Canadian Undergraduate Urology Curriculum (CanUUC):

PEDIATRIC UROLOGY

Legend

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. Be aware of the diagnosis and management of pediatric scrotal conditions

History

- **Age**
- **Presenting complaint**
- **History**
- **Medications and allergies**
- **PMHx**
  - Antenatal ultrasound
  - UTIs
- **Elimination History**
  - Voiding frequency
  - Holding maneuvers
  - Incontinence (day and night)
  - Bowel function (hard stool, infrequent stooling, straining, painful, clog toilet, encoporesis)
  - Fluid intake
- **Family History**
  - Childhood UTIs
  - Nocturnal enuresis
  - Congenital anomalies of the Kidney and Urinary Tract (CAKUT) - Cystic kidney disease renal agenesis, kidney obstruction, Vesicoureteral reflux (VUR)
  - Hypospadias and cryptorchidism

Physical Examination

- **Abdominal Exam**
  - Masses
  - Pain
  - Palpable bladder or stool
- **Genitourinary Exam**
  - Rash
  - Labial adhesions
  - Urethral prolapse
  - Ureterocele prolapse
  - Urethral opening (location)
  - Foreskin (phimosis vs retractable)
  - Testicular position
  - Testicular/inguinal masses
- **Back Exam**
  - sacral dimples
  - hairy patches
  - vascular malformations
  - skin tag
  - lipoma
  - assymetric gluteal cleft
- **Watch them pee!**
- **Postvoid residual**

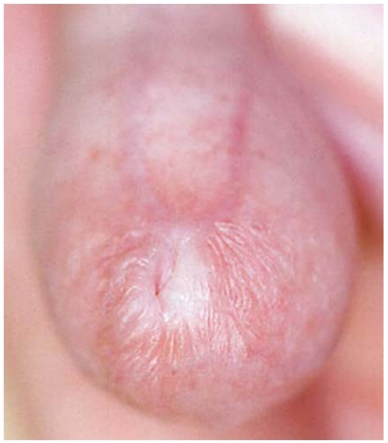
Phimosis, Paraphimosis and Balanitis

Foreskin Care

- **Physiologic phimosis** (an asymptomatic, non-retractile foreskin is noted in up to 50% of grade 1 boys)
- **Suggest to parents**
  - Normal cleaning –Daily bath or shower by soaking, Do not retracting; Parents not to retract forcefully, The child can retract themselves when old enough to do so
  - Teach boys to pull back foreskin to void
  - Daily bathing (rather than showers) can reduce foreskin inflammation; use Vaseline based antibiotic ointment for irritation as needed
- **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 → need for treatment**

Elder J. Campbell Textbook of Urology 8th ed. Ch 66

Physiologic Phimosis

No scars, no bleeding, symmetric eversion of soft, supple skin

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
  - Painful erections
  - Recurrent infections
- **This entity requires intervention**

Pathologic Phimosis: Treatment

Indications:

- Symptoms
- White scar suggestive of Balanitis Xerotica Obliterans (aka Lichen Sclerosis)

1. Corticosteroid cream – first line

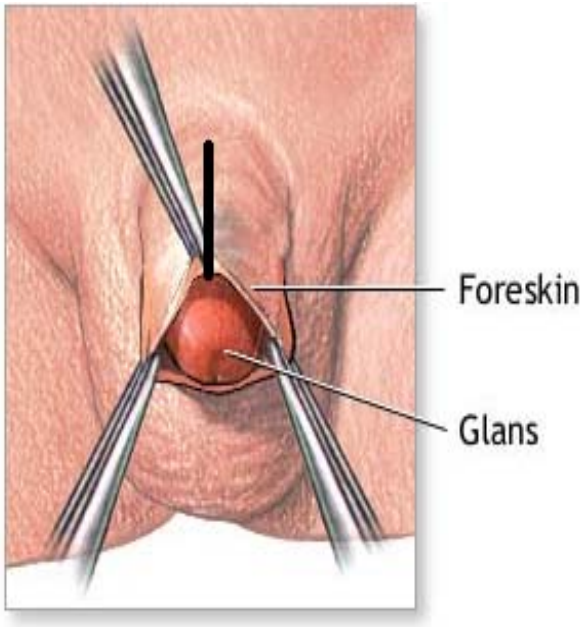
- Randomized study results = 70-85% (F/U 18 mo.)
- Must use strong or moderately strong steroid (betamethasone vs clobetasol) for 2 month course, applied to narrowest area of the foreskin

