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CASE REPORT

Prostatic tuberculosis incidentally discovered during transurethral resection of prostate with subsequent diagnosis of rectal and pulmonary involvement: a case report

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Background: *Tuberculosis (TB) is a globally prevalent infectious disease, including in Taiwan. Prostatic TB is a rare manifestation of genitourinary tuberculosis (GU-TB), which is the third most common extrapulmonary form of the disease. However, due to its insidious onset and non-specific symptoms, prostatic TB is often diagnosed late.*
Case Description: *We report a case of a 72-year-old male patient who presented with lower urinary tract symptoms (LUTS) and painful scrotal swelling. Following transurethral resection of the prostate (TURP), histopathological examination revealed prostatic TB. The patient subsequently had abdominal cramping and diarrhea. A colonoscopy detected an ulcer-like lesion in the rectum, indicating mycobacterial infection and cytomegalovirus colitis. Chest computed tomography revealed pulmonary involvement, and the patient was started on a six-month course of anti-TB treatment.*
Conclusions: *This case highlights the importance of considering TB in the differential diagnosis of LUTS and highlights the need for screening for other potential sites of involvement, particularly in the lungs, when a diagnosis of prostatic TB is made.*

Key Words: prostatic tuberculosis, pulmonary tuberculosis, rectal tuberculosis, lower urinary tract symptoms, case report

Introduction

Tuberculosis (TB) remains one of the most significant infectious diseases worldwide, with an estimated 10.8 million new cases reported in 2023[1] despite advances in public health measures and antimicrobial therapy. TB also continues to pose a substantial public health burden in Taiwan.[2] GU-TB is the third most common form of extrapulmonary tuberculosis (EPTB), accounting for around 20% of EPTB cases.[3] Within the spectrum of GU-TB, renal involvement is the most frequent, followed by prostatic TB.[4]

Prostatic TB is typically caused by the hematogenous spread of *Mycobacterium tuberculosis* from a primary focus, usually in the lungs. However, it can also result from lymphatic dissemination or local extension from adjacent infected organs, such as the epididymis.[5] Diagnosis of prostatic TB can be challenging due to its insidious onset and non-specific symptoms,[6] which commonly resemble benign prostatic hyperplasia (BPH) or chronic prostatitis, often leading to delays in diagnosis and potential irreversible organ damage. Because isolated involvement of the prostate is rare, identification of prostatic TB should prompt further investigation for other infectious sites.

Our case report describes a patient who initially presented with non-specific lower urinary tract

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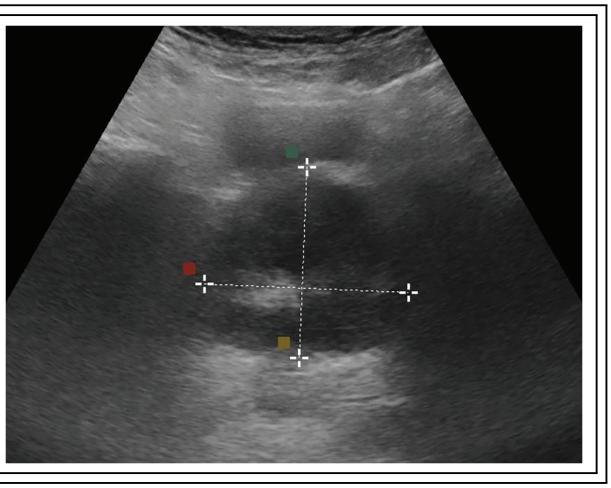

