UROLOGY
Pearls and Summaries

Illustrations are from Campbell's Urology and Smith's General Urology

The Evaluation of the Urological Patient

A careful history is critical

You must think in terms of differential not only definition

Urology covers patients of widely different age.

History will guide the multifaceted diagnostic technology available in Urology.

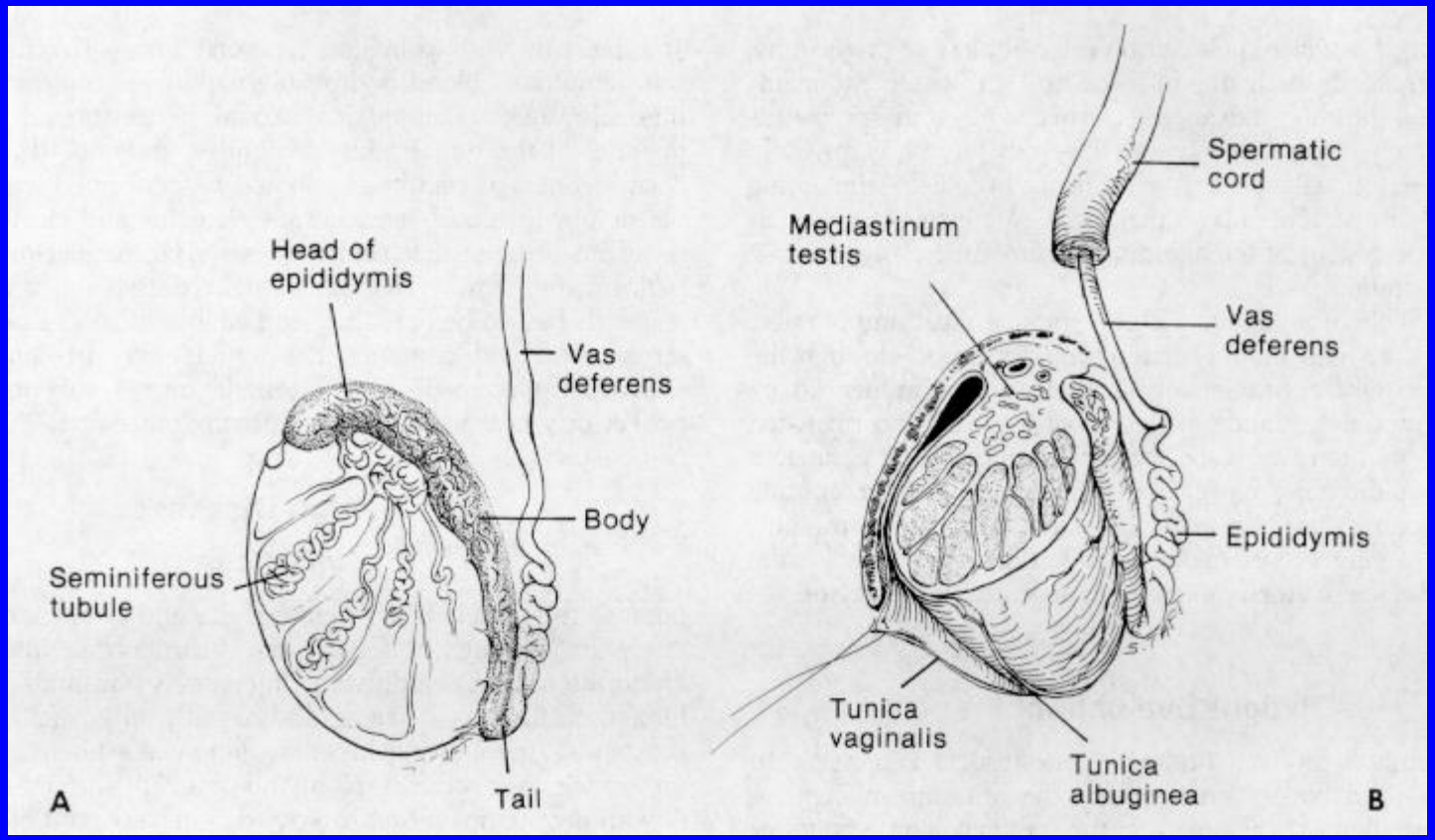
The Association For Surgical Education Objectives

- Dx of patient who presents with pain or mass in scrotum
- Testicular vs extratesticular origins
- Discuss benign vs malignant causes
- Discuss emergent vs non-emergent causes
- Discuss the management of cryptorchid testis

The Association For Surgical Education

Objectives:

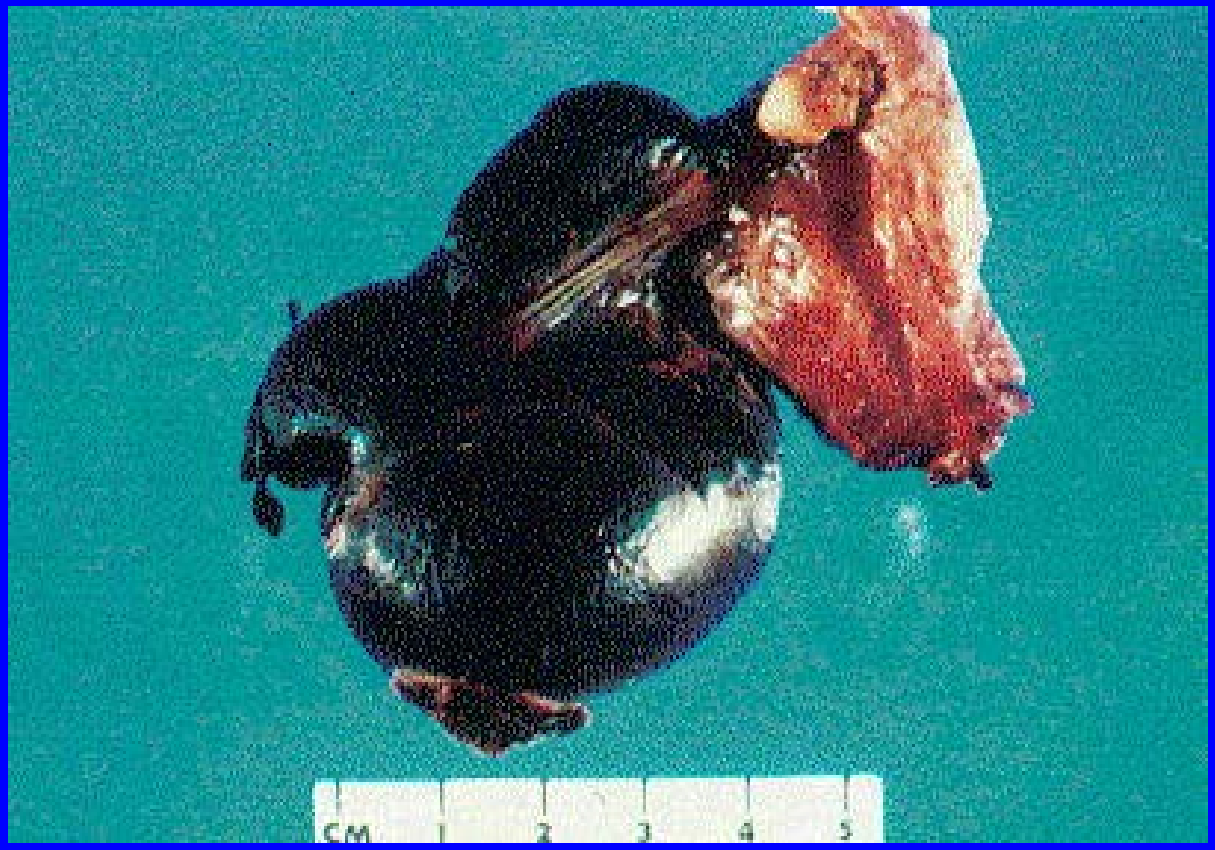
- Scrotal Pathology
  - Anatomy of scrotal contents - embryological development and descent of the testicle

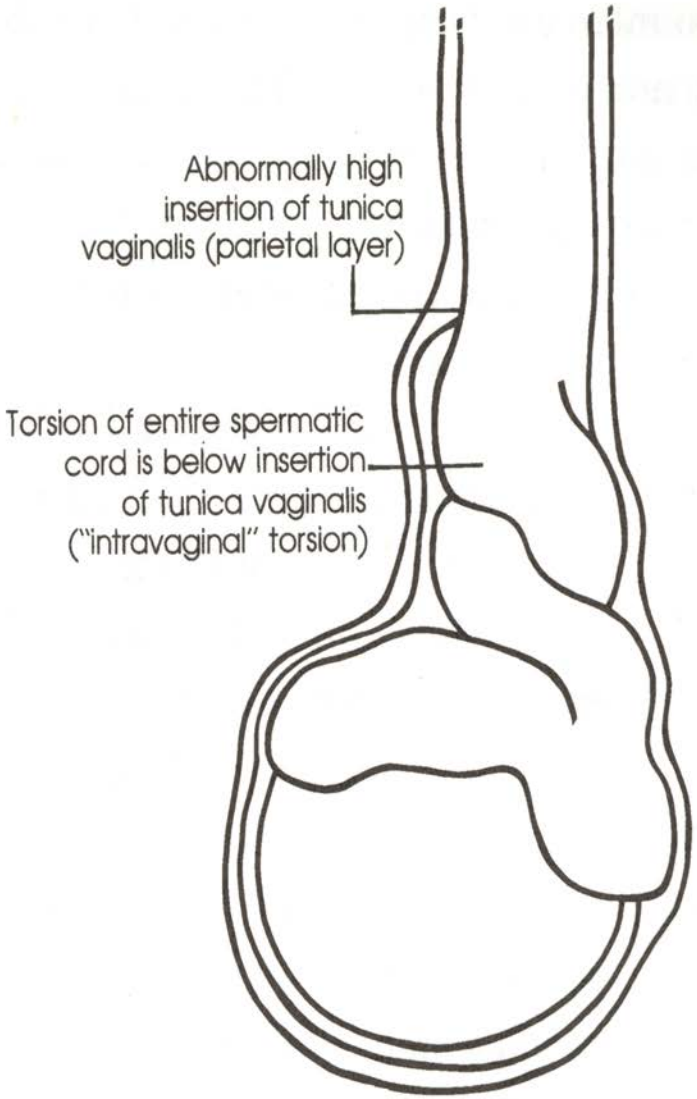

Head of epididymis
Vas deferens
Body
Seminiferous tubule
Tail
A
Spermatic cord
Mediastinum testis
Vas deferens
Epididymis
Tunica vaginalis
Tunica albuginea
B

Case In Point

- Twelve year old male presents to you at three AM in the E.R. with a history of awakening with severe unrelenting pain in his left scrotum. He was struck in the scrotum by a soccer ball the previous afternoon but was able to return to the game.He has a swollen left scrotum on physical exam. What is your diagnosis?

TORSION




Abnormally high
insertion of tunica
vaginalis (parietal layer)
Torsion of entire spermatic
cord is below insertion
of tunica vaginalis
("intravaginal" torsion)

Acute Scrotum

Differential Diagnosis

- TORSION - always consider
- Epididymitis
- Trauma
- Tumor
- Mullerian Remnant

TORSION
Pearls

Acute Scrotum = Torsion!!!! 1st. Dx.

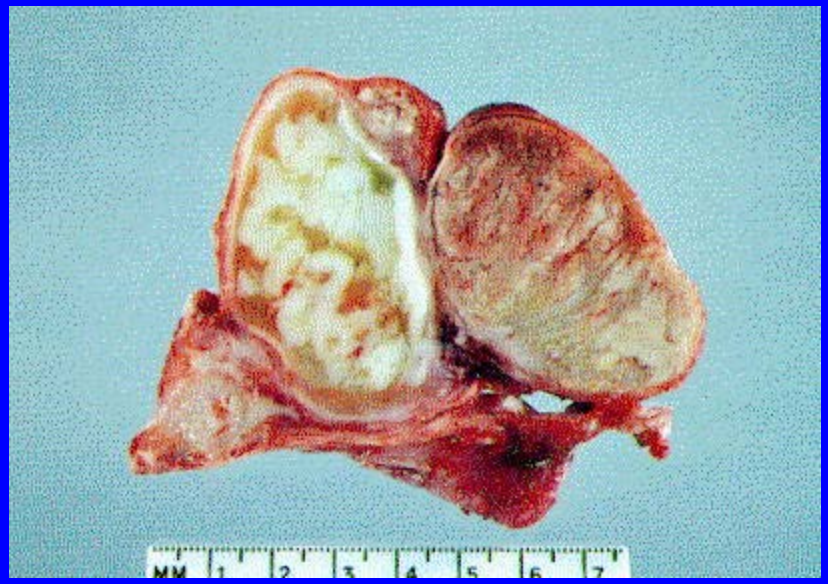
- Cremasteric reflex status?
- Orientation of epididymis?
- Relief by elevation?
- Shortened cord?
- Hx. Trauma does NOT R/O!

Operate if ANY Doubt because you have six hours! – Bilat. Exploration!

Scrotal Pathology Pearl

- Ischemic pain does not relent unless flow is restored or end organ becomes necrotic

Epididymitis



Scrotal Pathology Pearls

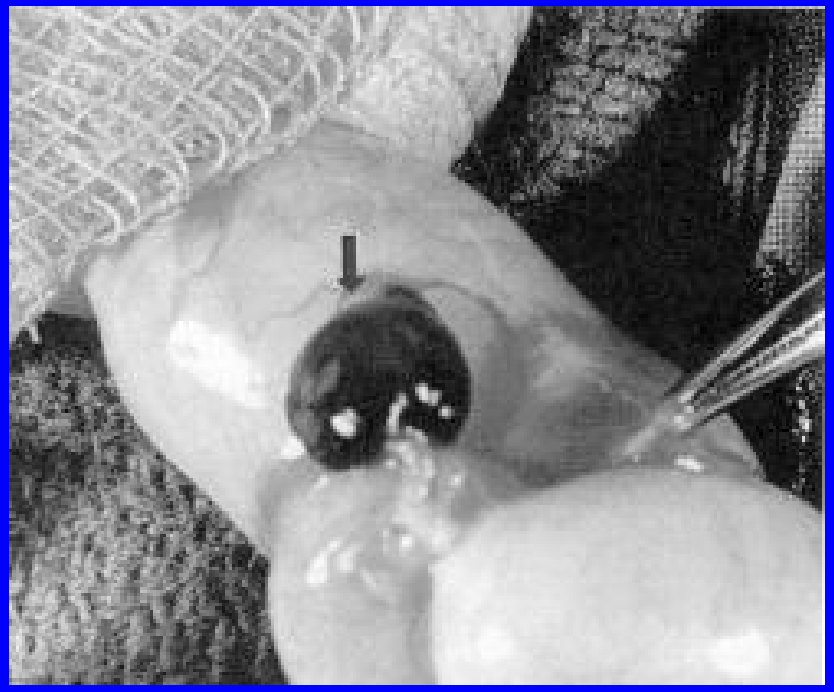
Epididymitis – STD? – anomaly in child

1/3 testis tumors present as epididymitis

Relief of pain by elevation of the testis(Prehn's sign)

Rx. Elevation – ice - antibiotics – Spermatic cord block

Torsion of Appendix Testis



“BLUE DOT ” sign upon transillumination

Mullerian Remnant

Scrotal Pathology

SCROTAL SWELLING IS AN EMERGENCY!!!!!!!! IF TORSION IS SUSPECTED REFER TO UROLOGIST IMMEDIATELY!!!

