



# Canadian Undergraduate Urology Curriculum (CanUUC): Pediatric Urology

# Pediatric Urology: Objectives

1. Define and describe the treatment of phimosis, paraphimosis and balanitis
2. Outline the basic management of nocturnal enuresis
3. Outline the investigation and management of a febrile pediatric UTI
4. List the common causes of antenatal hydronephrosis and collecting system abnormalities
5. Define cryptorchidism and hypospadias
6. List the urologic causes of an abdominal mass in a child

# Pediatric Urology: History

- ⇒ Age
- ⇒ Presenting complaint
- ⇒ History
- ⇒ Medications and allergies
- ⇒ PMHx
  - Antenatal ultrasound
- ⇒ Elimination History
  - Voiding frequency
  - Holding maneuvers
  - Incontinence (day and night)
  - Bowel movements
    - Hard stool
  - Fluid intake

## ⇒ Family History

- UTI
- Nocturnal enuresis
- Vesicoureteral reflux
- Cystic kidney disease and absence of kidney
- Hypospadias and cryptorchidism

# Pediatric Urology: Physical Examination

## ⇒ Abdominal Exam

- Masses
- Pain
- Palpable bladder

## ⇒ Genitourinary Exam

- Rash
- Labial adhesions
- Urethral prolapse
- Ureterocele prolapse
- Urethral opening (location)
- Foreskin (phimosis vs retractable)
- Testicular position
- Testicular masses

## ⇒ Back Exam

- Look for dimples
- Hairy patches

⇒ Watch them pee!

⇒ Postvoid residual

# Phimosis, Paraphimosis and Balanitis

## Foreskin Care

- ⇒ By 3 years of age 90% of boys have a retractable foreskin
- ⇒ Suggest to parents
  - Normal cleaning
  - No forceful retraction
  - Teach boys to pull back foreskin to void
- ⇒ Treatment only necessary for phimosis causing infection or difficulty voiding

# Phimosis

⇒ Narrowing of the opening of the prepuce



# Physiologic Phimosis

- ⇒ Important to differentiate from pathologic forms
- ⇒ If asymptomatic: NO TREATMENT → forceful retraction → bleeding → scar → more adhesions

■ Elder J. Campbell Textbook of Urology 8<sup>th</sup> ed. Ch 66



# Physiologic Phimosis



# Pathological Phimosis i.e. "Not Normal"

- ⇒ Distinguishing features:
  - History of cracking and bleeding with retraction
  - Indurated, scarred, whitened skin at tip of prepuce
  - Narrowest part is most distal
- ⇒ This entity requires intervention:
  - circumcision vs. dorsal slit



# Phimosis: Treatment

## ⇒ Indications

- Symptoms
- Pathologic phimosis

## 1. Corticosteroid cream

- Randomized study results = 70-85% ( F/U 18 mo.)
  - Lund et al. Scan J Urol Neph 2006
  - Lindhagen T, Eur J Surg. 1996
- Must use strong or moderately strong steroid (betamethasone vs clobetasol)
  - Yang SS et al. J. Urol. 2005

