Pediatric Urology

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OUTLINE

- Genital diseases
  1. Undescended testis
  2. Hydrocele
  3. Acute scrotum
     1. Torsion of the testis
     2. Torsion of the testicular appendage
     3. Epididymitis
- Abnormalities of the Penis:
  - Hypospadias

- Urinary track disease and abnormalities:
  - Cystic and dysplastic disease:
  1. Multicystic dysplastic kidney
  2. Autosomal recessive polycystic kidney disease
  3. autosomal dominant polycystic kidney disease
  - Hydronyphrosis
  - daytime urinary incontinence
  - Urinary obstruction and vesicoureteral reflux
  - Prune belly syndrome
  - exstrophy-epispadias complex (Cloacal exstrophy, bladder exstrophy, and epispadias)
  - Ambiguous genitalia and intersex conditions

Cryptorchidism (Undescended testes)

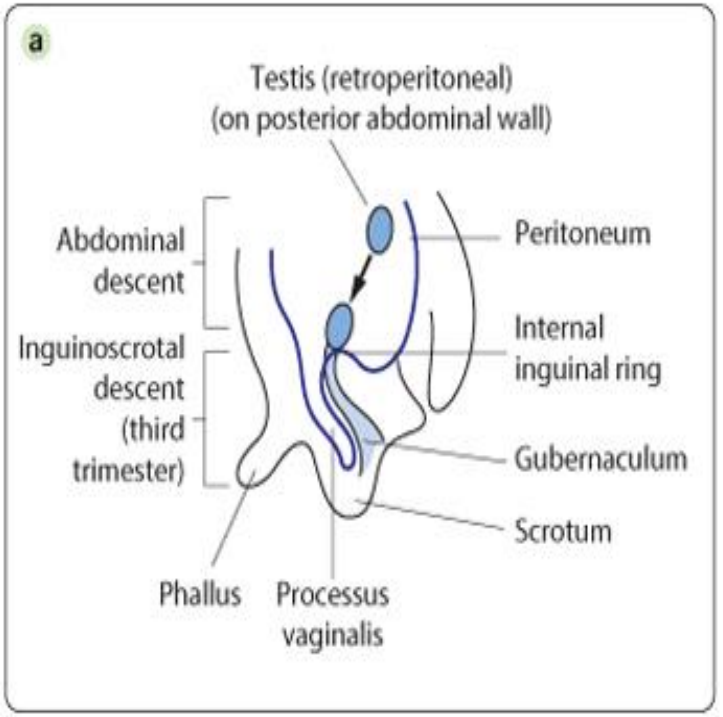
- Cryptorchidism is the absence of one or both testes from the scrotum.
- An undescended testis has been arrested along its normal pathway of descent.
- At birth, about 4% of full-term male infants will have a unilateral or bilateral undescended testis (cryptorchidism).
- Testicular descent may continue during early infancy and by 3 months of age the overall rate of cryptorchidism in boys is 1.5%, with little change thereafter.

Cryptorchidism

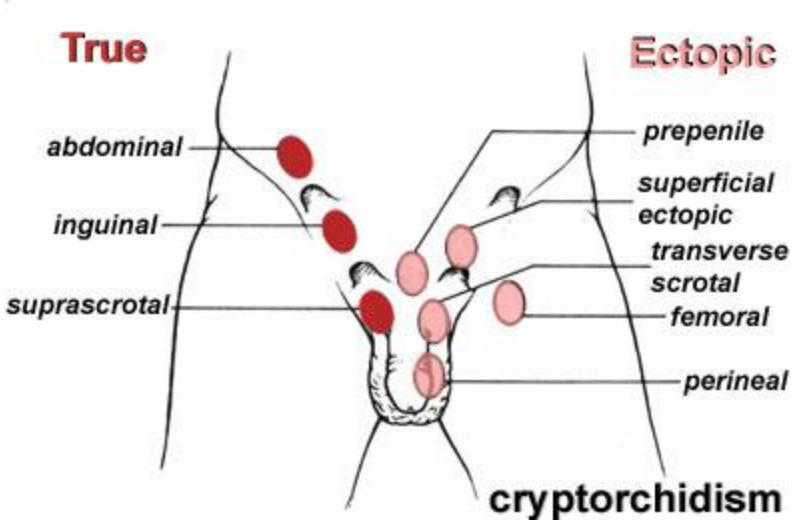
- It is more common in preterm infants because testicular descent through the inguinal canal occurs in the third trimester.
- it is now recognized that occasionally a testis which is fully descended at birth can ascend to an inguinal position during childhood, accounting for some late-presenting 'undescended' testes. This phenomenon may be due to a relative shortening of cord structures during growth of the child

Cryptorchidism

- Embryology:
  - The descend starts at the 26th week, controlled by anti-Mullerian hormone , and guided by the Gubernaculum, starting retroperitoneally, through the inguinal canal to the scrotum
- Risk factors:
  - Premature, iatrogenic cases, androgen or AMH deficiency or insensitivity, congenital malformation syndromes, alcohol and medication (aspirin, ibuprofen and paracetamol) consumption during pregnancy



Cryptorchidism



- Classification
  1. Retractile
     - The testis can be manipulated into the bottom of the scrotum without tension, but subsequently retracts into the inguinal region, pulled up by the cremasteric muscle. The testis has usually been found in the scrotum at a neonatal check. With age, the testis resides permanently in the scrotum. Follow-up is advisable as, rarely, the testis subsequently ascends into the inguinal canal.
  2. Palpable
     - The testis can be palpated in the groin but cannot be manipulated into the scrotum. Occasionally, a testis is ectopic, when it lies outside its normal line of descent and may then be found in the perineum or femoral triangle.
  3. Impalpable
     - No testis can be felt on detailed examination. The testis may be in the inguinal canal, intra-abdominal or absent.

