Pediatric Urologic Problems: A General Practitioner Perspective

Ali Ziada
Pediatric Urology - University of Kentucky

Pediatric Urology

- New Specialty being recognized.
- Europe
  - 2006: UEMS recognized new specialty
    - New Board Created
  - 2008: First FEAPU exam held
- USA:
  - Subspecialty certification
  - 2009 First Pediatric Urology Boards
Pediatric Urology Scope

- Circumcision
- Hypospadias
- Scrotal pathology
- Antenatal hydronephrosis
- UTI & Vesicoureteral reflux
- Urinary obstruction: UPJO & UVJO
- Neurogenic bladder & Incontinence
- Stone disease
Phimosis & Circumcision

Circumcision

- No absolute medical indication in the neonatal period
- Relative indication: recurrent infections
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

Circumcision

• Potential medical advantages
  • Decrease incidence of UTI in the first year of life
  • Prevent phimosis
  • Prevent balanoposthitis
  • Decrease incidence of penile cancer
  • May decrease the incidence of sexually transmitted disease
Complications

- Rare 0.2-0.5%
- Bleeding
- Injury to penis
- Skin issues
  - Take off too much/Leave on too much
  - Skin bridges
  - Inclusion cysts
  - Penile curvature
  - Urethrocutaneous fistula
  - Meatal stenosis

Complications hidden penis
Circumcision methods

- Gomco clamp
- Plastibell clamp
- Mogen clamp
- Surgically

Gomco Clamp
Plastibell

1. An incision is made in the top of the foreskin.
2. The plastibell is placed over the head of the penis and the foreskin is pulled over the plastibell.
3. A suture is tied around the foreskin over the tying groove in the plastibell. Excess skin beyond the suture is trimmed away. The plastibell falls off 3-7 days later.

Mogen Clamp
Phimosis & Paraphimosis

Phimosis

- Narrowing of the opening of the prepuce

- Treatment
  - Steroid cream (0.05% Betamethasone cream)
  - Circumcision
Paraphimosis

- Phimotic ring of foreskin is retracted by the child or parent
  - trapped proximal to coronal sulcus
  - significant glans edema
  - possible ischemic injury
- Treatment involves
  - Manual reduction of the foreskin
  - Surgically by division of the phimotic ring
  - Circumcision is advisable

Paraphimosis

- Painful constriction of the glans penis by the foreskin which has been retracted behind the corona
- Treatment: dorsal slit
Balanitis

- Nonspecific etiology; inadequate hygiene or external irritation
  - Balanitis (inflammation of the glans penis)
  - Posthitis (inflammation of the foreskin)
  - Balanoposthitis (inflammation of the glans and the foreskin)
- Inability to retract the foreskin and accumulation of smegma
- In severe cases, when the foreskin cannot be easily retracted, oral antibiotics may be required

Hair torniquet

- A surgical emergency similar to paraphimosis in appearance and pathophysiology.
- Ischemic injury to the glans may occur if not relieved promptly by division and removal of the hair strand.
Hypospadias

- Second most common birth defect, and
- Incidence increasing.
- Etiology unknown
Hypospadias

At 11 weeks, the urethra is open and urethral fold (uf) and groove are prominent in the transillumination view of the phallus. At 16.5 weeks, normal ventral curvature (vc) is seen and the foreskin is almost complete.
(C) At 20 weeks penis and urethra are complete with penile curvature resolved.

(D) At 24 weeks prepuce covers whole glans

ms: the midline seam

TIP (Snodgrass) Repair
TIP repair

Proximal Hypospadias
Preputial or Buccal Mucosa Grafts

Hypospadias- associated abnormalities

- Easy to remember - nothing!
- Normal kidneys and bladder
- Normal fertility
- Normal sexual function
Hypospadias - management

• For pediatricians
  • Do not circumcise ??
  • No need for imaging
  • Refer to pediatric urologist
  • Consider DSD if associated with undescended testis

For Pediatric Urologists
  • Surgery at 6 - 9 months
  • Attempt one stage reconstruction
  • Outpatient surgery
  • Success rates 95%

Who is a Boy? & who is A Girl?
Exstrophy Epispadias

Epispadias

- Very rare
- More often associated with bladder extrophy
- Need early referral for parental counseling
- Patients may be totally incontinent
Female epispadias

- Rare condition
- In females this condition is rare, at ≈1/480 000
- Less severe variants can result in sphincter incompetence without obvious clinical signs.
- History of chronic wetting without a diagnosis realized.