## 2. Dorsal Slit – incising the “top” of the foreskin

## 3. Circumcision

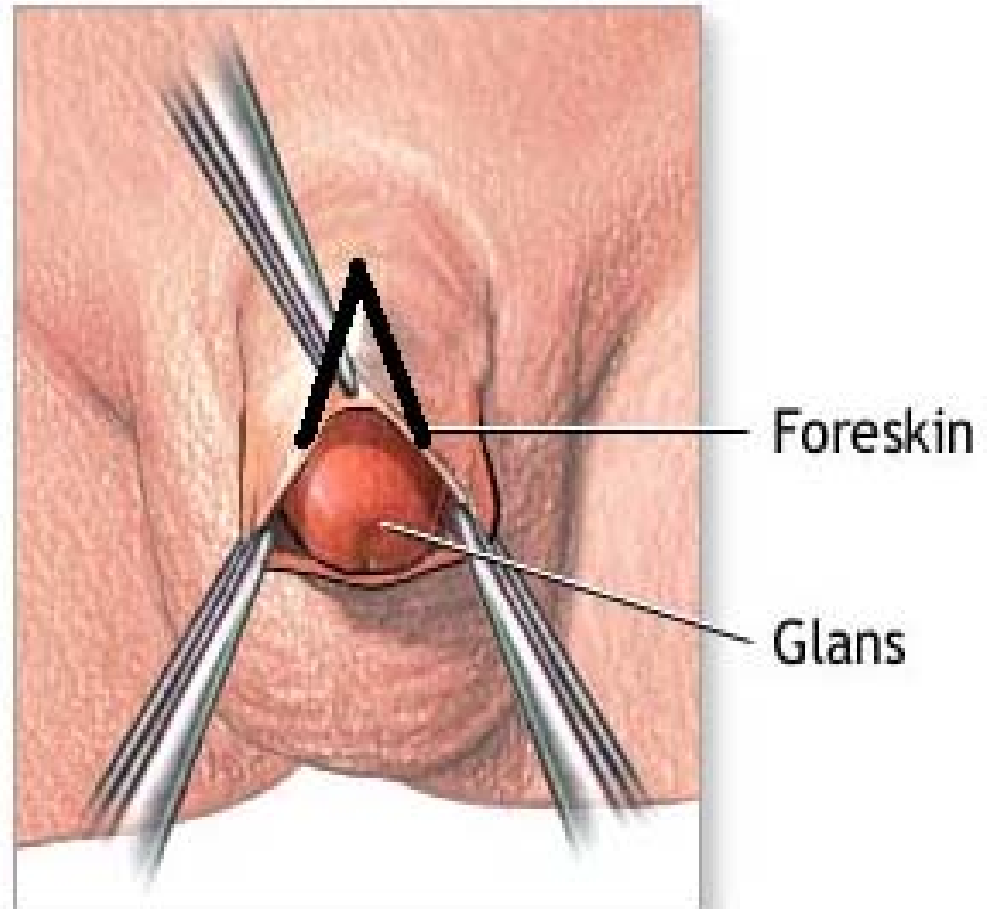
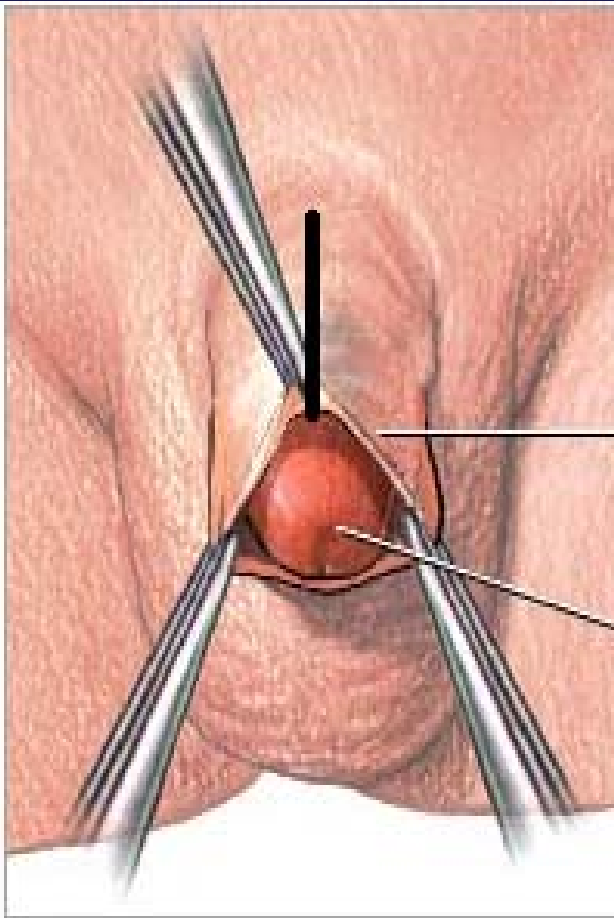
## Cost effectiveness

⇒ Steroids are more cost effective than dorsal slit or circumcision

- Berdeu D. et al BJU Int. 2001 Feb
- Van Rowe Pediatrics. 1998 Oct

⇒ 50 m Euro annually saved in France

# Dorsal slit



# Phimosis: Circumcision

- ⇒ There is no absolute medical indication for circumcision in the neonatal period
  - Relative indication anomaly of urinary tract and recurrent infections
  
