

Epididymoorchitis

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Abstract

Epididymoorchitis is a common cause of scrotal pain in children and may arise from infectious, post-infectious, or structural etiologies. Color Doppler US is essential for diagnosis, with characteristic findings of increased blood flow and reduced resistance in the affected testis—features that help distinguish it from testicular torsion, which presents with diminished or absent blood flow. Management is primarily supportive, with antibiotics reserved for patients with evidence of bacterial infection on urinalysis. Prognosis in pediatric cases is generally excellent, and complications such as abscess formation are rare.

Keywords: genitourinary, scrotum, infection/inflammation

Case Summary

A child presented with a 2-day history of left groin pain and a swollen left testicle. On examination, the left testicle was erythematous, tender, and enlarged. The patient experienced increased pain with movement. There was no dysuria, hematuria, or history of trauma.

Imaging Findings

US of the scrotum (Figure 1) showed hyperemia of the left testis and epididymis with mild scrotal thickening and a small hydrocele.

Diagnosis

Epididymoorchitis.

Other entities in the differential diagnosis for a child with acute scrotal pain include testicular torsion, torsion of the appendage testis, or scrotal cellulitis.¹

Discussion

Acute epididymitis is a leading cause of acute scrotal pain in children, accounting for approximately 35% of pediatric cases.² Acute epididymoorchitis refers to inflammation involving both the epididymis and the testis and is characterized by a gradual onset of scrotal pain and swelling.³ The etiology and management of epididymitis and epididymoorchitis are largely similar, and some sources use the terms interchangeably.

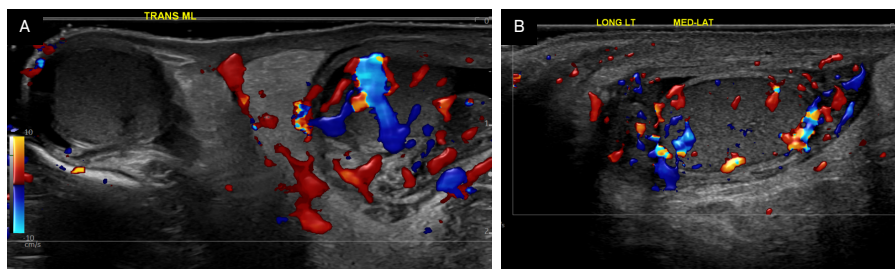
Epididymoorchitis can result from a variety of causes, including bacterial or viral infections, post-infectious inflammation, urinary tract malformations,

trauma, autoimmune disease, vasculitis, or idiopathic origins.⁴ The underlying etiology varies by age. In younger children—particularly those with preexisting genitourinary anomalies—bacterial seeding from the urinary tract is more likely, with organisms such as *Escherichia coli* commonly identified.¹ Viral infections are also a leading cause of acute epididymoorchitis in this age group.⁵ Post-infectious inflammation following viral illnesses is now recognized as a primary mechanism.³ *Adenovirus* and *enterovirus* are the most frequently implicated pathogens, though less common agents such as mumps and SARS-CoV-2 have also been reported.^{5,6} Historically, mumps virus was a well-known cause of orchitis and epididymoorchitis in children. Although vaccination has reduced its incidence, a recent increase in mumps cases—likely due to waning immunity—has led to a resurgence of mumps-related epididymoorchitis in adolescents and young adults.⁶ In sexually active adolescents and young adults, the most common cause of acute epididymoorchitis is ascending bacterial infection from the genitourinary tract, typically due to *Neisseria gonorrhoeae* or *Chlamydia trachomatis*.¹

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Figure 1. (A) Transverse color Doppler US image of the testes showing relative hyperemia of the left testis and mild left scrotal wall thickening. (B) Longitudinal color Doppler US image of the left testis confirms increased vascularity and mild scrotal wall thickening.



