

The acute scrotum

FR Youssef

David Shipstone

Abstract

The list of differential diagnoses for the acute scrotum is extensive, but it is paramount to rule out torsion of the spermatic cord, most common in boys aged 13–17 years and the most common cause of acute scrotal pain and swelling up to 18 years old. Torsion requires emergency surgical exploration and detorsion if the testis is to be salvaged. The management of perinatal torsion is surrounded by some controversy and best dealt with by dedicated paediatric units. Beyond 18 years epididymitis is a more common finding, usually caused by chlamydial, gonococcal or coliform infection. Investigations, antibiotic treatment and follow up should be based on the 2010 national guidelines. Torsion of the appendix testis and appendix epididymis, remnants of the Mullerian and Wolffian ducts, respectively, can mimic the more common diagnoses but most cases resolve spontaneously with non-operative management. Torsion of the testis is more likely if the onset of pain is sudden, the pain is severe and the patient is younger than 20 years of age. When there is any doubt about the diagnosis, an emergency scrotal exploration should be undertaken.

Keywords Acute scrotum; appendix epididymis; appendix testis; epididymitis; painful scrotum; torsion

Introduction

The differential diagnoses for the acute scrotum are extensive (Table 1). In all instances it is imperative to exclude torsion of the spermatic cord. This clinical diagnosis requires emergency surgical intervention.

Torsion of the spermatic cord

Testicular torsion or torsion of the spermatic cord has a prevalence of 1:125 males and occurs most commonly in boys aged 13 to 17 years. It is the most common cause of acute scrotal pain and swelling in boys from birth to 18 years old. Torsion is a true surgical emergency, because irreversible ischaemic injury to the testicular parenchyma may begin as soon as 4 hours after occlusion of the cord. In addition, the degree and duration of torsion may have a significant influence on the viability of the testis over time.

Torsion of the testicle occurring within the tunica vaginalis is known as intravaginal torsion and is most common during adolescence, whereas extravaginal torsion is a perinatal event where the spermatic cord and testis twist along with the tunica vaginalis.

FR Youssef MBChB BSc MRCS (Ed) is a Urology Registrar at Royal Hallamshire Hospital, Sheffield, UK. Conflicts of interest: none declared.

David Shipstone FRCS(Urol) is a Consultant Urological Surgeon at Chesterfield Royal Hospital, Chesterfield, UK. Conflicts of interest: none declared.

Intravaginal torsion

Intravaginal torsion can occur at any age, but most commonly occurs at puberty and is rare after the age of 30 years. It is usually associated with the ‘bell-clapper deformity’ that leads to an abnormally mobile testis. This extra mobility occurs because the testis hangs freely within an expanded tunical space caused by the failure of the normal posterior anchoring of the gubernaculum, epididymis and testis to the tunica vaginalis. The testis is free to swing and rotate within the tunica vaginalis of the scrotum much like the gong (clapper) inside of a bell (Figure 1). The added weight of the testis after puberty makes it more prone to twist on its vascular stalk. Sudden cremasteric contraction can initiate a rotational effect on the testis as it is pulled upward. This rotational effect occurs because the muscle inserts onto the cord in a spiral configuration. The cord usually twists such that the anterior surface of each testis turns towards the midline.

Presentation and investigation

Torsion usually arises spontaneously presenting with the sudden onset of scrotal pain. In many cases the patient is awakened from sleep, but sometimes the onset is more gradual and pain less severe. Many give a history of prior episodes of severe, self-limiting scrotal pain and swelling. Nausea and vomiting may accompany the pain and some individuals experience pain referred to the ipsilateral lower abdomen. There is usually no history of associated lower urinary tract symptoms.

Examination almost invariably reveals an acutely tender scrotum. The testis may be high riding in the scrotum in an abnormally transverse orientation. In established cases, a hydrocoele or scrotal oedema may occur. The absence of a cremasteric reflex is associated with the presence of torsion, but the assessment of this physical finding is difficult where pain and swelling exist.

Prompt surgical exploration is warranted and further investigation is of minimal benefit. Urinalysis rarely influences the decision to explore but urine should be obtained for microscopy, culture and sensitivity in order to assist with diagnosis and treatment if torsion is not subsequently confirmed. There are reports of colour Doppler ultrasound examination and radionuclide imaging being utilized, but in practice these investigations merely delay exploration and definitive treatment. Similarly, manual detorsion is described but is rarely successful and always painful.

Treatment

The scrotum is explored either through separate transverse incisions in each hemiscrotum or through a single incision in the median raphe. The separate incisions are more appropriate for dartos pouch fixation.

The affected side is explored first. A dartos pouch is created then the tunica vaginalis opened and the testis delivered and detorted. A testis with marginal viability should be placed in warm swabs and re-examined after the contralateral side has been fixed. When torsion is confirmed the contralateral testis must always be fixed to prevent a future torsion.

