Original Article

Direct visual internal urethrotomy: Is it a durable treatment option?

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Abstract

Objective: To evaluate the long-term success rate of direct vision internal urethrotomy as a treatment for anterior urethral strictures.

Materials and Methods: We retrospectively analyzed the results for patients who underwent internal urethrotomy from January 2009 to January 2014 for anterior urethral strictures. Patients were followed till January 2016. Patients with complicated urethral strictures with a history of previous urethroplasty, hypospadias repair, or previous radiation were excluded from the study, as anticipated low success rate of direct visual internal urethrotomy (DVIU) in these patients. The Kaplan–Meier method was used to analyze stricture-free probability after the first, second, and third urethrotomy.

Results: A total of 186 patients were included in this study. Stricture-free rates after first, second, and third urethrotomy were 29.66%, 22.64%, and 13.33%, respectively.

Conclusions: Although DVIU may be a management option for anterior urethral stricture disease, it seems that long-term results are disappointing.

Key Words: Endourology, stricture, urethra, urethrotomy

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INTRODUCTION

Urethral stricture refers to the narrowing of the urethral lumen resulting from fibrosis that affects the urethral epithelium and underlying corpus spongiosum. Urologists frequently encounter this disease in day-to-day practice. These patients mostly present with obstructive symptoms, urinary tract infection, or urinary retention. The treatment options for managing urethral strictures include minimally invasive methods such as direct visual internal urethrotomy (DVIU), urethral dilatation, or open reconstructive urethroplasty. DVIU is appealing both for treating urologists and patients because of its relative ease of performance, minimal resource requirements and simplicity in not requiring expertise in urethral reconstruction, can also be performed as an outpatient basis in the office (under local anesthesia), requires minimal recovery time, and has a low-cost burden to the patient. Urethral dilatation is easy to perform with minimal resource requirements and simplicity but higher chances of recurrence. Urethroplasty requires expertise in

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urethral reconstruction, longer recovery time, and high-cost burden to patient though with better success rate than DVIU as claimed in previous studies.

Recent surveys conclude that the most urologists perform DVIU as the initial management of urethral strictures.[1-3] According to the previous studies, the claimed success rates vary within a very wide range from 8% to 95%.[4-9] However, majority of the studies lack long-term follow-up.

We evaluated the long-term success rate of direct vision internal urethrotomy as a treatment for anterior urethral strictures.

MATERIALS AND METHODS

Following Institutional Ethical Committee approval, this retrospective study was conducted at our institute. Follow-up data of all the adult male patients, underwent DVIU from January 2009 to January 2014 for the treatment of urethral stricture, were retrospectively evaluated. Data on primary stricture characteristics, treatment, and follow-up visits were available by reviewing the computer database and case notes. Patients with complicated urethral strictures with a history of previous urethroplasty, hypospadias repair, or previous radiation were excluded from the study, as anticipated low success rate of DVIU in these types of patients.

As the departmental protocol, DVIUs were performed in single stricture, located in bulbar urethra, <1.5 cm in length. However, in some of the patients (elderly age group >60 years or having severe comorbidities), DVIUs were also performed in single stricture up to 2 cm length and multiple stricture (two in number with length of each stricture segment not more than 1 cm). Internal urethrotomies were performed by five consultant urologists in this period. A standard Sachse urethrotomy knife was used with 21 Fr Urethrotome under the guidance of a 0.035-inch guidewire. In all cases, a single 12 o'clock incision was made until the full thickness of the fibrous scar was divided. Complete incision of the stricture deemed achieved once the 21F sheath is passed freely into the bladder. After the procedure, an 18F Foley catheter was placed. Patients were discharged with an indwelling catheter on the 1st postoperative day. Oral fluoroquinolone was given until the catheter was removed. The catheter was usually removed after 5 days on an outpatient basis. After 7 days of catheter removal, patients were instructed to do self-urethral calibration by 18 Fr catheter at a frequency of every day for 1 month, alternate day for 3 months, then once in a week up to 6 months, and thereafter once a month.