FIGURE 1. Prostate ultrasound revealed enlargement with central calcification

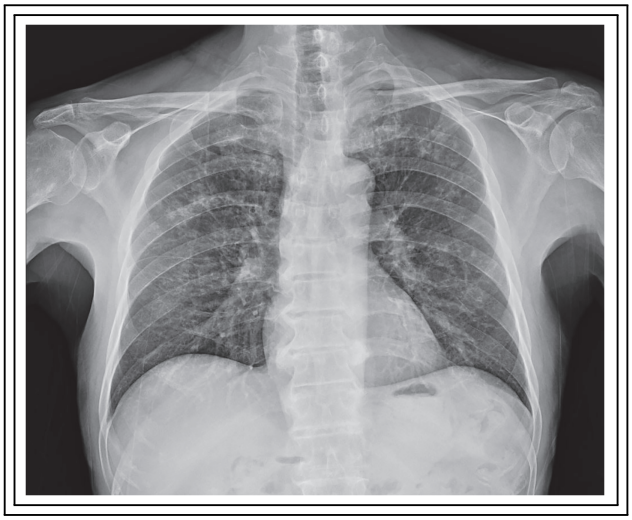

FIGURE 2. Preoperative chest X-ray revealed scattered small nodules over bilateral lungs

symptoms (LUTS) and was clinically diagnosed with benign prostatic hyperplasia (BPH). However, histopathological examination after transurethral resection of the prostate (TURP) incidentally revealed prostate TB. Further investigation uncovered rectal and pulmonary involvement, highlighting the need for comprehensive assessment once prostatic TB is detected.

This study was approved by the ethics committee of the Institutional Review Board (IRB) of Tungs' Taichung Metroharbor Hospital, with the reference number: TTMHH-IRB-114061. The informed consent was waived by the institutional review board, and no written consent was obtained from the patient. Besides, this study was prepared according to the CARE case report guideline,[7] and a CARE checklist was provided as Supplementary Material S1.

Case Presentation

A 72-year-old male with a medical history of hypertension and type 2 diabetes mellitus, both under pharmacologic control, presented with urinary frequency, weak urinary stream, and painful swelling in the right scrotum for several weeks. One month prior to his visit, the patient had been evaluated at an outpatient clinic, where his prostate-specific antigen (PSA) level was 5.2 ng/mL, and he was prescribed silodosin and oxybutynin. He denied systemic symptoms such as cough, fever, or night sweats and reported no known exposure to individuals with TB. He had no prior urological surgeries and no history of immunosuppressive therapy, either.

Upon examination in the outpatient department of Tungs' Taichung Metroharbor Hospital, digital rectal examination revealed an enlarged prostate with a firm consistency, while scrotal palpation did not detect any hard nodules. He had been empirically treated with oral cephalexin at first, with gradual improvement of symptoms. Meanwhile, his prostate-specific antigen (PSA) level had increased to 7.7 ng/mL. Multiparametric magnetic resonance imaging (MRI) and transrectal ultrasound (TRUS)-guided biopsy were not performed before surgery because the patient's primary concern was severe obstructive LUTS requiring prompt relief, and he declined additional imaging—including MRI—because of financial considerations. Urinalysis showed no evidence of pyuria or hematuria. Prostate ultrasound revealed enlargement (59 mm × 53 mm × 57 mm, estimated volume: 93 mL) with significant central calcification (Figure 1). Uroflowmetry indicated obstructive uropathy (Qmax 7.6 mL/s, Qavg 3.6 mL/s). Notably, the preoperative chest radiograph already demonstrated scattered small nodules in both lung fields (Figure 2); however, these findings were not initially recognized as suspicious for tuberculosis as the patient did not report any respiratory symptoms. On cystoscopy during TURP, only prostatic enlargement was noted (Figure 3A), with no other obvious intravesical lesions in the urinary bladder (Figure 3B). However, histopathological examination of the prostate tissue unexpectedly revealed granulomatous inflammation with epithelioid granulomas (Figure 4A) and acid-fast bacilli (Figure 4B), consistent with prostatic TB.