Patients with epididymoorchitis typically present with the gradual onset of scrotal pain accompanied by swelling, erythema, and urinary symptoms such as dysuria and increased urinary frequency.^{1,4} In pediatric patients with acute scrotal pain, the differential diagnosis includes testicular torsion, torsion of the appendix testis, and scrotal cellulitis.¹ Although clinical examination can aid in narrowing the diagnosis, it is not always reliable. The Prehn sign has been described as a clinical sign able to differentiate epididymitis and testicular torsion. In epididymitis, elevation of the affected hemiscrotum is said to relieve pain, whereas in testicular torsion, pain is due to ischemia and thus persists or worsens with elevation.¹ Unfortunately, the Prehn sign is considered unreliable; one study found that >90% of patients with torsion also exhibited a positive Prehn sign.⁷ In contrast, the cremasteric reflex is a more dependable clinical tool: it is typically preserved in epididymitis but absent in cases of testicular torsion.⁸

Because testicular torsion is a surgical emergency, rapid and accurate differentiation between torsion and epididymitis or epididymoorchitis is essential. The diagnostic test of choice for epididymoorchitis is color Doppler US.⁹ Grayscale US findings include enlargement of the epididymis or testis, heterogeneous echotexture, scrotal wall thickening, and a reactive hydrocele.¹ On color Doppler

interrogation, epididymoorchitis typically demonstrates increased blood flow with a decreased resistive index, often <0.5.⁹ These findings are best appreciated on transverse, side-by-side comparison views, allowing direct comparison between the symptomatic and asymptomatic testis.¹ In contrast, testicular torsion is characterized by unilateral decreased or absent intratesticular blood flow.¹ When reduced or absent flow is identified, immediate urologic consultation is warranted due to the risk of testicular ischemia and loss.

While US is the most accurate test for diagnosing epididymoorchitis, urinalysis serves as an important adjunctive tool.¹⁰ Although urinalysis can support the diagnosis—particularly in cases with a bacterial etiology—its primary role in the pediatric population is to guide management. When epididymoorchitis is caused by a bacterial infection, urinalysis typically reveals pyuria and/or bacteriuria.² While antibiotics are commonly used to initially treat epididymitis, studies show that only about 10% of pediatric cases have a confirmed bacterial source.¹¹ For this reason, urinalysis and urine culture help determine whether antibiotics are warranted. If urine cultures are negative, antibiotics can be withheld or discontinued.¹⁰ This approach aligns with the current understanding that many pediatric cases of epididymoorchitis are due to post-viral inflammation rather than bacterial infection. In young

children with recurrent episodes of epididymoorchitis, further evaluation for underlying genitourinary anomalies is recommended.^{1,4} Imaging studies may include voiding cystourethrography, MR urography, and complete urinary tract and renal US. Conditions associated with recurrent epididymoorchitis include vesicoureteral reflux, ectopic ureter, prostatic utricle, posterior urethral valves, and urethral stenosis.⁴ However, in children presenting with a first episode of epididymoorchitis, a genitourinary anomaly workup is not routinely indicated, and urinalysis alone is typically sufficient to guide initial management.⁴

The prognosis for pediatric epididymoorchitis is generally favorable. Although complications such as abscess formation, recurrence, or long-term fertility issues can occur, most patients do not experience lasting sequelae.³ Treatment typically includes antibiotics for patients with a positive urinalysis, along with supportive measures such as analgesics, anti-inflammatory agents, ice packs, scrotal support, and elevation.¹ Notably, some children respond well to symptomatic management with analgesia alone.³ In sexually active adolescents, empiric antibiotic coverage should include agents targeting *N. gonorrhoeae* and *C. trachomatis*.³ If symptoms do not improve with initial treatment, follow-up imaging may be necessary to evaluate for complications such as abscess formation.¹

Conclusion

Epididymoorchitis is a common cause of scrotal pain in children and may arise from infectious, post-infectious, or structural etiologies. Color Doppler US is essential for diagnosis, with characteristic findings of increased blood flow and reduced resistance in the affected testis—features that help distinguish it from testicular torsion, which presents

with diminished or absent blood flow. Management is primarily supportive, with antibiotics reserved for patients with evidence of bacterial infection on urinalysis. Prognosis in pediatric cases is generally excellent, and complications such as abscess formation are rare.

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