

A Pain in the...Scrotum

Case

A 52-year-old man presented to the ED for evaluation of right scrotal pain and swelling. The patient stated that the pain started several hours prior to presentation and had gradually worsened. He denied any trauma or inciting event to the affected area; he further denied abdominal pain, nausea, vomiting, dysuria, polyuria, or fever. The patient's remote medical history was significant for type 2 diabetes mellitus (DM), which he managed through dietary modification-only as he had refused pharmacological therapy. The patient admitted to smoking one half-pack of cigarettes per week, but denied alcohol or illicit drug use.

At presentation, the patient's vital signs were all within normal range. The physical examination was remarkable only for right testicular tenderness and mild scrotal swelling, and there were no hernias or lymphadenopathy present.

The emergency physician (EP) ordered a urinalysis and color-flow Doppler ultrasound study of both testes, which the radiologist interpreted as an enlarged right epididymis with hyperemia; the left testicle was normal. The urinalysis was normal.

The patient was diagnosed with epididymitis and discharged home with a prescription for oral levofloxacin 500 mg daily for 10 days. He also was instructed to take ibuprofen for pain, apply ice to the affected area, keep the scrotal area elevated, and follow-up with a urologist in 1 week.

Approximately 8 hours after discharge, the patient returned to the same ED with complaints of increasing right testicular pain and swelling. The history and physical examination at this visit were essentially unchanged from his initial presentation. No laboratory evaluation, imaging studies, or other tests were ordered at the second visit.

The patient was discharged home with a prescription for a narcotic analgesic, which he was instructed to take in addition to the ibuprofen; he was also instructed to follow-up with a urologist within the next 2 to 3 days, instead of in 1 week.

The patient returned the following morning to the

same ED with complaints of increased swelling and pain of the right testicle. In addition to the worsening testicular pain and swelling, he also had right inguinal pain, nausea, vomiting, and fever. Vital signs at this third presentation were: blood pressure (BP), 124/64 mm Hg; heart rate (HR), 110 beats/min; respiratory rate, 20 breaths/min; and temperature, 99.8° F. Oxygen saturation was 98% on room air.

The patient was tachycardic on heart examination, but with regular rhythm and no murmurs, rubs, or gallops. The lung and abdominal examinations were normal. The genital examination revealed marked right scrotal swelling and tenderness, as well as tender right inguinal lymphadenopathy.

The EP ordered an intravenous (IV) bolus of 1 L normal saline and laboratory studies, which included lactic acid, blood cultures, urinalysis, and urine culture and sensitivity. The EP was concerned for a scrotal abscess and ordered a testicular Doppler color-flow ultrasound study. The laboratory studies revealed an elevated white blood count of 16.5 K/uL, elevated blood glucose of 364 mg/dL, and elevated lactate of 2.8 mg/dL. As demonstrated on the ultrasound study performed at the patient's first presentation, the ultrasound again showed an enlarged right epididymis, but without orchitis or abscess. The scrotal wall had significant thickening, consistent with cellulitis. The EP ordered broad spectrum IV antibiotics and admitted the patient to the hospitalist with a consult request for urology services.

The patient continued to receive IV fluids and antibiotics throughout the evening. In the morning, he was seen by the same hospitalist/admitting physician from the previous evening. Upon physical examination, the hospitalist noted tenderness, swelling, and erythema in the patient's perineal area. The patient's BP had dropped to 100/60 mm Hg, and his HR had increased to 115 beats/min despite receiving nearly 2 L of normal saline IV throughout the previous evening and night.

The urologist examined the patient soon after the consult request and diagnosed him with Fournier's gangrene. He started the patient on aggressive IV fluid resuscitation, after which the patient was immediately

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taken to the operating room for extensive surgical debridement and scrotoectomy. The patient's postoperative course was complicated by acute kidney injury, respiratory failure requiring ventilator support, and sepsis. After a lengthy hospital stay, the patient was discharged home, but required a scrotal skin graft, and experienced erectile dysfunction and depression.

