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Acute scrotal pain

Background

Acute scrotal pain, once diagnosed, can be treated appropriately with either conservative or surgical measures. The complexity lies in the use of history, clinical examination and investigations in a restricted time frame, to identify the appropriate management path.

Objective

To evaluate the literature regarding important and common differentials of acute scrotal pain with the intent to enable primary care doctors to appropriately assess and manage the acutely painful scrotum.

Discussion

Since there is no single feature in the history, examination or investigation that is pathognomonic in diagnosing acute scrotal pain, the triad together is pivotal in its clinical evaluation. If there is any suspicion of testicular torsion, a prompt referral to a surgeon with relevant experience or to the emergency department may salvage the testis. Epididymitis and torsion of the appendix testis may be managed conservatively once testicular torsion has been ruled out.

Keywords

urological diseases; pain; emergencies

Definition and epidemiology

Testicular torsion is ischaemia of the testicle due to rotation along the longitudinal axis of the spermatic cord. Torsion can present with varying degrees of rotation, which may explain the diverse clinical presentations encountered. The degree of torsion (range from 180–720°) and duration of infarction (<6 hours) are key factors in salvage rates of torsed testicles.^{1,4} It is important to note that, regardless of time to presentation and consequent diagnosis of torsion, surgical intervention should be an urgent priority. There have been a number of case reports of salvaged torsed testicles even 24 hours after the onset of pain.^{3,5}

Testicular torsion can occur at any age, although the diagnosis is significantly less likely in older men. It has a bimodal peak of incidence, arising most commonly in neonates and adolescents. Sixty-five per cent of presenting cases are adolescents aged 12–18 years.^{1,6}

Clinical features

Testicular torsion is often a challenging diagnosis to make, yet it is one that must be actively excluded in every presentation of acute scrotal pain. Classically, testicular torsion presents with sudden onset, severe scrotal pain with associated swelling, nausea and vomiting.^{1,2,4,6,7} Importantly, however, this constellation of symptoms is not pathognomonic for testicular torsion and atypical presentations are also common.³ Pain may arise several hours after vigorous physical activity or minor trauma to the testicles. Children can, on occasion, present with intermittent torsion that occurs during the night and awakens them from sleep. Abdominal pain is present in a significant proportion of cases and a high index of suspicion for torsion is required when this is the presenting complaint.^{2,5}

The asymmetrically high-riding testis with a horizontal lie due to the shortened spermatic cord

The diagnosis of acute scrotal pain can be one of the most interesting and challenging aspects in medicine. Whether in an adult or a child, clinical signs may be inconsistent and investigations are not always definitive in establishing the diagnosis.

The majority of cases of diagnosed acute scrotal pain can be attributed to the three differentials explored below. The difficulty arises due to the similarities between the presentations.^{1–3} This article seeks to explore these causes of acute scrotal pain and the evidence behind some of the pitfalls in their accurate diagnosis.

Testicular torsion

The most important diagnosis to exclude when considering a presentation of acute scrotal pain is testicular torsion.

is described as a prominent finding in testicular torsion. Nonetheless, case studies suggest that this sign is only evident in approximately half of the cases of testicular torsion.^{1,2} This implies that the sign may be specific when identified, but not sensitive enough to rule out torsion when absent. There is usually an associated hydrocoele with scrotal wall erythema; however, these are common examination findings of many diagnoses of acute scrotal pain.⁷ If elevation of the scrotum does not relieve the pain (negative Prehn's sign) testicular torsion is more likely, but a positive Prehn's sign does not discount testicular torsion.^{3,6}

The cremasteric reflex (pinching or stroking the skin of the upper thigh, causing the ipsilateral testis to elevate via contraction of the muscle) may be absent in testicular torsion. This can be a difficult clinical sign to elicit and has shown significant clinician variance. Studies show that the absent cremasteric reflex may have less than 90% sensitivity and specificity in diagnosing testicular torsion.^{1,2,6,7} This large inconsistency makes it unsuitable as an adequate screening or diagnostic test on its own merit.³

Individually, these clinical features are not effective enough in identifying testicular torsion. However, it would be prudent to consider torsion in any patient that presents with one or more of nausea and vomiting, acute scrotal pain of less than 24 hours, a high position of the testis or an abnormal cremasteric reflex.^{1,2} *Table 1* provides a summary of the signs and symptoms in the classic case.

