A neglected case of Genito-urinary tuberculosis; presenting with "Putty" Kidney and "Thimble" bladder

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ABSTRACT: Tuberculosis is the most important health care challenge being faced by most developing countries in the 21st century. Tremendous improvements have been made in the diagnosis and treatment of tuberculosis. Considerable resources and effort is being put into making effective and affordable anti-tuberculosis treatment easily access to every patient with tuberculosis. Yet, we came across this patient, who despite being diagnosed with genitor-urinary tuberculosis about 6 years ago refused to take anti-tuberculosis treatment. He ignored all medical advice and took over the counter medications for his symptoms. He presented with advanced renal dysfunction, requiring dialysis. He was found to have advanced genito-urinary tuberculosis with "thimble" bladder, ureteric calcification, non-functioning right kidney and left hydroureteronephrosis. He underwent right nephrectomy and his nephrectomy specimen revealed "putty" kidney. He was eventually started on anti-tuberculosis treatment, with gradual improvement.

Key Words: Genito-urinary tuberculosis, putty kidney, thimble bladder

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INTRODUCTION: Genito-urinary tuberculosis is one of the most common and serious forms of extra-pulmonary tuberculosis infection [1-3]. It causes significant morbididty, in the form of urinary tract obstruction, renal failure and infertility [4-6]. Early diagnosis requires a high index of suspicion as most of the initial signs and symptoms are vague and non-specific. Most often by the time diagnosis is made, significant and irreversible damage to the genitor-urinary tract would have already occurred [5,8].

CASE: A 38 year old engineer presented with shortness of breath, nausea, anorexia, pedal edema and oliguria since 10 days. He was evaluated and was found to be anemic and had elevated serum creatinine, his important investigations are as shown in Table:1. In view of the uremic symptoms, he was inititiated on hemodialysis with improvement in his symptoms. On further questioning and perusal of his

previous medical records, it was clear that he had been diagnosed with genitor-urinary tuberculosis about 6 years back, during evaluation of vague lower abdominal pain and fever. At that time he was advised to start anti-tuberculosis treatment, which the patient did not take due to perceived side effects and stigma of taking anti-tuberculosis treatment. Over the period of next 6 years, he was repeatedly advised to start anti-tuberculosis treatment. Yet, he ignored all medical advice and took intermittent over the counter drugs for his symptoms.

Since past 2 years, he had gradual onset of increased frequency of micturition, dysuria and worsening of his flank pain. Even at that time the patient did not start anti-tuberculosis treatment despite being advised to do so by his doctor. There was no history suggestive of pulmonary tuberculosis.

On general examination, he was pale and poorly nourished. His vitals were stable and his systemic examination was unremarkable, except for mild tenderness in his flanks bilaterally.

Table: 1 – Investigations of the patient

Investigation	Result
Hemoglobin (g/dl)	9.1
W.B.C (cells/cu.m.m)	8,250
Sr. Creatinine (mg/dl)	7.5
Sr. Albumin (g/L)	2.2
Urine	
Pus cell's	10-12/HPF
RBCs	4-6/HPF
Albumin	2+

His IVP, done during a previous evaluation for his flank pain is shown in Figure 1.

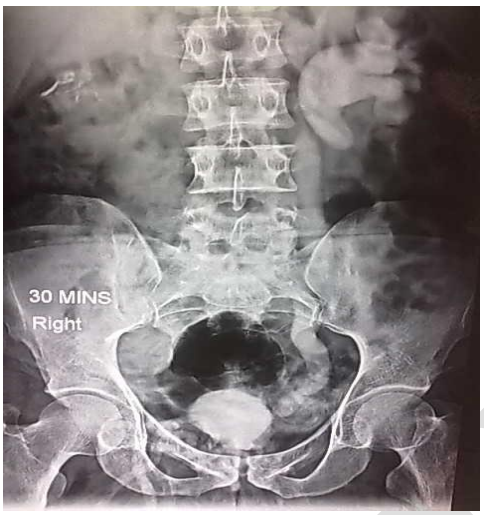

Figure 1 – IVP showing gross left hydroureteronephrosis, non-functioning right kidney with ureteric calcification and a small capacity bladder ("Thimble bladder")

His IVP shows hydroureteronephrosis on the left side and a non-functioning kidney, with calcification, on the right side along with a small capacity urinary bladder i.e"Thimblebladder" (Figure 2).

