

# Tuberculous Testicular Abscess: A Case Report

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## ABSTRACT

Genitourinary tuberculosis represents the second most prevalent form of extrapulmonary tuberculosis in developing countries. This condition may present with subtle or no obvious clinical symptoms, with patients often exhibiting only mild manifestations. Due to its slow progression, early diagnosis remains challenging. Pathologically, epididymal tuberculosis is characterized by extensive tissue destruction and fibrosis, which ultimately leads to the obliteration of the epididymis and surrounding structures, as well as the genital organs. Complications such as infertility and significant impairment of male reproductive function may result. If not promptly diagnosed and treated, recurrent orchitis is a frequent consequence. Abscess formation, although a rare complication of delayed treatment, necessitates surgical intervention. The diagnosis of genitourinary tuberculosis is frequently complicated by the nonspecific nature of its symptoms. In the present case, ultrasound revealed inflammation of the left testicle, epididymis, and scrotum, accompanied by moderate left hydrocele and left vas deferens dilatation. A quantitative CRP level of 47.5 mg/L was noted, and the Real-time PCR MTB test was positive. The patient subsequently underwent surgical drainage of a left epididymal abscess. Molecular diagnostic techniques, such as Real-time PCR, play a crucial role in facilitating timely and accurate diagnosis of extrapulmonary tuberculosis.

**Keywords:** Genitourinary tuberculosis, Testicular abscess, qPCR MTB, Case report

## ĐẶT VẤN ĐỀ

Tuberculosis (TB) remains a leading cause of morbidity and mortality worldwide. It is the most common cause of death from a single infectious agent [1]. In 2019, TB was still the leading cause of death from a single infectious pathogen. An estimated 10.6 million people developed TB in 2021, compared to 10.1 million in 2020. In the same year, 1.6 million people died from TB (including 187,000 people living with HIV), compared to 1.5 million deaths in 2020 (including 214,000 people living with HIV). Additionally, the global TB incidence rate increased by 3.6% in 2021 compared to 2020, marking a reversal of the nearly 2% annual decline observed over the past two decades [2], [3].

Extrapulmonary tuberculosis (EPTB) refers to the clinical manifestation of tuberculosis involving organs other than the lungs. It remains a significant public health concern, accounting for 15–20% of all TB cases, and up to 50% among individuals co-infected with HIV [4]. Abscess formation is an uncommon complication, often resulting from delayed diagnosis and treatment, and usually necessitates surgical intervention. Diagnosing EPTB poses considerable challenges due to the nonspecific nature of its clinical symptoms. As a result, diagnosis is frequently missed or only made at an advanced stage when complications have already developed [4].

Genitourinary tuberculosis (GUTB) represents 15-40% of EPTB cases and is the second most common form in developing countries. It is often underestimated by urologists, particularly in regions such as Europe where TB is relatively uncommon [5], [6].

Genitourinary tuberculosis without evidence of renal involvement is a rare condition that poses significant diagnostic challenges. The epididymis, prostate, seminal vesicles, testes, vas deferens, and penis are rarely described as being involved in male genitourinary tuberculosis. The epididymis and prostate are the most commonly affected organs [7], [8].

The diagnosis of extrapulmonary tuberculosis presents numerous challenges for several reasons. Many forms of extrapulmonary tuberculosis require invasive diagnostic sampling, which may pose risks to the patient and can be costly. Additionally, most forms of extrapulmonary tuberculosis are paucibacillary, which reduces the sensitivity of many diagnostic tests. For example, cultures exhibit reduced sensitivity in paucibacillary tuberculosis. Moreover, cultures take several weeks to yield results and require a well-equipped laboratory. Diagnostic limitations also arise from histological features that may resemble other conditions. Due to these challenges, the diagnosis of extrapulmonary tuberculosis often relies on clinical suspicion, and many cases are misdiagnosed, leading to unnecessary tuberculosis treatment or poor outcomes due to untreated extrapulmonary tuberculosis.

