

# The acute scrotum in children

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## Abstract

The acute scrotum is a common referral to paediatric emergency departments. The term covers a wide range of diagnoses, with variable severity. The most important diagnosis is testicular torsion, and this should be ruled out in all cases due to the risk of gonadal loss. History and examination may give some indication of the underlying cause of pain; however, surgical exploration of the scrotum is often required as an emergency procedure. This article describes the presentation, differential diagnosis and acute management of this common condition, as well as touching on some areas of debate.

**Keywords** Acute scrotum; hydatid of Morgagni; scrotal exploration; testicular fixation; testicular torsion

## Definition

The ‘acute scrotum’ is a common presentation to paediatric surgeons. The term is used to describe any boy with pain in the scrotum or testes, meaning that the eventual diagnosis can be quite varied.

Common features are pain (often limited to one hemiscrotum) which may be accompanied by swelling and/or erythema of the scrotal skin. Severe testicular pain is sometimes accompanied by vomiting. On rare occasions there may be urinary symptoms. The child is normally systemically well.

## Differential diagnosis (Box 1)

The most serious diagnosis is a testicular torsion; however, torsion of a testicular appendage is more commonly found in childhood. Other conditions presenting as an ‘acute scrotum’ include acute epididymo-orchitis, idiopathic scrotal oedema, Henoch–Schonlein purpura, and testicular tumour.

## Testicular torsion

### Pathogenesis

The pain experienced from testicular torsion is caused by ischaemia to the testis secondary to obstruction to vascular flow resulting from a twist in the cord. Testicular torsion may be either intravaginal or extravaginal. Extravaginal occurs almost exclusively during the perinatal period – it consists of a twist of the entire tunica vaginalis and its contents. It is thought to occur during the process of testicular descent when the tunica evaginates into the surrounding loose areolar tissue.

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## Differential diagnosis of acute scrotum

- Testicular torsion
- Torsion of testicular appendage
- Epididymo-orchitis
- Idiopathic scrotal oedema
- Henoch–Schonlein purpura
- Tumour
- Acute hydrocoele
- Perinatal torsion

## Box 1

Intravaginal torsion is the more commonly seen condition – where the testis and cord twists within the tunica vaginalis. As stated above, the aetiology remains unclear (Figure 1).

## Aetiology

The cause of testicular torsion in most cases is unknown. Testes with a transverse or ‘bell-clapper’ lie are widely stated to be more likely to twist, although this remains unproven. Given that the most common time of presentation is puberty, presumably there is some hormonal influence. However, the acute presentation and unpredictable timing mean that proving that hormonal fluctuations lead to increased risk of torsion would be extremely difficult.

## Epidemiology

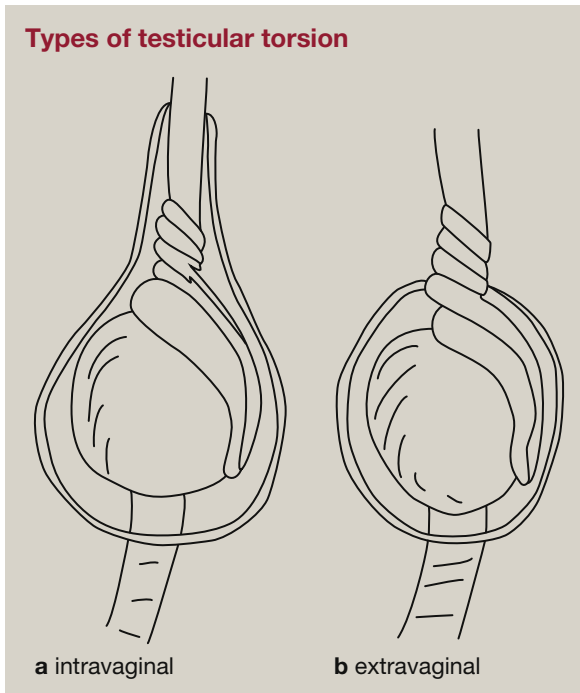
The overall incidence of acute scrotum or any of the eventual diagnoses is not clear. The acute scrotum is a common presentation to the paediatric surgeon. Appreciation of the difficulty in making a certain diagnosis and the consequences of a missed torsion mean that a high proportion of cases undergo surgical exploration; true testicular torsion is found in a relatively low proportion of explored cases (1 in 4 in some series). Torsion peaks in incidence perinatally and at adolescence with a relatively low incidence outside these times although it can occur at any age.

## Diagnosis

The final diagnosis is most often made during surgical exploration of the scrotum. The decision to be made when the patient presents is whether testicular torsion can be excluded, or whether he warrants an exploration. The decision is most usually made on the basis of history and examination. Investigations often add very little, and merely delay management.

