Testicular problems in children

Prasad P Godbole

Abstract

Testicular problems in children may be both congenital and acquired. These problems are often difficult to diagnose and carry significant sequelae if untreated. Early surgical consultation is often needed for correction of the problem. This article reviews the pathophysiology of the most common pediatric testicular abnormalities with emphasis on the diagnostic modalities employed and current treatment alternatives.

Keywords acquired anomalies; congenital; cryptorchidism; epididymal cyst; epididymoorchitis; testis; torsion; tumours; varicocoele

Introduction

The diagnosis and treatment of many paediatric testicular abnormalities can be both challenging and frustrating to the primary care physician. Additionally, these problems, if not evaluated and treated in a timely manner, can have significant sequelae. This article focuses on the diagnosis, evaluation, indications for referral, and treatment for some of the more common paediatric testicular problems that may be encountered.

Congenital

Undescended testis
Hernia and hydrocoele

Undescended testis (see Figure 1)

Definition: an undescended testis (cryptorchidism) is arrested along its normal path of descent.

Incidence: undescended testis occurs in about 1% of term male infants at 1 year of age; 20% of undescended testes are impalpable.

Aetiology: the testis develops from the bipotential gonad at 6 weeks' gestation under the influence of the SRY gene. Sertoli cells and Leydig cells secrete Mullerian inhibiting substance (MIS) and testosterone respectively. Secreted MIS causes regression of the Mullerian structures. Testicular descent occurs as a result of a complex interaction of several factors namely testosterone, calcitonin G-related peptide, insulin, the gubernaculum, the processus vaginalis and intra-abdominal pressure. Failure of any of these mechanisms may cause testicular non-descent or mal-descent. When a testicle is not palpable, this may represent either an intra-abdominal testicle or vanishing testicle syndrome (testicular agenesis). A retractile testicle occurs as a result of a hyperactive cremasteric muscle contraction.

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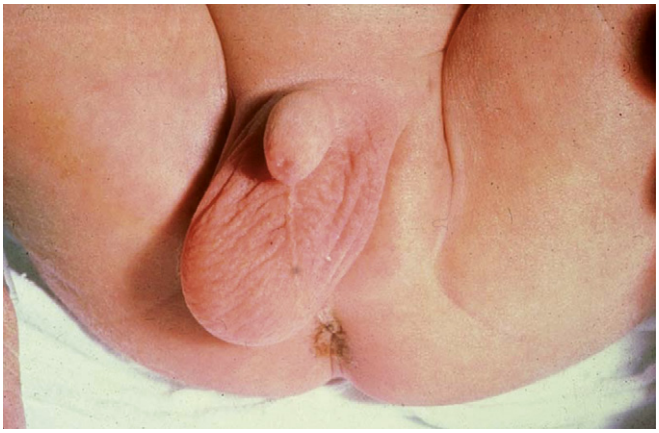

Figure 1 Picture depicting an empty hypoplastic looking hemiscrotum suggestive of an undescended testis *Courtesy of Dr Khizer Mansoor.*

Diagnosis: clinical examination is key to the diagnosis. It is important to differentiate between the true undescended testicle and the retractile testicle. In cases of retractile testicle, the testicle can easily be brought to the base of the scrotum and stays there without tension. Stimulating the cremasteric reflex by stroking the inner aspect of the thigh can induce the testis to move back up along the normal line of descent. A typical history is of the testicle that is easily seen and felt in the scrotum when the boy is relaxed and in a warm bath. A careful search should be made for an ectopic testicle in the superficial inguinal pouch, perineum, medial aspect of the thigh or even base of the penis. In cases of bilateral impalpable testis, one must raise suspicion of an intersex condition, and the karyotype and hormonal profile should be characterized. If a unilateral undescended testicle is associated with a proximal hypospadias, an intersex condition should be considered(6) and appropriate evaluation carried out, usually in conjunction with the paediatric endocrinologist.

Treatment: Huff and colleagues have characterized changes that take place within the testis in the first few years of life. An undescended testis undergoes structural changes within the first 2 years of life and may potentially affect fertility. However more recent evidence suggests that changes may occur much earlier within the first 6–12 months (John Hutson, BAPU consensus session September 2011). Furthermore It is more prone to trauma and torsion. The relative risk of malignancy in an undescended testis is 3.7–7.5 fold that of a normally descended testicle. Orchidopexy does not reduce this risk but makes the testis more amenable for self-examination.

A unilateral undescended palpable testis should be observed for the first 3 months of life to take advantage of the testosterone surge that may aid further descent. Current consensus is that if the testicle remains undescended after 3 months of age, it is unlikely to spontaneously descend and hence surgical intervention is warranted. Hutson and colleagues recommend surgery after 3 months of age in centres with facilities to carry out such procedures at this age (BAPU consensus session September 2011).

Laparoscopy is the treatment of choice for the unilateral impalpable testis. All patients are examined under a general anaesthetic and, if the testicle is palpable, an open orchidopexy is performed. If the testis is still impalpable, a diagnostic laparoscopy

is performed. If the testicle is of good quality, it may be brought down by either a single-step or two-step orchidopexy according to the staged Fowler Stephen principle. There is very little role for groin exploration in isolation for an impalpable testicle. If the laparoscopy indicates blind-ending gonadal vessels and vas deferens in conjunction with an impalpable testis, the patient is declared to have vanishing testis syndrome and no further action is necessary. If the laparoscopy indicates viable gonadal vessels and vas exiting the internal ring, the groin should be explored to confirm the presence or absence of viable testicular tissue.

