

Original Research Article

A comparative study of catheter size effect after direct vision internal urethrotomy for small urethral strictures

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ABSTRACT

Background: Urethral stricture disease is the most common cause of obstructive voiding symptoms in younger males and has always been a challenge for urologists. Optical urethrotomy (OU) has been considered as the standard therapy for anterior urethral and short segments strictures.

Methods: In our study 164 consecutive treatment naive and recurrent urethral stricture patients who underwent direct vision internal urethrotomy (DVIU) were retrospectively analyzed. 22Fr urethral catheters were placed for longer durations and small calibre catheters (14 or 16Fr) were preferred for shorter dwell times after DVIU. Catheter dwell times were grouped as <7 and ≥ 7 days.

Results: A total of 164 patients with a mean age of 54.51 ± 11.8 (range: 17 to 85) years were enrolled in the study during the follow-up, 24 (14.6%) patients experienced recurrences during 6 month follow up. The mean postoperative duration of catheterization was 8.47 ± 2.03 and 6.49 ± 1.14 days, in 6 patients with 14/16 Fr and 18 patients with 20 Fr catheter respectively have recurrence with $p=0.00802$. 5 patients with less than 7 days and 19 patients with >7 days had recurrence with $p=0.0019$.

Conclusions: Urethral stricture disease is disease of high recurrence. Factors responsible for recurrence of disease after treatment like-etiology, length of stricture, duration /size of catheter, open or endoscopic procedure. putting a small diameter catheter and short duration of catheterization help in reducing recurrence.

Keywords: DVIU, Urethral Stricture, Spongiositis, Cystoscopy

INTRODUCTION

Urethral stricture disease is the most common cause of obstructive voiding symptoms in younger males and has always been a challenge for urologists.¹ Although urethral stricture is one of the longest recognized urological diseases, its management is still challenging. The most important reason for this is the high recurrence rate of stricture despite various modern treatment modalities. The incidence and epidemiology of urethral strictures vary according to age, race, gender, geographical location, and socioeconomic status.² The simplest definition of the urethral stricture is narrowing of the urethral lumen with scar tissue. Obstructive voiding symptoms occur in

relation to the severity of this constriction. Urethral stricture is not only a pathology affecting patients' quality of life, but it is also associated with life-threatening conditions (urethral abscess, necrotizing fasciitis, kidney failure, etc.) in approximately 7% of patients.³ Male urethral stricture is one of the oldest urologic diseases, and it continues to be a challenging condition for urologists.^{1,4} In 1974, Sachse introduced DVIU to treat urethral strictures by cold-knife incision.⁵ OU by either incision or ablation has been considered as the standard therapy for anterior urethral strictures.⁴ Male urethral stricture disease continues to be a common and often challenging urological condition. The management of urethral stricture has evolved over the past few decades, however, the three most

commonly used procedures, i.e. dilation, OU and urethroplasty have changed very little over the past few decades. Excellent success rates have been reported for open surgical reconstruction, however, interest in minimally invasive techniques forces investigators to attempt endo-urolological approaches.^{6,7} OU is a widely accepted treatment in approximately 80% of patients' with Repeated urethral dilatation and open urethroplasty are other treatment procedures for urethral strictures.⁹ OU has been performed either under general or spinal anaesthesia.¹⁰ There are few excellent reports on use of local anaesthesia.¹¹ Generally OU is considered ideal for short segments (less than 2 cm).^{9,10}

The objectives of the study were including the effect of small and large size catheter effect on recurrence after DVIU surgery for small urethral stricture.

METHODS

After obtaining required institutional ethical committee approval the retrospective study was conducted at J.L.N medical college Ajmer between April 2022 and September 2022 in which 164 consecutive treatment naive and recurrent urethral stricture patients who underwent DVIU were retrospectively analyzed. Patients medical history and physical examination findings recorded along with their urine culture, preoperative uroflowmetry, urethroscopy and retrograde urethrography (RGU) findings. All cases were performed in the supervision of senior urologists. The 22Fr urethral catheters were placed for longer durations and small Caliber catheters (14 Fr or 16Fr) were preferred for shorter dwell times. Patients' demographics, stricture characteristics, size of the urethral catheter placed and the duration of catheterizations were noted. Catheter dwell times were grouped as <7 and ≥7 days. Statistical tool used to analyse the data was chi square test and p value calculator.

Inclusion criterion

Patients with age group of male patients-17 to 85, all treatment naive, recurrent strictures with size less than 3 cm were included.

Exclusion criterion

Strictures longer than 3 cm and/or multiple strictures, the patients who experienced post-traumatic or radiation induced strictures, unsuccessful DVIU in male procedures were excluded in the study.

Operative technique

The procedures were performed under spinal or general anaesthesia. All patients had sterile urine preoperatively and antibiotic prophylaxis was given with intravenous infusion of ceftriaxone 1 gram, prior to the induction of anaesthesia and 2 dosage apart post operative period. A 19 Fr cystourethroscope was inserted through external meatus and a 0.035-inch guide wire (PTFE floppy tip) was passed carefully through the narrowed stricture area with aided help of ureteric catheter.

