Pediatric Urinary Disorders

Important

Notes (Doctors'/students')

431 SURGERY TEAM

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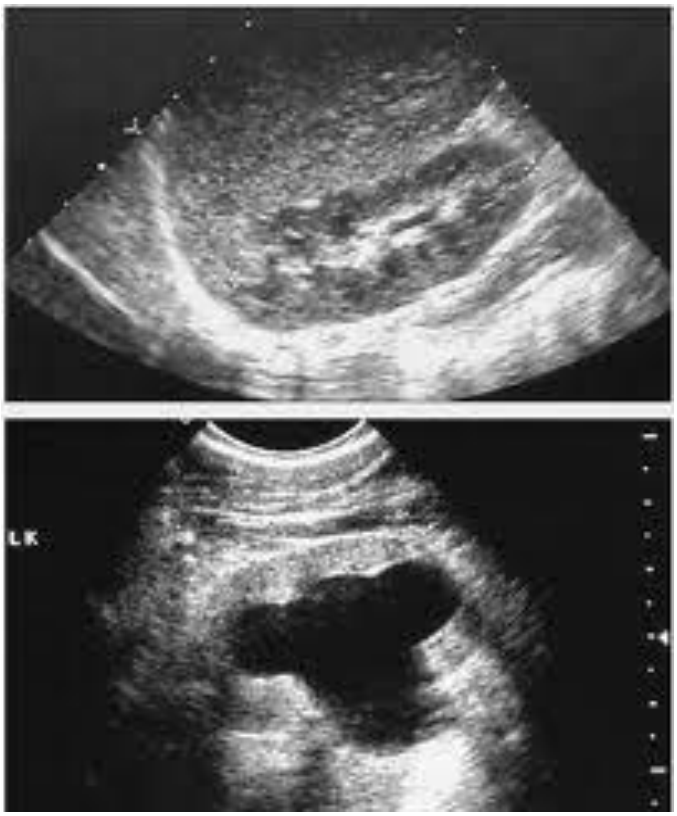
Antenatal hydronephrosis and its DDx

Hydronephrosis is not a diagnosis on its own. (it is a sign).

Dilatation of the urinary system before delivery detected by ultrasound.

Causes:

A. Obstruction is **the commonest** -64% of cases-
   (Pelviureteric junction obstruction in 41% of cases and Ureterovesical junction obstruction 23% of cases).
B. Duplication anomalies 13%.
C. Posterior urethral valves 10%.
D. Vesicoureteric reflux 7%.
E. Multicystic dysplastic kidney.
F. Others 6%.

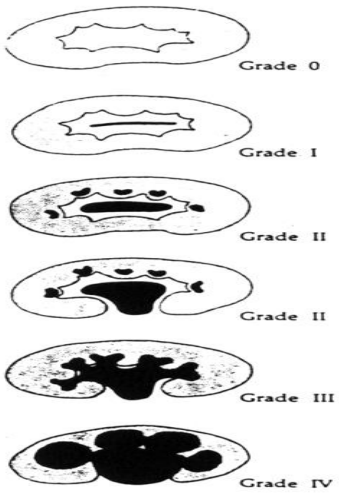


Normal

Dilated

Grading: "Doctor mentioned that he will not ask about it"

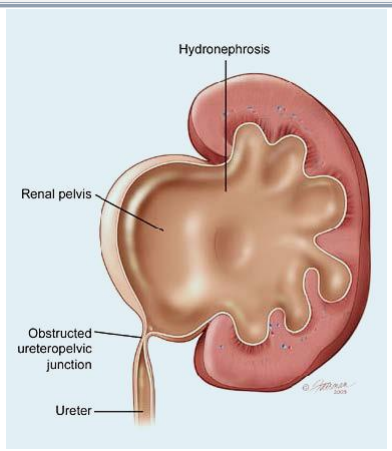
SFU "Society of Fetal Urology" grading system – antenatal hydronephrosis.



