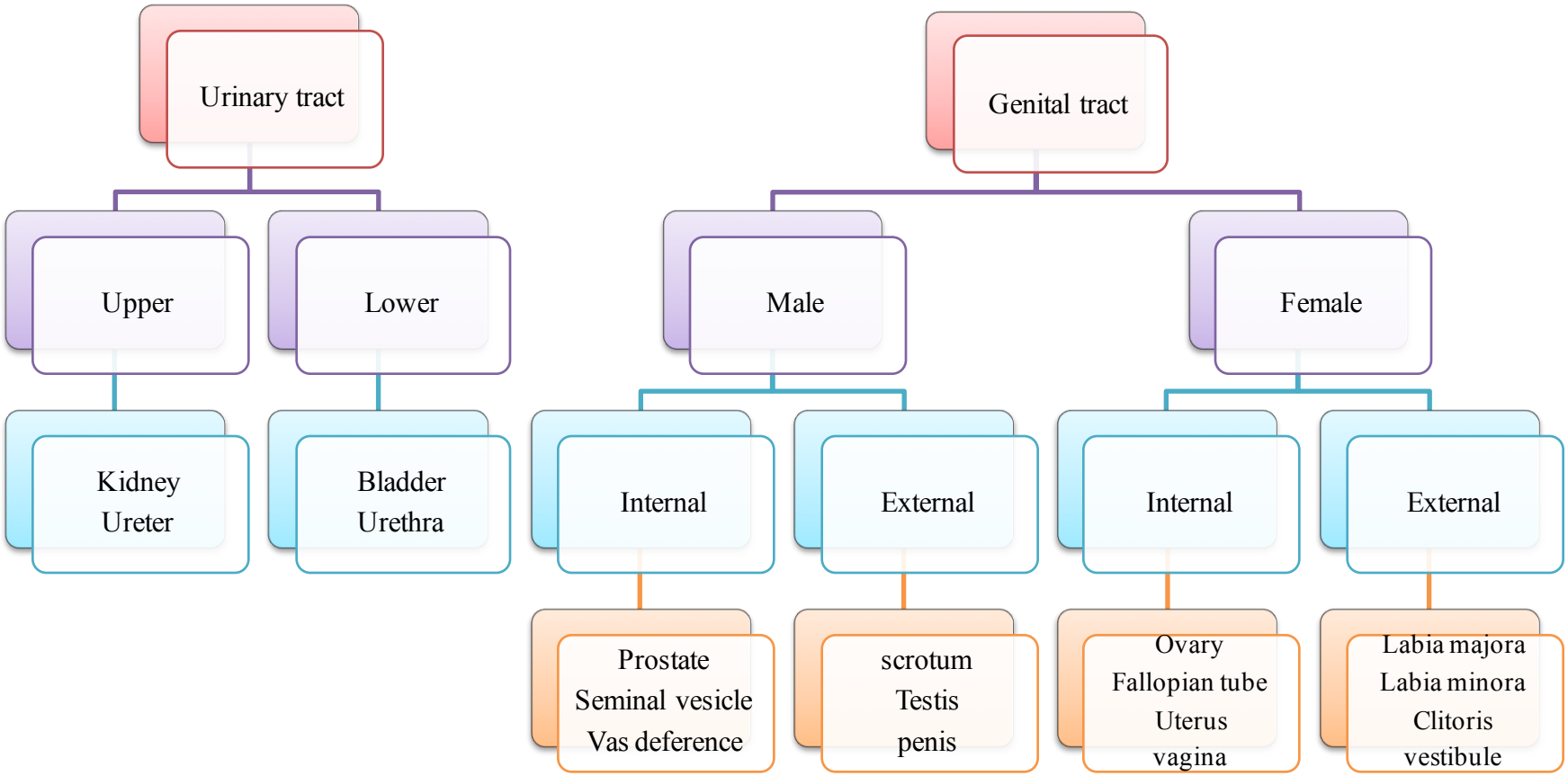
Pediatric Urinary Disorders

Surgery Team
MED 433

Objectives :

- ✓ Recall normal anatomy.
- ✓ Identify the common congenital anomalies
- ✓ How to detect this anomaly on radiological investigations
- ✓ Important steps in management

Anatomy of urinary and genital tract:



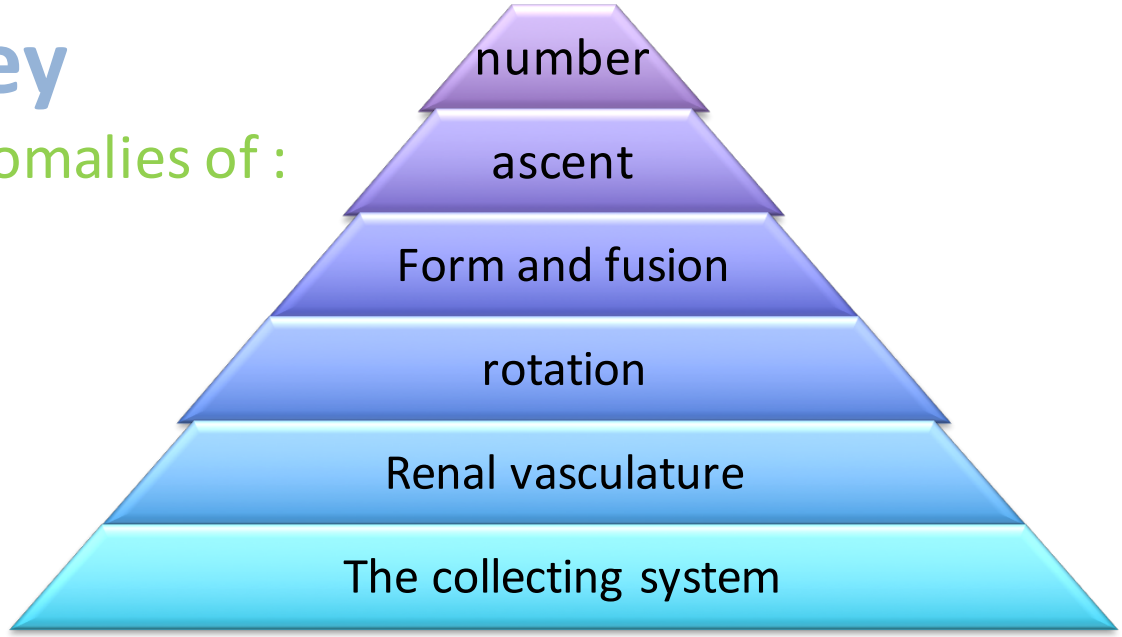
Introduction :

-Most common anomalies of all organ systems
- 10% of the population have some type of urogenital anomaly.
- 14:1000 births have an antenatal diagnosis of urogenital anomaly.
- The antenatal diagnosis is done by ultrasound after 28 weeks of gestation because at 24-28 weeks the urinary system starts to be clear on ultrasound.

Anomalies of the Upper Urinary Tract:

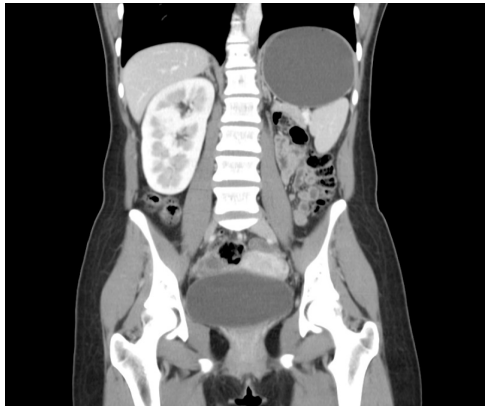
1- kidney

-involve anomalies of :



1-Anomalies of number :

First :Unilateral Renal Agenesis.



-1 in 1100 births.
-Male: Female of 1.8 : 1
-The left side is absent more frequently .
-The ipsilateral ureter is completely absent in 50%.
-mostly found incidentally

-Anomalies of other organ systems are found frequently in affected individuals which include : cardiovascular, gastrointestinal, musculoskeletal. Müllerian duct abnormalities occur in 25% to 50% of cases of females with URA (urinary renal agenesis) compared with wolffian duct anomalies, which are seen in 10% to 15% of males with URA.
-Approximately one fourth to one third of women with müllerian duct anomalies are found to have URA.