In the past decade, nucleic acid amplification techniques (NAATs) have developed valuable diagnostic tests with high positive diagnostic yields, including polymerase chain reaction (PCR) amplification methods for the early detection of *M. tuberculosis* from various extrapulmonary clinical samples. The advantages of amplification techniques include high sensitivity, rapid performance, and the provision of diagnostic results within a short timeframe of 6 to 8 hours. PCR tests targeting insertion sequences, such as the IS-6110 insertion element, are now routinely used [9], [10].

Here, we present a case of epididymal tail inflammation and left spermatic cord tissue progression to an abscess and concomitant hydrocele with a persistent purulent discharge in the left scrotum following three months of scrotal pain and swelling, which did not respond to initial antibiotic therapy. The patient underwent surgery for a left epididymal abscess and was subsequently discharged for referral to a specialized facility for anti-tuberculosis treatment.

## CASE REPORT

A 48-year-old male patient residing in a mountainous district of Quang Ngai Province presented to Phuc Hung Hospital approximately three months ago with signs of swelling and testicular pain. He was advised to undergo a bilateral testicular ultrasound, which revealed left epididymal tail inflammation and spermatic cord tissue involvement (Figure 1). The patient was prescribed a 7-day course of antibiotics and anti-inflammatory treatment. Subsequently, the patient sought multiple rounds of treatment at other healthcare facilities. The patient's condition did not improve following empirical antibiotic therapy, a hallmark feature of tuberculous infections. Unlike typical bacterial epididymo-orchitis, which often responds to broad-spectrum antibiotics, tuberculous abscesses persist due to *Mycobacterium tuberculosis* unique cell wall structure and intracellular survival mechanisms. This resistance to conventional antibiotics underscores the importance of considering tuberculosis in cases of chronic or recurrent scrotal inflammation, particularly in endemic regions. Early suspicion should prompt targeted diagnostics, such as PCR or acid-fast staining, to avoid delays in initiating anti-tuberculous therapy.

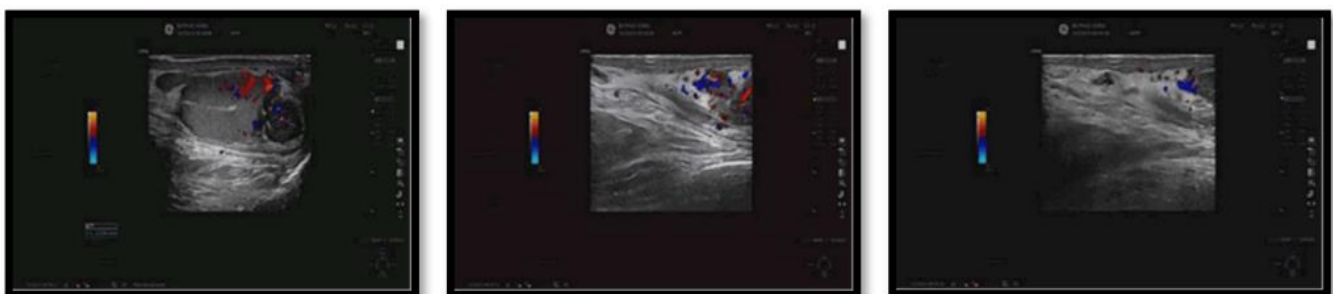


Figure 1: Ultrasound results showing left epididymal tail inflammation and spermatic cord involvement.

On January 13, 2025, the patient returned to Phuc Hung Hospital with signs of swelling, pain in the testicular region, and a persistent purulent discharge in the left scrotum. A bilateral testicular ultrasound was performed, revealing orchitis, epididymitis, and left scrotal inflammation, with a suspected epididymal abscess, moderate left hydrocele, and left vas deferens dilation (Figure 2). Further history-taking revealed that the patient did not experience fever, chills, or muscle stiffness, and had no history of urethral discharge or urinary tract issues. The patient was married and in a monogamous relationship, with no history of pelvic or genital trauma. He had no recent cough, chronic cough, contact with individuals with chronic cough, significant weight loss, or appetite loss. The patient denied a history of diabetes or hypertension. He did not have a history of alcohol use or smoking, and showed no signs of immunocompromise. The patient was subsequently advised to be hospitalized for surgery.

