

Outcome of Triamcinolone Injection following Optical Internal Urethrotomy in Short Segment Anterior Urethral Stricture

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ABSTRACT

Background: Internal Urethrotomy is a surgical procedure to treat urethral stricture disease. To assess the outcome of triamcinolone injection following Optical Internal Urethrotomy (OIU) in short segment anterior urethral stricture in our setting.

Materials and methods: This randomized controlled trial was carried out in the Department of Urology, Chittagong Medical College Hospital, Chattogram from September 2017 to August 2018 on 60 patients with short segment of anterior urethral stricture. Cases were randomly allocated to group A (OIU with Triamcinolone) and group B (OIU without Triamcinolone). Each group consisted of 26 patients. Data were analyzed and compared by Stata (version 16).

Results: There were no significant differences in the baseline characteristics of the patients. At 9 months of follow up, American Urological Association Symptom Score (AUA score) was decreased in Group A (5.8 ± 4.3) in comparison to control Group B (10.4 ± 7.9). In Group A, Qmax of only 1 patient was < 15 ml/min which was presented at 9 month of the study period. This was considered as recurrence (3.57%). So, success rate of Group A was 96.43% as the Qmax of the 27 patients were > 15 ml/min. In Group B, Qmax of the 4 patients (14.81%) were found < 15 ml/min. Among the 4 patient, 1 patient was presented with near retention at 7 day after surgery and Qmax < 10 ml/min and present with complete blind tract in RGU with MCU. He was managed with OIU within my follow up period. So, it was considered as failure (3.3%). But other 3 patients were presented with Qmax < 15 ml/min, much earlier than Group A and these were considered as recurrence (11.1%). So it can be said that recurrence rate is low and the period of recurrence is also prolonged in those patient who were treated with OIU along with Triamcinolone injection

Conclusion: OIU with intralesional triamcinolone is better than OIU alone. It significantly reduces and delays the recurrence of anterior urethral stricture.

Key words: LUTS; OIU; Urethral stricture.

Introduction

The urethral stricture refers to urethral disease resulting from scarring process involving the spongy erectile tissue of corpus spongiosum which leads to a decrease in the caliber of urethral lumen.¹ Today, most urethral strictures are the result of trauma (Usually straddle

trauma) but inflammatory strictures secondary to gonorrhea infection were the most commonly seen in the past are less common now. However, in many cases of anterior urethral stricture disease, the etiology remains unknown.² Stricture disease can have a profound impact on quality of life, resulting in infection, hydronephrosis, bladder calculi, fistula, sepsis and ultimately renal failure. Studies of the natural history of stricture disease in untreated patients show high rates of complications.³

Many different treatment modalities are available for the treatment of urethral stricture, ranging from urethral dilatation, minimally invasive Optical Internal Urethrotomy (OIU) to invasive modalities such as Buccal Mucosal Graft (BMG) urethroplasty and even tissue engineering in the 21st century.⁴ Optical internal urethrotomy, being a minimally invasive procedure with less morbidity, is commonly performed and the most favored procedure by urologists for the treatment of short segment stricture urethra.⁴ Optical internal urethrotomy refers to any procedure that opens the stricture by incising or ablating it transurethrally to allow the scar to expand. The goal is to maintain a resultant larger caliber of urethra even after healing.²

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Numerous techniques have been adopted to reduce the recurrence of stricture after OIU, such as prolong catheterization, Clean Intermittent Self Catheterization (CISC) etc. with varying success.²⁻⁴ Clean intermittent self-catheterization is commonly advocated by urologist to reduce the recurrence but there is no randomized control trial to support the use of CISC following OIU rather it is associated with significant long-term complications and high dropout rates.^{5,3}

Corticosteroid injection has been a well-established medical procedure in treating pathological scar since 1960. Injection of steroid at the site of urethrotomy prevents scar formation by inhibiting collagen synthesis, increasing endogenous collagenase production and reducing the levels of collagenase inhibitors.⁶ The addition of triamcinolone injection, a synthetic corticosteroid to optical internal urethrotomy site is easy and low-cost procedure.⁷

This present study is aimed to evaluate the outcome of triamcinolone injection in preventing anterior urethral stricture recurrence after open internal urethrotomy.

Materials and methods

This randomized control trial was carried out at the Department of Urology, Chittagong Medical College Hospital (CMCH) Chattogram, Bangladesh from September 2017 to August 2018. Patients admitted with short segment anterior urethral stricture (10 mm) during the study period in the Department of Urology, CMCH were the study population. Male patients of age between 18-45 years and with anterior urethral stricture that is up to 10 mm were the inclusion criteria. Patients or attendants who denied formal consent, length of stricture of anterior urethra > 10mm, multiple urethral strictures, history of optical internal urethrotomy, previous unsuccessful attempts of urethroplasty, history of urethral dilatation for stricture urethra, neurogenic bladder, balanitis xerotica obliterans with stricture, meatal stenosis, patient with bladder neck hypertrophy, patient with posterior urethral valve, patient with sign and symptoms of benign enlargement of the prostate were excluded from the study.