- ⇒ Potential medical advantages
  - Decrease incidence of urinary tract infections in the first year of life
  - Prevent phimosis
  - Prevent balanoposthitis (infection of the glans penis)
  - Decrease incidence of penile cancer
  - May decrease the incidence of sexually transmitted disease

# Circumcision

## ⇒ Method

- Gomco clamp
- Plastibell clamp
- Mogen clamp
- Surgically

## ⇒ Complications (0.2-0.5%)

- Bleeding
- Injury to penis
  - amputation of glans
- Skin issues
  - Take off too much
  - Leave on too much
  - Skin bridges
  - Inclusion cysts
  - Penile curvature
  - Urethrocutaneous fistula
- Long term
  - Meatal stenosis

# Paraphimosis

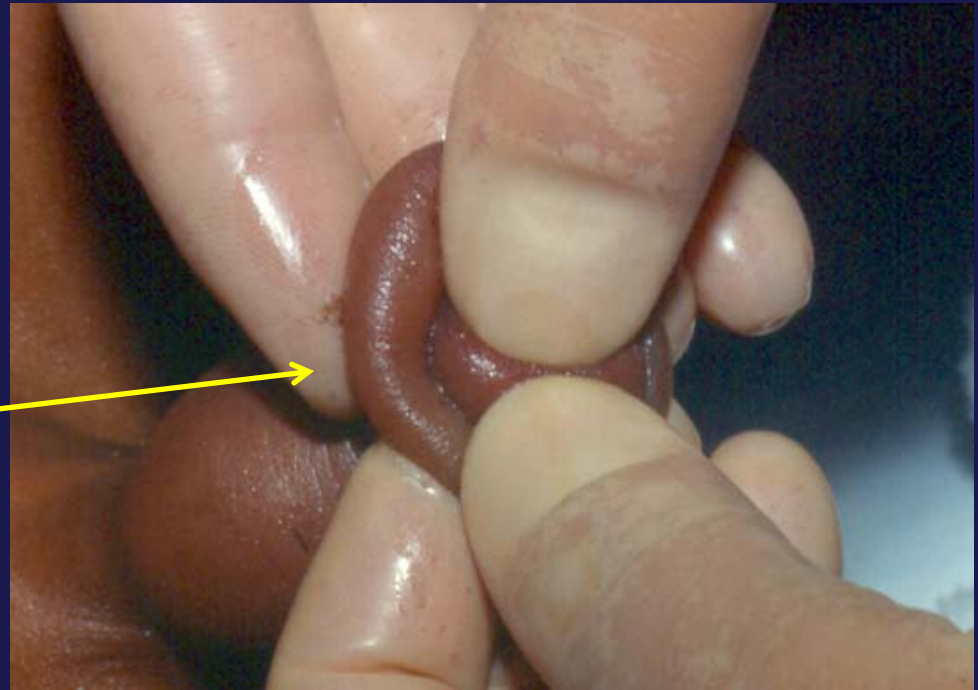
- ⇒ Painful constriction of the glans penis by the foreskin which has been retracted behind the corona





# Paraphimosis: Treatment

- ⇒ Local anesthetic
- ⇒ Wrap with Coban to reduce edema
- ⇒ ? Hypertonic saline
- ⇒ Manual reduction
- ⇒ Dorsal slit
- ⇒ circumcision



## Balanitis: Symptoms

- ⇒ Erythema (localized)
- ⇒ Edema
- ⇒ Purulent discharge
- ⇒ Fever → UTI?
- ⇒ Dysuria

# Balanitis



# Balano-posthitis



# Balanitis: Treatment

- ⇒ Topical antibiotic ( fucidin, polysporin etc)
- ⇒ Oral Antibiotics for severe cases
- ⇒ Topical Steroids
- ⇒ Occasionally antifungal
- ⇒ Do not retract the foreskin

# Nocturnal Enuresis

# Nocturnal Enuresis

- ⇒ Night-time bedwetting with continence during the day
- ⇒ Primary or secondary
- ⇒ More common in males
- ⇒ Most children reach night-time continence by 5 years old
  - 23% of 5 year olds
  - 20% of 7 year olds
  - 4% of 10 year olds
  - 1-2% of adolescents
- ⇒ Secondary enuresis accounts for 20% of cases