Müllerian duct	Wolffian duct
forms uterine tubes ,uterus, cervix, and upper one-third of vagina. Disappears in male.	pair of tubes that carry urine from primitive kidneys to a primitive bladder.

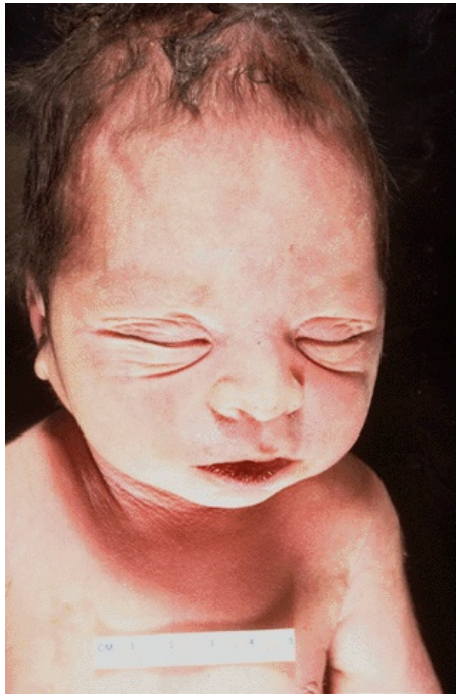
Second :bilateral renal agenesis :

-40% are stillborn.

-Do not survive beyond 48 hours due to respiratory distress associated with pulmonary hypoplasia.

Characterized by :

1-Potter facies. 2- Oligohydramnios(low amniotic fluid).



-Ureters are almost always absent.

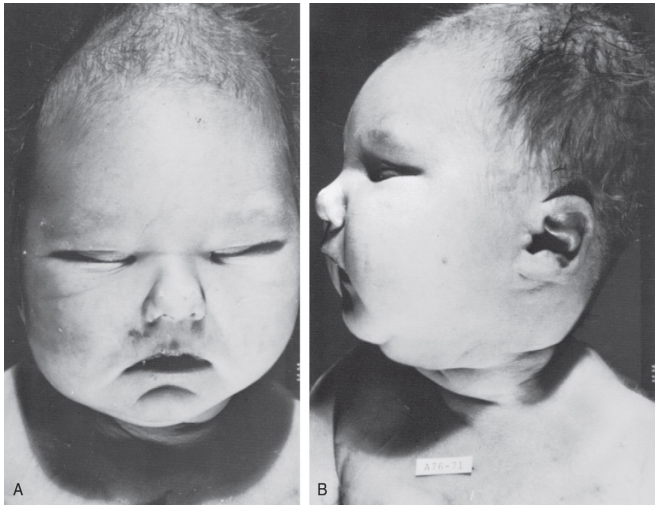
-Bladder is either absent or hypoplastic.

-Adrenal glands are usually positioned normally.

-Müllerian duct anomalies are commonly observed

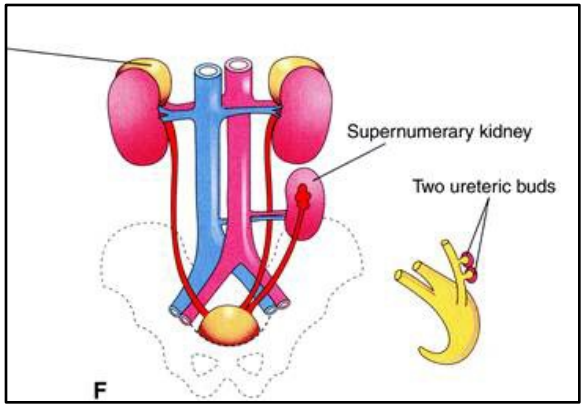
Potter Facies:

- Abnormal ear lobation
- Micrognathia (undersized jaw)
- Flattened nasal tip
- Prominent infra orbital folds



Third: Supernumerary Kidney:

- Definitive accessory organ with its own collecting system, blood supply, and distinct encapsulated parenchyma.
- Due to the presence of multiple ureteric buds on the same side.
- Either completely separate or loosely attached to the kidney on the ipsilateral side.
- The ureteral inter-relationships on the side of the supernumerary kidney can be variable.



2-Anomalies of ascent and position :

First: simple renal ectopia.

- A kidney that is outside the renal fossa.
- Can be in pelvic region (commenest) , lumbar or sacral .
- The left side is more occurring than the right.
- Pelvic ectopia has been estimated to occur in 1 of 2100 to 3000 autopsies.
- 50% present with hydronephrosis:
  - ✓Obstruction: UPJO and UVJO
  - ✓Reflux: grade III or greater
  - ✓Malrotation
- Vesicoureteral reflux is found in 30% .
- The incidence of genital anomalies in the patient with ectopia is about 15%.
- Most ectopic kidneys are clinically asymptomatic.

Second : Cephalad Renal Ectopia.

Third: Thoracic Kidney Kidney in chest .

3-Anomalies of form and fusion :

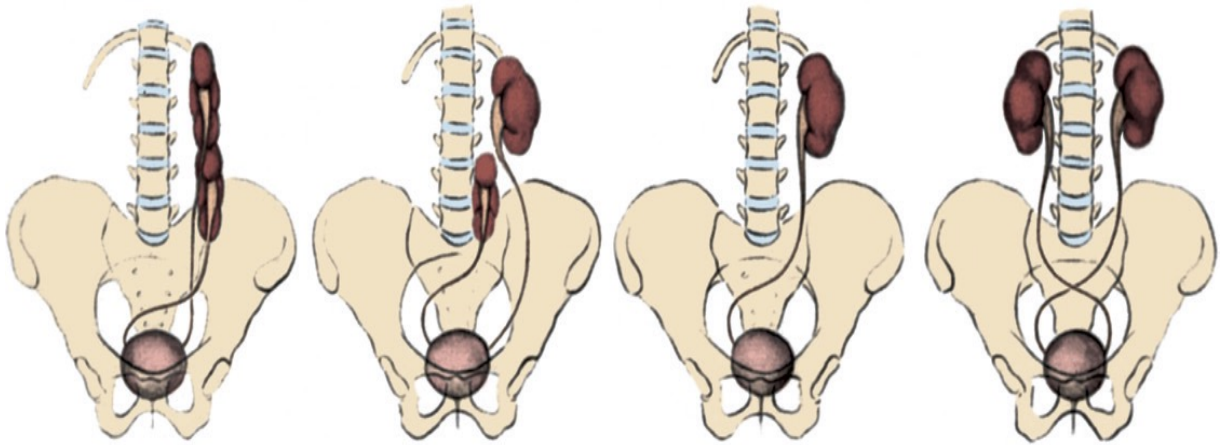
First :Crossed Renal Ectopia with and without Fusion.

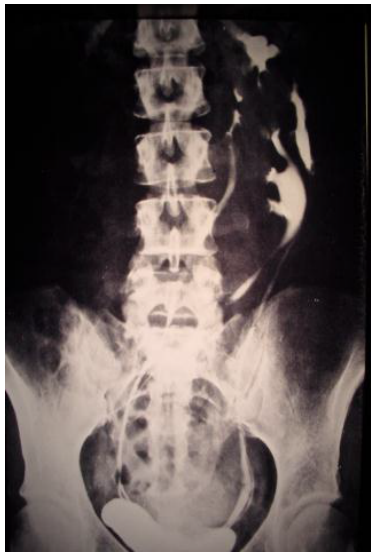
-Crossed ectopia: kidney is located on the side opposite from that in which its ureter inserts into the bladder.

-90% are fused with their mate

-the superior pole of the ectopic kidney usually joins with the inferior aspect of the normal kidney.

-The ureter from each kidney is usually orthotopic.