There were two groups of study subjects. Group A (Study group) were those patients who underwent optical internal urethrotomy followed by intralesional injection of triamcinolone acetonide. Group B (Control group) were those patients who underwent optical internal urethrotomy only.

A predesigned case record form was used for data collection. After proper counseling and a detailed explanation of the operative procedure, possible complications, care of catheter, postoperative follow-up, and investigations, written informed consent was

taken from all patients with the information that they can withdraw anytime from the study if they wished. Patients were assured of providing adequate treatment for any complications developed in relation to the purpose of the study. All the study subjects were assured of their confidentiality and freedom to withdraw from the study at any time.

A detailed history was taken and clinical examination was done for each patient who came with short segment anterior urethral stricture and planned for optical internal urethrotomy and recorded in the predesigned data collection form. After that pre-operative evaluation by urine analysis and culture and sensitivity, serum creatinine, uroflowmetry, ultrasonogram of Kidney, Ureter, Bladder (KUB) and prostate with Maximum Cystometric Capacity (MCC) and Post-Void Residual (PVR) retrograde urethrogram and micturating cystourethrogram were done.

The procedure was performed with the patient in the lithotomy position under spinal anesthesia. Standard surgical painting and draping were done. All patients received cefuroxime as prophylaxis preoperatively. Standard urethroscopy was done to visualize the stricture site and a .035 (Inch) guide wire was passed through the stricture up to the bladder. Normal saline solution was used as an irrigant. Optical internal urethrotomy was done in the usual manner under direct vision using cold knife at 12 o'clock position of the stricture site. The incisions were continued until a 21 Fr sheath could pass through the stricture site into the bladder. Triamcinolone acetonide was prepared with 40 mg in 10 ml of normal saline. Study group (Group A) received intralesional triamcinolone injection at the site of urethrotomy using Willium's endoscopic needle. At each edge of incision site, 5 ml was injected at 12 o'clock position. In the control group (Group B), triamcinolone acetonide was not injected after optical internal urethrotomy. 18 Fr bichannel Folley's catheter was inserted per urethra in both groups after completion of the procedure. The catheter was left in place for 5 days. A broad-spectrum antibiotic (500mg cefuroxime) was administered perioperatively and continued for 7 days after surgery. Clean intermittent self-catheterization was not offered to either group. Patients were advised to follow up at 7 day, 3 month, 6 month and 9 months of post-operative period.

Post operative follow up was done with history and physical examination, urine analysis and culture sensitivity, ultrasonography of KUB with MCC with PVR, uroflowmetry, RGU and MCU (When Qmax <15ml/sec). American Urological Association Symptom Score (AUA score) was also calculated and recorded in the case record form.

For data analysis, utilized Stata (Version 16, StataCorp, College Station, TX, USA). Using a histogram, a normal Q-Q plot and the Kolmogorov-Smirnov test, the normality of continuous data were determined. This study was authorized by the Institutional Review Board (IRB) of Chittagong Medical College (Approval number: CMC/PG/2017/359).

Results

The present study includes 60 patients underwent OIU divided into two groups, group A receiving triamcinolone injection and group B being the control. Both the study groups were comparable with respect to their age distribution. Mean age of the patients of Group A was 33.7±9.3years and Group B was 37.1±7.4years. Predominant age group was 35 to 46 years in both Group A and Group B. Preoperative AUA score was similar in both groups (Mean score was 28.6±2.8 and 28.3±2.1 respectively in Group A and Group B, p value=0.641). Similarly, there was no significant difference in preoperative mean maximum flow rate in two groups (mean Qmax 6.5±1.9 ml/sc and 6.6±1.8ml/sec in Group A and Group B, p value=0.811) (Table I).

Table I Comparison of preoperative variables in both groups (n=60)

Variables	Assigned group		p value
	Group A (n=30)	Group B (n=30)	
Age, in years			
Mean ±SD	33.7±9.3	37.1±7.4	0.138
Range	18-45	21-45	
Preoperative AUA score			
Mean ±SD	28.6±2.8	28.3±2.1	0.641
Range	23-33	24-33	
Preoperative Qmax, in ml/sec			
Mean ±SD	6.5±1.9	6.6±1.8	0.811
Range	3-9	3-9	
Preoperative PVR, ml			
Mean ±SD	143.8±67.0	146.1±98.7	0.895
Range	30-245	34-254	

AUA score: American Urological Association symptom score. PVR: Post-Void Residual. Qmax, maximum flowrate, SD: Standard Deviation.

Data presented as n (%) unless otherwise mentioned.

