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Case Report

Tuberculous spondylodiscitis with ureteral involvement: a rare case report

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Abstract: Background: Tuberculosis spondylitis, also known as Pott's disease, is a form of osteomyelitis that primarily affects the vertebral bodies and can lead to severe complications such as paravertebral abscesses, kyphosis, and degenerative spinal changes. Although it typically involves the skeletal system, contiguous spread to adjacent organs, such as the genitourinary tract, is rare. Methods: We report the case of a 64-year-old male with chronic back pain who underwent a renal protocol abdominopelvic CT scan following ultrasound findings of right kidney stasis. Results: The CT revealed obstructive uropathy with a dilated and tortuous ureter, a 27×30 mm intraluminal lesion, intraluminal gas, and periureteric fibrosis. Fusion of the L3-L5 vertebrae with gibbous deformity and degenerative changes suggested tuberculous spondylodiscitis with extension to the ureter. Urinalysis was positive for acid-fast bacilli, confirming genitourinary tuberculosis. The patient underwent right ureteronephrectomy due to pyonephrosis and extensive adhesions precluding ureteral reconstruction. Conclusion: This case highlights a rare but serious complication of spinal tuberculosis involving direct spread to the ureter. Timely diagnosis using imaging and microbiological testing, followed by appropriate surgical intervention, is critical to prevent long-term morbidity.

Keywords: Tuberculosis, spondylodiscitis, ureter, computed tomography

Introduction

Extrapulmonary tuberculosis may occur as a primary form without pulmonary involvement or as a consequence of primary pulmonary tuberculosis [1]. Tuberculous spondylitis, also known as Pott's disease, is an osteomyelitis of the vertebral bodies that accounts for approximately 50% of skeletal tuberculosis cases, 2-3% of all tuberculosis cases, and 15% of extrapulmonary tuberculosis cases [2]. Tuberculous spondylitis is diagnosed based on clinical suspicion, imaging findings (especially MRI), and microbiological or histopathological confirmation of Mycobacterium tuberculosis [3]. Typical clinical features include chronic back pain, fever, night sweats, weight loss, and in advanced cases, neurological deficits [4]. Laboratory findings often reveal elevated ESR and CRP, with confirmation via acid-fast bacilli in tissue or urine, culture, or PCR. First-line treatment involves a prolonged course of anti-tuberculosis therapy (usually 6-12 months) [5]. Surgery is reserved for cases with spinal instability, neurologic compromise, or severe deformity. Prognosis is generally favorable with early diagnosis and appropriate management. It can spread from anterior arterial arcades or the venous plexus of Boston. Its dissemination from arterial arcades, which supply anterosuperior and anteroinferior vertebral bodies, leads to paravertebral abscess, which may cause kyphosis and Gibbus deformity. Disk spaces are eventually spared due to sparse vasculature, especially in adults [6]. Spreading through the venous plexus can cause vertebral collapse, vertebra plana, acute kyphosis, and Gibbus deformity in the long run. Afterwards, it can lead to degenerative changes

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like disk desiccation, the formation of osteophytes, and the occurrence of vacuum phenomena. Tuberculosis can spread hematogenously or by direct extension to adjacent organs [2]. Tuberculous spondylitis typically spreads hematogenously from a primary pulmonary focus, involving the anterior vertebral body and potentially extending to adjacent structures, including the ureter, through direct contiguous spread. The resulting inflammation and fibrosis can lead to ureteral obstruction, hydronephrosis, or secondary infection. Pathogenesis involves granulomatous inflammation with caseous necrosis and vertebral destruction [7, 8]. Management requires a combination of antituberculosis therapy and, in cases with complications like ureteral obstruction, surgical intervention to preserve organ function and prevent further morbidity [9].

Case presentation

A 64-year-old male with chronic back pain was referred for a complementary abdominopelvic CT scan at Tabesh Medical Imaging Center following the detection of severe stasis in the right kidney on ultrasonography. The renal protocol CT scan revealed decreased parenchymal enhancement of the right kidney along with delayed excretion, indicative of obstructive uropathy. Significant stasis was noted in the right kidney, with a dilated and tortuous proximal ureter. A 27×30 mm intraluminal lesion was identified in the ureter, accompanied by the presence of gas approximately 6 cm distal to the right UPJ. Periureteric and anterior vertebral fibrosis were also observed. No para-aortic or periureteric lymphadenopathy was detected. Additionally, fusion of the L3, L4, and L5 vertebral bodies was noted, along with reversed lumbar lordosis and marked degenerative joint disease at the L5-S1 level, characterized by anterior osteophyte formation and a vacuum phenomenon. The spine's gibbous deformity's direct extension to the ureter and tuberculoma suggest spondylodiskitis. A urine test was done and a positive result for acid-fast bacilli was positive.

