COMPARATIVE STUDY OF OPTICAL INTERNAL URETHROTOMY VERSUS ANASTOMOTIC URETHROPLASTY FOR SHORT SEGMENT BULBAR URETHRAL STRICTURE

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Abstract

Objective: *This study was conducted to compare the outcome of anastomotic urethroplasty with that of traditional optical internal urethrotomy in the treatment of short-segment bulbar urethral stricture.*

Methods: *This comparative clinical study was conducted in the Department of Urology, Dhaka Medical College Hospital over a period 1 year from January 2007 to December 2008. A total of 50 patients with short-segment (< 2 cm) bulbar urethral strictures were consecutively included in the study. The test statistics used to analyses the data were Fisher's Exact Probability Test, Student's t-Test. For all analytical tests, the level of significance was set at 0.05 and p < 0.05 was considered significant.*

Results: *About one-quarter (24%) of patients in OI Urethrotomy group experienced bleeding, 4% epididymitis and another 4% incontinence. In contrast, 8% of patients in Anastomotic Urethroplasty group complained of periurethral leakage, 8% fever and another 8% wound infection. Apart from bleeding, all the complications were almost homogeneously distributed between groups.Six (24%) of patients in OI Urethrotomy Group exhibited narrow urinary stream at month 3, as opposed to none in Anastomotic Urethroplasty Group (p = 0.001). Nearly 30% of patients in OI Urethrotomy Group had narrow urinary stream at month 6 compared 4% in Anastomotic Urethroplasty Group (p = 0.024). Of the 25 patients in OI Urethrotomy Group, 1(4%) developed UTI at month 3 and 5(20%) at month 6. None of the patients in Anastomotic Urethropasty Group developed UTI. There was significant difference between groups in terms of UTI at month 6 (p = 0.025).The recurrence rate of stricture in OI Urethrotomy was 24% (6 out of 25 patients) at month 3. However, none in Anastomotic Urethroplasty Group had history of recurrence of stricture (p = 0.011). At baseline the mean uroflowmetry was 5.5 ml/sec in both groups which immediately increased to 25.3 ± 2.6 ml/sec and 23.9 ± 2.2 ml/sec in OI urethrotomy and Anastomotic Urethroplasty groups respectively and then dropped to 18.4 ± 6.3 ml/sec and 20.2 ± 2.6 ml/sec in OI Urethrotomy and Anastomotic Urethroplasty groups respectively at month 3 and to 17.8 ± 6.4 ml/sec and 19.6 ± 2.6 ml/sec respectively at month 6.*

Conclusion: *This study concludes that Anastomotic Urethroplasty is an effective and satisfactory technique for the treatment of short-segment bulbar urethral stricture.*

Key words: *Stricture urethra, Optical Internal Urethrotomy, Anastomotic Urethroplasty*

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Introduction :

Urethral stricture disease is a common urological and is one of the most important causes of bladder outflow obstruction which may be resulted from varieties of

pathology e.g. inflammatory disease, injuries of urethra, neoplasm of urethra etc.[1] In the management of urethral strictures the etiology, site, length of stricture are taken into account. Peterson and Webster suggested that no one technique is appropriate for all stricture diseases and the urologist must be familiar with various surgical techniques to deal with any condition of the urethra during surgery. Surgical treatment of urethral strictures includes numerous options such as dilatation, optical internal urethrotomy, stent and reconstructive surgical techniques[2]. Urethroplasty is an open surgical procedure for urethral reconstruction to treat urethral strictures. Urethroplasty can be performed by two methods; primary repair which involves complete excision of the narrowed part of urethra. The proximal and distal patent parts are then rejoined. The second method of urethroplasty utilizes tissue transfer or free graft technique. The gold standard treatment of a short segment bulbar stricture is excision, spatulation of the two ends and an overlapping end to end anastomosis, whether or not the lumen is completely occluded.

Internal urethrotomy refers any procedure that opens the stricture by incising or ablating it transurethrally. The urethrotomy procedure involves incising scar upto healthy tissue to allow the scar to expand (release of scar contracture and the lumen to heal). The goal is for the resultant larger luminal caliber to be maintained after healing. The most common complication of internal urethrotomy is recurrence of stricture. For many, an internal urethrotomy is successful if it offers temporary relief. Therefore, in many cases, internal urethrotomy has been reported as successful despite the fact that it has been associated with eventual stricture recurrence[3]. Optical internal urethrotomy continue to be the most commonly used techniques, but have a high recurrence rate and many patients progress to surgical repair. Moreover optical internal urethrotomy exacerbates scar formation, thus adding to stricture length and predisposing difficult definitive open repair and a lower success rate[4].

Several studies have been conducted in different parts of the world comparing the safety and efficacy between anastomotic urethroplasty and optical internal urethrotomy in short segment bulbar urethral stricture treatment. Urethral mucosa has several unique characteristics that make it superior to any tissues for reconstruction of urethra. Open urethroplasty is regarded as the gold standard treatment for urethral strictures[3]. No such study has yet been carried out in Bangladesh and continuous debate has been going on among urologist about the first & logical treatment option in treating short- segment bulbar urethral stricture.

