Although acute scrotal pain comprises fewer than 1% of overall emergency department (ED) visits, this presentation may provoke great anxiety for the patient or caretaker given its highly sensitive nature. An acute scrotum is defined as an acute painful swelling of the scrotum or its contents, accompanied by local signs or general symptoms. Although the list of diagnostic possibilities for a patient with an undifferentiated acute scrotum is extensive, early identification and skillful management of testicular torsion is critical, as it may threaten testicular viability and future fertility if not managed expediently and appropriately. Differentiating this genitourinary (GU) emergency from alternative conditions takes precedence over definitive diagnosis. The cremasteric reflex and testicular sonography are frequently used, yet imperfect, diagnostic tools in assessing for testicular torsion. Other emergent conditions include necrotizing fasciitis of the perineum (Fournier’s disease), incarcerated or strangulated inguinal hernia, and any form of GU trauma until proven otherwise. This article reviews the evaluation and management of the acute scrotum in the ED setting.

DIFFERENTIAL DIAGNOSIS

A diligent and focused history and physical examination of the male complaining of acute scrotal symptoms is the cornerstone of formulating an appropriate plan of action. One of the most challenging aspects of scrotal complaints is that a wide variety of clinical conditions may present in a similar fashion: a male patient complaining of an acute, painful, swollen, and tender hemiscrotum. Indeed, the differential diagnosis of the acute scrotum is extensive (Table 1).

For patients presenting with an acute scrotum, several life-threatening or fertility-threatening conditions should always be considered and ruled out: testicular torsion, Fournier’s disease, or incarcerated/strangulated inguinal hernia. When scrotal pain is associated with systemic symptoms, such as nausea or vomiting, additional vigilance is prudent in searching for these dangerous conditions. The 3 aforementioned conditions can occur at any age. With this said, Fournier’s disease tends to occur in adult

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**KEYWORDS**

- Male
- Genital
- Emergency
- Scrotum
- Testicle
- Torsion
<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Symptoms</th>
<th>Signs</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendage torsion</td>
<td>Typically a more indolent onset of symptoms compared with testicular torsion; less likely to present with nausea or vomiting</td>
<td>Tender nodule typically at head of testicle or epididymis; blue dot sign pathognomonic</td>
<td>US examination may demonstrate infarcted appendage</td>
</tr>
<tr>
<td>Epididymitis</td>
<td>Typically a more indolent onset of symptoms compared with testicular torsion; less likely to present with nausea or vomiting</td>
<td>Early: firmness and nodularity isolated to epididymis. Late: with progression, inflammation may become contiguous with testicle (termed epididymo-orchitis)</td>
<td>US examination may reveal increased intratesticular blood flow, although this is a nonspecific finding</td>
</tr>
<tr>
<td>Epididymo-orchitis</td>
<td>More likely to present with systemic findings, including nausea, vomiting, fever</td>
<td>Large, swollen scrotal mass typically with indistinct border between testicle and epididymis</td>
<td>US examination may reveal increased intratesticular blood flow, although this is a nonspecific finding</td>
</tr>
<tr>
<td>Fournier's disease</td>
<td>Perineal pain, swelling, redness; fever, vomiting, lethargy</td>
<td>May present with an absence of visible local findings on skin inspection in early stages (pain out of proportion to examination); ecchymosis, crepitus, necrotic eschar may be present in more advanced disease</td>
<td>Emergent surgical consultation for debridement, broad-spectrum antimicrobials</td>
</tr>
<tr>
<td>Hematocele</td>
<td>Large, painful scrotal mass; often antecedent history of trauma</td>
<td>Ecchymoses of scrotal skin; testicular tenderness or firmness</td>
<td>US examination may reveal fluid-filled tunica vaginalis</td>
</tr>
<tr>
<td>Hernia</td>
<td>Unilateral inguinal or scrotal swelling and pain</td>
<td>Reducible, incarcerated and strangulated forms; incarcerated/strangulated hernia may be particularly tender on examination</td>
<td>Emergent surgical consultation when incarcerated or strangulated; outpatient surgical referral reasonable if readily reducible</td>
</tr>
<tr>
<td>Hydrocele</td>
<td>Typically a gradual progression of swelling</td>
<td>Scrotal transillumination may be helpful</td>
<td>US examination may reveal fluid-filled tunica vaginalis</td>
</tr>
<tr>
<td>Idiopathic scrotal edema</td>
<td>Typically unilateral scrotal swelling and edema; primarily seen in children younger than 10 years</td>
<td>Scrotal, perineal, inguinal erythema and edema; may be difficult to distinguish from an acute skin-soft tissue infection</td>
<td>US examination</td>
</tr>
<tr>
<td>Orchitis</td>
<td>Typically gradual onset of unilateral (or bilateral) testicular swelling and pain</td>
<td>Swelling and tenderness isolated to testis/testes without epididymal involvement</td>
<td>US examination; often seen in conjunction with other systemic diseases (viral, other); treatment is disease specific</td>
</tr>
</tbody>
</table>