Cryptorchidism

- Examination

1. This should be carried out in a warm room, with warm hands and a relaxed child.
2. Inspect the groin
3. Palpate the scrotum and the inguinal region; if there is a mass, try to see if it can be brought down into a palpable position by gently massaging the contents of the inguinal canal towards the scrotum.

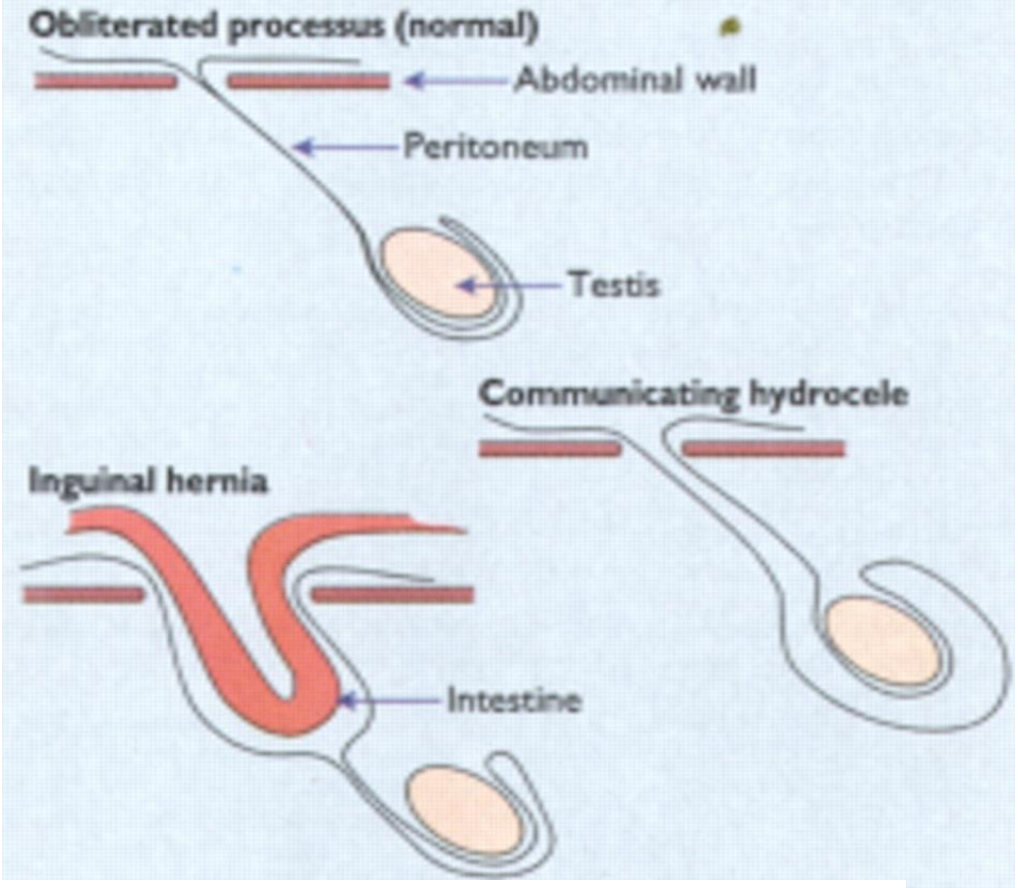
Cryptorchidism

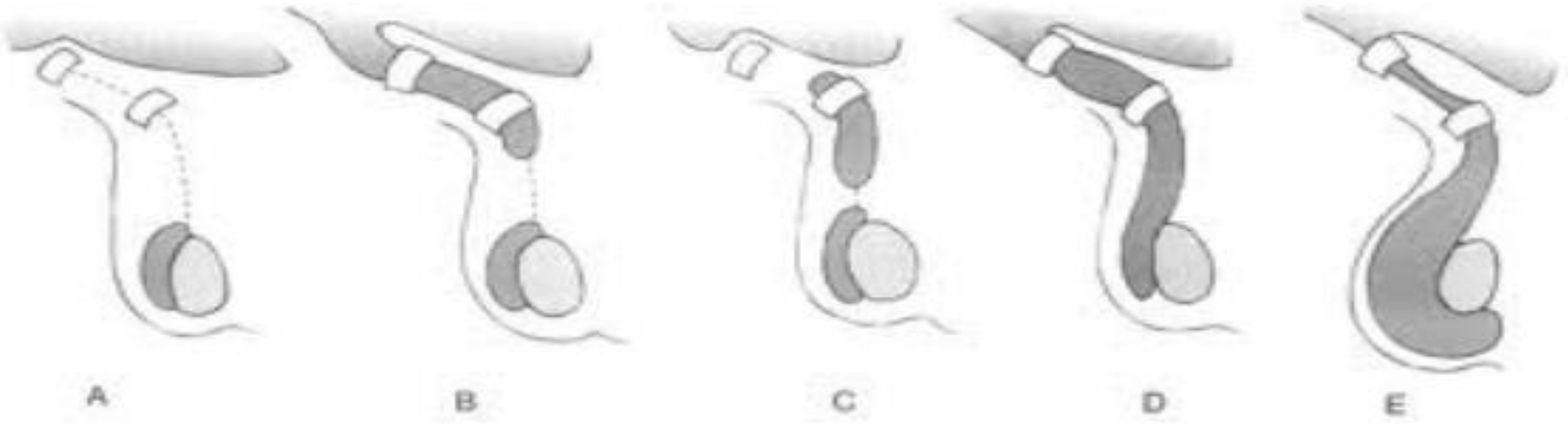
- Investigations :
  1. ultrasound - this has a limited role in identifying testes in the inguinal canal in obese boys but cannot reliably distinguish between an intra-abdominal or absent testis
  2. hormonal - for bilateral impalpable testes, the presence of testicular tissue can be confirmed by recording a rise in serum testosterone in response to intramuscular injections of human chorionic gonadotropin (HCG); these boys may require specialist endocrine review
  3. laparoscopy - the investigation of choice for the impalpable testis to determine if it is intra-abdominal or absent