Incidence

- 1 in 50,000 live births
- Incontinent epispadias alone 1 in 100,000 live births
- Male to female ratio 2:1
Anatomy Classic type

- Wide symphysis pubis.
- Outward rotation & shortening of pubic rami.
- Waddling gait in early childhood
- Few cases have hip dislocation and spinal defects

Abdominal & Pelvic defects

- Abdominal Wall Defects
  - Short distance between umbilicus and anus.
  - Umbilical hernia usually present and of insignificant size.
  - Frequent indirect inguinal hernias.
- Pelvic Floor Defects
  - Levator ani is more posterior in exstrophy.
  - The levators are rotated outward and more flattened.
Genital defects

Male
Anterior corporal length 50% shorter.
Urethra anterior to the prostate.

Female
Clitoris is bifid
Vagina is shorter but normal caliber.
Vaginal orifice is stenotic and anterior

Prenatal Diagnosis & Management

- Absence of bladder filling,
- A low-set umbilicus,
- Widening pubis ramus,
- Diminutive genitalia, and
- A lower abdominal mass.
Posterior urethral valve

PUV

- Most common structural cause of urinary outflow obstruction in pediatric practice
- Most common obstructive uropathy leading to childhood renal failure
- High incidence of renal failure in patients prenatally diagnosed
valve resection
Pathological effects of urethral valves

- Hydroureteronephrosis
- Vesicoureteral reflux,
- Detrusor dysfunction.
- Abnormal renal tubular function
- Reduced glomerular filtration

Valve bladder
Acute Scrotum

Scrotal emergencies

- Common
- Urgent
- Scrotal swelling + pain/erythema
- r/o torsion
Differential diagnosis

- Testicular torsion
- Torsion testicular/epididymal appendage
- Epididymitis
- Incarcerated hernia
- Trauma
- Insect bite

Keys to diagnosis

- Age of child
- History
- P/E
- Timing of presentation
Testicular torsion

- Bimodal age presentation
  - Perinatal period → Extravaginal torsion
  - Any age (puberty peak) → Intravaginal torsion

Testicular torsion

- Testicular torsion requires emergent surgery
- Late exploration not usually indicated
Extravaginal torsion

- Management of extravaginal torsion (controversial)
  - No intervention
  - Urgent exploration
    - excise necrotic testis & fix contralateral
    - Semielective exploration
      - optimize anesthetic risk

Intravaginal torsion

- Abnormal fixation of testis within tunica vaginalis
- Patients present with acute pain
- Later hemiscrotum becomes erythematous
- Transverse lie early
- Cremasteric reflex classically absent
- No imaging needed before emergent surgery.
Testicular torsion

Intermittent torsion

- Prior similar episodes
- Spontaneous “detorsion.”
- Subsequent testicular torsion.
- Elective fixation
Differential

- Torsion of appendix testis
  - Point of tenderness localized
  - Usually upper pole
  - Blue dot sign
  - Self-limited
- Epididymitis or orchitis
  - Hx dysuria & fever or instrumentation
  - Voiding symptoms + bacteriuria
  - Pre- and postpubertal boys.

