

# TUBERCULAR STRICTURE AT LOWER END OF URETER CAUSING VESICoureTERIC JUNCTION OBSTRUCTION: OUR EXPERIENCE IN RANGPUR MEDICAL COLLEGE

A.H.M. MANJURUL ISLAM<sup>1</sup>, M ZAHID HASSAIN<sup>2</sup>, MD ANOWAR HOSSAIN<sup>1</sup>, MD SHAHIDUL ISLAM<sup>1</sup>, TAPAS BOSE<sup>3</sup>

<sup>1</sup>Department of Urology, Rangpur Medical College and Hospital, <sup>2</sup>Department of Urology, United Hospital, <sup>3</sup>Department of Respiratory Medicine, Rangpur Medical College and Hospital, Rangpur, Bangladesh.

## Abstract

**Objective:** To determine the outcome of ureteroneocystostomy for vesicoureteric junction obstruction due to tubercular stricture.

**Patients and Method:** Twelve patients age from 19 years to 47 years were underwent ureteroneocystostomy with ipsilateral D-J stenting for vesicoureteric junction obstruction (VUJO) with proximal hydronephrosis. Tissue from the lower of the ureter shows granulomatous lesion compatible with tuberculosis. D-J stents were removed and patients were put into antitubercular chemotherapy.

**Results:** Patients were symptom free and follow up IVU at six months interval shows free passage of contrast at 10 minutes film.

**Conclusion:** Vesicoureteric junction obstruction (VUJO) due to lower ureteric stricture by tubercular lesion, though rare, should be searched, because if not treated properly may lead to damage of ipsilateral renal unit.

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## Introduction

Ureteric stricture following TB is rare. The commonest site of tubercular stricture formation is close to ureterovesical junction[1]. Stricture formation is also seen at the level of ureteropelvic junction and less commonly in the middle third of the ureter. Although rare, the entire length of ureter may be involved.

TB is an infectious disease with evidence of spinal involvement being found in Egyptian mummies dating back to several thousand years BC. Although common in various populations over the centuries, it acquired notoriety during the Industrial Revolution in Europe as the 'captain of all these men of death'[2]. The discovery of tubercle bacilli in 1882 by Robert Koch, the documentation of close link between TB and poverty, undernutrition and poor living condition, the discovery and use of anti-tubercular drugs between the 1940s and 1970s and the introduction of combination chemotherapy

to cure disease and prevent the development of drug resistant all led to modern-day control efforts[2]. Since 1994, the DOTS and Stop TB strategies have been successfully implemented in more than 180 of the 212 World Health Organization (WHO) member states. Worldwide, the estimated absolute number of TB-affected people is increasing on a yearly basis, while the annual incidence is decreasing very slightly, at a rate of 1% per year[3]. It is expected that at this rate of decline, the impact of TB control efforts on global TB burden will not be significant and the elimination of TB is unlikely to be achieved by 2050. TB remains the major public health problem also in Bangladesh. The country ranks sixth among 22 highest burden TB countries in the world[4]. It is estimated that about 70,000 people die every year due to TB. In 2009, 160,735 TB cases were notified to national Tuberculosis Control Program.

Genitourinary tract TB is a common form of extrapulmonary TB accounting for 18-22% of cases in the USA and up to 41% of cases in Spain. In Scotland, about 20 new cases are seen annually per 1 million

**Correspondence:** A. H. M. Manjurul Islam, Department of Urology, Rangpur Medical college and Hospital, E-mail: drislam67@yahoo.com.

population and in Europe it is estimated that 1% of renal replacement therapy results from TB. In India about 14-41% patient have genitourinary TB.<sup>5</sup> Despite this high incidence of GUTB worldwide, to our knowledge, there are a few report available that express the incidence of the presence of GUTB in Bangladesh but unfortunately no institution reports on the complication of GUTB, like tubercular ureteric stricture. Herein, our department of Urology is the first to report on the tubercular stricture at the lower end of ureter.

### Patients and Methods

Fifty one patients of ureteroneocystostomy for vesicoureteric obstruction were retrospectively reviewed from the discharged registrar of the department of Urology from December 2006 to December 2013 with appropriate institutional review board approval. Among them twelve patients histology from the lower end of the ureters showed granulomatous lesion compatible with tuberculosis were included for the study. Informed consent waived. Patients age, clinical features relevant investigations were reviewed.