Scrotal Pathology Essentials

Differential Dx. - Non-acute

- 1. Hydrocoele
- 2. Spermatocoele
- 3. Hernia
- 4. Testicular Tumor
- 5. Varicocoele
- 6. Cryptorchid testis

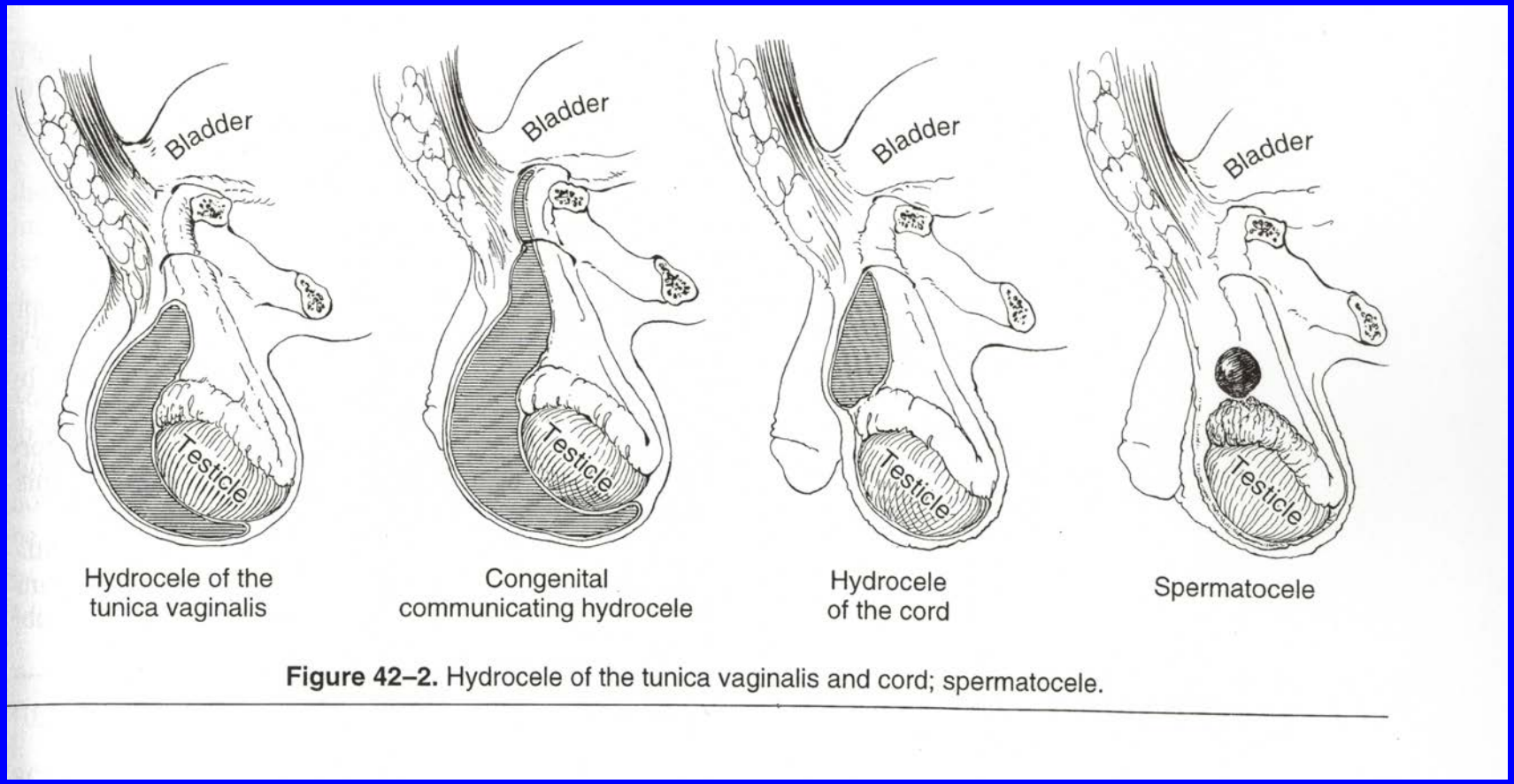
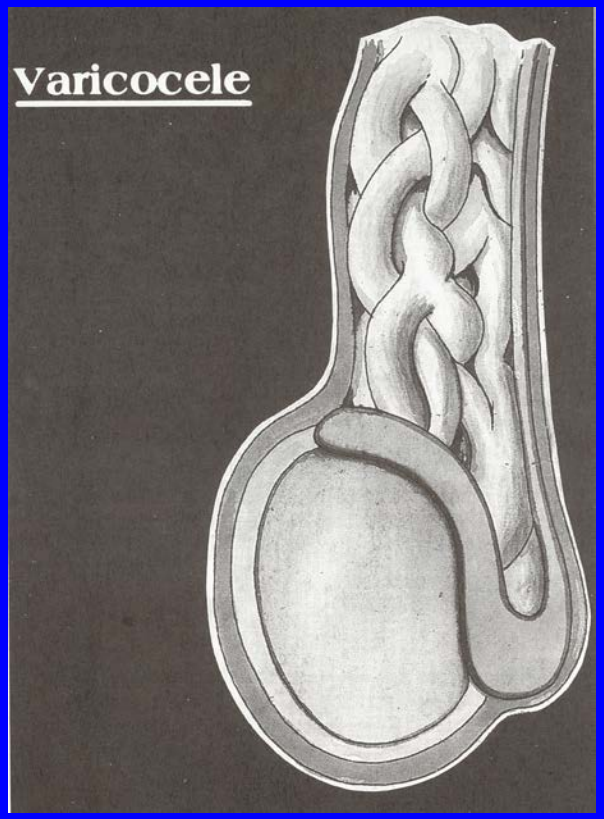


Figure 42–2. Hydrocele of the tunica vaginalis and cord; spermatocele.

Differential Diagnosis of Scrotal Masses Which Transilluminate


Varicocele

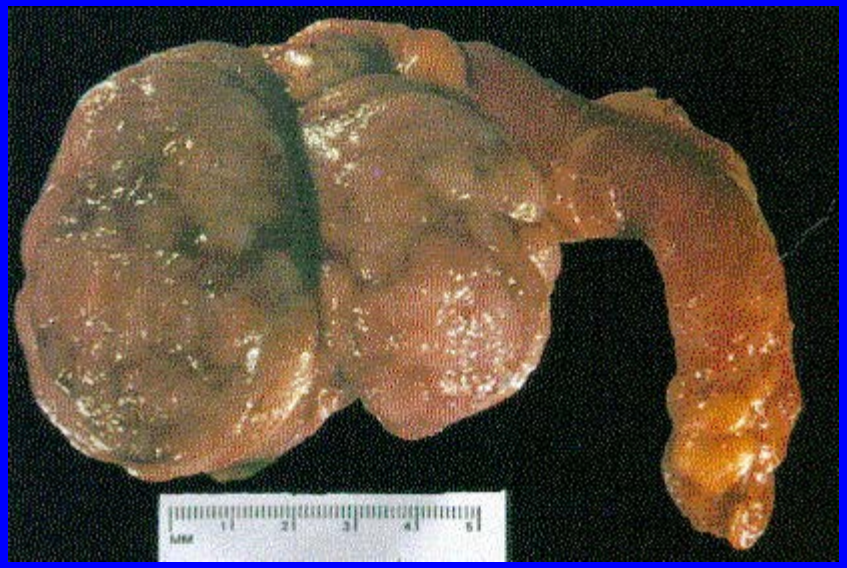
Scrotal Pathology Pearls

- Hydrocoele = transilluminates – testis palpably separate? – r/o hernia
- Spermatocoele = transilluminates – Clearly from head of epididymis
- Varicocoele – should disappear upon recumbence – beware R if solitary
- Testis tumor – ANY mass in the substance of testis is cancer until proven otherwise

Case In Point

- Scott Hamilton, Olympic Gold Medalist, began having severe abdominal pain while on tour with ‘Stars On Ice” Had had hx. of sporadic pain before but thought it was due to “junk food.” CAT scan showed retroperitoneal mass and Px. Showed testicular mass. How do we diagnose, evaluate and treat.What are the risk factors? Survival odds?

SEMINOMA



Testis Cancer
Essential Concepts

- Disease of young men
- Rare in African-Americans
- Presents as mass in testis – can present as acute scrotal problem
- 95% are malignant germ cell tumors
- Cryptorchid testis major risk

Testis Tumors

Types

- Seminoma
- Embryonal Cell
- Teratoma
- Choriocarcinoma survival rare

Embryonal Cell Carcinoma

Testis Tumors
Essential Concepts

Diagnosis

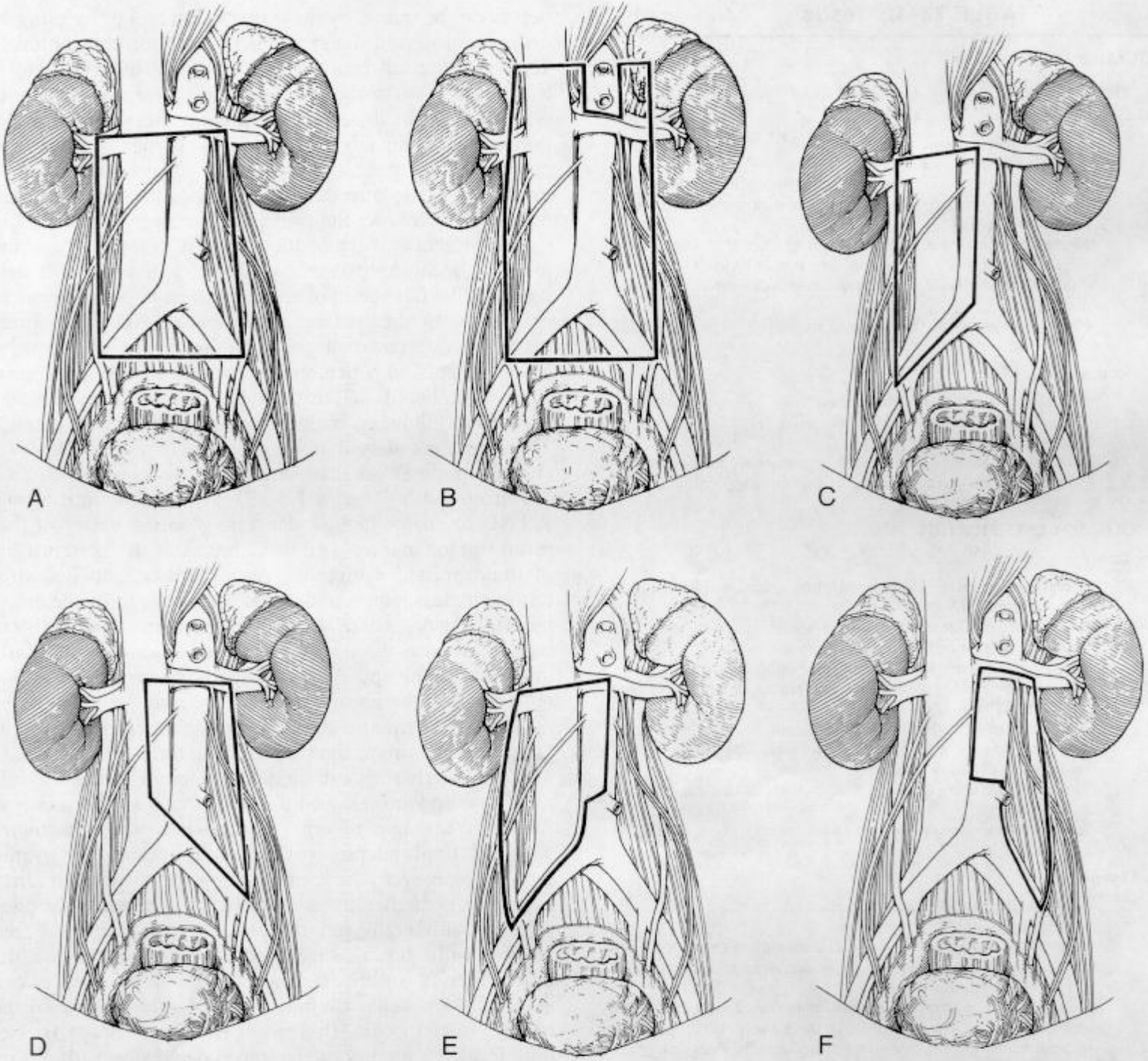
- Physical exam
- Ultrasound –
- DO NOT BIOPSY!! – EVER!!
- Markers - serum
  - Beta HCG
  - Alpha Fetoprotein

Testis

Due to relationship of Metanephros to the Gonadal Ridge:

1: pain refers from testis to flank and abdomen – T-12 & L-1

2: primary testicular nodal drainage is to renal level


A
B
C
D
E
F

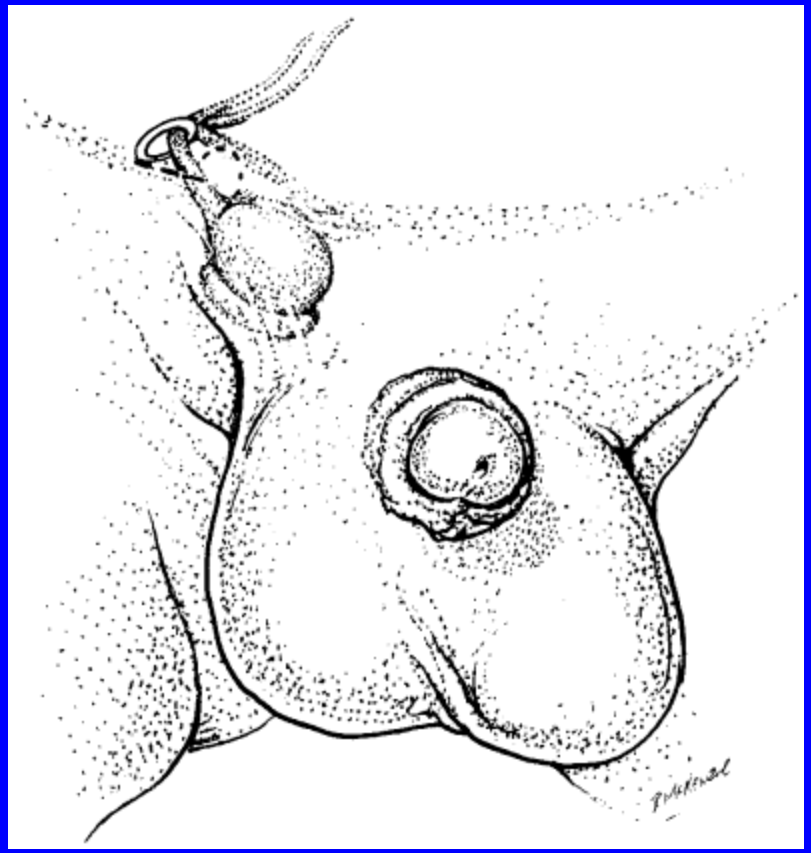
Testis Tumor

- Treatment
- Radical Inguinal Orchiectomy = ALL
- Seminoma – XRT to retroperitoneum for stage 1
- Embryonal – Retroperitoneal Lymphadenectomy for stage 1
- Surveillance for stage 1 is an option
- Platinum based chemo. Highly effective