After the patient was placed in a supine position under general anesthesia and prepped and draped in a sterile fashion, a midline incision was made through the skin, subcutaneous tissue, and muscle layers. Subsequently, a right anterior subcostal incision was performed to further access the surgical site. Upon entering the abdominal cavity, the liver was mobilized superiorly, and adhesionolysis of the bowel was carried out prior to medialization. The right renal pedicle was then identified, and the renal artery and vein were double-ligated with 2-0 silk sutures and transected. The kidney was carefully mobilized and separated from the surroundingtissues.Duetothepresenceofpyonephrosis, dense adhesions, and the inability to reconstruct the affected ureter, a right ureteronephrectomy was performed. Hemostasis was achieved using Surgicel and hemostatic powder. An 18 Fr Nelaton catheter was inserted as a drain. The pathology report confirmed the presence of caseating granulomas and tuberculosis bacilli (**Figures 1**, **2**).

Postoperatively, the patient recovered without immediate complications and was monitored closely for signs of infection or renal dysfunction. Anti-tuberculosis therapy was initiated, including isoniazid, rifampin, pyrazinamide, and ethambutol, planned for a total duration of 9 months. Follow-up urine cultures showed no growth of acid-fast bacilli, indicating good initial response. The patient was scheduled for regular imaging and laboratory assessments to monitor for recurrence or residual disease.

Discussion

Tuberculosis spondylodiscitis arises from the infection of the spine by Mycobacterium tuberculosis, resulting in inflammation and degradation of the vertebrae and intervertebral discs. The infection may extend to nearby structures, such as the ureter, resulting in further complications [10]. Patients may exhibit back pain, fever, night sweats, weight loss, and neurological deficits in cases of spinal cord compression. Involvement of the ureter may result in symptoms including flank pain, hematuria, and urinary tract infections [10, 11].

Diagnosis generally requires an integration of clinical characteristics, imaging modalities (e.g., MRI or CT scans), and microbiological assessments (such as sputum culture or biopsy). Imaging can demonstrate vertebral destruction, disc involvement, and ureteral involvement [12]. Treatment generally involves a regimen of anti-tuberculosis medications administered over an extended duration, typically rang-

