Basrah Journal of Surgery
ISSN: 1683-3589, Online ISSN: 2409-501X

Original Article

Bas J Surg, 2024; 30(1)

SURGICAL INTERVENTION IN THE MANAGEMENT OF PATIENTS WITH GENITOURINARY TUBERCULOSIS- A PROSPECTIVE STUDY

Document Type : Original Article: Doi: https://doi.org/ 10.33762/bsurg.2024.143404.1057

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Article ID: BSURG-2309-1057 (R1)
Receive Date: 17 September 2023
Revise Date: 20 March 2024
Accept Date: 05 June 2024
First Publish Date: 28 June 2024

ABSTRACT:

Background:

Genitourinary tuberculosis is a popular health disease prevalent in the Indian scenario. Early diagnosis is crucial to prevent its progression to renal failure . This study presents the experience of surgical intervention of genitourinary tuberculosis cases in a tertiary care hospital.

Materials and Methods:

Fifty patients of both genders undergoing elective surgical intervention for GUTB between Febraury 2022 and May 2023 were prospectively recruited in this study. The preoperative and postoperative investigations were done as per the institutional protocol.

Results:

In this study of 50 patients, more number of males (26) suffered from GUTB than females (24). Sixty percent of the patients were aged between 20 and 40 years. The mean age was 46.14 ± 10.16years. Imaging studies of the urinary system were abnormal in 80% of the patients with hydronephrosis being the most frequent presentation. Flank pain was the most common symptom experienced in 39 cases. The ureter was the most commonly involved organ (29 patients) for whom surgical intervention was performed, followed by kidney (12 patients) and bladder (9 patients). Psoas abscess compounding to the kidney involvement was seen in 2 cases . PUJ-associated obstruction was involved in 4 cases . One patient presented with tuberculosis in the left ovary with a colovesical fistula.

Conclusion:

Diagnosis of GUTB can be confounding, compelling a high index of suspicion owing to the paucibacillary load, in the biological specimens and the difficulty in isolating or culturing TB bacilli. Hence, a strong clinical suspicion is essential for the correct and early diagnosis and delay diagnosis of genitourinary tuberculosis may result in major organ damage necessitating either organ removal or reconstructive surgeries. The first line of medical treatment of multidrug chemotherapy should be supplemented with judicious surgery (as indicated) as the ideal management for restoration of the genitourinary tract function.

Key words: Genitourinary tuberculosis, Ureteric stricture, Thimble bladder, Boari flap, Ureteroneocystostomy

Introduction

Tuberculosis is a major health problem associated with morbidity and mortality in India. An estimated annual incidence of 199 cases per 100000 population was reported in India in 2018 according to World Health Organization (WHO).[1] Genitourinary TB (GUTB) is the second most popular and severe form of extra-pulmonary tuberculosis.. It occurs due to the haematogenous spread of the mycobacterium initially from the lung to the kidneys and later to the genitourinary tract. The kidney is the most common genitourinary organ involved. The males are more affected than the females and presented most routinely in the fourth decade of life].[2] Nonspecific lower urinary tract symptoms, multitudinous clinical and radiological manifestations, contribute to delayed diagnosis causing structural damage and organ loss. Pathogenesis includes slow destruction of the urinary tract either due to caseous or fibrosing reaction by the Mycobacterium bacteria, compelling some surgical intervention in almost 50% of the patients during their lifetime.[3] Thus, timely diagnosis and treatment play a pivotal role in preventing the delayed sequelae of this disease, like non-functioning kidneys and thimble bladder.[4]

This study explored the role of surgical intervention in the treatment of patients suffering from genitourinary tuberculosis. This study also discussed the various presentations and indications of different modalities of both ablative and reconstructive surgeries needed for the management of genitourinary tuberculosis to preserve the organ function.

Materials and Methodology:

After obtaining ethical committee approval [reference number: EC/NIMS/2928/2022] and written informed consent, 50 patients of both genders undergoing surgical intervention for GUTB between February 2022 and May 2023 for GUTB at a tertiary institute were prospectively recruited in this study. Patients aged lower than 18 years,

University of Basrah, Bas J Surg, 2024; 30(1)
Document Type : Original Article, Doi: https://doi.org/ 10.33762/bsurg.2024.143404.1057

associated with malignancies or neurogenic bladders were excluded from the study.