Grade	Central renal complex	Parenchyma
0	Intact.	Normal.
1	Slight splitting of pelvis.	Normal.
2	Evident splitting of intrarenal pelvis or dilated extrarenal pelvis. Major calyces dilated	Normal.
3	Wide splitting of pelvis. Major and minor calyces dilated.	Normal
4	Wide splitting of pelvis. Major and minor calyceal dilatation.	Thinned or reduced.

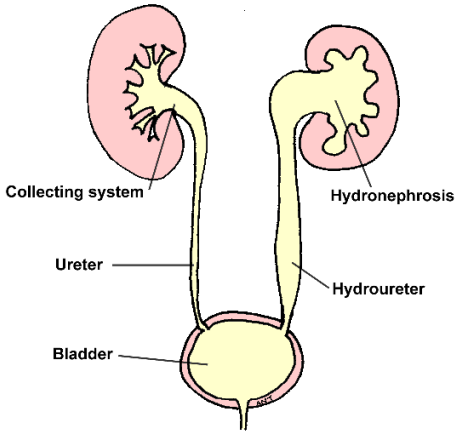
- To diagnose: Ultrasound of the kidney will show dilatation.
- To treat: Depends on the type.
- When? If the patient is symptomatic.

DDx for Antenatal hydronephrosis



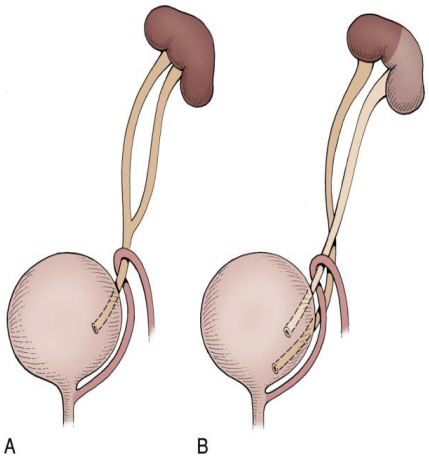
1- Pelviureteric junction obstruction:

- It presents as incidental finding in neonates and children.
- Symptomatic: UTI – Pain – Mass – Hematuria – Stone.
- To diagnose: Dilated Kidney in ultrasound. (=isolated hydronephrosis)
- To treat: Pyeloplasty. (only in symptomatic patients or reduce the renal function)



2- Ureterovesical junction obstruction:

- It causes hydroureteronephrosis.
- To diagnose: Kidney and ureteric dilatation in ultrasound. (Normally, ureter is not seen in ultrasound).
- To treat: Ureter reimplantation. (only in symptomatic patients or reduce the renal function or cause infection)



3- Duplication anomalies:

- Might be complete (two separate ureters) or incomplete (two ureters join at the distal part, hence; y-shape duplication)
- 85% unilateral.
- Associated with:

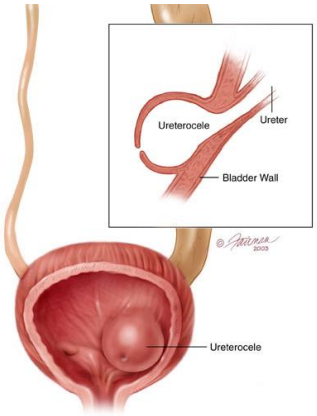
  - Reflux 43%.

  - Renal dilatation 29%.

  - Ectopic insertion 3%.

  - Ureterocele.

- To treat: If asymptomatic, do not operate. If pathology appears, refluxes for example, do operate.



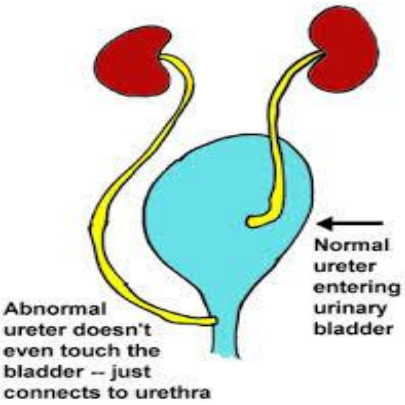
4- Ureterocele:

- Cystic dilatation of **intravesical** part of the ureter.
- It might be:

Orthotopic 'intravesical, simple, or adult type'.

