Renal Tuberculosis, the Great Mimicker: From Recurrent Urinary Tract Infection to Nephrectomy

Dr. Yuvanes Kumar A/L V J Kumaran[1]*, Dr. Anuradha A/P P Radhakrishnan[2], Dr. Alif Adlan Bin Mohd Thabit[3]

[1]Department of Internal Medicine, Hospital Selayang, Selangor, Malaysia.

[2,3]Department of Infectious Disease, Hospital Selayang, Selangor, Malaysia.

ABSTRACT

Extra-pulmonary tuberculosis is more common in immunocompromised patients such as HIV, uncontrolled diabetes mellitus, patients on immunosuppressants, children <15 years old and elderly individuals above the age of 65. Urogenital TB occurs in 2-20% of individuals with pulmonary TB (1). It is frequently misdiagnosed due to a lack of awareness among clinicians, non-specific symptoms and slow progression of disease. A low threshold for investigation towards genitourinary TB is needed in patients who are immunosuppressed and present with recurrent urinary tract infection despite being on a standard antibiotic regimen. Prompt treatment is warranted in such patients. In this case report, we will discuss a case of renal TB which was diagnosed late and resulted in devastating complications.

Keywords: Renal Tuberculosis, Recurrent Urinary Tract Infection, TB Mimick.

Address of Corresponding Author

Dr. Yuvanes Kumar A/L V J Kumaran; Department of Internal Medicine, Hospital Selayang, Selangor, Malaysia.

E-mail: y_kumar18@yahoo.com

Crossref Doi: https://doi.org/10.36437/irmhs.2025.8.5.B

Introduction

Renal tuberculosis (renal TB) is part of urogenital TB which is a chronic granulomatous infection caused by Mycobacterium tuberculosis. Urogenital tuberculosis is the third most common form of extrapulmonary TB.[1] The disease is insidious with symptoms ranging from asymptomatic bacteriuria to flank pain, dysuria, hematuria and renal dysfunction. Diagnosis of renal TB is often overlooked, and a high index of suspicion is warranted for a prompt diagnosis to be made.

Among patients with miliary disease, hematogenous seeding of the urogenital tract can occur in up to 62% of case.[2] Urogenital TB has a mean age of 40 years, with one review revealing a male preponderance.[3]

The diagnosis should be suspected in patients with a relevant clinical picture and epidemiological factors. Diagnosis relies on urine microscopy for acid-fast bacilli, cultures, radiographic imaging and in certain circumstances, histopathology.[1] Final diagnosis is established by demonstration of tubercle bacilli in the urine.

Treatment follows the standard anti-tuberculosis regimen, typically consisting of Isoniazid, Rifampicin, Ethambutol and Pyrazinamide for 6 months with extended therapy in cases of severe renal involvement, complications or immunosuppressed patients.[1]

Early recognition and management is crucial to prevent irreversible renal damage.

Case Presentation

Patient is a 21-year-old lady with underlying SLE with lupus nephritis who was on a prolonged period of immunosuppressant, ie. T. Hydroxychloroquine 200mg OD, T. Tacrolimus 2mg BD and T Prednisolone 10/7.5mg OD on alternate days respectively since the year 2016.

Prior to initiation of immunosuppressant, the patient was tested negative for human immunodeficiency virus and hepatitis B/C. The patient started to develop dysuria in early 2021, associated with frothy urine. She was seen at the clinic during her routine visit and noted to have deteriorating kidney function. She was treated for a urinary tract infection with oral antibiotics, T. Cefuroxime 250mg BD for one week. However, despite treatment with oral antibiotics, the patient had persistent dysuria and hence planned for an ultrasound of the kidney, ureter, and bladder (US KUB) as an outpatient. US KUB done showed a left renal abscess with mild hydronephrosis.

Patient's steroid medications and immunosuppressants were withheld and started on IV Ceftriaxone inpatient. However, her dysuria remained, and hence a CT renal was done which showed bilateral multiloculated renal abscesses, worse on the left and associated with mild left hydronephrosis, left ureteritis, and cystitis. The US kidney ureter bladder was repeated after 16 days of intravenous antibiotics to see progression of the disease, revealing unchanged bilateral multiloculated renal abscesses. Patient's intravenous antibiotics were continued, however clinically she did not improve, and a urogenital TB workup was done.