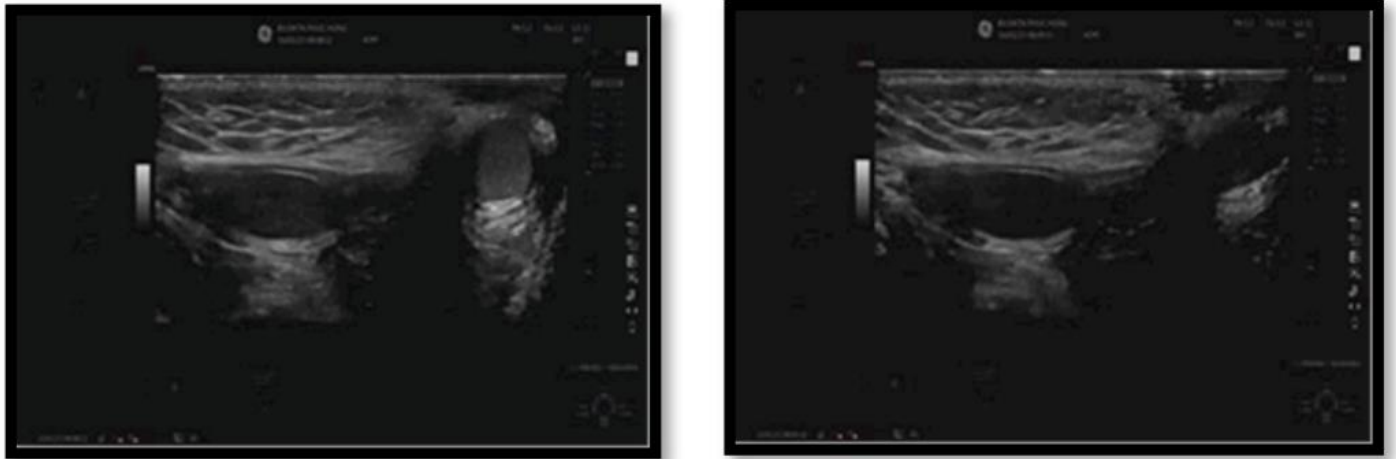


Figure 2: Ultrasound results showing epididymal abscess, hydrocele, and dilation of the left spermatic cord.

On January 14, 2025, the patient was admitted to the hospital for surgery to drain the left epididymal abscess. Preoperative diagnostic tests were conducted, and the results showed:

Diagnostic Tests	Results
Ultrasound (bilateral testes)	Orchitis, epididymitis, and left scrotal inflammation, suspected epididymal abscess, moderate left hydrocele, and dilation of the left vas deferens.
Electrocardiogram	Normal
Chest X-ray (frontal view)	Cardiac silhouette: Normal limits Lungs: Fibrotic opacity in both upper lobes (Old pulmonary lesions)
Complete blood count	Normal
- Glucose (blood)	5.5 (3.9 - 6.4 mmol/L)
- Creatinine (blood)	89 (62 - 106 $\mu$ mol/L)
- Electrolytes:	140 (133 - 147 mmol/L) 3.4 (3.4 - 4.5 mmol/L) 101 (94 - 111 mmol/L)
- AST (GOT) activity (blood)	23 (0 - 38 U/L)
- ALT (GPT) activity (blood)	33 (0 - 42 U/L)
- Protein (blood)	69 (65 - 82 g/L)
- CRP (blood)	<b>47.5</b> (0 - 10 mg/L)
- Prothrombin time	13.0 (11.0 - 13.0 giây)
- Activated partial thromboplastin time	36.5 (25.0 - 42.0 giây)
- HIV 1/2 rapid test	Negative
- Alpha-fetoprotein	1.39 (0 - 5.8 IU/mL)

The patient underwent a left scrotal incision, and the subcutaneous scrotal tissue was dissected. The left epididymis was then examined, and an incision was made to drain the pus. The cavity was irrigated with hydrogen peroxide and povidone-iodine, and meticulous hemostasis was performed in the scrotal area. A Penrose drain was placed, and the wound was left open. The patient was instructed to provide pus samples from the left epididymal abscess for Real-time PCR MTB testing to detect evidence of *Mycobacterium tuberculosis* presence. Postoperatively, the patient was administered antibiotics, anti-inflammatory agents, and pain management.