(continued on next page)
patients, whereas incarcerated inguinal hernia is most common at the extremes of age, particularly in the first year of life.\textsuperscript{3}

Although the differential is extensive and includes relatively rare life threats such as strangulated inguinal hernia and Fournier’s gangrene, the acute scrotum can frequently be distilled to 3 principal diagnostic possibilities: testicular torsion, epididymitis, and appendage torsion\textsuperscript{4}; this serves to better focus the ED evaluation. Testicular torsion is the fertility threat that needs to be ruled out. There is, however, significant overlap in the clinical signs and symptoms of these 3 conditions (Table 2).\textsuperscript{5} Appendage torsion results from twisting of an appendage, which are embryologic remnants without known physiologic function (Fig. 1). Testicular torsion and epididymitis are the principal diagnostic considerations in the adult.\textsuperscript{4}

The vast majority of series reported in the medical literature addressing the diagnosis and management of the acute scrotum are limited to pediatric cohorts, although testicular torsion in adults does occur.\textsuperscript{6} The frequency of testicular torsion, appendage torsion, and epididymitis in children varies significantly from study to study. Differences in factors such as the age distribution and study setting make it difficult to draw definitive conclusions from the available data.\textsuperscript{7,8} With this said, each of these

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### Table 1

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Symptoms</th>
<th>Signs</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrotal skin</td>
<td>Variable depending on cause</td>
<td>Must distinguish between lesions localized to scrotal wall and those contiguous with deeper scrotal structures</td>
<td>US or CT imaging may be helpful in determining the depth and extent of involvement if invasive process suspected</td>
</tr>
<tr>
<td>Testicular torsion</td>
<td>Typically a sudden and severe onset of pain; more likely to be associated with nausea or emesis</td>
<td>Classic findings include an elevated testis with a transverse lie</td>
<td>Emergent surgery consultation in high-probability cases</td>
</tr>
<tr>
<td>Trauma</td>
<td>History of blunt or penetrating mechanism of injury</td>
<td>Variable depending on mechanism</td>
<td>US examination; low threshold for surgical consultation in all but the most minor injuries</td>
</tr>
<tr>
<td>Tumor</td>
<td>Typically a gradually progressive testicular mass; may be painless or painful</td>
<td>May palpate testicular mass, firmness, or induration</td>
<td>US examination</td>
</tr>
<tr>
<td>Varicocele</td>
<td>Typically a gradual onset of unilateral swelling, often painless</td>
<td>Abnormally enlarged spermatic cord (pampiniform) venous plexus (often described as a “bag of worms”)</td>
<td>US examination</td>
</tr>
<tr>
<td>Vasculitis (eg, HSP)</td>
<td>Testicular swelling and pain</td>
<td>Associated vasculitis findings (such as buttock/lower extremity purpura and renal involvement in HSP)</td>
<td>US examination, other diagnostic testing guided by suspected cause (eg, complete blood count, serum electrolytes with renal function in HSP)</td>
</tr>
</tbody>
</table>

*Abbreviations: CT, computed tomography; HSP, Henoch-Schönlein purpura; US, ultrasonography.*
diagnoses contributes to roughly one-third of pediatric acute scrotum cases in series from surgery or urology services.\(^9\) However, this probably does not reflect the patient mixture seen in the ED setting. In fact, a recent large retrospective series from a pediatric ED (patients aged 0–18 years) showed a testicular torsion rate of only 3.3% in 523 patient visits reviewed.\(^5\) The incidence was even lower than the 12% to 16% incidence of testicular torsion found in other ED-based studies.\(^1,10–12\) In this same series, epididymitis and appendage torsion accounted for 32% and 8%, respectively. Of importance, scrotal pain of unknown etiology was the most frequent (34%) final diagnosis.