Cryptorchidism

- Management:
  - Surgical placement of the testis in the scrotum (orchidopexy) is undertaken for several reasons:
  1. *Fertility*
  2. *Malignancy*
  3. *Cosmetic and psychological*
- Orchidopexy via an inguinal incision, the testis is mobilised, preserving the vas deferens and testicular vessels, the associated patent processus vaginalis is ligated and divided, and the testis is placed in the scrotal pouch.
- Orchidectomy is often advised for a unilateral intra-abdominal testis which cannot be corrected by simple orchidopexy, because of the future risk of malignancy

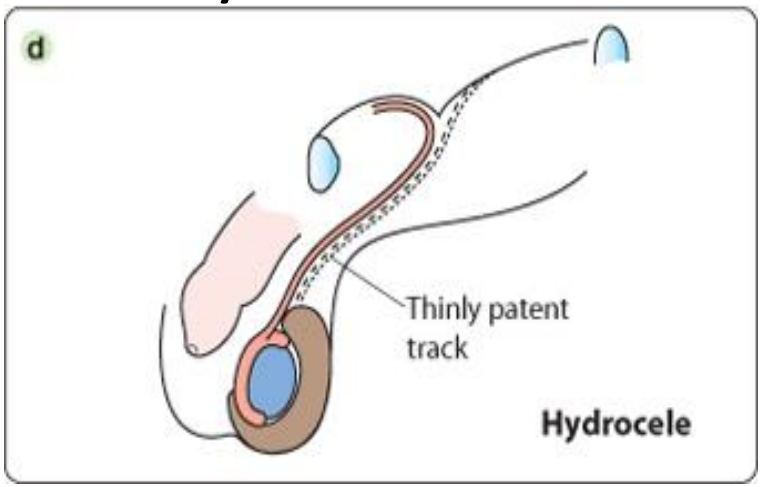
- Patent Processus Vaginalis:
  1. Fluid (hydrocele)
  2. Blood (hematocele)
  3. Bowel (indirect inguinal hernia)
  - Persistent patent processus vaginalis is more common on the right than the left.





Hydrocele

- A hydrocele of the testis is the accumulation of fluids around a testicle, and is fairly common.
- Causes:
  1. Patent processus vaginalis
  2. Cancer
  3. Trauma
  4. Orchitis
  5. can also be the result of a plugged inguinal lymphatic system caused by repeated, chronic infection of Wuchereria bancrofti or Brugia malayi



Hydrocele

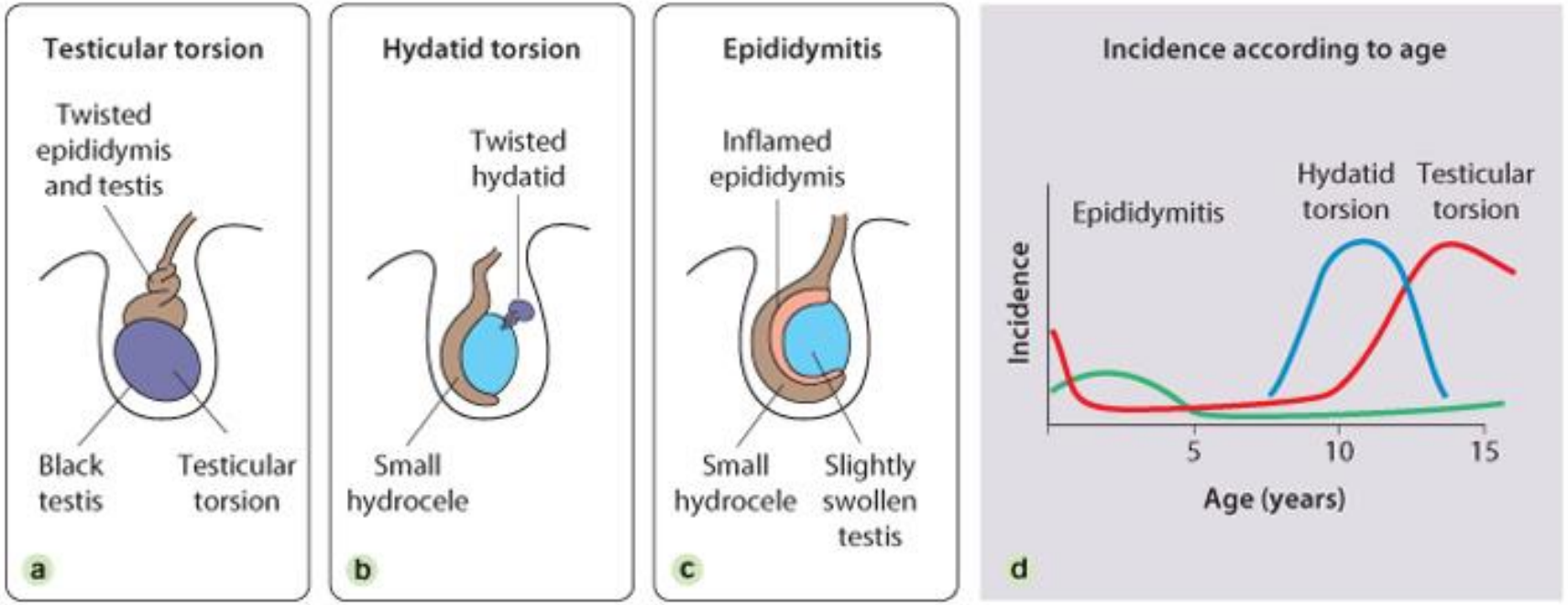
- Clinical features:
  1. asymptomatic scrotal swellings
  2. often bilateral
  3. sometimes with a bluish discoloration.
  4. They may be tense or lax but are <u>non-tender</u> and <u>transilluminate</u>
  5. <u>Cannot be reduced and can go above it</u>
  6. A hydrocele of the cord forms a non-tender mobile swelling in the spermatic cord