All patients were followed up at 1 month and thereafter every 3 months. The postprocedure evaluation was performed by uroflowmetry and urethral calibration. Retrograde urethrogram was performed in those who had any symptoms pertaining to recurrence (including decrease force of stream, sensation of incomplete emptying, and recurrent urinary tract infections), obstructive pattern in uroflowmetry, or failure to calibrate the urethra. Time for recurrence was defined as the time from internal urethrotomy to first subjective or objective sign of recurrence or the date of subsequent repeat urethrotomy. The procedure was considered successful if there was absence of symptoms or signs of recurrent stricture and ability to pass freely 18Fr catheter during urethral calibration at last follow-up.

We evaluated the stricture-free rate (SFR) after first and subsequent urethrotomies by Kaplan–Meier method using Statistical Package of Social Sciences (SPSS, version 20, IBM Corporation, NY, USA).

RESULTS

From January 2009 to January 2014, 218 patients were undergone DVIU. Twenty-three Patients with a history of previous urethroplasty, hypospadias repair, or previous radiation were excluded from the study, and nine patients were lost to follow-up. Data of the remaining 186 patients were evaluated in the study. Out of 186 patients, in 118 patients, first time DVIU was done, in 53 patients, second time DVIU was done for recurrence, and 15 patients undergone third time DVIU for recurrence.

The mean age of the patients of DVIU-1 was 39.48 ± 15.10 (mean ± standard deviation [SD]) years with a range of 16–71 years and the median age was 37.0 years. Etiologically, strictures were categorized as inflammatory, traumatic (history of perineal trauma), iatrogenic (history of prior catheterization and urethral dilatation), and idiopathic. Out of 118 patients of DVIU-1 group, 31 patients had inflammatory stricture, 6 patients had traumatic, 12 patients were of iatrogenic variety, and rest 69 patients were from idiopathic category. Out of 118 patients of DVIU-1 group, 33 were located at peno-bulbar region, 70 at mid-bulbar region, and 15 at proximal-bulbar region. In most of the patients, single stricture was present. However, in nine patients, there were two strictures. In most of the patients, (85) stricture length was <1 cm. In 19 patients, stricture length was >1–1.5 cm. Rest of five patients have stricture length >1.5 cm [Table 1].

The mean follow-up after DVIU-1 was 57.97 ± 15.11 (mean ± SD) months with a range of 25–84 months and the median follow-up was 59.0 months. During the follow-up, after first time DVIU, disease recurred in 83 out of 118 patients [Table 2].

The mean age of the patients of DVIU-2 was 42.08 ± 14.20 (mean ± SD) years with a range of 25–70 years and the median age was 39.0 years. The mean follow-up after DVIU-2 was 55.68 ± 14.90 (mean ± SD) months with a range of 26–81 months and the median follow-up was 59.0 months. During the follow-up, after second time DVIU, disease recurred in 41 out of 53 patients [Table 2].

The mean age of the patients of DVIU-3 was 64.46 ± 5.25 (mean ± SD) years with a range of 56–72 years and the median age was 65.0 years. The mean follow-up after DVIU-3 was 44.92 ± 14.90 (mean ± SD) months with a range of 27–76 months and the median follow-up was 41.0 months. During the follow-up, after third time DVIU, disease recurred in 13 out of 15 patients [Table 2].

On follow-up, SFR after first DVIU was 93.22%, 53.39%, 32.20%, and 29.66% at the period of <6 months, >6–12 months, >12–24 months, and thereafter >24 months, respectively. Whereas the SFR second DVIU for recurrent stricture disease was 83.02%, 43.40%, 26.41%, and 22.64% at the period of <6 months, >6–12 months, >12–24 months, and thereafter >24 months, respectively. However, SFR of third DVIU for recurrent stricture disease was 66.67%, 26.67%, and 13.33% at the period of <6 months, >6–12 months, and thereafter >12 months, respectively [Table 3].

On follow-up, median time for recurrence was 8.5 months, 8.0 months, and 6.5 months after DVIU-1, DVIU-2, and DVIU-3, respectively [Table 2].

Statistically significant differences were found when we assessed the relation of recurrence with factors such as stricture length ($P = 0.0003$) and number ($P = 0.0314$) [Table 1].

