

Case Report

A Rare Case of Isolated Testicular Drug-Resistant Tuberculosis (Testicular DR-TB): Case Report

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Abstract

Introduction: Drug-resistant TB poses a significant threat to global TB care and prevention and remains a major public health issue in many countries and Testicular drug-resistant tuberculosis (testicular DR-TB) refers to a form of tuberculosis that specifically affects the testicles and is resistant to standard anti-TB medications, isolated testicular involvement is uncommon.

Case presentation: a twenty-seven-year-old male patient presented with painful swelling of the scrotum for one month. He was treated with first-line anti-TB (RHZE/RH) and completed a month back at the health center. He had a similar complaint during the first diagnosis. While he was on treatment, the swelling subsided and recurred while he discontinued the medication. Our hospital received a referral for this complaint. Otherwise, he has no history of chronic illness, no surgical procedure at any site, no usage of second-line anti-TB drugs, or contact with a DR-TB patient. During the presentation, his vital signs were within normal range. The only pertinent finding was in the genitourinary system, which is that the scrotum is swollen and tender. Following clinical examinations and investigation findings with the diagnosis of RR-EPTB (testicular TB), we put him on an individualized longer regimen (Lfx/Cs/Cfz/Bdq/Cfz/Lzd) and pyridoxine. After 18 months of treatment, the outcome is declared as completed. After being advised on danger signs, he was appointed after six months for post-treatment follow-up according to the Ethiopian DR-TB management protocol. **Conclusion:** This case highlights the importance of timely diagnosis and adherence to treatment in managing drug-resistant extrapulmonary tuberculosis (RR-EPTB), specifically testicular TB. The patient's recurrent symptoms following discontinuation of first-line anti-TB therapy illustrate the challenges faced in treatment adherence and the potential consequences of inadequate management.

Keywords

DR-TB, Testicular TB, EPTB, Case Report, Ethiopia

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1. Introduction

Tuberculosis (TB) is the leading global cause of death due to infectious disease [1]. Drug-resistant TB poses a significant threat to global TB care and prevention and remains a major public health issue in many countries. According to the Global TB Report 2022, [2, 3] an estimated 10.6 million people fell ill with TB in 2022. In 2021, there were approximately 1.4 million deaths among HIV-negative individuals and 187,000 deaths among HIV-positive individuals, resulting in a total of 1.6 million TB-related deaths. Globally, about 3.6% of new TB cases and 18% of previously treated cases were identified as having multidrug-resistant (MDR) or rifampicin-resistant TB (RR-TB) in 2021, with a total of around 450,000 new MDR/RR-TB cases estimated to have emerged that year [4, 5].

Testicular drug-resistant tuberculosis (testicular DR-TB) refers to a form of tuberculosis that specifically affects the testicles and is resistant to standard anti-TB medications. This condition can occur when the *Mycobacterium tuberculosis* bacteria mutate and develop resistance to drugs typically used to treat TB, such as rifampicin and isoniazid. The genitourinary tract is highly susceptible to infections transmitted through the bloodstream [6], making it the primary location for extrapulmonary tuberculosis, accounting for approximately 14-41% of cases [7, 8]. This condition, known as genitourinary tuberculosis (GUTB), was first identified by Wildbolz in 1937 [12] and is prevalent globally, with a more severe impact in developing nations.

The genitourinary tract is a primary location for infections that spread through the blood, accounting for the majority of extra pulmonary tuberculosis cases at 14-41%. Wildbolz first used the term "genitourinary tuberculosis" (GUTB) in 1937, and it remains a global health concern, particularly in developing countries where its impact is more severe [9].

Tuberculosis (TB) primarily affects the lungs, but it can impact other body systems as well. Approximately 10% of all TB cases involve extra-pulmonary TB. [10], the most common presentations of tuberculosis include lymphatic, pleural, bone and joint, and genitourinary (GUTB) involvement. GUTB often affects the kidneys and prostate, which means that the scrotal organs, although uncommon, can still be a potential site of infection [11, 12].

Tuberculosis can impact various organs in the genitourinary region and is considered a rare form of extra pulmonary involvement. Genital tuberculosis (TB) is infrequent, and testicular TB is even more so, accounting for only 3% of cases of genital TB [13]. Because isolated testicular involvement is uncommon, differential diagnoses should include testicular tumors, infarction, and other granulomatous infections [14].