In another review of consecutive cases presenting to a children’s hospital ED, the most common diagnosis varied by age group: testicular torsion in the first year of life, appendage torsion in the toddler to prepubertal (3- to 13-year-old) age range, and epididymitis after 13 years of age.\(^1\) Specifically, bimodal peaks in the incidence of testicular torsion were noted in newborns and peripubertal males, which are concordant with other investigations (Fig. 2).\(^13,14\) Up to 20% of acute scrotum cases, however, may result from other causes entirely, including incarcerated inguinal hernia.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Differentiating characteristics of testicular torsion, epididymitis, and appendage torsion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Testicular Torsion</strong></td>
<td><strong>Epididymitis</strong></td>
</tr>
<tr>
<td><strong>Historical Features</strong></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Incidence peaks in neonatal and adolescent groups, but may occur at any age</td>
</tr>
<tr>
<td>Risk factors</td>
<td>Undescended testicle (neonate), rapid increase in testicular size (adolescent), failure of prior orchiopexy</td>
</tr>
<tr>
<td>Pain onset</td>
<td>Sudden</td>
</tr>
<tr>
<td>Prior episodes of similar pain</td>
<td>Possible (spontaneous detorsion)</td>
</tr>
<tr>
<td>History of trauma</td>
<td>Possible</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>More likely</td>
</tr>
<tr>
<td>Dysuria</td>
<td>Less likely</td>
</tr>
<tr>
<td><strong>Physical Findings</strong></td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>Less likely</td>
</tr>
<tr>
<td>Location of swelling/tenderness</td>
<td>Testicle, progressing to diffuse hemiscrotal involvement</td>
</tr>
<tr>
<td>Cremasteric reflex</td>
<td>Testicular torsion less likely if present</td>
</tr>
<tr>
<td>Testicle position</td>
<td>High riding testicle, transverse alignment</td>
</tr>
<tr>
<td>Pyuria</td>
<td>Less likely</td>
</tr>
</tbody>
</table>
or idiopathic scrotal edema, among others. In addition, as previously noted, reaching a final diagnosis of scrotal pain of unclear etiology is not uncommon, particularly when evaluating all-comers in the ED setting.

EVALUATION IN THE EMERGENCY DEPARTMENT

History

The presence of systemic symptoms may provide additional diagnostic clues in the patient presenting with an acute scrotum. As noted, the vast majority of studies

Fig. 1. Position of appendages. (From Sidhu PS. Clinical and imaging features of testicular torsion: role of ultrasound. Clin Radiol 1999;54:346; Courtesy of Royal College of Radiologists; with permission.)

Fig. 2. Relative incidence of torsion, appendage torsion, and epididymitis as a function of age. (From Lewis AG, Bukowski TP, Jarvis PD, et al. Evaluation of the acute scrotum in the emergency department. J Pediatr Surg 1995;30(2):278; with permission.)
addressing the evaluation and management of the acute scrotum are derived from pediatric cohorts. Therefore, the information that follows is based on analysis of pediatric cases unless noted otherwise.

As a general rule, patients with testicular torsion are more likely to have associated systemic symptoms such as nausea and vomiting when compared with patients with the other commonest causes of acute scrotal pain, such as uncomplicated epididymitis or appendage torsion.\(^{16,17}\) Beni-Israel and colleagues\(^6\) reported an odds ratio of 8.9 (95% confidence interval 2.6–30.1) for the association between the presence of nausea or vomiting and the diagnosis of testicular torsion. Another variable associated with testicular torsion in this study was duration of symptoms for less than 24 hours (odds ratio 6.7, 95% confidence interval 1.5–33.3). A second study confirmed a shorter symptom duration (<12 hours) for testicular torsion when compared with epididymitis.\(^{10}\) Although these features have been associated with testicular torsion, their absence should certainly not preclude the diagnosis.\(^{16}\)