This study was conducted to compare the outcome of anastomotic urethroplasty with that of traditional optical internal urethrotomy in the treatment of short-segment bulbar urethral stricture.

Patients and methods

The comparatie clinical study was conducted in the Department of Urology, Dhaka Medical College Hospital between January 2007 to December 2008. A total of 50 patients were consecutively included in the study. The required numbers of patients were consecutively included in the study and were randomly assigned either optical internal urethrotomy or anastomotic urethroplasty groups.

The present study has been conducted on the patients with bulbar urethral stricture size < 2 cm admitted in the Department of urology, DMCH for anastomotic urethroplasty or optical internal urethroyomy (OIU).

All patients were evaluated by history, physical examination and some investigations including urine analysis & cultural sensitivity (C/S), serum creatinine, random blood sugar (RBS), ultrasonography, retrograde and micturating cystourethrogram (RGU & MCU) and uroflowmetry. All the cases were further evaluated for fitness of anesthesia. Patients with documented urinary tract infection (UTI) were treated with appropriate antibiotics before the procedure & confirmed by repeat culture sensitivity (C/S). The surgical procedure was performed with the patients under spinal anesthesia. All patients were followed-up by urinary symptoms, uroflowmetry, urine analysis, RGU & MCU at 3 and 6 months.

Data were processed and analyzed using SPSS (Statistical Package for Social Sciences). The test statistics used to analyze the data were descriptive statistics, Fisher Exact Probability Test and Student's t-Test. For all analytical tests, the level of significance was set at 0.05 and $p < 0.05$ was considered significant.

Results :

Twenty four percent of patients in OI Urethrotomy group experienced bleeding, 4% epididymitis and another 4% incontinence. In contrast, 8% of patients in Anastomotic Urethroplasty group complained of periurethral leakage, 8% fever and another 8% wound infection. Apart from bleeding, all the complications were almost homogeneously distributed between groups i.e. not

significant (p > 0.05) (Table I). Fisher Exact Test was done to analyse the data.

Table I
Comparison of complications between groups following intervention

Complications	Group		p-value
	OI Urethrotomy (n = 25)	Anastomotic Urethropasty (n = 25)	
Periurethral leakage	00	2(8.0%)	0.245
Bleeding	6(24.0%)	00	0.011
Fever	00	2(8.0%)	0.245
Epididymitis	1(4.0%)	00	0.500
Incontinence	1(4.0%)	00	0.500
Wound infection	00	2(8.0%)	0.245

Six (24%) of patients in OI Urethrotomy Group exhibited narrow urinary stream at month 3, as opposed to none in Anastomotic Urethroplasty Group (p = 0.001). Nearly 30% of patients in OI Urethrotomy Group had narrow urinary stream at month 6 compared 4% in Anastomotic Urethroplasty Group. The difference was statistically significant in terms of narrow urinary stream (p = 0.024) (Table II). Fisher Exact test was done to analyse the data.

Table II
Comparison of narrow urinary stream between groups

Follow up	Group		p-value
	OI Urethrotomy (n = 25)	Anastomotic Urethroplasty (n = 25)	
Narrow urinary stream at 3 month	6 (24%)	00	0.011
Narrow urinary stream at 6 month	7 (28%)	1(4%)	0.024

Of the 25 patients in OI Urethrotomy Group, 1(4%) developed UTI at 3 month and 5(20%) at 6 month. None of the patients in Anastomotic Urethroplasty Group developed UTI. There was significant difference between groups in terms of UTI at 6 month (p = 0.025) (Table III). Fisher Exact Test was done to analyse the data.

Table III
Comparison of UTI between groups

Follow up	Group		p- value
	OI Urethrotomy (n = 25)	Anastomotic Urethroplasty (n = 25)	
UTI at 3 month	1(4%)	00	0.500
UTI at 6 month	5(20%)	00	0.025

The recurrence rate of stricture in OI Urethrotomy was 24% (6 out of 25 patients) at 3 month. However, none in Anastomotic Urethroplasty Group had history of recurrence of stricture. Seven (28.1%) patients in OI Urethrotomy needed a second urethrotomy, where as only 1(4%) required Anastomotic urethroplasty at 6 month. The differences between the groups in terms of recurrence of stricture at 3 month and at 6 month were statistically significant (p = 0.011 and p = 0.024 respectively) (Table IV). Fisher Exact Test was done to analyse the data.