Males aged 20 to 40 are the most affected, experiencing symptoms such as scrotal enlargement that may be painful or painless, with or without a discharging sinus. Infertility issues may also be present. In older age groups, a diagnostic

challenge can occur due to the higher prevalence of testicular cancer compared to testicular tuberculosis [13]. Fine needle aspiration cytology (FNAC) guided by ultrasonography (USG) and testicular USG are utilized to confirm the diagnosis. In older patients, testicular biopsies are necessary, primarily to exclude testicular cancer. The mainstay of treatment is anti-TB chemotherapy, which includes rifampicin, isoniazid, pyrazinamide, and ethambutol. The rise of drug-resistant tuberculosis, coupled with a rapid increase in HIV infection rates, exacerbates the critical situation the world faces today [13].

The presentation may coexist with other scrotal conditions, making radiological investigations essential for distinguishing between benign and malignant disorders in the scrotal region, including testicular tuberculosis. However, MRI has demonstrated greater accuracy in localizing and characterizing scrotal lesions compared to scrotal USG. [15-17]. In advanced stages, testicular tuberculosis may occasionally present as a scrotal fistula. Treatment options depend on the initial clinical diagnosis and radiological investigations. In Genitourinary tuberculosis (TB) is the most prevalent form of extrapulmonary TB, accounting for up to 20% of cases [13]. However, testicular TB is rare, comprising only about 3% of genitourinary TB cases [1, 13]. While genitourinary TB can occur at any age, it is more commonly seen between the third and fifth decades of life [18]. Concurrent pulmonary and renal TB is present in 50% and 80-85% of genitourinary TB cases, respectively [19].

The incidence of extrapulmonary TB is rising not only in endemic regions but globally, driven by factors such as immigration, immunosuppression, and HIV infection. The imaging features of testicular TB are nonspecific, making it difficult to differentiate from other more common conditions like tumors, infections, inflammation, and infarction. Imaging techniques for the testis are limited to magnetic resonance imaging (MRI) and ultrasound, as computed tomography (CT) scans are not reliable for diagnosing or characterizing testicular pathology. Ancillary tests, such as a positive chest radiograph or tuberculin test, can support the diagnosis, but negative results do not reliably rule it out. [1, 18]

2. Case Presentation

This twenty-seven-year-old male patient presented with painful swelling of the scrotum for one month. He was treated with first-line anti-TB (RHZE/RH) and completed a month back at the health center. He had a similar complaint during the first diagnosis. While he was on treatment, the swelling subsided and recurred while he discontinued the medication. Our hospital received a referral for this complaint.

Otherwise, he has no history of chronic illness, no surgical procedure at any site, no usage of second-line anti-TB drugs,

or contact with a DR-TB patient.

During the presentation, his vital signs were within normal

range. The only pertinent finding was in the genitourinary system, which is that the scrotum is swollen and tender.

Table 1. Shows investigation summary of the patient.

Date		05/01/2023	01/09/2023	01/12/2023	09/21/2023	11/20/2023	03/21/2024
CBC	WBC ($\times 10^3$)	8.9				5.44	5.7
	L/N (%)	15.9/69				31.4/57.2	33/54
	Hg/HCT	17/47.7				16/46	14.6/37.7
	MCV/MCH	91.5/32.6					92/35
	Platelet ($\times 10^3$)	230				168	121
RFT	Urea (mg/dL)	20	17	15	16.4		17
	Cr. (mg/dL)	0.89	0.42	0.82	0.96		1.1
LFT	GOT (U/L)	20	117.5	19.6			30
	GPT (U/L)	13	64.3	11.1			7
	ALP (U/L)	119	64	109	71		120
	Bil D/T (mg/dL)	0.24/0.6	0.3/0.7	0.2/0.5			0.38/0.43
	Serum alb. (g/dL)	---	---	---			3.4
Visual Acuity		6/6	6/6	6/6	6/6	6/6	6/6
ECG (02/07/2023)		Sinus rhythm					
Genexpert from the scrotal Abscess (01/13/2023)		MTB detected and Rifampicin resistance					
PICT (01/19/2023)		Non-reactive					
		Findings: There are right testicular two locules of hypoechoic collections seen with internal debris seen measured 0.83 cm by 0.75 cm and 0.86 cm by 0.61 cm. there are bilateral testicle microcalcifications seen.					
Inguino-scrotal ultrasound (01/09/2023) (figure 1)		There are multiple locules of hypoechoic collections the largest measured 2.68 cm by 1.43 cm with internal debris and peripheral fat stranding seen.					
		The scrotal wall has normal thickness but there is hypoechoic collection with debris measured 3.88 cm by 2.50 cm.					
		Conclusion: Right testicular and epididymis abscess collection, Scrotal skill cold abscess and testicular microlithiasis\					
Abdominal ultrasound (01/09/2023)		DDx: TB epididymorchitis and funiculitis					
		Unremarkable					
Fluid Cytology (01/11/2023)		Findings: Smear shows caseating necrosis only					
		Conclusion: Scrotal fluid: Tuberculosis					
Scrotal ultrasound (8/24/2023) (figure 2)		Findings: There are multiple well-defined heterogeneously hypoechoic right testicular lesions seen. The largest measuring 0.9 cm by 0.8 cm in size. There are multiple small sized hyperechoic lesions seen having no posterior acoustic shadowing. The right epididymis is also enlarged in size having heterogeneously hypoechoic echogenicity, maximum AP diameter measuring 0.45 cm.					
		Conclusion: Multiple right testicular hypoechoic lesions with enlargement of the right epididymis.....there is radiologic interval improvement seen as compared to previous ultrasound.					
		Testicular microlithiasis					
Scrotal Doppler Ultrasound		Conclusion: right testicular scar (likely healed infection)					