# Nocturnal Enuresis: Bedwetting



⇒ Isolated nocturnal Enuresis is usually a functional disorder

## Work-up

⇒ Voiding log

⇒ Physical exam usually normal

⇒ Urinalysis



# Nocturnal Enuresis: Pathogenesis

- ⇒ Delayed maturation of CNS
- ⇒ Reduced functional capacity
- ⇒ Deep sleepers
- ⇒ Reduced renal concentration

# Nocturnal Enuresis: Treatment

- ⇒ Reassurance
- ⇒ Behavioural (positive reinforcement)
- ⇒ Alarms
  - Can take several weeks to work
  - More effective than, DDAVP and tricyclic
  - 70% average response during treatment
  - 50% relapse
  - Glazener et al; Cochrane Database of Syst Rev April 2005



# Nocturnal Enuresis: Treatment DDVAP

## Pharmacologic

### ⇒ DDAVP (desmopressin)

- decreases urine output
- taken at night
- effective in the short term (RR 1.5 vs placebo)
- well tolerated
- High relapse rate

- Glazener et al; Cochrane Database Syst Rev 2002

## Nocturnal Enuresis: Treatment Tricyclic Anti-depressants (TCA)

- ⇒ Both anticholinergic and alpha adrenergic effects
- ⇒ Average one wet night per week ↓
- ⇒ 20-30% dry on treatment
- ⇒ High relapse rate
- ⇒ Potential serious side effects (sedation, etc.)

■ Glazener et al; Cochrane Database Syst Rev 2003

# Urinary Tract Infections (UTI)

# Urinary Tract Infection (UTI): Presentation

## ⇒ Young children

- Febrile
- Decreased appetite
- Lethargy

## ⇒ Older children

- Febrile (implies pyelonephritis)
- Dysuria
- Frequency
- Abdominal pain

# Urinary Tract Infection: Investigation

## ⇒ History and physical

- Voiding history
- Family history
- Fever

## ⇒ Urine

- Ideally cath specimen
- Bag specimens are bad!

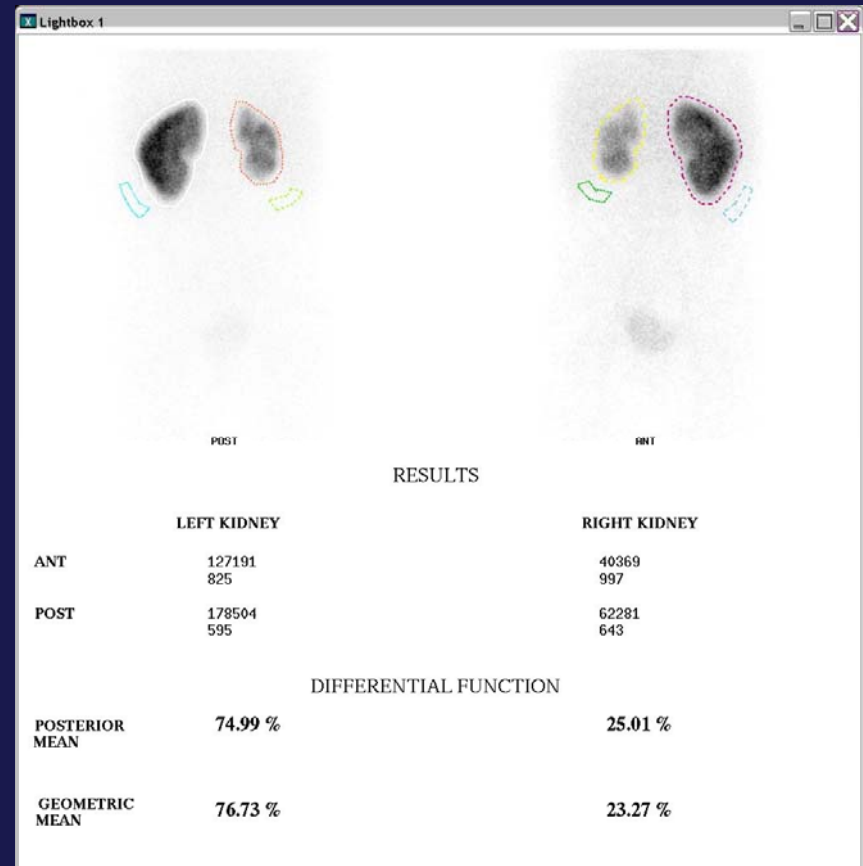
## ⇒ Radiology

- Febrile UTI in a child
  - Ultrasound and VCUG
  - DMSA can document that it is a pyelonephritis

