Managing testicular torsion – time is of the essence

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Testicular torsion is a medical emergency that usually requires surgical intervention to untwist the spermatic cord and restore blood flow to the testis. Delays in the pathway from diagnosis to surgery can lead to testicular loss and need to be minimised. In this article the authors explore some of the current controversies surrounding the management of this important organ-saving surgery.

In the era of minimally invasive surgery and interventional radiology, the management of many urological conditions has changed significantly. However, torsion of the spermatic cord remains one of the few urological emergencies that still warrants expeditious open surgical exploration. Delays in management can lead to testicular loss, with a potentially substantial physical and psychological impact on the patient (Figure 1). It is relatively common, accounting for around 10–15% of acute scrotal disease in children. Causes of testicular pain and the signs are detailed in Table 1. Since the first case of surgically treated testicular torsion was described by Delasiauve in 1840, attempts have been made to minimise the incidence of testicular loss resulting from this condition. However, even today outcomes are far from perfect.

Optimising the patient pathway
Standard practice in most UK centres is to perform urgent surgical exploration when a diagnosis of testicular torsion is suspected. This places a large emphasis on clinical judgement, as it is one of the few surgical interventions that is not confirmed by prior investigations. One of the challenges in minimising missed torsion lies in pinpointing factors that result in delayed surgical exploration. The pathway begins with the onset of symptoms, and there are usually multiple checkpoints before the patient finally arrives in the operating theatre. The balance therefore lies in creating a pathway free from unnecessary delay, but that concurrently aims to reliably exclude cases that do not require specialist intervention. Looking at the current diagnostic pathway, there are a number of points where delays can occur, ranging from patient/carer appreciation of the problem to secondary care treatment (Figure 2), and are common in many time-sensitive pathways.

Is there a delay in the community?
There are a number of studies that support the idea that the time taken before presentation to hospital is the most important factor to address if we are to improve testicular salvage rates. However, the delay incurred by onward referral from primary care...
Testicular torsion appears to be minimal. Twenty-four practices in East London and Essex were questioned by the authors on their standard care of acute paediatric scrotal pain, and all stated that every case presenting in this manner would be referred immediately to secondary care for assessment. Instead, the survey identified that the majority of families had waited a considerable time before approaching their GP. This concurs with a recent audit of missed torsions confirming that the longest delays occur before parents or the child access any medical care.⁵

Who should make the initial secondary care assessment? Ideally, in cases of testicular torsion, the time from symptom onset to assessment by a surgeon should be minimal. The question of whether patients who have a potential diagnosis of testicular torsion are undergoing unnecessary delays in secondary care is a controversial point. When we reviewed the treatment of scrotal pain over three years in East London, we were struck by the important role played by emergency departments (EDs). EDs correctly discharged half of all paediatric patients presenting with scrotal pain with no resultant cases of missed torsion, thereby minimising the number of unnecessary onward referrals and speeding up the discharge from casualty.⁶ Despite this, there are some proposed models of care where all patients with testicular pain are automatically referred directly to an on-call team, bypassing the ED.⁶

Should emergency assessment be bypassed? Some innovative models have tried to fast-track patients to theatre by bypassing emergency assessment. A hospital in Texas, operating as a tertiary paediatric centre, assessed a novel protocol whereby patients diagnosed with torsion elsewhere were transferred straight to the operating room, and outcomes compared with those who underwent further assessment on arrival prior to surgery. Although time from arrival to incision was shorter in the first

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Signs</th>
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<tr>
<td>Testicular torsion</td>
<td>Acute onset of testicular pain Short duration of symptoms Nausea/vomiting Lower abdominal pain Previous self-limiting episodes of severe testicular pain and swelling (may indicate intermittent torsion)</td>
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<tr>
<td>Torsion of appendix testes</td>
<td>Pain onset can be sudden or gradual</td>
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<tr>
<td>Obstructed/ incarcerated inguinal hernia</td>
<td>Vomiting Abdominal pain and distension Constipation, absence of flatus</td>
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<tr>
<td>Epididymo-orchitis</td>
<td>Gradual onset of testicular pain (hours to days) Symptoms of urinary tract infection</td>
</tr>
<tr>
<td>Mumps orchitis</td>
<td>Initial headache and fever Parotid swelling (unilateral or bilateral) Testicular swelling 7–10 days later</td>
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Important points of note:

- No single clinical feature has consistently been found to rule out testicular torsion. There should be a low threshold for referral and admission
- Resolving pain does not necessarily indicate resolution, as this may occur with onset of necrosis
- Normal urinalysis does not exclude epididymitis, and abnormal urinalysis does not exclude testicular torsion
- Epididymitis in pre-pubertal boys does not require antibiotic treatment unless there is evidence of bacterial infection on urinalysis or culture

Table 1. Causes of testicular pain and important features
group, there was no difference in testicular salvage rates between the two cohorts.\(^7\)

**Should patients be transferred for surgical exploration?**

The transfer of paediatric patients with scrotal pain to specialist centres has been controversial, but the difficulties in providing emergency cover for paediatric surgery has led many organisations to re-evaluate their models of care.

