

Managing the paediatric ‘acute scrotum’

Malik Samarasinghe¹

Sri Lanka Journal of Child Health, 2009; **38**: 65-67

(Key words: Acute scrotum, paediatric)

Introduction

The ‘acute scrotum’ which is the most common paediatric urological emergency refers to the clinical condition characterised by an acute onset of pain or swelling of the scrotum. This situation, like the acute abdomen, may require surgical intervention due to the fact that testicular torsion presents in this manner. Testicular torsion if not surgically corrected within hours of onset will result in testicular loss.

The conditions that may manifest as an acute scrotum are listed in table 1. This article will look at the appropriate management of infants and children presenting with features of an acute scrotum, with special attention to torsion of the testis and appendages, epididymo-orchitis, idiopathic scrotal oedema and parasitic granuloma.

Table 1
Causes of an ‘acute scrotum’

- Torsion of the testis
- Torsion of the appendages
 - of epididymis
 - of testis
- Epididymo-orchitis
- Idiopathic scrotal oedema
- Parasitic granuloma (dirofilariasis)
- Trauma
- Acute hydrocoele
- Incarcerated inguinoscrotal hernia
- Henoch-Schönlein purpura
- Testicular tumours

Clinical features

Testicular torsion

Testicular torsion refers to an acute vascular insult to the testis caused by the twisting of the spermatic cord on its own axis. This impedes the flow of blood to and from the testis leading to testicular infarction if not corrected early. There are 2 peaks in the incidence of testicular torsion. The first is

during the perinatal period and the second higher peak is during early adolescence. However, the age at presentation should not be given much weight in considering the diagnosis of testicular torsion as it has been reported to occur at all ages¹.

Typically, the young boy has unilateral testicular pain associated with swelling and redness of the affected hemiscrotum. The pain generally is abrupt in onset and severe; however it also has been reported to present with a more gradual onset¹. The pain may radiate to the ipsilateral groin and iliac fossa and be associated with nausea and vomiting. Oedema and redness of the affected hemiscrotum may not be evident in the child presenting within a few hours of onset of the pain. The whole testis is exquisitely tender. Elevation of the affected testis due to shortening of the twisted spermatic cord, transverse lie of the contralateral testis, and the absence of a cremasteric reflex on the affected testis are signs that help in the diagnosis. However, none of them are absolutely reliable¹. Testicular torsion in the presence of a cremasteric reflex is well documented².

Intermittent testicular torsion (i.e. recurrent torsion with spontaneous detorsion) may present with a history of recurrent testicular pain with few signs. Subtle evidence of an abnormal testicular anatomy such as a transverse lie will be helpful in making the diagnosis.

Sudden onset groin or lower abdominal pain in the presence of an empty scrotum with or without a tender inguinal swelling is very likely to be due to torsion of an undescended testis.

Perinatal or neonatal testicular torsion may occur as an antenatal event or even postnatally. Most often a swollen, oedematous hemiscrotum with dark discolouration is noted at birth or on the 2nd or 3rd day of life. The testicle is typically not tender, feels firm and is adherent to the scrotal wall. Occasionally the typical features of torsion i.e. sudden onset painful, tender testis with erythema and oedema of the scrotal wall is noted a few days or weeks after birth³.

¹Senior Lecturer, Department of Surgery, Faculty of Medicine, University of Colombo

Torsion of the testicular or epididymal appendages

The appendix of the epididymis and the appendix of the testis are embryological remnants that are situated at the upper pole of the epididymis and testis respectively. These structures may twist around their pedicles and undergo necrosis. This condition is more common in prepubertal boys. The scrotal pain is typically of a more insidious onset than in testicular torsion and is not very severe. Lower abdominal pain, nausea and vomiting are unusual. Scrotal oedema and erythema develop as in torsion of the testis. With gentle examination it may be possible to elicit tenderness confined to the upper pole of the testis or epididymis and a nodule may be palpable. This together with the 'blue dot sign' which is the gangrenous appendage visible through the scrotal skin of fair skinned boys as a bluish black dot sitting on the upper pole of the testis is diagnostic of the condition.

Epididymo-orchitis

Acute inflammation of the testis and / or epididymis in boys is most commonly caused by infection with gram negative bacilli such as *Escherichia coli*. Rarely viral infections such as mumps may also be responsible. Epididymo-orchitis may occur in children of any age, but is seen more commonly in younger children than is torsion of the testis and the appendages. The scrotal pain is typically of insidious onset. There may be voiding symptoms such as dysuria and frequency. Fever may be a feature. There may be a past history of urinary tract infections or of epididymo-orchitis. A recent history of urethral instrumentation such as catheterisation or cystoscopy may be forthcoming. Scrotal erythema and oedema is a feature of this condition too. Tenderness confined to the epididymis may be elicited in epididymitis.

Idiopathic scrotal oedema

This condition is characterised by scrotal wall oedema and erythema with little if any pain. There may be itching. The oedema is not confined to a hemiscrotum and may extend to the groins and perineum. The underlying testes are not tender. There may be evidence of an insect (e.g. ant) bite. This condition can often be clinically diagnosed with confidence.

