CASE REPORT
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A 14-years-old girl with Sterile Pyuria due to Renal Tuberculosis: A Case Report

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ABSTRACT

A 14-years-old girl presented with a 2-years history of a dull ache in her right flank along with recurrent urinary tract infection and weight loss of 10 kg over two years. She was treated in upazila health complex and local health care centres without any improvement. Then she was admitted in medicine ward of North Bengal Medical college, Sirajganj, Bangladesh. There was no history suggestive of tuberculosis and examination was unremarkable except for cachexia and a tender, palpable right kidney and tender right renal angle. Investigations including complete blood count showed Hb-9 gm/dl and ESR 90 in 1st hour. Tuberculin skin test showed induration 18 mm at 72 hours and X-ray showed dense opacity in right renal area. Ultrasonography of the abdomen revealed right sided hydronephrosis, CT urogram showed right renal and ureteric calcification with hydronephrosis. Urinary sample for polymerase chain-reaction (PCR) assay for Mycobacterium tuberculosis was positive. She started anti tuberculous chemotherapy and responded well.

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INTRODUCTION

Tuberculosis is a disease caused by *Mycobacterium tuberculosis* and pulmonary manifestation is most common.[1] In other extra pulmonary cases, tuberculous lymphadenitis is frequent, followed by urogenital tuberculosis, which represents about 30% of the extra pulmonary cases worldwide[2,3] and reaches rates of 40–60% in developed countries.[4] Tubercle bacillus infection is almost always airborne and it is followed by replication of the bacillus in alveolar macrophages which form the characteristic Ghon focus.

After a latent infection renal TB may be due either to a disseminated infection or to a primitive genitourinary localization. The majority of patients have pyuria, sometimes with hematuria. The diagnosis of urinary tuberculosis is based on the finding of pyuria in the absence of infection by common bacteria. Although sterile pyuria strongly suggests that genitourinary tuberculosis, but it should be investigated.[2-5] Secondary bacterial infections may occur in up to 50% of the cases[4] and patients with immunosuppression like HIV infection, diabetes are at higher risk.[2]

The Case

A 14-years-old girl presented with a 2-years history of a dull ache in her right flank along with recurrent urinary tract infection and weight loss of 10 kg over two years. There was no history suggestive of tuberculosis. There were no exacerbating or relieving factors. The pain did not radiate. There was no history of fever, chronic cough, anorexia and hematuria or dysuria. She did not have any bowel symptoms. There was no family history of tuberculosis. She was vaccinated as per EPI schedule. On examination the only finding was a tender and palpable right kidney and tender right renal angle. Chest examination was unremarkable. Investigations including complete blood count showed Hb-9 gm/dl, total leucocyte count was 8,600/mm3 of blood with a lymphocyte count of 25%. Her serum creatinine was 1.1 mg/dl, ESR 90 in 1st hour and blood urea was 30 mg/dl. Tuberculin skin test showed induration 18 mm at 72 hours and Chest x-ray (P/A) was normal. Abdominal X-ray showed dense opacity in the right renal area. Ultrasonography of the abdomen revealed right sided hydronephrosis, CT urogram showed right renal and ureteric calcification with hydronephrosis (Figures 1, 2). Blood and urine examination, the letter with culture, were requested. The absence of bacterial growth along with leukocyturia led to the investigation for the acid-alcohol resistant bacillus. Early in the morning three urine samples were collected and a urinary sample for Gene Xpert/RIF polymerase chain-reaction assay for *Mycobacterium tuberculosis* was positive with Rifampicin sensitivity (Figure 3). Culture for mycobacterium was not done.