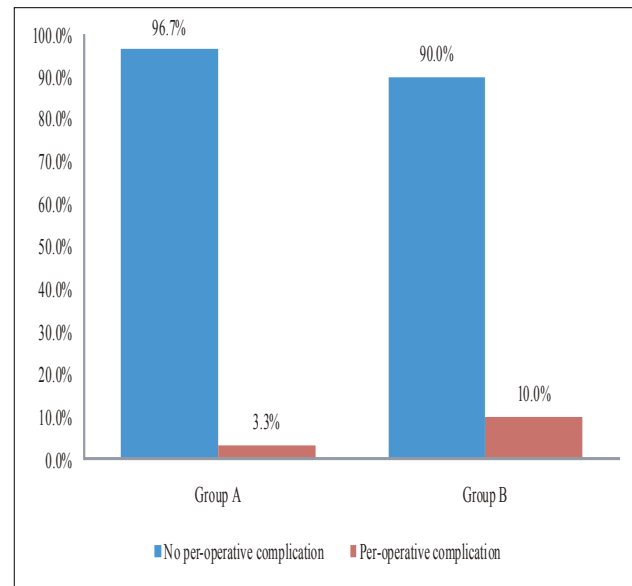


Figure 1 Distribution of the study patients by their study groups and per-operative complication

Table II shows the postoperative comparison of AUA score, PVR and maximum flow rate between two groups at different follow up period. At 3rd month mean AUA score was found 8.4±3.1 in group A and 8.1±3.4 in group B and the difference was statistically not significant (p=0.138). Similar trend was also observed in 6th month and 9 month follow up regarding AUA score between two groups. At 3 month, 6 month, 9 month after surgery mean PVR was found 9.5±11.5; 10.7±11.3, 11.4±40.3 in Group A and 39.5±83.9; 41.8±84.2; 42.2±85.3 in Group B. Post void residual urine in both groups was not statistically significant as p>0.05. In Group A, among the 28 patient, Qmax of 1 patients was found < 15 ml/min which was considered as recurrence which was 3.57% of total population and Qmax of other 27 patients were found normal (Qmax ≥ 15ml/min). So, the success rate of Group A was 96.43%. In Group B, among the 27 patients, Qmax of 1 patient was found below 10ml/sec, which was considered as Failure and Qmax of 3 patients was found below 15ml/min, which was considered as recurrence which was 14.81% of the population and Qmax of other 24 patients were found ≥15ml/min. So, the success rate of group B was 85.19%. Although there is low rate of recurrence and no failure (3.57%) in Group A, and slightly high rate of recurrence and failure (14.81%) in Group B, was not statistically significant.

Table II Comparison of postoperative AUA score, PVR and Qmax between both groups at different follow up (n=55)

Variables	Assigned group		p value [†]
	Group A (n=28)	Group B (n=27)	
AUA score, mean \pm SD			
Follow up at 3 rd month	4.3 \pm 0.5	8.1 \pm 3.4	0.138
Follow up at 6 th month	7 \pm 2.1	6.1 \pm 4.3	0.061
Follow up at 9 th month	5.8 \pm 4.3	10.4 \pm 7.9	0.113
PVR (ml), mean \pm SD			
Follow up at 3 rd month	9.5 \pm 11.5	39.5 \pm 83.9	0.138
Follow up at 6 th month	10.7 \pm 11.3	41.8 \pm 84.2	0.061
Follow up at 9 th month	11.4 \pm 40.3	42.2 \pm 85.3	0.091
Qmax			
Follow up at 3 rd month	15 ml/sec	0 (0%)	1 (3.85%)
	>15ml/sec	28 (100%)	25 (96.15%)
Follow up at 6 th month	15 ml/sec	0 (0%)	1 (4.0%)
	>15ml/sec	28 (100%)	24 (96.0%)
Follow up at 9 th month	15 ml/sec	1 (3.57%)	1 (4.17%)
	>15ml/sec	27 (96.43%)	23 (95.83%)

AUA score: American Urological Association symptom score. PVR: Post-Void Residual. Qmax, maximum flowrate. SD: Standard Deviation.

Data presented as n (%) unless otherwise mentioned.

In group A, the recurrence rate is comparatively low and the period of recurrence is also prolonged. Among the 55 completed patients 4 patients has recurrent stricture disease. Though the recurrence rate is higher in Group B than Group A (3 patient versus 1 patients) it is not statistically significant (p=0.342). Early recurrence is more common in Group B patients. In group B there was 1 failed intervention whereas in group A there were none (Table III).

Table III Distribution of the study subjects by their stricture recurrence and failed intervention (n=55)

Variables	Group A (n=28)	Group B (n=27)	p value
Recurrence	1 (3.6%)	3 (11.1%)	0.34
Failed Intervention	0 (0%)	1 (3.3%)	0.74

Data presented as n (%) unless otherwise mentioned.

