Inguinal Scrotal and Urachal Anomalies

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OUTLINE

- Cryptorchidism
- Inguinal Hernia
- Hydrocele
- Varicocele
- Testicular Torsion
- Urachal Anomalies
Cryptorchidism

- Undescended testis (UDT)
- Failure of one or both testes to descend or remain descended in a dependent scrotal position
- Position
  - Intraabdominal (10-20%)
  - Canalicular: within inguinal canal
  - Distal to external ring
  - True ectopic (Perineal)
Cryptorchidism

1. 2 – 4 % of full term boy
2. up to 30% of premature boy
3. 50% descend spontaneously in first 3 – 6 months
4. Premature boys may take up to 1 year to descend
5. Increased incidence in families
6. Low birth weight : Prematurity/ SGA
Cryptorchidism

1. Congenital
   - Testis extrascrotal at birth

2. Acquired
   - Testis intrascrotal at birth but found in extrascrotal position at subsequent time
   (Jensen MS et al. J Uro 2011)
   - Delayed diagnosis of primary UDT, after inguinal surgery, retractile testes

3. Vanishing
   - Blind ending spermatic vessels and vas deferens in a boy initially diagnosed with UDT
Cryptorchidism

• Complete testicular descent requires normal development & function of gubernaculum, stimulation by testicular androgens

• Associated conditions:
  - Inguinal hernia/PPV
  - Hypospadias
  - Disorder of sex differentiation
  - Neurological & musculoskeletal disease
Cryptorchidism

• History
  1. Family history of UDT
  2. History of inguinal hernia/ surgery
  3. Birth history
  4. Document testicular position at birth
Cryptorchidism

• PHYSICAL EXAMINATION
1. Scrotal development
2. Penile development – hypospadias, ambiguous genitalia (DSD)
3. Periodic examinations - ? Spontaneous descent up to 6 month
4. Vanishing testis – intrascrotal “nubbin”, contralateral testicular hypertrophy, length > 1.8 cm (Huff DS et al J Uro 1992)
Cryptorchidism

- Lab Test
  1. No testing for unilateral UDT
  2. bilateral non palpable testes
    - Karyotype – TRO 46 XX congenital adrenal hypoplasia
    - Ganadotrophin post natal surge, low anti –Mullerian hormone
Cryptorchidism

- Diagnostic Procedure
  1. Laparoscopy
     - localisation and determination status of non palpable testis
     - Open Internal ring: Distal testis likely
     - Closed internal ring: no vessels, look for abdominal testis
     - Small/atretic vessels suggest distal vanishing testis
     - Retroperitoneal exploration to kidney may be required
Cryptorchidism

• Surgery
  - At 6-18 months of age if testis fails to descend to improve testicular growth (Kollin et al J Clin Endocrine Metab 2012)
  1. Inguinal orchidopexy
  2. Primary scrotal orchidopexy (Bianchi)
  3. Laparoscopic orchidopexy
  4. Open abdominal orchidopexy
  5. Fowler-Stephens Orchidopexy
Cryptorchidism

Prognosis

1. Fertility
   - 20-50% unilateral UDT, 75-100% bilateral UDT abnormal semen

2. Paternity
   - Conception normal in unilateral, reduced 30-50% in bilateral UDT

3. Malignancy
   - Overall relative risk 2.9 - 6.5 ties
   - Prepubertal orchidopexy < postpubertal orchidopexy
Inguinal Hernia

- Indirect hernia
- PPV
- Associated with hydrocele
Hydrocele

• Collection of serous fluid in some part of the processus vaginalis, usually in the tunica
• Congenital vs Acquired
• More common in children
• Prevalence: 1000 in 100,000
Hydrocele

RISK FACTOR
1. Patent Processus Vaginalis – Congenital hydrocele
2. Excessive Fluid Production (e.g. epididymo-orchitis, testicular torsion)
3. Trauma with bleeding ("hematocele")
4. Lymphatic obstruction - filariasis, scotal surgery (varicocele), malignancy
5. Migration of VP shunt
6. Prematurity, Low birth weight
Hydrocele

4 variants:

