THE SURGICAL INTERVENTION IN GENITOURINARY TUBERCULOSIS

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Abstract

Introduction: *Genitourinary tuberculosis (GUTB) is the leading cause of morbidity and mortality worldwide especially in developing countries. Surgery is an essential management modality in genitourinary tuberculosis when indicated.*

Objective*: This study aims to document the role of surgery for genitourinary tuberculosis according to the organ involved.*

Materials and Methods: *Retrospective review of 33 GUTB cases was done that underwent surgery at department of urology, Bangabandhu Sheikh Mujib Medical University from January 2008 to December 2014. Patient's baseline characteristics, mode of presentation, organ involvement, investigation, surgical intervention and follow up were studied.*

Results: *Among enrolled patients, mean age at presentation was 31.5 years and 64% (21, 33) were male. The most common presentation was irritative voiding symptoms. Kidney was the most common organ involved in 39% (13, 33) cases, and next common site was bladder in 30% (10, 33) cases. Preoperative bacteriologic diagnosis was confirmed only in 21% (7, 33) cases. A total of 41 surgical procedures were performed as some patients needed more than one procedure. These included 13 endoscopic, 6 temporary diversion, 19 ablative procedures and 3 reconstructive procedures. Post surgical follow up of all the patients were given after 3, 6 and 12 months. Then the patients were followed with RFT and ultrasonography 6 monthly for 3 years and then annually. The intravenous urography and diethylenetriamine pentaacetic acid scan were performed when indicated.*

Conclusion: *Multidrug chemotherapy with judicious surgery when indicated is the ideal treatment. Surgery plays an important role in symptomatic relief and helps to lead a normal life. The results of reconstructive surgery are good and should be done when possible. Rigorous and long term follow up is necessary in patients undergoing reconstructive surgery.*

Key Words: *Tuberculosis, reconstructive surgery, urogenital.*

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Introduction:

Tuberculosis (TB) is a major public health problem in developing as well as de-veloped countries. The recent surge in reported cases of TB is mainly attributable to Human Immunodeficiency virus (HIV) infection, emergence of resistant bacilli and human migration [1]. The World Health Organization (WHO) estimates that 9.27 million new cases of TB occurred in 2007, compared with 9.24million new cases (140 per 100,000) in 2006. An estimated 1.37million (14.8%) of the cases in 2007 were HIV-positive. Pulmonary sites account for 10% of tuberculosis cases. Genitourinary TB accounts for 30% to 40% of all extrapulmonary TB, second only to lymphonodal affection. In developed countries, urogenital tuberculosis occurs in 2% to 10%of cases of pulmonary tuberculosis, while in developing countries it occurs in as many as 15% to 20% of cases[2].

Diagnosis of genitourinary tuberculosis (GUTB) are not straight forward and the low yield of current available investigations, the disease remains subclinical for long

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time before initiation of chemotherapy, that leads to distorted and dysfunctional anatomical changes in the genitourinary tract. Therefore, Surgery still continues to play a major role despite effective chemotherapy for tuberculosis. It is estimated that approximately 55% of patients with GUTB require surgical intervention[3]. In this study, we assessed the role of surgical intervention in GUTB. Both ablative and reconstructive surgery have role to eradicate the disease and prevent relapse as well as to preserve or to restore the function of the organs.

Materials and methods

This retrospective study was conducted in Department of Urology of our institution, a tertiary care center of Dhaka, Bangladesh. A total of 33 patients diagnosed as GUTB were admitted and undergone surgery for different indication, from January 2008 to December 2014. Evaluation included detailed clinical history and physical examination, followed by a complete blood count, renal function test (RFT) and liver function tests. Urine examination, including bacterial cultures, was performed. Urine for acid-fast bacteria (AFB) smear was done on 3 consecutive days, and mycobacterial culture was obtained. Radiological evaluation included chest X-ray, X-ray of kidneys-ureters-bladder (KUB) was performed in all cases and intravenous urogram when serum creatinine was normal. Gene Xpert test for urine and body fluid was also done in selected cases.

A voiding cystourethrogram, nephrostogram and retrograde pyelogram, ultrasound study of KUB region and computerized tomography were obtained when necessary. Cystoscopy and bladder biopsy were done wherever indicated. Fine needle aspiration cytology (FNAC) was performed in cases with epididymal nodule. Biopsy from fistulous or sinus tract were also taken when indicated.

Renal dynamic scans were used selectively to ascertain renal function in compromised kidneys. Polymerase chain reaction (PCR) was done in cases to assist in diagnosis. All patients received antitubercular drug therapy with 4 drugs (rifampicin, ethambutol, isoniazid and pyrazinamide) for 2 months followed by 2 drugs (rifampicin and isoniazid) for 4-7 months. Temporary urinary diversion was performed in case of obstruction. The operative procedure was selected depending upon the organ involved, the extent of disease, functional status of the involved organs and overall renal function. Follow-up included history, physical examination and investigations like complete blood count, liver function tests and RFT at 3and 6 months. The intravenous urography and diethylenetriamine pentaacetic acid (DTPA) scan were performed when indicated. Then the patients were followed with RFT and ultrasonography 6 monthly for 3 years and then annually. Data were collected from departmental register in a predefined proforma. Analyses were done with SPSS version 19.

