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A STUDY OF RENAL TUBERCULOSIS IN BASRA, IRAQ

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Abstract

Renal tuberculosis is the third most frequent form of extra-pulmonary tuberculosis. About 25% of cases are asymptomatic. It is more common in male and in age group 20-40 years. Urine culture for mycobacteria is the gold standard for the diagnosis. The aim of this study is to use certain clinical criteria that helps in the diagnosis of renal tuberculosis.

This is a prospective study of patients with recurrent urinary tract infections from September 2009 to September 2012. Certain clinical criteria were used for the diagnosis.

Thirty five patients with renal tuberculosis were studied. Seven (20%) patients had evidence of old pulmonary TB. The most common presenting complaint was frequency in 43.3%. Sterile pyuria in 82.9%. The tuberculin skin test was positive in 74.3%. The intravenous urography (IVU) showed abnormalities in 82.9%. The urine culture for mycobacteria was positive in 5.7%.

In conclusion, diagnosis of renal tuberculosis require high index of suspicion with the aids of certain clinical criteria and cheap investigations with a high accuracy.

Introduction

Genitourinary tuberculosis is the third most frequent extra-pulmonary tuberculous infection, following nodal and pleural involvement[1]. It is almost always secondary to a symptomatic or asymptomatic primary lesion in the lung. It may also occur as a result of military tuberculosis. It may presents with constitutional symptoms or symptoms relate to the lower urinary tract, abdomen or genitalia[2]. A high index of suspicion enables early diagnosis. Most patients are between 20 to 40 years of age with a male to female ratio of 2:1. Because active genitourinary tuberculosis presents 5 to 15 years after primary infections, it is relatively rare in children[3]. Nearly 25% of patients have no clinical or laboratory evidence of abnormality and the diagnosis is made on investigations for other diseases, during surgery or at autopsy[4]. Another 25% have asymptomatic urinary abnormalities, usually acid sterile pyuria or hematuria[5]. Of the patients who are symptomatic, lower urinary tract symptoms occur in more than 75%. Constitutional symptoms such as fever, night sweat and weight loss occur in less than 20% of patients and indicate active infections in other organs or secondary bacterial infections of the urinary tract[3,4]. Investigations that assist in the diagnosis of urinary tract tuberculosis include high erythrocyte sedimentation rate (ESR), acid sterile pyuria which presents in 50% of patients, hematuria, positive tuberculin skin test which is useful for proving infections but not necessarily active

disease[5]. Although the urine AFB test is simple, economical, and rapid, it has low sensitivity and specificity for M. tuberculosis[6]. Isolation of mycobacterium tuberculosis by urine culture is the definitive diagnostic test. It has a higher specificity compared with the urine AFB test but requires at least 8 weeks before the results are obtained[6]. Urine for polymerase chain reaction (PCR) can be used for early diagnosis but it is expensive and not available in some centers[7]. Imaging studies are used to assess the extent, severity of involvement and complications of the disease e.g. intravenous urography (IVU), CT scan and MRI[8].

Patients and methods

This is a cross sectional study of patients with recurrent urinary tract infections attends the private clinic, outpatient's clinic and medical ward in Basra teaching hospital from the period of September 2009 to September 2012. A total of 1500 patients with recurrent urinary tract infection were studied. Renal tuberculosis was diagnosed in 35 patients and was included in this study. Other 51 patients were excluded from the study. The age range of patients with renal tuberculosis was 20 to 85 years and mean ages of 50.7 ± 14.9 SD. Eleven (31.4%) patients were male and 24 (68.6%) patients were female. The inclusion criteria include constitutional symptoms, suggestive urinary symptoms, a possible past history of tuberculosis, sterile pyuria, characteristic IVU findings and a positive tuberculin skin test[9]. A history was taken regarding the age, gender, history of old pulmonary tuberculosis, constitutional symptoms, urinary tract symptoms, smoking and risk factors which include diabetes, chronic kidney disease and immunosuppressive medications. Body mass index (BMI) using the weight and the height with the formula (BMI=wt./ht.2) and classifying BMI into: normal (15.5-24.9), overweight (25-29.9) and obese (<30) was measured. Blood pressure was measured using mercury sphygmomanometer in a quiet room; with the patients relax in a seated position, no tea, coffee or smoking for at least 30 min prior to measurement and 1 minute apart for two measurements[10]. Hypertension was diagnosed with blood pressure measurement of >140/90 mmHg[11]. Investigations were made and include the following: hemoglobin (HB) with anemia definition according to the WHO (HB <13 g/dl in men and post-menopausal women and HB <12 g/dl in pre-menopausal women), fasting blood sugar (FBS) (normal value 70-110 mg/dl),serum creatinine (normal value 0.6-1.1 mg/dl), ESR (normal value in male=age/2 and in female age+10/2), general urine exam (GUE), urine culture for bacteria using standard culture media, centrifuged urine for acid fast bacilli (AFB) using Ziehl-Neelsen stain, urine culture for mycobacteria with 3 to 6 first morning midstream centrifuged urine specimens on Lowenstein-Jensen medium, chest x-ray, abdominal x-ray, abdominal ultrasound ,intravenous urography (IVU), abdominal CT-scan and HIV testing. The findings on IVU which is suggestive for renal tuberculosis include erosion of the tips of the calyces, blunting of the calyces or overt papillary necrosis and parenchymal scarring and calcification[12]. Statistical analyses were performed using SPSS (version 15), the data expressed as number and percentage. Chi-square used as a test of significance. P value <0.05 considered as significant.