The classical history is of an acute onset of unilateral scrotal pain, which is severe in nature. This can occasionally be accompanied by vomiting. Physical examination reveals testicular tenderness, often with associated erythema and swelling of the hemiscrotum. The testicle may be lying higher than on the opposite side. The findings are limited to one hemiscrotum. Movement typically exacerbates the pain if a testicular torsion is present.

As with any clinical scenario, however, the presentation may be extremely variable, and the history is often more long-lasting, with gradually increasing pain. Elucidating the true sequence of events can be complicated if the boy has been embarrassed to divulge the nature and/or location of the pain to his family.



**Figure 1**

Ultrasound of the testis and cord can very occasionally be useful. Ultrasound can look at vascular flow within the testis – but struggles to tell us if this is partially occluded, or if the testis has recently ‘un-torted’ with secondary hyperaemic appearances. The majority of ultrasonographers would be extremely reluctant to confidently exclude a torsion – and with the inevitable delay in management the investigation causes it is rarely requested. In exceptional circumstances (such as the patient with known recurrent episodes of epididymitis, or the possibility of a testicular mass) it may be helpful in answering a specific question.

The key question is whether a true testicular torsion can be confidently excluded. If it cannot, then the patient needs surgical exploration as the consequences of missing the diagnosis of torsion can be significant. For many paediatric surgeons, the threshold is low – and if there is any doubt then the scrotum should be explored.

### Management

Where testicular torsion is diagnosed or suspected, urgent surgical exploration is required. The benefit of imaging or further investigation in the acute phase is limited and should be balanced against the knowledge that the earlier a testis is untwisted, the more likely it is to be salvaged. There is no doubt that success in testicular salvage following torsion is greater with a shorter duration of symptoms. The exact timing is impossible to define (due to variation in severity through number of twists, inaccuracy in symptom onset, etc.); however, 6 hours from onset to untwisting is often quoted.<sup>1</sup>

Patients should be given adequate analgesia and prepared for theatre. The case should be undertaken as an emergency without waiting for normal ‘starvation’ times in order to maximize the chances of saving the testis. Indeed, due to the gastric stasis associated with torsion, most anaesthetists use rapid sequence anaesthesia in these patients whether they have been fasted or not.

### Operative procedure

After appropriate skin preparation, the scrotal skin and fascial layers are opened (either via a transverse or midline incision depending on surgical preference) and the testis delivered into the wound. The colour of the testis is inspected and the cord assessed for any twist. If a twist is present, this should be corrected. The testis is then wrapped in warm swabs for at least 5 minutes to encourage the return of blood flow. After this, a decision needs to be made whether there is any potential for the testis to survive. In case of doubt, an incision into the testis to see if there is any fresh bleeding can be helpful. If there is no possibility of recovery, an orchidectomy should be performed. However, if there is any chance of survival the testis should be returned to the scrotum and fixed to prevent further twists. The contralateral testis should also be fixed.

The method of fixation varies amongst surgeons, but for a proven torsion, most surgeons would perform a three-point fixation to the scrotal tissues at least on the affected side. There is a debate whether in children this should be done using a non-absorbable suture as in adults or an absorbable one.

### Complications

The vast majority of scrotal explorations do not result in any complications. Wound infection is always a possibility and usually responds to simple oral antibiotics. Infection or necrosis of a preserved testis that has remained ischaemic is a risk and sometimes requires re-exploration. Scrotal haematoma can also occur due to the vascularity of the region and the laxity of the scrotum, meaning there is very little natural tamponading effect. When seen, this can often be managed conservatively with scrotal support and possible antibiotic cover. In severe cases a return to theatre may be needed for evacuation of the haematoma and haemostasis.

### Follow-up

Most surgeons will follow-up a true torsion with an outpatient appointment perhaps 2 months after the event to document survival of the untwisted testis. When an orchidectomy has been performed this can also be a good opportunity to discuss the possibility of inserting a testicular prosthesis at a later date.

### Outcomes

As above, testicular salvage rates are dependent on the time between symptom-onset and surgery.

In a single institution series, salvage rates of around 60% have been reported.

Long-term fertility problems following torsion have been suggested, but it is extremely difficult to be sure about this. Spermatic auto-antibodies have been detected following an episode of torsion. Whether these are due to the acute event, or to breach of the testicular capsule during surgery is unclear. Furthermore, the effect of such antibodies is also debated. Some have proposed a lower threshold for removing an ischaemic testis to try and prevent antibody formation and therefore protect function in the contralateral side. However, the evidence for this is not available and most surgeons would try and preserve an ischaemic testis wherever possible.

The most significant long-term sequel of a torsion is of course the loss of a gonad. Insertion of a testicular prosthesis is a

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