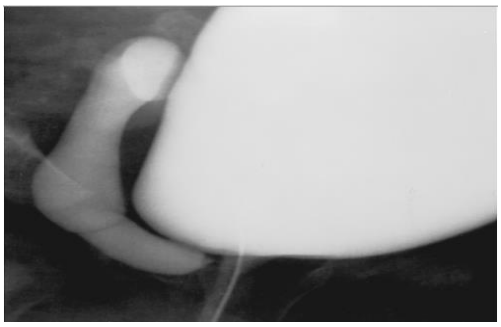
Ectopic 'extravesical, duplex, or infant type'. (note that extravesical means it occurs IN the bladder and some part **EXTENDS** to bladder neck and urethra, so still the definition is true).

- In obstruction of ureterovesical junction, the obstruction occurs outside the bladder, meanwhile in ureterocele it occurs within the bladder (intravesical).
- Incidence: female: male 7:1, **being the commonest cause of urine retention in female infants.**
- 10% bilateral, ectopic: orthotopic 4:1.
- It presents with urine retention, infection, and calculus formation.
- To diagnose: On ultrasound, thin-like structure will appear inside the bladder. On VCUG (Voiding cystourethrogram) contrast will fill the ureterocele.
- To treat: Puncture the cyst by cystoscopy and reattach the ureter to the bladder.



5- Ectopic ureter:

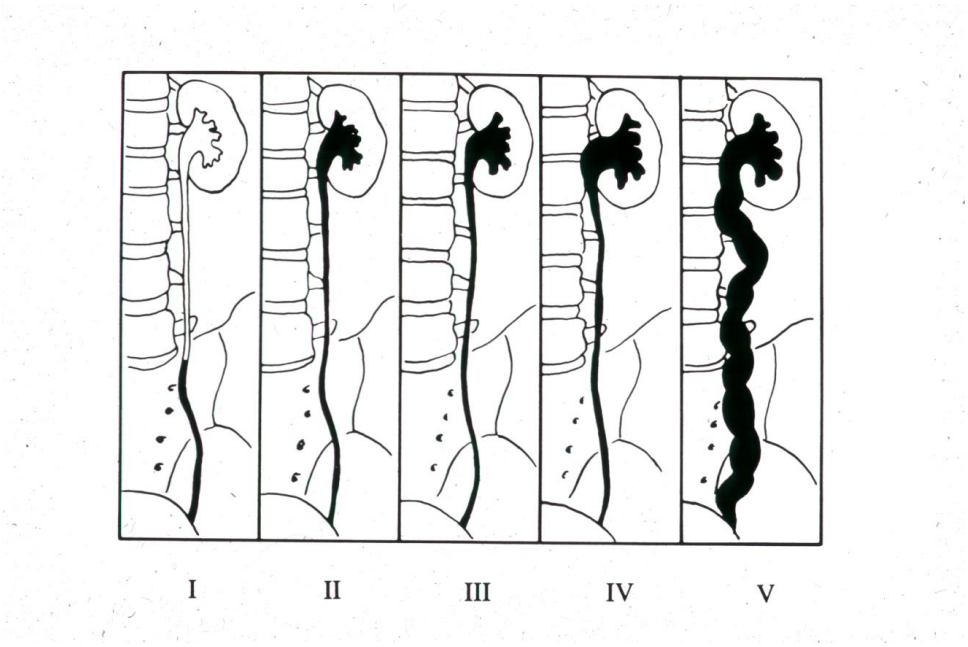
- Any abnormal anatomy of the ureter.
- In female, the opening is distal to the sphincter, thus continuous incontinence. In male, the opening is proximal to the sphincter, so no incontinence.



- To diagnose: VCUG will show the ureter outside the bladder inserting to urethra.
- To treat: Reimplant.

6- Vesicoureteric reflux:

Retrograde flow of the urine.



International Classification of Vesicoureteral Reflux	
I	Reflux into non-dilated ureter.
II	Reflux into the renal pelvis and calyces without dilatation.
III	Mild/moderate dilatation of the ureter, renal pelvis and calyces with minimal blunting of the fornices.
IV	Dilation of the renal pelvis and calyces with moderate ureteral tortuosity.
V	Gross dilatation of the ureter, pelvis and calyces; ureteral tortuosity; loss of papillary impressions.