# Urinary Tract Infection: Treatment

## ⇒ Treatment

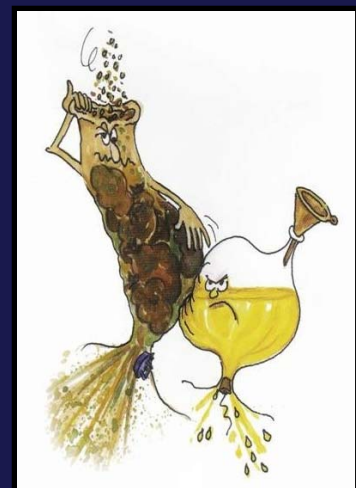
- Lower tract: short course antibiotic
- Upper tract (fever, back pain, nausea and vomiting)
  - 2 week course
  - Admission if very ill
  - Quick treatment decreases chances of scarring





# Recurrent UTI's: Treatment

- ⇒ Improve voiding patterns
  - Timed voiding (q2h)
  - Double Void
  - Improve emptying
    - Biofeedback
    - Alpha Blocker
- ⇒ Increase water
- ⇒ Stool softener
- ⇒ Antibiotic Prophylaxis
- ⇒ Treat anatomic abnormality



# Hydronephrosis and Collecting System Abnormalities

# Collecting System Abnormalities

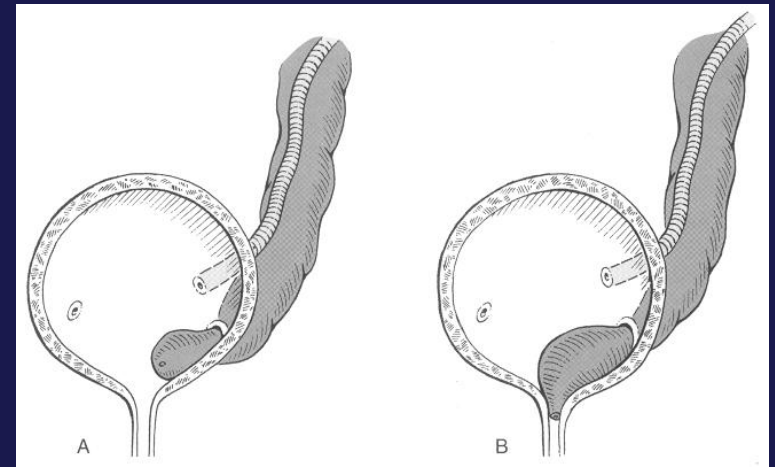
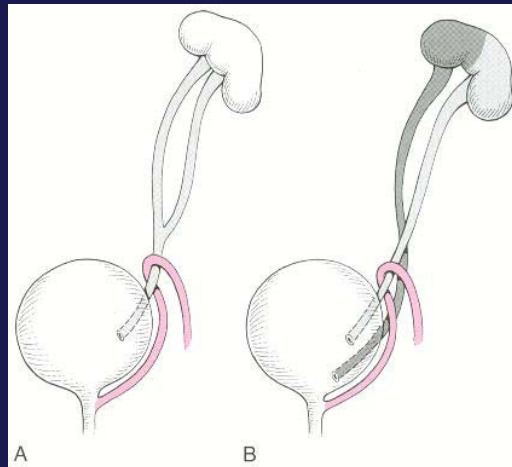
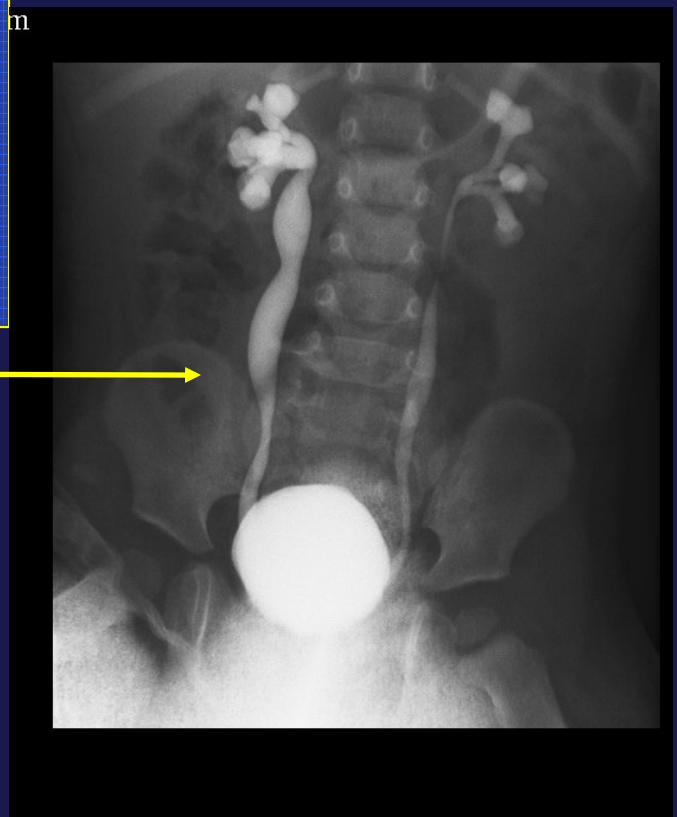
⇒ Vesicoureteral Reflux