Parasitic granuloma (dirofilariasis)

This condition caused by Dirofilarial worms is seen quite commonly in the Western Province of Sri Lanka. The boy typically presents with swelling and erythema of the scrotum with a palpable nodule in the scrotum which is separate from the testis. At times the presentation is less acute, where a scrotal nodule is felt with no erythema or oedema.

Making the diagnosis

The role of imaging

Modern imaging techniques are reported to show a high degree of accuracy in the diagnosis of testicular torsion and other causes of acute scrotum. However, in actual clinical practice, diagnosing the cause of an acute scrotum remains largely clinical. This is so because not much time can be lost prior to surgical exploration and treatment in the case of suspected testicular torsion; the possibility of false negative results in diagnosing testicular torsion by imaging studies; and the lack of ready availability of suitable imaging modalities at all times in all centres. Therefore, the place for imaging is largely in situations where the diagnosis is uncertain and when testicular torsion is judged to be unlikely⁴.

Ultrasonography with colour Doppler scanning of testicular blood flow is currently the most widely used imaging modality for the diagnosis of testicular torsion. Ultrasonography can also diagnose other pathologies such as epididymo-orchitis, torsed testicular / epididymal appendages and testicular tumours. High resolution ultrasonography or power Doppler studies using high resolution probes are reported to be more accurate in diagnosis⁴. Overall sensitivity in the diagnosis of testicular torsion is reported to be 86 – 100% and specificity 77–100%⁵. However, the worrying fact is that these modalities of imaging are operator dependent and there are a significant number of false negative diagnoses reported in testicular torsion^{4,5}.

Nuclear imaging or scintigraphy may also be used in the diagnosis of testicular torsion. It has a reported sensitivity of 90% and a specificity of 60%⁵. Scintigraphy is reported to be more accurate than colour Doppler and power Doppler ultrasonography in the prepubertal and neonatal testis.

Magnetic resonance imaging has also a reportedly high accuracy in diagnosing testicular torsion. However this modality has not been used widely in the investigation of the acute scrotum⁵.

Laboratory studies

Urinalysis may be of value to demonstrate a pyuria in cases that are suspected to be epididymo-orchitis.

Treatment

The clinician needs to answer the following question with minimal delay: "Can testicular torsion be definitely excluded?". If so, he / she will have to make a specific diagnosis and institute appropriate treatment which is non-surgical in most

instances. However, if the answer to the above question is “no” emergency surgical exploration is required, the rationale being that a negative surgical exploration for testicular torsion is a better outcome than a misdiagnosed testicular torsion resulting in testicular loss.

Testicular torsion

In suspected testicular torsion the treatment is an emergency surgical exploration of the testis. At surgery, if the diagnosis is confirmed, the spermatic cord is untwisted and the viability of the testis is assessed. If the testis is viable it is fixed in the scrotum to prevent a recurrence of torsion. If it happens to be non-viable the testis is removed. The contralateral testis is fixed prophylactically to prevent a possible future episode of torsion as it too has a higher risk of torsion due to a pre-existing anatomical abnormality.

The appropriate approach to the management of perinatal torsion is currently being debated⁶. Some surgeons are in favour of not operating on these neonates who have a higher anaesthetic risk arguing that as testicular salvage is rare and there is no increased risk of contralateral testicular torsion, not much is achieved by surgery. However, the traditional approach is to explore the testis early as there have been albeit rare reports of testicular salvage, and it provides an opportunity to confirm the diagnosis and remove the testis if it is non viable and to prophylactically fix the contralateral testis, as metachronous torsion has been reported^{1,7}.

Torsion of testicular / epididymal appendage

This may be managed non-operatively with scrotal support and the use of analgesics if the diagnosis is made with confidence. However, if it was diagnosed on exploring the testis, the gangrenous appendage is excised, and this gives a rapid relief from symptoms. Surgery may also be offered in the cases that take long (such as over 5-7 days) to resolve non-operatively¹.

Epididymo-orchitis

This is treated with an appropriate antibiotic (e.g. aminoglycoside, trimethoprim or cotrimoxazole), analgesic and scrotal support. The child should be subsequently screened for a possible structural abnormality of the genitourinary tract with an ultrasound scan.

Idiopathic scrotal oedema

An antihistamine, analgesic and scrotal support is adequate treatment in most. If cellulitis is suspected, an appropriate antibiotic will be required.

Parasitic granuloma (dirofilariasis)

The nodule consisting of the worm is excised. This is therapeutic and confirms the diagnosis.

Outcome

The testicular salvage rates in testicular torsion are 85-97% if operated within 6 hours of onset of symptoms. The salvage rate drops to 55-85% if there is a 6-12 hour delay and to less than 10% if the delay is greater than 24 hours¹. This highlights the urgency with which the clinician should act when confronted with the problem of the acute scrotum.

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