A presumptive diagnosis of GUTB was made by the presence of clinical history, radiological findings and raised ESR after ruling out other possibilities. Diagnosis was further confirmed by the detection of mycobacterium from either acid-fast bacilli staining, L J medium culture, or detection of mycobacterial DNA by TB PCR test.

A predesigned proforma drafted for the study was utilised. Preoperative and postoperative investigations were done as per our institutional proforma.

Statistical Analysis:

IBM Software SPSS 20 version was utilized to analyse statistics. The independent t-test was used to calculate continuous data and expressed as mean ± standard deviation. The Chi-square test or Fischer's Exact test was used to calculate categorical data and expressed in terms of counts and percentages.

Results

Out of 50 patients, 26 (52.0%) of the participants were males and 24 (48.0%) of the participants were females. The mean age (Years) was 46.14 ± 10.16. and the most common symptom was loin pain. Regarding clinical presentation, 33 participants (66.0%) had loin pain. 8 participants (16.0%) had urgency, 7 participants (14.0%) had frequency and 2 participants (4.0%) had clinical feature of dysuria. (Figure 1) .

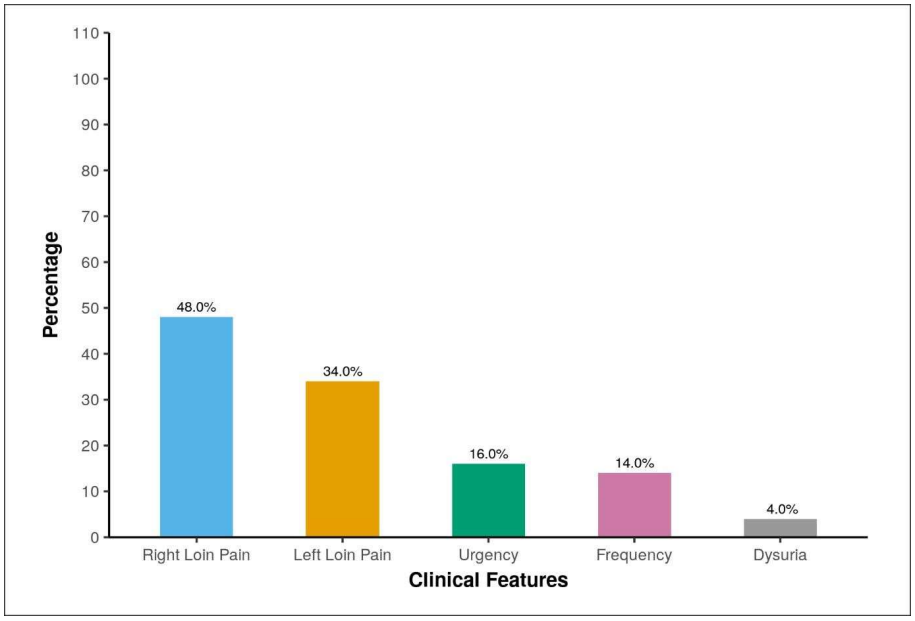

Figure 1: Clincal Features

Regarding lab investigations, the baseline serum creatinine was 1.33 ± 0.42 (mg/dL) (mean ±SD). The follow-up serum creatinine was 1.17 ± 0.24(mg/dL) (mean ±SD). The ESR ranged from 11 – 87 (mm/hr) with a mean (SD) of ESR (mm/hr) was 43.48 (18.43). 24.0% of the participants were urine TB PCR positive, while the remaining 76.0% of the participants were urine TB PCR negative. 22.0% of the participants had urine tested AFB positive and 78.0% of the participants had urine tested AFB negative. Anti tuberculous treatment was given to all patients immediately after diagnosis and continued for 6-8 weeks before undergoing elective surgery.