Urine AFB sent was reported as positive. In addition to that, Urine Gene Xpert for tuberculosis and MTB C&S was positive for MTB complex, sensitive to the first-line anti-tuberculous regimen. Both chest radiograph and CT thorax to look for pulmonary TB involvement revealed no abnormality. Ultrasound-guided biopsy of left renal lesion done; however, the patient was only able to aspirate 10cc of pus and sent for microbiological sampling which was also positive for tuberculosis. She was started on the first line of anti tb based on MTB culture, i.e., T.Akurit-4 3 tabs OD which consists of (Isoniazid, Rifampicin, Ethambutol and Pyrazinamide). While she was on anti-TB, she needed an adjustment of the anti-TB regimen due to transaminitis. Patient was able to complete the anti-TB regimen as adjusted during the intensive phase and then changed to T.Akurit-2 3 tabs OD (Isoniazid, Rifampicin) for 4 months after the repeated urine AFB was negative. The repeated urine AFB after 6 months of total anti-TB was negative, thus anti tb was discontinued.

Despite the above measures, the patient was noted to have on-and-off cloudy urine 1 month after completion of anti-TB. Urine full microscopy sent was positive for yeast cell (persistently positive for yeast cell since early July 2023 and completed 1 course of antifungal-Fluconazole for 1 week). She was then readmitted to the ward and started on empirical antibiotics IV Ceftriaxone 2g OD and anti tb restarted. However, repeated urine MTB C&S and AFB were negative for TB. CECT abdomen showed bilateral multiloculated renal abscesses, worsening on the left associated with mild left hydronephrosis, left pelviureteritis, cystitis and reactive lymph nodes. However, no involvement of spleen, liver or adrenal glands could be found. Done MAT3 scan to assess accurate functioning of each kidney, and it revealed satisfactory function of the right kidney but severely reduced function of the left kidney, approaching non-functional status. As the left kidney tissue had already necrosed from tuberculosis infection and was anticipated to undergo auto-amputation which will cause recurrent pain and fever, the patient was planned for radical left nephrectomy. Histopathology of the resected kidney and para-aortic lymph nodes was suggestive of chronic granulomatous inflammation consistent with tuberculosis and caseating granulomatous inflammation.

Post-nephrectomy, the patient completed anti-TB treatment for 9 months, free of UTI symptoms, and the patient's creatinine clearance remained static at a range of CKD stage 2.

Discussion

Renal tuberculosis (renal TB) is a rare but serious form of extrapulmonary TB that often presents insidiously, leading to delayed diagnosis and significant complications.[4] This case highlights the challenges in diagnosing and managing renal TB in an immunosuppressed patient, emphasizing the

need for early suspicion, prompt investigation, and aggressive treatment to prevent irreversible renal damage.

Renal TB often has delayed recognition. Renal TB is often misdiagnosed due to its non-specific symptoms, which overlap with more common conditions such as bacterial urinary tract infections (UTIs) and pyelonephritis.[5] In this case, the patient initially presented with persistent dysuria and deteriorating renal function, which were attributed to a urinary tract infection. Despite multiple courses of antibiotics, her symptoms persisted, prompting further imaging, which eventually revealed multiloculated renal abscesses and hydronephrosis. TB is often called the great mimicker, and a delay in diagnosis may lead to prolonged morbidity and irreversible loss of renal function.[6]