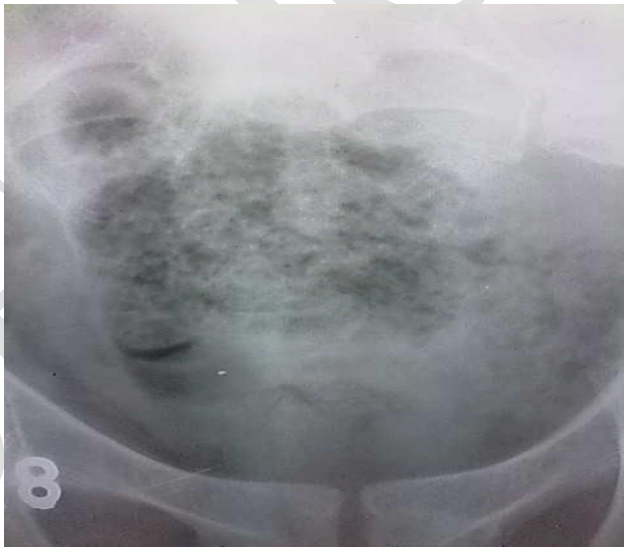

Figure 2 – X-Ray KUB; "Thimble bladder" – Small capacity urinary bladder with diffuse calcification of the bladder wall

His cystoscopy showed red mucosa, golf hole ureter and multiple whitish patch, suggestive of tuberculosis.

He was taken up for right nephroureterectomy after stabilization of his general condition and after initiation of anti-tuberculosis treatment. His

nephroureterectomy specimen is shown in Figure 3.

Figure 3 – Nephrectomy specimen – "Putty kidney"; completely destroyed kidney, filled with cement like material and calcification.

The cut section of the kidney shows "cement" like material with calcification and nephrocalcinosis; typical features of "putty kidney" secondary to tuberculosis.

He improved gradually and was discharged in a stable condition, though he continued be dialysis dependent. He was compliant with anti-tuberculosis treatment this time around.

DISCUSSION: Tuberculosis is the defining public health problem of 21st century. Tuberculosis (TB) is a major global health problem. In 2012, an estimated 8.6 million people developed TB and 1.3 million died from the disease [7]. Even though pulmonary tuberculosis is the commonest form of infection, extra pulmonary tuberculosis causes significant mortality and morbidity. Unlike pulmonary tuberculosis, most of the manifestations of extra-pulmonary tuberculosis are non-specific and vague [5,8,9] . This leads to considerable delay in diagnosis and most often by the time diagnosis is made, significant structural and functional impairment would have occurred. Extra-pulmonary tuberculosis comprises 20-25 % total burden of the disease in which genito-urinary tuberculosis is nearly 4 to10% in various studies[1,2,5,6] .

The kidney usually is infected by hematogenous spread of bacilli from a focus of infection in the lung. In most cases, at the time of presentation there is

no evidence of active pulmonary disease suggesting that renal involvement occurs as a result of reactivation after a period of dormancy. Active genitourinary tuberculosis presents 5 to 25 years after the primary infection [6,8].

In the kidney, hematogenous spread primarily involves the renal cortex and remains dormant. Abnormal host defense mechanism leads to reactivation of these foci with enlargement. Later, the abscess may rupture into the proximal tubule and loop of Henle with eventual development of enlarging, caseating granulomas with papillary necrosis. Spread to the renal pelvis produces pyonephrosis-like lesion, also known as a "cement" or "putty" kidney, which frequently spreads down to the ureters, bladder, or urethra, resulting into ureteric strictures and segmental dilation and obstruction [3,4,8].

The clinical manifestations are variable and the onset of clinically evident genitourinary tuberculosis is usually insidious [3,4,6]. Patients may present with symptoms referred to the organ involved or unexplained long-standing urological symptoms such as dysuria, gross hematuria, recurrent or resistant urinary tract infection, sterile pyuria, and irritative voiding symptoms. Obstructive uropathy, ureteral strictures, contracted and calcified bladder - "thimble bladder", organ calcifications, renal or epididymal mass, and infertility can occur. Some patients are fully asymptomatic and are incidentally found to have pyuria and/or microscopic hematuria. Constitutional symptoms such as fever, weight loss, and night sweats are unusual [4,5].