Regarding the organ involvement, ureter was the most commonly involved organ [29 patients] which required surgical intervention followed by kidney (12 patients) and bladder (9 patients). Psoas abscess was present in patients who also had kidneys involved. PUJ was involved in 4 cases causing obstruction. Only one patient presented with tuberculosis in the left ovary with Colo vesical fistula. (Table I)

Table I : Organ Involvement

Organ involved	Number of patients
Ureter	**29**
a) Upper ureter	**2**
b) Mid ureter	**4**
c) Lower ureter	**16**
d)diffuse	**7**
Kidney	**12**
Bladder	**9**

Non contrast CT radiological findings revealed thimble bladder in 4 patients, right proximal and mid ureteric stricture in 2 patients and pan ureteric stricture 2 cases (Table II).

Table II. Non-Contrast CT (NCCT) Findings

Findings	Number Of Cases
Thimble Bladder	**4**
Right Proximal And Midureteric Stricture	**2**
Panureteric Stricture	**2**

CT urogram was performed in thirty eight cases and the urogram showed distal ureteric stricture, pan ureteric stricture, poorly functioning kidney in thirty six patients (Table III).

Table III: Findings In Ct Urogram

Findings	No of cases
Distal ureteric stricture	18
VUJ stricture	6
Pan ureteric stricture	6
Thimble bladder	3
PFK	3

Chronic cystitis changes were seen in majority of cases.

Definitive surgical procedure was performed in forty cases. Regarding the surgical technique, 19 patients underwent Boari flap,8 patients ureteric reimplantation, 9 patients augmentation cystoplasty and 1 ileal ureter. 3 patients underwent simple nephrectomy. Nephrectomies were done in patients who had kidney involved less than 15% in DTPA renogram. 10 patients (20%) required only minor surgical procedures like DJ stenting and PCN placement. (Table IV)

Table IV. Surgical Procedure

Intervention	**No. Of Patients**
Boari Flap	19
Lead Better Politano	8
Augmentation Cystoplasty	9
Simple Nephrectomy	3
Ileal Ureter	1
DJ Stenting	5
PCN Placement	5

Discussion

Genitourinary tuberculosis is reported to occur in 15-20% of cases of pulmonary tuberculosis. Combination chemotherapy with anti tuberculous drugs is the first line treatment. Though there are no randomized controlled trials addressing the duration of anti tuberculous therapy (ATT), most of the national and international guidelines recommend 6 months of treatment. This is similar to newly diagnosed smear positive pulmonary tuberculosis (category 1). Fibrosis occurs during healing with anti tuberculous drugs. This leads to irreversible damage to the genitourinary system compelling the need of reconstructive procedures. According to Wong etal approximately 55% of patients will require surgical intervention which include relieving urinary obstruction, draining infected material and removing non-functioning kidneys.[5] According to Gupta etal more than half of interventions for GUTB are reconstructive.[6] Surgery is performed 4 to 6 weeks after the initiation of antituberculous therapy to allow subsiding of the active inflammation, decrease in the bacillary load , and stability of the lesions.

In patients who present with sepsis due to ureteral obstruction, prompt relieving of obstruction is needed either by double J (DJ) stenting or by placing a percutaneous nephrostomy (PCN). (DJ) double J stenting during the early course of the disease prevents renal loss and also increases opportunity for later reconstructive procedures.[7] According to Ramanathan et al, retrograde placement of double J (DJ) stent is successful in 41% of cases.[8] In the present study retrograde DJ stenting was done in five patients. Factors which play important role in the management of patients with ureteral strictures due to GUTB include the length and degree of the stricture, vascular supply to the lesion, and renal function.[9] Good outcome are seen in patients who undergo DJ stenting for short strictures and with good renal function. Fibrosis of ureters occurs during the course of ATT , and it is best managed by early DJ stenting.[10] In this study five patients were managed by DJ stenting alone.

When DJ stenting is not possible, percutaneous nephrostomy (PCN) must be placed until definitive reconstructive procedure is done.(5 patients). Because of multiple infundibular stenosis, more than one PCN may be necessary.[11] Our two patients required multiple PCNs . Later all these patients underwent definitive procedures to treat obstruction.