Date	05/01/2023	01/09/2023	01/12/2023	09/21/2023	11/20/2023	03/21/2024
(07/17/2024) (figure 3)						
NB: done during outcome declaration day.						

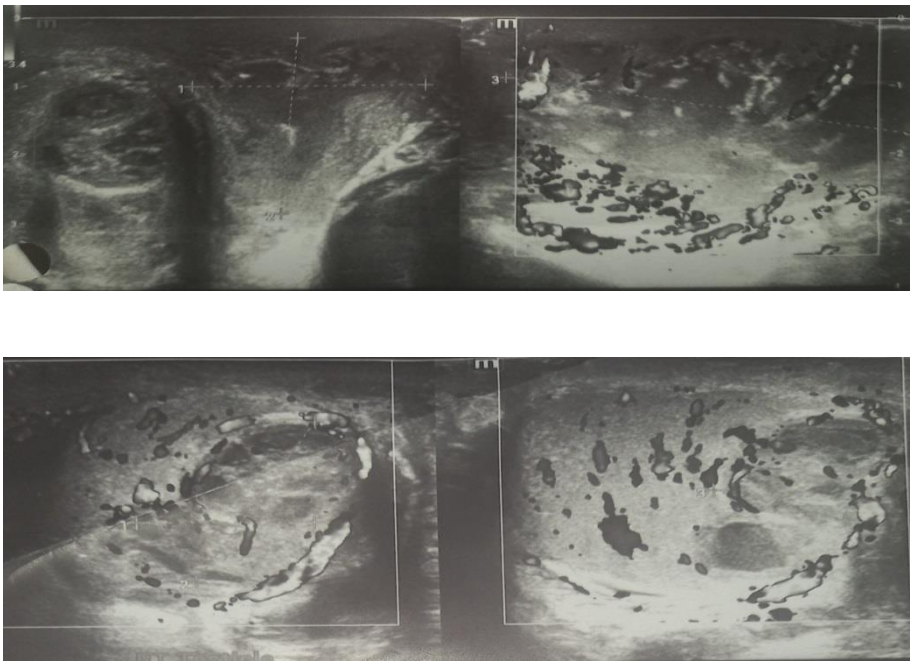


Figure 1. Inguino scrotal ultrasound (prior to treatment initiation).

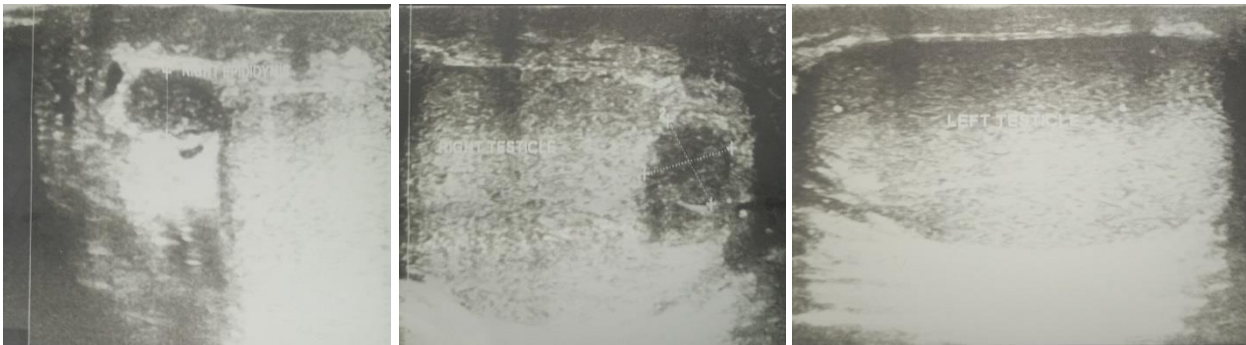


Figure 2. Inguino scrotal ultrasound (in the mid of treatment).