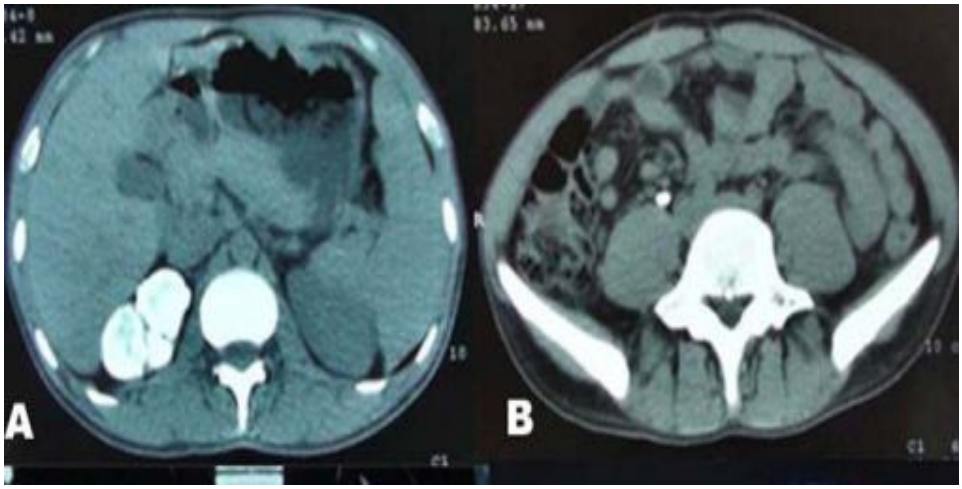


Figure 1: (A) Axial non-contrast CT image showing renal calcification
(B) Non-contrast axial cut showing ureteral calcification

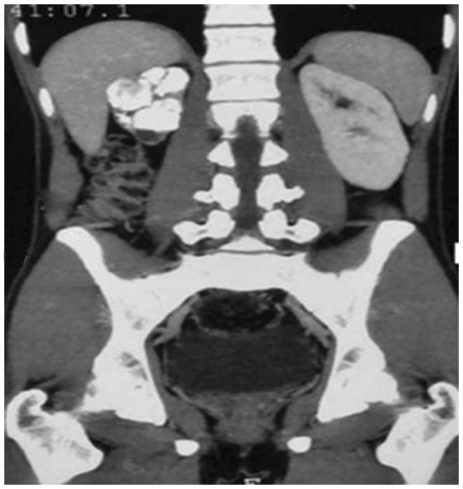
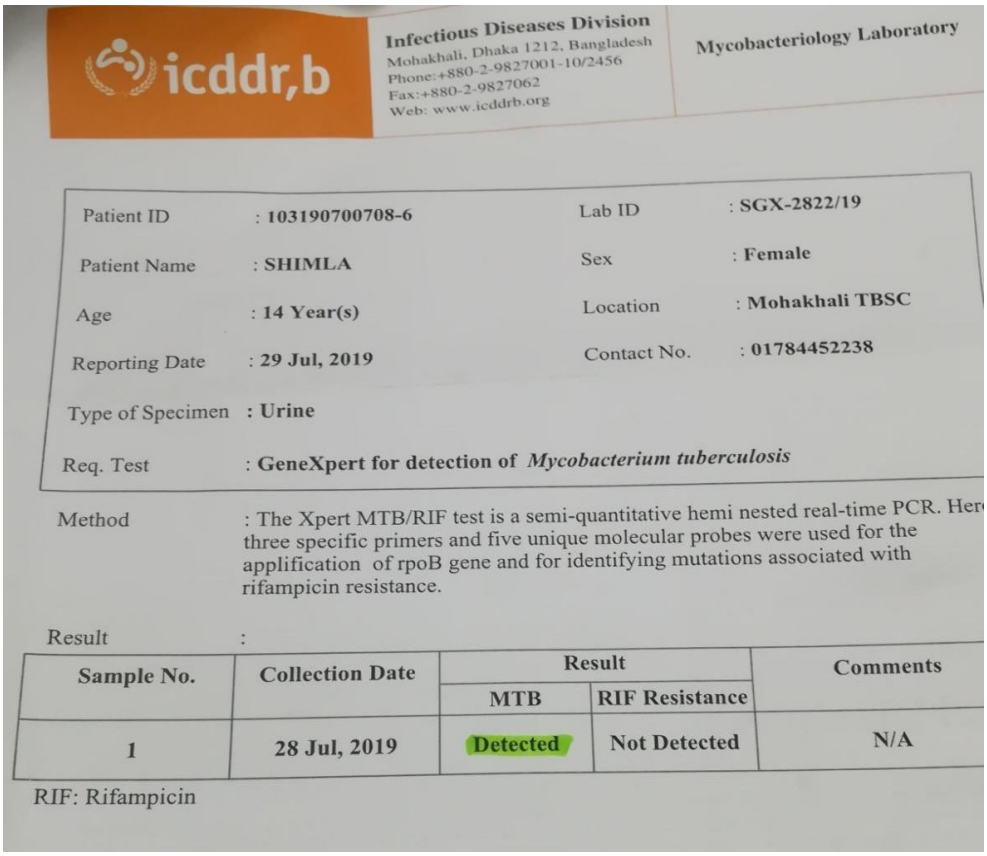