Table 1: Factors influencing recurrence of stricture after direct visual internal urethrotomy-1 (etiology, location, number, and length)

	Recurrence			*P*
	No	Yes	Total	
Etiology				
Idiopathic	29 (42.0)	40 (58.0)	69 (100.0)	0.0606
Infection	6 (19.4)	25 (80.6)	31 (100.0)	
Iatrogenic	2 (16.7)	10 (83.3)	12 (100.0)	
Traumatic	1 (6.7)	5 (83.3)	6 (100.0)	
Location				
Peno-bulbar	10 (30.3)	23 (69.7)	33 (100.0)	0.1937
Mid-bulbar	26 (37.1)	44 (62.9)	70 (100.0)	
Proximal-bulbar	2 (13.3)	13 (86.7)	15 (100.0)	
Number				
Multiple	0	9 (100.0)	9 (100.0)	0.0314
Single	38 (34.9)	71 (65.1)	109 (100.0)	
Length				
≤1.00	38 (44.7)	47 (55.3)	85 (100.0)	0.0003
>1.00-1.50	0	19 (100.0)	19 (100.0)	
>1.50	0	5 (100.0)	5 (100.0)	

However, no statistically significant association was found between the stricture recurrence with either the location ($P = 0.1937$) or etiology ($P = 0.0606$) of the stricture [Table 1].

DISCUSSION

Since the first introduction by Sachse in 1974, DVIU has widely been practiced as first-line management of short segment anterior urethral strictures.[10] Despite having a higher success rate, urethroplasty was less popular as it is costly, technically more demanding, and time-consuming procedure with greater morbidity than DVIU.[1,2,11]

Previously published studies have reported the initial urethrotomy success rate ranging from 20% to 95%.[4-8] In a more recent study, Santucci and Eisenberg reported a much lower SFR following DVIU-1, DVIU-2, and DVIU-3 (8%, 6%, and 9%, respectively). For procedures 4 and 5, SFR was 0%. This is the only study that has reported an extremely poor success rate.[9]

In the present study, we found SFR after the first urethrotomy was 29.66% with a median time to recurrence of 8.5 months. The SFR following the second urethrotomy was 22.64% with a median time to recurrence of 8 months. For the third urethrotomy, the SFR was 13.33% with a median time to recurrence of 6 months [Figure 1]. No patient was willing to undergo further urethrotomy following the third failed DVIU. These patients were either undergone urethroplasty or opted to retain suprapubic catheterization as a diversion procedure (because of high risk due to severe comorbidities). Even after DVIU-2, most of the patients opted for another management options for recurrence such as urethroplasty, only a few elderly patients or patients with high-risk comorbidities

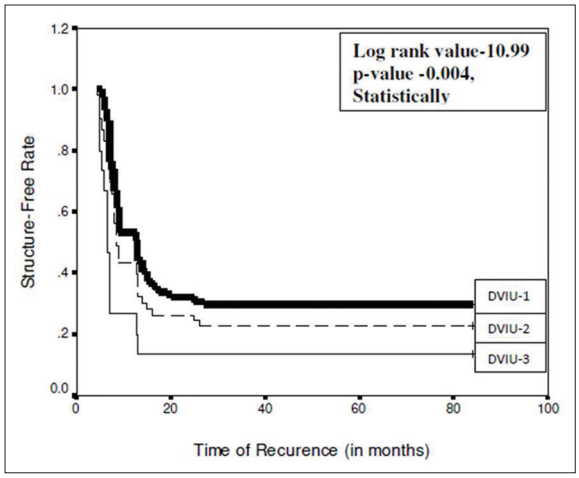

Figure 1: Kaplan–Meier curves predicting stricture-free rate after direct visual internal urethrotomy

Table 2: Results of direct visual internal urethrotomy

	DVIU-1	DVIU-2	DVIU-3
Number of patients	118	53	15
Mean age (range), years	39.48 (16-71)	39.00 (25-70)	64.46 (56-72)
Survivor	35	12	2
SFR%	29.66	22.64	13.33
Mean time for recurrence (range), months	10.26 (5.5-27.00)	9.39 (4.5-26.00)	7.11 (5.00-13.00)
Median time for recurrence (months)	8.5	8.0	6.0