A necrotic testis should be excised immediately. Most urologists preserve testes that appear marginally viable but there is some concern that circulating antibodies released from the

Differential diagnosis of scrotal pain and swelling

Pain and swelling	Swelling without pain	Pain without swelling
Acute epididymitis/epididymo-orchitis	Idiopathic scrotal oedema	Chronic epididymitis
Torsion of the spermatic cord	Generalized oedema	Idiopathic
Torsion of an appendage	Epididymal cyst	Torsion of an appendage
Neoplasia	Neoplasia	Adductor tendinitis
Hernia	Hernia	Ureteric colic
Hydrocoele	Hydrocoele	
Varicocele	Varicocele	
Fournier's gangrene		Inflammatory vasculitis
Dermatological lesions	Dermatological lesions	Herpes zoster
Trauma		

Table 1

injured testis might lead to a 'sympathetic orchioopathy' of the contralateral testis. Preserved testes should be placed in a dartos pouch without suture fixation. This is because it has been shown that placing sutures through the tunica albuginea can produce local injury to the testis, and that dartos pouch placement is the superior method of fixation. However, if suture fixation is elected, fine, non-reactive, non-absorbable sutures such as 3/0 prolene should be employed and they should be placed through the tunica albuginea avoiding superficial blood vessels and the underlying parenchyma. The testis is fixed at three poles to the adjacent inner scrotal wall. A Jaboulay procedure juxtaposes the albuginea to the scrotal wall allowing adhesions to form, which enhance the fixation.

Anatomy of torsion

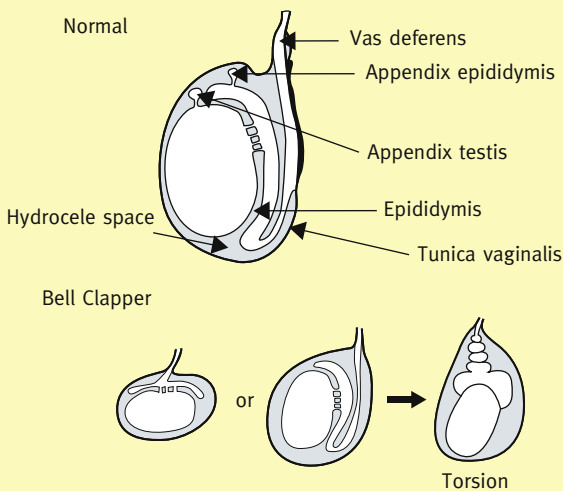


Figure 1

Intermittent torsion of the spermatic cord

Some adolescents describe episodic bouts of severe acute scrotal pain and swelling that resolve spontaneously. These episodes are sometimes associated with vomiting. Physical examination almost invariably takes place after the episode has resolved and is normal. Most of these individuals are subsequently found to have a bell-clapper deformity thus it is assumed that they must be experiencing spontaneous torsion and detorsion. Elective scrotal exploration and bilateral testicular fixation is indicated.

Perinatal torsion of the spermatic cord

Perinatal torsion of the spermatic cord probably represents two distinct pathological processes, prenatal torsion and postnatal torsion.

Prenatal (in-utero) torsion is characterized by the finding at delivery of a hard, non-tender testis fixed to skin that is commonly discoloured by underlying hemorrhagic necrosis. Surgical and pathological examination reveals extravaginal torsion with resolving infarction, the acute phase of which occurred before delivery. Prenatal torsion may be responsible for cases of the 'vanishing testis' and the common finding of hemosiderin on the blind-ending spermatic cord is evidence to support this theory.

Urgent exploration is not required but there is controversy regarding the need to explore the contralateral testis because of reports of asynchronous perinatal torsion.

Postnatal torsion is characterized by swelling and tenderness of the scrotum without fixation of the skin. Extravaginal torsion is the most common finding on exploration but a bell-clapper deformity with intravaginal torsion has also been seen.

Prompt exploration is indicated but the chance of salvage against the risk of general anaesthesia must be considered in the neonate.

An inguinal incision is preferred to allow for the treatment of other causes of scrotal swelling. The contralateral testis is also fixed by the dartos pouch technique if torsion is confirmed.

Torsion of the testicular and epididymal appendages

The appendix testis and appendix epididymis are remnants of the Mullerian and Wolffian ducts, respectively. Hormonal stimulation in adolescence increases their mass making them more likely to twist on their vascular pedicle.

The presentation of torsion of an appendage ranges from an insidious onset of mild scrotal discomfort to an acute presentation indistinguishable from torsion of the cord. At an early stage it may be possible to detect a tender nodule at the upper pole of the testis or epididymis or even visualize the infarcted appendage through the skin (the blue dot sign). The cremasteric reflex should be present, and the testis should be mobile.

Most cases resolve spontaneously with non-surgical management, and the symptoms are managed by the limitation of activity and simple analgesia (e.g. non-steroidal anti-inflammatory drugs [NSAIDs]). Excision of the torted appendage is therapeutic if exploration is performed due to diagnostic uncertainty or failure of symptoms to resolve.

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