Whereas patients with epididymitis may present with nausea, malaise, or low-grade fever, it is typically those with more advanced degrees of infection (epididymo-orchitis) who exhibit more systemic involvement.\(^{18,19}\) It must be noted that patients with Fournier’s disease or an incarcerated/strangulated inguinal hernia typically present with systemic symptoms as well.\(^{20}\)

The distinction between constant/progressive and intermittent/colicky pain can be useful in the diagnosis of acute scrotal pain. Scrotal pain that begins abruptly and severely should be considered testicular torsion until proven otherwise.\(^{16}\) Although urinary symptoms may accompany many causes of acute scrotal pain, epididymitis in particular may present with accompanying urinary complaints such as dysuria and urgency.\(^{16}\)

Other important historical features include inquiring about prior similar episodes, which may occur in intermittent torsion-detorsion.\(^{21}\) Eliciting a history of minor trauma is also important, as trauma-induced testicular torsion has been reported.\(^{22}\)

**Examination**

Differentiating among the causes of acute scrotal pain by physical examination is challenging. Often confounding the problem is the exquisite pain and discomfort elicited by the examination itself. There are several examination findings which, if present, may facilitate a more accurate diagnosis.\(^{10}\) High position of the testis was associated with an odds ratio of 58.8 (95% confidence interval 19.2–166.6) for testicular torsion in one study,\(^5\) and when absent had a negative predictive value of 95% in a second study.\(^{16}\) Other examination findings that have been associated with testicular torsion include transverse location of the testis (sensitivity 83%, specificity 94%, negative predictive value 95%) and anterior rotation of the epididymis from its typical posterolateral position (sensitivity 69%, specificity 98%, negative predictive value 92%).\(^{16}\) Along these lines, Kadish and Bolte\(^{10}\) found a statistically significant association between the following variables and the diagnosis of epididymitis: normal testicular position, presence of a tender epididymis, and the absence of testicular tenderness. Furthermore, they found a strong association between the presence of isolated tenderness at the superior pole of the testis and the diagnosis of appendage torsion.

A congenital anomaly of fixation of the testis, termed the bell-clapper deformity, is associated with the development of testicular torsion.\(^{23}\) This condition occurs when the intrascrotal portion of the spermatic cord lacks firm posterior adhesion to the scrotal wall and remains surrounded by the tunica vaginalis (Fig. 3). As a result of the abnormal attachment, the testis may be suspended horizontally.\(^{24}\) These anatomic features predispose the affected testis to rotation.
The cremasteric reflex is elicited by stroking the inner thigh, resulting in reflexive elevation of the ipsilateral testicle through contraction of the cremaster muscle. The absence of the reflex is nonspecific. Some healthy individuals lack the reflex altogether (particularly males in their first few years of life), and inflammation or swelling from any cause may blunt or otherwise limit the ability to appreciate the reflex.25

It has been suggested that the presence of an intact ipsilateral cremasteric reflex can be helpful in excluding the diagnosis of testicular torsion.13,26,27 However, there have been several published reports of testicular torsion presenting with an intact cremasteric reflex.28–30 Beni-Israel and colleagues5 reported that 5 of the 17 patients (29%) included in their study who were ultimately diagnosed with testicular torsion had a normal cremasteric reflex noted on initial examination. This finding is concordant with those of other studies suggesting that the presence of a normal cremasteric reflex does not necessarily rule out testicular torsion. Specifically, Karmazyn and colleagues31 noted the presence of a normal cremasteric reflex in 3 of 31 patients (10%) with testicular torsion, whereas Van Glabeke and colleagues32 noted the lack of an absence of the cremasteric reflex in 10 of 25 patients (40%) with testicular torsion. The bottom line is that, like many diagnostic adjuncts, the cremasteric reflex needs to be cautiously interpreted in the context of the overall clinical picture. Even though it has been suggested that the presence of an ipsilateral cremasteric reflex makes testicular torsion less likely, it is not powerful enough to exclude this fertility-threatening diagnosis.