Discussion

Urethral stricture is a well-known disease that has been known for centuries. Difficulty on managing urethral strictures is its tendency to recur. There are many treatment modalities as dilatation, endoscopic urethrotomy, stent placement, and urethroplasty. Internal urethrotomy was widely used for urethral stricture less than 2 cm. Although, open urethroplasty is a highly successful and durable treatment method, surgeons do not perform it so often due to its invasiveness, longer catheterization requirement and need of experienced surgical skill.⁸

The mean age of Group A and Group B was 33.7 \pm 9.3 years and 37.1 \pm 7.4 years. The age of the patients ranged between 18 and 45 years. In previous study observed that median age at presentation of anterior urethral stricture was 37.4 years which is almost similarly matched with current study.⁹ In present study, per operative complications were more in control group (10%) than in intervention group (3.3%) which is lower than Tabassi et al. who observed that in the experimental group with intralesional triamcinolone acetonide, 3 (8.82%) and 2 (5.8%) patients developed bleeding, and extravasations, respectively. In control group, bleeding, and extravasations occurred in 3 (8.33%) and 2 (5.55%) patients, respectively.¹⁰

Mean preoperative AUA score was similar in both groups (Mean score was 28.6 \pm 2.8 and 28.3 \pm 2.1 respectively in Group A and Group B). In post operative non recurrence group significant improvement of AUA score (5.1 \pm 4.1) occur. At 9 months of follow up, AUA score was decreased in Group A (5.8 \pm 4.3) in compare to control Group B (10.4 \pm 7.9). Modh et al., 2015, noted the decrease in AUA score in patients treated with intralesional triamcinolone acetonide after optical internal urethrotomy, which is comparable with present study.¹¹ In present study, at 9 months post operative of follow up, PVR was significantly decreased in study group as compare to control group. In Modh et al, 2015 also observed that PVR was decreased after treatment of stricture urethra by optical internal urethrotomy with triamcinolone injection which similar with present study.¹¹

Current study revealed that in both Group A and B all the patients' preoperative Qmax were < 10ml/sec. In Group A, Qmax of only 1 patient was < 15 ml/min which was presented at 9 month of the study period. This was considered as recurrence (3.57%). So, success rate of Group A was 96.43% as the Qmax of the 27 patients were > 15ml/min. In Group B, Qmax of the 4 patients (14.81%) were found <15ml/min. Among the 4 patient, 1 patient was presented with near retention at 7 day after surgery and Qmax < 10ml/min and present with complete blind tract in RGU with MCU. He was managed with OIU within my follow up period. So, it was considered as failure (3.3%). But other 3 patients were presented with Qmax <15ml/min, much earlier than Group A and these were considered as recurrence (11.1%). So it can be said that recurrence rate is low and the period of recurrence is also prolonged in those patient who were treated with OIU along with Triamcinolone injection, though it was not statistically significant.

Tabassi et al studied 70 patients of urethral stricture who were treated internal urethrotomy and intraurethral

triamcinolone injection.¹⁰ Recurrence was noted in 12 patients out of 34 and 15 patients out of 36 in control group. Recurrence rate was lower in experimental group. Govindaraju et al. 2018 observed that out of 30 patients who underwent OIU alone, 11 patients had recurrent stricture disease.⁸ In OIU with steroid group, only 4 patients had recurrent stricture out of 30 patients. Early recurrence is more common in patients who were treated with OIU only. In other group of patients who received OIU with steroid, the recurrence rate is very low and the period for recurrence rate is also prolonged. In OIU alone group in 6th month 3 patients came with recurrence, 4 patients in 9th month, 2 patients in 12th month and 15th month totally 11 patients (36.6%). In OIU plus steroid group, one patient came with recurrence in 12th month and 3 patients in 15th month. Total 4 patients (13.3%). The p-value is <0.05, which was the statistically significant difference. In this study, in study group (Group A) 1st onset of recurrence was noted on 9 months after surgery, whereas onset of recurrence was much earlier at 3 months after surgery in control group (Group B) and 4 patient was found recurrence in control group. So, the recurrence rate and the onset of recurrence of this study were almost similar with study result.

However, in this study, the difference between recurrence rates of both groups was not statistically significant, but recurrence rate is lower in group A. But it can be said that recurrence rate is low and the period of recurrence is also prolonged in those patients who were treated with OIU along with Triamcinolone injection in Group A.

Conclusions

Steroid injection after optical internal urethrotomy in short segment anterior urethral stricture is safe and effective in preventing recurrence of stricture. OIU combined with intralesional triamcinolone injection reduced the strictures recurrence rate and able to delay the onsets of recurrence and also showed improvement of symptoms (AUA), urine flow (Qmax) and decreases post void residual urine.

Disclosure

All the authors declared no competing interest.

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