Fig. 129 Bilateral hydroceles

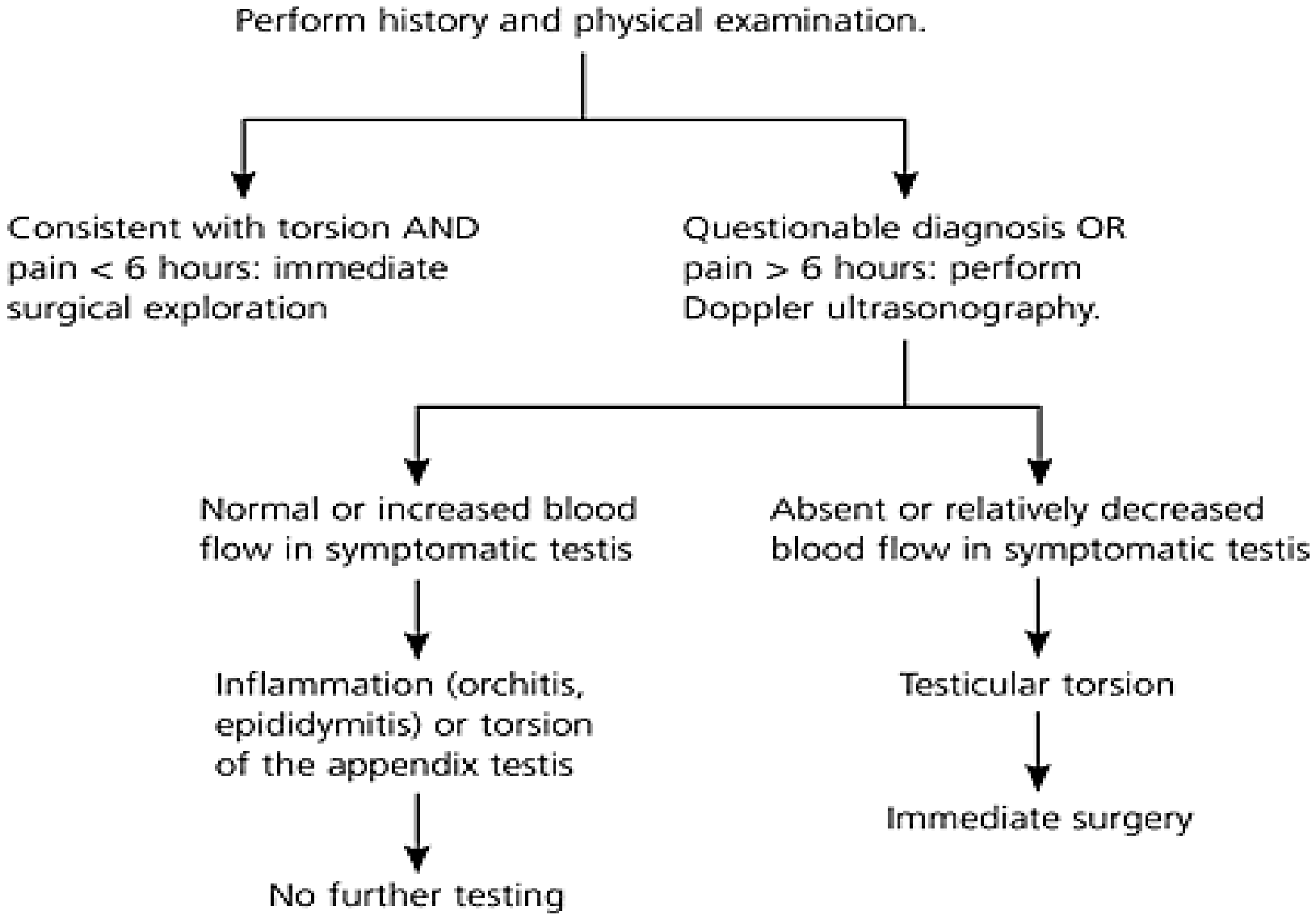
- The majority resolve spontaneously as the processus continues to obliterate, but surgery is required in children older than 18 months

Acute Scrotum

1. testicular torsion(16%)
2. torsion of a testicular appendage (46%)
3. epididymitis (35%).

