

Assessment and Management of Scrotal Disorders

Urgent message: Males with a scrotal disorder often present to urgent care with pain, swelling, or both. Especially in boys and young men, it is important to quickly assess the acute scrotum, which can be a surgical emergency.

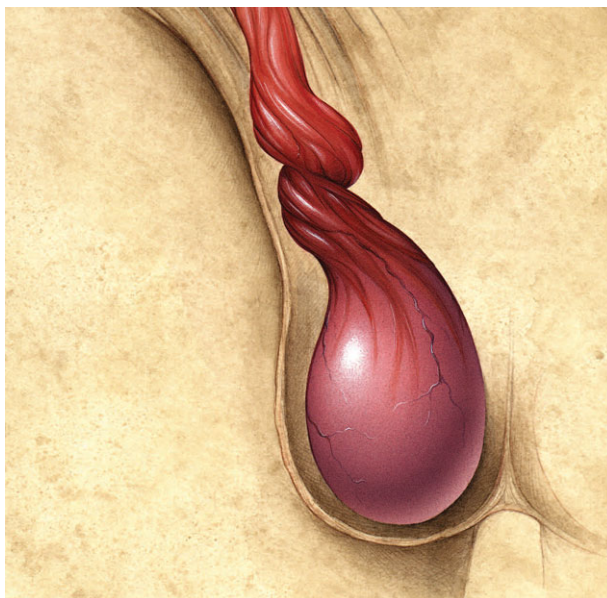
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Introduction

Males with a scrotal disorder often present with pain, swelling—or both. Because of the location of the problem, patients often choose to seek urgent medical attention. Especially in boys and young men, it is important to assess the acute scrotum quickly, as it can be a surgical emergency.

The differential diagnosis of the acute scrotum includes:

- torsion of the spermatic cord
- appendix testis or appendix epididymitis
- epididymo-orchitis
- inguinal hernia
- trauma
- tumor
- hydrocele
- inflammatory vasculitis (Henoch-Schonlein purpura)
- dermatologic lesions
- non-urogenital pathology (e.g., adductor tendinitis).



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Their characteristics are highlighted in **Table 1**.

After a brief review of the physical examination of the scrotum, the most common causes of scrotal pain and swelling will be reviewed.

Scrotal Examination

As with most other complaints, a brief but thorough history should precede a careful physical examination.

Begin the scrotal exam with careful inspection, noting asymmetry, redness, or swelling. Have the patient identify the location

of the pain, specifying whether it is unilateral or bilateral.

Each testis should be examined by grasping it between the index and middle fingers and the thumb. Pay particular attention to any tenderness to palpation, discrepancies in size, loss of landmarks, or discoloration.

The epididymis should be non-tender and soft, and have a noticeable smooth ridge posterolateral to the testis.

Note whether there is pain relief with testicular ele-

Table 1. Differential Diagnosis of Scrotal Pain and Swelling

Disease	Pain	Swelling
Torsion of the spermatic cord, appendix testis, or appendix epididymis	++	+ or ++
Epididymitis / Epididymo-orchitis	++	+
Trauma	++	±
Tumor	Unusual	+
Inguinal hernia	±	+ or ++
Communicating hydrocele	o	+
Hydrocele	Unusual	++
Spermatocele	o	+
Varicocele	Unusual	+
Necrotizing fasciitis of the perineum (Fournier's gangrene)	++	++
Inflammatory vasculitis (Henoch-Schönlein purpura)	+	+
Idiopathic scrotal edema	Unusual	++
Non-urogenital pathology (e.g., adductor tendinitis)	+	o

vation (i.e., Prehn's sign). The normal cremasteric reflex is elicited by stroking or pinching the inner aspect of the thigh and observing a more than 0.5 cm elevation of the ipsilateral testicle.

Transillumination of a scrotal swelling can help distinguish fluid from a solid mass. If a transillumination light is not available, an otoscope may be substituted. The "blue dot sign" is a small bluish discoloration visible through the scrotal skin near the upper pole of the testis, present when torsion of the appendix testis is present.¹

Torsion

Torsion of the spermatic cord is a true surgical emergency of the highest order. Irreversible ischemic injury to the testicular parenchyma may begin as soon as *four hours* after occlusion of the cord.