Results:

There were 21 males and 12 females. Mean age of the patients was 31.5 years with a range of 15-57 years. The most common symptom was irritative voiding symptoms in all 33 patients, 20 had constitutional symptoms, 15 patients had haematuria, 12 had sterile pyuria , 3 had discharging scrotal sinus 1 had nephrocuteneous fistula 3 had renal failure [Table 1]. The most commonly involved organ was the kidney cases 13, followed by the bladder in 10, ureteral lesions were found in 09 cases, epidydmis in 05 and complex lesions in 04 cases [Table 2].

Table-I

Distribution of presenting symptoms and signs among studied patients

Presenting symptoms	Number of patients (n 33)
Irritative voiding symptomps	33
Constitutional symptomps	20
Haematuria	15
Sterile pyuria	12
Discharging scrotal sinus	3
Nephrocuteneous fistula	1
Renal failure	3

Most patients had more than one symptoms

Table-II

Distribution of organ involvement

Organ involved	Number(n 33)
Renal lesions	13
Ureteropelvic junction obstruction	4
Ureteral lesions	9
Upper	2
Middle	3
Lower	4
Bladder	10
Epididymis	5
Complex (more than two sites)	4

Radiological evidence suggestive of TB such as calcification, caliceal destruction, infundibular stenosis, cavitation, ureteral stricture, urethral stricture and small capacity bladder was apparent in 29 cases [Table 3]. Raised ESR was found in 25 patients. Mountoux test (MT) was positive in 9 patients. Urine culture for AFB was found positive in 7 while pus culture for AFB resulted positive in 6 patients. Among serological tests Polymerage Chain Reaction (PCR) suggestive of TB was in 4 patients while the newly available Gene Xpert test for TB was positive in 3 cases. Cystourethroscopy was performed in13 cases. The bladder had evidence of chronic cystitis in the vast majority of cases Bladder biopsy was diagnostic of TB in 5 cases. FNAC was performed in 5 cases with epididymal swelling and was suggestive of TB. Patients received antitubercular therapy (ATT) for a total of 6-9 months with 4 drugs for 2 months, and 2 drugs for another 4-7 month.Abnormal liver function, drug intolerance or hypersensitivity was seen in 2 patients. The offending drug was excluded thereafter for that particular patient, and the second-line drug introduced as and when necessary.

Table-II

Distribution of patients with abnormal laboratory and radiological investigation

Investigations	Number of patients (n 33)
Raised ESR	25
Positive Mountoux test	9
Positive AFB urine culture	7
Positive AFB pus culture	6
Positive bladder biopsy	5
Positive PCR	4
Positive Gene Xpert test	3
Positive FNAC	5
Positive radiological evidence	29

A total of 41surgical procedures were performed [Table 4]. Of the procedures, Endoscopic was 13, in the form of bladder biopsy (5), retrograde DJ stenting of ureter (6) and antegrade stenting (2). Temporary divertion by percuteneous nephrostomy was done in 6 patients. In our study 19 ablative procedures was done. Of them nephrectomy 10, nephroureterectomy 4 and epididymectomy in 5 cases. Augmentation cystoplasty for small capacity refluxing bladder by ileocystoplasty was done in 3 cases that needed intermittemnt catheterization. Post operative complications were found as wound infection in two cases and fever in one case, both were managed conservatively.

Table-IV

Pattern of surgical interventions among studied patients

Surgical interventions	Number (n 33)
Bladder biopsy	5
Retrograde ureteric stenting	6
Antegrade stenting	2
PCN	6
Nephrectomy	10
Nephroureterectomy	4
Epididymectomy	5
Augmentation cystoplasty	3

Discussion

The term GUTB was first introduced by Willbolz *et al*. It is the second most common form of extra-pulmonary tuberculosis after lymph node involvement. Although GUTB was the most common sub-type of extra-pulmonary tuberculosis (EPTB), it was recently reported to account for <5% of all patients with EPTB. Eight to 15% of patients with pulmonary tuberculosis are supposed to be at risk of developing GUTB. In our study, 19.6% of patients had the history of pulmonary tuberculosis. Active GUTB usually presents 5-25 years after the primary infection. The primary organ affected in urinary tract is kidney. Renal involvement is usually slow, progressive and destructive. It may lead to unilateral renal loss and renal failure in bilateral involvement. Other part of urinary tract is involved as extension of disease from kidney[4].

TB is an important cause of morbidity and mortality, especially with the emergence of treatment resistant bacilli and HIV infections[5]. GUTB, a common type of extrapulmo-nary TB, can have a variable presenta-tion; the severity of the disease is related to the time of diagnosis[6]. Human infection is mainly caused by Mycobacterium tuberculosis and M. bovis. Immunity is predominantly mediated by T-helper cells, cytokines and the genetic make up of the host[7].