Investigation and treatment

Colour Doppler sonography is indicated in equivocal cases, but has operator-dependent factors that can cause variances in sensitivity (86–100%) and specificity (95–100%).^{3,8–10} Importantly, a normal investigation does not rule out testicular torsion if history and examination indicate otherwise. In children, the use of ultrasonography should not delay surgical intervention if the history and examination are indicative of testicular torsion.^{5,7}

Treatment involves immediate surgical exploration with detorsion (or orchidectomy) and fixation of both testes. The current literature suggests that although the rates of non-viability 12 hours post-torsion can be as high as 75%,

surgical intervention should not be withheld even if the pain has been ongoing for more than 6 hours, as there is still a possibility of salvage for patients presenting up to 48 hours post-torsion.^{3,4}

Manual detorsion must never substitute or delay surgery, or be attempted if surgical intervention can be arranged within a reasonable time frame. In some instances, if surgery is not feasible within 6 hours, manual detorsion may be attempted with appropriate consent and discussion. In most cases, the testis rotates medially (ie. rotates in, toward the midline). Detorsion should occur by 'opening the book' (ie. grasping the inferior pole of the testis from below and gently supinating). Successful detorsion may relieve pain, cause a vertical lie of the testis with a lower position, and may return normal arterial supply. After manual detorsion, surgery is still required to perform bilateral orchidopexies.^{4,5}

Epididymitis

Inflammation of the epididymis is one of the most common causes of scrotal pain in adults. The likely pathogenesis is due to infection by any of several pathogens listed in *Table 2*. When the infection lasts for more than 3 months it can be considered as chronic epididymitis.^{11–14} There are several other causes of epididymitis that can only be diagnosed once infection has been ruled out. These include autoimmune disease, vasculitis and idiopathic causes.^{11,13}

Clinical features

In the severe case, a patient can present with scrotal swelling and pain with associated fever, rigors and lower urinary tract symptoms such as increased frequency, dysuria and urgency. An insidious onset is perhaps more common with a history of isolated scrotal pain.^{1,12} The predisposing factors include sexual activity, heavy physical exertion, and prolonged periods of sitting (including bicycle/motorbike riding). As with urinary tract infections, recurrent epididymitis should warrant investigations into possible structural abnormalities.^{7,12} Extended diagnostic evaluation for structural abnormalities could include renal ultrasonography, uroflowmetry, cystoscopy and micturition cysto-urethrography.⁸

On examination, an indurated, tender or swollen epididymis can be a clinical feature that makes epididymitis more likely. This can be associated with orchitis, a consequent hydrocoele and erythema.¹² Signs that are often considered to be strong predictors of epididymitis are pain isolated to the upper pole of the testicle, a positive Prehn's sign and an intact cremasteric reflex (*Table 1*). However, there is a significant proportion of cases of testicular torsion or torsion of the appendix testis that can also present with these signs.^{3,12} In chronic cases, signs and symptoms may be subclinical and hence more difficult to detect. In rare cases, some men can present with epididymitis and prostatitis. This should be

Table 1. Signs and symptoms in the classic case

	Symptoms	Signs
Testicular torsion	<ul style="list-style-type: none"> • Sudden onset • Severe pain • Associated nausea and vomiting • Associated trauma • Possible abdominal pain 	<ul style="list-style-type: none"> • Asymmetric, high-riding testis • Negative Prehn's sign • Absent cremasteric reflex
Epididymitis	<ul style="list-style-type: none"> • Insidious onset • Fevers and rigors • Lower urinary tract symptoms • Relevant sexual history 	<ul style="list-style-type: none"> • Indurated testis • Tender upper pole of testis • Positive Prehn's sign • Intact cremasteric reflex
Torsion of the appendix testis	<ul style="list-style-type: none"> • Gradual onset • Moderate to severe pain • Associated nausea and vomiting 	<ul style="list-style-type: none"> • Localised tenderness to anterior testis • 'Blue dot' sign

suspected in patients with underlying lower urinary tract obstruction or recent prostatic surgery.