⇒ Obstruction

- UPJ Obstruction
- UVJ Obstruction

⇒ Duplication



# Ureteropelvic Junction (UPJ) Obstruction

## ⇒ Cause:

- Congenital stricture or adynamic segment
- Crossing vessel

## ⇒ Presentation

- Antenatal hydronephrosis
- Intermittent severe flank pain (lasts about 6 hours) with nausea and vomiting
- Urinary Tract Infection
- Renal calculi

# Ureteropelvic Junction Obstruction: Investigation and Management

## ⇒ Investigations

- Ultrasound
- MAG3 Renal Scan

## ⇒ Asymptomatic

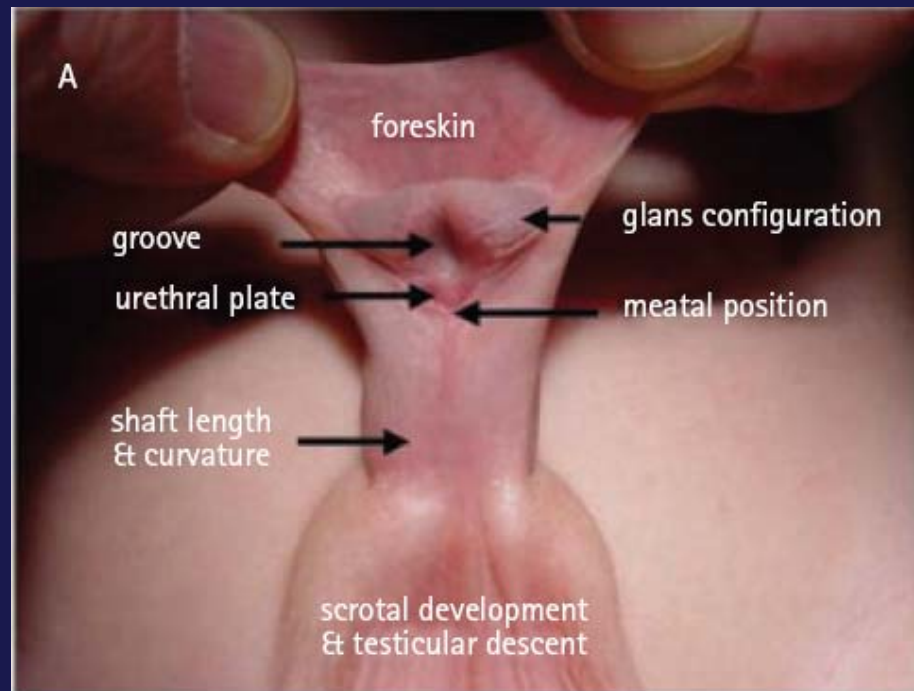
- Observe
- If drop in renal function  
or worsening of hydro  
operate