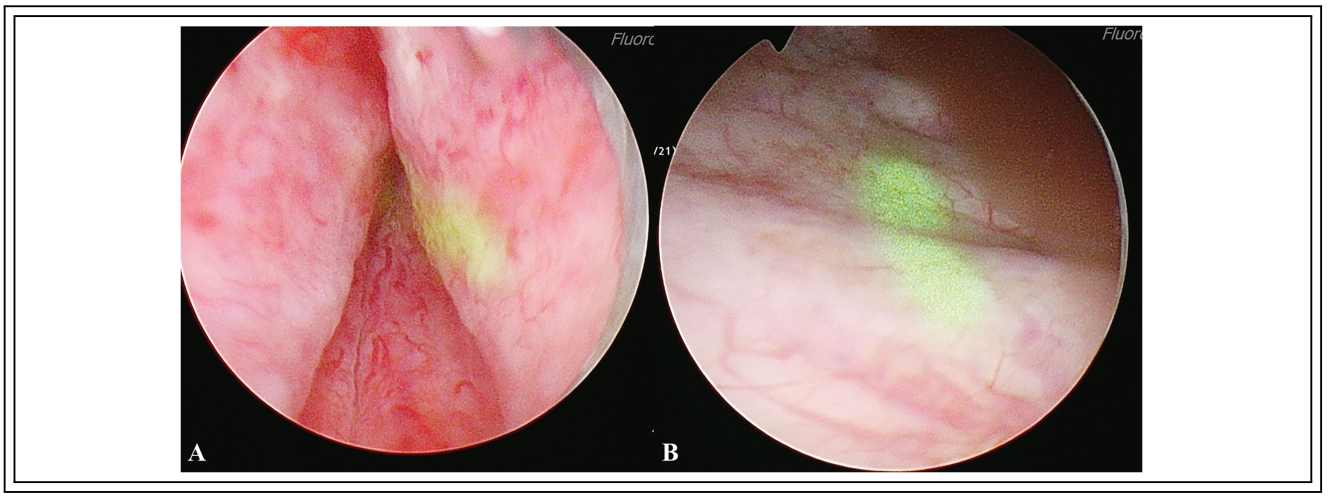

FIGURE 3. Intraoperative cystoscopy findings during TURP. (**A**) The appearance of the enlarged prostate gland with kissing lateral lobes. (**B**) No obvious lesion of the urinary bladder mucosa

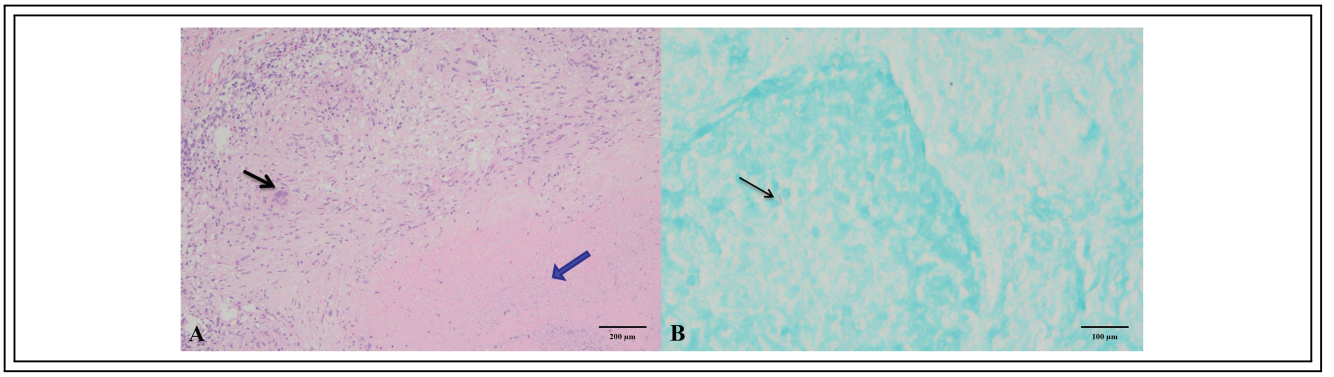

FIGURE 4. Representative prostate tissue sections demonstrate features consistent with tuberculous prostatitis. (**A**) H&E stain of the prostate shows granulomatous inflammation with caseous necrosis (blue arrow) and Langhans giant cells (black arrowhead). Scale bar = 200 μm. (**B**) Ziehl–Neelsen staining of the prostate tissue identifies acid-fast bacilli (black arrowhead). Scale bar = 100 μm

Renal ultrasonography and computed tomography (CT) did not reveal any renal abnormalities, such as hydronephrosis, papillary necrosis, or abnormal calcifications, and renal function remained stable throughout follow-up. Therefore, invasive evaluation, such as ureterorenoscopy, was not indicated.