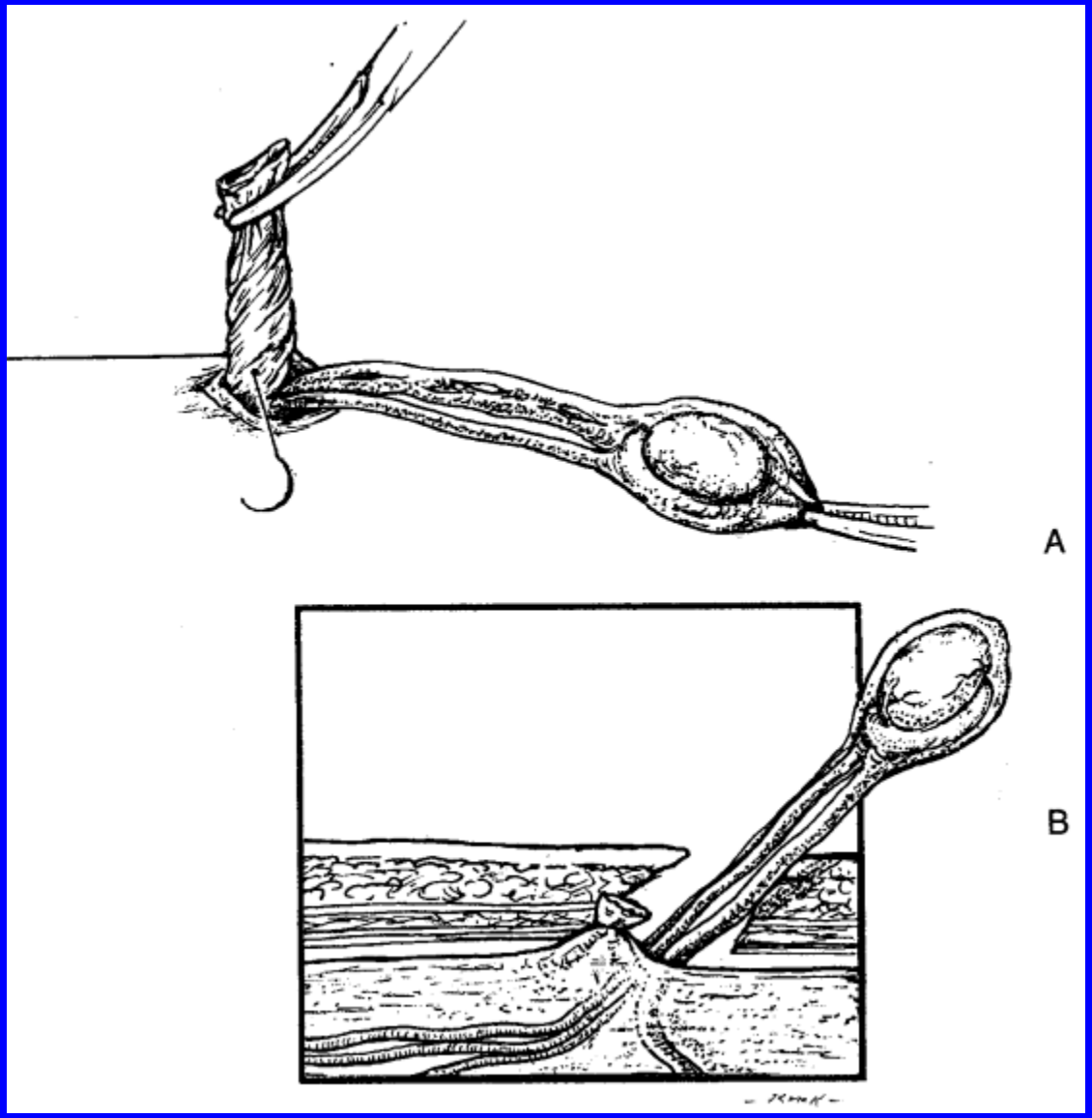
Pediatric Urology
Essential Concepts

Cryptorchid Testis

- Incidence higher with premature birth
- Spontaneous descent most likely in first year – testosterone surge
- Retractile vs true lack of descent
- Increased incidence of Ca. & Infertility



Remember to FIRST trap testis by placing finger at the internal ring.



Crytorchid testis always has asso. hernia

HYPOSPADIAS - PEARLS

Incidence = 1/500

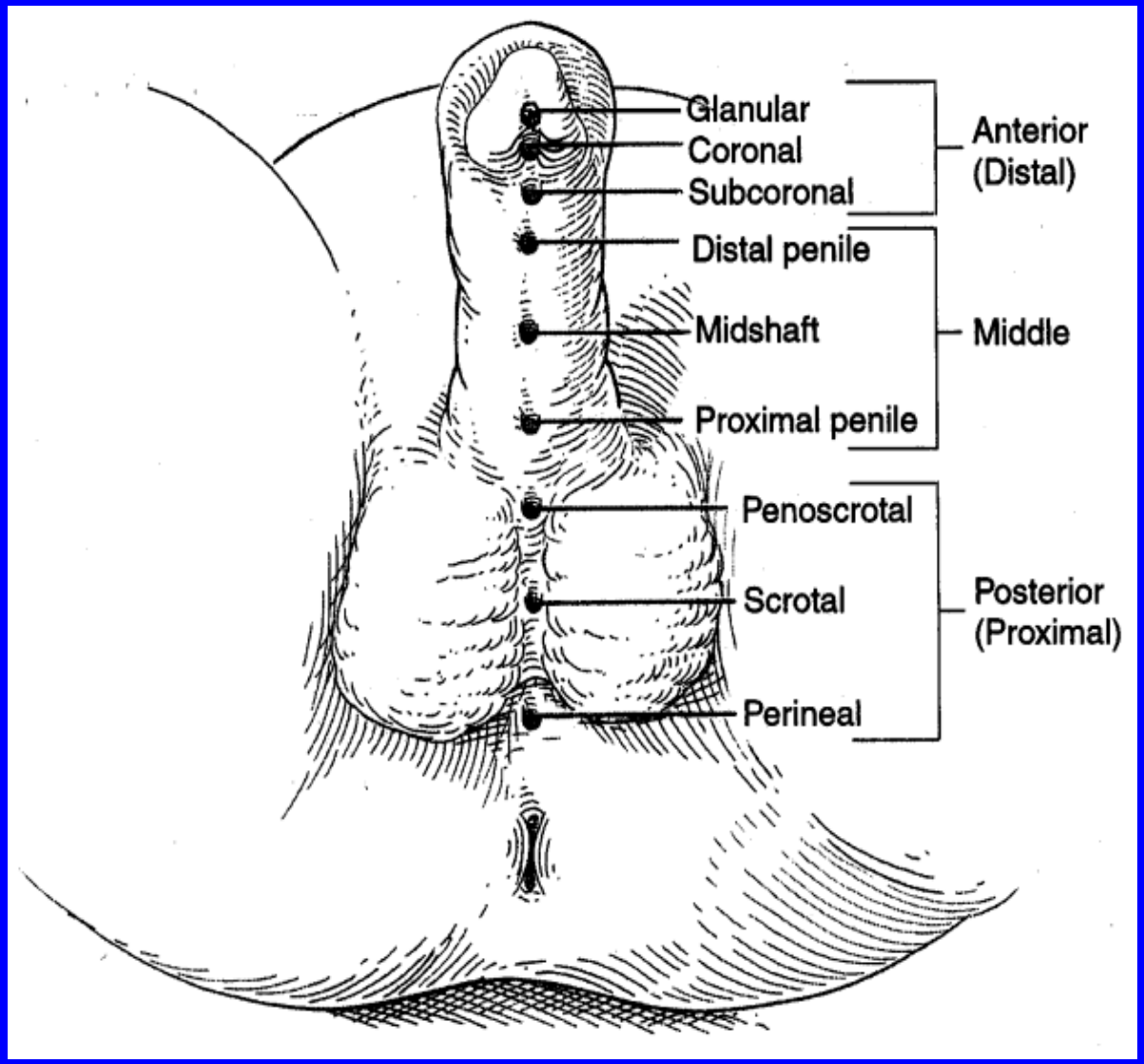
The more distal the urethral opening the less likely is Intersex