One study found that although testes that were operated on less than eight hours after the onset of symptoms of torsion retained normal testis size and showed just slight changes in testicular morphology, only 50% of men whose testes underwent detorsion less than four hours after symptoms began had normal testicular function.²

Testicular torsion is estimated to occur in three to four patients per year in a large general hospital. The average

salvageability rate remains low in most series, with approximately 50% testicular loss from either atrophy or orchiectomy.

There are two peak periods in which torsion is likely to occur: in the first year of life and at puberty.

Torsion is not limited to boys, however; it has been identified in men through age 40.

Testicular torsion is 10 times more likely in an undescended testis. It should be high in the differential diagnosis when a patient has a painful inguinal mass and an empty scrotum.

Although torsion of the cord does occur in prepubertal males, it appears that the added weight of the testis after puberty adds a physical dimension

that may be more likely to allow the testis to twist on its vascular stalk.

Torsion can occur in association with trauma or athletic activity, but in most cases spontaneous torsion of the cord is reported; in many cases, in fact, the adolescent is awakened from sleep.

It is thought that sudden contraction of the cremasteric muscle, which inserts onto the cord in a spiral configuration, is the inciting event in most cases and initiates a rotational effect on the testis as it is pulled upward. The cord may twist as many as several complete (360°) rotations.

The classic manifestation of acute torsion of the spermatic cord is that of an acute onset of scrotal pain, but in some instances the onset appears to be more gradual, and in some boys the degree of pain is minimized.

A large number of boys with acute scrotal pain give a history of previous episodes of severe, self-limited scrotal pain and swelling. It is likely that these incidents represent previous episodes of intermittent torsion of the cord, with spontaneous detorsion.

Nausea and vomiting may accompany acute torsion, and some boys have pain referred to the ipsilateral lower quadrant of the abdomen.

Dysuria and other bladder symptoms are usually absent.

Examination

The history is an important factor in the differential diagnosis of an acute scrotum, but the physical examination may perhaps be even more crucial in determining whether the diagnosis is torsion of the cord or otherwise (i.e., whether the patient does or does not require immediate surgical exploration).

Inspection of the genitalia may prove helpful if the affected testis is riding high in the scrotum, perhaps indicating foreshortening of the spermatic cord as the result of twisting of the cord.

In some cases, the affected testis has an abnormally transverse orientation, but in many cases, in particular when several hours have passed since onset, an acute hydrocele or massive scrotal edema obliterates all landmarks.

The absence of a cremasteric reflex is a good indicator of torsion of the cord. Assessment of this physical finding may be difficult in some patients. When the patient is cooperative enough to allow examination of the affected hemiscrotum, effort should be made to assess anatomic landmarks in order to look for an appreciation of normal structures and identify a swollen and tender epididymis or a twisted appendix of the testis or epididymis.

When the diagnosis of acute torsion of the cord is suspected, prompt surgical exploration is warranted. Although adjunctive tests are commonly used to aid in the differential diagnosis of an acute scrotum, prompt transfer of the patient to a facility with immediate urologic surgical availability should take precedence. These tests are most appropriately performed when their purpose is to confirm the absence of torsion of the cord in cases in which surgical intervention is believed to be unnecessary.

While it may not be readily accessible in the urgent care setting, color Doppler ultrasound examination has become the adjunctive investigation of choice for the evaluation of sub-acute and chronic scrotal conditions in many institutions. Color Doppler studies allow an assessment of anatomy (e.g., presence of a hydrocele or swollen epididymis) while determining the presence or absence of blood flow to the testis. Color Doppler examination can also have a diagnostic sensitivity of 86% to 88% and a specificity of 90% to 99%.³ However, ultrasound imaging is inherently operator-dependent.

Radionuclide imaging—originally the study of choice for assessment of an acute scrotum—is more limited because it allows evaluation of only testicular blood flow.

Management

The first step in management of suspected testicular torsion is consultation with a urologist. Intravenous access should be obtained, analgesia provided, and nothing-by-mouth status maintained.

Manual detorsion should be attempted in most cases while steps are being taken for definitive surgical exploration. Manual detorsion is not considered curative, but rather a temporizing technique.

