Testicular Torsion

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Last Updated:

Tuesday, February 21, 2023

Keywords:

Testicle, Torsion, Acute, Scrotum

Common Case Presentation

17-year-old male came to the emergency department with left testicular pain for 4 hours. ER physician is suspicious of a testicular torsion but the patient is not allowing examination of the scrotum.

I. Receiving the phone call and initial thoughts

a. **Consider that many non-urologists may refer to any testicular pain as "torsion" and it is critical to obtain a greater understanding of the presentation and work up.**
b. **What is the age of the patient?**
   This occurs most commonly in boys/men aged 12-18 (and neonates), although it can occur in any male patient.
c. **When did the symptoms begin and is the pain intermittent?**
   The onset of symptoms is critical to the chance of testicular salvage. Ideally de-torsion occurs prior to 4 hours. If the pain is intermittent, a diagnosis of intermittent torsion is possible.
d. **Was there an event that precipitated the pain?**
   Torsion often occurs after sports or activity but can also occur in the patient's sleep. A gradual onset not related to activity is more consistent with epididymoorchitis.
e. **Dysuria associated with the testicular pain?**
   This is often associated with urinary tract infection and epididymoorchitis.
f. **Other exam findings such as edema?**
   A twisted testis can present scrotal edema, high riding testis, horizontal lying testis, absent cremasteric reflex, knotted spermatic cord. Epididymoorchitis often presents with scrotal erythema, edema, fever and hydrocele.
g. **History of testicular surgery or undescended testis?**
   Cryptorchidism predisposes the patient to torsion.

II. Differential diagnosis

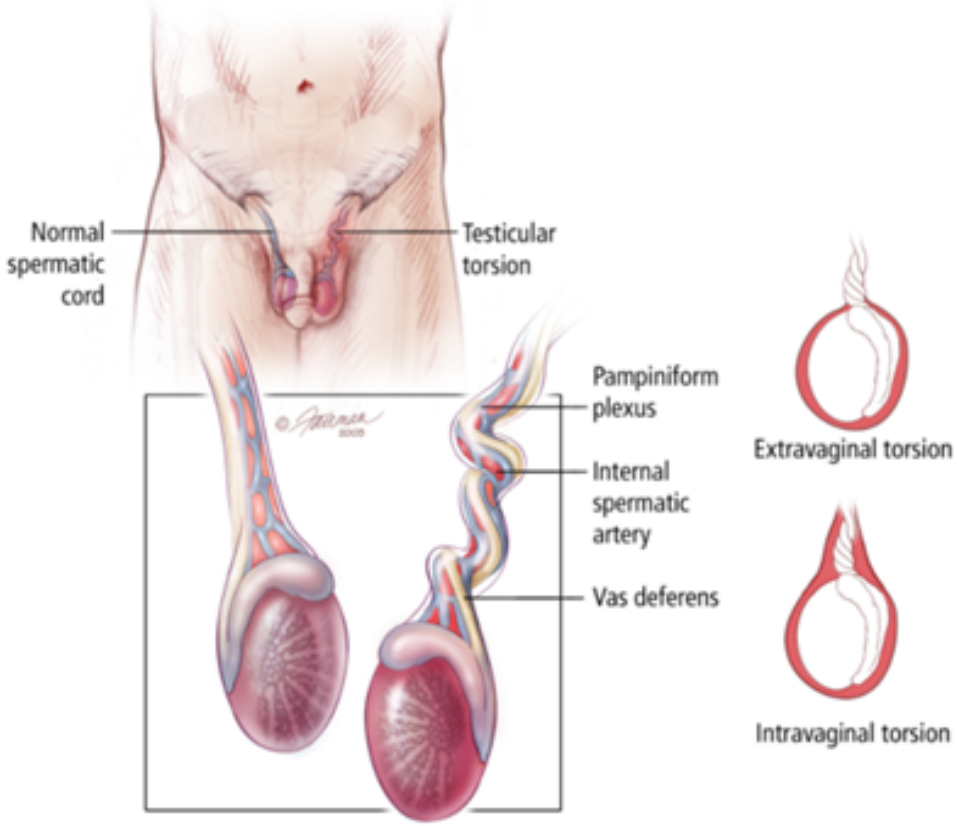

Figure: extravaginal and intravaginal torsion (https://www.urologyhealth.org/urologic-conditions/testicular-torsion)