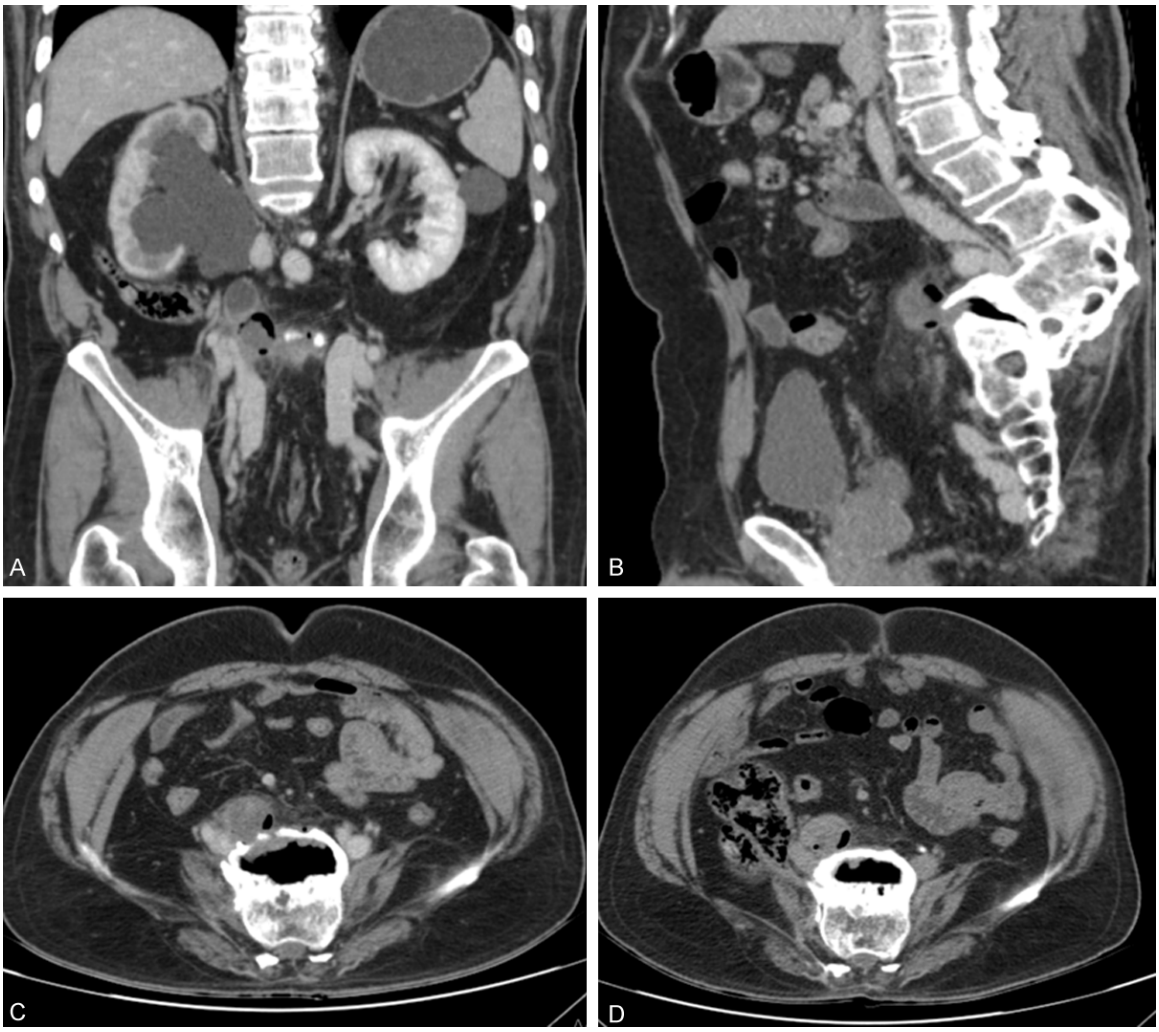

Figure 1. Abdominopelvic CT scan with contrast. In the portovenous phase, (A) coronal images show severe stasis of the right kidney with an intra-ureteric mass lesion in the midpart of the ureter; (B) sagittal images show Gibbus deformity of lower lumbar spines with degenerative changes and a vacuum phenomenon; and (C) direct invasion of spondylitis to the right ureter with tuberculoma within the ureter. In the delayed phase, (D) the right kidney's excretion is delayed due to obstructive uropathy.

ing from 6 to 9 months. Surgical intervention is indicated in instances of severe spinal instability, neurological deficits, or considerable ureteral obstruction. Timely diagnosis and management are essential to avert severe complications and long-term disability, although the prognosis can be favorable with appropriate treatment [10, 12].

Conversely, renal tuberculosis represents a prevalent form of extra-pulmonary tuberculosis, constituting 20% of cases and resulting in 3 million deaths each year [13]. The disease may result in significant renal mass destruction, stricture, obstruction, secondary calculi, and infection, ultimately contributing to renal functional loss and failure. Common clinical features encompass frequency, dysuria, urgency, hematuria, and loin pain. Constitutional symptoms are present in 14% of patients, whereas 20% exhibit no symptoms. Irritative voiding symptoms and dysuria resulting from urinary inflammation are prevalent. Flank pain resulting from ureteral obstruction is prevalent. Hypertension occurs in 5-10% of cases of renal tuberculosis, with increased prevalence following nephrectomy in instances of impaired renal function [14, 15]. Intravenous urography and CT scans are valuable tools in the differential diagnosis, as they can reveal characteristic features such as gross strictures, cavities, and calcifications. Patients presenting with localized