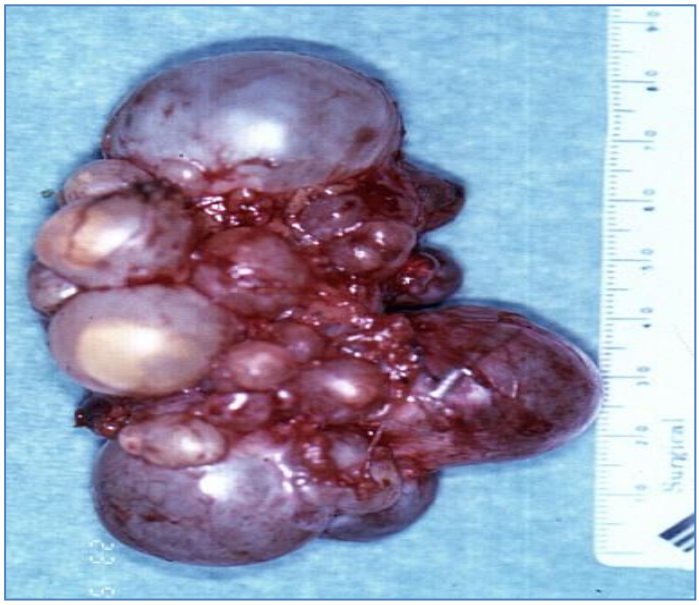
- To diagnose: best modality is **VCUG**, the contrast will appear in the ureter, while in normal individual it will remain in the bladder.
- To treat:

- Prophylactic antibiotic: one third the dose, once at night.

- Surgery: either ureteric reimplantation or endoscopic correction.

7- Posterior urethral valves:

- Universal disruption of renal system.
- It is an emergency case, seen in male infants only.
- 30-40% of cases end up with end-stage renal disease.
- **Most common cause of urinary retention in male infants.**
- Associated with: Oligohydramnios (deficiency of amniotic fluid) – bilateral renal dilatation – vesicoureteric reflux in 40% - vavle bladder.
- To diagnose: VCUG.
- To treat: **Emergency,** ablation of the posterior urethral valve, to decrease resistance.

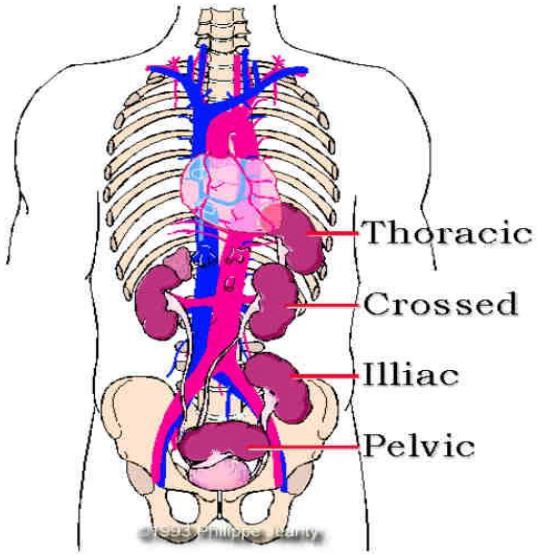


8- Multicystic dysplastic kidney:

- No nephrons, replaced by cysts.
- Non-functioning kidney, in contrast to polycystic kidney disease which the kidney is functioning.
- Diagnosis: by US multiple not connected cysts are seen.
- To treat: if asymptomatic, follow up because it might decrease in size or the fluid will be absorbed, and the kidney will disappear, thus do not operate. If symptomatic (pain, hypertention, palpable kidney in physical examination) or increased in size, simple nephrectomy is done.