Two weeks after TURP, the patient developed persistent abdominal cramping and diarrhea. A colonoscopy revealed an ulcerative lesion in the rectum (Figure 5A), and histopathology confirmed the presence of mycobacterial infection (Figure 5B,D) along with cytomegalovirus (CMV) colitis (Figure 5C). He was referred to an infectious disease specialist for further evaluation of TB. Subsequent sputum and stool cultures confirmed *Mycobacterium tuberculosis* infection. However, three sets of sputum and one stool sample tested negative for acid-fast bacilli, which may reflect a low bacillary burden. Immunological testing was performed and was negative for human immunodeficiency virus (Ag/Ab), and no detectable CMV viral load was found. A chest CT scan revealed multiple small, spiculated nodules in the bilateral upper lungs (Figure 6), consistent with pulmonary TB. Based on these findings, the patient began a two-month course of quadruple anti-TB therapy (isoniazid, rifampin, pyrazinamide, and ethambutol), followed by a four-month continuation phase with isoniazid, rifampin, and ethambutol. After completing six months of treatment, chest radiography showed residual lesions in the bilateral upper lungs without new active

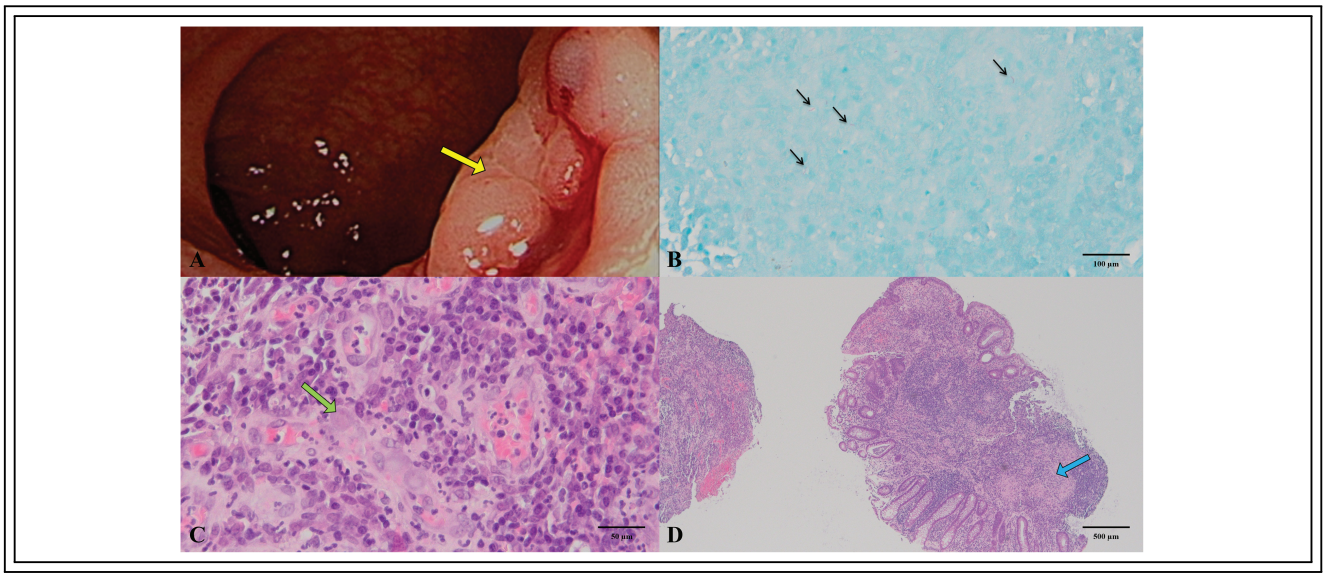

FIGURE 5. Colorectal findings associated with concurrent tuberculous and CMV infection. (**A**) Ulcerative lesion at the rectum (yellow arrow) under colonoscopy. (**B**) Ziehl–Neelsen staining of the rectum tissue identifies acid-fast bacilli (black arrowhead). Scale bar = 100 μm (**C**) H&E stain of the rectum tissue revealed cytomegalic endothelial cells with inclusions (green arrow). Scale bar = 50 μm (**D**) Epithelioid granuloma (blue arrow) formation. Scale bar = 500 μm