On January 16, 2025, the Real-time PCR MTB test returned positive results (Figure 3). The patient was then counseled and transferred to the Quang Ngai Provincial Tuberculosis and Lung Disease Hospital for treatment according to the tuberculosis treatment regimen.

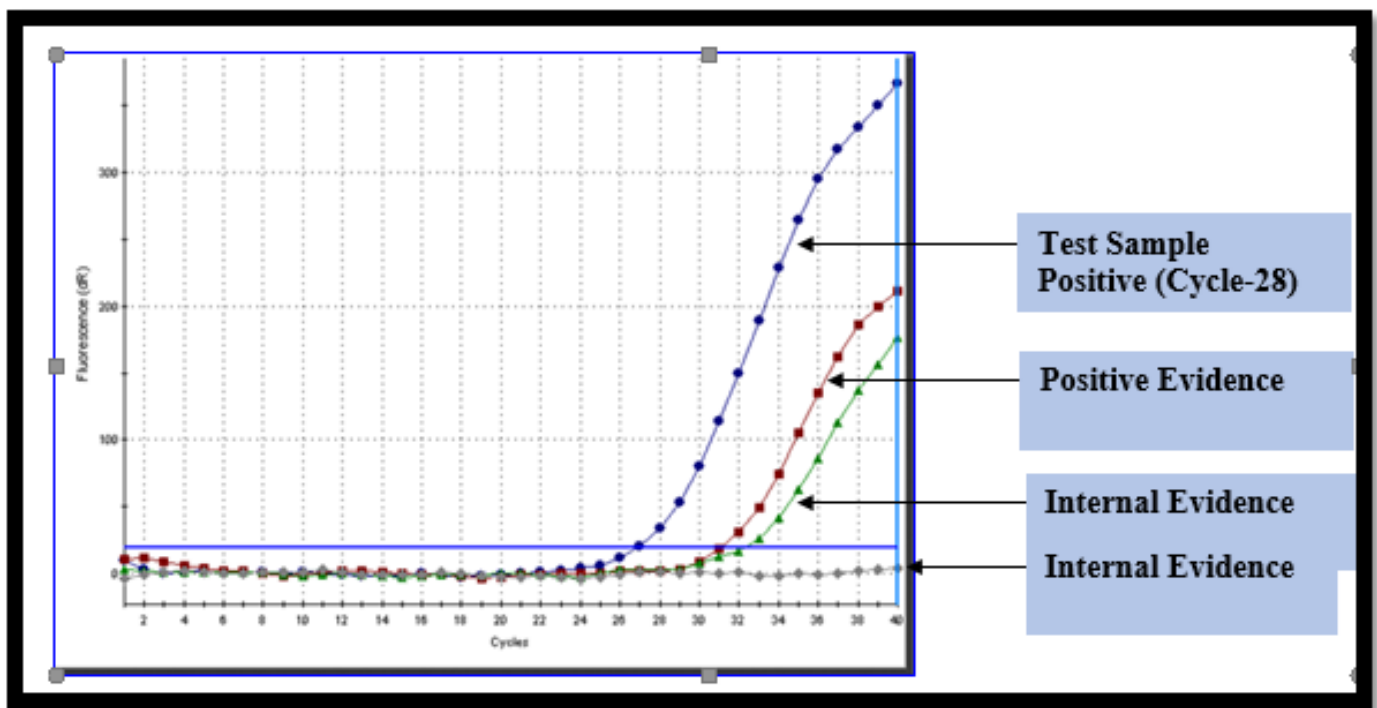


Figure 3: Results of Real-time PCR MTB test showing positive results.