The stricture site was completely incised at 12 o'clock position using a cold knife urethrotome. An indwelling silicone urethral catheter with a diameter of 14, 16 or 20Fr was inserted at the end of each procedure.

Postoperative period

The uneventful patients were discharged on the 1st postoperative day with urethral catheters *in situ*. After removal of the catheters, patients were invited for follow-up visits at 1st, 2nd and 3rd and 6th postoperative months. Symptoms pertaining to recurrence, including poor stream of urine, retention of urine, and burning sensation during micturition were noted.

The procedure was considered successful if the patient was asymptomatic and had a maximum flow rate of >15 mL/sec on uroflowmetry. RGU, uroflowmetry and cystoscopy were performed to confirm recurrence in the cases of voiding symptoms or significant decrease in the maximal flow rate

RESULTS

A total of 164 male patients enrolled in the study. Demographic profile includes mean age of 54.51±11.8 (range: 17 to 85) years, most of which were more than 50 years of age. The mean duration of symptoms before the operation was 4.6±1.2 months. The mean duration of follow-up period was 6.42±1.31 (range: 5 to 15) months. During the follow-up, 24 (14.6%) patients experienced recurrences during 6 month follow up.

The mean postoperative duration of catheterization was 8.47±2.03 and 6.49±1.14 days, in 6 patients with 14/16 Fr and 18 patients with 20 Fr catheter have recurrence with p=0.00802. Five patients with less than seven days and 19 patients with >seven days had recurrence with the p=0.0019.

Table 1: Age distribution of the patients with recurrence.

Age group (in years)	No. of patients	No. of recurrence
17-30	30	5
31-50	65	7
>50	69	12

Table 2: Stricture characteristics of patients.

Characteristics	Total number	Without recurrence (%)	With recurrence (%)
Length of stricture			
Thin membranous	10	9 (90)	1 (10)
<1 cm	86	76 (88.4)	10 (11.6)
1-2 cm	62	52 (83.9)	10 (16.1)
>2 cm	6	3 (50)	3 (50)
Mean duration of catheterization			
<7 days	82	77 (93.9)	5 (6.1)
>7 days	82	63 (76.8)	19 (23.2)
Catheter diameter			
14 Fr/16Fr	82	76 (92.7)	6 (7.3)
20 Fr	82	64 (78.1)	18 (21.9)

DISCUSSION

Male urethral stricture is one of the common urologic diseases, and it continues to be a very challenging condition for uro-surgeons.^{12,13} Although the success of urethrotomy at 5 years is less than that of urethroplasty 50% compared to 83% respectively in one study.¹⁴ The stricture length was measured on standard retrograde urethrogram, however, for small bulbar strictures ultrasonography study is more accurate in measuring length of stricture than conventional RGU and is therefore helpful in determining whether to excise or graft the disease. Few studies have compared the efficacy of urethral dilation and internal urethrotomy. In a retrospective study of 199 men patients with strictures treated at the Mayo clinic between 1976 and 1990, 101 (67%) underwent dilation and 39 (26%) underwent DVIU.¹⁵ The strictures were primarily iatrogenic (47%), less than 2 cm long (96%), single (99%) and in the bulbar urethra (57%). At a median follow up of 3.5 years the probability of not requiring retreatment within 3 years was 65% for dilation and 68% for urethrotomy, indicating that these procedures were equally efficacious as initial treatment of bulbar strictures.¹⁶ In a study performed, 400 DVIU in 154 men with complete urethral occlusions, and noted that 35% of them were cured with a single DVIU procedure.¹⁷ They placed a 22 Fr silicone catheter except for 36 cases, in whom it was possible only to insert a 16 Fr catheter. They compared various catheter dwell times including 1, 2 weeks 1, and 3 months. They suggested leaving an indwelling silicone catheter for 3 months for optimal epithelization, depending on the follow-up urethroscopy findings. In another inserted 18 and 20 Fr latex catheters, and left them for 24 to 36 hours. They instructed all patients to perform hydraulic self-dilation for 3 months, beginning from the 15 postoperative days. At a median follow-up of 98 months, overall success rate after 1st DVIU was 32 percent.¹⁸ The findings of another retrospective analysis compared the recurrence rates with respect to the postoperative catheter drainage in 798 strictures.¹⁹ A silicone catheter was used in 89.7% of the cases with a mean duration of 5.5 days. Recurrence was experienced in 34%, 43% and 65% of the patients with 1-

3, 4-7 and more than 7 days of catheterization, respectively. The authors concluded that postoperative catheter drainage for less than 3 days seems to result in a decreased recurrence rate. However, they did not mention how they decided the duration of catheterization and the size of the silicone catheter used.