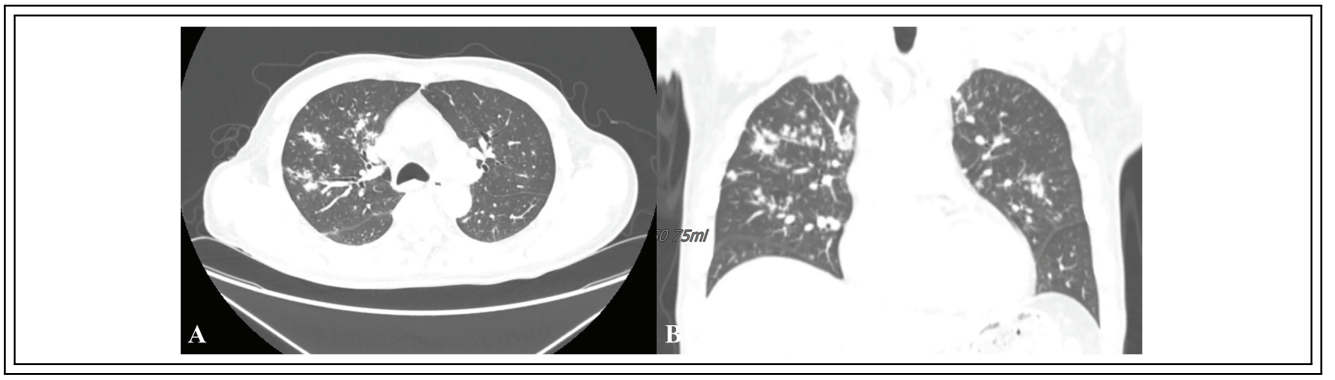

FIGURE 6. Chest CT scan revealed disseminated small nodules with spiculated margins in the bilateral upper lungs. (**A**) Axial view; (**B**) Coronal view

lesions. Additionally, *Mycobacterium tuberculosis* was not detected in either the urine or sputum culture. The patient remained clinically stable, though he was lost to follow-up three months after completing treatment. A summarized clinical timeline of the patient's presentation, diagnostic evaluation, and treatment course is provided in Table 1.

Although the patient's symptoms improved during treatment, several diagnostic limitations remained. First, scrotal ultrasonography, urine PCR testing for *Mycobacterium tuberculosis*, and detailed imaging of other genitourinary organs were not performed, and thus subtle involvement of adjacent structures cannot be completely ruled out. Another limitation is the absence of a patient perspective, as loss to follow-up prevented assessment of his experience and long-term outcomes.

Discussion

This case illustrates the diagnostic complexity of genitourinary tuberculosis, particularly when it presents

TABLE 1. **Timeline of the clinical course**

Timepoint	Clinical events & Symptoms	Interventions & Diagnostic findings
1 month prior to admission	Patient presented with urinary frequency and weak urinary stream.	**PSA:** 5.2 ng/mL. **Treatment:** silodosin and oxybutynin for suspected benign prostatic hyperplasia (BPH).
Admission	Worsening LUTS	**PSA:** Increased to 7.7 ng/mL. **DRE:** Enlarged prostate with firm consistency. **Ultrasound:** Enlarged prostate with estimated volume 93 mL.
Surgery	Persistent voiding difficulty.	**Procedure:** Transurethral Resection of the Prostate (TURP).
Post-operative diagnosis	No systemic symptoms initially.	**Pathology:** Granulomatous inflammation with acid-fast bacilli. **Diagnosis:** Prostatic Tuberculosis.
2 weeks post-TURP	Patient developed abdominal cramping and diarrhea	**Colonoscopy:** Ulcerative lesion in the rectum. **Biopsy:** Confirmed Rectal TB and CMV Colitis. **Chest CT:** Multiple spiculated nodules in bilateral upper lungs (Pulmonary TB).
Treatment initiation (Months 1–2)	Diagnosis of disseminated TB	**Regimen:** Quadruple anti-TB therapy (Isoniazid, Rifampin, Pyrazinamide, Ethambutol). **Microbiology:** Sputum/Stool cultures positive for *M. tuberculosis*.
Treatment continuation (Months 3–6)	Clinical condition stable.	**Regimen:** Continuation phase with Isoniazid, Rifampin, and Ethambutol.
6 months post-treatment	Complete resolution of urinary and gastrointestinal symptoms.	**Imaging:** Chest radiography showed stable residual lesions. **Microbiology:** Urine and sputum cultures were negative for *M. tuberculosis*.