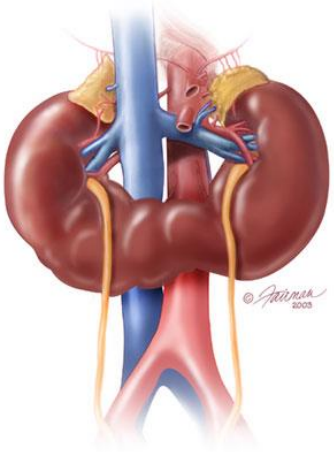
	Polycystic kidney disease	Multicystic dysplastic kidney
Kidney	Functioning	Not functioning
Incidence	Bilateral	Unilatral
DDX	Large kidneys	Hydronephrosis
Ultrasound	Cysts do communicate with central pelvis	Cysts do not communicate with central pelvis

Kidney Anomalies



1– Renal ectopia:

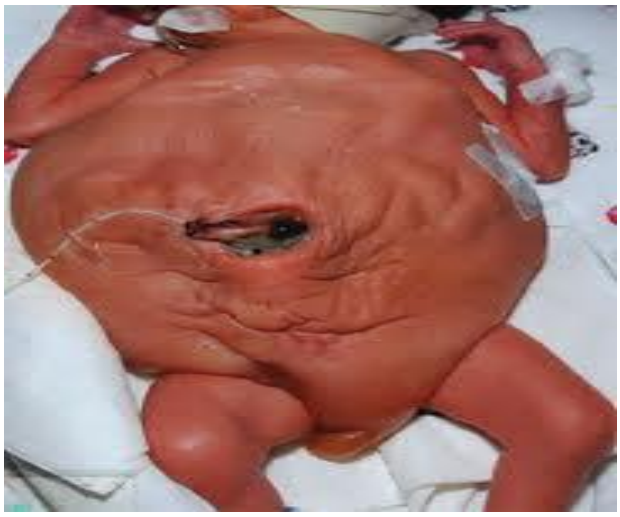
- Normal anatomy of the kidney is from T10 to L3, otherwise: ectopic.
- In x-ray, we differentiate it from duplication that the ureter will be inserted on the other side, while in duplication the ureter will be inserted in the same site.
- To treat: Do not operate unless complication occurs, and the operation in situ (Do not move the kidney).
- The only ectopic kidney we move from its place is the thoracic when symptomatic 'hernia'.



2– Horseshoe kidney:

- 90% of cases the connection in the lower pole.
- To treat: do not operate unless symptomatic.

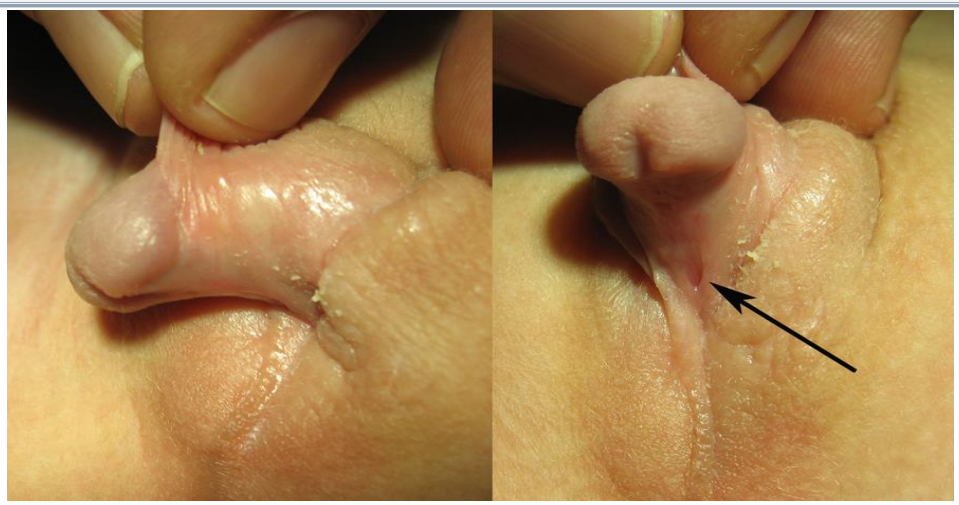
Prune Belly syndrome



Prune Belly syndrome 'triad syndrome':

- Absent abdominal wall muscle.
- Bilateral undescended testes 'abdominal testes'.
- Urinary tract dilatation.