A) Crossed renal ectopia with fusion

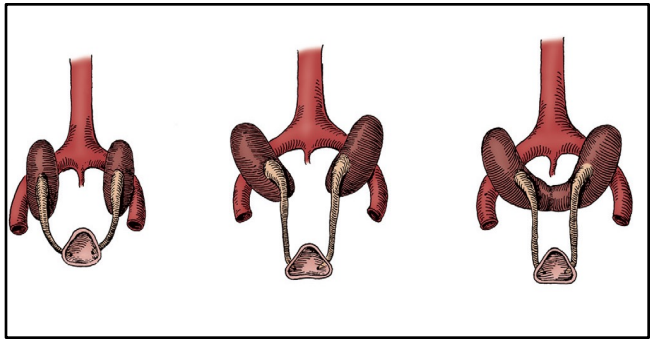
B) Crossed renal ectopia without fusion

C) Solitary crossed renal ectopia

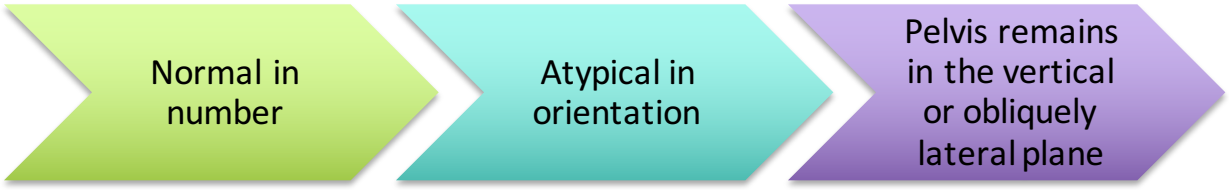
D) Bilaterally crossed renal ectopia

Right to left ectopia

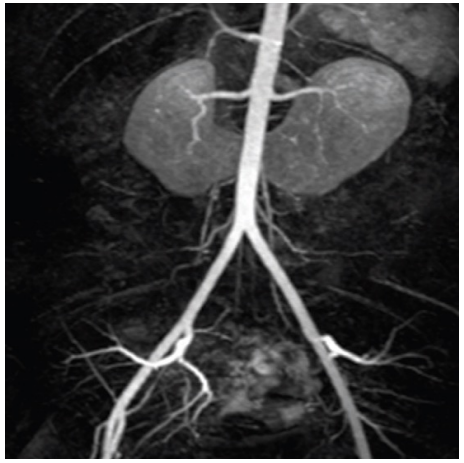
Second : horseshoe kidney:

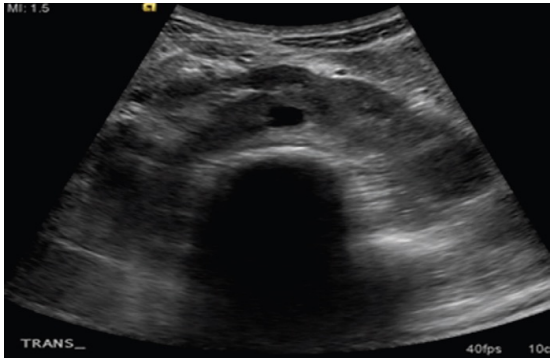


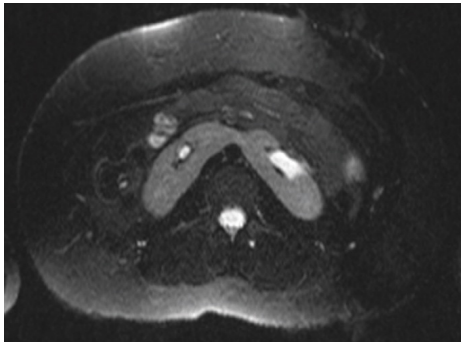
-Occurs 1 in 400 persons.
- 2 kidneys fused and connected together.
- 90% by the lower lobes.
-10% upper lobes connected.
-The isthmus is bulky and consists of parenchymatous tissue.
-The blood supply is abnormal.
-The calyces:



-The blood supply can be quite variable.
-Horseshoe kidney is frequently found in association with other congenital anomalies.
-Ureteropelvic junction obstruction is seen in one third of the cases.
-60 % asymptomatic.







4-Anomalies of rotation:

-The kidney and renal pelvis normally rotate 90 degrees ventromedially during ascent

- ✓the calyces point laterally.
- ✓the pelvis faces medially.

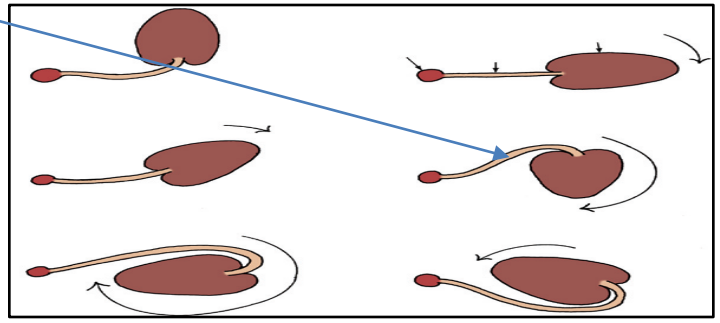
-When this alignment is not exact, the condition is known as malrotation.

Frequently associated with Turner syndrome.

Malrotated kidney:

- Normal position of the kidney: retroperitoneal in flank area.
- Anywhere other than the normal location is known as ectopia

-Cross ectopia: in when a kidney goes to the other side.

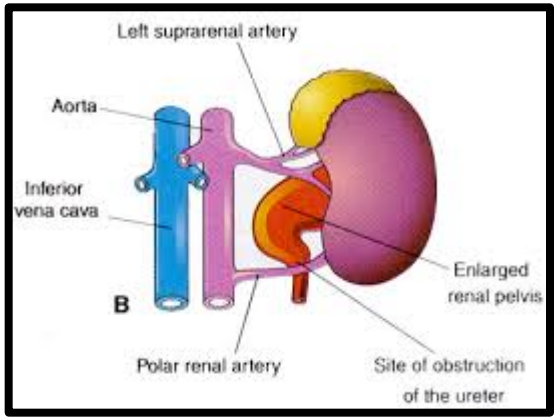


5-Anomalies of the renal vasculature :

-Aberrant, Accessory or Multiple Vessels.

-Renal Artery Aneurysm.

-Renal Arteriovenous Fistula.



RENAL ARTERY ANEURYSM :

-The overall incidence has been calculated to be between 0.1% and 0.3%.

-Most renal artery aneurysms are silent, especially in children.

-Many asymptomatic renal artery aneurysms are diagnosed during an evaluation of hypertension.

-The diagnosis may be suspected with a pulsatile mass in the region of the renal hilum or when an abdominal bruit is heard.

A wreathlike calcification in the area of the renal artery or its branches (30%) is highly suggestive.

6-Anomalies of the Collecting System:

Calyceal Diverticulum.
Hydrocalycosis.
Megacalycosis.
Unipapillary Kidney.
Extrarenal Calyces.
Anomalous Calyx (Pseudotumor of the Kidney).
Infundibulopelvic Stenosis.
Extrarenal Pelvis.
Bifid Pelvis.

Calyceal Diverticulum:

A cystic cavity within the kidney that is lined by transitional epithelium and communicates with a calyx or, less commonly, with the renal pelvis through a narrow isthmus.
The incidence based on excretory urography is about 4.5 per 1000.
The diagnosis is best made by CT or MR urography.
Laparoscopy by a retroperitoneal approach for marsupialization of the diverticulum, fulguration of the epithelial lining, and percutaneous marsupialization/ablation are treatment options.