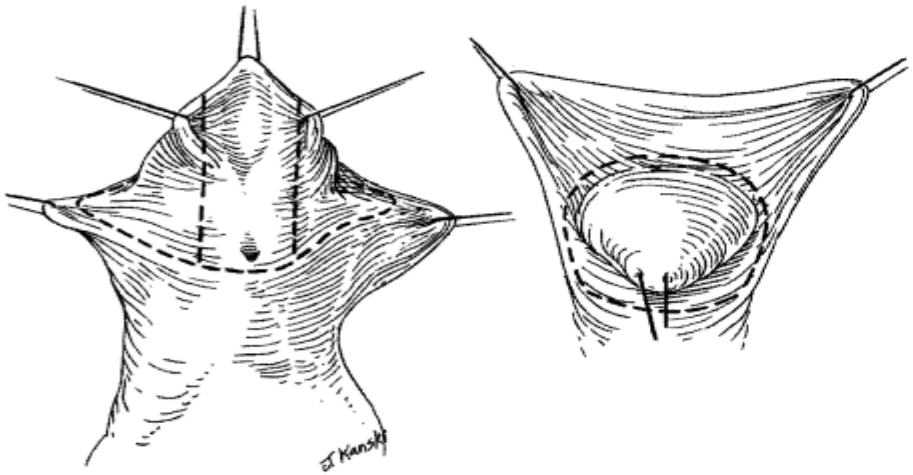
In newborn consider adrenal hyperplasia

UDT + Hypospadias – think Intersex

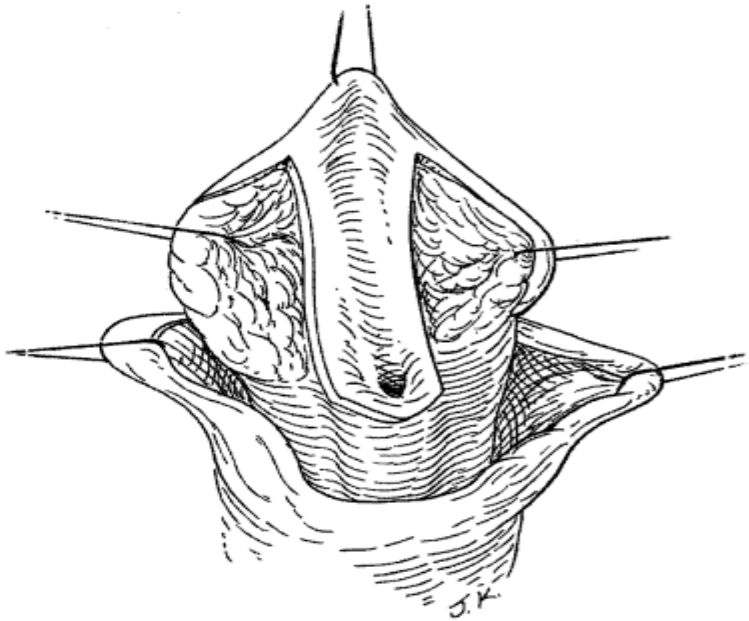
Do Not Circumcise

Repair by age one

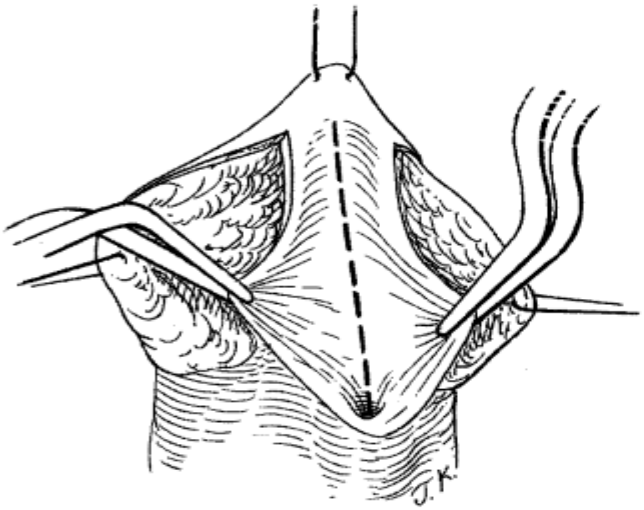




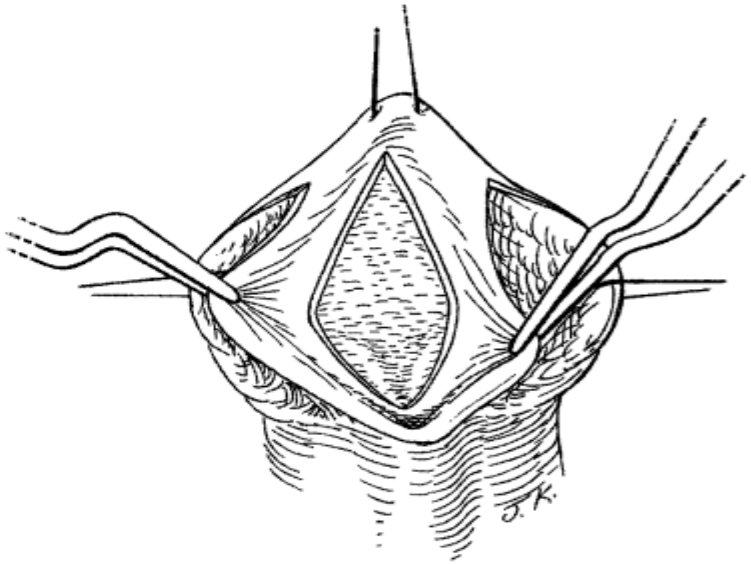
A



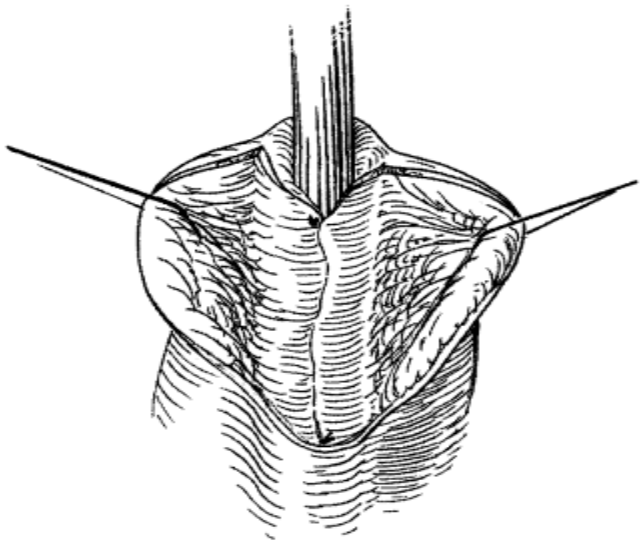
B



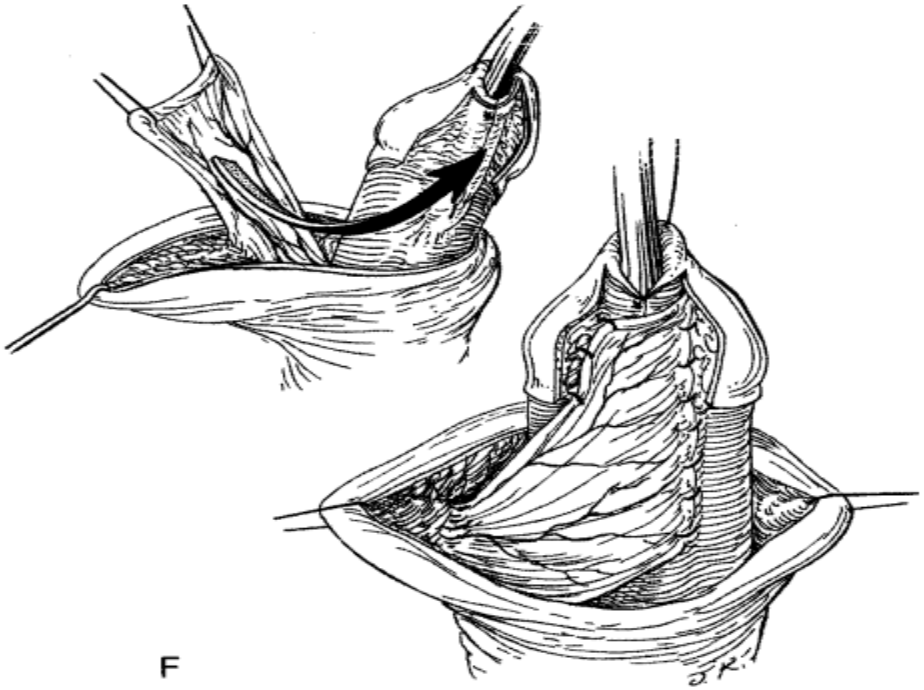
C



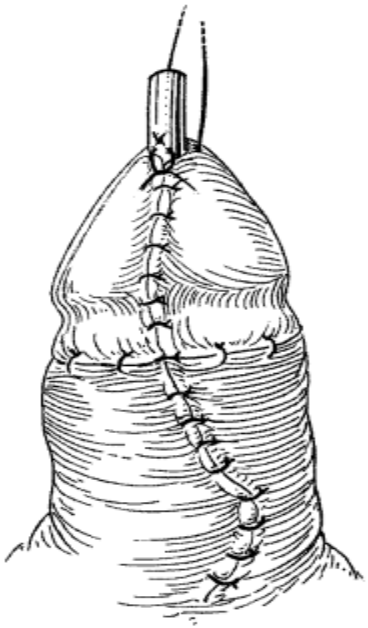
D



E



F



G

Circumcision

In male neonate it confers a 10xs advantage in avoiding urinary tract infection

It decreases the risk of penile cancer but risk is slight

Most are done for social or religious reasons

Indicated by infection or paraphimosis

Circumcision Paraphimosis

- Reduce by pressure on glans-then circ
- True phimosis is unusual
- Do not manually open foreskin adhesions to glans unless you plan to circ.

CASE IN POINT

- A five year old white female presents to you with a history of fever, flank pain, and dysuria. She has had several episodes of fever as an infant, which was diagnosed as URI. Is this latter history important? What do you do? Does this problem have any import to the patient when she becomes an adult?

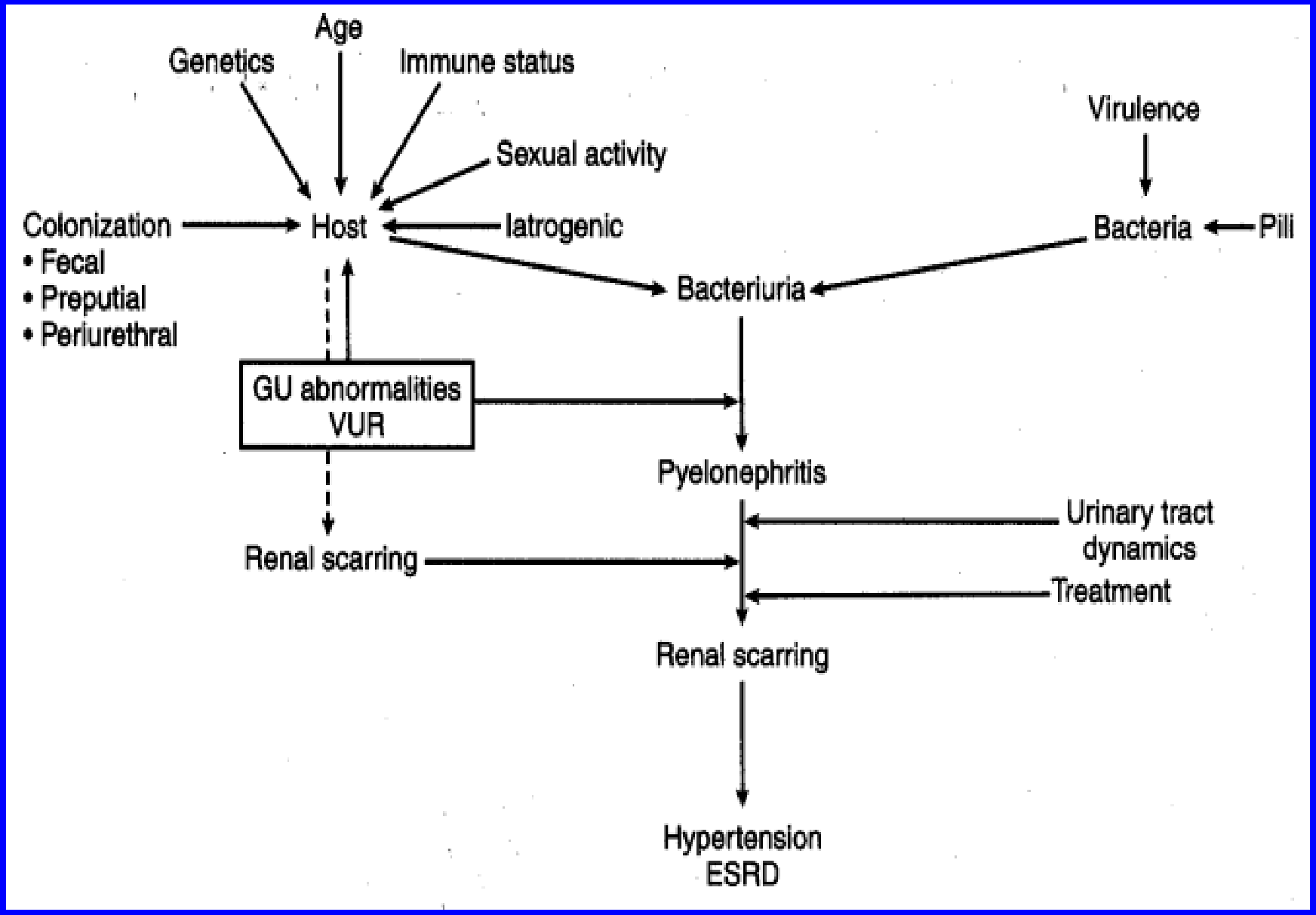
Pediatric Urology

- Pearls Hx. & Px.
- Hx. Febrile UTI = workup in child - 30% will have reflux and 30% will have a renal scar – in a male child, esp. neonate, likely to have congenital anomaly - REMEMBER - cystitis is an afebrile disease

Urinary Tract Infection

Urinary Tract Infection

- More common in females after first six months
- Infection in male neonate = anomaly
- Multiple UTIs in childhood = 50% incidence of intercourse related infection & >ASB in pregnancy
- Female perineal defense is key
- 85% of UTIs are e-coli


Age
Genetics
Immune status
Virulence
Sexual activity
Colonization
• Fecal
• Preputial
• Periurethral
Host
Iatrogenic
Bacteria
Pili
Bacteriuria
GU abnormalities
VUR
Pyelonephritis
Urinary tract
dynamics
Renal scarring
Treatment
Renal scarring
Hypertension
ESRD

REFLUX NEPHROPATHY

Little girls with renal scarring have a 10-15% chance of developing toxemia of pregnancy.Much higher incidence of ASB of pregnancy, due to perineal colonization.

Bottom line : Recurrent urinary tract infections in childhood predict a subset of women who will have complications of pregnancy.

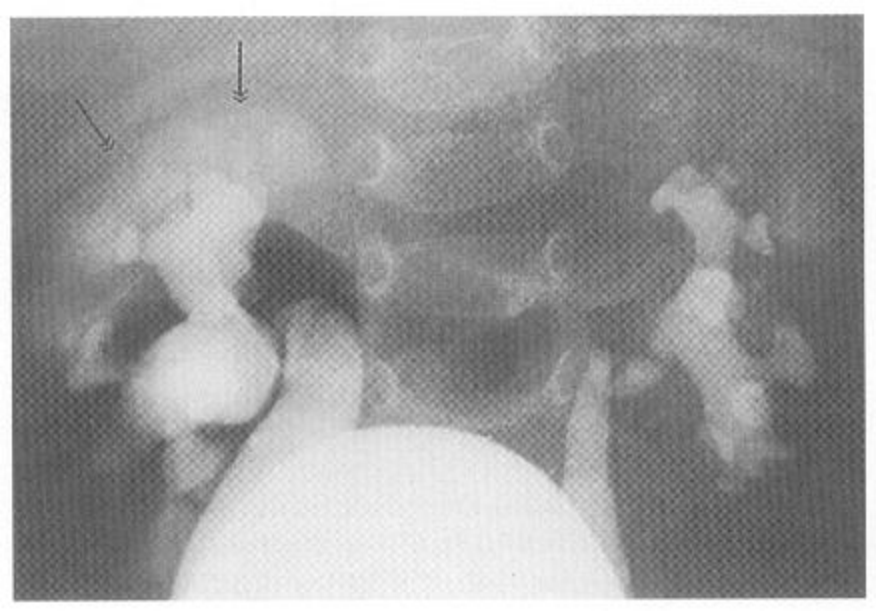
REFLUX-NEPHROPATHY

Hypertension

11 % incidence

Sir David Innes-Williams

Bottom line : Renal scars are noted in @ 1/3 of little girls evaluated for urinary tract infection and a significant number will have hypertension



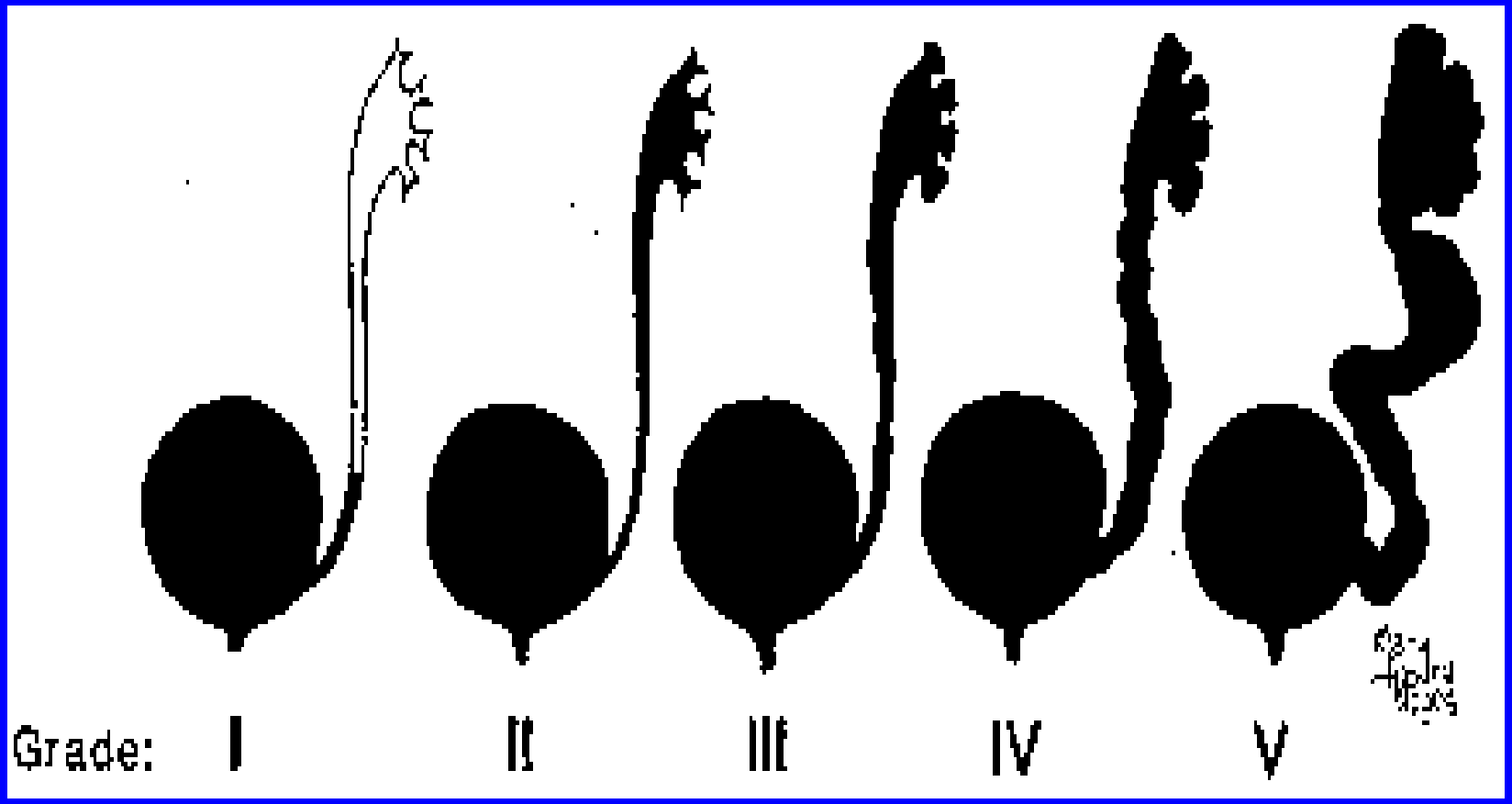
Pediatric Urology

Reflux

Diagnosis - by ultrasound in fetus and neonate

- during evaluation of UTIs with VCUG

REFLUX



Pediatric Urology

Reflux Management

Depends upon grade of reflux, age, and ability to control infection

1. Suppression with antibiotics and follow – dose = 1/3 dose/day
2. Surgical repair >95% success

REFLUX NEPHROPATHY

SURGICAL CORRECTION OF REFLUX DOES NOT CHANGE THE INCIDENCE OF URINARY TRACT INFECTION . URINARY TRACT INFECTIONS RESULT FROM COLONIZATION , REFLUX IS A CONDUIT AND IN MANY CASES THE RESULT OF ANOTHER PROBLEM

URINARY TRACT INFECTION Pearls

- 85% of adult female cystitis is intercourse related. 85% are due to e-coli. If there are no complicating factors you may Rx. recurrent intercourse related cystitis with one dose of nitrofurantoin or Bactrim post intercouse.
- Three days is usually adequate Rx. For acute uncomplicated cystitis.