Results

Thirty five patients with renal tuberculosis were studied. Table I showed sociodemographic characteristics of the patients. Their mean age was 50.7±14.9. One (2.9%) patient was less than 20 years old, 9 (25.7%) patients were between 21-40 years, 16 (45.7%) patients were between 41-60 years and 9 (25.7%) patients were more than 61 years old.

Eleven (31.4%) were male and 24 (68.6%) were female. Nine (25.7%) patients had normal body weight, 23 (65.7%) patients were overweight and 3 (8.6%) patients were obese. Nine (25.7%) patients were smokers and 26 (74.3%) were nonsmokers.

Table I: Sociodemographic characteristics of the patients

Variables		No. (%)
Age distribution in years	< 20	1 (2.9)
	21-40	9 (25.7)
	41-60	16 (45.7)
	> 61	9 (25.7)
BMI distribution	15.5-24.9	9 (25.7)
	25-29.9	23 (65.7)
	>30	3 (8.6)
Gender	Male	11 (31.4)
	Female	24 (68.6)
Smoking	Smokers	9 (25.7)
	Non smokers	26 (74.3)

Table II showed renal tuberculosis patients' results. Seven (20%) patients had evidence of old pulmonary TB while, 28 (80%) patients had no evidence. Nine (25.7%) patients presented with loin pain, 7 (20%) with dysuria, 12 (43.3%) with frequency and 7 (20%) were asymptomatic. Twenty three (65.7%) patients had constitutional symptoms while, 12 (34.3%) had no constitutional symptoms. The underlying risk factors were diabetes (DM) in 8 (22.9%) patients, chronic kidney disease (CKD) in 3 (8.6%), both DM and CKD in 3 (8.6%) patients, immunosuppressive drugs in 1 (2.9%) patient, systemic lupus erythematosus (SLE) in 1 (2.9%) patient and no underlying risk factors in 19 (54.3%) patients. Eighteen (51.4%) patients had hypertension while, 17 (48.6%) had no hypertension. Seven (20%) patients had urolithiasis while, 28 (80%) patients had no urolithiasis. Pyuria was presented in 27 (77.1%) patients, hematuria in 9 (25.7%) patients and sterile pyuria in 29 (82.9%) patients. The urine for AFB was positive in 1 (2.9%) patient and urine culture for mycobacteria was positive in only 2 (5.7%) patients. The tuberculin skin test was positive in 26 (74.3%) patients. The intravenous urography (IVU) showed suggestive abnormalities in 29 (82.9%) patients. Ten (29.4%) patients had anemia and 27 (77.1%) patients had high erythrocyte sedimentation rate (ESR).

Table II:Renal tuberculosis patients study results

Variables		No. (%)
Evidence of old pulmonary TB	Present	7 (20.0)
	Absent	28 (80.0)
Renal symptoms	Loin pain	9 (25.7)
	Dysuria	7 (20.0)
	Frequency	12 (43.3)
	Asymptomatic	7 (20.0)
Constitutional symptoms	Present	23 (65.7)
	Absent	12 (34.3)
Underlying risk factors	DM	8 (22.9)
	CKD	3 (8.6)
	DM & CKD	3 (8.6)
	Immunosuppressive drugs	1 (2.9)
	SLE	1 (2.9)
	No	19 (54.3)
Hypertension	Present	18 (51.4)
	Absent	17 (48.6)
Urolithiasis	Present	7 (20.0)
	Absent	28 (80.0)
Pyuria	Present	27 (77.1)
	Absent	8 (22.9)
Hematuria	Present	9 (25.7)
	Absent	26 (74.3)
Tuberculin skin test	Positive	26 (74.3)
	Negative	9 (25.7)
Urine AFB	Positive	1 (2.9)
	Negative	34 (97.1)
Urine culture for bacteria	Positive	6 (17.1)
	Negative	29 (82.9)
Urine culture for mycobacteria	Positive	2 (5.7)
	Negative	33 (94.3)
Intravenous urography	Abnormal	29 (82.9)
	Normal	6 (17.1)
Anemia	Present	10 (29.4)
	Absent	25 (70.6)
ESR	High	27 (77.1)
	Normal	8 (22.9)
Favorable response to anti-tuberculous drugs		35 (100)
Death		0 (0.0)

Table III showed distribution of tuberculin test according to the diagnosis. The tuberculin test was positive in 26 patients with renal tuberculosis and in 1 patient with recurrent UTI. It was negative in 9 patients with renal TB and in 50 patients with recurrent UTI. The test was statistically significant.