Torsion of a testicle may occur in either direction, but usually the anterior portion twists medially.

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After appropriate parenteral analgesics, the anterior portion of the testicle should be twisted laterally unless it appears to shorten the cord or worsen the torsion, in which case detorsion in the reverse direction should be attempted.

Epididymitis/Orchitis/Epididymo-orchitis

Acute epididymitis represents sudden occurrence of pain and swelling of the epididymis; this is associated with acute inflammation of the epididymis.

In most cases of acute epididymitis, the testis is also involved in the process; this is referred to as epididymo-orchitis.

Isolated orchitis is a relatively rare condition and is usually viral in origin.

Epididymitis affects one in 350 U.S. men annually.

Chronic epididymitis refers to inflammation and pain in the epididymis, usually without swelling (but with induration in longstanding cases), persisting for over six weeks. Inflammation is not always clinically evident in many cases of localized epididymal pain.

Epididymitis usually results from the spread of infection from the bladder, urethra, or prostate via the ejaculatory ducts and vas deferens into the epididymis. The process starts in the tail of the epididymis, then spreads through the body to the head of the epididymis.

In infants and boys, epididymitis is often related to a urinary tract infection (UTI) and/or an underlying genitourinary congenital anomaly, or even the presence of a foreskin.

In elderly men, benign prostatic hyperplasia and associated stasis, UTI, and catheterization are the most common causes of epididymitis.

Bacterial prostatitis and/or seminal vesiculitis are associated with epididymal infection in post-pubertal males of all ages.

In sexually active men younger than 35 years of age, epididymitis is commonly the result of a sexually transmitted infection (STI).

Chronic epididymitis may result from inadequately treated acute epididymitis, recurrent epididymitis, or some other cause, including associations with other disease processes such as Behçet's disease.

The most common causative microorganisms in the pediatric and elderly age groups are coliform organisms that cause bacteriuria.

In men younger than the age of 35 who are sexually active with women, the most common offending organisms causing epididymitis are the usual bacteria that cause urethritis (*N gonorrhoeae* and *C trachomatis*).

In homosexual men practicing anal intercourse, *E coli* and *H influenzae* are most commonly responsible.⁴ Viral, fungal, and parasitic microorganisms all have been implicated in epididymitis.

Examination

Physical examination localizes the tenderness to the epididymis (although in many cases the testis is also involved in the inflammatory process and in subsequent pain—referred to as epididymo-orchitis).

The spermatic cord is usually tender and swollen. Early on in the process, only the tail of the epididymis is tender, but the inflammation spreads quickly to the rest of the epididymis. If it continues to the testis, the swollen epididymis becomes indistinguishable from the testis.

Prehn's sign is often positive with orchitis.

Laboratory testing should include Gram stain of any urethral discharge. If the urethral smear reveals the presence of intracellular gram-negative diplococci, a diagnosis of gonorrhea is established.

If only white blood cells are seen on the urethral smear, a diagnosis of *C trachomatis* will be established two thirds of the time.

Abnormal urinalysis with positive leukocyte esterase and/or nitrates and pyuria on microscopic exam can usually be identified in patients with underlying cystitis.

The type of urine specimen collection for bacterial identification depends upon suspected organism. A midstream urine specimen should be sent for culture and sensitivity testing for organisms causing typical urinary tract infections. However, a first voided urine specimen for DNA amplification testing is best for gonorrhea and chlamydia detection, and can replace the uncomfortable urethral swab when no discharge is present.⁵

When an infant or young boy is diagnosed with epididymitis, he should be referred for further evaluation with abdominopelvic ultrasound, voiding cystourethrography, and, possibly, cystoscopy.

If the diagnosis is uncertain, color Doppler scrotal ultrasonography to look for increased blood flow to the affected epididymis may be performed (also to rule out torsion).

Management

General principles of therapy include bed rest, scrotal support, hydration, antipyretics, anti-inflammatory agents, and analgesics. Antibiotic therapy (specific for

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UTI, prostatitis, or STI) should be employed for infectious epididymo-orchitis, and is ideally based on culture and sensitivity testing but may be based on microscopic or Gram stain results.