Urinary Tract Infection Pearls

- E-coli most likely in all ages
- Patient should be asymptomatic in 48 - 72 hours. If not consider:
  - Wrong antibiotic or poor renal function or perfusion = urine level
  - Foreign body - stone for example
  - Closed space infection - obstruction or abcess

URINARY TRACT INFECTION Pearls

- Most recurrent cases of cystitis are re-infection not infection inadequately treated
- You must consider urine levels of antibiotic when considering sensitivity
- Choosing a broader spectrum antibiotic is poor Rx., in recurrent UTI, unless C&S demands it.

Pediatric Urology
Pearls

Hematuria

- Gross – emergency in neonate
- Microscopic – in child – think G.N. and U.T.I.
  - Always check perineum, foreskin, or meatus

Lower Urinary Tract Symptoms
LUTS

- Irritative Sxs
- Frequency – alone = volume
- Urgency + Frequency - think unstable bladder, neurological lesion, aging, Ca. In Situ
- Dysuria - think infection
- - stranguria in infant with hematuria - think sarcoma
-

PAIN
Pearls

- Suprapubic pain unrelated to the act of voiding is not usually GU in origin
- Suprapubic pain relieved by the act of voiding is usually Interstitial Cystitis
- Suprapubic pain worsened by voiding suggests UTI

Pediatric Urology

- Pearls Hx. & Px
- REMEMBER – Irritative urinary sxs may be indication of sexual abuse.

Pediatic Urology

- Enuresis
- Nocturnal bed wetting, in < 6y/o, without additional sxs does not demand evaluation.
- Association with UTI hx. = workup
- Diurnal sxs. = consider workup
- “Curtsy sign” = consider workup

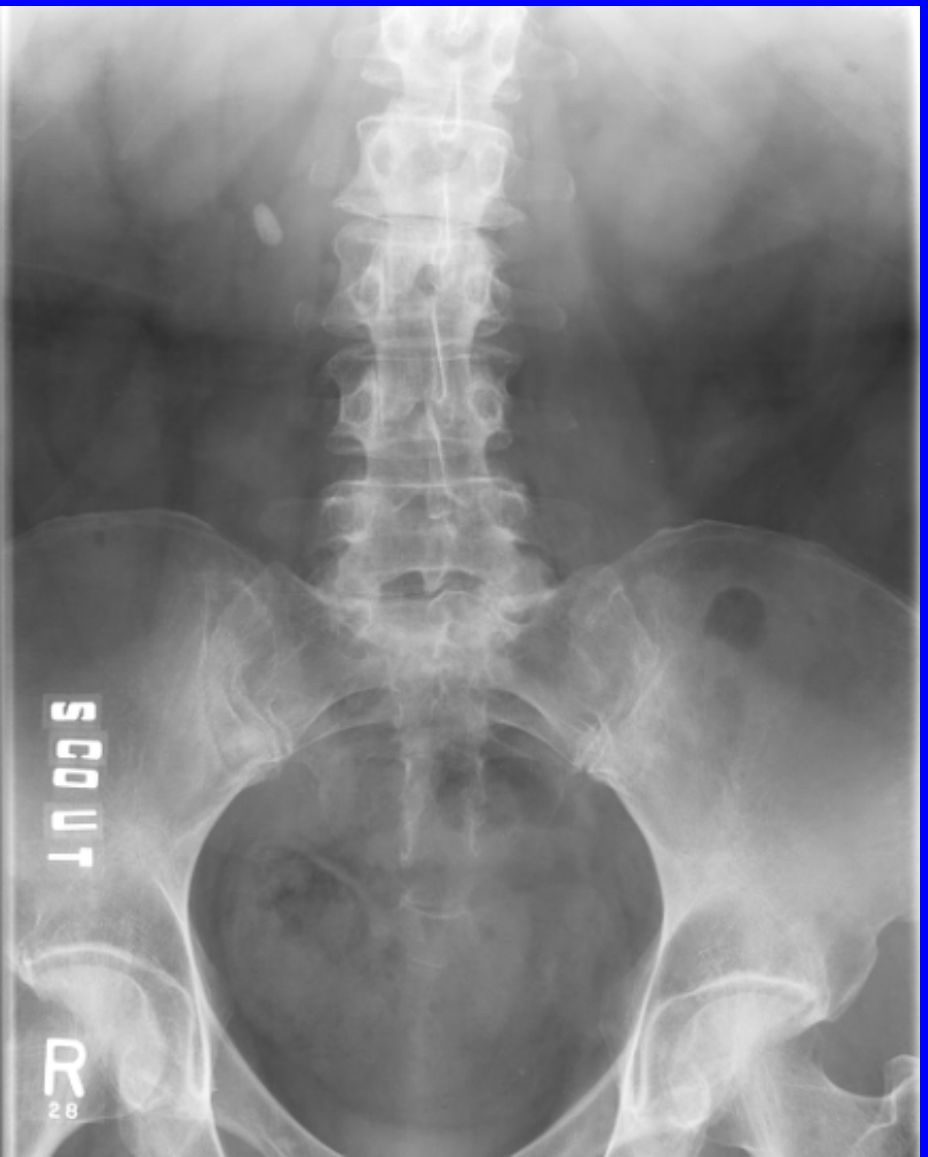
Pediatric Urology

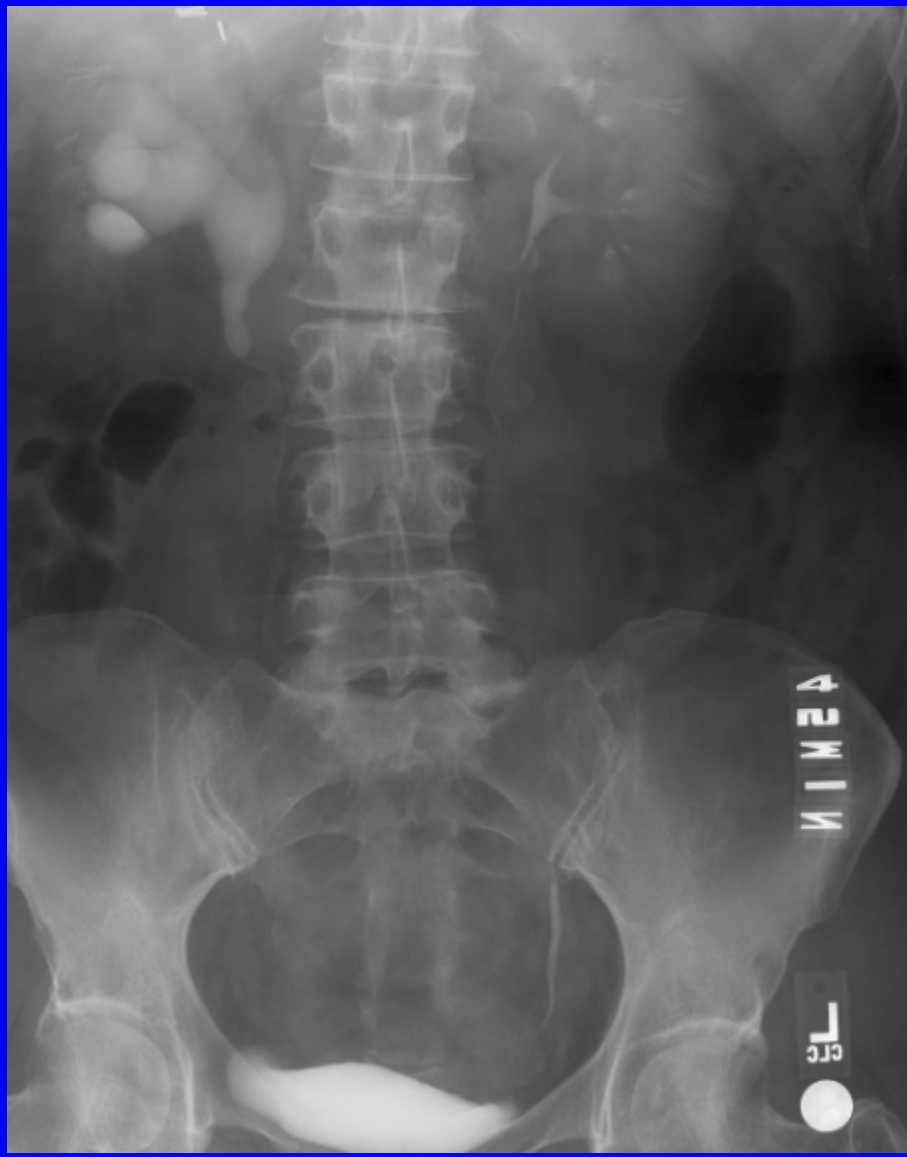
- Pearls Hx & Px
- Bowel function hx. is critical, esp. in children with dysfunctional voiding and urinary tract infection.Constipation must be corrected in these instances

CASE IN POINT

- A thirty-five year old male presents to you with severe episodic right flank pain which radiates to the right testicle.He has a history of passing two ureteral calculi over the last four years. He has no fever or history of UTI’s. How do you evaluate and manage?

Obstructing right ureteral stone





Three points where ureteral stone is likely to become impacted:

1. UPJ
2. Crossing Vessels
3. UV Junction

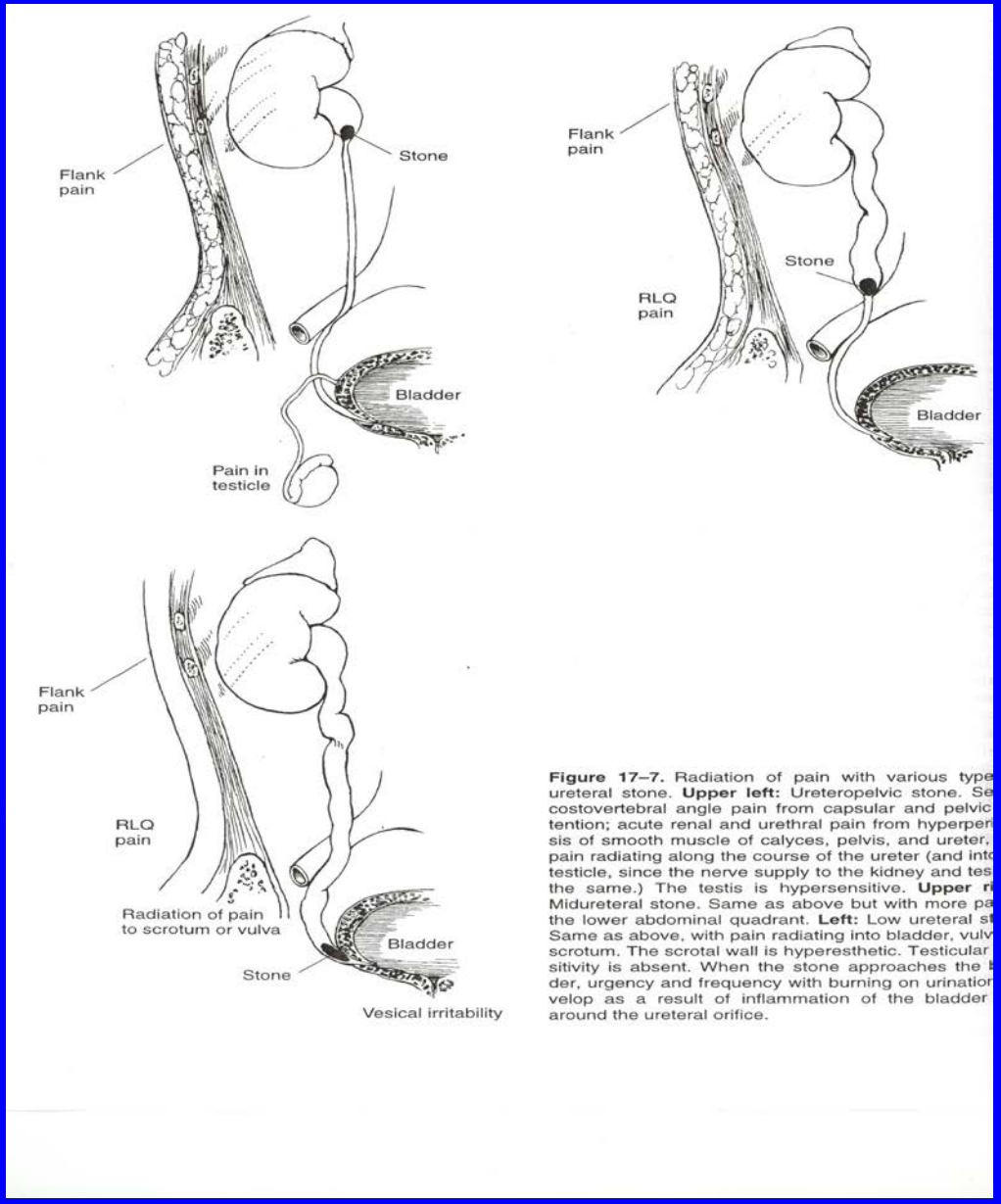


Figure 17–7. Radiation of pain with various type ureteral stone. **Upper left:** Ureteropelvic stone. Se costovertebral angle pain from capsular and pelvic tention; acute renal and urethral pain from hyperper sis of smooth muscle of calyces, pelvis, and ureter, pain radiating along the course of the ureter (and int testicle, since the nerve supply to the kidney and tes the same.) The testis is hypersensitive. **Upper ri** Midureteral stone. Same as above but with more pa the lower abdominal quadrant. **Left:** Low ureteral st Same as above, with pain radiating into bladder, vulv scrotum. The scrotal wall is hyperesthetic. Testicular sitivity is absent. When the stone approaches the der, urgency and frequency with burning on urinatio velop as a result of inflammation of the bladder around the ureteral orifice.