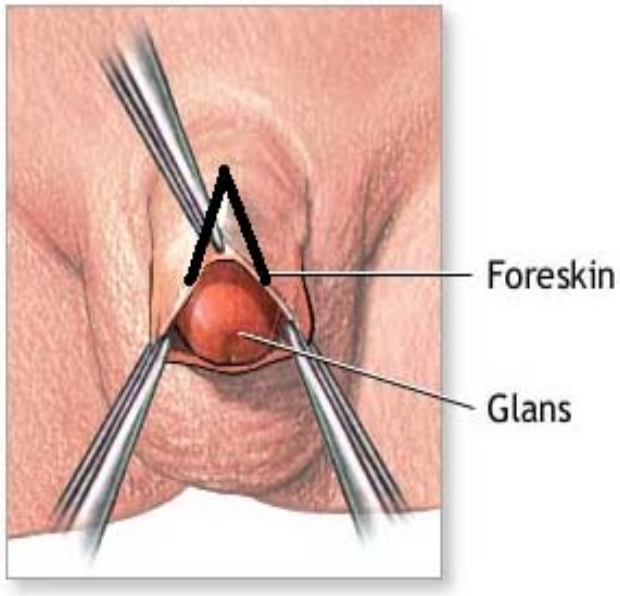
2. Dorsal Slit – incising the "top" of the foreskin

3. Circumcision – indicated for obvious scar of foreskin

Lund et al. Scan J Urol Neph 2006
Lindhagen T, Eur J Surg. 1996
Yang SS et al. J. Urol. 2005

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**
- **For newborns:**
  - Gomco clamp
  - Plastibell clamp
  - Mogen clamp
  - Surgically
- **For older children:**
  - Surgically

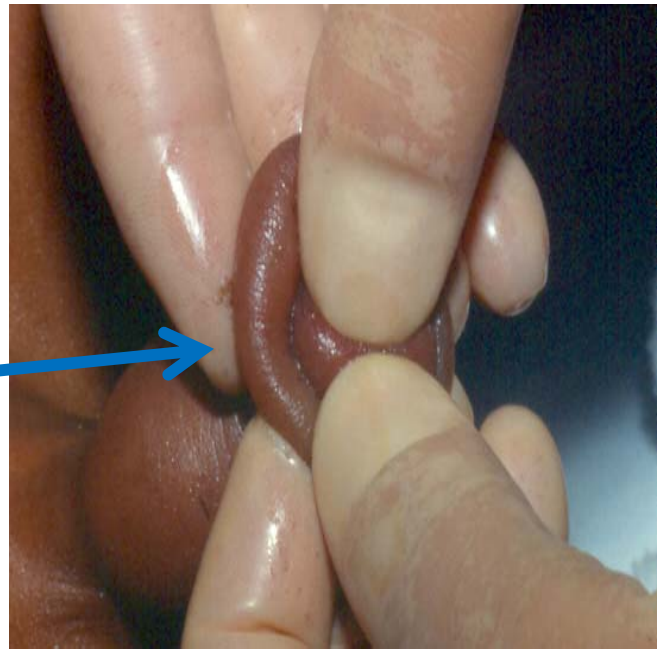
- **Complications (0.2-0.5%)**
  - Bleeding
  - Injury to penis
    - Amputation of glans
  - Skin issues
    - Take off too much
    - Leave on too much
    - Skin bridges
    - Inclusion cysts
    - Penile curvature
    - Urethrocutaneous fistula
  - Long term
    - Meatal stenosis

Paraphimosis

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

Paraphimosis: Treatment

- Needs to be treated emergently
- Local anesthetic/sedation
- Manual pressure or wrap with Coban to reduce edema
- ? Hypertonic saline
- Manual reduction
  - "fingers over thumbs"
- 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
- Warm water soaks twice daily

Nocturnal Enuresis

Nocturnal Enuresis

- **Night-time bedwetting**
- **Primary or secondary**
- **Monosymptomatic or Non-monosymptomatic (i.e. also have daytime voiding symptoms)**
- **More common in males**
- **Most children reach night-time continence by 5 years old**
  - 23% of 5 year olds have nocturnal enuresis
  - 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
- Snoring? Rule out obstructive sleep apnea
- Physical exam usually normal
- Urinalysis

Nocturnal Enuresis: Pathogenesis

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

Nocturnal Enuresis: Treatment

- **Reassurance** of high incidence of nocturnal enuresis and high rate of spontaneous resolution (15% annually)
- **Alarm**
  - Minimum 4 month trial
  - More effective than pharmacologic options
  - 70% average response during the 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
  - Theoretical risk of seizure if taken with large amount PO fluid
  - High relapse rate