Prehn’s sign, or relief of pain with scrotal elevation, was historically taught as a method to aid in differentiating epididymitis (pain relief with scrotal elevation) from testicular torsion.33 However, this sign is entirely unreliable in distinguishing these two disorders.34 Therefore, its use should be abandoned. The blue dot sign is pathognomonic for appendage torsion.35 This finding is very specific, yet insensitive.10,13,14

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**Fig. 3.** Testis position within the tunica vaginalis. (A) Normal anatomy. (B) Bell-clapper deformity. (C) Bell-clapper deformity with horizontal testis. (From Testis torsion. In: Oldham KT, Colombani PM, Foglia RP, editors. Surgery of infants and children: scientific principles and practice. Philadelphia: Lippincott-Raven; 1997. p. 1552–3; with permission.)
In a large pediatric ED cohort, Ben-Israel and colleagues identified 4 variables associated with an increased likelihood of testicular torsion: nausea or vomiting, pain duration of less than 24 hours, high position of the testis, and abnormal cremasteric reflex. All patients with testicular torsion in their study had one or more of the risk factors. The investigators concluded that the absence of all 4 of these findings is helpful in ruling out testicular torsion based on its very high negative predictive value.

MANAGEMENT IN THE EMERGENCY DEPARTMENT

The key to managing acute GU problems is the timely recognition of conditions that threaten life or testicular viability. Most routine laboratory aids, such as blood work or urinalysis, cannot exclude testicular torsion. Certain laboratory tests may, however, be important in ruling in alternative conditions such as acute epididymitis.

Testicular salvage rates are time sensitive. A meta-analysis of 1140 patients in 22 series demonstrated a greater than 90% salvage rate with surgery within 6 hours of pain onset. An accompanying meta-analysis of 535 patients in 8 series showed that the risk of subsequent testicular atrophy increased despite surgical detorsion beyond the 6-hour window (Fig. 4). Testicular atrophy may lead to subfertility.

![Fig. 4. Testicular salvage and atrophy rates over time in testicular torsion. (A) Immediate (early) surgical salvage after torsion. (B) Subsequent atrophy of surgically salvaged testes after torsion of various time intervals. (Reprinted from Visser AJ, Heyns CF. Testicular function after torsion of the spermatic cord. BJU Int 2003;92:201; with permission.)](image-url)
Furthermore, testicular loss may lead to contralateral testis dysfunction through immune-mediated or other mechanisms.\textsuperscript{38}

A retrospective review of 162 cases of testicular torsion demonstrated a median of 360° of torsion in cases of testicular salvage, and a median of 540° of torsion in nonviable cases.\textsuperscript{39} There was overlap between the categories, however, with a range of 180° to 1080° of torsion found in both categories. Of importance, testicular infarction can occur with as little as 180° of torsion.

**Diagnostic Imaging**

If the history and examination suggests the diagnosis of testicular torsion, surgical consultation and plans for immediate exploration should be initiated without delay. A patient with compelling historical and examination findings of testicular torsion does not require any diagnostic tests. In other cases, a confirmatory diagnostic study such as color flow Doppler ultrasonography (CDUS) is indicated.\textsuperscript{40} Surgical exploration is the initial treatment of choice with a strong clinical suspicion for testicular torsion, although guidelines published by the American College of Radiology recommend that confirmatory imaging can be performed if readily available and obtained within 30 to 60 minutes of the request to simultaneously prepare the operating room.\textsuperscript{41} At present, however, there are no such guidelines specific to emergency medicine.

When used in the appropriate clinical setting, sonography remains the most useful diagnostic modality in the evaluation of GU complaints. A patient with compelling historical and examination findings of testicular torsion does not require any preoperative diagnostic tests. CDUS may be very helpful in all other cases. The classic sono graphic finding suggestive of testicular torsion is diminished intratesticular blood flow. In addition, examination of the spermatic cord with high-resolution gray-scale ultrasonography (HRUS) may reveal “coiling” or “kinking” of the cord at the site of torsion.\textsuperscript{42–44} Sonography is used not only to exclude testicular torsion but also to search for alternative causes of acute scrotal pain.\textsuperscript{45} In epididymitis, perfusion may be normal (or increased) because of the effects of inflammatory mediators on local vascular beds, although this is a nonspecific finding.\textsuperscript{46,47} An infarcted appendage may be visualized on ultrasonography as well.\textsuperscript{48} Ultrasonography may also identify hydroceles, hematoceles, varicoceles, hernias, tumors, abscesses, and gonadal vasculitis, among others. It has been suggested that emergency physicians may be able to accurately assess for intratesticular blood flow in patients presenting with acute scrotal pain using bedside sonography.\textsuperscript{49}