The outcomes from studies have been interesting. One French study evaluated the outcomes of children who had presented directly to a tertiary centre versus patients who were transferred following assessment at a peripheral hospital or in primary care.\(^8\) The median time between admission and surgery was equivalent in both groups. The study also found that although the median journey distance for the patients was significantly longer in the transfer group, the orchiectomy rate was dependant on duration of pain prior to surgery and not on the transfer status, and the rate was found to be no higher in the transfer group. A similar study carried out in California also showed that inter-hospital transfer certainly delayed surgical management, but did not seem to impact on testicular salvage rates.\(^9\)

Although the protocols overseas will differ from those in the UK, the recurrent theme across these studies is that outcomes are not being affected by delays following hospital assessment. Time from symptom onset to theatre may be prolonged by many factors following presentation, but most of the delay appears to be occurring prior to arrival at a medical centre. Therefore, the main problem lies with late presentation, and this appears to be the most influential factor in determining testicular salvage rates.

Studies indicate that parental awareness of testicular torsion and its implications is low,\(^10,11\) suggesting that one of the most effective ways to reduce testicular loss would involve more public education on scrotal pain and torsion. This could be achieved through media campaigns, teaching at schools, and raising awareness in primary care. The problem lies at the beginning of the pathway, and tackling it effectively could prevent the significant psychological and physical implications that many children face after losing a testicle.

**Who should be operating?**

The arrangements for out-of-hours emergency cover for urology differs across trusts within the UK. Although some have a dedicated urology registrar rota, some use the general surgical team to provide this cover overnight, with a responsible consultant urologist on-call. This may be unavoidable depending on the agreed working pattern and distribution of urology trainees within a deanery. However, does it impact on patient care?
One study looking at practice in the Severn and South West Peninsula deaneries examined variations between hospitals with separate middle-grade specialist urology cover and those without. The study found no difference in the number of scrotal explorations performed between surgical and urology trainees, and the management of confirmed testicular torsion was the same for both groups. However, on finding a normal testicle, far more of the surgical trainees would perform an orchidopexy (which is unnecessary if not torted) than urology trainees, and they were significantly less aware of the potential sequelae of infertility and chronic pain following orchidopexy. Surgical trainees were also less likely to discuss the management plan with the on-call consultant prior to taking the patient to theatre, which may have medico-legal implications in the event of a perioperative complication. As expected, urology trainees were more likely than surgical trainees to have been taught the operation by a urologist.²

In the centres where general surgical trainees are expected to provide this cover, it may be beneficial to encourage more formal training from a urologist to ensure a standardised practice and that the sequelae are appreciated. However, there may be an advantage for hospitals to have middle-grade specialist urology cover overnight, as it would reduce variation in practice, as well as providing valuable surgical experience for junior trainees.

**What method of testicular fixation should be used?**

Guidelines from the European Association of Urology do not currently provide a consensus recommendation on the preferred type of fixation or suture material.¹³ However, when reviewing the literature on recurrent torsion following orchidopexy, the majority of cases used absorbable sutures, so we would recommend non-absorbable sutures. Whether two- or three-point fixation is employed is a matter of surgeon preference. Eversion of the *tunica vaginalis* has previously been shown to produce dense adhesions, which may also reduce the likelihood of recurrent torsion.¹⁴

**Psychological impact of testicular loss**

Failure to salvage a testicle is a devastating event, and this is not always appreciated. Patients who undergo orchidectomy suffer an obvious physical impact postoperatively, both cosmetically and from the potential effect on fertility. However, an area that is not often emphasised is the psychological impact of testicular loss. The peak incidence of testicular torsion lies in the early teens, a time of important physical and sexual development. Losing a testicle during this period can have a huge influence on the individual’s perception of themselves, leading to significant distress and anxiety. Many patients may not have been expecting to undergo expeditious surgery when they attended the emergency department, let alone undergo an orchidectomy, meaning that they are unlikely to have had time to process the potential outcome pre-operatively. Surprisingly, there is little research in this area. However, the long-lasting psychological impact of orchidectomy following testicular cancer is well documented, and it is likely that children undergoing the same procedure as an emergency will have suffered similar initial consequences.¹⁵

Providing patients with support following an orchidectomy is therefore essential. This goes beyond discussing the timing of a testicular prosthesis, should they wish to have one – the patient’s psychological needs must also be addressed. Effective liaison with primary care, with a full explanation of available support services, should be a priority. Follow-up should ensure that the needs of the patient are met, and that any questions are fully addressed. Furthermore, ideally the same consultant should be involved throughout to ensure a continuity of care.

**Conclusion**

We still have many hurdles to overcome in order to perfect the assessment and management of testicular torsion in both primary and secondary care. We have excellent doctors in general practice and the emergency department who play a key role in the pathway. Moving forward, we must ensure that awareness is raised among patients and parents about the condition. Improving salvage rates is the best way to minimise the long-term impact of this condition on patients. In the future we may develop more definitive non-invasive diagnostic methods that negate the need for explorative surgery, but for the time being it is our duty to ensure that our current practice ensures the best outcome for our patients with the resources we have available.

**Declaration of interests:** none declared.

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Testicular torsion