

Case Report

In the Aftermath of Trauma: Unraveling the Mystery of Pyocele vs Hematocele

Dr. Abhishek Jain^{1*}, Dr. Nunes Neil Aurelio¹, Dr. Saptarshi Roy¹

¹Junior Resident, Department of Radio-Diagnosis, Sree Balaji Medical College and Hospital, Chennai

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Abstract: Ultrasound is the preferred method for identifying the cause of sudden scrotal pain and diagnosing related conditions. A pyocele refers to a collection of pus in the scrotal sac, which can occur as a result of a testicular abscess, infection of the testis or epididymis, or after trauma. In this case, a young man from rural India developed a pyocele following an injury. An ultrasound scan revealed that the pyocele had ruptured, with the pus spreading throughout one side of the scrotum. While rupture of the protective layer around the testicle (tunica) is commonly seen with a hematocele (blood collection), it is rarely associated with a pyocele. This case report explains the possible causes of a pyocele, how it appears on imaging, how it is treated, and the complications that can occur. It also discusses other conditions that may look similar.

Keywords: Radiology, Pyocele, Infection, Testicle, Hematocele, Male Ultrasound.

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INTRODUCTION

Scrotal pyocele is an uncommon but important urological emergency characterized by a collection of purulent fluid between the visceral and parietal layers of the tunica vaginalis surrounding the testis. It may arise secondary to sexually transmitted infections, intra-abdominal infections, or scrotal trauma. Ultrasound remains the imaging modality of choice for the evaluation and diagnosis of scrotal pathologies. Initial management typically includes intravenous fluid resuscitation, broad-spectrum empirical antibiotics, and analgesia. However, in some cases, conservative measures may be insufficient, necessitating urgent surgical intervention for drainage and definitive management.

CASE PRESENTATION

A 30-year-old male presented to the emergency department with complaints of pain, redness, and progressive swelling in the left side of the scrotum over the past three days. On visual inspection, the left hemiscrotum appeared erythematous and enlarged, with a smooth, shiny surface due to the loss of normal scrotal folds. Physical examination revealed that the scrotum was warm, tender to touch, and showed clear signs of inflammation. An ultrasound examination was recommended to identify the underlying cause of the pain and swelling.

Ultrasound imaging revealed a heterogeneous fluid collection located between the scrotal sac and the testis, containing multiple hyperechoic debris particles, producing a characteristic "falling snow" appearance. The collection measured roughly 5 x 4 x 2 cm and exerted a mass effect, displacing the left testis toward the right side, as illustrated in Figure 1.

*Corresponding Author: Dr. Abhishek Jain

Junior Resident, Department of Radio-Diagnosis, Sree Balaji Medical College and Hospital, Chennai



Figure 1: Ultrasound imaging of the scrotal sac using a curvilinear probe demonstrates a hypoechoic fluid collection (white star) within the left scrotal sac, causing displacement of the left testis away from the midline and toward the right side (curved white arrow)

The fluid collection was located next to the left testis, and a discontinuity in the tunica layers was observed, with a defect measuring approximately 1.5 cm.

The contents were seen extending through the ruptured membrane, while the visceral layer of the tunica vaginalis remained intact, as demonstrated in Figure 2.

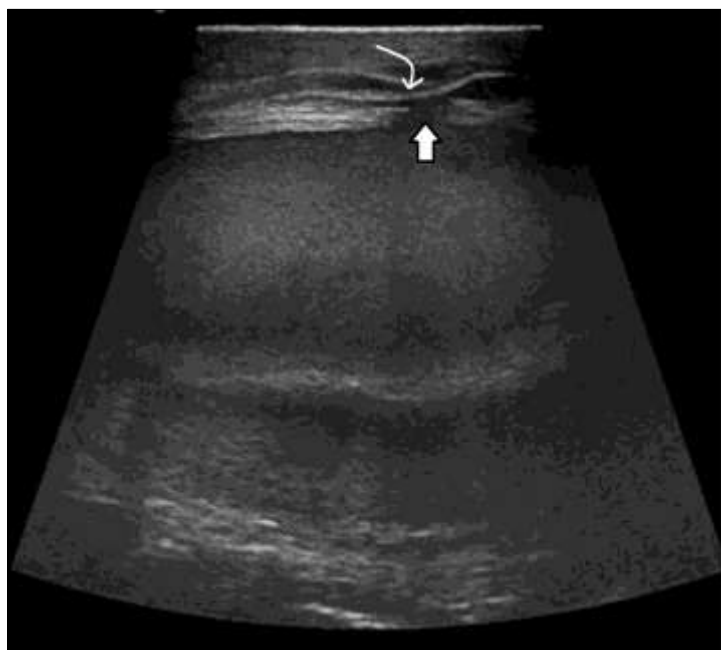


Figure 2: Ultrasound of the left scrotal sac performed with a linear probe reveals a hypoechoic fluid collection containing internal debris, producing a "falling snow" appearance. There is evidence of disruption in the tunica layers (indicated by solid white arrow), while the tunica vaginalis remains intact (indicated by the curved white arrow)

