

How should you further evaluate an adult with a testicular mass?

Evidence-based answer

Perform a scrotal ultrasonography immediately to determine whether emergency surgery is necessary for patients with an exam or history that suggests testicular torsion or rupture (strength of recommendation [SOR]: **B**, based on cohort trials of patient oriented outcomes). In less urgent cases, ultrasound is also useful for verifying diagnoses made by physical exam, and to

exclude conditions such as neoplasm, for which further workup is indicated (SOR: **C**, based on expert opinion).

In those cases in which ultrasound and clinical exam are inconclusive or conflicting, magnetic resonance imaging (MRI) can provide additional information to improve management and decrease unnecessary surgery (SOR: **B**, based on cohort trials of patient-oriented outcomes).

Clinical commentary

Acutely painful testicle? Involve a radiologist and urologist early on

One of the keys to managing testicular masses is to differentiate normal anatomical structures and benign peritesticular pathology (such as varicoceles and spermatoceles) from true testicular masses. Early in my career, after I counseled men to do testicular self-exams, they occasionally made return visits concerned about a mass. These were almost always the testicular appendix, the epididymis, or scrotal

inclusion cysts. I now describe these findings as a routine part of my counseling. Given the devastating consequences of a missed or delayed diagnosis of torsion, infarction, and cancer, I always make 2 phone calls early on when a patient has an acutely painful testicle or a true testicular mass: I call the radiologist and the urologist. These 2 phone calls can substantially reduce the risk of diagnostic delay.

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Perform a scrotal ultrasound immediately to exclude any pathology that needs emergency surgery

Evidence summary

A wide variety of conditions can cause scrotal masses (see **TABLE 1** for a list of causes of acute scrotal swelling and **TABLE 2** for causes of nonacute swelling).^{1,2} Many just require that you reassure the patient; however, some conditions do need diagnostic testing to determine appropriate treatment.

Ultrasound is the best initial test

Testicular torsion and acute epididymo-orchitis are the most common causes of an acute scrotum.³ Patients with an acute scrotum require an urgent ultrasound to exclude pathology that requires immediate surgery (**TABLES 1 AND 2**).¹ Although clinical exam identifies almost all cases of torsion, a few cases are missed.⁴ In a

TABLE 1

Causes of acute scrotal swelling^{1,2}

CONDITION	CLINICAL PRESENTATION	PHYSICAL EXAM/CLINICAL COMMENTS
Epididymitis	<ul style="list-style-type: none"> Severe swelling and pain 	<ul style="list-style-type: none"> Edema, tenderness, erythema Positive urinalysis because it's often associated with urinary tract infection or prostatitis Can result in abscess formation
Testicular torsion	<ul style="list-style-type: none"> Severe pain sudden in onset (except in neonates) 	<ul style="list-style-type: none"> Usually occurs in post-pubertal and neonatal age group Often presents with an asymmetric high riding testis or transverse orientation of affected testis Cremasteric reflex usually absent Not relieved with elevation Surgical emergency
Trauma	<ul style="list-style-type: none"> Associated with wide spectrum of injuries 	<ul style="list-style-type: none"> May result in testicular rupture or torsion, which are surgical emergencies
Torsion of appendix testis	<ul style="list-style-type: none"> Gradual onset of pain 	<ul style="list-style-type: none"> Usually pre-pubertal age group Cremasteric reflex preserved Tenderness often localized to anterosuperior testes Surgery not required in majority of cases
Inguinal hernia	<ul style="list-style-type: none"> Pain and swelling 	<ul style="list-style-type: none"> May hear bowel sounds on affected side

study of 209 emergency scrotal explorations, clinical exam by general practitioners and surgeons correctly diagnosed only 92.5% and 94% of testicular torsion cases, respectively, compared with the surgical diagnosis.⁴

In another study, which used surgery as the diagnostic gold standard, color Doppler ultrasound had a sensitivity of 93.5% for the diagnosis of testicular torsion;⁵ this has led some to say the combination of both clinical exam and ultrasound should be used to determine the need for surgery.¹ However, this combination has not been thoroughly evaluated by researchers, and the best evidence shows that physician exam is essentially the same as color Doppler ultrasound for diagnosing testicular torsion. If torsion cannot be reliably excluded, emergent surgical exploration is mandatory.⁴

For patients who have a nonacute scrotal mass, ultrasound is often indicated to distinguish intratesticular from extratesticular masses.¹ Although testicular neoplasm is relatively rare, it is a concern for patients with non-painful masses.