Megacalycosis:

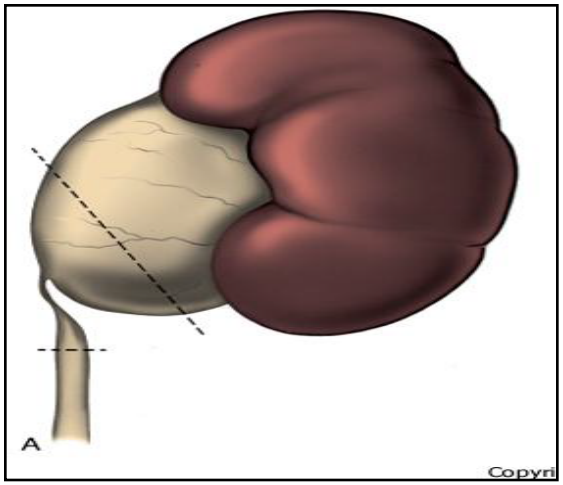
A non- obstructive enlargement of calyces resulting from malformation of the renal papillae.
It occurs predominantly in males with a ratio of 6 : 1.
Bilateral disease has been seen almost exclusively in males, whereas segmental unilateral involvement occurs only in females.
Long-term follow-up of patients with this anomaly does not usually reveal progression of the anatomic or functional status of the kidney.

Infundibulo pelvic Stenosis:

A link between cystic dysplasia of the kidney and the grossly hydronephrotic kidney.
Infundibulopelvic stenosis is usually bilateral and is commonly associated with vesicoureteral reflux, suggesting an abnormality of the entire UB.

2-Anomalies of ureter :

-Ureteropelvic junction (UPJ) obstruction.
-Ureterovesical junction (UVJ) obstruction.
-Megaureters.
-Ectopic Ureter.
-Ureterocele.
-Vesicoureteral Reflux (VUR).
-Anomalies of Number :
1-Bifid Ureters 2- Dublication
3- Triplication 4- Quadruple Ureters
-Fibroepithelial Polyps.



First: Pelviureteric Junction Obstruction(PUJO) .

Dilation of the renal pelvis due to obstruction at the junction between the pelvis and ureter.
Because the obstruction is before the ureter, in these cases it is usually not affected.
On Ultrasound the renal pelvis is dilated and the ureter is normal.
It is the most common cause of antenatal hydronephrosis (ANH).
Etiology: (theories): Segmental muscular attenuation, angulation, true stenosis, extrinsic compression, crossing vessels; 20-30%.

Associated findings:

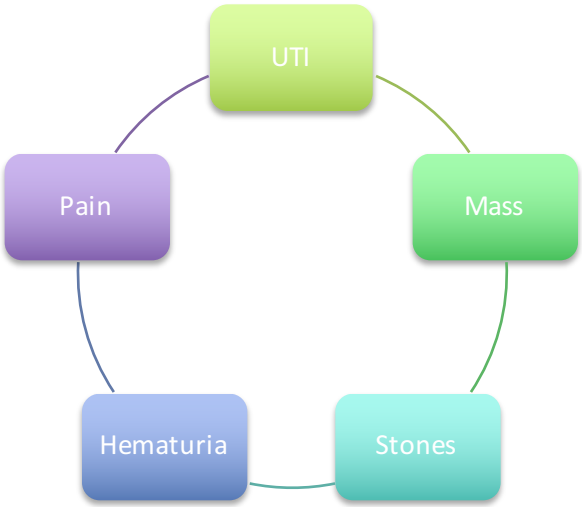
- Reflux in 5-10%
- Contralateral PUJO in 10%
- Contralateral agenesis in 5%

Presentation:

-More in males and occurs in the left side more than the right.

- Incidental in neonates by US or in infancy.

-If the diagnosis is missed during pregnancy or early infancy, the child could come with symptoms such as:



- Indications of surgery:

1-Symptomatic patients

2-If the finding is incidental:

Neonates: worsening pattern or reduced renal function.

Children: significant obstruction.

Investigations:

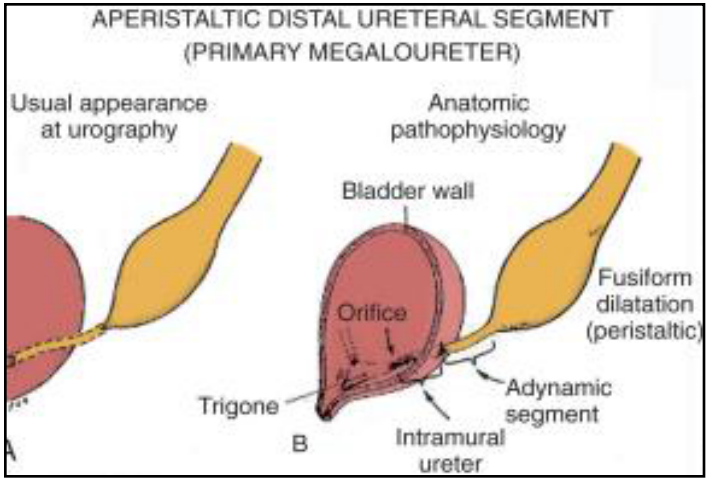
- ultrasound
- renal scans
- VCUG (voiding cystourethrography)

Second : Ureterovesical junction (UVJ) obstruction:

- Also called megaureter or severely dilated ureter.
- There is a narrow segment that causes the dilatation of the whole renal system.
- Could be bilateral or unilateral but it is mostly unilateral.
- It is different from PUJO in that the ureterovesical junction obstruction has a dilated ureter.

Presentation:

- Male 3:1 female
- Left 3:1 Right.

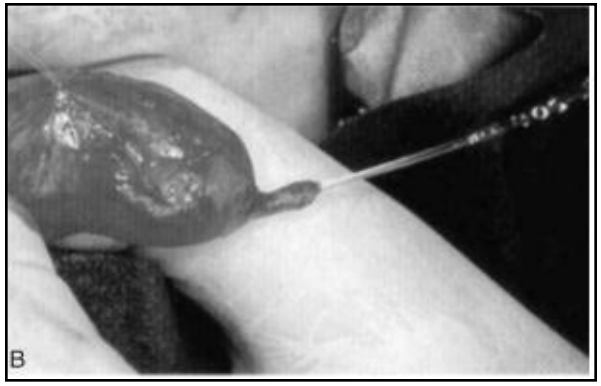


Types of (UVJ) obstruction :

1- Obstructive non refluxing
2-Obstructive refluxing
3-Refluxing non obstructive
4-Non refluxing non obstructive (adynamic ureter).

Treatment:

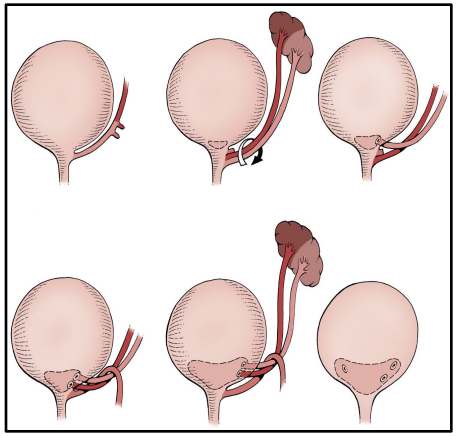
1-Obstruction: excision and reimplanting of the UVJ.
2-Reflux: according to the same line of reflux management.



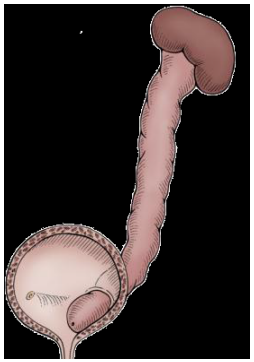
Third: Ureteral Anomalies:

1-Ectopic ureter:

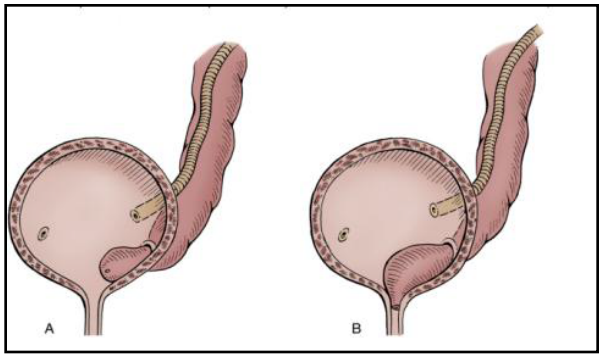
- ✓ An ectopic ureter is any ureter, single or duplex, that doesn't enter the trigonal area of the bladder.
- ✓ In a *duplex* system, the ectopic ureter is inevitably the upper pole ureter due to its budding from the mesonephric duct later (more cephalad) than the lower pole ureteral bud.
- ✓ In females, the ectopic ureter may enter anywhere from the bladder neck to
- ✓ the perineum and into the vagina, uterus, and even rectum.
- ✓ One of the classic symptoms is continuous wetting.
- ✓ But, In males the ectopic ureter always enters the urogenital system above the external sphincter or pelvic floor, and usually into the wolffian structures including vas deferens, seminal vesicles, or ejaculatory duct.
- ✓ Most commonly associated with duplex system and with ureterocele.
- ✓ Clinical picture depend on: associated anomalies, site, and sex of the patient.
- ✓ Can be: Simple ectopia which implanted in abnormal position.
- ✓ Ectopic ureter: it is completely outside the bladder.
- ✓ Investigations : IVP, VCUG, cystoscopy.
- ✓ Renal scan asses the function of both renal poles in case of duplication.