## ⇒ Symptomatic

- Operate

# Hypospadias

# Hypospadias



# Hypospadias: Epidemiology

⇒ Incidence: 1/125 male births

- Caucasian 0.3-0.8%
- Other racial groups 0.05-0.4%

⇒ Associations

- Cryptorchidism (9.3% of patients with hypo)
  - Incidence of chromosomal abnormality higher with proximal hypo and UDT (22%)
- Inguinal hernias (9%)



# Hypospadias: Risk Factors

## ⇒ Endocrine

- Disruption in the synthetic biopathway of androgens
- May be a delay in the maturation of the hypothalamic-pituitary-axis

## ⇒ Genetic

- Familial rate 7%

## ⇒ Environmental

- Endocrine disrupters in the environment may be responsible for the increase in incidence

## ⇒ Maternal

- Maternal progestin exposure may increase likelihood of hypospadias
- Some studies show a marked increase in hypospadias in women undergoing IVF

# Hypospadias: Investigation

- ⇒ Simple distal hypospadias
  - No evaluation
  
- ⇒ Proximal hypospadias + one or bilateral impalpable testicles
  - Intersex evaluation
    - **Electrolytes**
    - Karyotype
    - 17 hydroxyprogesterone
    - Ultrasound abdomen

# Pediatric Scrotal Conditions

# Scrotal Conditions: Testicular Pain

## ⇒ Causes

- Torsed appendix
- Epididymitis
- Testicular Torsion
- Constipation

# Scrotal Conditions: Torsion of Appendix Testes

- ⇒ Torsed appendix
  - Pre adolescent
  - Pinpoint tenderness
  - Blue dot sign
  - Over time can cause local inflammation which looks like epididymitis on ultrasound