Glazener et al; Cochrane Database Syst Rev 2002

Nocturnal Enuresis: Treatment
Tricyclic Anti-depressants (TCA)

- Both anticholinergic and alpha adrenergic effects
- Not first line management
- Average one wet night per week ↓
- 20-30% dry on treatment
- High relapse rate
- Potential serious side effects (sedation, cardiovascular etc.); rarely used

Glazener et al; Cochrane Database Syst Rev 2003

Urinary Tract Infections (UTI)

Urinary Tract Infection (UTI): Presentation

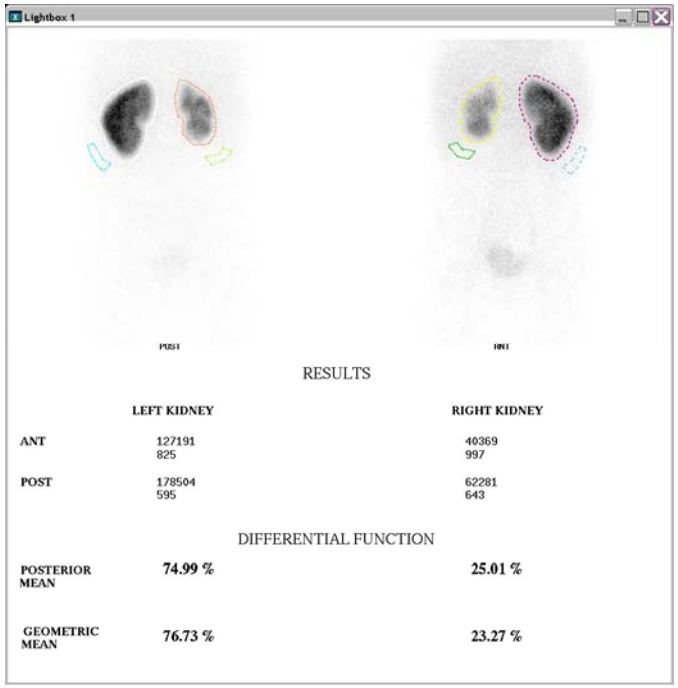
- **Young children**
  - Febrile
  - Vomiting
  - Decreased appetite
  - Lethargy
- **Older children**
  - Febrile (implies pyelonephritis)
  - Dysuria
  - Frequency, new or worsening incontinence
  - Abdominal pain

Urinary Tract Infection: Investigation

- **History and physical**
  - Voiding and bowel history
  - Family history
- **Urine**
  - Ideally cath specimen and urinalysis to confirm inflammatory response to infection
  - Bag (PUC- pediatric urine collection) specimens are bad! Close to 90% false positive rate
- **Radiology**
  - Febrile UTI in a child under 2 years, or recurrent febrile UTI in any child
    - Renal/Bladder Ultrasound
    - Cystogram (if US is abnormal)
    - DMSA can document a pyelonephritis/scars