1. Vaginal (PV around the testis)
2. Infantile (PV around testis and cord)
3. Congenital Communication (PV — peritoneal cavity)
4. Hydrocele of the cord (Pv patent with obliteration above and below)
Hydrocele

HISTORY
1. Usually painless
2. Discomfort /sensation of heaviness
3. Symptoms of epididymitis, UTI or acute pain (torsion)
4. Change in size of the swelling
5. Birth history
6. Medical / surgical history
Hydrocele

- Physical Examination
  1. Transillumination of scrotum
  2. Palpation of bilateral testes - undesended testes
  3. Examine Groin - hernia
  4. Lymphedema of external genitalia or lower limb (tissue edema mistaken for hydrocele)
Hydrocele

- Treatment
  1. Most will resolve in 1st year of life
  2. If persist > 1 year, suggest the presence of a patent indirect hernia sac
    - Should be repaired
  3. High ligation of the processus vaginalis and excision of sac

4. Nonseptated hydrocele aspiration & scleroherapy with doxycycline reported to have an 84% success rate with a single treatment (Francis JJ Uro 2013)
Hydrocele

• Complication
  1. Rupure
  2. Hernia
  3. Calcification of the wall (long standing case)
  4. Hematocele
  5. Infection
Hydrocele

FOLLOW UP
1. Periodic follow up, observe for any acute changes in symptoms
2. Parents of newborn instructed the natural history of hydrocele
Torsion of testis / testicular/ epididymal appendages

1. Age 12-18
2. 1:4000 <25 years old
3. Prepubertal: appendix torsion (common)
4. Puberty: Intravaginal testicular torsion
Torsion of testis / testicular/ epididymal appendages

Testicular torsion

1. **Intravaginal**
   - twisting of the spermatic cord within the tunical vaginalis
   - Incomplete fixation of testis within the tunical vaginalis (bell – clapper deformity)

2. **Extravaginal**
   - Twisting of both spermatic cord and tunical vaginalis
   - Incomplete fixation of tunica vaginalis to the scrotum in perinatal period
Torsion of testis / testicular/ epididymal appendages

- Appendix torsion
  1. Appendix testis (hydatid of Morgagni)
     - 95% of appendage torsion

2. Appendix Epididynis

U/S-
- Supratesticular complex mass without vascular flow
- Enlarged epididymis
- Dopper Flow normal or increased
Torsion of testis / testicular/ epididymal appendages

Testicular torsion Treatment
- Emergency exploration / Orchiedectomy/Orchidopexy
- Urgent exploration, bilateral fixation for extravaginal testicular torsion to avoid asynchronous contralateral torsion (Sell H et al. ANZ J Surg 2002)

Appendix torsion
- Rest until pain resolves
- exploration if pain worsen/ proloned pain/ recuurent pain
Urachal Abnormalities

- Urachus is a tubular connection between the allantoic stalk and the dome of the bladder
- Faulty embryologic resolution of this connection
- Congenital urachal abnormalities:
  1. Urachal sinus
  2. Urachal Cyst
  3. Patent urachus
  4. Urachal diverticulum
Urachal Abnormalities

1. Urachal Sinus
   - Most common type
   - Arises from a persistent patent urachus that drains to the umbilicus
   - Wetness, purulence or malodorous discharge

2. Urachal Cyst
   - 2nd most common
   - Persistence of part of this channel between the bladder and umbilicus, lacking communication
   - Older child
   - Midline lower abdominal mass, tenderness, pain, erythematous
Urachal Abnormalities

3. Patent Urachus
   - Persistence of urachal channel between the bladder and umbilicus

4. Urachal diverticulum of the bladder
   - Drainage of urachal cyst to the bladder
   - UTI
Urachal Abnormalities

1. Complete excision of the abnormal structure including a cuff of bladder (Risk of Urachal carcinoma, 0.2% of all bladder carcinoma)

2. Except for the asymptomatic urachal diverticulum
Varicocele, Pediatric

- Abnormal dilatation of internal spermatic veins in the pampiniform plexus of spermatic cord
- Incidence: 8-16%, unusual in prepubertal
- 90% left side (unique angle of left spermatic vein entering left renal vein)
- 2% bilateral
Varicocele, Pediatric