A high index of suspicion for renal TB is warranted, especially in immunosuppressed patients. In such patients, recurrent or atypical UTIs should prompt early screening for TB. Selecting specific testing for genitourinary TB is case-dependent and varies based on patient presentation. Although urine AFB can be useful in diagnosis, the possibility of it also detecting NTM is high.[7] MTB C&S is the gold standard to diagnose genitourinary TB; however, the result can take up to 8 weeks and this leaves room for urine PCR testing which can aid in prompter diagnosis of genitourinary TB.[8] Urine MTB gene Xpert carries a sensitivity and specificity of 85.9% and 96.1%, respectively.[9] However, due to the small risk of false positive results, it has to be paired with urine culture.[8] Detection with liquid-based media is faster and slightly more sensitive than with solid-based media although the high sensitivity of that method is prone to contamination with environmental mycobacteria and a host of other organisms.[10,11] The time taken to isolate mycobacteria is important to attain a rapid diagnosis. Ultrasonography can be helpful as an early imaging modality; however, the findings may be non-specific.[12] A CT scan is more sensitive to reveal renal calcification, and CT IVP is more sensitive to detect stages of renal TB.[12] Renal nuclear scan, such as MAT3 scan, helps in the identification of kidney function and also to monitor the effect of therapy. Biopsies are recommended in case of suspicious clinical and radiological findings with a diagnostic dilemma.[13]

In this case, the progression from renal abscesses to extensive renal involvement demonstrates the destructive nature of renal TB when left untreated or inadequately managed. The patient developed worsening hydronephrosis, ureteritis, and cystitis, ultimately leading to necrosis of the left kidney. The chronic granulomatous inflammation caused by Mycobacterium tuberculosis can result in fibrosis, stricture formation, and renal parenchymal destruction, eventually leading to non-functioning kidneys.

Despite completing a full course of anti-TB therapy for 6 months, the patient continued to experience cloudy urine, suggesting ongoing renal damage. The decision to perform a nephrectomy was made due to the severely reduced function of the left kidney and the risk of persistent infection or auto-amputation, a phenomenon where the necrotic kidney undergoes spontaneous resorption. The histopathological findings of caseating granulomas confirmed the diagnosis of renal TB, reinforcing the need for aggressive management.

Standard anti-TB therapy, consisting of isoniazid, rifampicin, ethambutol, and pyrazinamide, remains the cornerstone of treatment for renal TB. In immunosuppressed individuals or those with severe renal involvement, extended therapy beyond the typical six-month regimen may be necessary.[14] This patient initially received six months of anti-TB therapy but required re-initiation of treatment following recurrent symptoms and imaging findings of worsening renal disease. Ultimately, she completed a total of nine months of anti-TB therapy following nephrectomy, resulting in resolution of symptoms and stabilization of renal function at chronic kidney disease (CKD) stage 2.

This case underscores the importance of individualized treatment plans in renal TB, particularly in immunocompromised patients. Early intervention with anti-TB therapy can prevent complications, but in cases of extensive renal destruction, surgical intervention may be required.[2] Post-treatment monitoring is crucial, as persistent symptoms or recurrent infections may indicate treatment failure, drug resistance, or secondary infections requiring further evaluation.[3]

Conclusion

All urogenital tract infections in immunocompromised patients should have a low threshold for investigation towards tuberculosis. Recurrent infection with resistance to standard antibiotics should raise suspicion towards urogenital tuberculosis. Treatment of drug-sensitive TB requires 6–9 months of standard anti-TB, and multidrug-resistant TB requires 12-24 months of anti Tb. However, an extended duration of anti-TB is needed in immunocompromised patients, although they are sensitive to standard therapy. Surgical intervention, such as nephrectomy or rarely reconstruction of the genital tract, is indicated for a severely damaged kidney or urogenital tract, respectively. Therefore, urogenital TB needs early diagnosis and prompt treatment to prevent complications and optimize patient outcomes.