There are no specific antiviral agents available to treat orchitis caused by mumps, and the previously mentioned supportive measures are important. If early testing is negative, or if results are unavailable, empiric treatment should be initiated, directed at the most likely pathogens based on the available clinical information.

If STI is suspected, treat with parenteral ceftriaxone plus oral doxycycline for chlamydia for 10 days. Azithromycin may be used if the patient has a true penicillin allergy, but there is concern about increasing gonorrhea resistance to azithromycin worldwide.

Fluoroquinolones should not be used if gonorrhea is suspected because of the high incidence of resistance today.⁶ Older men at lower risk for STI can be treated with a fluoroquinolone such as ofloxacin or levofloxacin for 10 days, trimethoprim/sulfamethoxazole for 14 days, or amoxicillin/clavulanate for 10 days.

Some clinicians do employ fluoroquinolones when treating boys, though this class should not be used first-line in patients under age 18.

Most patients can be managed readily on an outpatient basis, but toxic-appearing patients may require hospitalization and parenteral antibiotics.

Surgical intervention is rarely indicated, unless testicular torsion is suspected (as discussed previously).

Spermatic cord blocks with injection of a local anesthetic may sometimes be needed to relieve the patient of severe pain.

Patients may be re-examined in three to seven days to confirm improvement and to detect any mass that was masked by pain.

Abscess formation is rare, but if it does occur, percutaneous or open drainage is necessary.

If STI is diagnosed, partner treatment should be discussed. Screening for other STIs should be performed, and counseling on condom use provided to prevent future infections. Early retesting for STI cure is not necessary, but follow-up testing for reinfection is recommended in three months.

Trauma

A direct blow or straddle injury may result in contusion, hematoma, testicular fracture or rupture. Urologic consultation should be obtained for any serious scrotal injury. Severe trauma often requires surgery.

Traumatic hematoceles do not transilluminate well,

and may develop quickly. Surgery is recommended if they reach 5 cm or more. Surgical exploration of smaller hematoceles is associated with better pain control and shorter hospital stays.

A history of mild trauma does not rule out non-traumatic diagnoses, including torsion and epididymitis.

Medical management includes: scrotal support, anti-inflammatory medications, and ice packs applied to the groin with a barrier (as direct application can cause burns) at least every three to four hours in the acute phase.

Follow-up should be in one week.

Preventive measures include the use of an athletic supporter or protective cup when playing sports with potential for groin injury. Prevent chafing and neuropathy by limiting repetitive stress on the perineum or using a special bicycle seat.

Testicular Tumors

Tumor of the testis is the most common malignancy in young men; it occurs at an average age of 32 years. Testicular cancer accounts for 1% of all cancer in men.

Typically, on exam there is a palpable hard, painless growth. Although tumors are generally painless (though "heaviness" is commonly reported), the patient may have sudden testicular pain because of acute hemorrhage within the tumor. This acute hemorrhage causes an expanding mass effect on the non-pliable tunica albuginea.

The differential diagnosis among tumor, torsion, and epididymitis can be extremely difficult. In fact, epididymitis is the most common incorrect diagnosis made in cases of testicular tumor (6% to 16% incidence). There is an increased prevalence in patients with cryptorchidism in both the non-descended and descended testis.

The key to diagnosis is identification of a distinct intra-testicular mass. Color Doppler ultrasonography is the appropriate initial diagnostic imaging study.

The vast majority of testicular cancers are seminomas, followed by embryonal cell cancer and teratoma.

The cancer spreads by the lymphatic system.

If a testicular tumor is clinically evident or identified on ultrasound, arrange for urgent referral to a urologist for biopsy and definitive treatment.

Hydrocele/Inguinal Hernia

A persistent processus vaginalis may lead to a hydrocele or an indirect inguinal hernia. A hydrocele (fluid collection around the testis) is fluctuant, ovoid, and generally non-tender.

Communicating hydroceles have a connection with the

abdomen and often have a history of variable size. Very large hydroceles may be uncomfortable or even painful.

Transillumination demonstrates light transmission through the fluid-filled hydrocele, compared with non-transmission or limited transmission through the solid testis or blood.