Risk factor
- Increase height & relatively low weight and BMI
- Congenital incompetenct valves of internal spermatic vein
- Acquired incompetence (e.g. inginal hernia repair)
- Genetics – risk 4-8 times higher in 1st degree relatives
- Retroperitoneal tumour / fibrosis, renal vein thrombosis, renal tumour
Varicocele, Pediatric

HISTORY
- Asymptomatic
- Symptomatic dull ache /Fullness in scrotum, worsened with activity
- Occasional testicular pain
- Change in size with Valsalva
Varicocele, Pediatric

Physical Examination

- Examine in upright and supine position, with or without Valsalva

Grade

0 – Subclinical, not visible
1 – Palpable only with Valsalva
2. – Palpable but not readily visible
3 – Visible through scrotal skin

Varicocele: Bag of Worms Appearance
Varicocele, Pediatric

Physical Examination
- “Bag of worms”
- Negative transillumination
- Testicular — Ochidometer (2cc or 20% discrepancy suggest testicular hypotrophy)
- Semen analysis if > 18 years old or in Testicular hypotrophy
Varicocele, Pediatric

1. Scrotal Ultrasound
2. Doppler US if subclinical varicocele
Varicocele, Pediatric

Surgical Indication
1. 2cc or 20% size discrepancy between testicles based on US/orchidometer
2. Symptomatic
3. Bilateral Varicocele
4. Abnormal Semen Analysis
5. Solitary testis with varicocele
Varicocele, Pediatric

• Operative Technique
  1. Subinguinal
     - Standard
     - greater number of veins requiring ligation
     - Microscope & Doppler to protect spermatic artery/lymphatics
     - Recurrence rate – 1%
     - Hydrocele <1%
Varicocele, Pediatric

2. Inguinal
   - Ligation of spermatic vein within inguinal canal
   - Allow concurrent inguinal hernia repair
   - Hydrocele rate up to 30%

3. Scotal - obsolete

4. Retroperitoneal (Palomo) - high ligation
   - Recurrence rate: 15 - 25%
   - Hydrocele: 7%
Varicocele, Pediatric

5. Laparoscopic
   - High ligation, internal ring
   - Recurrence rates: <2%
   - Hydrocele: 5-8%
   - 5% experience transient anterior thigh numbness
Varicocele, Pediatric

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<tr>
<th>Ligating Vein ALONE</th>
<th>Ligating Vein and Artery</th>
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<td>Risk of recurrence: 15% (fine peri-arterial veins may communicate with spermatic veins - gradually dilate over time)</td>
<td>Reduce the risk of recurrence - collateral supply to testis from vasal &amp; cremasteric artery</td>
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<td>Greater risk of hydrocele</td>
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Varicocele, Pediatric

- Recurrence
  - Complex venous anatomy
  - Parallel duplication of internal spermatic vein is common
Varicocele, Pediatric

Bahren Classification
Varicocele, Pediatric

Interventional Radiology
- Failed surgery
- Venography and perform occlusion therapy (sclerotherapy/embolisation)
- Fast recovery
- Recurrence up to 27%
Complication of surgery
1. Hydorchle
2. Recurrence
3. Testicular artery injury
4. Nerve Injury
5. Testicular Atrophy
Varicocele, Pediatric

Follow Up
1. Varicocele Recurrence - 6-13 month
2. Infertility
   - Semen analysis at 3 months interval
   - Monitor at least 1 year / or until pregnancy has been achieved
   - Varicocele with normal SA, follow up with testis size, SA, FSH every 1-2 years
Varicocele, Pediatric

- Semen Analysis
  - Sperm concentration < 20 million / ml
  - Motility < 60%
  - Morphology < 14% strict normal forms
  - OAT (Oligoasthenoteratozoospermia)- abnormal count, morphology and motility
  - FSH> 4.5 & OAT = varicocele impacting sperm production
Varicocele, Pediatric

- Nonoperative treatment can be proposed when patient or guardian fully understood the need for lifelong follow up & the potential for progressive subfertility
• THANK YOU