Paediatric surgery for the busy GP – Getting the referral right

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Background

Is a child who presents with a possible non-acute surgical complaint a welcome prospect? Unavoidable deliberations follow: normal versus abnormal, common versus exotic, routine versus urgent, investigate or not, and reassurance versus referral. Delayed or inadequately investigated referrals are uncommon in general paediatric surgery; rather, those that may be unnecessary, inappropriately ascribed as 'urgent' or over-investigated are more commonplace.

Objectives

This article seeks to optimise a general practitioner's assessment of children with surgical presentations to ensure any resulting paediatric surgery referrals are necessary, timely and appropriately investigated.

Discussion

Common, non-acute complaints presenting in childhood, including testicular maldescent, inguinal hernia and hydrocoele, non-retractile foreskin, and abdominal wall herniae, are discussed in this article. Each summary outlines the basis of the complaint, recommended pre-referral work-up and typical management of these paediatric surgery referrals. Online guidelines may be useful (eg www.rch.org.au/kidsconnect/prereferral_guidelines).

This article discusses common, non-acute complaints in children; each complaint is a regular source of paediatric surgical referral. Each summary aims to inform a general practitioner's (GP's) decision-making regarding the priority of referrals (Table 1) and pre-referral work-up, and to briefly describe the surgical management.

Maldescended testes

Testicular maldescent is present in 5% of newborn males, but reduces to 2% by three months of age due to postnatal descent.[1] Maldescended testes may be 'undescended' (in the line of normal descent) or 'ectopic' (outside the line of normal descent). Failure to consider the possibility of an 'ectopic' testis is one reason for an otherwise palpable testis evading detection.[2] Indeed, of the 20% of maldescended testes deemed 'impalpable', 40% are absent (eg following perinatal torsion and atrophy), 30% inguinal but unable to be palpated, 20% intra-abdominal and 10% ectopic.[3]

A 'retractile' testis is normally descended, and may be brought

Table 1. When to refer

Condition	Referral time frame
Inguinal hernia – neonate	1 week
Inguinal hernia – infant	2–4 weeks
Inguinal hernia – child	1–3 months
Phimosis – pathological	1–3 months
Undescended testis	3–6 months
Umbilical hernia	After 3 years of age
Epigastric hernia	After 3 years of age
Phimosis – physiological	After 7 years of age

Unless specified otherwise, time frames refer to the time within which referral should be made following diagnosis. These are not absolute, and discussion with a surgeon should resolve any concerns.

to the base of the scrotum (regardless of its initial position) and remains there temporarily after manipulation. An 'ascending' testis was previously descended, but no longer resides in the lower scrotum because of spermatic cord tension or tethering. Ascent is more common in boys with a history of postnatal testicular descent or inguinal surgery.[2]

Tips for examination

A prominent suprapubic fat pad may give a false impression of testicular maldescent and scrotal underdevelopment. When on the patient's right, use of the left hand to draw the suprapubic fat pad upward avoids this and makes the testes and scrotum more evident (Figure 1A and B). The optimal technique for locating a testis is by circular palpation using the flat of the fingers, remembering ectopic sites if no testis is palpable along the line of descent (eg parascrotal, femoral, peroneal or pre-penile). Once located, a 'pincer grip' with the wrist supinated is used to examine the testis more thoroughly (Figure 1C and D).

Investigation

No pre-referral imaging is recommended for the assessment of testicular maldescent. Ultrasonography may falsely ascribe normally descended testes as being 'undescended', probably due to the cremasteric reflex evoked by the boy feeling cold or afraid. With an 'impalpable' testis, some (but not all) paediatric surgeons use ultrasonography to establish if a testis is present in the inguinal region.[4] This imaging request need not be pre-empted in the community.