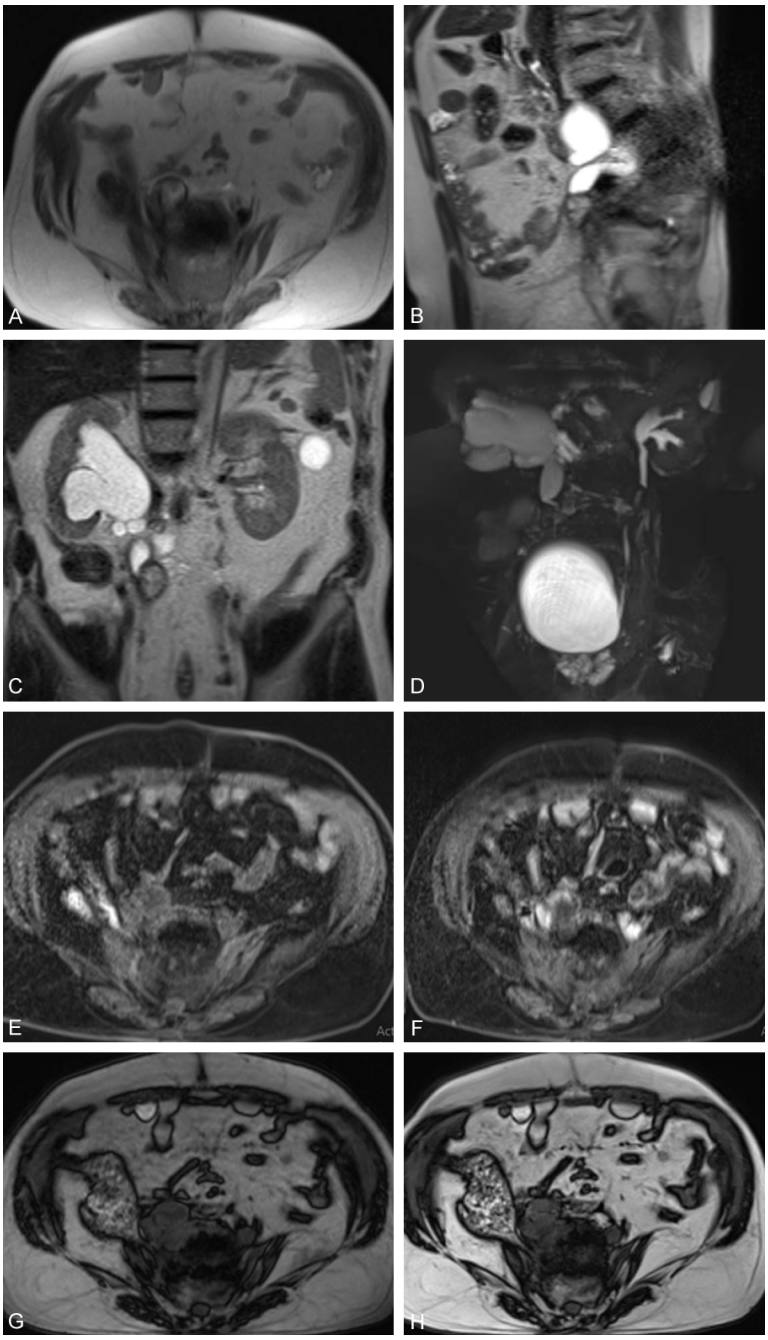

Figure 2. Abdominopelvic MRI with and without contrast. (A) Axial T2 HASTE, (B) Sagittal T2 HASTE, (C) Coronal T2 HASTE (D) MRU, (E) T1 fl2d, (F) T2 TRUFI, (G) T1 VIBE without contrast and (H) with contrast images show an intra ureteric lesion with in continuity to the spondylitis and minimal post contrast enhancement.

urinary symptoms and abnormal urinalysis - especially in the context of negative routine urine cultures - should be screened for tuberculosis.

In our report, the patient with persistent back discomfort was referred for a CT scan following the observation of significant stasis in the right kidney on ultrasonography. The CT scan revealed diminished renal function and delayed urinary excretion due to obstructive uropathy. Additionally, a lesion and gas were identified within the ureter, along with fibrosis surrounding the ureter and adjacent spine. The patient exhibited fused vertebrae with degenerative changes and a gibbous spinal deformity extending toward the ureter, suggestive of spondylodiscitis. Urine analysis confirmed the presence of acid-fast bacilli, indicative of tuberculosis. The patient subsequently underwent surgical excision of the affected ureter followed by anastomosis.

This case has parallels to earlier documented instances of TB spondylodiscitis with atypical manifestations. A 2012 case by Chhaya Bhatt et al. [16] involves a 30-year-old female with renal TB who presented with a paraspinal abscess and sinus tract development, necessitating a nephrectomy for therapy. Both instances underscore the necessity of evaluating TB in individuals with atypical spinal and renal manifestations. A 2022 case report from Academic OUP [17] described a young immunocompetent patient with severe multilevel tuberculous spondylodiscitis. This case highlighted the intricacy and many manifestations of spinal TB, despite the absence of ureteral problems.

Finally, a 2023 report from the Faculty of Medicine [18] addressed tuberculous spondylodiscitis, although exact information were few. These accounts collectively underscore the varied signs and considerable morbidity linked to TB, emphasizing the necessity for timely diagnosis and tailored treatment approaches.

Conclusion

Our case of tuberculous spondylodiscitis with ureteral involvement is rare and highlights the complex and varied manifestations of tuberculosis. It underscores the importance of maintaining a high index of suspicion and adopting a multidisciplinary approach to improve patient outcomes.

Disclosure of conflict of interest

None.

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