Urinary Tract Infection: 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



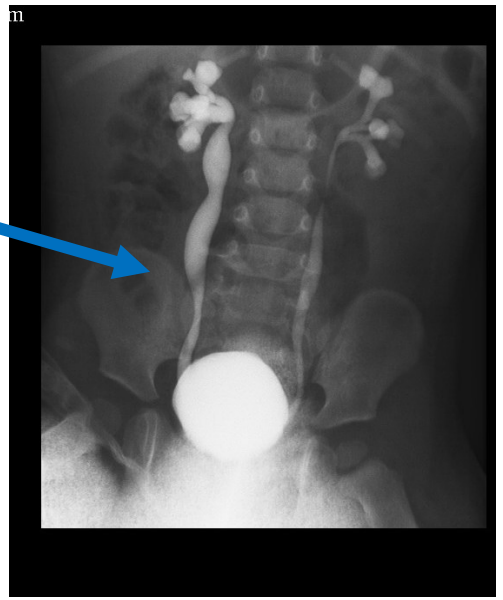
Recurrent UTI's: Treatment

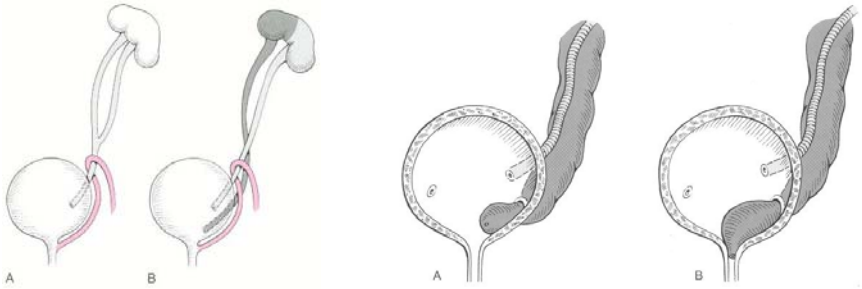
- **Improve voiding patterns**
  - Timed voiding (q2h)
  - Double Void
  - Improve emptying
    - » Biofeedback
    - » Alpha Blocker
- **Increase water**
- **Treat constipation -** Stool softener
- **Antibiotic Prophylaxis**
- **Treat anatomic abnormality**

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 with nausea and vomiting
  - Urinary Tract Infection
  - Renal calculi

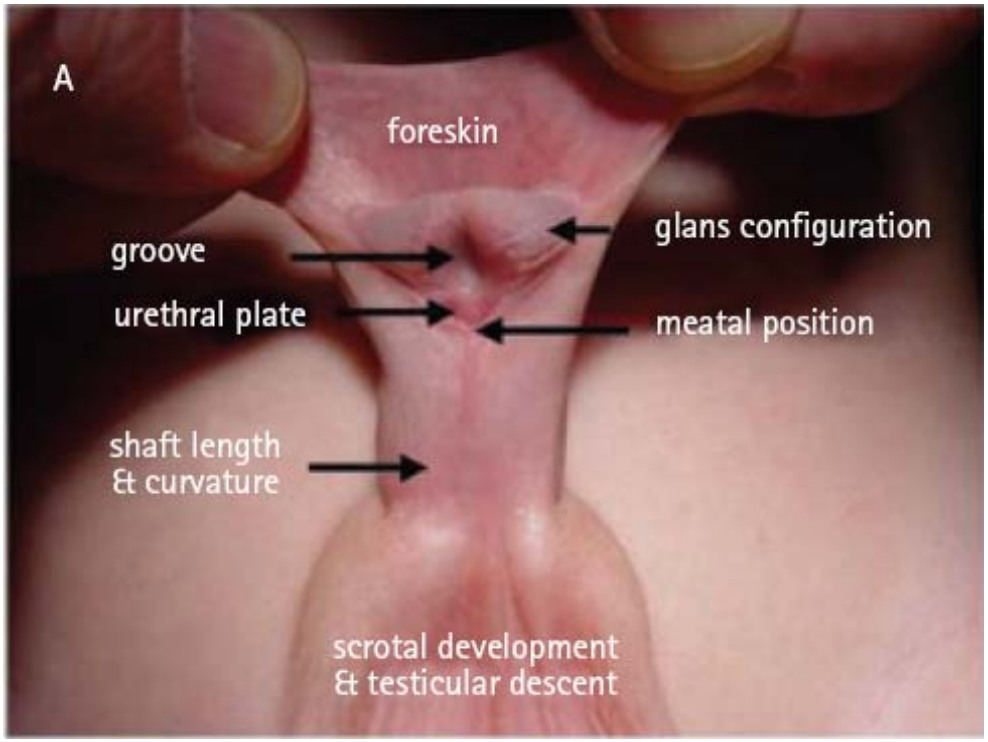
Ureteropelvic Junction Obstruction: Investigation and Management

- **Investigations**
  - Ultrasound
  - MAG3 Renal Scan to assess function and drainage
- **Asymptomatic**
  - Observe with serial US and renal scans
  - If drop in renal function or worsening of hydro operate
- **Symptomatic** (pain, stones, infection)
  - Operate

Hypospadias

Hypospadias:

- **ventral position of urinary meatus**
- **dorsal hooded foreskin**
- **possible ventral curvature**



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
  - Placental insufficiency
  - 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

Hypospadias: Treatment

- **Referral before 6 months of age**
- **Surgery usually between age 1 and school age**
- **Distal hypospadias**
  - Surgery mostly for cosmesis
  - Sometimes for urinary function
- **Proximal hypospadias**
  - Treatment for both urinary and reproductive function
  - Higher risk of complications