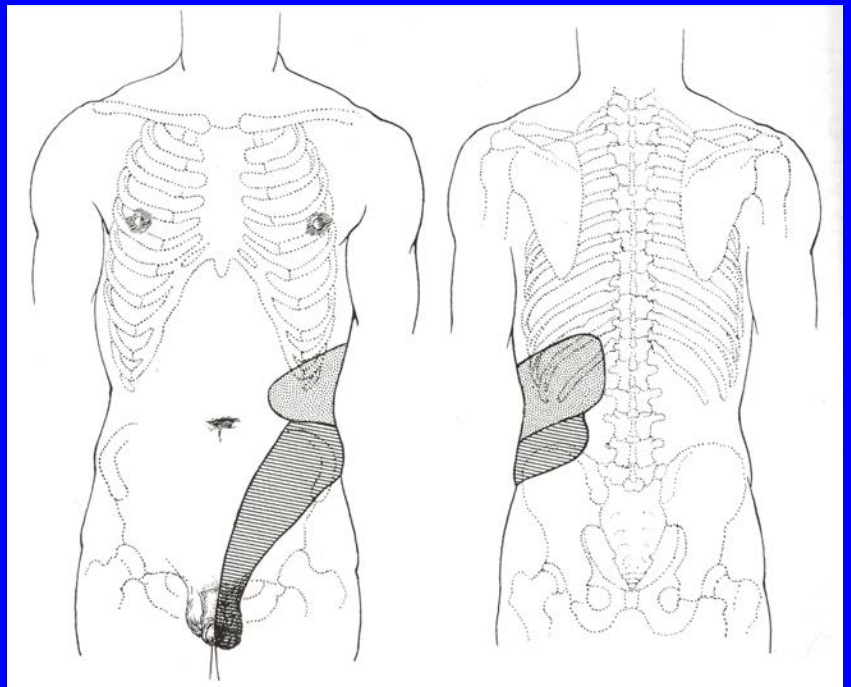


Figure 3–1. Referred pain from kidney (dotted areas) and ureter (shaded areas).

PEARL UROLITHIASIS

- Frequency and urgency in absence of fever, usually means stone in lower ureter and has passed the upper two points of obstruction.

UROLITHIASIS

- 10% of U.S. residents will have a stone
- One stone = 50% recurrence in 5 yrs
- 30-50 yrs most likely age of onset
- Males are more likely but “fast food” diet is lowering ratio

UROLITHIASIS

- Stone types
- Calcium oxalate = 70%
- Uric acid=7%
- Struvite=7%
- Cystine

UROLITHIASIS

- Spiral , non-contrast, CAT is the most useful study with acute stone. A plain KUB should accompany the CAT.

UROLITHIASIS

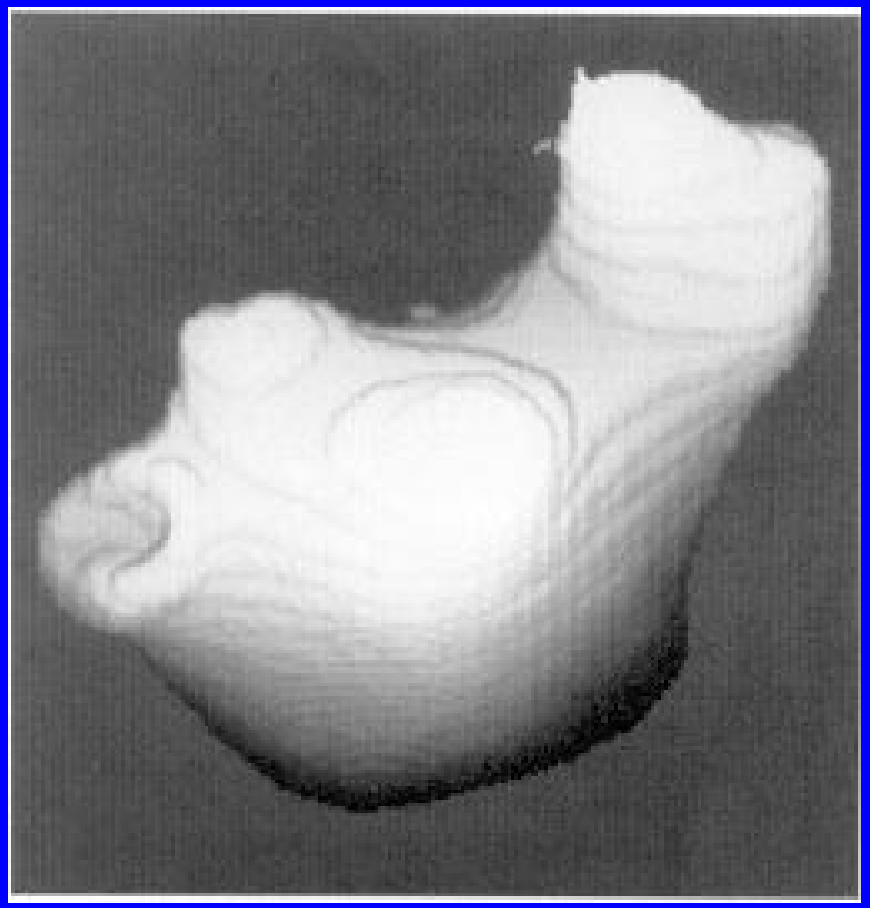
- Essential concepts
  - Fluid intake
  - Diet – sodium- holidays-”fast foods” - acid ash
  - Ca/Oxalate ratio-decrease Ca can increase Oxalate absorption
  - Urine components-24 hour urine
  - Systemic diseases-Sarcoid-Parathyroid

UROLITHIASIS

- 50-60% calcium oxalate pts. have hypercalciuria
- Most useful drugs

  thiazides

  k citrate



Staghorn calculus usually due to Proteus infection
More common in females - Never due to e-coli.
Must remove all of the stone! - antibiotics

UROLITHIASIS

Uric acid stone

- Allopurinol
- Low purine diet?
- Ph manipulation - Uric Acid stones are very sensitive to Ph changes. Form in acid urine.
- May be nidus for Ca/Oxalate Stone

UROLITHIASIS

Initial studies You can not make radical changes in a stone patient without:

Stone analysis

Blood = Cr, K, Bicarbonate, Ca., P., Uric acid, (PTH only if ca elevated in blood or urine)

Urine 24 hr.- volume, Ph, Cr., Ca., Na., K, Oxalate, Uric acid, Citrate, P., Magnesium, Sulfate, C&S

PEARLS - UROLITHIASIS

Red Meat is a major hazard in stone former

Na can block thiazide hypocalciuric effect

Atkin's diet = >acid ash = >stone risk

Citrate excretion higher in women

elevated by lemonade + K citrate

Cola beverages have as much oxalate as tea

UROLITHIASIS

Drugs

- thiazide
- furosemide
- carbonic anhydrase inhibitor
- guaifenesin- ephedrine addicts
- indinavir

UROLITHIASIS

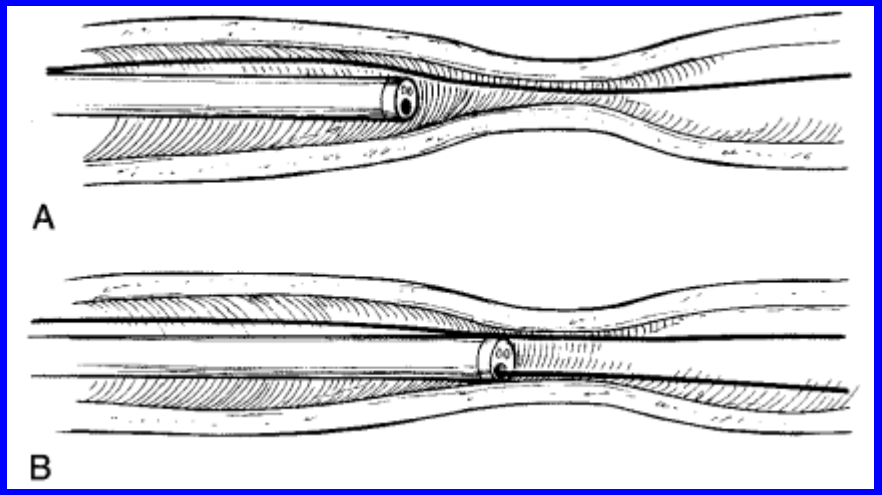
- Options
  - Observation
  - Eswl
  - Endoscopy
  - Open surgery

UROLITHIASIS
Pearls

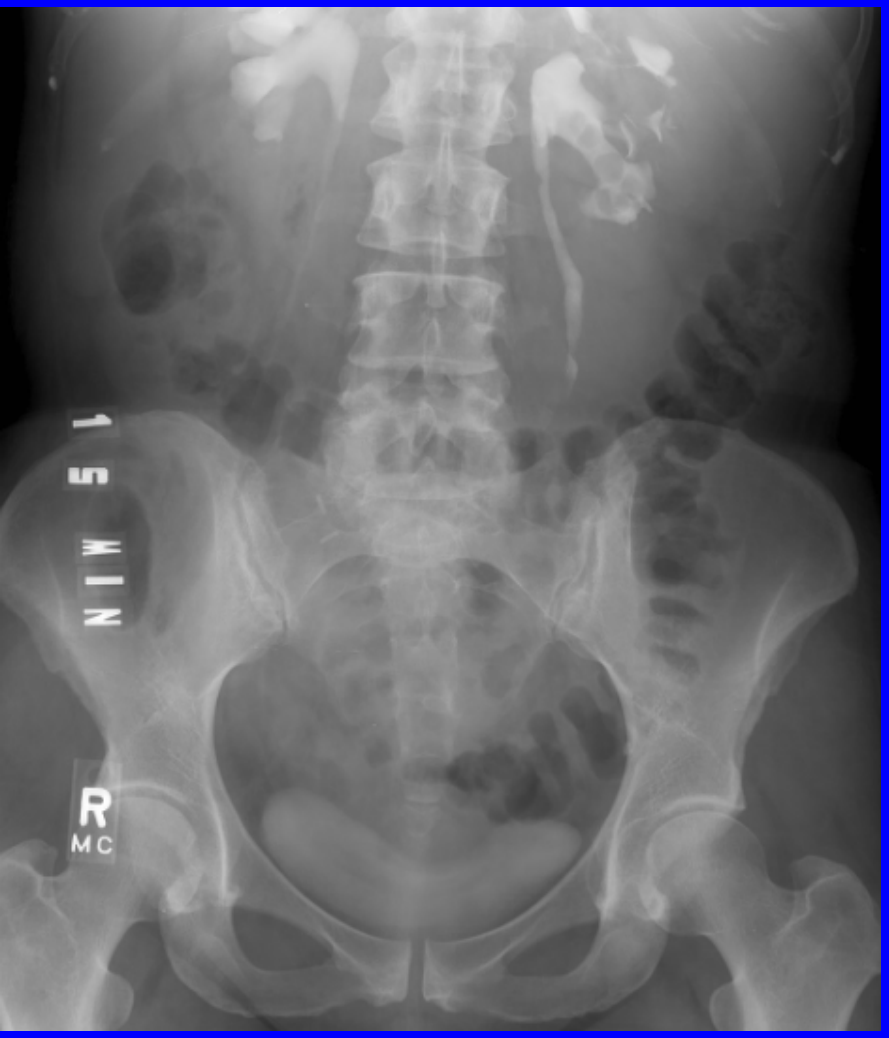
- 0.5 cm stone will usually pass

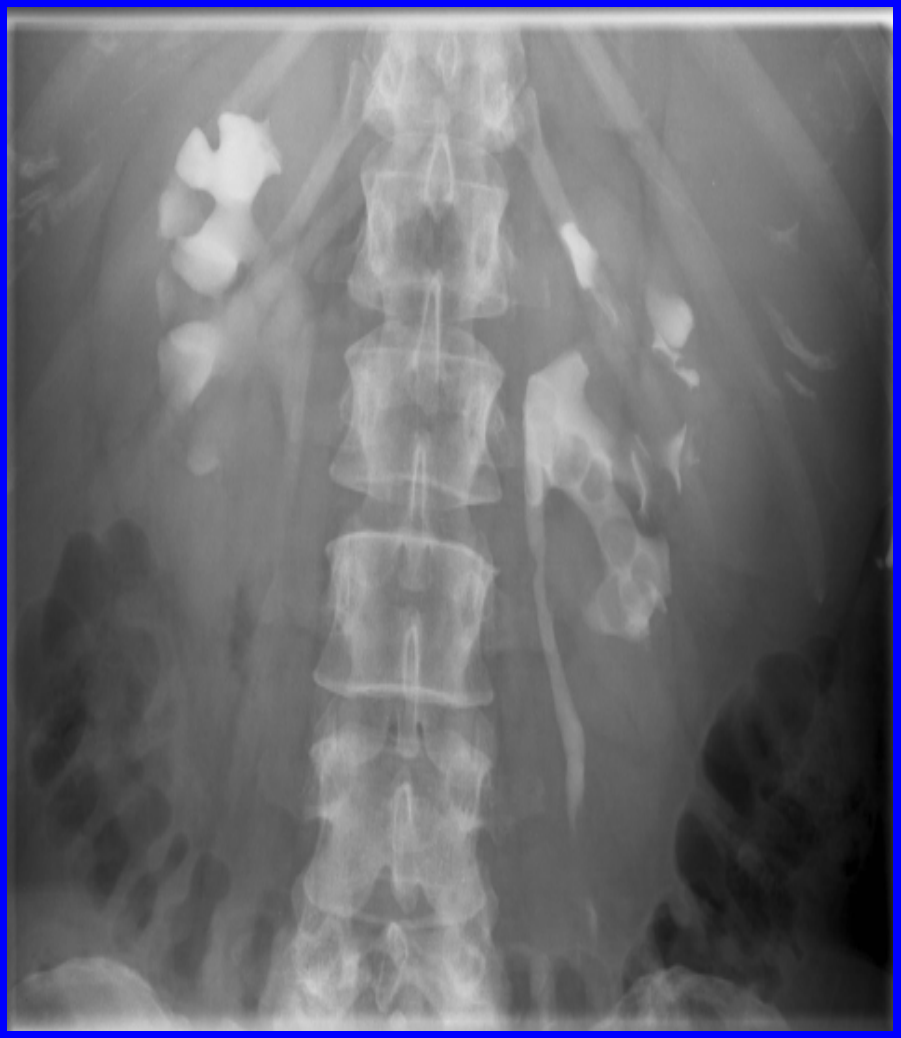
UROLITHIASIS

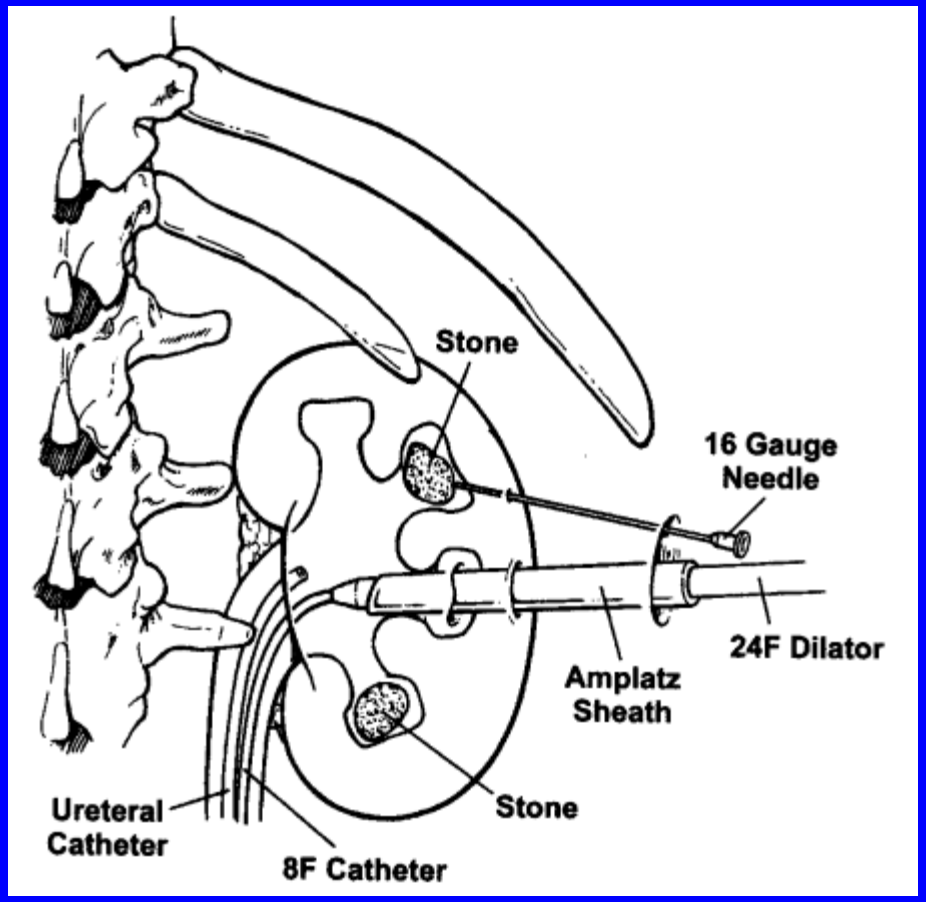
- Endoscopy
  - Cystoscopy
  - Ureteroscopy
  - Percutaneous