When to refer

Unilateral testicular maldescent that persists after three months of age should be referred for non-urgent assessment. Bilateral testicular maldescent in the setting of abnormal genitalia should prompt earlier and urgent referral to a paediatric urologist or other specialist in disorders of sexual differentiation. Boys in whom testicular maldescent is first noted (or acquired) in later childhood should be reassessed after three months and referred if the findings are sustained.

Why correct the testicular position?

Failure of descent places the testis in a warmer than physiological environment, which has a negative impact on germ cell transformation. This is hypothesised to underlay the reported increased rates of subfertility and testicular malignancy in men with a past history of testicular maldescent,[5] and the benefit of earlier orchidopexy to ameliorate these risks.[6,7]

Surgical treatment

The recommended age for orchidopexy has trended down on the strength of evidence that earlier orchidopexy is likely to reduce the risks of maldescent.[5,6] Orchidopexy is currently recommended at 6–18 months of age; children referred at older ages are triaged accordingly. Intra-abdominal testes are typically managed with laparoscopic-assisted two-staged orchidopexy.[2,4]

Inguinal hernia and hydrocele

Inguinal hernia

Inguinal hernia is a very common paediatric surgical condition, occurring in 3–5% of full-term infants and 13% of infants born before 33 weeks gestation.[8] Like an infantile hydrocele, the underlying pathology is the persistence of a patent processus vaginalis (PPV). The PPV calibre in an inguinal hernia is wide, which allows herniation of bowel and omentum, and in girls, ovaries. By comparison, the PPV in a hydrocele is narrow, transmitting only fluid.

Findings from an examination that distinguishes an inguinal hernia from a hydrocele are the:

- inability to get above swelling at the level of the scrotal neck
- ability to reduce the swelling (unless the hernia is incarcerated)
- inability to brilliantly transilluminate (unreliable sign in neonates).

Investigation

No investigation is required for a suspected (or confirmed) inguinal hernia.

When to refer

Urgency and timing of referral vary according to age (Table 1).

Figure 1. Technique of examining for testes

A, B. Draw the suprapubic fat pad up with the left hand to make the testes more obvious. C, D. Use a 'pincer grip' when examining the testis further

Surgical treatment

All cases of inguinal hernia require inguinal herniotomy, which involves ligation of the PPV (hernial sac). In Australia and many other countries, a 'watch and see' approach is not advised due to the morbidity of incarceration and paucity of evidence for spontaneous PPV closure in inguinal herniae.[9,10]

Infantile hydrocele

'Hydrocele' describes fluid around the testis. In infancy, this is due to the transmission of peritoneal fluid via a PPV. Refraction of the straw-coloured fluid through the skin provides the typical 'blueish hue', which is often misinterpreted as being sinister. The swelling is irreducible and transilluminates brilliantly.

Investigation

Diagnostic imaging has no role in hydrocele assessment.

When to refer

Referral should be deferred until after the child is three years of age as 90% of hydroceles resolve by this age because of the spontaneous closure of the narrow PPV.

Surgical treatment

Ligation of the PPV for reasons of cosmesis is undertaken as an elective day procedure.

Varicocele in children

A varicocele describes the varicosity of the pampiniform venous plexus of the spermatic cord and is present in 15% of males of all ages.[11] Venous dilatation impairs normal countercurrent thermoregulation of the testis, which may cause testicular atrophy as well as subfertility due to oligospermia. Most varicoceles are asymptomatic, but some cause testicular ache (or 'dragging'). The vast majority are left-sided due to left–right differences in gonadal and renal venous anatomy.[11]

On examination, the hemiscrotum is redundant and the varicocele feels like a 'bag of worms'. Examination is performed when the patient is first standing, then lying. When lying, the varicocele empties but may be made to fill with a Valsalva manoeuvre.

Investigation

An ultrasound is useful to accurately measure testicular volume and confirm the clinical diagnosis of varicocele in lower grade cases. Rarely, a retroperitoneal malignancy may present with a varicocele. For this reason, some practitioners always order a renal ultrasound in newly presenting varicocele cases. However, clinical assessment for a renal mass, hypertension and haematuria is more important than ultrasound to address this rare association.