2-uretrocele :



- Commonest cause of urine retention in female infants .
- A cystic dilation of the distal aspect of the ureter , leading to obstruction and the
- Whole ureter will get dilated .its associated with duplication anomalies (figure3).
- Located either: within the bladder or spanning the bladder neck and urethra.
- This can be confused with Uretrovesical junction obstruction but the difference here is there is cystic dilatation which can be present in the bladder.
- Sacculation of the terminal portion of the ureter has 2 types:



1-Orthotopic:

Intravesical (inside bladder).

Simple OR adult type ureterocele.

2-Ectopic

Start in bladder and extended outside the bladder.

Extravesical=duplex system OR infant type ureterocele.

In ectopic ureterocele it involve the upper pole system.

Presentation:

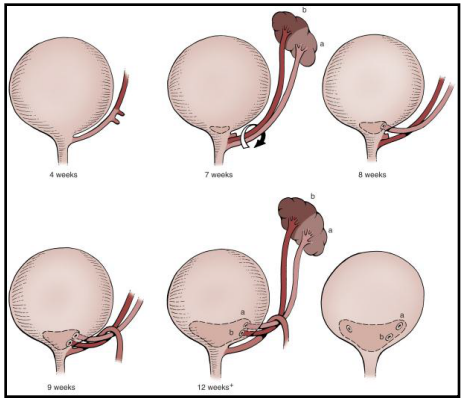
1- Hydrouretronephrosis

2- 7:1 Female:Male, 10% bilateral, ectopic : orthotopic 4:1

3- Usually detected by Antenatal (U/S) so, we use MCUG (micturating cystourethrogram) to confirm the diagnosis .(figure 5)

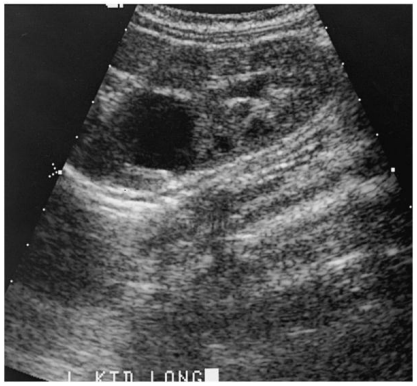
4- Symptoms include: urine retention, infection and presence of stones

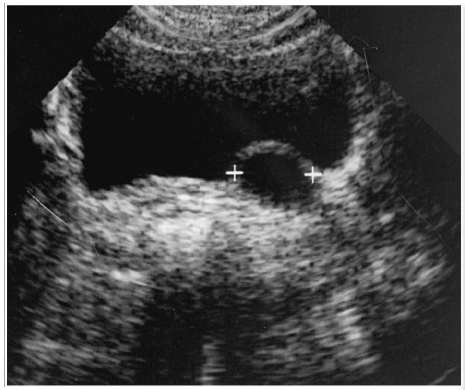
5- Intralabial mass: One of the differential diagnosis in females is a ureterocele.



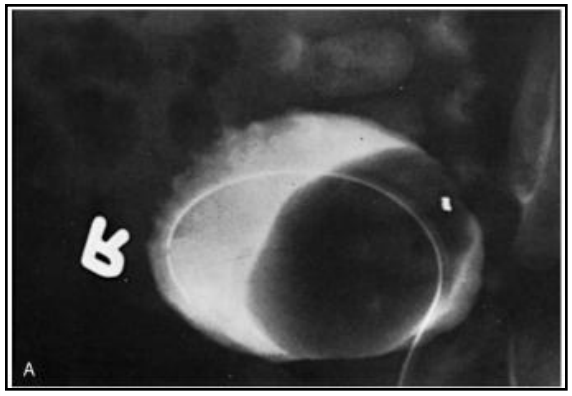
Management:

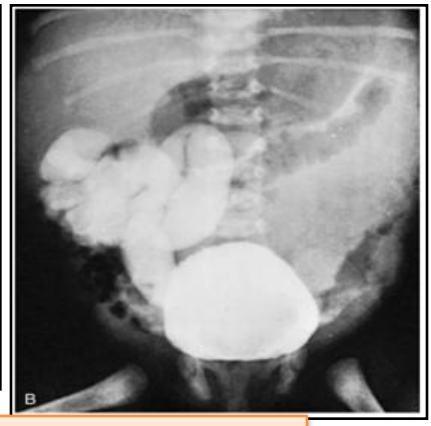
urgent intervention → Incision of ureterocele → Upper pole heminephroectomy → Excision of ureterocele and common sheath reimplant





Cystic structure in bladder which is cystic dilation of distal part of ureter





MCUG, put catheter in bladder and use contrast. if there is no abnormality the whole bladder will be white. But in ureterocele we will see filling defect ⓘ

3-Vesicoureteral Reflux (VUR):

- There is a normal anti-reflux mechanism between the bladder and the ureter. A "Flap Valve" which depends on:
- Ureter has an Oblique course as it enters the bladder.
- Proper muscular attachments to provide fixation and posterior support to enable its occlusion.
- Adequate submucosal length.
- The study to rule out reflux is MCUG and it is also used for grading:

✓ Normal: contrast in bladder.
✓ Grade I: confined to ureter, contrast is in the distal part of the ureter.
✓ Grade II: contrast reaches the kidney but there is no dilation.
✓ Grade III: Mild dilation of the renal pelvis and ureter without loss of calyces.
✓ Grade IV: moderate dilation but there is loss of calyces.
✓ Grade V: severe dilation and tortuous dilated ureter".

Resolution of reflux: Over 3 year follow up:

87% of Grade 1
63% of Grade 2
53% of Grade 3
33% of Grade 4

Management: The decision depends on :

- The chance of spontaneous resolution (age and grade at presentation).
- Breakthrough infection.
- Renal scarring and renal function.
- Compliance with medication.

Medical management:

Patients with UTI (the most common presentation) and VUR is suspected.

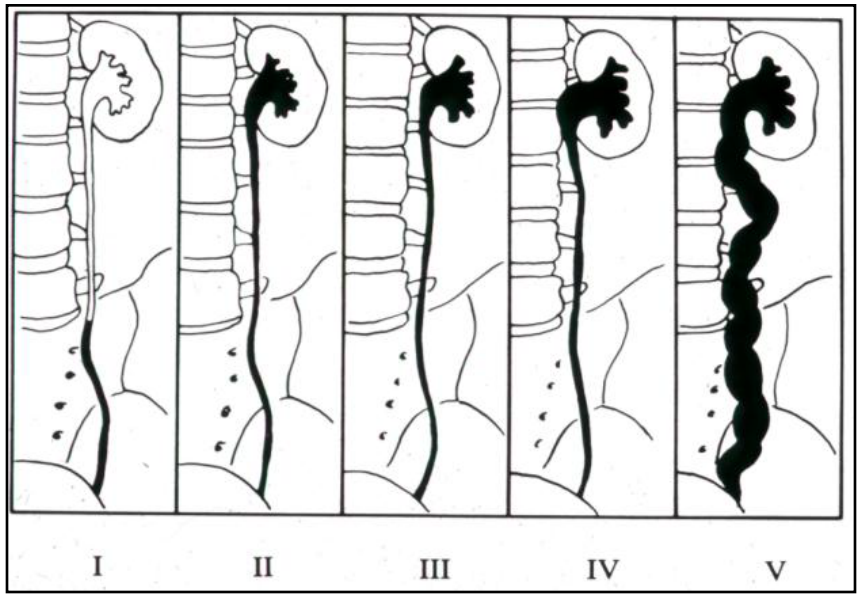
Continue on prophylactic antibiotics after treatment till the VCUG is done.