as the primary manifestation of a systemic disease. The incidental discovery of prostatic TB during surgery for presumed BPH highlights the insidious clinical presentation and provides an opportunity to discuss several critical aspects of its diagnosis and management.

TB remains one of the most prevalent infectious diseases worldwide.[3] According to the World Health Organization's (WHO) 2024 Global Tuberculosis Report, an estimated 10.8 million new TB cases occurred in 2023, despite advances in public health interventions and antimicrobial therapy. Although the incidence of tuberculosis in Taiwan has shown a gradual decline over recent years, the disease burden remains substantial. In 2022, Taiwan still reported an incidence rate of approximately 28 cases per 100,000 population.[2] While pulmonary TB is the most common form, GU-TB is the third most common extrapulmonary manifestation, accounting for around 20% of EPTB cases.[3] Among GU-TB cases, renal involvement is the most frequent, followed by prostatic TB.[4]

Prostatic TB is typically a result of the hematogenous spread of *Mycobacterium tuberculosis*; however, lymphatic dissemination or local extension from adjacent structures, such as the epididymis, has also been reported.[5] As the clinical presentation of prostatic TB is often subtle and non-specific, it is often overlooked or misdiagnosed, leading to underreporting.[7] The gold standard for diagnosing TB in any organ system remains a positive culture, demonstrating the growth of *Mycobacterium tuberculosis*.[8] In suspected GU-TB cases, urine samples should be obtained. Acid-fast bacilli (AFB) smear is a useful but limited diagnostic tool. A previous study has shown that the sensitivity and specificity of acid-fast bacilli smear for GU-TB are relatively low, with reported sensitivity of 37.1% and specificity of 52.1%.[9] Molecular diagnostic tools, such as urine Polymerase Chain Reaction (PCR), are valuable for rapid diagnosis, particularly in AFB smear-negative cases where the bacterial

load is insufficient for microscopic detection,[10] with a sensitive rate of 95.9% and specificity rate of 98.1%.[11]

Ultrasound of the prostate might reveal multiple hypoechoic lesions, predominantly located in the peripheral zone.[12] A TRUS biopsy may be considered when the clinical suspicion remains high despite negative culture results. However, such a procedure has been associated with a risk of disseminating miliary TB.[13] Therefore, informed consent is critical when opting for these invasive investigations. In our case, prostate ultrasound revealed prominent central calcification, which is a common feature in prostatic TB, but no hypoechoic lesions were observed. Given the diagnostic challenges and risks associated with invasive procedures, MRI serves as a crucial tool for further characterization. On MRI, prostatic tuberculosis typically manifests as diffuse or focal hypointense lesions on T2-weighted images (T2WI), predominantly involving the peripheral zone, which can closely mimic the appearance of prostate carcinoma.[14] Diffusion-weighted imaging (DWI) often demonstrates restricted diffusion with corresponding low apparent diffusion coefficient (ADC) values, further complicating the differentiation from malignancy.[14]