When to refer

Varicoceles associated with symptoms or a greater than 10% discrepancy in testicular size should prompt a non-urgent referral.

Surgical treatment

Intervention is indicated when there is a greater than 10% discrepancy in testicular volume or if symptoms are sufficient to offset the risks of elective surgery. Whether those without these indications should also be treated to protect future fertility remains controversial.[12] Elective surgical correction by ligation of the testicular vessels (Palomo procedure) is very effective and now most often performed laparoscopically.[13] Interventional radiology approaches are also efficacious and may be standard in some centres.

Non-retractile foreskin

'Phimosis' describes the inability to retract the foreskin, which may be normal (physiological) or due to foreskin pathology (pathological).

A non-retractile foreskin that balloons with voiding, becomes uncomfortable with erections and periodically becomes focally inflamed in association with release of white cheesy material may be entirely normal. These are all common with physiological phimosis, in which the foreskin remains attached (at least in part) to the underlying glans due to congential preputial adhesions (Figure 2A). Such features are often mistakenly considered evidence of obstruction, infection or other pathology, which may lead to unnecessary specialist referral.[14,15]

The white cheesy material is termed 'smegma' and is a concretion of desquamated skin cells trapped between the epithelial surfaces of the glans and inner foreskin. Occasionally, the smegma collects to form a 'smegma pearl', which can be mistakenly referred as a tumour, but is normal and needs no referral (Figure 2A). Smegma accumulation aids the separation of these two surfaces and, together with physical stretching of ballooning or manipulation, achieves gradual resolution of the physiological phimosis. Resolution occurs before five years of age in more than 90% of boys, but physiological phimosis may persist into teenage years.[16]

The key feature of pathological phimosis is scarring, which may be accompanied by difficulty voiding due to dysuria, straining or haematuria. One important cause of pathological phimosis is balanitis xerotica obliterans (BXO), an idiopathic scarring condition that is likely to be related to lichen sclerosis and is uncommon before five years of age (Figure 2B). Other causes include recurrent balanitis, forceful retraction and previous paraphimosis.

Investigation

No investigation is required. However, a trial of topical corticosteroid (eg 0.1% betnovate) may be effective, thus avoiding the need for referral. We advise twice-daily application to the narrow (phimotic) segment together with gentle retraction for four weeks. Longer use may cause skin irritation.

When is a circumcision indicated?

In Australia and many other countries, circumcision is performed

in the public health system only for surgical indications (eg BXO). Recurrent balanitis and urosepsis are also valid indications;[17] however, these are notoriously misdiagnosed when offered as the basis for referral. Balanitis (or 'balanoposthitis') describes gross inflammation and oedema of the foreskin, and often of the penis. This striking appearance (Figure 2C) is distinct from the far more common (but seemingly still concerning) local irritation of the redundant foreskin.

When to refer

Boys younger than seven years need only be referred if the phimosis is considered pathological, or there is another surgical indication for circumcision. Boys older than seven years who fail to respond to topical corticosteroid may warrant referral; however, many will still avoid circumcision.[15]

Surgical treatment

When indicated, circumcision performed by a trained surgeon is a safe and effective day procedure. This notwithstanding, many paediatric surgeons may recommend a further trial of topical corticosteroid before committing to surgery. Preputioplasty, which retains the foreskin but renders it able to be retracted, is an alternative procedure.

Umbilical and epigastric herniae

Umbilical hernia

An umbilical hernia is evident in one in five children at birth and may become more prominent during the first few months of life (Figure 3A). Umbilical herniae are typically asymptomatic. Incarceration of the bowel may occur, but it is very uncommon. Tense protrusion of the hernial contents may be easily mistaken as the cause rather than consequence of the child being upset, presenting as a concerning and confusing, but entirely safe, clinical picture.

Investigation

No investigation of an umbilical hernia is required.