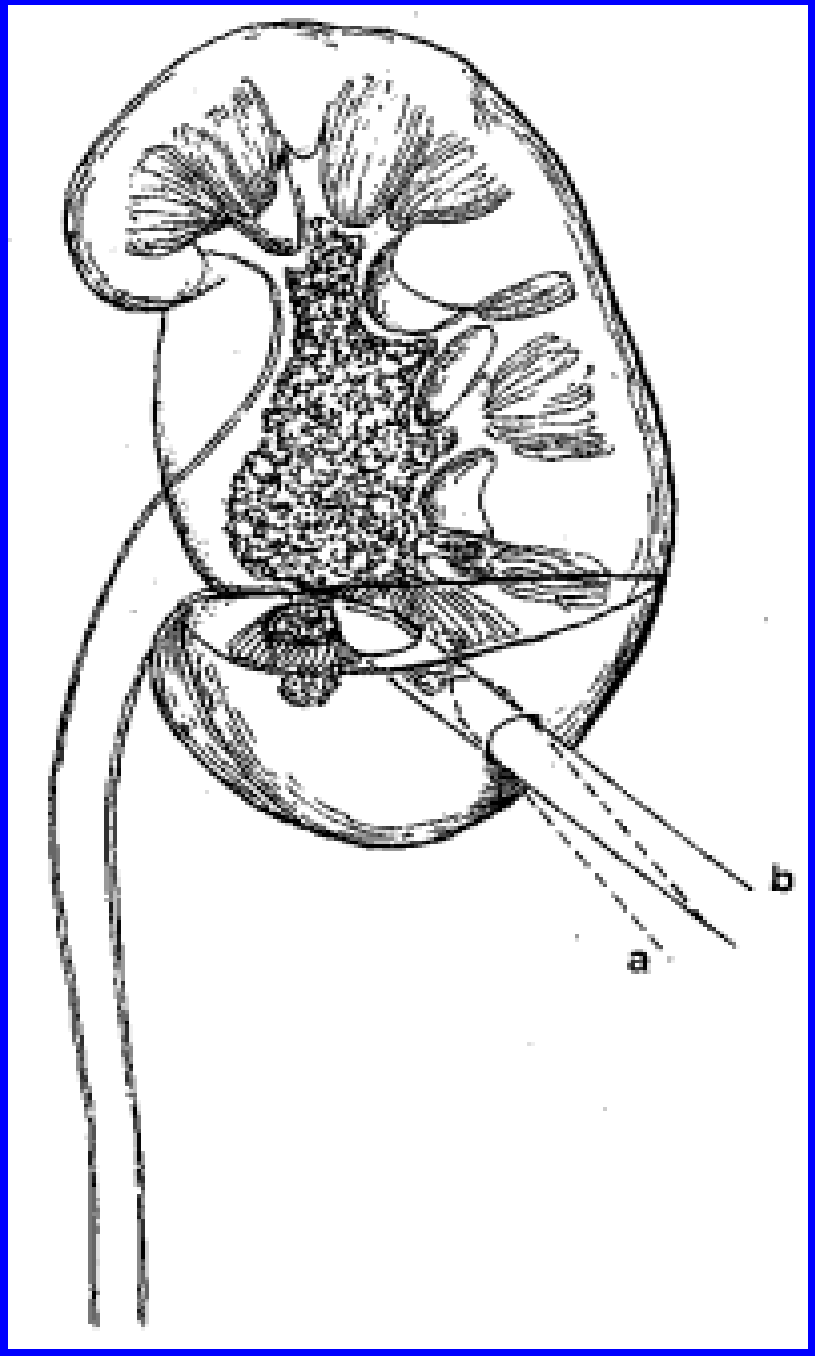

A
B

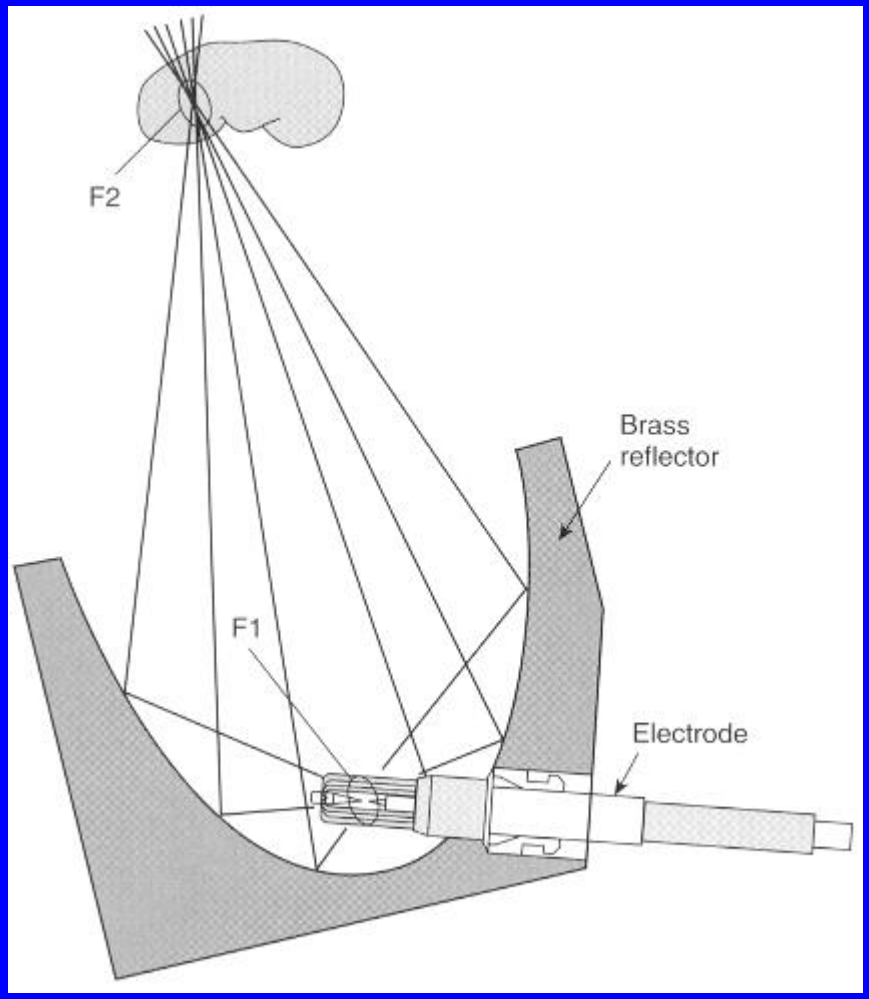
Non-obstructing left renal stones






Stone
16 Gauge
Needle
24F Dilator
Amplatz
Sheath
Stone
Ureteral
Catheter
8F Catheter


b
a


F2
Brass
reflector
F1
Electrode

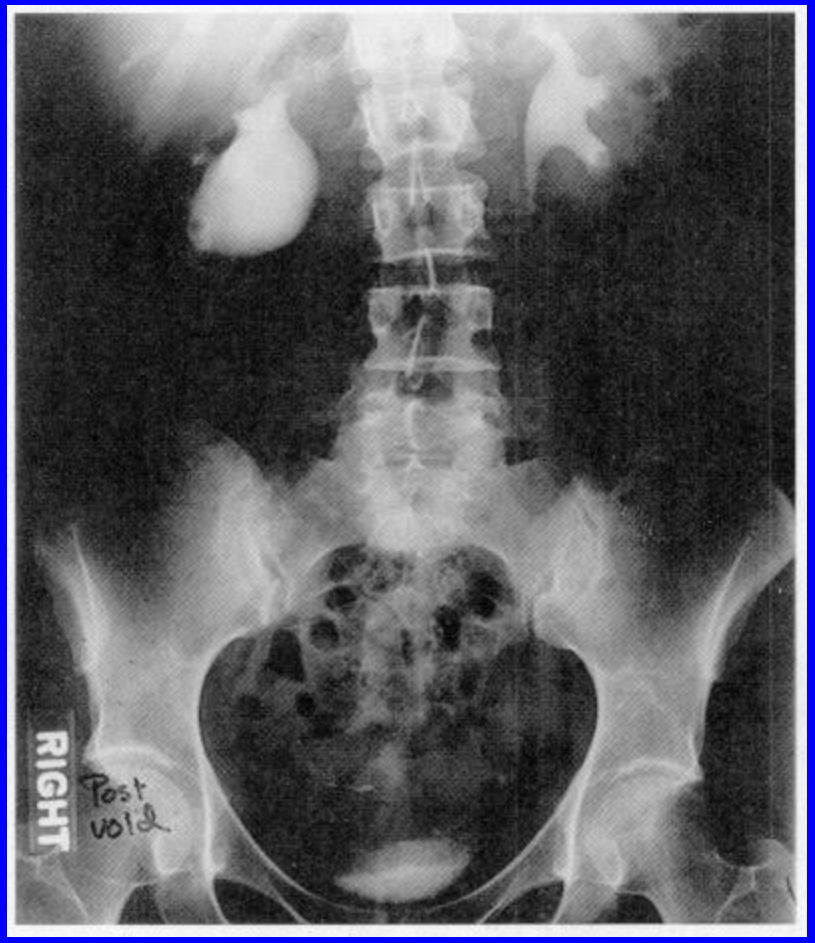
Pediatric Urology Pearls

Flank mass in child = urological origin

Think:

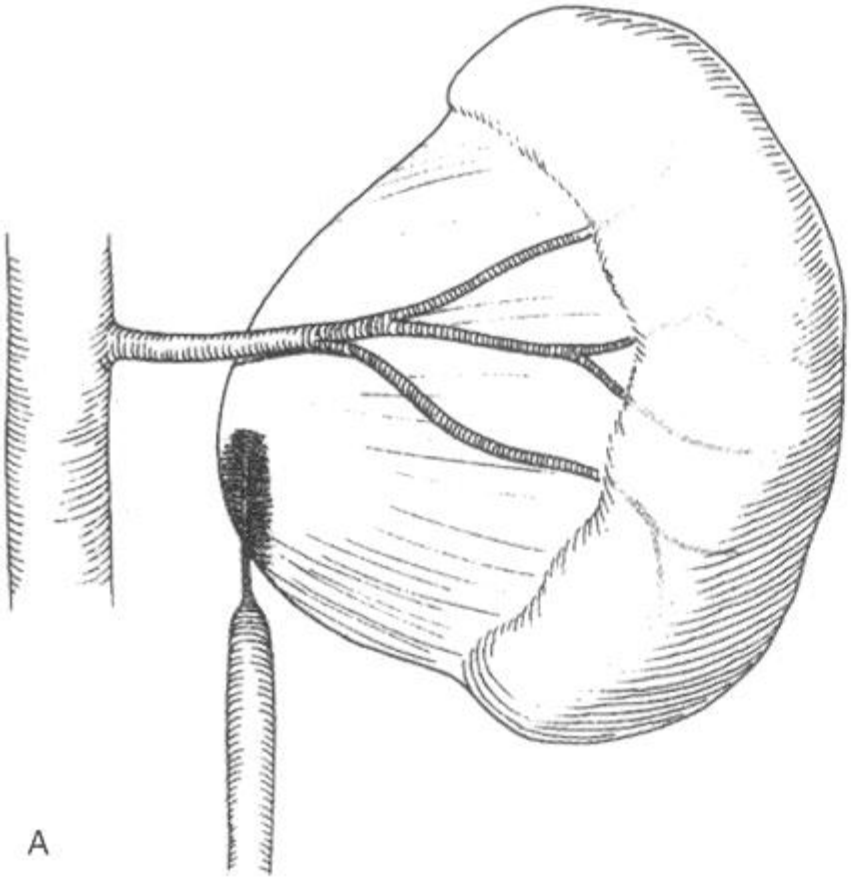
1. UPJ,
2. MCDK,
3. Reflux
4. Wilm's and Neuroblastoma