Differential Diagnosis: Scrotal/testicular abscess must be distinguished from other causes of acute scrotal pathology. Bacterial epididymo-orchitis typically presents with gradual-onset pain, dysuria, and diffuse epididymal swelling on ultrasound without focal fluid collections. Mumps orchitis is suggested by preceding parotitis and confirmed by serology, showing diffuse testicular edema rather than abscess formation. Brucellosis, though rare, should be considered in patients with livestock exposure, where blood cultures and serology aid diagnosis. Testicular torsion presents as sudden severe pain with an absent cremasteric reflex, and Doppler ultrasound reveals absent blood flow, requiring immediate surgical intervention. Finally, testicular malignancies are typically painless masses with solid vascular features on ultrasound and elevated tumor markers (AFP,  $\beta$ -hCG). Key discriminators include symptom onset, ultrasound findings (hypoechoic collection vs. diffuse hyperemia/avascularity), and laboratory results (CRP, cultures, serology).

## DISCUSSION

Genitourinary tuberculosis can occur at any age, with the highest incidence in men aged 30-50 years. Due to the long incubation period, the disease is not commonly seen in children. The most frequently affected organ is the epididymis, followed by the seminal vesicles, prostate, testes, and vas deferens. Recent studies have suggested that isolated epididymal tuberculosis may be the first or only manifestation of early genitourinary tuberculosis [11].

The pathogenesis of epididymal tuberculosis includes hematogenous transmission and retrograde infection of *Mycobacterium tuberculosis* from the urethra due to factors such as trauma, alcohol abuse and excessive sexual activity. The initial lesions of epididymal tuberculosis typically occur at the tail of the epididymis due to its rich blood supply and retrograde infection from the vas deferens. The lesions gradually invade the body of the epididymis and eventually affect the entire structure. In severe cases, the testes may also be involved [12].

Epididymitis caused by tuberculosis can be the only manifestation of genitourinary tuberculosis. Historically, diagnosing isolated epididymal tuberculosis has been challenging, and no preoperative diagnostic methods currently provide high sensitivity and specificity. However, diagnosing abscesses and scrotal ulcers is relatively uncomplicated. Clinically, a definitive diagnosis can often be made by identifying acid-fast bacilli in tissue samples from the affected area, using high-specificity techniques such as pus or discharge testing [13], [14]. Our Real-time PCR MTB test, using a diagnostic kit with an analytical sensitivity of 34.5 copies/reaction, can qualitatively detect *Mycobacterium tuberculosis* (MTB) in biopsy or sputum samples through Real-time PCR based on the presence of IS6110 and mpt64, with no detection of other microorganisms.

Epididymal tuberculosis, like other forms of tuberculosis, requires early, compliant, and appropriate combination anti-tuberculosis therapy. The treatment regimen typically involves three to four anti-tuberculosis drugs for a duration of 6-9 months [15].

Surgical intervention is indicated when medical treatment fails or in cases of abscess formation. Due to the nonspecific early symptoms of epididymal tuberculosis, abscesses or invasion of adjacent tissues such as the testes often progress by the time intervention is required, meaning that most patients ultimately require surgery. When active tuberculosis is confirmed, anti-tuberculosis treatment should be initiated before considering surgical intervention [16].

## CONCLUSION

Epididymal tuberculosis is easier to diagnose in patients with a history of tuberculosis. However, in cases of isolated epididymal tuberculosis, the initial symptoms are often unclear, and the condition typically progresses to a severe stage by the time of diagnosis. Epididymal tuberculosis has usually invaded surrounding tissues by the time it is detected. Surgical treatment combined with anti-tuberculosis medication before and after surgery is an effective treatment approach. Molecular biological diagnosis plays a crucial role in providing timely, definitive diagnoses for extrapulmonary tuberculosis.

## Ethical Declaration

Informed consent was obtained from the patient for the publication of this case report, including all relevant medical details and images, in accordance with ethical guidelines. The patient was thoroughly informed about the purpose of the report, potential risks, and benefits, and their right to confidentiality was maintained by anonymizing personal identifiers. This study adheres to the principles outlined in the Declaration of Helsinki and institutional ethical standards for case reporting.

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## Declarations

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**Conflict of interest:** None declared

**Ethical approval:** Ethical clearance was obtained from the Hospital Research and Ethical Committee.



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