Definitive diagnosis of tuberculosis involves demonstration of M. tuberculosis by microbiological, cytopathological, or histopathological methods (demonstration of granulomatous lesion). The usual tests used to diagnose GUTB are the demonstration of mycobacterium in urine or body fluid, and radiographic examination [2,4,8].

A microbiologic diagnosis of tuberculosis usually is made by isolation of the causative organism from urine or biopsy material. Acid-fast bacilli may be seen on microscopy of centrifuged urine. Because the Mycobacterium tuberculosis organisms are excreted intermittently, a minimum of 3 (preferably 5) consecutive

early morning urine samples must be sent for culture. Radiometric liquid culture systems (i.e., BACTEC®) [Becton Dickinson, USA]) give rapid results and are highly sensitive in the identification of mycobacterium, but are expensive and not easily available. Polymerase chain reaction (PCR) lets the sequence of DNA fragment from just a few mycobacteria to be amplified in vitro such that the amount of amplified DNA can be visualized and identified; its sensitivity in detecting urine acid-fast bacilli (AFB) has been reported in up to 94% of the cases. [2,4,5,8].

The imaging modalities make an important part of the investigation module. In the initial work-up, plain X-ray abdomen and chest are the two basic imaging tests. Plain X-ray abdomen may show renal calcification. Renal calcification may develop in 7 to 14% of patients. Calcification rarely occurs in ureter (intraluminal), bladder wall, or seminal vesicles. Intravenous urography (IVU) is the hallmark radiological investigation to make a diagnosis of urinary tuberculosis. Computed tomography and magnetic resonance imaging are replacing the intravenous pyelogram in many centers because these techniques can provide information regarding changes in the renal parenchyma, adjacent organs, and genital organs that is not available from excretory urography. Cystoscopy and biopsy is rarely needed, biopsy is usually contraindicated, unless the tubercles or the ulcers are situated away from ureteral orifice [2,4,8].

Management generally consists of intensive anti-tuberculous treatment as per the currently accepted protocols [9]. If any surgical intervention is anticipated, atleast 4 to 6 weeks of prior anti-tuberculous treatment is mandatory to facilitate easy healing of the surgical wound and also to prevent dissemination of the mycobacterium into the systemic circulation during surgery [9,10]. Surgical intervention is indicated in cases of advanced unilateral disease complicated by pain or hemorrhage and for bladder augmentation. Relief of ureteral obstruction by stenting or percutaneous nephrostomy may be indicated. Other procedures like Partial nephrectomy, Calycorrhaphy and infundibuloplasty are done depending on the extent of involvement. Nephrectomy is generally

recommended in all patients with non-functioning kidneys or with calcifications in their kidneys, as upto 50% of patients who have achieved sterile urine after anti-tuberculous treatment will show show viable mycobacteria on tissue cultures, this can lead to re-activation later on life[10]

In the above discussed case, it is indeed tragic that although the diagnosis of renal tuberculosis was made quite early, the patient did not take anti-tuberculosis treatment, due to his misconceptions regarding tuberculosis and its treatment. It is ironical that although we have made tremendous progress in diagnosis and treatment of tuberculosis, there still exists significant stigma attached in being labeled as a tuberculosis patient among the general populace. This has lead to considerable patient morbidity and mortality, and also to the emergence of MDR and X-DR TB. The scourge of tuberculosis cannot be erased until all the stakeholders take responsibility. As exemplified in this case, there was a communication gap between the treating doctors and the patient, regarding the nature of the disease and treatment options. Though the patient was well educated he did not completely understand the gravity of his condition, this coupled with social factors, eventually led the patient ending up in chronic renal failure.

CONCLUSION:

Genito-urinary tuberculosis is a great masquerader, early diagnosis requires high index of suspicion, as most of the early features are vague and non-specific. The impact of untreated tuberculosis on the genitor-urinary tract is devastating, with most of the patients having serious sequelae in the form of obstructive uropathy, renal failure or infertility. It is imperative upon diagnosis, that the patients should be explained regarding the disease, treatment options and outcomes in detail, so that the patients are appropriately treated and complications can be prevented.

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