The patient sued all of the EPs involved in his care, the hospital, the hospitalist/admitting physician, and the urologist for negligence. The plaintiff's attorney argued that since the patient progressively deteriorated over the 24 to 36 hours during his three presentations to the ED, urology services should have been consulted earlier, and that the urologist should have seen the patient immediately at the time of hospital admission.

The attorneys for the defendants claimed the patient denied dysuria, penile lesions, or urethral discharge and that the history, physical examination, and testicular ultrasound were all consistent with the diagnosis of epididymitis. For this reason, they argued, there was no indication for an emergent consultation with urology services. The jury returned a defense verdict.

Discussion

It is easy for a busy EP to have a differential diagnosis of only two disorders when evaluating a patient for unilateral testicular pain and swelling—in this case, testicular torsion and epididymitis. While these are the most common causes of testicular pain and swelling, this case emphasizes the need to also consider Fournier's gangrene in the differential. A thorough history and physical examination, coupled with appropriate testing, will usually identify the correct diagnosis. While the differential diagnosis is broader than just these three disease processes (see the **Box**), we will review the evaluation and management of the three most serious: epididymitis, testicular torsion, and Fournier's gangrene.

Noninfectious and Bacterial Epididymitis

Epididymitis is the most common cause of acute scrotal pain among US adults, accounting for approximately 600,000 cases each year.¹ Infectious epididymitis is typically classified as acute (symptom duration of <6 weeks) or chronic (symptom duration of ≥6 weeks).²

Cases of noninfectious epididymitis are typically due to a chronic condition, such as autoimmune disease, cancer, or vasculitis. Although not as common, noninfectious epididymitis can also occur due to testicular trauma or amiodarone therapy.^{3,4}

Differential Diagnosis of Unilateral Testicular/Scrotal Pain and Swelling

- Abscess
- Epididymitis
- Fournier's gangrene
- Henoch-Schonlein purpura
- Hydrocele
- Inguinal hernia
- Orchitis
- Referred pain (ie, renal colic)
- Testicular cancer
- Testicular torsion
- Torsion of the appendiceal testis
- Trauma

Patients with acute bacterial epididymitis typically present with scrotal pain and swelling ranging from mild to marked. These patients may also exhibit fever and chills, along with dysuria, frequency, and urgency, if associated with a urinary tract infection.² The chronic presentation is more common though, and usually not associated with voiding issues.

Chronic epididymis is frequently seen in postpubertal boys and men following sexual activity, heavy physical exertion, and bicycle/motorcycle riding.² On physical examination, palpation reveals induration and swelling of the involved epididymis with exquisite tenderness.² Testicular swelling and pain, along with scrotal wall erythema, may be present in more advanced cases.² The cremasteric reflex should be intact (ie, scratching the medial proximal thigh will cause ipsilateral testicle retraction). Similarly, the lie of both testicles while the patient is standing should be equal and symmetrical—ie, both testicles descended equally. However, in the presence of moderate-to-severe scrotal swelling, both of these physical findings may be impossible to confirm.

A urinalysis and urine culture should be ordered if there is any suspicion of epididymitis; pyuria will be present in approximately 50% of cases. However, since pyuria is neither sensitive nor specific for epididymitis, in most cases, a testicular ultrasound with Doppler flow is required to exclude testicular torsion. In cases of epididymitis, ultrasound usually demonstrates increased flow on the affected side, whereas in testicular torsion, there is decreased or absent blood flow.

The treatment for epididymitis involves antibiotics and symptomatic care. If epididymitis from chlamydia and/or gonorrhea is the suspected cause, or if the patient is younger than age 35 years, he should be given ceftriaxone 250 mg intramuscularly plus oral doxycycline 100 mg twice a day for 10 days. Patients who practice insertive anal sex should be treated with ceftriaxone, plus either oral ofloxacin 300 mg twice a day or oral levofloxacin 500 mg daily for 10 days.

Patients with Fournier's gangrene also develop systemic signs of infection, including fever, tachycardia, tachypnea, and hypotension.