Testicular salvage

- Salvage directly related to duration
  - Excellent salvage expected if <6 hours
  - Progressively worse rates thereafter.
  - Beyond 48 hours, salvage rate is poor
- Delay presentation >>> diagnosis becomes obscure.
  - Urinalysis, WBC, and ultrasonography
Imaging

- Boys who have an acute scrotum DO NOT require an ultrasound.
- H&P consistent with torsion → immediate surgery
- Doppler US is technician dependent and NOT 100% sensitive or specific for torsion
- In equivocal cases, it can be helpful

Scrotal trauma

- A direct blow or straddle injury
- Hematoma, ecchymosis or rupture
- The examination can be difficult
- Doppler ultrasound can be a useful adjunct.
- Testicular rupture can be present despite an ultrasound showing an intact tunica albuginea.
- If the testicle is not intact, urgent surgical repair.
Incarcerated inguinal hernia

- Tender or nontender scrotal swelling
- Persistent mass and induration extending to the inguinal area
- Prior suggestive history
- Manual reduction can delay surgical exploration
- Surgical exploration if reduction is not possible.

Hydroceles & spermatoceles

- Nontender scrotal swelling
- Transilluminate.
- Lack of persistent mass in the upper scrotum and external inguinal ring along the spermatic cord.
- Noncommunicating hydroceles can be electively corrected after the age of 2 years
- Spermatoceles do not require excision unless desired by the patient
Varicoceles

- 15% of boys
- Present as a scrotal swelling or discomfort
- Examination standing and supine with & without Valsalva
- Management controversial
- May be a sign of retroperitoneal process

Undescended testis

- 3-6% of all newborn
- 1% of all 1-year-old boys
- Genetic inheritance of this disease is unclear.
Undescended testis

- Palpable or nonpalpable?
- Unilateral or bilateral?
- Associated hypospadias?
- Associated syndromes?
- Most will have isolated unilateral undescended testis

Undescended testis

- Intraabdominal (nonpalpable)
  - Testis located above internal ring
- Canalicular “routine” undescended testis
- Retractile - not a UDT
Undescended testis

- Observation until 6-12 months of age
- If still undescended, surgical correction
- No advantage to further observation after 12 months of age
  - Testis will not descend
  - Germ cell fibrosis evident by three years of life

Genital abnormalities

- Genital abnormalities requiring urgent evaluation include ambiguous genitalia, hypospadias with nonpalpable testis & interlabial masses.
- Ambiguous genitalia often presents a social emergency and a potential medical emergency, owing to potential life-threatening, salt-wasting CAH.
Ambiguous genitalia

- Evaluation includes karyotype, electrolytes, 17-OH progesterone, testosterone, LH, and FSH in the immediate perinatal period.

- Possible presentations include clitoral enlargement with a palpable labioscrotal mass, microphallus with hypospadias, and clitoromegaly with labial fusion.

- If the 17-OH progesterone level is elevated → CAH

- If the 17-OH progesterone level is normal → further endocrine evaluation

Interlabial masses

Gartner's duct cyst
Imperforate hymen
Urethral prolapse
Prolapse ureterocele

- Normal urethral meatus: Smooth, translucent lesion protruding from or filling the vagina. Asymptomatic.

- Shiny bulge over vaginal introitus: Urethral meatus uninvolved.

- Everted urethral mucosa: Treatment includes observation, topical antibiotic, estrogen creams & sitz baths. Rare surgical excision.
Voiding dysfunction

Bladder function

• Store urine at low pressure
• Empty urine
  • Bladder is in storage mode for 23 hours and 45 minutes
Voiding Dysfunction

**History**
- Daytime vs. nighttime wetting vs. both
- Urgency?
- Frequency? Infrequent voiding?
- Damp vs. soaking?
- Does child care if wet?
- Bowel function?