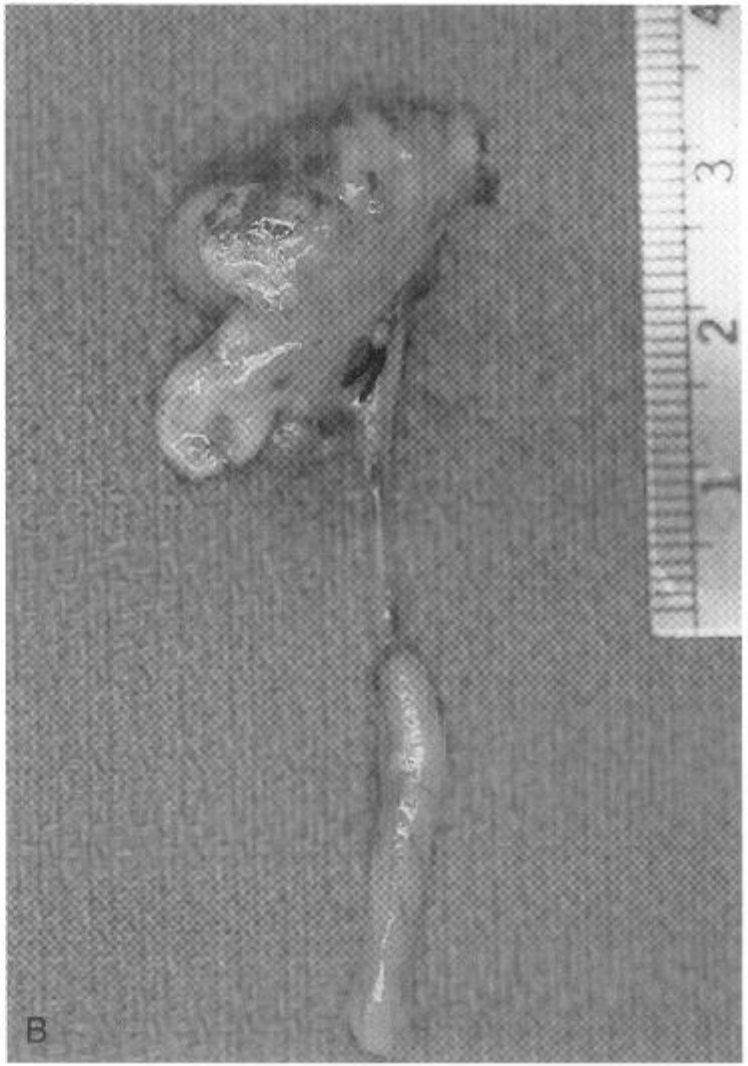
Ureteropelvic Junction Obstruction

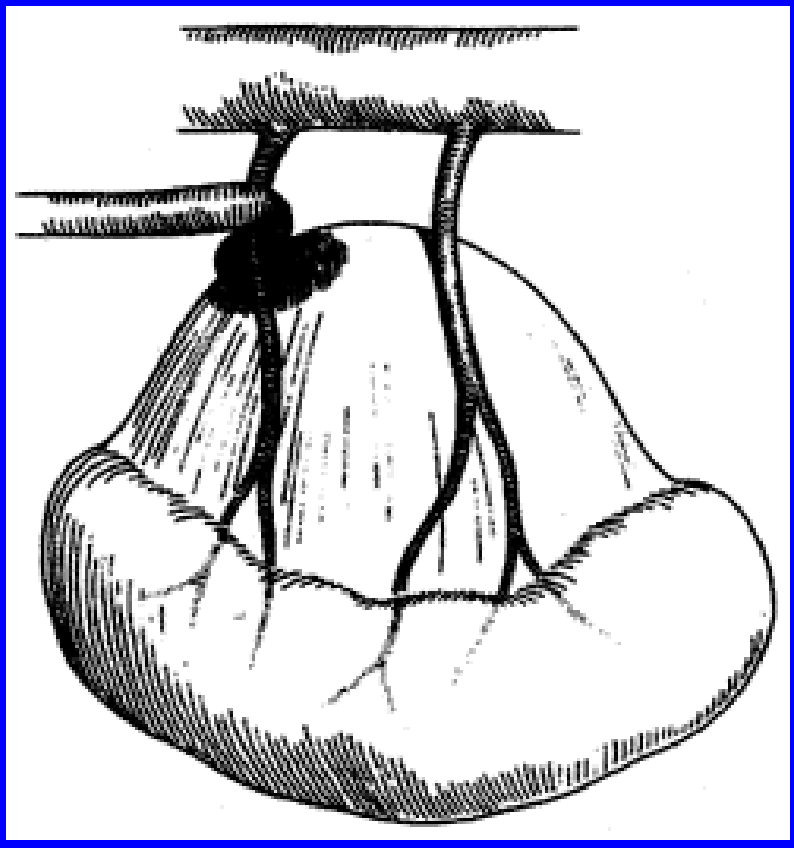


Ureteropelvic Junction Obstruction

- Diagnosis
  - Usually via ultrasound esp. in neonates
  - “Beer drinker’s” = usually extrinsic obstruction
  - Nuclear scans help delineate severity


A


B

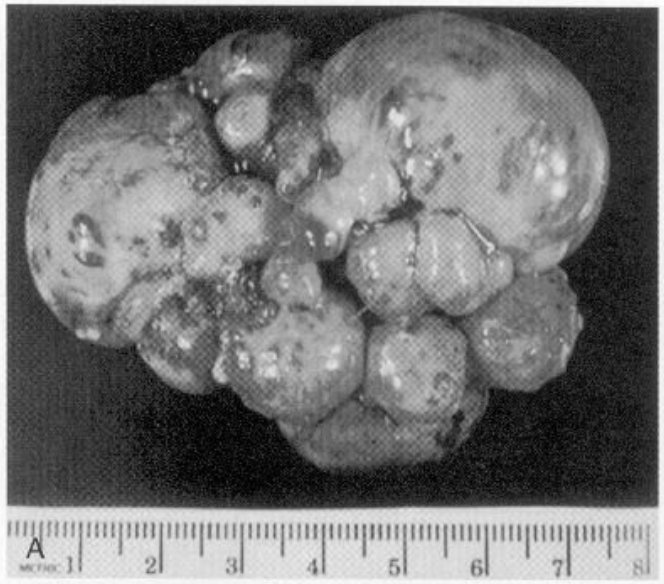


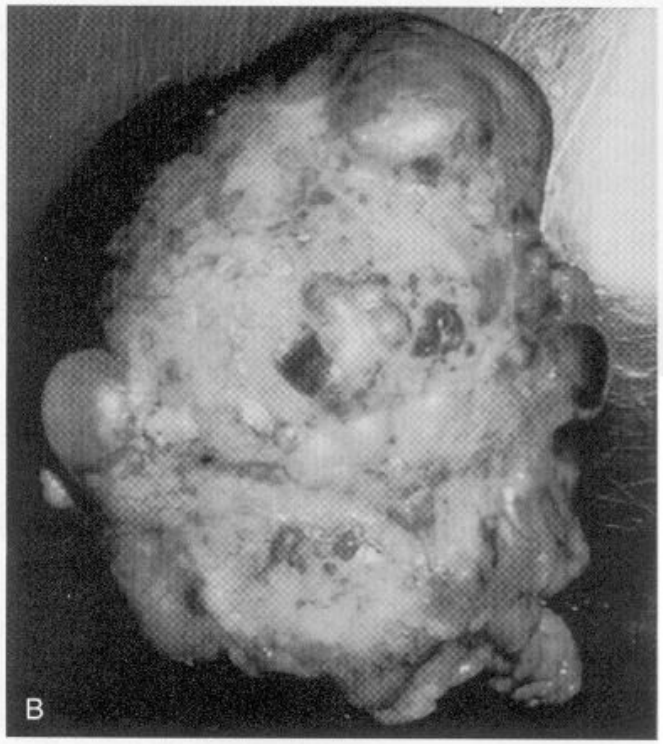
U.P.J.

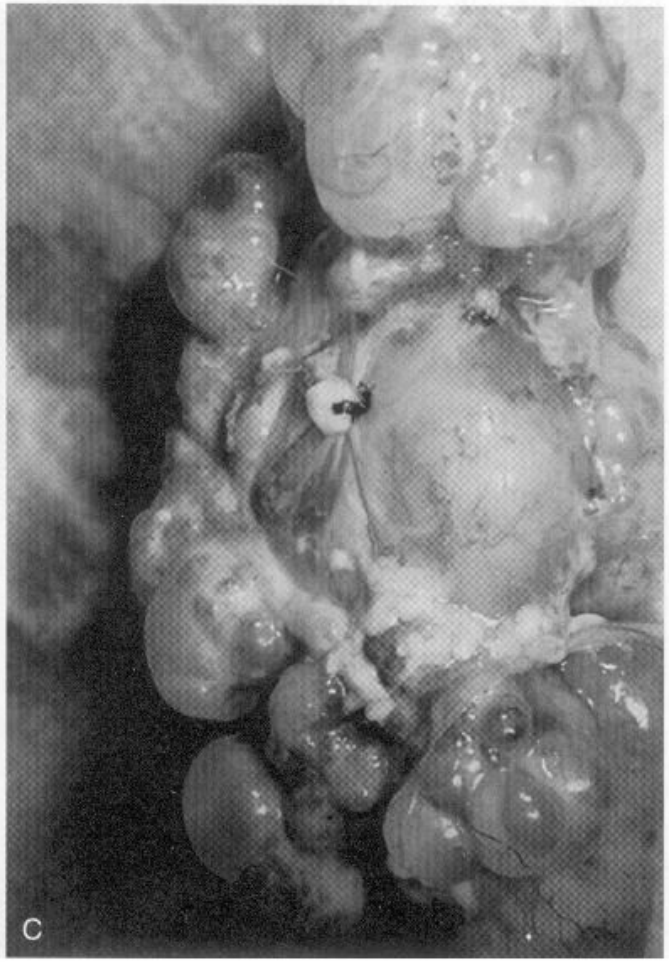
- Watchful waiting based on DMSA scan in a select population
- Surgery is demanded by hx. Infection, pain, significant functional compromise.
- Dismembered pyeloplasty treatment of choice in children – success rate > 95%

Pediatric Urology
Abdominal Mass

- Pearls Hx. & Px.
- Aniridia or hemihypertrophy DEMAND workup for Wilms
- Mass in abdomen of child which is smooth and mobile likely hydronephrosis r/o Wilms – non-moveable mass crossing midline likely Neuroblastoma


A
1
2
3
4
5
6
7
8


B

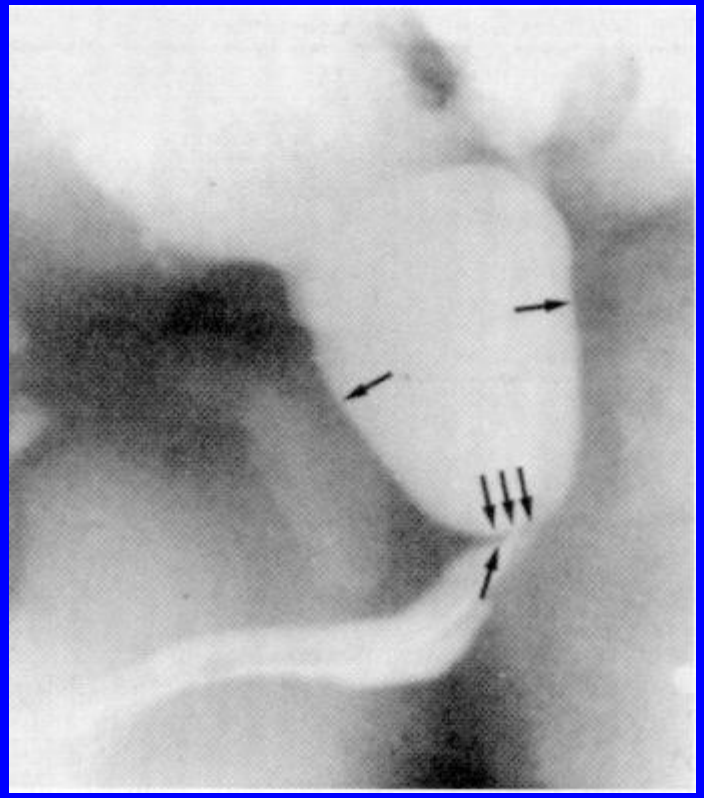

C

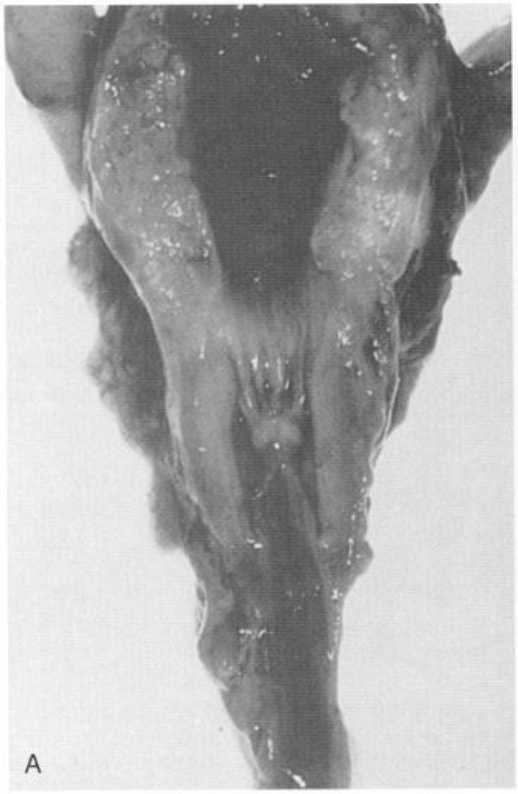
Pediatric Urology

- MCDK = Multicystic Dysplastic Kidney
- Common cause of flank mass in neonates.
- Check function with DMSA scan
  If no function follow with ultrasound
- Function = Rx debated

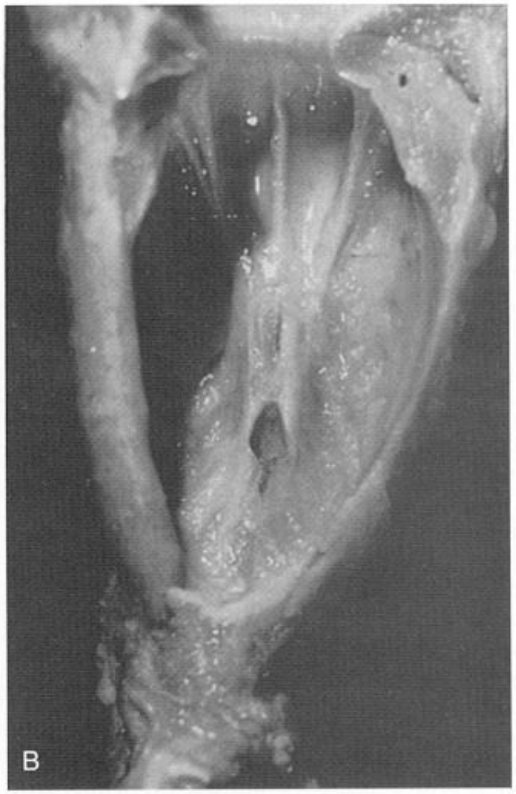
Pediatric Urology

- Pearls Hx. & Px.
  - Suprapubic mass – think distended bladder
    - Consider PUV and neurogenic bladder

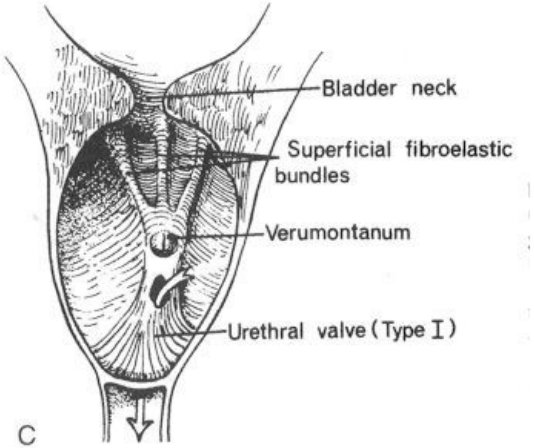




A



B


Bladder neck
Superficial fibroelastic bundles
Verumontanum
Urethral valve (Type I)

C