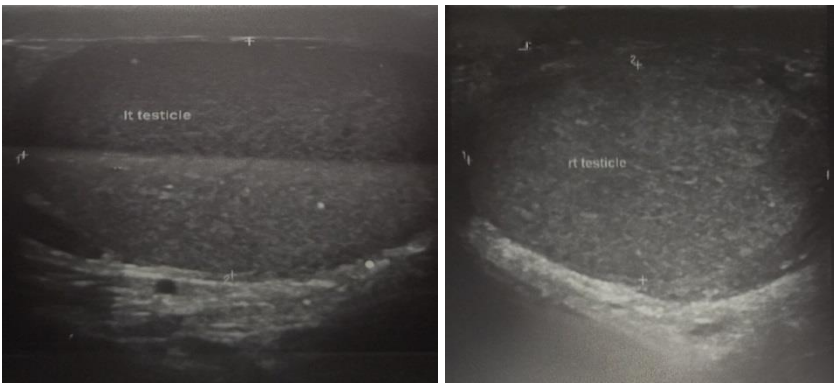


Figure 3. Scrotal Doppler ultrasound (post treatment).

Following clinical examinations and investigation findings with the diagnosis of RR-EPTB (testicular TB), we put him on an individualized longer regimen (Lfx/Cs/Cfz/Bdq/Cfz/Lzd) and pyridoxine. After 18 months of treatment, the outcome is declared as completed. After being advised on danger signs, he was appointed after six months for post-treatment follow-up according to the Ethiopian DR-TB management protocol.

3. Discussion

This case highlights the complexities of diagnosing and treating testicular tuberculosis (TB), particularly in a young male patient with recurrent symptoms. The patient's history of painful scrotal swelling, which improved during treatment but recurred upon discontinuation, underscores the importance of adherence to anti-TB therapy.

Diagnosis and Treatment

The diagnosis of RR-EPTB was supported by clinical findings and imaging studies. In endemic areas, fine needle aspiration cytology (FNAC) is crucial for confirming TB, especially when histological examination is limited. The individualized longer regimen (Lfx/Cs/Cfz/Bdq/Cfz/Lzd) was appropriate given the patient's resistance profile and previous treatment failure.

Outcomes and Follow-Up

After 18 months of treatment, the resolution of symptoms indicates successful management. Regular follow-up is essential to monitor for potential relapses or complications, as testicular TB can lead to infertility and other sequelae if not adequately addressed. This case reinforces the need for awareness of genitourinary TB in similar clinical presentations and adherence to treatment protocols to prevent recurrence.

4. Conclusion

This case highlights the importance of timely diagnosis and adherence to treatment in managing drug-resistant extra pulmonary tuberculosis (RR-EPTB), specifically testicular TB. The patient's recurrent symptoms following discontinuation of first-line anti-TB therapy illustrate the challenges faced in treatment adherence and the potential consequences of inadequate management. The individualized longer regimen successfully resolved the patient's symptoms, underscoring the need for tailored therapeutic strategies in complex cases of TB. Regular follow-up and patient education on danger signs are crucial for early detection of potential relapses or complications. This case serves as a reminder of the significance of comprehensive care in patients with extrapulmonary TB, ensuring they receive appropriate treatment and support throughout their recovery journey.

Abbreviations

AFB	Acid Fast Bacillus
Bdq	Bedaquiline
Cs	Cycloserine
Cfz	Clofazimine
FNAC	Fine Needle Aspiration Cytology
GUTB	Genitourinary Tuberculosis
INH	Isoniazid
Lfx	Levofloxacin
Lzd	Linezolid
RR-EPTB	Resistance to Rifampicin Extra Pulmonary Tuberculosis
RR-TB	Rifampicin-resistant TB
SPSH	Saint Peter Specialized Hospital
TB	Tuberculosis
USG	Ultrasonography

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Informed Consent

Informed consent was taken and signed from the patient for publication.

Availability of Data and Material

The datas are available with corresponding author upon reasonable request will provide.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Authors' Contribution

Mustofa Hassen Yesuf: Conceptualization, Investigation, Validation, Writing – original draft, Writing – review & editing

Abdurehman Seid Mohamed: Data curation, Investigation, Validation, Writing – original draft, Writing – review & editing

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Conflicts of Interest

The authors declare no conflicts of interests.

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