Figure: Intraoperative photo of testicular torsion. Patient presented after acute onset of right sided pain for 30 hours.

a. Acute scrotum is defined as the sudden onset of scrotal pain, which can be accompanied by swelling, erythema, and systemic signs of illness
b. **The two most likely diagnoses for the acute scrotum is testicular torsion and acute epididymoorchitis. A diagnosis of testicular torsion is primarily by clinical decision making. Torsion is more likely when onset of pain is acute and extremely intense. Epididymoorchitis is more likely when pain is gradual, milder, and associated with dysuria**
c. **Testicular torsion has several forms, but the spermatic cord is the actual structure that twists to occlude arterial blood flow**
    i. Intravaginal torsion
        1. Torsion of the spermatic cord within the tunica vaginalis.
        2. More common in children/adults and more common in general
    ii. Extravaginal torsion
        1. Torsion of the entire tunica vaginalis
        2. More common in neonates
        3. The gubernacular attachments are not fully formed and the tunica vaginalis is therefore not anchored do the dartos of the scrotum
    iii. Intermittent torsion
        1. A testis that goes into and out of torsion
        2. Very high risk for acute torsion
        3. See Figure 1
d. **Infectious causes of an acute scrotum**
    i. Epididymitis
    ii. Urinary tract infection
    iii. Sexually transmitted disease
    iv. Viral orchitis
    v. Bacterial orchitis
    vi. Early Fournier gangrene
    vii. Pyocele
    viii. Scrotal abscess
    ix. Mumps
e. **Other items on differential**
    i. Appendage torsion: the testicular appendage is a vestigial remnant of the Mullerian duct that can twist and cause pain mimicking testicular torsion. It is benign and often self-limiting. The traditional “Blue-dot” sign is unreliable finding. Other appendage (epididymis, paradidymis, vas aberrans) can twist as well [1]
    ii. Scrotal edema/erythema

iii. Insect bite or other skin rash
iv. Vasculitis: Henoch-Schönlein purpura can cause an acute scrotum
v. Testicular trauma: testicular rupture is also a surgical emergency
vi. Hernia or hydrocele
vii. Inguinal hernia/communicating hydrocele
viii. Abdominal pathology: peritonitis can cause acute scrotal edema and pain
ix. Varicocele: usually painless, but can be painful with acute thrombosis
x. Intrascrotal mass: testicular cancer has much more of an insidious onset, but a patient can undergo mild scrotal trauma that make him “notice” the abnormality for the first time, mimicking an acute onset
xi. Musculoskeletal pain due to inguinal tendonitis or muscle strain
xii. Referred pain (e.g., ureteral calculus or anomaly)

III. Evaluation

a. **Physical exam**
   i. Generalized testicular tenderness, typically extremely acute and severe
   ii. Cremasteric reflux
      1. A normal cremasteric reflex is strongly correlated with intact blood flow to testis
      2. An absent cremasteric reflex is associated with torsion[1]
      3. However, the presence of a cremasteric reflex is not sufficient to rule out testicular torsion
   iii. Ipsilateral scrotal elevation: as the cord twists, its length decreases
   iv. Thickening of the ipsilateral spermatic cord
   v. Blue dot sign: unreliable physical exam finding associated with torsion of the testicular appendage
   vi. Scrotal edema: Associated with both torsion as well as many other pathologies
   vii. Bell-clapper deformity
      1. Due to partial or complete failure of fusion of the tunica vaginalis along the epididymis
      2. Puts testis at a high risk of intravaginal torsion
      3. Occurs to some degree in approximately 12% of males[2]
b. **Laboratory Findings**
   i. Urinalysis: pyuria or bacteriuria is associated with epididymoorchitis
      1. It is possible to have pyuria with torsion, so not definitive
   ii. Leukocytosis: other infectious etiologies can elevate the white cell count, however not definitive enough to rule out torsion
   iii. Obtain CBC, coagulation profile to ensure patient is safe for surgery
c. **Imaging**
   i. Important note: torsion is a clinical diagnosis, if clinical suspicion is strong, do not delay