Patients for conservative management :

Continue meticulously on prophylactic antibiotics and surveillance with urine culture and sensitivity, U/S ,and DMSA (dimercaptosuccinic acid) scan.

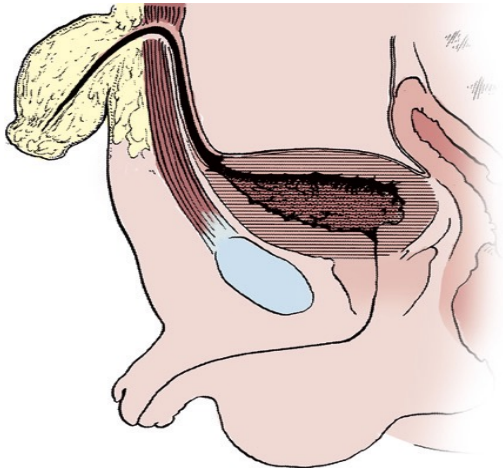
DMSA : it's a radionuclide scan uses to assess the renal morphology , structure and function.

Prophylactic dose:
(1/3 of therapeutic dose only at night (24h), long term)



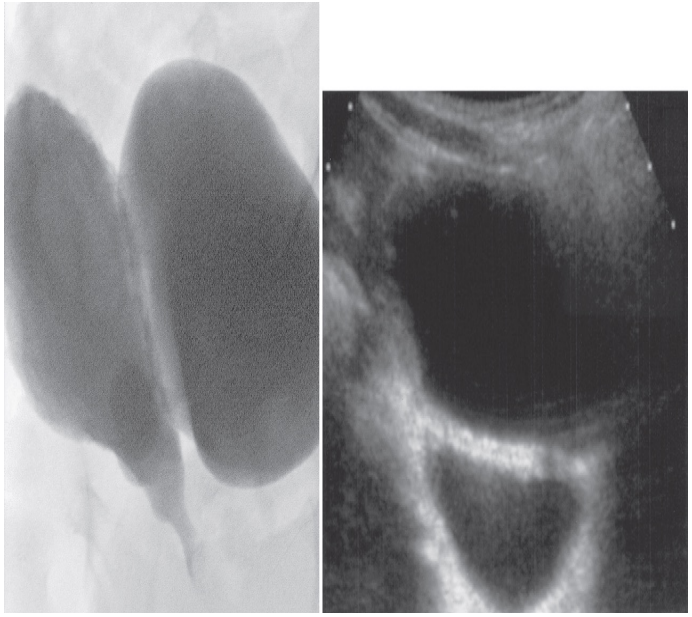
PATENT URACHUS

- The urachus is a remnant of a channel between the bladder and the umbilicus (where urine initially drains in the fetus during the 1st trimester of pregnancy).
- The channel of the urachus usually obliterates around the 12th week of gestation.
- Presentation: varying amounts of clear urine to leak at the umbilicus.
- Investigations In MCUG : you will see contrast in abdomen.
- Treatment :
  - It is usually asymptomatic and it will close by itself eventually with time.
  - If the urachal disorder presents with an infection, the **infection is treated first.**
  - And occasional surgical drainage of any infected cyst or poorly draining cavity.
  - Once the infection is under control, excision of the urachus is usually performed. This can usually be done laparoscopically or with a small incision on the lower abdomen.



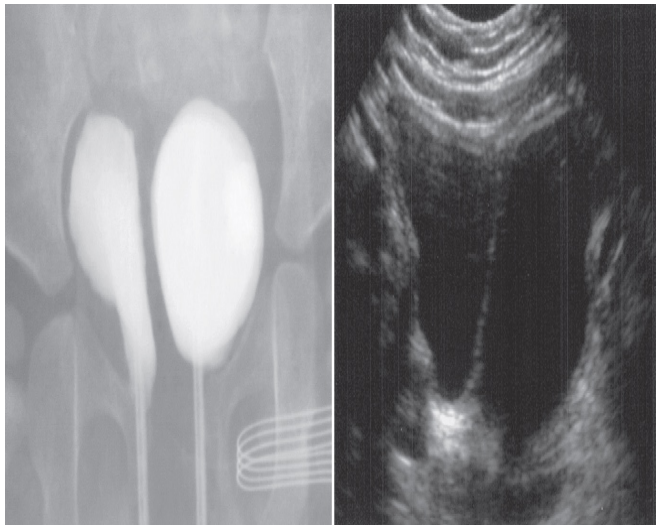
BLADDER DIVERTICULUM:

- Out pouching in bladder.
- Primary ➔congenital, solitary.
- Secondary ➔acquired, multiple.
- Acquired bladder diverticula are typically the result of an obstruction of the bladder outlet (e.g. an enlarged prostate or area of scarred urethra, posterior urethral valve), bladder dysfunction from nerve injury or, rarely, as a result of prior bladder surgery.
- Treatment:
  - Follow up, do not always require treatment. If becomes very large ➔ excise it. (Because there will be urine stasis ➔ stones).



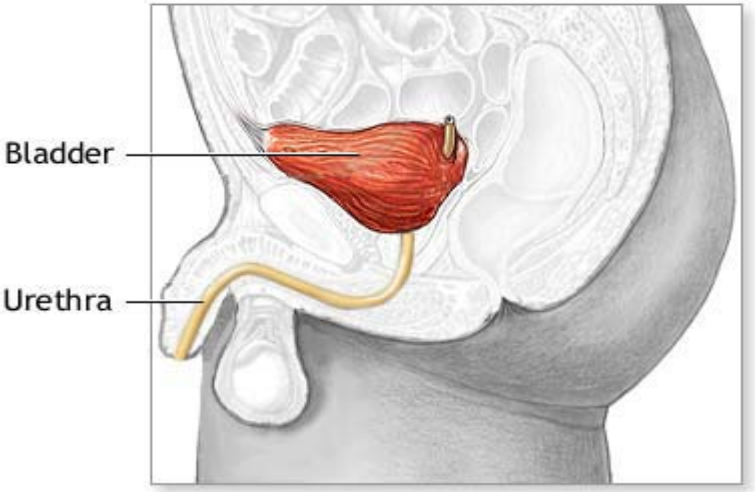
BLADDER DUPLICATION:

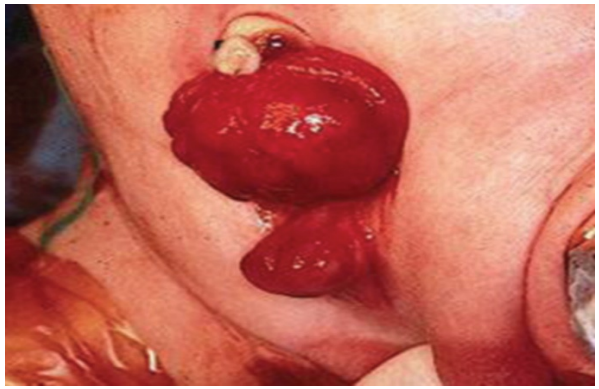
- Complete: each one has its own urethra and urethral opening.
- Incomplete: two bladders opens in one urethra



BLADDER EXSTROPHY

- Bladder has 3 walls: Anterior, lateral and posterior.
  - Anterior wall consist of abdominal muscles and skin
- In bladder exstrophy the anterior wall is absent (no anterior abdominal wall ,no skin) so the lateral wall will be attached to skin to outside.
- the bladder is exposed to the outer environment
- We need to close bladder and to reconstruct abdomen
- if you see part of bowel also → cloacal extrophy
- Rare; 1:30000 live births with a 3:1 male : female ratio
- The results of improper development of anterior abdominal wall, pelvic girdle, and anterior wall of the bladder