## Scrotal Conditions: Epididymitis

- ⇒ Adolescent and older
- ⇒ Gradual onset
- ⇒ Tender superior portion

# Scrotal Conditions: Testicular Torsion

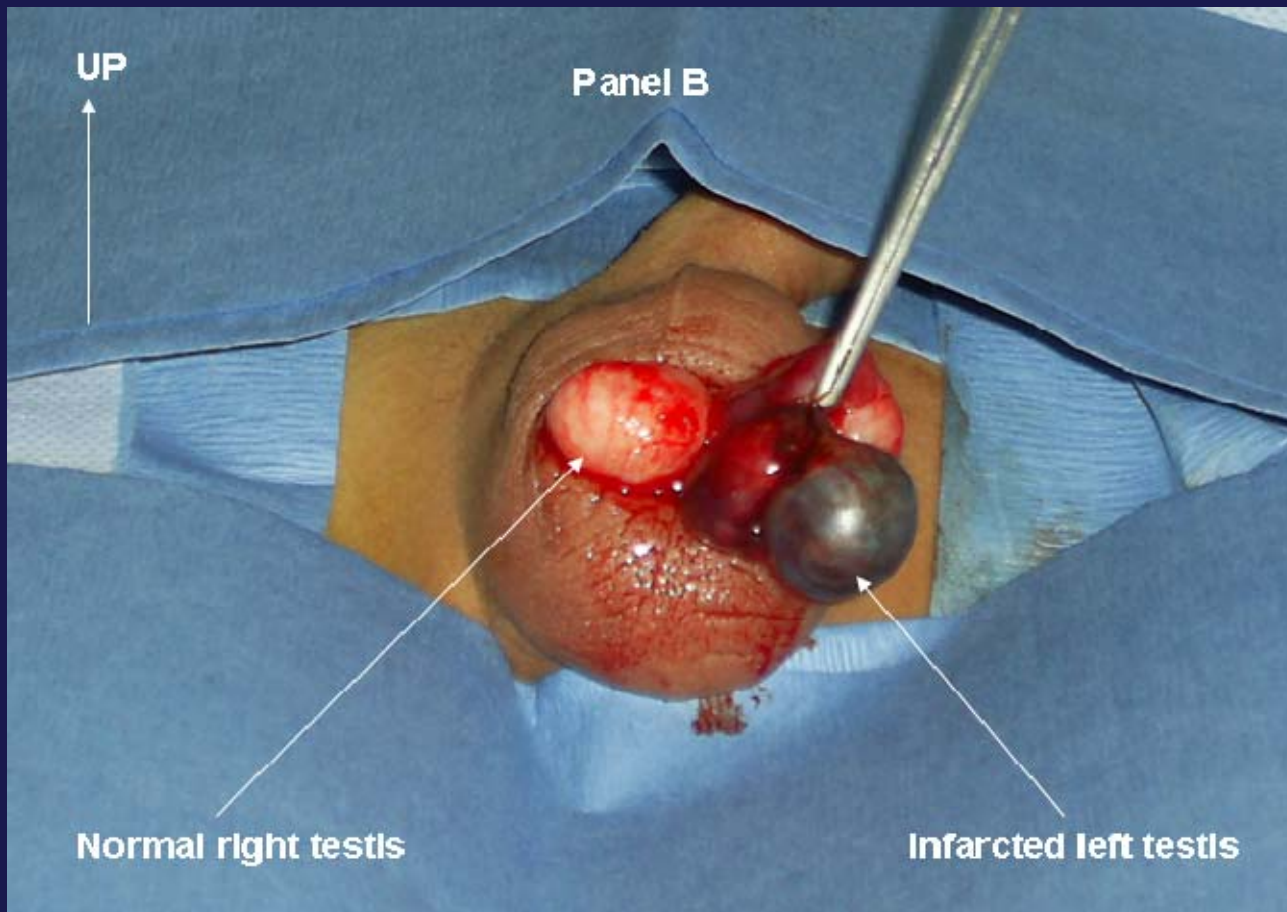
- ⇒ Adolescent (not always)
- ⇒ Sudden onset
- ⇒ Severe pain
- ⇒ Sometimes only abdominal pain
- ⇒ Nausea and Vomiting
- ⇒ Abnormal lie to the testicle
- ⇒ Ideally fix within 6 hours

## Torsion: Investigation

- ⇒ If it looks like torsion go straight to the OR
- ⇒ Urinalysis and culture
  - If normal unlikely to be epididymitis
- ⇒ Scrotal Ultrasound



# Torsion: Scrotal Exploration



## Scrotal Conditions: Undescended Testicles (Cryptorchidism)

- ⇒ The most common birth abnormality involving the male genitalia (0.8% incidence at 6 months)
- ⇒ All (except premature infants) will descend in first 3 months of life
  - If undescended at 3 months should refer to peds urologists
- ⇒ Retractable testicle is a normally descended testicle that is pulled out of the scrotum by an overactive cremasteric reflex

# Undescended Testes: Complications

- ⇒ Inguinal hernia
- ⇒ Risk for torsion?
- ⇒ Infertility
  - Only decreased if bilateral
- ⇒ Increased risk of testicular cancer
  - 4-10 times normal

## Undescended Testes: Treatment

- ⇒ Orchidopexy – placement of testicle in scrotum
- ⇒ May improve fertility
- ⇒ Easier to monitor for malignancy
- ⇒ Surgical correction by 6 months of age

# Scrotal Conditions: Hydrocele

## ⇒ Communicating hydrocele

- Persistence of a patent processus vaginalis
- Accumulation of fluid around the testicle
- Treatment:
  - often will close in first year of life
  - Period of observation then surgery if remains

## ⇒ Non-communicating hydrocele

- Rare in children
- Usually a result of inflammation

# Pediatric Urology: Important Points

## ⇒ History and Physical

- Take a history on voiding and bowel habits
  - UTI history ask about fever and symptoms of upper tract
  - Check for scrotal position
  - Start examining boys as they reach puberty for testicular masses and speak about self exam
- ⇒ If testicle is not down after 3 months refer to peds urologist
- ⇒ With hypospadias and impalpable testicle consider intersex condition
- ⇒ Possible torsion – needs to be fixed within 6 hours