SFR: Stricture-free rate, DVIU: Direct visual internal urethrotomy

Table 3: Stricture-free-rate of direct visual internal urethrotomy

	SFR% (DVIU-1)	SFR% (DVIU-2)	SFR% (DVIU-3)
≤6 months	93.22	83.02	66.67
>6-12 months	53.39	43.40	26.67
>12-24 months	32.20	26.41	13.33
>24 months	29.66	22.64	13.33

SFR: Stricture-free rate, DVIU: Direct visual internal urethrotomy

opted for DVIU-3 after informed consent. Hence, in the present study, we did not have the scope to evaluate the results of subsequent urethrotomies.

As previous studies have shown that the success rate of DVIU decreases with each subsequent DVIU performed and that the first IU has the best chance of cure.[4,5,10] In the present study, we also found this fact.

In the present study, we also evaluated possible risk factors which could influence the SFR. Etiology for urethral stricture might be infectious (mainly sexually transmitted disease), traumatic, iatrogenic (transurethral procedures and per urethral catheterization), or idiopathic in nature. From previous studies, conflicting evidences were found regarding the etiology as a significant risk factor to affect the SFR. Pansadoro and Emiliozzi found higher SFR for infective (48%) and iatrogenic (42%) etiology than the traumatic etiology (16%).[4] Albers *et al.* found more recurrence with infective and iatrogenic strictures.[12] Similarly, Boccon Gibod and Le Portz showed that SFR was less in stricture with infective etiology than the strictures with either iatrogenic or traumatic etiology.[13] Whereas in other studies, strictures with posttraumatic and idiopathic etiology showed higher SFR than iatrogenic and infective etiology.[14,15] Hence, there is no consensus on whether stricture etiology predicts recurrence, as different studies have proposed different etiologies as poor responders to DVIU. In the present study, no statistically significant difference ($P = 0.0606$) was found when etiology was considered as a predictive factor for the recurrence of stricture.

Stricture length was always considered as an important predictive factor for the recurrence after internal urethrotomy. There is clear evidence that stricture length determines the SFR of DVIU.[4,5,12,16] Pansadoro and Emiliozzi reported recurrence in 71% of strictures length >10 mm after first urethrotomy, whereas 18% of strictures <10 mm recurred after first urethrotomy.[4] Albers *et al.* reported recurrence in 51% of strictures length >10 mm after first urethrotomy, whereas 28% of strictures <10 mm recurred after first urethrotomy.[12] the present study has also strengthened this fact, as statistically significant difference ($P = 0.0003$) was found when stricture length was compared with the SFR.

When stricture location was considered as a predictive factor for recurrence after internal urethrotomy, most of the studies claimed better SFR with bulbar urethral stricture than the proximal and distal strictures.[4,5,12,17] Pansadoro and Emiliozzi showed recurrence in 58% of bulbar strictures after first urethrotomy, whereas 84% of penile strictures recurred after first urethrotomy.[4] In the present study, no statistically significant difference ($P = 0.1937$) was found when stricture location considered as the predictor of the recurrence. Perhaps, the location of the stricture did not influence outcome, as we restrict our procedures within the bulbar urethra.

Evidence from previous studies also showed better SFR for single stricture than multiple strictures. Pansadoro and Emiliozzi noted that single strictures might respond better than multiple strictures, with recurrence rates of 50% versus 84%, respectively.[4] In the present study, we also found statistically significant ($P = 0.0314$) results when a number of stricture considered as a predictive factor for the recurrence.

Previous studies showed that frequent and regular self-urethral calibration could reduce stricture recurrence rates.[12,18,19] In the present study, we found that most of the recurrences occurred when patients decreased the frequency of self-urethral calibration (>6 months). Self-urethral calibration, at a frequency of weekly/biweekly for at least a year, could be attempted by patients to improve the success rate.