Total nephrectomy is done in patients with nonfunctional kidney and recurrent TB despite giving adequate antituberculous therapy. One more indication for total nephrectomy is a nonfunctional kidney with medically resistant hypertension. In this study we have performed three simple nephrectomies. Out of three nephrectomies, two were done for non functioning kidneys and one for non functioning kidney with medically resistant hypertension.

Isolated involvement of ureter by tuberculosis is rare. It is usually associated with involvement of either kidney or bladder. Lower ureteric strictures are more common compared to the upper and midureteric strictures. For short segmented lower ureteric strictures ureteroneocystostomy is the treatment of choice. Long segmented strictures of around 10-15 cm are best managed by Boari flap with psoas hitch.[12] In this study we have done ureteroneocystostomy in eight patients. Patients having a good bladder capacity can undergo a psoas hitch . In all our eight patients psoas hitch was also performed. Boari flap was done in nineteen patients for mid and upper ureteric strictures.

In patients with multiple ureteric strictures where there is total obstruction, ileal interposition is an option.[13] Ileal interposition (ileal ureteric replacement) was done in one patient with multiple strictures.

Augmentation of bladder is recommended in case of grossly distorted anatomy and which is not compatible with normal function. According to de Figueiredo et al, evaluating renal function, reconfiguring a low-pressure reservoir,[14] performing patient education, and conducting long-term follow-up are the general rules of incorporating bowel into urinary tract. The aim of blader augmentation is to increase bladder capacity and to create a low pressure system. Low pressure voiding system prevents upper tract damage. Augmentation with ileum gives the excellent results compared to other bowel segments. In patients with bladder capacity of less than 15-20 ml, augmentation is not possible due to cicatrized bladder. Construction of orthotopic neobladder is recommended in these patients. Augmentation cystoplasty was done in nine patients with ileum as the material. Out of nine patients two patients had concomitant lower ureteric strictures, so ureteric reimplantation was done along with augmentation cystoplasty. Mucus production, electrolyte derangements, and secondary bacterial infection are some of the complications of bladder augmentation.

Early diagnosis and combination of medical ATT with surgery yields good results in most of cases. Good patient education and long term follow up is necessary in patients who undergo reconstructive procedures. This study has highlighted the role of surgery in the management of GUTB.

Limitations:

Limitation of this study is small sample size conducted in a single institute and shorter followup period. Further studies are required with large sample size and longer followup.

Conclusion

Genitourinary tuberculosis poses a challenge to the urologist due to the nonspecific clinical features and baffling diagnosis, compelling a high index of suspicion owing to paucibacillary load in the biological specimens and the difficulty to isolate or grow TB bacilli. In selected patients with distorted and dysfunctional anatomical changes, surgery along with medical ATT plays a key role to restore the normal functioning of genitourinary system to ensure satisfactory outcome.

Genitourinary tuberculosis poses a challenge to the urologist due to the nonspecific clinical features and the difficulty to isolate or grow tuberculous bacilli in the biological specimens. In selected cases with distorted and dysfunctional anatomical changes, surgery along with modern antituberculous drugs plays a key role to restore the normal functioning of genitourinary system .

University of Basrah, Bas J Surg, 2024; 30(1)
Document Type : Original Article, Doi: https://doi.org/ 10.33762/bsurg.2024.143404.1057

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Acknowledgement: None
Financial support: No Financial Support For this Work
Conflict of interest : Authors declare no conflict of interest

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Work concept and design 1,2
Data collection and analysis 1,2,4
Responsibility for statistical analysis 1,2,3,4,5
Writing the article 1,2
Critical review, 1,2,3,4,5,
Final approval of the article 1,2,3,4,5
Each author believes that the manuscript represents honest work and certifies that the article is original, is not under consideration by any other journal, and has not been previously published.
Availability of Data and Material: The corresponding author is prompt to supply datasets generated during and/or analyzed during the current study on wise request.

Cite this article: G V, C., M, P., G, R., Devraj, R., Ch, R. SURGICAL INTERVENTION IN THE MANAGEMENT OF PATIENTS WITH GENITOURINARY TUBERCULOSIS- A PROSPECTIVE STUDY. *Basrah Journal of Surgery*, 2024; 30(1):31 -40. doi: 10.33762/bsurg.2024.143404.1057