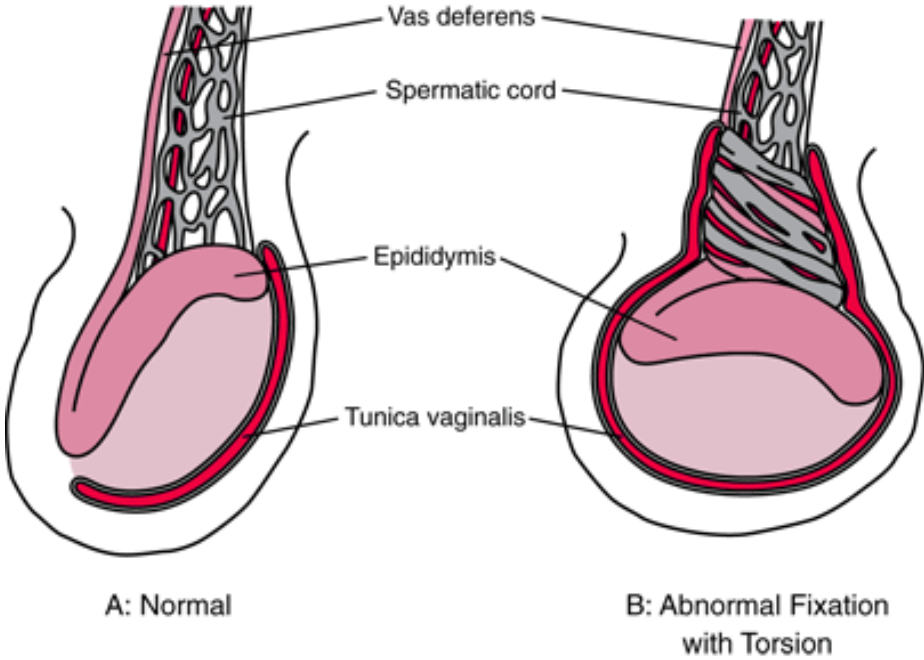


Evaluation of Acute Scrotal Pain



Torsion of the testis

- **Testicular torsion** is when the spermatic cord to a testicle twists, cutting off the blood supply
- Emergency diagnosis and treatment is required in order to save the viability of the testicle.
- most common in adolescents but may occur at any age, including the perinatal period
- There may be a history of previous self-limiting episodes



Torsion of the testis

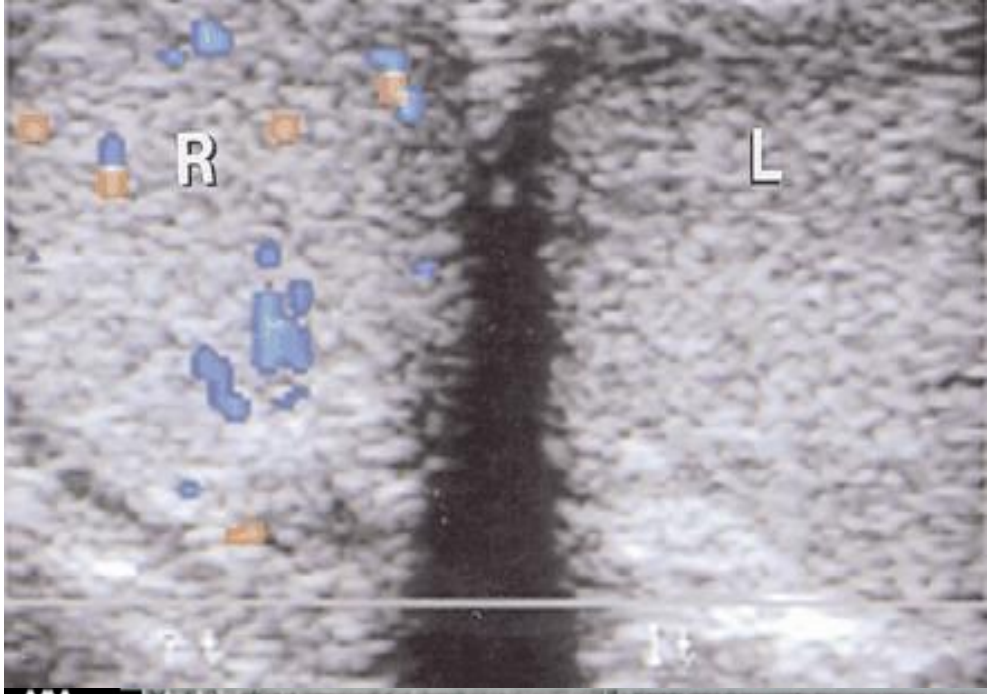
- Risk factors:

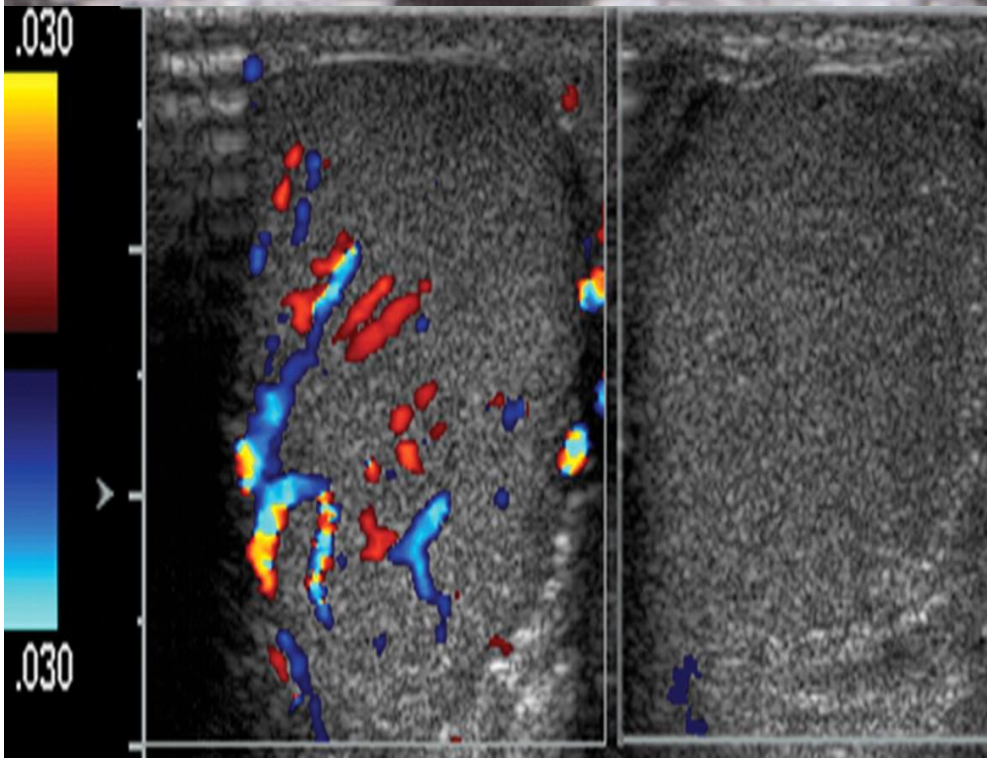
1. **bell-clapper deformity**
   - is a deformity in which the testicle is not attached to the scrotal walls, and can rotate freely on the spermatic cord within the tunica vaginalis
   - An undescended testis is at increased risk of torsion
2. **Size**
   - A larger testicle either due to normal variation or a tumor increases the risk of torsion.
3. **Temperature**
   - sometimes called "winter syndrome". This is because they often happen in winter, when it is cold outside.

