

Original research article

**STUDY THE OUTCOME OF VISUAL INTERNAL
URETHROTOMY IN MANAGEMENT OF URETHRAL
STRICTURE**

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Abstract

Urethral stricture disease is the most common cause of obstructed voiding symptoms in younger males and has always been a challenge for urologists. Currently available treatment modalities for urethral strictures are urethral dilation, direct vision internal urethrotomy (DVIU), urethral stent placement and open urethroplasty. Direct vision internal urethrotomy is the procedure that opens the stricture by incising the scar tissue via transurethral route. If the incision heals by epithelisation rather than wound contraction, the procedure is successful. Higher early stage postoperative success rates and the simplicity of this endoscopic approach resulted in rapid acceptance of the procedure. Success rates following DVIU have been shown to vary between 30% and 90%, depending on the length and location of the stricture. Patients are usually left with an indwelling urethral catheter for 3-5 days after DVIU; However there is no consensus on the duration of the catheterization.

Keywords: Urethral stricture, ascending urethrogram, visual internal urethrotomy

Introduction

Urethral stricture disease impose a great burden on both health and quality of life in men. The true incidence of urethral stricture disease in men is unknown. Studies on male urethral strictures shows that nearly 90% of men present with complications ^[1]. The majority of men with stricture suffer from obstructive and irritative voiding symptoms and may experience haematuria, recurrent urinary tract infection. More severe complications include acute retention of urine, renal failure, fournier gangrene, bladder atonia which are seen in a minority of patients ^[1]. The diagnostic modalities used for urethral stricture are urethroscopy, radiographic studies including ascending urethrogram, micturating cystourethrogram and ultrasonography. Direct visual internal urethrotomy and urethral dilation are the most commonly performed procedures for urethral stricture disease. Direct visual internal urethrotomy procedure is greatly appealing for both urologists and patients as it is minimally invasive. Direct visual internal urethrotomy is most suitable for strictures of bulbar urethra with short segment involvement (<1.5 cm) associated with minimal spongiofibrosis ^[2]. Short term success

rates of 50-85% are seen. If urethrotomy under direct vision fails alternative treatment modalities should be considered [3-8]. Since Direct visual internal urethrotomy is most commonly performed procedure for urethral stricture disease the following study shows the outcome of visual internal urethrotomy in management of urethral strictures.

Aims and Objectives

To study the effectiveness of Visual Internal Urethrotomy in management of urethral stricture.

Methodology

Source of data: Patients admitted under Department of surgery at Karnataka Institute of Medical Sciences Hospital. Hubli were taken up for study. Number of cases studied were 22 from December 2014 to June 2016.

Inclusion Criteria

All male patients between 20 to 70 yrs. of age, having short segment (<1.5 cm) length, bulbar urethral stricture with minimal spongiofibrosis.

Exclusion Criteria: Traumatic posterior-urethral strictures.

1. Pan-urethral strictures
2. Malignant urethral lesions.
3. Genital lichen sclerosus. (BXO).
4. Failed hypospadias repair and incomplete data on personal medical charts.
5. Female patients.

Direct visual internal urethrotomy is associated with good results in patients with short segment bulbar urethral strictures associated with minimal spongiofibrosis. Direct visual internal urethrotomy is associated with poor results after failure of initial urethrotomy.

Method of collection of data

After admission patients history was assessed with special reference to presenting symptoms of dribbling of urine, poor urinary stream, burning micturition, haematuria, acute retention of urine, fever. Detailed past history was taken with special reference to any history of trauma to urethra either by direct trauma or history of urethral instrumentation, history of urinary tract infection. Physical examination was carried out to note suprapubic bulge, periurethral abscess, orchitis. Patients with the above symptoms were subjected to ascending urethrogram, ultrasonography of pelvis, sono urethrography, urethroscopy, assessment of renal profile, urine flow rate measurements, urine routine and urine culture and sensitive. A diagnosis of urethral stricture was made and 22 patients with stricture length less than 1.5 cm with minimal spongiofibrosis were selected for study. 6 patients had undergone suprapubic cystostomy. Patients were assessed preoperatively for fitness for surgery and later subjected to surgery. A dose of antibiotic (usually IV Ceftriaxone 1 gm) was given 4 hours before surgery.