Our patient presented with typical symptoms of BPH, including dysuria, urinary frequency, and a weak urinary stream, leading to the decision to perform TURP. Ideally, multiparametric MRI and TRUS-guided biopsy are standard investigations for elevated PSA. However, in real-world practice, resource limitations often determine management. The decision to proceed directly to TURP was based on the patient's severe obstructive symptoms requiring immediate relief, as well as his declination of further imaging due to financial considerations. Thus, TURP served both as a therapeutic intervention and a diagnostic procedure for tissue acquisition.[15] Consequently, routine histopathological evaluation of resected prostate chips is essential, particularly in endemic regions, as it remains the only definitive method to distinguish specific granulomatous inflammation from common benign pathologies that share similar clinical features. Clinically, the patient did not report any cough, systemic symptoms, or known TB exposure at presentation. He also reported painful swelling of the right scrotum, which was initially suspected to be bacterial epididymitis. The decision to defer immediate scrotal imaging or biopsy was based on the patient's rapid clinical response to empirical Cephalexin therapy. Since the pain and swelling subsided significantly with standard antibiotics, a bacterial etiology was initially favored. Retrospectively, while concurrent epididymal TB cannot be definitively excluded without tissue sampling, the resolution of symptoms suggests that a superimposed bacterial infection was the primary cause of the scrotal presentation.

Since prostatic tuberculosis typically results from the hematogenous dissemination of *Mycobacterium tuberculosis*, it rarely exists in isolation. Consequently, the identification of prostatic involvement serves as a potential marker for systemic disease, necessitating a thorough investigation for other occult foci of infection throughout the body, especially chest X-ray and CT scan. Autopsy studies have demonstrated that 85% of patients with GU-TB also have pulmonary lesions.[16] A major challenge in this case was the patient's asymptomatic pulmonary presentation, which masked the severity of his systemic infection. While preoperative chest radiography revealed scattered bilateral nodules that were not initially identified as suspicious for TB, it was only through the superior resolution of the subsequent chest CT scan that the characteristic spiculated margins of the nodules were identified. This prompted the sputum analysis that confirmed the diagnosis.

Additionally, the immunological profile should be evaluated to rule out acquired immunodeficiency syndrome (AIDS).[17] In our patient, rectal TB and CMV colitis were both identified in the biopsy, which may have contributed to the gastrointestinal symptoms. Although positive stool cultures in patients with pulmonary TB can sometimes be attributed to swallowed sputum, the diagnosis of rectal tuberculosis was unequivocally confirmed through histopathology. The presence of epithelioid granulomas and acid-fast bacilli directly within the rectal tissue provided robust evidence of tissue invasion, rather than simple luminal contamination from swallowed respiratory secretions. Rectal involvement in TB is exceedingly uncommon and accounts for less than 5% of all gastrointestinal TB cases.[18] Reported presentations include abdominal pain, altered bowel habits, bleeding, or ulcerative lesions resembling inflammatory bowel disease or malignancy.[19] The coexistence of rectal TB and CMV colitis in our patient is particularly unusual, since CMV colitis is most frequently observed in individuals with significant immunosuppression. Nevertheless, isolated reports have described CMV colitis in older or diabetic patients without overt immune compromise, suggesting that local mucosal inflammation may result in opportunistic infection.[20] We hypothesize that the underlying tuberculous mucosal damage likely compromised local immune barriers, enabling CMV reactivation or secondary infection, even in the absence of detectable

systemic immunodeficiency. Our patient's clinical presentation raised concerns about possible underlying immune dysfunction; however, further testing revealed no evidence of AIDS. The coexistence of rectal TB and CMV colitis in this patient illustrates that overlapping infections may arise even without clear evidence of systemic immune compromise. Hence, tissue diagnosis remains essential whenever endoscopic findings are inconclusive or atypical.