Fortunately, false-negative scrotal ultrasounds are rare. In a small study comparing clinical exam with ultrasound for diagnosis of testicular tumor, the negative predictive value of ultrasound was 100%.⁶

Although ultrasound has high sensitivity for detection of testicular neoplasm, it cannot differentiate benign from malignant tumors.² Additionally, ultrasound sometimes fails to differentiate a neoplastic process from a complication of an infection such as an abscess. In those instances, a repeat ultrasound is suggested after antibiotic administration to ensure resolution of the mass.²

When ultrasound is inconclusive, MRI may be helpful

When clinical and ultrasound findings are inconclusive, MRI may help determine a diagnosis. For example, MRI can help distinguish inflammation or abscess from neoplasm, thus preventing a patient from undergoing unnecessary surgical intervention.^{2,7} If testicular

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In nonacute cases, ultrasound can help confirm exam findings and exclude neoplasms

TABLE 2

Causes of nonacute scrotal swelling¹

CONDITION	CLINICAL PRESENTATION	PHYSICAL EXAM/CLINICAL COMMENTS
Hydrocele	<ul style="list-style-type: none"> • Painless mass that may increase in size throughout the day 	<ul style="list-style-type: none"> • Can be transilluminated • Reactive hydrocele may be associated with testicular neoplasm, epididymitis, orchitis, or torsion
Testicular cyst	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Benign incidental finding • Nonpalpable
Varicocele	<ul style="list-style-type: none"> • Scrotal swelling secondary to dilation of spermatic veins • May present as infertility • May present with pain if intratesticular 	<ul style="list-style-type: none"> • Usually left-sided • Described as a bag of worms superior to the testicle • Noticeable when standing or with Valsalva maneuver
Spermatocele	<ul style="list-style-type: none"> • If painful, relieved with elevation 	<ul style="list-style-type: none"> • Often an incidental finding on exam • Freely mobile • Usually located in epididymal head
Epidermoid cyst	<ul style="list-style-type: none"> • Painless mass 	<ul style="list-style-type: none"> • Found anywhere in epididymis • Often surgically removed because it may be difficult to differentiate from malignancy
Primary testicular tumor^{1,9}	<ul style="list-style-type: none"> • Solid mass • Classically painless but may produce testicular discomfort 	<ul style="list-style-type: none"> • 10% present acutely with hemorrhage • Most common malignancy in males between ages 18 and 40
Metastatic tumor	<ul style="list-style-type: none"> • Painless mass 	<ul style="list-style-type: none"> • Possible primary cancers include leukemia lymphoma, melanoma, lung, prostate, kidney, GI tract

neoplasm cannot be excluded based on clinical and radiographic findings, surgery is indicated.¹

Recommendations from others

Few current evidence-based recommendations exist on the approach to patients with scrotal masses. The National Collaborating Centre for Primary Care (UK) suggests an urgent ultrasound when a scrotal mass does not transilluminate or when the examiner cannot distinguish the body of the testis.⁸ ■

References

1. Micallef M, Torreggiani WC, Hurley M, Dinsmore WW, Hogan B. The ultrasound investigation of scrotal swelling. *Int J STD AIDS* 2000; 11:297–302.
2. Eyre RC. Evaluation of nonacute scrotal pathology in adults. In: Rose BD, ed. UpToDate [online database]. Version 14.1. Waltham, Mass: UpToDate; 2006.
3. Akin EA, Khati NJ, Hill MC. Ultrasound of the scrotum. *Ultrasound Q* 2004; 20:181–200.
4. Watkin NA, Reiger NA, Moisey CU. Is the conservative management of the acute scrotum justified on clinical grounds? *Br J Urol* 1996; 78:623–627.
5. Andipa E, Liberopoulos K, Asvestis C. Magnetic resonance imaging and ultrasound evaluation of penile and testicular masses. *World J Urol* 2004; 22:382–391.
6. van Dijk R, Doesburg WH, Verbeek AL, van der Schouw YT, Debruyne FM, Rosenbusch G. Ultrasonography versus clinical examination in evaluation of testicular tumors. *J Clin Ultrasound* 1994; 22:179–182.
7. Muglia V, Tucci S Jr, Elias J Jr, Trad CS, Bilbey J, Cooperberg PL. Magnetic resonance imaging of scrotal diseases: when it makes the difference. *Urology* 2002; 59:419–423.
8. National Collaborating Centre for Primary Care. Referral guidelines for suspected cancer. London: National Institute for Health and Clinical Excellence; June 2005. NICE Clinical Guideline 27. Available at www.nice.org.uk/page.aspx?o=261649. Accessed on August 29, 2007.

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If other findings are inconclusive, MRI can help distinguish inflammation from tumor