Torsion of the testis

- Clinical features:
  - acute onset of diffuse testicular pain and tenderness (atypical: inguinal or lower abdominal pain)
  - absent or decreased cremasteric reflex
  - Negative Prehn's sign: no pain relief with lifting the affected testicle, which points towards testicular torsion
  - scrotum is generally not very swollen, and the affected testis may have a horizontal lie

- Diagnosis:
  1. Clinical
  2. A Doppler ultrasound scan of the scrotum is nearly 100% accurate at detecting torsion. It is identified by the absence of blood flow in the twisted testicle
- Treatment:
  - Surgical treatment with fixation of the contralateral testis, because there may be an anatomical predisposition to torsion, for example the bell clapper testis





Torsion of the appendage of the testis

- Anatomy:
  - Two such appendages are the appendix testis, a remnant of the paramesonephric (müllerian) duct, and the appendix epididymis, a remnant of the mesonephric (wolffian) duct.
  - The appendix testis is present in 92% of all testes and is usually located at the superior testicular pole in the groove between the testicle and the epididymis. The appendix epididymis is present in 23% of testes and usually projects from the head of the epididymis, but its location may vary.

Torsion of the appendage of the testis

- Torsion of the appendage is a twisting of a vestigial appendage that is located along the testicle.
- one of the most common causes of acute scrotum; it is the leading cause of acute scrotum in children, occurs in children aged 7-14 years.
- Although this condition poses no threat to health, it can be painful
- Torsion of an appendage leads to ischemia and infarction. Necrosis of appendices causes pain and local inflammation of surrounding the tunica vaginalis and epididymis (acute hemiscrotum).
- Torsion of the testicular appendage may also be accompanied by presence of a thickened scrotal wall, a reactive hydrocele, and enlargement of the head of the epididymis.

Torsion of the appendage of the testis

- History:
  1. Pain may be present; acute gradual onset
  2. Intensity ranges from mild to severe; Patients may endure pain for several days before seeking medical attention.
  3. The pain is located in the superior pole of the testicle. This is a key distinguishing factor from testicular torsion. A focal point of pain on the testicle is uncommon in complete testicular torsion.
  4. Systemic symptoms are absent. Nausea and vomiting (frequently seen in testicular torsion) are usually not associated with this condition.
  5. Urinary symptoms are absent. Dysuria and pyuria are not associated with torsion of the testicular appendages. Their presence is more indicative of epididymitis

Torsion of the appendage of the testis

- Physical examination may reveal the following findings:
  1. The patient is afebrile with normal vital signs.
  2. Although the scrotum may be erythematous and edematous, it usually appears normal.
  3. the cremasteric reflex is usually intact.
  4. The testis should be nontender to palpation. If present, tenderness is localized to the upper pole of the testis. Diffuse tenderness is more common in testicular torsion.
  5. The presence of a paratesticular nodule at the superior aspect of the testicle, with its characteristic blue-dot appearance, is pathognomonic for this condition. A blue-dot sign is present in only 21% of cases.
  6. Vertical orientation of the testes is preserved.

Torsion of the appendage of the testis

- Imaging
  1. Ultrasound
  2. Doppler ultrasound
     - normal blood flow to the testis, with an occasional increase on the affected side that possibly is due to inflammation.
  3. Radionuclide imaging
     - The positive sign for testicular appendix torsion is the hot-dot sign, which is an area of increased tracer uptake.
- treated conservatively; NSAIDs and ice are the mainstays of therapy for inflammation, reduced activity and scrotal support are indicated

Epididymitis

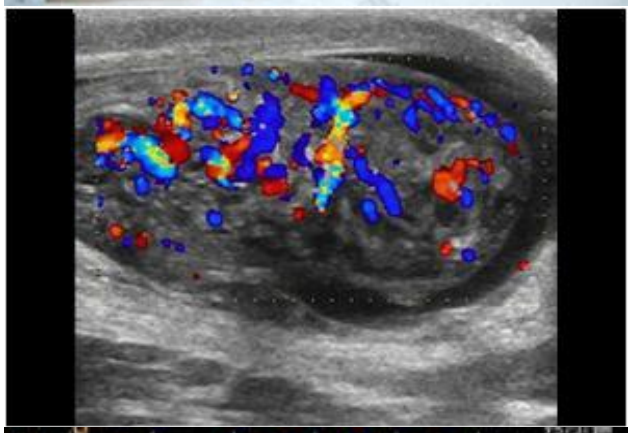
- Epididymitis is usually caused by the spread of a bacterial infection from the urethra or the bladder.
- **The most common causes:**
  - young heterosexual men are gonorrhea and chlamydia.
  - Children, homosexual men and older men, *E. coli* and similar infections are much more common.
  - *Mycobacterium tuberculosis* (TB) can occur as epididymitis. Other bacteria (such as Ureaplasma) may also cause the condition.
  - Another cause of epididymitis is the use of amiodarone (antiarrhythmic agent)
  - chemical epididymitis, this occurs when urine flows backward into the epididymis. It may occur with heavy lifting or straining.
- **The risk factors:**
  - Being uncircumcised
  - Recent surgery or a history of structural problems in the urinary tract
  - Regular use of a urethral catheter
  - Unprotected Sexual intercourse with multiple partner