Investigations and treatment

Although it is routine to obtain a urine specimen for analysis, it will often be unhelpful in patients without lower urinary tract symptoms. In some patients a urethral swab can be useful in identifying sexually transmitted infections (STIs) as the cause of these symptoms.^{11,12} In cases of acute epididymitis where there is only scrotal pain and swelling, it can be difficult to rule out torsion and the use of ultrasonography may hold some value. In the most diagnostically challenging cases, surgical exploration may be the only way to rule out testicular torsion.

Table 2. Causes of epididymitis

Sexually active men <35 years of age
<ul style="list-style-type: none"> • <i>Chlamydia trachomatis</i> • <i>Neisseria gonorrhoea</i>
Men >35 years of age
<ul style="list-style-type: none"> • Coliform bacteria (<i>Escherichia coli</i>)
Children
<ul style="list-style-type: none"> • Enteroviruses • Adenoviruses • Mumps • <i>E. coli</i>
Chronic infection
<ul style="list-style-type: none"> • <i>Mycobacterium tuberculosis</i> • Many of the above untreated
Immunocompromised
<ul style="list-style-type: none"> • Cytomegalovirus (CMV) • Cryptococcus • <i>Pseudomonas aeruginosa</i> • <i>Klebsiella pneumoniae</i>
Rare
<ul style="list-style-type: none"> • <i>Ureaplasma urealyticum</i> • <i>Corynebacterium</i> spp. • <i>Mima polymorpha</i> • <i>Proteus mirabilis</i> • Brucella • <i>Treponema pallidum</i> • Filariasis
Non infectious
<ul style="list-style-type: none"> • Sarcoidosis • Behcet's disease • Amiodarone • Idiopathic • Polyarteritis nodosa

Once diagnosed, epididymitis can be treated conservatively, with analgesia, NSAIDs, ice and scrotal support (comfortable underwear that elevates the scrotum).¹² Empirical antibiotics should be commenced while awaiting cultures if infection is suspected. If there is no improvement within a few days, other causes or factors may be at play and specialist referral for further investigation would be appropriate.¹¹

Some severe cases may require urological intervention, such as surgical exploration, especially if there is sepsis and inadequate source control. Septic patients will also require urgent transfer to a hospital for more intensive monitoring and management. Patients with torted testicles may also present with fevers, thus adding to the conundrum in discriminating between epididymitis and testicular torsion.^{9,12,13}

Torsion of the appendix testis

As the most common cause of scrotal pain in children, torsion of the appendix testis can present with clinical features similar to testicular torsion, such as severe acute scrotal pain with nausea and vomiting.^{1,5,7} The gradual onset of pain, compared with testicular torsion, can sometimes be an aid to diagnosis. Torsion of the appendix testis also usually occurs in the young adolescent age group.¹²

Common examination findings are a hydrocoele and localised tenderness to the anterior testis (Table 1). On occasion, the 'blue dot' sign may be visible, indicating an infarcted testicular appendage.^{1,7,12}

Ultrasound may reveal a hypoechogenic focus with normal or increased blood flow to the testis (probably due to inflammation). The treatment is via conservative measures using NSAIDs, rest, ice, scrotal support and elevation. As the pain may last for several weeks, surgical intervention can be used for those with increasing pain, severe persistent pain unresponsive to conservative measures or for alleviation of parental anxiety. Routine surgical exploration is a much debated topic and may have a role in torsion of the appendix testis, but there is insufficient literature to support this avenue of management in adults.⁷

Conclusion

It is the diagnostic triad of history, examination and investigation that can lead to an appropriate

diagnosis. For all equivocal cases of acute scrotal pain presentations, an urgent referral to an emergency department or a surgeon with appropriate experience, to consider surgical exploration, should be the standard. Whilst no single clinical history or examination finding can rule out testicular torsion, the sum of clues may provide sufficient evidence to help identify those cases that can be managed conservatively and those requiring further investigation.

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