Age of the patients was from 19 years to 47 years, mean age 34.4 years, Nine patients were male and three patients were female. All patients were consulted for intermittent mild loin pain with occasional dysuria and fever for one year at two or three episode, and received one to two week courses of oral ciprofloxacin for urinary tract infection. All patients were healthy looking and they have no wet loss or evening rise of temperature.

Two patients (16.66%) were diabetic. Urinalysis of all patients except one (8.33%) showed sterile pyuria. Three patients (25.00%) had microscopic haematuria even after a course of oral antibiotic. Ultrasonography suggested unilateral hydronephrosis without any evidence of bladder outflow obstruction (Mean MCC=320 ml, Mean PVR=0-5ml). Serum creatinine level in all cases were within normal range. Intravenous Urography(IVU) showed no radio opaque shadow in KUB region, well excreting kidneys, but held up of contrast even in 30 minutes film in affected side (figure 1). Urethroscopy was performed, urinary bladder showed no ulcer and ureteric orifices were well visualized, golf hole pattern in affected side and 7.5 Fr rigid ureteroscope could not be negotiated beyond 1-2 mm. Routine blood test showed raised ESR from 25 to 65 mm of Hg (mean) at the end of first year and chest X-Ray was negative for tubercular lesion. DTPA renogram was performed to check split function of both kidneys. The mean split function of the affected kidney was 37%. The cases were diagnosed as having vesicoureteric junction obstruction and planned for ureteroneocystostomy were done. All patient were undergone ureteroneocystostomy with D-J stenting and



**Fig.-1:** Held up of contrast even in 30 minute film in effected.

histopathology of the lower end of the ureter revealed granulomatous lesion compatible with tuberculosis (Figure 2)



**Fig.-2:** Histopathology of the lower end of the ureter revealed granulomatous lesion compatible with tuberculosis

## Discussion

Vesicoureteric junction obstruction leading to hydronephrosis is not a common clinical entity. The obstruction may be due to congenital, inflammatory, post-traumatic, stone, urothelial carcinoma. In the inflammatory etiology tubercular stricture is the only pathology known till to date. Lower ureteric stricture is seen in about 9% of patients with genitourinary tuberculosis. One recent article from China reporting tuberculous ureteric stricture as a cause of hydronephrosis in 11 out of 141 (7.80%) middle-aged and elderly patients. This finding is consistent with our result that showed 7 adult patients out of 51 (23.52%) had tubercular stricture. The reason for this higher percentage in our country is that we have higher incidence TB than that of China. According to WHO 2013 report based on 2012 data incidence rate of new TB cases of all forms per year is 225 per 100,000 populations in Bangladesh whereas this rate is only 73 in China [7].

It is hypothesized that the development of disease depends on the interaction between the pathogen and the host immune response [8]. Mycobacterium Tuberculosis is the paradigm of the successful intracellular pathogen. Although the organism evokes both a humoral and a cellular immune response, it is the latter that determines the outcome of an infection [8]. Orme et al found that T lymphocytes interact with mycobacterial antigens to proliferate and to generate cytokines that, in turn, activate macrophages to become more mycobactericidal. These mononuclear phagocytes also release a number of factors (Tumor Necrosis Factor- $\alpha$ , Transforming growth factor- $\alpha$ ,) that together with the lymphocyte secretory products, determine the character of the pathologic lesion and the outcome of the infection. During the primary pulmonary infection the Mycobacterium Tuberculosis organisms multiply and evoke an inflammatory reaction. In spite of this reaction, there is still little resistance to the multiplication of the bacteria, and rapid spread occurs, first by the way of lymphatics and then through the blood stream. After several weeks, the rate of multiplication decreases as the aforementioned host response develops and the dissemination ceases. At this stage, the individual shows evidence of delayed hypersensitivity, coincident with the macrophages acquiring the ability to inhibit the multiplication of M. Tuberculosis. Most persons control the initial infection and develop no clinical illness. They have dormant bacilli, which may begin to produce disease years later [10]. Ustvedt et al suggested that symptoms of genitourinary tuberculosis do not appear

for 3 to 10 or more years after the primary infection and they have not found any child below 5 years to suffer from genitourinary tuberculosis. In our series we find that the mean age of our patient is 35 years which is consistent with their findings.

The mechanism of tubercular stricture formation at the lower end of ureter is largely unknown. Genitourinary TB is caused by metastatic spread of the organism through the bloodstream during the initial infection. The kidney is usually the primary organ infected in urinary disease, and other parts of the urinary tract become involved by direct extension. [11] When the tubercle bacilli shower the renal pelvis and ureter, it is presumed that they settled at the natural constrictions at pelviureteric junction and vesicoureteric junction etc. At the vesicoureteric junction, the bacilli remain dormant for decades and the dormant infection becomes activated due to failure of the local immunoresponse. The course of the infection depends on the virulence of the organism and resistance of the host. Caseating granulomas develop and consist of Langhans giant cells surrounded by lymphocytes and fibroblasts. The healing process results in fibrous tissue and thus a stricture formed at the vesicoureteric junction.