Outcome: boys with undescended testis may have diminished fertility potential in adulthood. Boys with unilateral undescended testis have a better fertility outcome (considered to have normal fertility if the contralateral testis is normally descended) than those with bilateral undescended testis or intra-abdominal testis. Literature suggests a fertility rate of up to 80% for unilateral and 50–60% for bilateral undescended testes.

Ascending testis

Some boys may present later in infancy with a palpable undescended testicle. These have been noted to be normally positioned at birth in the scrotum at postnatal examination and further health checks. These testis are referred to as ascended testis as opposed to undescended testis. The ascending testis is as a result of differential growth of the boy as compared to the growth of the gubernaculum and cord structures which therefore fix the testis in a higher position relative to the scrotum. The ascended testis may represent the cohort of older children undergoing orchidopexy. The incidence of undescended testis may be as high as 32–50% in cases where a testis is significantly retractile. Testicular ascent may also be iatrogenic secondary to groin surgery after inguinal hernia repair. Orchidopexy is recommended and at the time of surgery it is common to find the obliterated processus vaginalis rather than a patent processus vaginalis.

Hydrocoele and hernia (Figures 2 and 3)

Definition: the difference between a hydrocoele and hernia relates to the calibre of the patent processus vaginalis which develops in relation the descent of the testis. Failure of closure of the patent processus vaginalis (PV) may lead to peritoneal fluid (hydrocoele) or intra-abdominal visceral (hernia) within a patent processus vaginalis.

Aetiology: the PV develops during the descent of the testis and acts as a conduit for the intraabdominal fetal testis to pass to the scrotum. The natural history is for the PV to close spontaneously within the first 2 years of life. A patent PV may however be present in upto 60% of boys in the first two months of life following which there is a steady decline till 2 years of age. Boys with cryptoorchidism frequently have a patent PV.

Diagnosis: a patent processus vaginalis should be regarded as a potential hernia. Consistent with the high incidence of a patent processus in the newborn, a hydrocoele may present in the neonatal period. Typically a hydrocoele presents as a painless scrotal swelling of variable size (Figure 2) and an inguinal hernia as an intermittent inguinal swelling (Figure 3). In older boys, a hydrocoele may manifest for the first time following a viral or

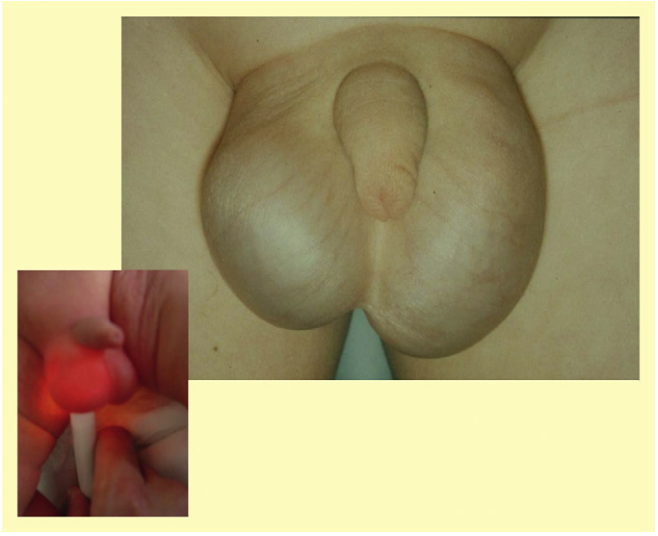

Figure 2 Typical bilateral hydrocoeles. Note transillumination although not a reliable sign (see text) *Courtesy of Dr Khizer Mansoor.*

gastroenteritic illness. A hydrocoele may give a bluish discolouration to the skin. The size may vary during the course of the day, being smallest first thing in the morning after a period of lying down. Hydrocoeles are usually asymptomatic but occasionally children may complain of discomfort in the groin or scrotum. It is possible to get above the scrotal swelling. Hydrocoeles are characteristically transilluminant although transillumation is not a very good diagnostic test in young boys and infants as fluid-filled obstructed loop of bowel may also give this appearance. In large tense hydrocoeles where the testis is impalpable, an ultrasound scan is advisable especially in infants where an abdomino scrotal hydrocoele should be ruled out. If the patent processus undergoes partial obliteration, an encysted hydrocoele may develop along the line of the cord. This presents as a painless mobile cystic swelling separate from the testis but moves with the cord on gentle traction on the testis in a downward direction. A hydrocoele may present in unusual ways such as a meconium hydrocoele, with appendicitis, following intra-abdominal bleeding (haematocele).

A hernia presents as an intermittent lump in the groin and may descend down into the scrotum. In infants and especially premature babies, it may present as an incarcerated hernia in its

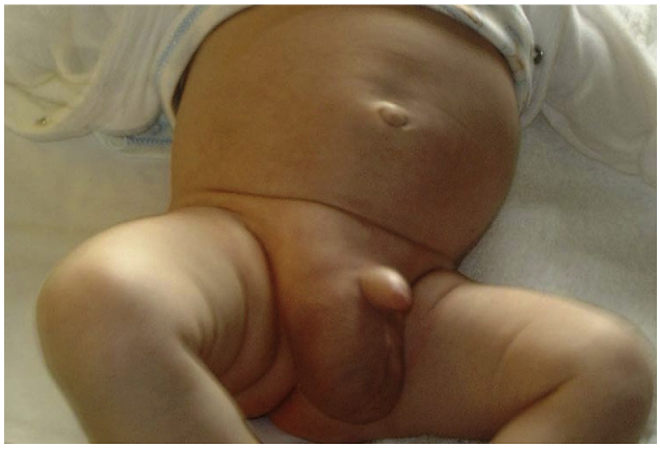

Figure 3 Typical groin lump in an inguinal hernia *Courtesy of Dr Khizer Mansoor.*