No calcifications or air pockets were identified within the collection. The right testis demonstrated normal size, contour, vascularity, and echotexture. The patient reported a history of blunt trauma to the scrotum seven days prior, caused by impact from a metal rod while working in the field. There was no relevant history of unprotected sexual activity, urinary tract infection, or sexually transmitted infections.

The patient subsequently underwent emergency scrotal exploration, which included debridement and excision of necrotic tissue. A sample was sent for microbiological culture to identify the causative organism responsible for the pyocele. Post-operatively, the patient was discharged with instructions for follow-up in three weeks to assess healing and the condition of the scrotum.

DISCUSSION

A pyocele refers to a collection of pus that accumulates between the visceral and parietal layers of the tunica vaginalis surrounding the testis. Microorganisms can enter the scrotal sac through several routes, including sexually transmitted infections, intra-abdominal infections, or direct trauma [1–3].

Epididymo-orchitis and epididymitis are the leading causes of acute scrotal pain. If left untreated, these infections can progress to abscess formation or even testicular infarction [6]. In sexually active males under the age of 35, the most commonly implicated pathogens are *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. In contrast, in men over 35, *Escherichia coli* and other urinary tract pathogens are more frequently responsible [6].

Hydrocele refers to either an acquired or congenital accumulation of serous fluid between the two layers of the tunica vaginalis and is the most frequent cause of painless scrotal swelling. On ultrasound, it typically appears as a simple fluid collection without internal blood flow on color Doppler imaging. In some cases, the fluid may be septated and may contain calcifications or cholesterol deposits [7].

Hematocele, an important differential diagnosis, usually develops following scrotal trauma and occasionally after surgical procedures. Some studies suggest that varicocele may increase the risk of hematocele formation. Ultrasound serves as the primary diagnostic tool, typically showing a collection with increased echogenicity and internal septations. In acute cases, the hematocele may initially appear anechoic, but internal turbulence may be observed [8]. The detection of air foci within a collection can aid in distinguishing a pyocele from a hematocele [9].

Testicular trauma represents the third most common etiology of acute scrotal pain [10]. Differential diagnoses include testicular fracture, dislocation, torsion, intratesticular pseudoaneurysm, and intratesticular hematoma. In cases of testicular rupture, ultrasound may demonstrate signs such as discontinuity, crinkling, or retraction of the tunica albuginea. Extrusion of seminiferous tubules may also occur and can be evaluated using color doppler imaging. Color doppler helps assess testicular perfusion and is useful in distinguishing rupture from complex hematocele [10].

Management of pyocele may begin with conservative measures, including intravenous fluid resuscitation, analgesia, and empirical antibiotic therapy [5]. However, definitive treatment often requires prompt surgical exploration, debridement of necrotic tissue, excision of non-viable testicular components, and repair of the ruptured tunica layers [11].

In the case presented, the patient had a prior history of scrotal trauma, which subsequently led to the development of a pyocele. Ultrasound examination confirmed a heterogeneous fluid collection located between the visceral and parietal layers of the tunica vaginalis, along with evidence of tunica rupture and extravasation of its contents. The patient underwent prompt surgical exploration, including debridement and excision of devitalized tissue.

Potential complications include Fournier's gangrene—a rapidly progressive, necrotizing fasciitis involving both superficial and deep fascial planes of the perineum and scrotum. This condition is life-threatening if not diagnosed and managed promptly. Computed tomography (CT) is considered the imaging modality of choice for the evaluation and diagnosis of Fournier's gangrene [6].

CONCLUSIONS

Pyocele is a serious acute scrotal emergency that requires prompt and appropriate medical intervention. In cases where there is rupture of the scrotal membranes, hematocele is often considered the primary differential diagnosis; however, the possibility of a pyocele should not be dismissed. Accurate and early identification of the underlying cause of acute scrotal pain is essential to avoid potential complications and long-term damage. Timely diagnosis, followed by proper and effective treatment, plays a vital role in improving patient outcomes. While initial management may involve supportive measures such as fluids, antibiotics, and pain relief, surgical exploration and drainage remain the gold standard and most definitive treatment for pyocele.

Conflict of Interest: Nil

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