In cases in which enteric organisms are suspected, the patient is older than age 35 years, or if patient status is posturinary tract instrumentation or vasectomy, he should be treated with either oral ofloxacin 300 mg twice a day or oral levofloxacin 500 mg daily for 10 days.²

For symptomatic relief, scrotal elevation, ice application, and nonsteroidal anti-inflammatory drugs are recommended.

Patients with epididymitis, regardless of etiology, should be instructed to follow-up with a urologist within 1 week. If the patient appears ill, septic, or in significant pain, admission to the hospital with IV antibiotics, IV fluids, and an urgent consult with urology services is required.

Testicular Torsion

Testicular torsion is a time-sensitive issue, requiring early diagnosis and rapid treatment to preserve the patient's fertility. Most clinicians recommend detorsion within 6 hours of torsion onset because salvage rates are excellent when performed within this timeframe; after 12 hours, the testis will likely suffer irreversible damage due to ischemia.^{5,6}

Testicular torsion can occur at any age, but is most commonly seen in a bimodal distribution—ie, neonates and postpubertal boys. The prevalence of testicular torsion in adult patients hospitalized with acute scrotal

pain is approximately 25% to 50%.²

Patients with testicular torsion usually describe a sudden onset of severe, acute pain. The pain frequently occurs a few hours after vigorous physical activity or minor testicular trauma.² Occasionally, the patient may complain of lower quadrant abdominal pain rather than testicular or scrotal pain. Nausea with vomiting can also be present.

On physical examination, significant testicular swelling is usually present. Examining the patient in the standing position will often reveal an asymmetrical, high-riding testis with a transverse lie on the affected side. The cremasteric reflex is usually absent in patients with testicular torsion.

Because of the significant overlap in history and physical examination findings for epididymitis and testicular torsion, a testicular ultrasound with color Doppler should be ordered. Multiple studies have confirmed the high sensitivity and specificity of ultrasound in the diagnosis of testicular torsion.

The treatment for suspected or confirmed testicular torsion is immediate surgical exploration with intraoperative detorsion and fixation of the testes. The EP can attempt manual detorsion (ie, performed in a medial to lateral motion, similar to opening a book). However, this should not delay the EP from consulting with urology services.

Pediatric patients with testicular torsion usually have a more favorable outcome than do adults. In one retrospective study, patients younger than age 21 years had a 70% testicular salvage rate compared to only 41% of patients aged 21 years and older.⁷ Regardless of age, better outcomes are associated with shorter periods of torsion.

Fournier's Gangrene

Fournier's gangrene is a polymicrobial necrotizing fasciitis of the perineum and scrotum that typically develops initially as a benign infection or abscess but quickly spreads. Risk factors for Fournier's gangrene include DM, alcohol abuse, and any immunocompromised state (eg, HIV, cancer).

If the patient presents early in onset, there may be only mild tenderness, erythema, or swelling of the affected area; however, this infection progresses rapidly. Later findings include marked tenderness, swelling, crepitus, blisters, and ecchymoses. Patients with Fournier's gangrene also develop systemic signs of infection, including fever, tachycardia, tachypnea, and hypotension. The key to diagnosis is careful examina-

tion of the perineal and scrotal area in any patient presenting with acute scrotal pain.

In the majority of cases, the diagnosis of Fournier's gangrene is made clinically. Once the diagnosis is made, patients require immediate and aggressive IV fluid resuscitation, broad-spectrum IV antibiotics (typically vancomycin and piperacillin/tazobactam), and emergent evaluation by a urologist. It is essential that these patients undergo early and aggressive surgical exploration and debridement of necrotic tissue.² Antibiotic therapy alone is associated with a 100% mortality rate, emphasizing the need for urgent surgery.² Even with optimal medical and surgical management, the mortality rate remains significant.

Summary

This case emphasizes several important teaching points. The EP should be mindful of the patient who keeps returning to the ED with the same complaint—despite “appropriate” treatment—as the initial diagnosis may not be the correct one. Such returning patients

require greater, not less, scrutiny. As with any patient, the EP should always take a complete history and perform a thorough physical examination at each presentation—as one would with a de novo patient. Finally, the EP should consider Fournier's gangrene in addition to testicular torsion and epididymitis in the differential diagnosis for acute scrotal pain.

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