When to refer

We recommend that referral be deferred until after the child is two to three years of age. For younger children, parents may be reassured of the rarity of complications and natural history. Most (80–90%) umbilical herniae will close spontaneously before three to five years of age, especially those <1 cm in diameter at one year of age.[18] Referral may be further deferred for a child of African descent as spontaneous closure in later childhood in this group is well recognised.[19]

Figure 2. Is this foreskin normal?

A. Normal (physiological) foreskin with a 'smegma pearl'. B. Abnormal (pathological) foreskin with the typical scarring of balanitis xerotica obliterans. C. Balanitis has a striking appearance

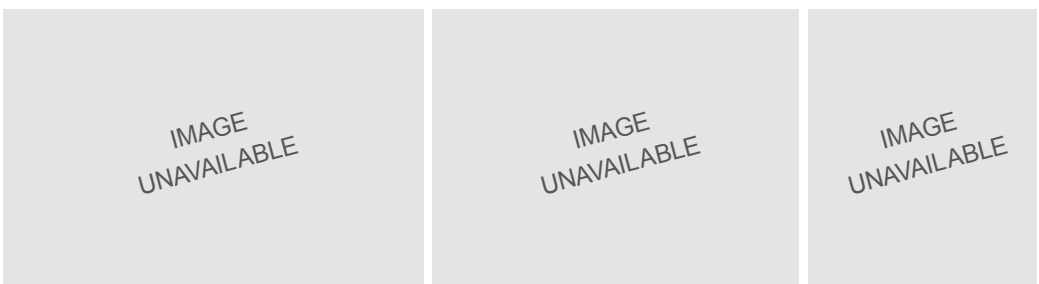

Figure 3. Umbilical hernia; epigastric hernia; no hernia

A. Umbilical hernia. B. Epigastric hernia. C. Divarication of the recti, which is not a hernia and never needs referral. (On closer inspection, the child in A also has a divarication)

Surgical treatment

Elective surgical correction is the closure of the umbilical defect once spontaneous closure is considered unlikely (ie after three years of age). As surgery is essentially cosmetic, preoperative counselling correctly acknowledges the variable cosmetic outcomes for the umbilicus after closure of the defect.

Epigastric hernia

An epigastric hernia presents as a pea-sized lump in the midline; a variable distance above the umbilicus (Figure 3B). The 'lump' is extraperitoneal fat from the falciform ligament, which protrudes through a tiny defect in linea alba. Epigastric herniae are typically asymptomatic, but some children report vague epigastric tenderness or pain (eg after eating or during exercise). This tenderness or pain probably reflects fat incarceration, which – unlike incarcerated bowel in an inguinal hernia – is not dangerous. A typical examination reveals a firm, irreducible, midline lump, which is best demonstrated with the child standing because it may be completely missed if only examined when the child is lying down.

Investigation

No investigation of an epigastric hernia is required.

When to refer

Referral is warranted if cosmesis or symptoms cause concerns. These concerns almost never arise during infancy. Therefore, we recommend deferring referral until after the child is three years of age.

Surgical treatment

Elective closure of the linea defect is undertaken as a day procedure. It is valid to leave an asymptomatic epigastric hernia uncorrected.

Divarication of the recti

This physiological appearance (Figure 3C) reflects normal separation of the recti due to relative laxity of the linea alba during infancy. A long 'ridge' protrudes from xiphisternum to umbilicus whenever the infant strains, which bears no resemblance to an umbilical or epigastric hernia.

Investigations

No investigation of divarication of the recti is required.

When to refer

No referral is needed. Rather, reassurance that the appearance will resolve once the abdominal wall musculature acquires sufficient tone is all that is required.

Pre-referral guidelines

Online pre-referral guidelines are an effective tool to reduce the burden of unnecessary investigations and referrals. The following is suitable for an Australian context if local guidelines are not available: www.rch.org.au/kidsconnect/prereferral_guidelines

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