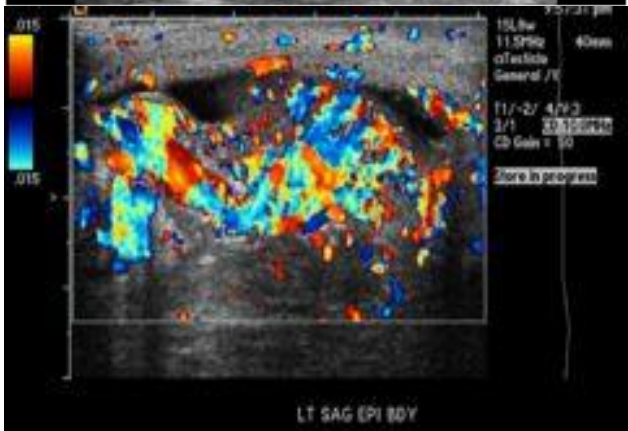
Epididymitis

- **Symptoms**
  - Epididymitis may begin with a low-grade fever, chills, and a heavy sensation in the testicle area. The area becomes more and more sensitive to pressure.
- Other symptoms include:
  1. Painful scrotal swelling and tenderness that starts gradual (Testicle pain that gets worse during a bowel movement), Groin pain
  2. Lump in the testicle
  3. Enlarged lymph nodes in the groin (inguinal nodes)
  4. Blood in the semen
  5. Discharge from the urethra
  6. Discomfort in the lower abdomen or pelvis
  7. Pain during ejaculation
  8. Pain or burning during urination

Epididymitis

- **physical examination:**
  - normal vertical position, of equal size compared to its counterpart, and not high-riding.
  - Typical findings are redness, warmth and swelling of the scrotum, with tenderness behind the testicle, away from the middle.
  - The cremasteric reflex (if it was normal before) remains normal.
  - If there is pain relieved by elevation of the testicle (Prehn's sign positive), However, its non-specific.
- **Diagnosis**:
  - Complete blood count (CBC)
  - Urinalysis and culture (you may need to give several specimens, including initial stream, mid-stream, and after a prostate massage)
  - Doppler ultrasound
  - nuclear medicine scan (Testicular scan)
  - Tests for STD's