For immunocompetent patients with confirmed GU-TB, the recommended treatment regimen consists of a two-month intensive phase with rifampicin, isoniazid, pyrazinamide, and ethambutol, followed by a four-month continuation phase with rifampicin and isoniazid.[21] This regimen has demonstrated high cure rates for both pulmonary and extrapulmonary TB, including prostatic and other genitourinary sites.[22] Given the rising prevalence of multidrug-resistant TB, antimicrobial susceptibility testing is essential to guide therapy. Surgical intervention is generally reserved for selected situations, such as diagnostic uncertainty, obstructive uropathy, nonresponsive disease, persistent abscess formation, or severely damaged organs.[23]

Distinguishing between miliary tuberculosis and hematogenous dissemination is critical for prognosis. In our case, although the chest CT revealed multiple small, spiculated nodules, these lesions were not diffusely distributed throughout the lung fields, which are radiologic features of miliary TB.[24] Furthermore, the patient lacked the characteristic systemic presentation of miliary disease, such as high-grade fever, night sweats, or significant weight loss. Therefore, we interpreted the pulmonary findings as evidence of hematogenous dissemination rather than acute miliary tuberculosis. This case underscores the importance of thoroughly evaluating other potential TB sites when prostatic TB is diagnosed.

After six months of anti-TB therapy, the patient showed resolution of symptoms, and interval imaging demonstrated no new lesions. Both urine acid-fast staining and culture were negative at follow-up, supporting adequate therapeutic response. Although urine PCR was not initially performed, it would not have influenced the therapeutic plan since histopathological and sputum confirmation of the disease had been obtained. Early recognition of GU-TB is essential, as delayed diagnosis can result in disease progression, persistent urinary tract involvement, and irreversible structural damage, including urethral strictures, bladder contracture, or renal impairment.[4]

In this case, imaging did not demonstrate renal involvement, and renal function remained stable throughout follow-up, thus obviating the need for invasive upper tract investigations, such as ureterorenoscopy. This report has several limitations. First, there was the lack of comprehensive imaging and tissue sampling of other genitourinary organs, such as the epididymis and kidneys. Consequently, the possibility of the involvement of adjacent structures cannot be entirely excluded. An additional limitation is the absence of a patient-perspective section, as the patient was eventually lost to follow-up, preventing further insight into his clinical experience and long-term outcomes.

Conclusion

Prostatic TB should be recognized as a rare yet clinically important manifestation of GU-TB, as it frequently mimics benign prostatic hyperplasia or chronic prostatitis. It is crucial to perform a systematic evaluation for additional TB foci, particularly pulmonary involvement, when prostatic TB is diagnosed. In TB-endemic regions such as Taiwan, recognizing atypical presentations of LUTS, scrotal symptoms, or unexplained imaging findings is crucial to avoid diagnostic delay. Early consideration of TB, timely histopathologic confirmation, and prompt initiation of anti-TB therapy are essential to prevent disease progression and irreversible organ damage. Furthermore, close post-treatment surveillance is vital to monitor for potential late complications, such as urethral strictures, which can occur during the healing process.

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Author Contributions

Study conception and design: Shao-Chen Su, Yi-Sheng Lin. Data collection: Shao-Chen Su, Zhon-Min Huang. Analysis and interpretation of results: Shao-Chen Su, Yi-Sheng Lin, Zhon-Min Huang, Chao-Yu Hsu. Draft manuscript preparation: Shao-Chen Su, Yi-Sheng Lin, Zhon-Min Huang, Yen-Chuan Ou. All authors reviewed the results and approved the final version of the manuscript.

Availability of Data and Materials

All data generated or analyzed during this study are included in this published article. Further inquiries can be directed to the corresponding authors.

Ethics Approval

This case report was approved by the Institutional Review Board (IRB) of Tungs' Taichung Metroharbor Hospital (approval no. TTMHH-IRB-114061). The requirement for informed consent was waived by the IRB.

Conflicts of Interest

The authors declare no conflicts of interest to report regarding the present study.

Supplementary Materials

The supplementary material is available online at https://www.techscience.com/doi/10.32604/cju.2025.73769/s1.

Abbreviations

AFB	Acid-Fast stain
CMV	Cytomegalovirus colitis
CT	Computed tomography
EPTB	Extra-pulmonary tuberculosis
GU-TB	Genitourinary tuberculosis
LUTS	Lower urinary tract symptoms
MRI	Magnetic Resonance Imaging
PCR	Polymerase chain reaction
PSA	Prostate specific antigen
TB	Tuberculosis
TURP	Transurethral resection of prostate
TRUS	Transrectal ultrasound
URS	Ureterorenoscopy

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