scrotal exploration to obtain imaging[3]

ii. Doppler ultrasound: usually can be performed during the time the operating room is being prepared
    1. Torsion testis will have minimal flow compared to contralateral testis (historical article Pedersen et al)[4]
    2. Acute epididymitis demonstrated increased flow to the affected side
    3. Ultrasound will also demonstrate other pathology such as varicocele, tumor, hydrocele

iii. Nuclear testicular scan: rarely used, but will show decreased flow to side with testicular torsion

iv. Contrast-enhanced CT: not typically needed to diagnose an acute scrotum but consider if acute abdominal pathology (peritonitis) or inguinal hernia is on the differential

IV. Management

Testicular torsion is a surgical emergency.

Management includes bilateral scrotal exploration, ipsilateral de-torsion, possible orchiectomy, contralateral versus bilateral orchidopexy should be performed immediately.

a. **Initial management**
Notify the operating room to begin preparations, discuss the diagnosis, treatment options, and risks of non-treatment as well as risk of testis loss with the patient and/or parents

    i. Manual de-torsion
        1. Manual de-torsion can be attempted by externally rotating the testis
        Rotate in clockwise direction on patient's left and counterclockwise on the patient's right - like opening a book[5]
        2. Up to 46% of testis rotated laterally, and manual de-torsion could make torsion worse[6]
        3. Manual de-torsion attempts should NOT delay surgical management and if the manual de-torsion is successful, the patient still requires a bilateral orchidopexy

b. **Scrotal exploration**

    i. After induction of anesthesia the affected testis should be approached via a midline trans-scrotal approach along the median raphe. The testis is delivered, and the torsion is reduced. A handheld Doppler probe can be used to confirm blood flow. The testis should be observed for viability

    ii. If viability is in question, an incision can be made at in the tunica vaginalis to observe for bleeding

    iii. A non-viable/necrotic testis should be removed

    iv. It has been proposed that testicular compartment syndrome contributes to testicular death. After incision the tunica albuginea, a vascularized tunica vaginalis flap can be placed over the defect in the albuginea. This technique has not been validated in the long

term[1]

v. If the testis is salvable, the testis is affixed in three places to the dartos tissue
vi. The contralateral testis must be explored and pexied in a similar fashion

c. **For patients with intermittent torsion**
   i. If there is no pain currently, urgent exploration is not required, however bilateral scrotal exploration and orchidopexy should be performed as soon as reasonably possible
d. **Extravaginal Torsion**
   i. Managed in the same way as intravaginal torsion, however many cases occur prenatally and are not salvageable
e. **Potential complications**
   i. The biggest risk is testicular loss with delay of treatment. Informed consent must include the risk of finding a non-viable testis upon surgical exploration necessitating orchiectomy
   ii. The risk of orchiectomy is 5% if surgery is within 6 hours of onset, 20% at 7-12 hours, 40% at 13-18 hours, 60% at 19-24 hours, and 80% over 24 hours [7]
   iii. The risk of late atrophy is less than 10% if the repair was within 12 hours of pain onset. Likewise the risk is 40% if the repair is between 12 and 24 hours, and 75% if the repair is after 24 hours [7]
   iv. Paternity in males with one testis appears to be normal[8]
   v. Partial atrophy negatively affects spermatogenesis but overall effect on fertility is unclear[9]
   vi. Any scrotal surgery is associated with the risk of scrotal hematoma or wound infection
f. **Post-operative management**
   i. Observe for scrotal hematoma or wound infection
   ii. Patients are often discharged within one day of surgery
   iii. If concern of long term non-viability, follow with scrotal ultrasound
   iv. Educate patient on use of athletic cup for contact sports

Key Takeaways

- Differential diagnosis of acute scrotum: testicular torsion, epididymoorchitis, appendage torsion
- Testicular torsion is a clinical diagnosis. Image only if diagnosis is unclear
- Always fix the contralateral testicle at the time of scrotal exploration

Videos

Intraoperative evaluation of Testicular Torsion

Presentations

Testicular Torsion Presentation 1

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