Clinical Procedures

Reduction of paediatric inguinal hernias

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Introduction

Groin lumps are a relatively common reason for young children, particularly boys, to present to the emergency department (ED). When assessing and managing this problem, it is important to remember that an inguinal hernia is not the only possible pathology (*Table 1*). There are many common paediatric differential diagnoses for an acute scrotal swelling – the most important of which is testicular torsion – however, these are outside of the scope of this article, which will focus on young children rather than sexually active adolescents.

When assessing for a potential hernia, familiarity with relevant anatomy and potential differential diagnoses is important. It is a little embarrassing to discover that the reason that you couldn't reduce the "hernia" was that it wasn't a hernia at all! It is therefore important that we spend the first half of the paper on the clinical assessment of an inguinoscrotal lump, prior to describing how to perform a hernia reduction.

How can I be sure that I am dealing with an inguinal hernia?

Most causes of groin swelling in young children result from failure of obliteration of the processus vaginalis. Depending on the width of this patent processus vaginalis this results in variable pathologies, including an inguinal hernia, inguinoscrotal hernia, and hydrocele of the cord or a communicating hydrocele (*Figure 1*). With an encysted hydrocele of the cord there has been partial closure with entrapment of some of the peritoneal fluid to give the appearance of a cyst. Peritoneal fluid increases with a concurrent viral illness hence leading to an increase in the size of hydroceles. There is a higher incidence on the right side as the right testis descends later than left, which gives less time for the processus vaginalis to close (*Figure 2*). A higher incidence is also noted amongst premature infants, and bilateral inguinal hernias (*Figure 3*) occur in 15% of patients¹.

Table 1: Differential diagnosis for paediatric groin / scrotal swellings:

Inguinoscrotal swellings	Inguinal swellings	Scrotal swellings
Inguinal hernia	Inguinal hernia	Hydrocele (<i>Non-tender</i>)
Hydrocele	Encysted hydrocele of the cord	Torsion of the testis (<i>Tender</i>)
Encysted hydrocele of the cord	Undescended testis	Torsion of the appendix testis (<i>Tender / blue dot</i>)
	Inguinal lymphadenopathy	Epididymo-orchitis (<i>Older patient / sexually active / existing urological abnormality</i>)
		Varicocoele (<i>Bag of worms</i>)
		Trauma – haematocele, testicular rupture, haematoma
		Tumour / Leukaemia (<i>Hard & enlarged</i>)

Figure 1: Different types of inguinoscrotal swellings:

How does it present?

The majority of lumps in the groin are picked up during maternal-child health nurse checks, or noted by parents while changing a nappy. Some become apparent during a viral illness while others may cause a bowel obstruction, resulting in an acutely unwell child. Older children may present with a painful intermittent groin lump.

The history from parents should include descent of testis, mention of hydrocele or fluid around the testis at birth, and inguinal swelling noted during baby checks prior to this. If the child is unwell, ask about any changes to the size of lump, tenderness, abdominal distension, vomiting, and irritability.

Figure 2: Inguinoscrotal hernia in a newborn (Note the incidental hooded prepuce, a normal variant):

Figure 3: Bilateral inguinal hernias in a neonate:

What are the important findings on examination?

Inguinoscrotal examination is a routine part of the abdominal examination. If there is a visible groin swelling, examine for its extent. Is it contained in the inguinal region, or does it extend to the scrotum? The colour and any oedema of the overlying skin should also be noted.

On palpation first check the position of testis, as occasionally the differential diagnosis of a lump in the groin is an undescended testis. Check for tenderness, whether you can get above the swelling, whether the swelling moves with the cord if you pull on the testis, and whether the lump transilluminates (Figure 4). Always consider other differential diagnoses of the acute scrotum (Table 1). Table 2 summarises relevant examination findings. If it is not possible to differentiate between the diagnoses on clinical findings an ultrasound examination may be helpful. However, ultrasound should not be used if considering testicular torsion as a differential diagnosis.

Ensure the patient is not fully exposed, as a cold infant tends to be irritable and that may lead you to assume that the lump is tender to touch or irreducible. You should also account for the fact that there may have been multiple previous examinations or reduction attempts.