Small diameter catheter causes less obstruction to urethral lumen, blockage of periurethral gland and facilitates the easy passage of urethral secretions, collected blood and infective material which reduce the risk of recurrent infection, fibrosis, scar and stricture formation after catheter removal. On contrary large diameter and prolonged duration of catheter may lead to pressure necrosis, blocking of periurethral glands, stasis of infective materials which leads to recurrent infection, micro-abscess formation, increase fibrosis, increase scar formation and leads to recurrence of stricture disease.

Limitations

By using conventional retrograde urethrography we cannot evaluate the exact severity of stricture disease and extent of spongiofibrosis. In our study duration of catheter may affect the result as we used small diameter catheter for small duration and large diameter for long duration.

CONCLUSION

Urethral stricture disease is disease of high recurrence. Factors responsible for recurrence of disease after treatment like-etiology, length of stricture, duration /size of catheter, open or endoscopic procedure. Putting a small diameter catheter and short duration of catheterization help in reducing recurrence. Urethral stricture is a disease of high recurrence nature which is aided by multiple factors, small size of catheter postoperatively is one of the factors which can reduce the rate of recurrence.

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REFERENCES

1. Wong SS, Aboumarzouk OM, Narahari R, O'Riordan A, Pickard R. Simple urethral dilatation, endoscopic urethrotomy, and urethroplasty for urethral stricture disease in adult men. *Cochrane Database Syst Rev.* 2012;CD006934.
2. Rourke KF. The epidemiology, clinical presentation, and economic burden of urethral stricture. In: Brandes, Steven B., Morey, Allen F. eds. *Advanced Male Urethral and Genital Reconstructive Surgery* New York: Humana Press. 2014;83-93.
3. Rourke K, Hickie J. The clinical spectrum of the presenting signs and symptoms of anterior urethral stricture: Detailed analysis of a single institutional cohort. *Urology.* 2012;79:1163-7.
4. Buckley JC, Heyns C, Gilling P, Carney J. SIU/ICUD Consultation on Urethral Strictures: Dilation, internal urethrotomy, and stenting of male anterior urethral strictures. *Urology.* 2014;83(3):S18-22.
5. Sachse H. Treatment of urethral stricture: Transurethral slit in view using sharp section. *Fortschr Med.* 1974;92:12-5.
6. De Kock MLS, Allen FJ. Guidelines for the treatment of urethral strictures. *S Afr J Surg.* 1989;27(5):182.
7. Sandozi S, Ghazali S. Sachse optical urethrotomy, a modified technique: 6 years of experience. *J Urol.* 1988;140(5):968.
8. Matouschek E. Internal urethrotomy of urethral stricture under-vision; a five year report. *Urol Res.* 1978;6(3):147-50.
9. Gaches CGC, Ashken MH, Dunn M, Hammonds JC, Jenkins IL, Smith PJ. The role of selective internal urethrotomy in the management of urethral stricture: a multi-centre evaluation. *Br J Urol.* 1979;51(6):579-83.
10. Greenland JE, Lynch TH, Wallace DMA. Optical urethrotomy under local urethral anesthesia. *Br J Urol.* 1998;67(4):385-8.
11. Ather MH, Zehri AA, Soomro K, Nazir I. The safety and efficacy of optical urethrotomy using a spongiosum block with sedation: a comparative nonrandomized study. *J Urol.* 2009;181(5):2134-8.
12. Buckley JC, Heyns C, Gilling P, Carney J. SIU/ICUD Consultation on Urethral Strictures: Dilation, internal urethrotomy, and stenting of male anterior urethral strictures. *Urology.* 2014;83(3):S18-22.
13. Bullock TL, Brandes SB. Adult anterior urethral strictures: a national practice patterns survey of board certified urologists in the United States. *J Urol.* 2007;177(2):685-90.
14. Chilton CP, Shah PJ, Fowler CG, Tiptaft RC, Blandy JP. The impact of optical urethrotomy on the management of urethral strictures. *Br J Urol.* 1983;55(6):705.
15. Stormont TJ, Suman VJ, Oesterling JE. Newly diagnosed bulbar urethral strictures: etiology and outcome of various treatments. *J Urol.* 1993;150(5pt2):1725.
16. Ishigooka M, Tomaru M, Hashimoto T, Sasagawa I, Nakada T, Mitobe K. Recurrence of urethral stricture after single internal urethrotomy. *Int Urol Nephrol.* 1995;27(1):101.
17. Pansadoro V, Emiliozzi P. Internal urethrotomy in the management of anterior urethral strictures: Long-term follow up. *J Urol.* 1996;156(1):73-5.
18. Al-Ali M, Al-Shukry M. Endoscopic repair in 154 cases of urethral occlusion: The promise of guided optical urethral reconstruction. *J Urol.* 1997;157(1):129-31.
19. Albers P, Fichtner J, Bruhl P, Müller SC. Long-term results of internal urethrotomy. *J Urol.* 1996;156(5):1611-4.

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