Figure 2: Reconstructed image showing right renal calcification



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Patient ID	: 103190700708-6	Lab ID	: SGX-2822/19
Patient Name	: SHIMLA	Sex	: Female
Age	: 14 Year(s)	Location	: Mohakhali TBSC
Reporting Date	: 29 Jul, 2019	Contact No.	: 01784452238
Type of Specimen	: Urine		
Req. Test	: GeneXpert for detection of *Mycobacterium tuberculosis*		

Method : The Xpert MTB/RIF test is a semi-quantitative hemi nested real-time PCR. Her three specific primers and five unique molecular probes were used for the applification of rpoB gene and for identifying mutations associated with rifampicin resistance.

Result :

Sample No.	Collection Date	Result		Comments
		MTB	RIF Resistance	
1	28 Jul, 2019	Detected	Not Detected	N/A

RIF: Rifampicin

Figure 3: Gene X pert /RIF polymerase chain-reaction assay for Mycobacterium tuberculosis

She started anti tuberculous chemotherapy with rifampicin, isoniazid and pyrazinamide on 31/07/2019 and then responding well with resolution of symptoms and weight gain of 36 kg from 28 kg. After anti tuberculous chemotherapy for 12 months, it was decided to refer the patient to urosurgical evaluation.

DISCUSSION

Tuberculosis is due to the *Mycobacterium tuberculosis*, which is usually very resistant to environmental factors and forms a specific type of granulomatous inflammation called caseous granuloma. *M. tuberculosis* can enter the body through mucous membranes or through the skin.[2,3] Development of tuberculosis is dependenton the patient's immune response to the infection, route of infection and lymphatic or haematogenous spread of the organism. In granulomatous lesions cell-mediated immunity effectively regulates bacterial restraint and in most cases mycobacterium persist in a latent state as eradication is not entirely possible.[4]

Renal infection, usually following the haematogenous spread of the mycobacterium, is characterized by the formation of micro-abscesses around the periglomerular capillary. The immune system is usually capable of blocking the disease with the formation of small inactive granulomas. In advanced stages of granulomas may coalesce with the formation of cavities, later may communicate with the calyces, and thus allow the infection of the downstream anatomical structures such as the renal pelvis, ureter, bladder and urethra. A further destruction of the kidney then takes place with the formation of multiple scars and deformed excretory system filled with caseous material resulting in pyonephrosis, ultimately resulting in the formation of fibrosis of kidney known as chalk or putty kidney.[6,7]

Symptoms of renal tuberculosis resemble symptoms of low urinary tract infection. One has to suspect when conventional antimicrobial therapy is not effective to eradicate infection or there is presence of sterile pyuria,[3] a fact that often re-

sults in late disease diagnosis. The cytological analysis of urine in specific colouration is sensitive to detect mycobacteria, like *Mycobacterium bovis* or *Mycobacterium avium-intracellulare* complex, but very little specifically for *M. tuberculosis. S*pecific culture for *M. tuberculosis* or through polymerase chain reaction (sensitivity=94.7%) will confirm *M. tuberculosis*.[4,5,8-10]
Calcifications are common and easily identified in a simple abdominal x-ray. Abdominal CT scan is mandatory to observe the structural changes and renal parenchymal calcification.[9,11]
The radiological alterations based on different presentations seen in ultrasound of renal system can be classified into six different types: nephrectasia (type I), hydrops (type II), empyema (type III), calcification (type IV), inflammatory and atrophic (type V) and mixed (type VI).[12]
A series of 102 cases has already shown the importance of early diagnosis and proper treatment of renal tuberculosis.[13] The treatment resides in the administration of early introduction of anti tuberculous chemotherapy and or partial or total excision if structural abnormalities are present. We use pyrazinamide-rifampicin isoniazid based regimen which is renal friendly. Precautions required regarding use of streptomycin, ethambutol and other aminoglycosides as these are nephrotoxic, so dose adjustment is recommended.[2] Failure to early detection and treatment results unfortunate and extreme adverse outcomes.

Conflict of interest: None

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