Figure 4: Examination & Transillumination of a hydrocele:

Table 2. Clinical features of common inguinoscrotal lumps

Inguinal Hernia	Hydrocele	Encysted Hydrocele of the cord
Inguinal swelling that may extend into the scrotum	Usually contained within the scrotum but may have an inguinal compressible component.	Lump present in the inguinal region although may also be in the upper scrotum

Tenderness may be present	Non-tender	Non-tender
Reducible	Irreducible	Irreducible
Unable to get above it	Able to get above	Able to get above
Does not transilluminate	Transilluminates	Transilluminates

(NB may transilluminate in neonates as the bowel wall is thin)

How do I attempt reduction of an inguinal hernia?

Most unsuccessful reductions are secondary to failure to correctly guide the herniated bowel in the right direction. It is therefore important to remember the anatomy of the inguinal canal (external ring – medial and inferior; internal ring – superior and more lateral at the mid-point between the pubic tubercle and the anterior superior iliac spine). Paediatric inguinal hernias are all indirect inguinal hernias rather than the direct type that are found in older patients.

The first step is to create a funnel with your thumb and fingers at the level of the external ring. This allows the herniated bowel to enter the inguinal canal rather than spread laterally into the surrounding inguinal region tissue planes (*Figure 5-2*). A common mistake is to use pressure over the swelling directed posteriorly. This only compresses the herniated bowel into the inguinal canal and scrotum, rather than directing it towards the internal inguinal ring which is more laterally situated.

Gentle pressure should then be applied in the direction of the inguinal canal (laterally and superiorly) using the thumb and index finger to guide the bowel (*Figure 5-2&3*). Often moving the scrotum to the contralateral side aids the correct positioning for the reduction. If gentle pressure alone does not reduce the bowel using a circular motion with the reducing fingers can sometimes aid the reduction.

Successful reduction is often accompanied with a sudden decrease in the swelling with a “squelching” noise and immediate relief for the child. Once it has been reduced a finger should be placed over the internal and external inguinal rings to ensure that the bowel does not herniate immediately again (*Figure 5-4*). The anatomical landmark for the internal ring is the mid-point between the anterior superior iliac spine and the pubic tubercle.

There is often residual fluid in the scrotum or associated testicular swelling after reduction so the hemi-scrotum often does not return to the same size as the contralateral one (*Figure 5-5*). If the bowel is reduced with this technique alone then it is classified as a reducible hernia.

Figure 5: Reduction technique for an inguinal hernia:

If the bowel is unable to be reduced then the patient should be referred to the paediatric surgeons. If there are overlying skin changes such as erythema or oedema suggesting an incarcerated inguinal hernia, then the patient should also be referred to the paediatric surgeons, however, on their advice and given the local logistics, it may be reasonable to still attempt a reduction in ED. If an incarcerated hernia is successfully reduced there is still a 15% risk of re-incarceration within 5 days without surgical repair². Surgical repair is usually delayed for 24-48hrs to allow any post-reduction oedema to resolve³.

If the child presents with symptoms and signs of obstruction or shock then there may be a strangulated inguinal hernia. Do not attempt reduction in the ED. Provide adequate fluid resuscitation and analgesia, keep the child fasted and consider intravenous antibiotics. Contact paediatric surgical services to organise urgent review or transfer.

Even with successful reduction of an inguinal hernia if the patient is less than three months old then urgent referral should also occur, as there is an increased complication rate in these infants, leading

even to testicular atrophy on the affected side⁴⁻⁶. Any hydroceles or undescended testicles should be routinely referred to paediatric surgical outpatients. A potential treatment and referral pathway is shown in Figure 6.

What about inguinal lumps in girls?

This article has centred on the reduction of an inguinal hernia in boys, as the incidence in boys is nine times that of girls⁷. The most common herniated contents in boys are small bowel (usually ileum). In girls the ovaries are the most commonly herniated intra-abdominal organs. These are palpated as a small mobile lump similar to a lymph node. If there is tenderness then torsion of the ovary may have occurred and emergency referral to a paediatric surgical centre rather than attempted reduction should occur⁸⁻¹⁰. These should not be routinely reduced if non-tender and referred to the outpatient department. Small bowel can be herniated in a minority of girls and these will present with a larger swelling and these should have an attempted reduction.

Figure 6: Treatment and referral pathway:

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