Table III: Distribution of tuberculin test according to the diagnosis.

Tuberculin skin test	Diagnosis		Total
	Renal tuberculosis	Recurrent UTI	
Positive	26 (74.3%)	1 (2.0%)	27 (31.4%)
Negative	9 (25.7%)	50 (98%)	59 (68.6%)
Total	35 (100%)	51 (100%)	86 (100%)

Chi-square value 47.632 degree of freedom 2 P value 0.000

Discussion

In the present study, most ages affected were 41-60 years in 45.7% of patients which is in disagreement with study done by Raviglione and colleagues where they showed that the most ages affected is 20-40 years[13]. This could be explained by latency in the diagnosis of renal tuberculosis in our country. But, in agreement with study done in Siberian by Kulchavenya and Khomyakov and study done in Korea by Joo Yong Lee and colleagues where they showed that the most ages affected are 40-60 years[14,15]. The female to male ratio was 2:1 in the present study, which is in disagreement to study done by Raviglione and colleagues where they showed that the male to female ratio is 2:1[13]. But, this was in agreement to a study done by Joo yong and colleagues where they showed that the female to male ratio is 1.53:1[15]. There was no previous history of tuberculosis in 80 % in the present study, which is higher than study done by Joo yong and colleagues where they showed that two third of cases had no previous history of tuberculosis[15]. Constitutional symptoms occurred in 23 (65.7%) patients, who is in disagreement with a study done by Figueiredo and colleagues where they showed that 25-33 % of patients have systemic symptoms[16]. Seven (20%) patients were asymptomatic, who is in agreement to a study done by Raviglione and colleagues where they showed that 25 % of cases are asymptomatic[13]. The most common presentation was frequency in 12 (43.3%) patients followed by loin pain in 9 (25.7%) patients and dysuria in 7 (20%) patients. This was in comparable to Joo Yong and colleagues study where they showed that the most common presentation is frequency in 40.6%, dysuria in 16.8% and flank pain in 16.8%[15]. But, in disagreement to Simon and colleagues study where they showed that dysuria is the most common presentation[2]. Hypertension was found in 18 (51.4%) of patients which was in disagreement to a study done by Marks and Poutasse where they showed that hypertension is unusual in renal tuberculosis[17]. Urolithiasis occurred in 7 (20%) of patients, which is comparable to Simon and colleagues study where they showed that urolithiasis occurred in 7-18 %[2]. The urinalysis findings were abnormal in nearly 100 % which is in comparable to a study done by Wise and Shteynshlyuger where they showed that abnormal urinalysis findings in more 90% of cases[5]. But, pyuria occurred in 27 (77.1%) and hematuria in 9 (25.7%) of patients in the present study, while pyuria in 26 % and hematuria in 13% in Wise and Shteynshlyuger study[5]. Sterile pyuria occurred in 82.9 % of cases which was higher to Wise and Shteynshlyuger study where they showed that sterile pyuria occurred in 51 % of cases[5]. This could be explained by more liberal use of antibiotics in our country which render the urine sterile even in the presence of secondary bacterial infection which does not exclude renal tuberculosis. Anemia was presented in 29.4 % of cases which is comparable to a study done by Wisnia and colleagues where they showed that anemia occurred in 20% of nonmiliary disease, but higher frequency with renal dysfunction[18]. The tuberculin skin test was positive in 74.3% of cases, which is in

comparable to a study done by Jacob and colleagues where they showed that tuberculin test is positive in 60-90% of cases[19]. The IVU was abnormal in 82.9% of cases, which is in comparable to 2 studies done by Figuerido and Burill with their colleagues where they showed that IVU showed abnormalities in 75% of cases[3,20]. Navarro-Vilasarshowed that IVU is abnormal in 87.5%[1].The urine culture for mycobacteria was positive in only 5.7% of cases, which is much lower to a study done by Lattimer and colleagues where they showed that urine for mycobacterial culture is positive in 30-40% which is also reported by Joo yong and colleague's study[15,21]. This could be explained by liberal usage of broad spectrum antibiotics which has anti-mycobacterial effects which inhibit mycobacterial growth. Also, because the urinary shedding of mycobacteria is intermittent and the need for 24 hours 3-5 samples collections so patient's noncompliance explained the low yields.

Conclusion

Renal tuberculosis occurred more frequently in females and mainly in patients of 40 to 60 years old. The majority of patients had no previous evidence of tuberculosis. Frequency was the most common presenting complaint. Diagnosis of renal tuberculosis require high index of suspicion with the aids of certain clinical criteria and cheap investigations with a high accuracy.

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