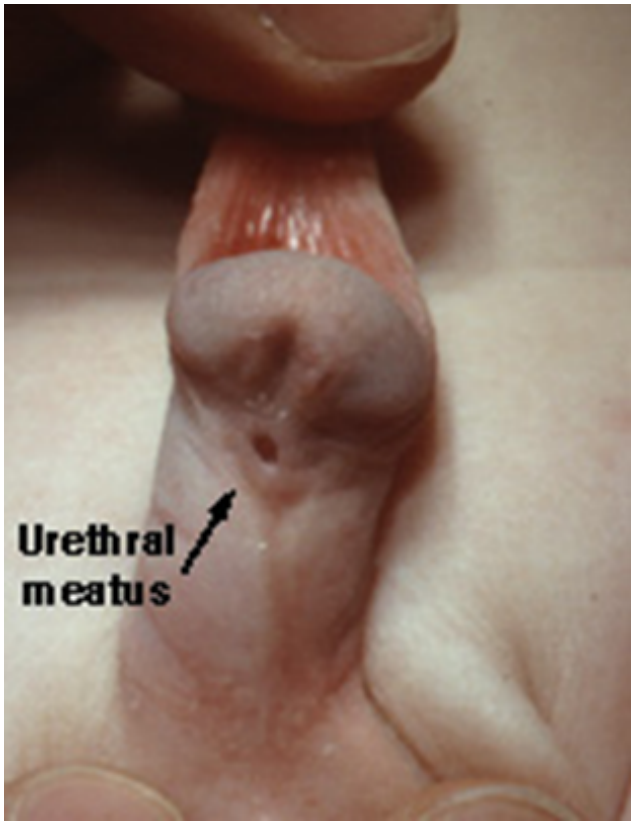


EPISPADIAS

- Very rare, Abnormal position of external urethral meatus in dorsal surface of the penis
- If in a female, commonest presentation is incontinence

- **Hypospadias** :

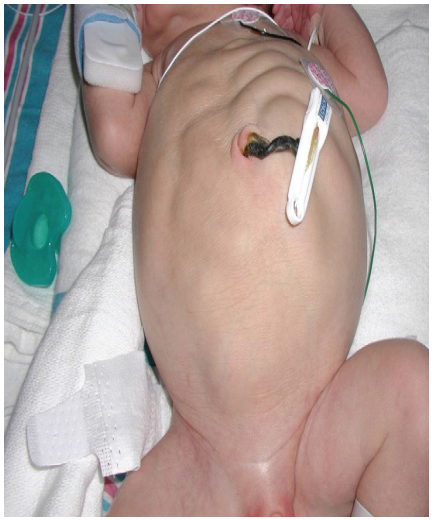
- Abnormally located meatus which contains the urethral opening
- The meatus usually opens in the tip of the glans penis and if it opens anywhere else it is considered an ectopic opening.
  - In hypospadias the opening is towards the scrotum or ventral side
  - In Epispadias the opening is towards the abdomen or dorsal side
- Common (2%)
- Abnormal position of the EUM (external urethral meatus):
  - Distal hypospadias: (from mid shaft to Glans)
  - Proximal hypospadias (from proximal penile "proximal shaft" to the perineal)
- Treatment:
  - **NO Circumcision (**Absolute contraindication because dorsal urethral skin we will be needed in repairing later on especially in proximal hypospadias)
  - Age to repair: 6 to 9 months
  - Requires one stage repair



• PRUNE BELLY SYNDROME (Eagle-Barrett Syndrome):

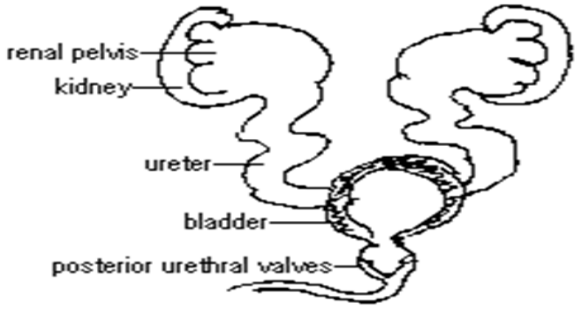
- Consists of a triad of:

Absent abdominal wall muscles	Bilateral undescended testis	obstructive uropathy
• External oblique, Internal oblique, Transverse abdominal muscles • You can feel all the organs (kidneys and liver) and you can even see the bowel movement because the muscle layer is either absent or thin (hypopalstic).	• (intra abdominal)	• bilateral hydrouretronephrosis and large bladder (dilation of whole urinary system because no peristalsis "abnormality in smooth muscles" → urine stasis)

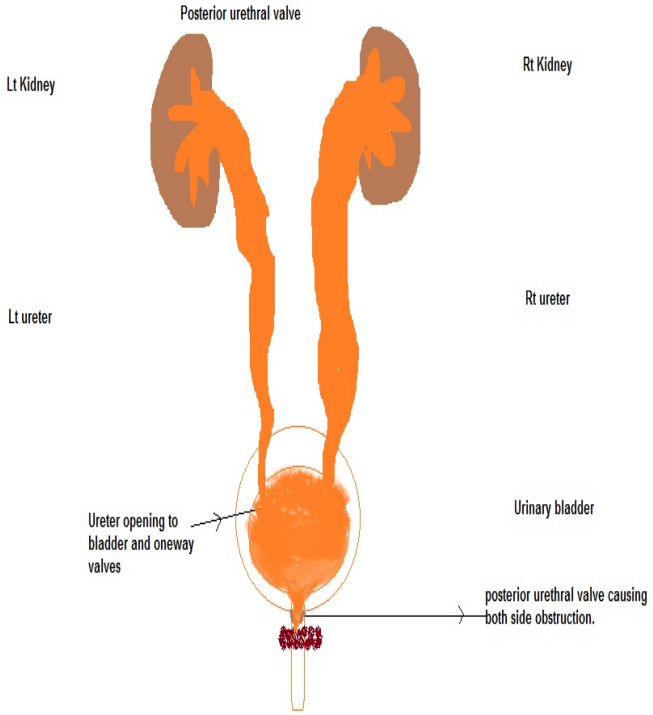


Note:
In a female ➔ pseudo prune belly syndrome (because classically it is a triad and in a male)

POSTERIOR URETHRAL VALVE (PUV):

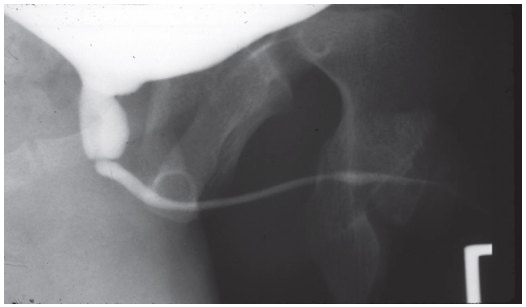


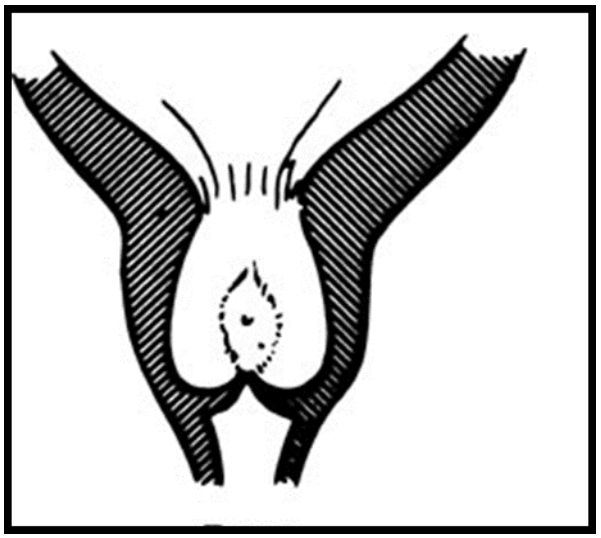
- Incomplete canalization of the posterior urethra
- 1:5000 male infants.
- Most common cause of urine retention in male infants.
- 50% have renal impairment.
- The bladder and the kidneys developed under high
- pressure and resistance.
- The more proximal the valve the more sever the condition
- Presentation:
  - ✓ Antenatal (hydonephrosis)
  - ✓ Urine retention
  - ✓ UTI
  - ✓ Poor urinary stream
  - ✓ CRF; at late stage
- Associated findings:
  - ❑ Oligohydramnios
    - Low amount of Amniotic fluid
    - No output of urine or little → Amniotic fluid
    - Low in Ultrasound "because there is no secretion but there is absorption".
    - Obstruction of esophagus →no absorption →Polyhydramnios.