Recent literature reviews have shown that people with DM have a significantly higher risk of developing active TB compared to those without DM [12]. Although the definite pathophysiological mechanism of the effect of DM as a predisposing risk factor for TB is unknown, some hypotheses are suggested. Karachunskii et al found decreased capacity for blast-cell formation and fewer T-lymphocytes in diabetics and suggested that they have depressed cellular immunity [13]. Furthermore, Wang et al found hypodense alveolar macrophages in patients with diabetes mellitus and active pulmonary TB which play a vital role in eliminating mycobacterial infections [14]. Tsukaguchi et al searched the relation between diabetes mellitus and INF- $\gamma$ , IL-2, IL-10, production by CD-4+ alpha beta T cell and monocyte in patients with pulmonary tuberculosis and found interferon- $\gamma$  and cytokine production were significantly lower in diabetics with poor glycaemic control than in patients with good control [15]. Furthermore, MacRury et al [16] and Repine et al [17] suggested that hyperglycaemia has a distinct influence on the microbicidal role of macrophage, with even short lived blood glucose concentrations of 200 mg/dl (11.1 mmol/l) significantly reducing macrophage respiratory burst. Generally, blood glucose concentrations greater than 250 mg/dl (14 mmol/l

l) impairs white cell function. However, in our study, two of 12 patients (28.57%) are diabetic. This result is comparable with the systemic review of bi-directional screening for DM and TB in 2009 using strict inclusion criteria identified by 12 studies on screening people with DM for TB and 18 studies on screening TB patients for DM. In this review Jeon et al find that in persons with DM screening for TB showed high rates of TB, ranging from 1.7% to 36%[18].

The patient of tubercular stricture may be grouped into two broad categories; 1) simple/uncomplicated: Short segment passable stricture with salvageable renal function greater than 25% and good bladder capacity, 2)Complex/complicated: long segment, dense fibrosis, extensive/bilateral, impassable stricture with or without salvageable kidney, renal function <20% and small bladder capacity.[19] Treatment option depends on the category of patient. First category of patient may be treated by pre antitubercular chemotherapy antegrade/retrograde balloon dilatation, endoureterotomy, cautery wire balloon incision with placement of Double J-stent[20]. The stent can be kept for a period of 6-12 months and usually by that time the stricture stabilizes. When endourologic treatment fails in category 1 stricture or else, in most cases of category 2 stricture surgical repair of ureteric stricture should be done. In our cases we could only negotiate the tip of 7.5 mm ureteroscope more than 0.5 cm, and their mean MCC of bladder was 300ml, mean ipsilateral split function in DTPA renogram was 43% and IVU showed single narrowing at VUJ level. We performed ureteroneocystostomy with psoas hitch in all the cases. As all our patients presented with vague abdominal complain and our clinical diagnosis lacks suspicion of tubercular stricture at the lower end of ureter, the operative procedure helped us in incidental detection of tubercular stricture at the lower end of the ureters and saved the patient from autonephrectomy-a long term complication of the disease[21].

Ureteroneocystostomy is a major surgical procedure having some known complication, such as reflux, early or persistent obstruction[22]. Weiss et al found that persistent obstruction after ureteroneocystostomy may be entirely silent leading to renal loss[23]. We were careful about the vascularity of the ureter and we put D-J stent and did detrusororrhaphy to avoid these complication.

### Conclusions

Ureteric stricture following TB is not common. It is a feared manifestation of genitourinary TB with the

commonest site being the lower ureter. In an endemic zone of TB, Urologists should keep in mind the diagnosis of tubercular stricture at the lower end of ureter in any middle-aged, diabetic patient presented with longstanding vague urinary symptoms with hydronephrosis, for which there is no obvious cause. If it can be diagnose earlier, simple endourologic procedure may avoid major surgical procedure like ureteroneocystostomy that have many known complications.

**Conflict of Interest :** None declared

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**Abbreviation:**

- TB = Tuberculosis
- MCC = Maximum Cystometric Capacity
- PVR = Post Voidal Residue
- D-J = Double J
- VUJ = Vesicoureteric Junction
- GUTB = Genitourinary Tuberculosis