Table IV
Comparison of recurrence of stricture between groups (n = 50)

Follow up	Group		p- value
	OI Urethrotomy (n = 25)	Anastomotic Urethroplasty (n = 25)	
Recurrence of stricture at month 3	6(24%)	00	0.011
Recurrence of 6 stricture at month	7(28.1%)	1(4%)	0.024

Table V shows the comparison of changes in mean uroflowmetry between groups at different time intervals. At baseline the mean uroflowmetry was 5.5 ml/sec in both groups which immediately increased to 25.3 ± 2.6 ml/sec and 23.9 ± 2.2 ml/sec in OI urethrotomy and Anastomotic Urethroplasty groups respectively and then dropped to 18.4 ± 6.3 ml/sec and 20.2 ± 2.6 ml/sec in OI Urethrotomy and Anastomotic Urethroplasty groups respectively at 3 month and to 17.8 ± 6.4 ml/sec and 19.6 ± 2.6 ml/sec respectively at 6 month. The uroflowmetry improved in both groups compared to their baseline figures, but no significant difference was between the groups with respect to improvement. Data were analysed using Student's t-Test and were presented as mean ± SD.

Table V

Uroflowmetry at different time interval between groups (n = 50)

Uroflowmetry (ml/sec)	Group		p- value
	OI Urethrotomy (n = 25)	Anastomotic Urethropasty (n = 25)	
At baseline	5.5 ± 1.7	5.5 ± 1.8	0.936
Immediate outcome	25.3 ± 2.6	23.9 ±2.2	0.039
Follow up at month 3	18.4 ± 6.3	20.2 ±2.6	0.217
Follow up at month 6	17.8 ± 6.4	19.6 ±2.6	0.218

Discussion :

Andrich et al, 2003 stated that the result of anastomotic urethroplasty is good and sustained in the long term, while the result of optical internal urethrotomy deteriorate steadily with time and there is definite room for development. An anastomotic repair should be performed in preference to an optical internal urethrotomy when possible[5].

Primary end-to-end anastomosis is the gold-standard reconstructivetechnique for short bulbar urethral strictures (< 2 cm). Free grafts and pedicled flaps best reserved for longer strictures. Eltahawy et al. find new onset ED to be negligible following anterior anastomotic urethroplasty 2.3%)[6]. Similarly, Santucci et al. report that new onset of ED occurred in less than 1% of 168 men having bulbar urethroplasty via primary anastomosis[7]. Others have reported a range of 5%-26% of men with anastomotic reconstruction for anterior strictures complaining of ED. These figures, taken together, justify the continued aggressive use of primary anastomosis for short-length urethral strictures[8].

Immediate outcome of intervention shows that 24% of patients in optical internal urethrotomy (OIU) group encountered bleeding, 4% developed epididymitis and another 4% incontinence of urine. In contrast, 8% of patients in anastomotic urethroplasty group had periurethral leakage, 8% fever and another 8% wound infection. All the complications except bleeding were almost identically distributed between groups Stormont et al. (1993) reported that all the complications except bleeding were nearly identical between optical internal urethrotomy (OIU) and anastomotic urethroplasty[9].

Nearly one-quarter (24%) of patients in optical internal urethrotomy (OIU) Group exhibited poor urinary stream at month 3, as opposed to none in anastomotic urethroplasty Group. Narrow urinary stream at month 6 demonstrated its significant presence in Optical internal urethrotomy (OIU) Group (30%) compared to that in anastomotic urethroplasty Group (4%) ($p < 0.05$).

The recurrence of stricture in optical internal urethrotomy OIU at month 3 was 24% as opposed none in anastomotic urethroplasty Group ($p = 0.011$). Seven (28.1%) patients in optical internal urethrotomy (OIU) needed a second urethrotomy, where as only 1(4%) required anastomotic urethroplasty at 6th month ($p = 0.024$) Albers et al. (1996) demonstrated in their study a recurrence rate of 44.8% after primary urethrotomy and 34.6% underwent a second urethrotomy. The recurrence rate of anastomotic urethroplasty was 26.9% and 16.9% needed a second urethroplasty[10].

The mean uroflowmetry at baseline was 5.5 ml/sec in both groups which steeply increased in both optical internal urethrotomy (OIU) and anastomotic urethroplasty groups reaching a mean uroflowmetry of 25.3 ± 2.6 ml/sec and 23.9 ± 2.2 ml/sec respectively and then dropped to 18.4 ± 6.3 ml/sec and 20.2 ± 2.6 ml/sec in optical internal urethrotomy (OIU) and anastomotic urethroplasty groups respectively at month 3 and to 17.8 ± 6.4 ml/sec and 19.6 ± 2.6 ml/sec respectively at month 6. Kane et al. (2002) reported in his study that average peak urinary flow rates increased from 7.9 ml/sec at baseline to 30.1 ml/sec postoperatively in anastomotic group[11].

Conclusion :

From the findings of the study and discussion thereof, it can be concluded that anastomotic urethroplasty is a versatile, effective and a satisfactory technique for the treatment of short segment bulbar urethral strictures. The morbidity and complications are low and outcomes are excellent.

Conflict of Interest : None

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Abbreviations:

UTI: Urinary tract infection

RGU : Retrograde urethrogram

MCU: Micturating urethrogram

OIU: Optical internal urethrotomy

ED: Erectile dysfunction