Bilateral renal dilatation:

- VUR: 40%
- Valve bladder → loss of its Function and become abnormal bladder
- The bladder is urogenic, because during pregnancy the detrusor muscle is replaced by collagen so no contraction of muscle occurs.
- Baby start voiding during 24th week of gestation → so in Posterior urethral valve the baby will void against pressure so bladder will be large and trabeculated and urogenic
- "Posterior urethral valve is the universal destruction of urinary tract because it affects kidney, bladder, ureters, bladder, and urethra
- Renal impairment: in 30-50%, 25% of them will have renal transplantation in the future
- The obstruction is not complete (narrowing or stenosis) because if it is complete "severe" the patient will die in utero.





Investigations:

✓Antenatal US, US, VCUG, Renal scan, renal function studies, Urodynamic studies.

✓MCUG: Posterior urethra dilated, urethra ,bladder trabeculated and (Christmas tree bladder)

Treatment:

Endoscopic primary valve ablation

• Myelo-meningocele:

1. The baby may have a closed swelling containing spinal cord and/or spinal nerves.
2. More often, the spinal canal is open and leaks CSF, with his flattened cord forming a plaque on its surface→ Causes neurogenic bladder.

- Always examine from the back in a baby with urological symptoms.
- presentation:
  - ✓ Loss of bladder or bowel control
  - ✓ Partial or complete lack of sensation
  - ✓ Partial or complete paralysis of the legs
  - ✓ Weakness of the hips, legs, or feet of a newborn
  - ✓ Skin lesions
    - café-au-lait (coffee with milk, hyper-pigmented lesions that may vary in color from light brown to dark brown. The borders may be smooth or irregular.
    - Hypertrichosis (abnormal amount of hair growth over the body)
    - Dermal Sinus Tracts
- Mongolian spots → green spots are normal finding. (Flat, gray-blue in color (almost looking like a bruise), are very common in any part of the body of dark-skinned babies).

Summary

- Urinary system anomalies are the most common of all systems.
- Antenatal diagnosis for such problems is done by US after 28 weeks of gestation
- In unilateral renal agenesis, the left side is more affected. It is mostly found incidentally.
- Bilateral renal agenesis is associated with the characteristic potter facies and oligohydraminos. The ureters are almost always absent as well. The bladder is either absent or hypoplastic. Yet the adrenal glands are in their normal position.
- The presence of a supernumerary kidney is due to the presence of multiple ureteric buds on the same side.
- Most common location of simple renal ectopia is in the pelvis. The left side is more commonly affected. 50% of those patients present with hydronephrosis. Most of those are symptomatic.
- Crossed renal ectopia occurs when a kidney is located on the side opposite from that in which its ureter inserts into the bladder. It can fuse with its mate or remain separated.
- 90% of horseshoe kidneys are fused at the lower lobes. Its blood supply is abnormal and yet 60% of its patients are asymptomatic. The calyces with it are normal in number, atypical in orientation, and the pelvis remains in the vertical or obliquely lateral plane.
- During development, normally the kidney and renal rotate 90 degrees venteromedially during their ascent, so the calyses will point laterally and the pelvis will face medially. If its not exact, it's a malrotation. Its frequently associated with turners syndrome.

Summary

- Renal artery aneurysms are usually found incidentally upon evaluation for hypertension. We see a wreathlike calcification in the renal artery area. Pulsatile mass in the region with an abdominal bruit.
- PUJO is seen on US as dilated pelvis with a normal ureter. It's the most common cause of ANH. Its more common in males and is more commonly occurring on the left side. Its usually an incidental finding.
- UVJ obstruction is otherwise known as megaureter. Its mostly unilateral. It has 4 subtypes one of which is adynamic. We usually excise it surgically and reimplant it.
- An ectopic ureter refers to a ureter that doesn't enter the bladder in the trigonal area. Has a classical symptom of continuous wetting in females. In males, it's associated with duplex system and uterocele. It needs urgent intervetion.
- Commonest cause of urinary retention in female infants is the uterocele.
- Sacculation of the terminal portion of the ureter is of two types: orthotopic and ectopic.
- Vesicourteral reflux occurs when there is a problem with the flap valve.

Summary

- Patent urachus is the nonobliteration of the channel between the bladder and umblicius. It presents as leakage of varying amounts of fluid or urine through the umbilicus. It will eventually close itself with time.
- Bladder diverticulum is the outpouching of the bladder. Could be single and congenital (primary) or acquired and multiple (secondary)
- Bladderextrophy is seen when the anterior wall is absent, it becomes exposed to the environment.
- The commonest presentation in epispadiasis in females in incontinence.
- Circumcision is an absolute contraindication in patients with hypospadias. The best age for repair is 6 to 9 months. It's a one-stage repair surgery.
- Prune belly syndrome is a triad of absent abdominal wall muscles, bilateral undescended testicles (cryptorchidism), and obstructive uropathy. In females this triad is not present so we call it pseudo-prune belly syndrome.
- Posterior urethral valves are associated with oligohydraminos.
- Bilateral renal dialation appears as Christmas tree bladder with MCUG. We treat it with endoscopic primary valve ablation.
- Myelomeningocele causes neurogenic bladder. Also presents with skin lesions like café au lait and hypertrichosis, dermal sinus tracts, and Mongolian spots.

MCQs

Q1- An infant presented to you with a discharge from umbilicus. What is the most likely diagnosis?

a. epispadias
b. uretrocele.
c. prune belly syndrome
d. patent urachus

Q2- what is the best modality to rule out urine reflux?

a. MCUG
b. US
c. IVP
d. ERCP

Q3- A female child presented with Intralabial mass what is the most likely diagnosis?

a. prune belly syndrome
b. epispadias
c. ureterocele
a. myelo-meningocele

Answer key: 1:d , 2:a , 3:c

MCQs

Q4- Which of the following congenital anomalies is an absolute contraindication for Circumcision:

a- Bilateral undescended testis.
b- Hypospedias.
c- posterior urethral valve.
d- Vesioureteral Refulx.

Q5- 5 Years old female presented with history of recurrent febrile UTI with incontinence, whats the best modality in diagnosing VUR?

a- Intravenous ureterogram(IVP)
b-. nuclear study
c- Voiding Cysturethrogram (VCUG)
d- Renal and bladder US

Q6- The antenatal diagnosis for congenital urinary problems is done by US after:

a- 28 weeks of gestation
b- 14 weeks of gestation
c- 13 weeks of gestation
d- 29 weeks of gestation

Answer key: 4:b , 5:c , 6:a

MCQs

Q7- renal malformations are commonly associated with:

a- klienfelters syndrome
b- Down syndrome
c- Marfan syndrome
d- Turner syndrome

Q8- the most common cause of antenatal hydronephrosis is:

a- supranumerary kidney
b- hypertension
c- oligohydraminos
d- PUJO

Q9- which one of the following is true about hypospadias:

a- circumcision is recommended
b- it's a two stage surgery
c- repair is best during 6 to 9 months
d- repair is best during 6 to 9 years.

Answer key: 7:d , 8:d , 9:c

Thank You..

Done By :
Fahad Al-Qahtani
Faisal M. Al-Ghamdi
Revised By:
Rheema Al-Fadhil

surgery433@gmail.com