Although many hydroceles resolve spontaneously, patients may be referred to urology for elective aspiration or hydrocelectomy.

Symptomatic indirect inguinal hernias may develop at any age. Patients may present with scrotal swelling that fluctuates in size, and may note increased swelling with Valsalva-type maneuvers. The indirect inguinal hernia is felt as a swelling extending up the spermatic cord to the inguinal ring. Inguinal hernias can be reduced by the examiner unless the hernias are incarcerated.

In contrast, patients with hydroceles will have a palpably normal spermatic cord and inguinal ring above the swollen area.

Strangulated indirect inguinal hernias present as acute

painful masses, often accompanied by abdominal complaints such as pain, nausea, and vomiting. The hernia is typically firm and tender, and is usually not reducible.

Strangulated hernias are a surgical emergency. Non-strangulated hernias may be referred to a general surgeon for elective repair.

Other Scrotal Masses

A *varicocele* consists of dilatation of the pampiniform venous plexus and the internal spermatic vein, primarily on the left side. They are generally painless, so in the urgent care setting, they are primarily an incidental finding of a mass in the scrotum, superior to the testis, with a “bag of worms” consistency. At times, they may cause a heavy feeling or mild pain.

Varicoceles are associated with decreased fertility.

Patients may be referred for varicocele embolization or surgical ligation.

A *spermatocele* is a cystic structure containing sperm in the epididymis. They occasionally become firm and can be confused with a cancer. Similar to varico-



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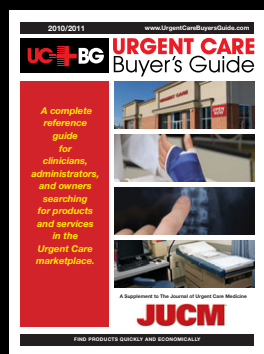
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celes, they are generally painless, so they are primarily an incidental finding of a small mass in the scrotum. They are mostly fluid filled and will transilluminate. Most spermatoceles do not require any treatment, but if the diagnosis is not clear, referral to a urologist may be warranted.

Less Common Scrotal Disorders

Necrotizing fasciitis of the perineum (i.e., Fournier's gangrene) is a severe infection involving the soft tissues of the genitalia. It is usually polymicrobial, with staphylococci, streptococci, enterococci, anaerobes, and fungi most frequently isolated.

Risk factors include diabetes mellitus, morbid obesity, cirrhosis, vascular disease of the pelvis, malignancies, alcoholism, high-risk behaviors (e.g., intravenous drug abuse), and immune suppression due to systemic disease or steroid administration.

Typically, affected patients have fever, lethargy, and severe pain in the genital region with progressive erythema. Dusky or frankly gangrenous areas may be apparent, or a frankly purulent wound is present. Untreated patients may develop septic shock.

Prompt surgical consult for biopsy and debridement should be obtained. Begin intravenous fluids and broad-spectrum antibiotics, and manage comorbid conditions such as hyperglycemia, pending culture results and definitive surgical management.

Inflammatory vasculitis (i.e., Henoch-Schönlein purpura) occurs primarily in children with hemorrhagic rash, abdominal pain, and joint pain. Up to one third of male patients have scrotal edema that can mimic testicular torsion. The rash is a characteristic palpable purpura.

Most patients recover in a few weeks, but some patients develop chronic renal insufficiency. More severely ill patients may require consultation and/or hospitalization.

Idiopathic scrotal edema occurs in prepubertal boys. It is characterized by swelling and erythema, without evidence of infection. White count and urinalysis are normal.

Contact allergic reaction, bedbug bites, and angioedema should also be considered. Other causes should be ruled out. Surgical exploration may be required to rule out torsion.

Symptoms usually subside within five days.

Non-urogenital pathology (e.g., adductor tendinitis or tendinopathy) can cause referred pain to the scrotum and groin area. Chronic overload and stress of the adductor tendon may result in degeneration of the tendon. There is point tenderness over the tendon and a normal scrotal exam.

Treatment for this musculoskeletal injury includes RICE (i.e., rest, ice, compression, elevation) and non-steroidal anti-inflammatory medication for pain. Physical therapy may be a useful adjunct to treatment. ■

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