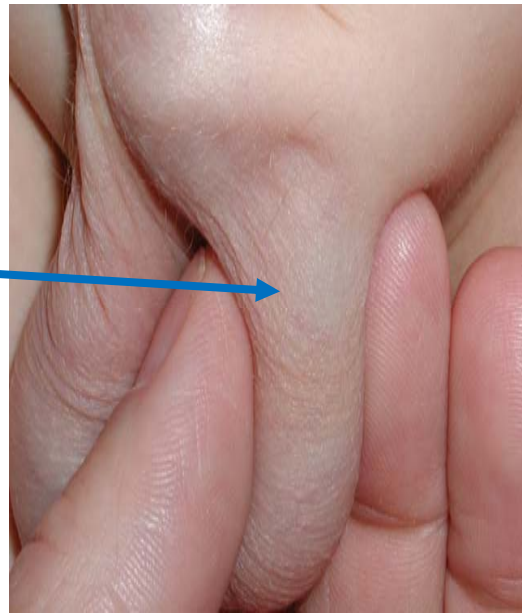
Pediatric Scrotal Conditions

Scrotal Conditions: Testicular Pain

- **Causes:**
  - Torsed appendix
  - Epididymitis
  - Testicular Torsion
  - Hernia

Scrotal Conditions: Torsion of Appendix Testes

- **Symptoms/Signs**
  - Pre adolescent
  - Pinpoint tenderness
  - Blue dot sign
  - Over time can cause local inflammation which looks like epididymitis on ultrasound
- **Treatment**
  - Rest, scrotal support, NSAIDS



Scrotal Conditions: Epididymitis

- **Adolescent and older**
- **Gradual onset**
- **Tender superior portion**
- **Investigations:**
  - U/A
  - Urine culture
  - Sexual history
  - Possible ultrasound to r/o torsion

Scrotal Conditions: Testicular Torsion

Symptoms:

- Adolescent (not always)
- Severe pain (sometimes abdominal not scrotal)
- Sudden onset
- Sometimes only abdominal pain
- Nausea and Vomiting

Examination

- Tests tender, swollen and firm on palpation
- Abnormal lie to the testicle and/or high-riding testes
- Absence of cremaster reflex

“If it looks like a torsion go right to the O.R.”

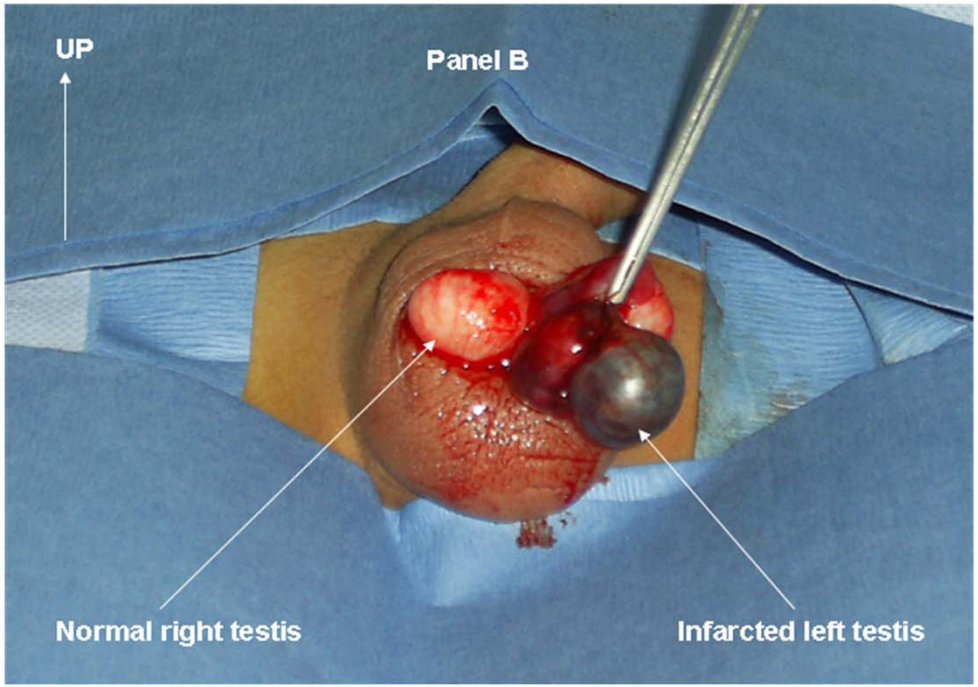
- Ideally fix within 6 hours (50% of testes not salvaged at 6 hours)

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)**
- **If spontaneous descent occurs it will descend in first 3 months of life (except premature infants)**
  - If undescended at 3 months should refer to peds urologists
- **Retractile 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 increased risk if bilateral undescended testes
- **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, will fluctuate in size
  - Treatment:
    - » Often will close in first year of life
    - » Period of observation then surgery if remains greater than 1 year of age
- **Non-communicating hydrocele**
  - Rare in children
  - Usually a result of inflammation

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**