In the present study, we found that long-term results after internal urethrotomy are not good enough. Long-term success rates after anastomotic (86%–96%) and substitution (42%–85%) urethroplasty seem far better than the internal urethrotomy.[20,21]

CONCLUSIONS

Although DVIU might be a management option for anterior urethral stricture disease, it seems that long-term results are not good enough as was previously claimed. Internal urethrotomy with long-term self-dilation might be an option in men with severe comorbidities and limited life expectancy or stricture recurrence after repeated previous urethroplasty.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Anger JT, Buckley JC, Santucci RA, Elliott SP, Saigal CS; Urologic Diseases in America Project. Trends in stricture management among male medicare beneficiaries: Underuse of urethroplasty? Urology 2011;77:481-5.
2. Ferguson GG, Bullock TL, Anderson RE, Blalock RE, Brandes SB. Minimally invasive methods for bulbar urethral strictures: A survey of members of the American Urological Association. Urology 2011;78:701-6.
3. Veeratterapillay R, Pickard RS. Long-term effect of urethral dilatation and internal urethrotomy for urethral strictures. Curr Opin Urol 2012;22:467-73.
4. Pansadoro V, Emiliozzi P. Internal urethrotomy in the management of anterior urethral strictures: Long-term followup. J Urol 1996;156:73-5.
5. Heyns CF, Steenkamp JW, De Kock ML, Whitaker P. Treatment of male urethral strictures: Is repeated dilation or internal urethrotomy useful? J Urol 1998;160:356-8.
6. Greenwell TJ, Castle C, Andrich DE, MacDonald JT, Nicol DL, Mundy AR. Repeat urethrotomy and dilation for the treatment of urethral stricture are neither clinically effective nor cost-effective. J Urol 2004;172:275-7.
7. Naudé AM, Heyns CF. What is the place of internal urethrotomy in the treatment of urethral stricture disease? Nat Clin Pract Urol 2005;2:538-45.
8. Morey A. Urethral stricture is now an open surgical disease. J Urol 2009;181:953-4.
9. Santucci R, Eisenberg L. Urethrotomy has a much lower success rate than previously reported. J Urol 2010;183:1859-62.
10. Sachse H. Treatment of urethral stricture: Transurethral slit in view using sharp section. Fortschr Med 1974;92:12-5.
11. Bullock TL, Brandes SB. Adult anterior urethral strictures: A national practice patterns survey of board certified urologists in the United States. J Urol 2007;177:685-90.
12. Albers P, Fichtner J, Brühl P, Müller SC. Long-term results of internal urethrotomy. J Urol 1996;156:1611-4.
13. Boccon Gibod L, Le Portz B. Endoscopic urethrotomy: Does it live up to its promises? J Urol 1982;127:433-5.
14. Pain JA, Collier DG. Factors influencing recurrence of urethral strictures after endoscopic urethrotomy: The role of infection and peri-operative antibiotics. Br J Urol 1984;56:217-9.
15. Merkle W, Wagner W. Risk of recurrent stricture following internal urethrotomy. Prospective ultrasound study of distal male urethra. Br J Urol 1990;65:618-20.
16. Hafez AT, El-Assmy A, Dawaba MS, Sarhan O, Bazeed M. Long-term outcome of visual internal urethrotomy for the management of pediatric urethral strictures. J Urol 2005;173:595-7.
17. el-Abd SA. Endoscopic treatment of posttraumatic urethral obliteration: Experience in 396 patients. J Urol 1995;153:67-71.
18. Tunc M, Tefekli A, Kadioglu A, Esen T, Uluocak N, Aras N. A prospective, randomized protocol to examine the efficacy of postinternal urethrotomy dilations for recurrent bulbomembranous urethral strictures. Urology 2002;60:239-44.
19. Bødker A, Ostri P, Rye-Andersen J, Edvardsen L, Struckmann J. Treatment of recurrent urethral stricture by internal urethrotomy and intermittent self-catheterization: A controlled study of a new therapy. J Urol 1992;148(2 Pt 1):308-10.
20. Barbagli G, Palminteri E, Lazzeri M, Guazzoni G, Turini D. Long-term outcome of urethroplasty after failed urethrotomy versus primary repair. J Urol 2001;165(6 Pt 1):1918-9.
21. Andrich DE, Dunglison N, Greenwell TJ, Mundy AR. The long-term results of urethroplasty. J Urol 2003;170:90-2.