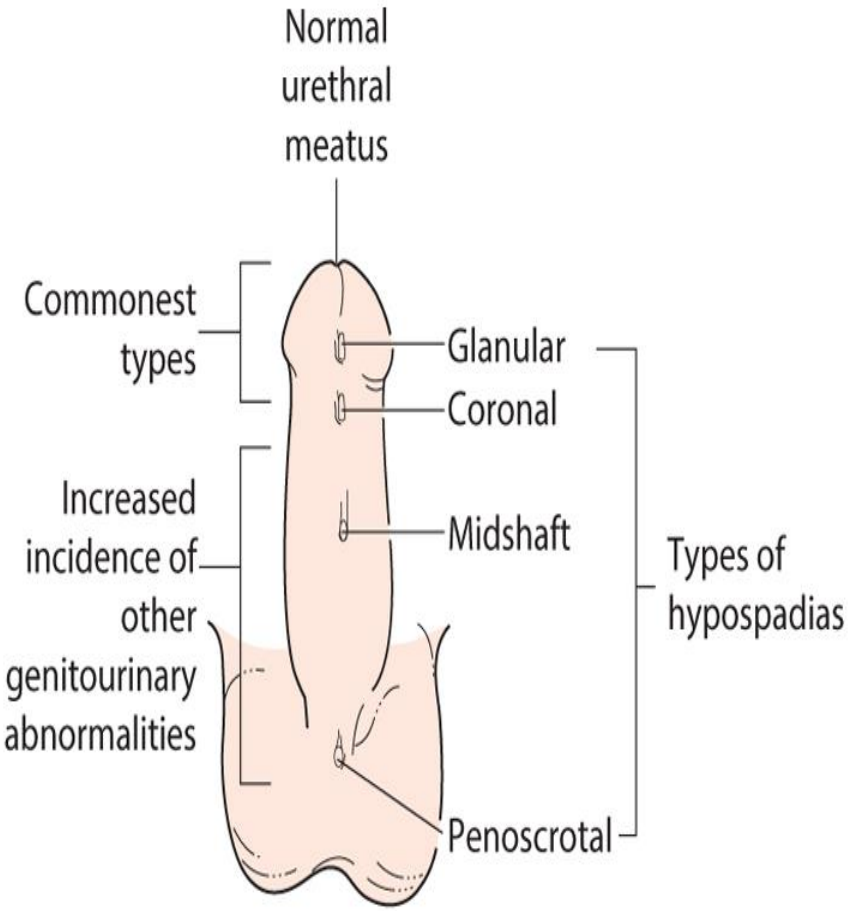


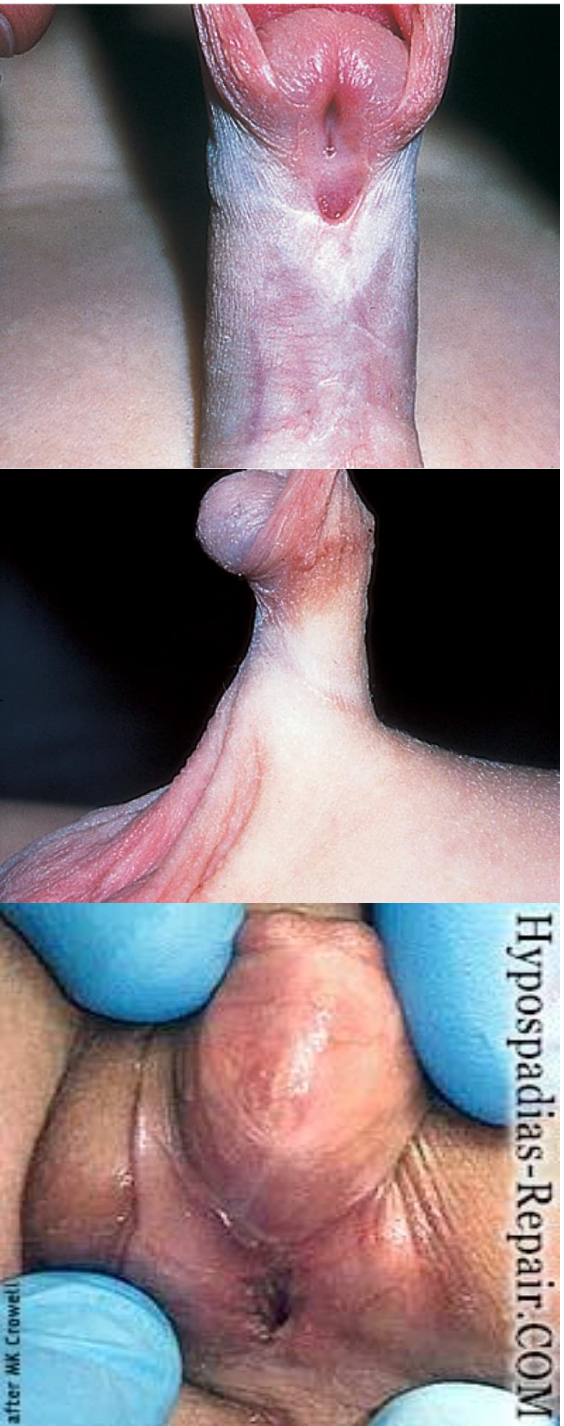
Epididymitis

- **Treatment**:
  - Antibiotics :
    1. gonorrhea and chlamydia: azithromycin and cefixime to cover both
    2. *E. coli*: ofloxacin or levofloxacin are recommended
    3. Children: co-trimoxazole or suited penicillins
  - elevation of the scrotum and cold compresses applied regularly to the scrotum may relieve the pain. Painkillers or anti-inflammatory drugs are often necessary.
  - Surgery is rarely necessary, except, for example, in those rare instances where an abscess forms.
- **Complications**
  1. Epididymitis may eventually cause:
  2. Scrotal abscess, when infected tissue fills with pus
  3. Chronic epididymitis, which can occur when untreated acute epididymitis leads to recurrent episodes
  4. atrophy
  5. Reduced fertility, but this is rare

Hypospadias

- In the male fetus, urethral tubularisation occurs in a proximal to distal direction under the influence of fetal testosterone. Failure to complete this process leaves the urethral opening proximal to the normal meatus on the glans and this is termed hypospadias.
- This is a common congenital anomaly, affectin about 1 in every 200 boys. Recent studie suggest that the incidence is increasing
- **Degrees**
  1. *first degree* The urethral meatus opens on the underside of the glans penis in about 50–75% of cases
  2. *Second degree* (when the urethra opens on the shaft),
  3. *third degree* (when the urethra opens on the perineum) occur in up to 20 and 30% of cases respectively.
- **Associated birth defects:**
  1. at least one undescended testis
  2. inguinal hernia.
  3. An enlarged prostatic utricle is common when th hypospadias is severe (scrotal or perineal), and can predispose to urinary tract infections, pseudo-incontinence, or even stone formation





Hypospadias

- **Hypospadias consists of:**
  - a ventral urethral meatus - in most cases the urethra opens on or adjacent to the glans penis, but in severe cases the opening may be on the penile shaft or in the perineum
  - a hooded dorsal foreskin - the foreskin has failed to fuse ventrally
  - chordee - a ventral curvature of the shaft of the penis, most apparent on erection. This is only marked in the more severe forms of hypospadias
- Glanular hypospadias may be a solely cosmetic concern but more proximal varieties may cause functional problems including an inability to micturate in a normal direction and erectile deformity. With more severe varieties of hypospadias, additional genitourinary anomalies should be excluded and sometimes it is necessary to consider ambiguous genitalia and intersex disorders.

Risk factors:

1. Treatment with hormones such as progesterone during pregnancy may increase the risk of hypospadias [vitro fertilization (IVF)]
2. Certain hormonal fluctuations, such as failure of the fetal testes to produce enough testosterone or the failure of the body to respond to testosterone, increase the risk of hypospadias and other genetic problems.
3. Sometimes hypospadias is inherited
4. Rare iatrogenic urethral injuries similar to hypospadias after procedures such as surgery, catheterization, or circumcision have been reported

Surgery :

•Correction is often undertaken before 2 years of age, often as a single-stage operation. The aims of surgery are to produce:

1. a terminal urethral meatus so that the boy can micturate in a normal standing position like his peers
2. a straight erection
3. a penis that looks normal.

Infants with hypospadias must not be circumcised, as the foreskin is often needed for later reconstructive surgery.