References

1. Visveswaran RK. Urogenital tuberculosis [Internet]. UpToDate. 2025 [cited 2025 Mar 17]. Available from: https://www.uptodate.com/contents/urogenital-tuberculosis?search=urogenital%20tuberculosis&source=search_result&selectedTitle=1%7E150&usage_type=default&display_rank=1
2. Roddy K, Tobin EH, Leslie SW, Ratfish B. Genitourinary Tuberculosis. 2024 Aug; https://pubmed.ncbi.nlm.nih.gov/32491490/
3. Figueiredo AA, Lucon AM. Urogenital Tuberculosis: Update and Review of 8961 Cases from the World Literature. Reviews in Urology. 2024 Aug;10(3):207–217. https://pmc.ncbi.nlm.nih.gov/articles/PMC2556487/
4. Nor Z, Nazari MJ. Hydronephrosis secondary to isolated renal tuberculosis in an immunocompetent adolescent: "A case report." Urology Case Reports. 2024 Nov;57. doi: https://doi.org/10.1016/J.EUCR.2024.102876
5. Muneer, A., Macrae, B., Krishnamoorthy, S. *et al.* Urogenital tuberculosis — epidemiology, pathogenesis and clinical features. *Nat Rev Urol* **16**, 573–598 (2019). doi: https://doi.org/10.1038/s41585-019-0228-9
6. Tuberculosis of the genitourinary system: urinary tract tuberculosis: renal tuberculosis-part I. Merchant S, Bharati A, Merchant N. Indian J Radiol Imaging. 2013;23:46–63. doi: doi: https://doi.org/10.4103/0971-3026.113615
7. Atherton RR, Cresswell FV, Ellis J, Skipper C, Tadeo KK, Mugumya G, Wadda V, Meya DB, Boulware DR. Detection of Mycobacterium tuberculosis in urine by Xpert MTB/RIF Ultra: A useful adjunctive diagnostic tool in HIV-associated tuberculosis. Int J Infect Dis. 2018; doi: https://doi.org/10.1016/j.ijid.2018.07.007
8. Bausch K, Mantica G, Smith EJ, Bartoletti R, Bruyère F, Cai T, Geerlings S, Kranz J, Köves B, Pilatz A, Schubert S, Veeratterapillay R, Wagenlehner F, Gupta N, Bonkat G. Genitourinary Tuberculosis: A Brief Manual for Urologists on Diagnosis and Treatment from the European Association of Urology Urological Infections Panel. Eur Urol Focus. 2024 Jan;10(1):77-79. doi: https://doi.org/10.1016/j.euf.2023.07.006

9. Ministry of Health Malaysia. Management of Tuberculosis. 4th ed. Putrajaya: Malaysian Health Technology Assesment Section; 2021; https://www.moh.gov.my/images/04-penerbitan/penerbitan-klinikal/panduan-amalan-klinikal/CPG-_Management_of_Tuberculosis_4th_Edition.pdf
10. Hanna BA, Ebrahimzadeh A, Elliott LB, Morgan MA, Novak SM, et al. Multicenter evaluation of the BACTEC MGIT 960 system for recovery of mycobacteria. J Clin Microbiol. 1999;37:748–752. doi: https://doi.org/10.1128/JCM.37.3.748-752.1999
11. Dowdy DW, Lourenço MC, Cavalcante SC, Saraceni V, King B, et al. Impact and cost-effectiveness of culture for diagnosis of tuberculosis in HIV-infected Brazilian adults. PloS One. 2008;3:e4057. doi: https://doi.org/10.1371/journal.pone.0004057
12. Amukotuwa s, Niknejad M, Luitel S, et al. Renal tuberculosis. Reference article, Radiopaedia.org (Accessed on 18 Mar 2025); https://doi.org/10.53347/rID-1973
13. Dinnes J, Deeks J, Kunst H, Gibson A, Cummins E, Waugh N, Drobniewski F, Lalvani A. A systematic review of rapid diagnostic tests for the detection of tuberculosis infection. Health Technol Assess. 2007 Jan;11(3):1-196. doi: https://doi.org/10.3310/hta11030
14. Wejse C. Medical treatment for urogenital tuberculosis (UGTB). GMS Infect Dis. 2018 Aug 9;6:Doc04. doi: https://doi.org/10.3205/id000039

How to cite this Article: Yuvanes Kumar A/L V J Kumaran, Anuradha A/P P Radhakrishnan, Alif Adlan Bin Mohd Thabit; Renal Tuberculosis, the Great Mimicker: From Recurrent Urinary Tract Infection to Nephrectomy; Int. Res. Med. Health Sci., 2025; (8-5): 13-17; doi: https://doi.org/10.36437/irmhs.2025.8.5.B
Source of Support: Nil, **Conflict of Interest:** None declared.
Received: 11-10-2025; **Revision:** 16-11-2025; **Accepted:** 23-12-2025