Reconstructive surgery for GUTB is required for cases with grossly distorted and dysfunctional anatomy that

are unlikely to regress with chemotherapy alone[8]. Reconstructive surgery has a role in the management of GUTB, despite the presence of effective ATT. The various procedures of reconstructive bladder surgery can be used according to the various indications in an individual patient. It affects males and females equally and is commonest in the fourth decade of life[9].

In the present study there were 21 males and 12 females. Mean age of the patients was 31.5 years with a range of 15-57 years. The most common symptom was irritative voiding symptoms in all 33 patients, 20 had constitutional symptoms,15 patients had haematuria, 12 had sterile pyuria ,3 had discharging scrotal sinus 1 had nephrocuteneous fistula 3 had renal failure.

The most commonly involved organ was the kidney cases 13, followed by the bladder in 10,ureteral lesions were found in 09 cases, epidydmis in 05 and complex lesions in 04 cases. These findings correlates well with Bansal p et al. as their frequency of organ involved. Paul DK et al. in 2015 found kidney as the most commonly involved organ. Radiological evidence suggestive of TB such as calcification, caliceal destruction, infundibular stenosis, cavitation, ureteral stricture, urethral stricture and small capacity bladder was apparent in 29 cases in present sereies. GUTB is diagnosed by demonstration of mycobacterium in urine or body fluid and granulomatous lesion on histopathology. Other features which help in diagnosis are changes in radiographic study (IVU, CT scan and Chest X-ray) and raised ESR[10,11]. Although urine AFB test is simple, economical, and rapid, it has low sensitivity and specificity for M. tuberculosis. In urine examination, sterile pyuria is a classical finding, but demonstration of mycobacterium is used as primary test for Diagnosis10. The yield of direct A.F.B. smear is low and it is positive in 30% of cases[11].The culture in special medium takes six-eight weeks, but it is sensitive in 20- 97% of cases and has a higher specificity compared with the urine AFB test[11,12]. Urine PCR can detect the presence of M. tuberculosis within a few hours of DNA extraction from the sample, even when the urine AFB test and the urine M. tuberculosis culture test are negative. It has a reported sensitivity approach to 94% with specificity 88%[13].

In the present study raised ESR was found in 25 patients. Mountoux test (MT) was positive in 9 patients. Urine culture for AFB was found positive in 7 while pus culture for AFB resulted positive in 6 patients. Among serological tests Polymerage Chain Reaction (PCR) suggestive of TB was in 4 patients while the newly available Gene Xpert test for TB was positive in 3 cases. Cystourethroscopy was performed in13 cases. The bladder had evidence of chronic cystitis in the vast majority of cases. Bladder biopsy diagnostic of TB was 5 in number. FNAC was performed in 5 cases of epididymal swelling and was suggestive of TB. Pus from pyonephrotic kidneys and other sites revealed AFB in 6 cases. Singh JP et al. in 2012 and Chandra s et al. in 2012 found similar results in their study.

Patients received antitubercular therapy (ATT) for a total of 6-9 months with 4 drugs for 2 months, and 2 drugs for another 4-7 month. Abnormal liver function, drug intolerance or hypersensitivity was seen in 2 patients. The offending drug was excluded thereafter for that particular patient, and the second-line drug introduced as and when necessary.

A total of 41surgical procedures were performed. Of the procedures, Endoscopic was 13, in the form of bladder biopsy (5), retrograde DJ stenting of ureter (6) and antegrade stenting (2). Temporary divertion by percuteneous nephrostomy was done in 6 patients. In our study 19 ablative procedure was done. Recently with effective chemotherapy, the role of nephrectomy has been reassessed. Wechsler and associates found that nephrectomy is not mandatory in incidentally diagnosed, asymptomatic patients .Gupta et al in 2008 reported an incidence of nephrectomy of 33% of the patients and Paul DK et al. in 2015 reported 28.57% in their series. In our series, nephrectomy 10 and nephroureterectomy was performed in 4 patients which is similar to other studies. Epididymectomy was performed in 5 cases who were refractory to anti tubercular chemotherpy. Augmentation cystoplasty for small capacity refluxing bladder by ileocystoplasty was done in 3 cases , bladder capacity improved significantly in all 3 cases but needed intermittemnt catheterization. Post operative complications was found as wound infection in two cases and fever in one case, both were managed conservatively.

Follow-up included history, physical examination and investigations like complete blood count, liver function tests and renal function tests at 3and 6 months. The intravenous urography and diethylenetriamine pentaacetic acid (DTPA) scan were performed when indicated. Then the patients were followed with RFT and ultrasonography 6 monthly for 3 years and then annually.

Conclusion:

Many patients of urogenital TB present late with cicatrisation sequelae. Multidrug chemotherapy with judicious surgery when indicated is the ideal treatment. Surgery plays an important role in symptomatic relief and helps to lead a normal life. The results of reconstructive surgery are good and should be done when possible. Rigorous and long term follow up is necessary in patients undergoing reconstructive surgery.

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