CDUS has long been regarded as the diagnostic modality of choice in assessing for testicular torsion. However, reports of false-negative ultrasound results have been reported.\textsuperscript{50–56} Many of these studies are case reports or case series, limited by small numbers and retrospective design. Two larger series reported documented intratesticular blood flow with CDUS in 6 of 23 (26%) and 50 of 208 cases (24%), respectively, of confirmed testicular torsion.\textsuperscript{42,57} Doppler ultrasonography may reveal seemingly adequate intratesticular blood flow in partial torsion, which can be very misleading to the practitioner.\textsuperscript{58}

Radionuclide scintigraphy and CDUS show similar sensitivity, as well as false-negative rates, for the diagnosis of testicular torsion.\textsuperscript{59} However, given the widespread availability and expertise with ultrasound technology, combined with the risks of isotope radiation exposure, radionuclide procedures have fallen out of favor. The use of magnetic resonance imaging has been explored, but limitations include speed of imaging and availability.\textsuperscript{60,61}
Ultrasound evaluation of the acute scrotum has its limitations. Ultrasonography may be helpful in identifying an alternate diagnosis. However, surgical scrotal exploration remains the only definitive diagnostic modality in assessing for testicular torsion, but this needs to be balanced with the potential for unnecessary operations. The real question is: when is the risk low enough to safely send a patient home following a “normal” ultrasound imaging study? Whereas some series have found ultrasonography to be unreliable, other larger series have reported a negative predictive value approaching 97%. Overall, it is wise for the emergency practitioner to approach the acute scrotum with a “play not to lose” rather than a “play to win” mentality. If the ultrasonogram is nondiagnostic for testicular torsion, and the clinical story is still concerning, emergent surgical consultation is prudent.

Manual Detorsion

The pain of testicular torsion may be relieved following a trial of manual detorsion. A study of 162 cases of testicular torsion revealed that anticipated lateral to medial rotation occurred in 67% of cases, with medial to lateral rotation in the remaining 33%. This result challenges the standard dogma of medial to lateral rotation, or “opening the book,” as the standard method for detorsion. The end-point of manual detorsion is relief of pain, or the return of intratesticular blood flow as seen on ultrasound imaging. Although manual detorsion may allow for reperfusion of the testis, a lesser degree of residual torsion may remain. Given that infarction can occur with as little as 180° of torsion, immediate surgical exploration after what is thought to be a successful manual detorsion is still advocated. If attempted in the ED, preprocedure local anesthesia or systemic analgesia is prudent. The bottom line is that specialty consultation and plans for possible immediate surgical exploration need to occur regardless of outcome of the detorsion procedure.

Epididymitis

Antibiotics are the mainstay of therapy for epididymitis. Antimicrobial selection is guided by patient demographics: younger (<35 years of age), sexually active males are treated with agents to cover Neisseria gonorrhoeae and Chlamydia trachomatis, such as single-dose intramuscular (IM) ceftriaxone with a 10-day course of oral doxycycline. Fluoroquinolones are no longer recommended for the treatment of gonococcal infections. Antibiotics covering common urinary pathogens are recommended for males older than 35 years with epididymitis. This age distinction, however, is arbitrary, and variability exists.

Epididymitis may also occur in prepubescent males; this is thought to be caused by reflux of sterile urine into the epididymis, although the precise mechanisms remain unclear. Reflux may result from congenital GU anomalies that require diagnostic evaluation. Recommendations regarding treatment of the resulting inflammation vary from treating all boys to limiting antimicrobial use to patients with documented urinary findings such as pyuria or a positive urine culture. If used, prophylactic antibiotics should cover the common urinary pathogens.

Appendage Torsion

Appendage torsion occurs most frequently in the prepubertal age group, likely resulting from the increased size of the pedunculated structures as a result of hormonal stimulation. Appendage torsion is self-limited. Treatment includes pain relief with nonsteroidal anti-inflammatory agents and limiting activity. Pain relief coincides with degeneration of the infarcted, necrotic appendage, which typically occurs within
1 to 2 weeks. Appendage torsion may recur, given appendage variability in both number and position.