**Investigations**
- Screening ultrasound
- Ensure normal kidneys
- Bladder wall thickness
- Post-void residual
- Functional bladder capacity by voiding diary
- VCUG

**Differential diagnosis**
- Bladder instability/overactivity
- Infrequent voiding
- Incomplete emptying
- Hinman’s syndrome
Voiding Dysfunction
Treatment

- Anticholinergics
- Timed voiding
- Intermittent catheterization
- Bowel management
- Prophylactic antibiotics

Enuresis

- Prevalence 15-20% of 5 year olds & 1-2% adolescents
- Cause: Genetic, maturational delay, difficulty awakening, psychological
- Investigation: urine and nothing further if only nocturnal
- Treatment
  - Reassurance
  - Bed alarm
  - DDAVP ± Anticholinergics
Hydronephrosis

Antenatal Hydronephrosis

- Incidence 1/100 pregnancies
- Only 1/500 are significant abnormalities
Differential Diagnosis

- Normal
- Uretero-Pelvic Junction Obstruction
- Vesicoureteral reflux
- Ureterovesical junction obstruction (megaureter)
- Multicystic Dysplastic Kidney
- Posterior urethral valves
- Prune Belly syndrome

Investigation

- Immediate postnatal ultrasound if
  - Bilateral severe hydronephrosis
  - Dilated posterior urethra suggesting valves
- Repeat ultrasound 4-6 weeks and if persistent
  - VCUG
  - MAG3 renal scan
SFU classification

- Grade 0: no dilatation
- Grade I: only pelvic dilatation
- Grade II: pelvis + calyces visible
- Grade III: pelvis + calyces dilated
- Grade IV: parenchymal thinning

Calyceal dilatation is not an indication for early delivery

Renal pelvic diameter

- A-P diameter of the renal pelvis
  - 10-20 mm: mild, probably reversible
  - 20-30 mm: moderate, equivocal
  - > 30 mm intervention: severe, probably will need postnatal intervention
Urinary Obstruction

- Congenital stricture or adynamic segment
- Crossing vessel
- Ultrasound & MAG3 scan
  - Asymptomatic >> Observe
  - Worsening renal function or hydro operate
  - Symptomatic >> Operate

Ureteropelvic Junction Obstruction
Goal

- Relief obstruction
- Preservation or improvement of function

Indications

- Symptomatic obstruction
- Impairment of overall renal function
- Progressive impairment of ipsilateral renal function
- Development of stones, infection
- Hypertension

- Timing of repair is controversial
Ureterovesical Junction Obstruction “Megaureter”

- Obstruction or adynamic segment at the UVJ
- Presentation: Often antenatal ultrasound
- Investigation: Ultrasound + MAG3 renal scan
- Management
  - Observe if function preserved
  - If function deteriorating correct surgically
Vesicoureteral Reflux

- Abnormal retrograde flow of bladder urine back into the upper urinary tract
- Sibling predisposition: 40%
- Presentation
  - Antenatal ultrasound with hydronephrosis
  - Urinary tract infection

Grades of VUR
Endoscopic VUR treatment
Surgical treatment of Reflux

Collecting System Abnormalities

- Partial Duplication
- Complete Duplication
- Intravesical Ureterocele
- Ectopic Ureterocele
Weigert-meyer rule

Ureterocele
Ureterocele

Duplex system Ureterocele
A. intravesical ureterocele entirely within the bladder.
B. distal portion of an ectopic ureterocele extends outside the bladder

Ureteral duplication

• Reflux into both ureters of a complete duplication is less common than reflux into the lower pole ureter alone
Ectopic Ureter in Males & Females

Surgical options

- Upper pole surgery (open vs lap)
- partial nephrectomy
- pyelo-ureterostomy
- Ureteral reimplantation (and ureterocele excision)
- Combined upper and lower tract approaches
- Lower tract uretero-ureterostomy (U-U)
Surgical techniques

- Excision of ectopic ureterocele & common sheath reimplantation
- Upper pole nephrectomy

UTI: Presentation

- Young children
  - Fever
  - Decreased appetite
  - Lethargy
- Older children
  - Fever (implies pyelonephritis)
  - Dysuria
  - Frequency
  - Abdominal pain
UTI: investigation

- H & P
  - Voiding history
  - Family history
  - Fever
- Urine: Ideally cath specimen; bag specimens are bad
- Radiology
  - U/S
  - VCUG
  - DMSA

UTI 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
Thank you