in the wall

2- Renal Adenocarcinoma

- 90% of all renal malignancies.
- Exophytic renal mass with cystic content and irregular wall
- Treatment: radical or partial nephrectomy

3- Renal Angiomyolipoma

- Benign hamartomatous tumor composed of fat, smooth muscle and vessels.
- Usually asymptomatic
- Detected by CT.

4- Transitional cell carcinoma

- Most common malignancy of ureter and bladder.
- Usually seen as filling defect
- CT for staging and surgical planning.
- Treatment: Radical nephrectomy.

GU trauma

- Unstable: Surgery or angiography
- Stable: CT with contrast to grade the trauma

QUESTIONS

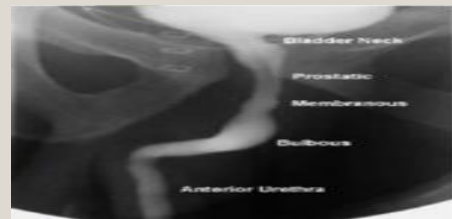
1. Young adult presented with right flank pain and blood in urine. Ultrasound exam was performed.

Which of the following is most likely the diagnosis:

- a) renal calculi
- b) normal US
- c) Hydronephrosis
- d) renal cyst



4. What's the name of this test?



- a) IVU
- b) KUB
- c) retrograde urethrogram
- d) Single contrast exam

2. A 37 year old male came to the ER after a RTA. He was stable so a CT was performed. After seeing the result his doctor diagnosed him with penetrating GU trauma what's the grade?

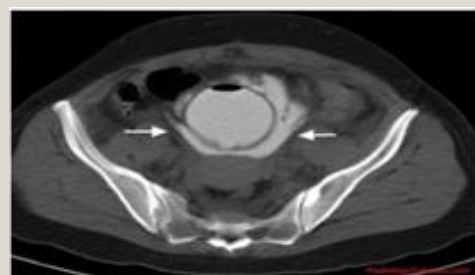
- a) Grade 1-2 injury
- b) Grade 3 injury
- c) Grade 4 injury
- d) Grade 5 injury



5. Which of the following is a relative contraindication for CT with contrast:

- a) Aneurysm clip
- b) Renal failure
- c) High grade fever
- d) cardiac pacemaker

6. A CT was done to a patient after transurethral resection of bladder tumor and the CT shows:



- a) Renal injury
- b) Bladder injury
- c) TCC
- d) Renal mass

3. A 25 year old female came to the ER with fever, Nausea and flank pain. A CT was performed. Which of the following is the likely diagnosis?

- a) Atrophic kidney
- b) Pyelonephritis
- c) Renal mass
- d) Normal



1.A 2.C 3.B 4.C 5.B 6.B

QUESTIONS

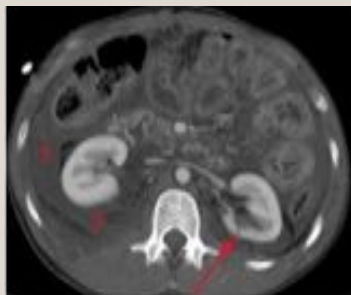
7. 60 years old male presented to the emergency with gross hematuria CT was done which of the following is correct:



- a) TTC
- b) Renal stone
- c) Pyelonephritis
- d) Normal CT

8. A 43 years old Pakistani gentleman came to the ER with a stab wound to the right kidney. A CT was performed. What's most likely the diagnosis

- a) Grade 1-2 injury
- b) Renal calculi
- c) Grade 4 injury
- d) Normal CT



9. A 55 year old diabetic female came to the ER with history of worsening fever and left flank pain. A CT was performed. What's the most likely diagnosis?

- a) renal cyst
- b) renal mass
- c) renal abscess
- d) renal stone



10. Young adult complaining of sudden left flank pain radiating to the left groin.

A. What's the name of the exam?

- a) IVU
- b) Single contrast exam
- c) Double contrast exam
- d) KUB



B. What's the most likely diagnosis?

- a) renal mass
- b) renal stone
- c) renal abscess
- d) renal hemorrhage

11. which level of creatinine is contraindicated to give IV contrast in renal failure patient?

- a) >200 mmol/dl
- b) 133 mmol/dl
- c) 150 mmol/dl
- d) 50 mmol/dl

12. Which of the following is a common site of urinary stone obstruction?

- a) Junction of mid-distal ureter
- b) Vesico-ureteric junction
- c) Mid ureter
- d) Proximal ureter

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please fill this very very quick form



References

- ✓ Slides
- ✓ 436 Teamwork



THANK YOU FOR CHECKING OUR WORK