**FOURNIER’S GANGRENE**

Fournier’s gangrene should be considered in elderly, diabetic, or otherwise immune compromised males. Fournier’s disease has also been reported in women and children. Early surgical consultation and administration of broad-spectrum antibiotics is indicated in all suspected cases of Fournier’s gangrene. Surgical debridement is imperative and remains the definitive treatment. Computed tomography (CT) may be helpful in assessing the degree of extension. However, delays in recognition and definitive surgical debridement can be life threatening, so imaging should not delay surgical consultation. Early intravenous broad-spectrum antibiotic therapy covering gram-positive, gram-negative, and anaerobic species is imperative. There is some literature to suggest a potent synergistic role of clindamycin along with β-lactam antimicrobials in combating necrotizing soft tissue infections, particularly when streptococcal species are involved. Recommended empiric intravenous antimicrobials include ampicillin-sulbactam plus clindamycin plus ciprofloxacin, or clindamycin plus an aminoglycoside in individuals with known penicillin hypersensitivity. The addition of vancomycin to either regimen for expanded gram-positive coverage is reasonable. The role of hyperbaric oxygen therapy has been suggested, although its utility remains the subject of much debate in the medical literature.

**INCARCERATED INGUINAL HERNIA**

An inguinal hernia may occur when there is a defect in the anterior abdominal wall musculature. Alternatively, a persistent embryologic communication (patent processus vaginalis) between the peritoneal cavity and the tunica vaginalis may result in an indirect inguinal hernia. A reducible hernia occurs when abdominal contents can freely (or with simple manipulation) move between the abdomen and the hernia sac. An irreducible, or incarcerated, hernia cannot return to its normal site spontaneously or by simple manipulation. An irreducible hernia may become strangulated, where pressure on the hernial contents may compromise blood supply; this represents a surgical emergency. Both direct and indirect hernias may present when incarcerated or strangulated.

**GENITOURINARY TRAUMA**

Traumatic injury must be included in the differential of any GU complaint. Trauma to the GU system may be either blunt or penetrating (Table 3). The Société Internationale D’Urologie has published recommendations regarding the management of GU trauma. Of importance, trauma-induced testicular torsion has been reported. As such, consideration of testicular torsion in the differential diagnosis of blunt scrotal trauma is prudent.

Significant trauma to the scrotum and its associated structures occurs infrequently with minor blunt force mechanisms, owing to both testicular mobility and a protective cremasteric reflex. In addition, each testicle is encapsulated by a fibrous tunica albuginea, which may protect the testicular parenchyma from injury. Blunt force injury may cause testicular contusion or, less frequently, rupture of the tunica albuginea. Traumatic dislocation of the testicle to an aberrant site outside of the scrotal compartment is possible with significant blunt-force trauma. All but the most superficial penetrating scrotal injuries will require specialty consultation for possible exploration. Patients
with either blunt or penetrating GU trauma may present with a hematocele, which is a painful, tender, ecchymotic scrotal mass resulting from the accumulation of blood within the tunica vaginalis. Ultrasonography is an invaluable tool in the evaluation of GU trauma. In addition, CT imaging may be helpful in uncovering coexisting injuries.

**SUMMARY**

Male GU problems are frequently high-risk complaints from a medicolegal perspective. Definitive diagnosis for the patient presenting with an acute scrotum is not always feasible in the ED setting. However, recognition of GU emergencies takes precedence. Identification of testicular torsion is critical given its implications for future fertility. Additional emergent conditions include Fournier’s gangrene, incarcerated or strangulated inguinal hernia, and any form of GU trauma until proven otherwise. Other causes of the acute scrotum can typically be managed in the outpatient setting once these life threats or fertility threats have been reliably excluded.

There is no individual or combination of clinical features or diagnostic testing that can reliably rule out testicular torsion. The cremasteric reflex and testicular sonography are frequently used, yet imperfect, diagnostic tools. It is wise for the emergency practitioner to approach the acute scrotum with a “play not to lose” rather than a “play to win” mentality. It is prudent to maintain a high index of clinical suspicion and a low threshold for surgical consultation when evaluating for emergent conditions, particularly in the setting of ongoing pain. Armed with this knowledge, the acute scrotum can be skillfully and effectively managed in the ED setting.

**ACKNOWLEDGMENTS**

The authors wish to acknowledge Dr Robert Schneider, who is board certified in both emergency medicine and urology, for his contributions and mentorship.
REFERENCES