Urethral Malformations



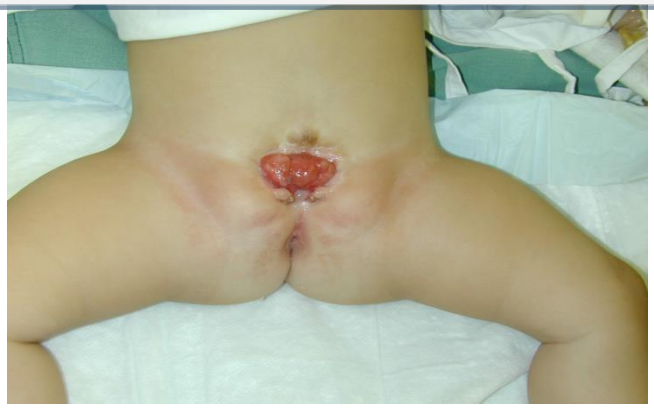
1- Hypospadias:

- Abnormal opening of the urethral meatus in ventral aspect.
- To treat: 6-9 months is the optimal age to do the operation. NEVER do circumcision because skin is used to do suturing.

2- – Epispadias:

- Abnormal opening of the urethral meatus in dorsal aspect.

Bladder Exstrophy



Bladder Exstrophy:

- Absence of skin, subcutaneous tissue, muscles, sheathes and anterior wall of the bladder.
- So grossly, you will see the posterior wall of the bladder.
- In male infants, exstrophy is seen with epispadias.

Summary

(Dr said what you need to know from the lecture are Definition, Dx and the outline of treatment)

	Dx	Rx	Comments
Antenatal hydronephrosis	Ultrasound (dilatation).	Depends on the type.	Common cause is obstruction.
Pelviureteric junction obstruction	Dilated kidney in ultrasound.	Pyeloplasty.	-
Ureterovesical junction obstruction	Dilatation of the kidney and ureter in US.	Ureter reimplantation.	-
Duplication anomalies	-	When symptomatic.	-
Ureterocele	On ultrasound, thin-like structure will appear inside the bladder.	Puncture the cyst by cystoscopy and reattach the ureter to the bladder.	Commonest cause of urine retention in female infants.
Ectopic ureter	VCUG will show the ureter outside the bladder inserting to urethra.	Reimplant.	In female, continuous incontinence. In male, no incontinence.
Vesicoureteric reflux	VCUG, the contrast will appear in the ureter	Prophylactic antibiotic - Surgery: either ureteric reimplantation or endoscopic correction.	-
Posterior urethral valve	VCUG	Emergent ablation of the posterior urethral valve.	Commonest cause of urinary retention in

			male infants.
Multicystic dysplastic kidney	-	If symptomatic, simple ephrectomy is done.	No nephrons, replaced by cysts.
	Dx	Rx	Comments
Renal ectopia	-	Do not operate unless complication occurs.	The only ectopic kidney we move from its place is the thoracic when symptomatic 'hernia'.
Horseshoe kidney	-	When symptomatic.	90% of cases the connection in the lower pole.
Prune belly syndrome	-	-	- Absent abdominal will muscle. - Bilateral undescended testes 'abdominal testes'. - Urinary tract dilatation.
Hypospadias	-	Suturing	NEVER do circumcision because skin is used to do suturing.
Epispadias	-	-	-
Bladder exstrophy	-	-	In male infants, exstrophy is seen with epispadias.

Questions:

1- You did MCUG for a male infant; you found dilated kidneys, ureters and bladder.
What would be the most likely structures effected?
   A. Anterior urethral valve
   B. Posterior urethral valve
   C. Urinary bladder

2- Patient with Vesicoureteric reflex , first line of management :
   A. Prophylactic antibiotics
   B. Endoscopic correction
   C. Uretral implantation

3- The common cause of urine retention in female infant :
   A. Renal and uretric duplication
   B. Ureterovesical junction obstruction
   C. Uretrocele

Answers:

B , A , C