

Testicular and Scrotal Masses

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Testicular masses in children represent a broad spectrum of diagnoses. Although most of these masses are benign, the urgency of the workup depends on the presentation and the potential cause.

Painful testicular masses require immediate evaluation because testicular torsion is a surgical emergency. Torsion can involve the spermatic cord or the testicular appendage. Pain is usually abrupt in onset. Physical examination findings in patients with testicular torsion may demonstrate a high-lying, enlarged, painful testicle and absence of the cremasteric reflex. Urgent intervention, including surgery, is essential so that testicular perfusion can be returned within 4 to 6 hours from the onset of pain to prevent necrosis.

Torsion of the appendix testis or appendix epididymis presents similarly to testicular torsion with acute onset of pain, but the physical examination findings differ. Examination reveals a nontender testicle but a firm painful nodule palpable superior to the testis and may demonstrate the classic blue dot sign in the gangrenous appendix.

Inflammation within the scrotal sac can present as a painful testicular mass. In epididymitis, the testicle is painful and swollen. The scrotal skin may develop an orange peel appearance. Most of these patients have fever and dysuria, although urine culture results are often negative. In prepubertal patients with an identifiable bacterial origin, *Escherichia coli* is the most common cause, whereas *Chlamydia trachomatis* and *Neisseria gonorrhoeae* are common in sexually active males. Tuberculosis is a rare cause of epididymitis but should be considered in high-risk patients.

Orchitis is another consideration in a patient with a painful testicular mass. These patients have fever and sudden testicular pain. Scrotal evaluation reveals erythema and tenderness with unilateral or bilateral swelling. The most common viral causes include mumps and Coxsackie B virus. Bacterial causes, such as *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and brucellosis, should be considered. It is rare that mumps orchitis results in infertility.

A child with a painless testicular mass does not require an emergency evaluation, but careful physical examination will provide valuable guidance. Hydrocele is one of the most common causes of painless testicular masses. In this condition, peritoneal fluid collects between the layers of the tunica vaginalis, producing an enlarged scrotum with a smooth, nontender mass that transilluminates. A hydrocele usually resolves spontaneously by 24 months of age. Although most commonly a benign entity, young men may develop a hydrocele in association with testicular cancer.

In pubertal children, a varicocele may present as a painless scrotal swelling or mass, a dull ache, or occasionally scrotal pain. A varicocele is an abnormal dilation of the veins in the pampiniform plexus, producing the characteristic “bag of worms” palpable above the testicle. In most cases, varicoceles do not require intervention or referral. Although varicocele is associated with infertility, two-thirds of men with a varicocele can father children.

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A spermatocele can also present as a painless testicular mass. The physical examination in a patient with a spermatocele typically reveals a mobile mass that is palpable posterior and superior to the testis and transilluminates. No treatment is necessary.

Classic indirect inguinal hernias can present as a reducible, painless, smooth scrotal mass that extends through the external inguinal ring. In cases of incarceration, the mass will become tender and nonreducible, with overlying edema. Incarcerated inguinal hernias are a surgical emergency.

Of all the painless testicular masses, testicular cancers are the rarest but most serious to consider. The incidence of testicular tumors is estimated to be 0.5 to 2.0 per 100,000 children. In postpubertal males, testicular cancer represents only 1% of cancers; however, it is the most common tumor in males between ages 15 and 35 years. Patients with a history of cryptorchidism are at greater risk of testicular cancer and infertility, with a relative risk ranging from 2.75 to 8. Because there is a greater incidence of cryptorchidism in patients with Down syndrome, family history of a sibling with an undescended testicle, prematurity, low birth weight, Prader-Willi syndrome, gastroschisis, and prune belly syndrome, clinicians will want to perform thorough genital examinations in patients with these characteristics. Risk factors for testicular cancer include Klinefelter syndrome, human immunodeficiency syndrome, and a family history of testicular cancer.

In prepubertal patients, 75% of testicular tumors are benign. Testicular tumors are categorized by their cell line of origin. Germ cell tumors represent more than 95% of testicular tumors. In prepubertal children, the most common germ cell tumor is the benign teratoma, whereas most malignant tumors are yolk sac tumors. Mixed germ cell

tumors are the predominant malignant cause in postpubertal testicular tumors. Although orchiectomy is the surgical treatment option of choice, more recent studies indicate benign masses may be treated successfully with a testis-sparing procedure. Testis-sparing surgery for malignant tumors is controversial and is being assessed for small testicular masses and for patients with bilateral testicular malignant tumors or monorchidism to attempt to preserve fertility.

If further evaluation is necessary after the finding of a testicular mass and a thorough history, ultrasonography is the imaging method of choice. Specifically, color duplex Doppler ultrasonography differentiates the testicular torsion, solid masses, cystic masses, and intratesticular and extratesticular location.

COMMENTS: Dr Blair's In Brief on testicular masses reinforces the importance of regular inclusion of the male genitourinary examination during both acute care and health supervision visits. Although presentations of scrotal pain would lead one to examine the testes, the asymptomatic possibilities are equally important to identify. I find that this part of the examination is often overlooked, especially in prepubertal males. Because testicular masses, such as teratomas and yolk sac tumors, can be found in younger males (median ages of prepubertal presentations, 13 months and 16 months, respectively), evaluation of painless masses with scrotal ultrasonography and measurement of the α -fetoprotein level are critical. It is important to educate our patients and families on the importance of this aspect of the physical examination.

– Janet Serwint, MD
Consulting Editor, *In Brief*

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