Procedure of visual internal urethrotomy

All patients underwent visual internal urethrotomy using cold knife optical urethrotome. All the procedures were carried out under spinal anaesthesia. A Terumo guide wire of size 0.032 straight tip was first passed through stricture into the urinary bladder which was used to guide to cut the stricture. The stricture was then incised at 12 o'clock position cutting through entire fibrous tissue until healthy tissue was seen. A no.18 Fr foley catheter was then passed through urethra and was left in place for 2- 7 days. Postoperatively patients were started orally after 6 hours and iv antibiotics 3 generation cephalosporins (ceftriaxone 1g) twice daily were given for 2 days. Most of the patients were discharged on second postoperative day, after which they were given oral antibiotics like tab ciplox 500mg twice daily for another 5 days. Postoperatively patients condition was assessed and observed for bleeding and infection. For the first 3 months of postoperative period monthly followup of patients was done because the stricture recurrence rate is more during first 3 months and the compliance of the patients in our study is lost with passage of time ^[11]. Following that regular followup of patients was done with subjective and by visual uroflow study of patients. Recurrence of stricture was defined if there was-Poor urinary stream.

If the above symptom was present then patient was subjected for cystoscopy, USG pelvis for post void volume, Ascending urethrogram as required. During followup at first 3 months and at the end of total followup period of 17 months the results of visual internal urethrotomy were graded as.

1. **Excellent:** Patient fully satisfied, good urinary stream and no complaints.
2. **Good:** Patient satisfied but required urethral dilatation after 3 months.
3. **Acceptable:** Patient satisfied but required urethral dilatation at monthly interval.
4. **Poor:** Patient not satisfied, stream remained poor, required regular dilatation ^[11].

Results and Observation

Study Design

A prospective cohort study consisting of 22 cases of urethral stricture who have undergone visual internal urethrotomy were undertaken to investigate its outcome.

Table 1: Age distribution of patients with urethral stricture disease

Age of patient	No. Of patients	Percentage (%)
20-34 years	5	22.72
35-44 years	4	18.18
45-54 years	6	27.27
55-64 years	2	9.09
65 + years	5	22.72

The above table shows analysis of age distribution. The age varied from 20 years to 70 years. All patients were male with a preponderance in fifth decade of life accounting for 27.27% of cases. The mean age was around 47.45 years.

Table 2: Showing percentage distribution of presenting complaint of the patients

Presenting complaints	No of patients	Percentage (%)
Dribbling of urine	4	18.18
Poor urinary stream	16	72.72
Acute retention of urine	4	18.18
Recurrent urinary tract infections	5	22.72
Periurethral abscess	0	0
Prolong urethral catheterisation	11	50

Poor urinary stream symptoms were the main presenting complaints of the patients with 72.72%, prolong urethral catheterisation 50%, recurrent urinary tract infections 22.72%, both dribbling of urine and acute urinary retention contributing to 18.18% of presenting complaints with no periurethral abscess.

Table 3: Showing percentage distribution of patients according to site of stricture

Site	No. of patients	Percentage (%)
Bulbar	17	77.27
Membranous	0	0
Bulbar with Penile component	5	22.72

Among 22 patients, bulbar urethral strictures were present in 17 (77.27%) patients and membranous urethral stricture in 0 patients & bulbar stricture associated with penile urethral stricture is 5 (22.72%)

Table 4: Showing percentage distribution of patients according to etiology of stricture

Etiology	No. of patients	Percentage (%)
Idiopathic	3	13.63
Iatrogenic	12	54.54
Traumatic	1	4.54
Inflammatory	6	27.27

Table 5: Table showing results of visual internal urethrotomy

Grade	No. of patients	Percentage (%)
Excellent	13	59.09
Poor	9	40.90

Table 6: Shows results of visual internal urethrotomy according to the site of stricture

Site of stricture	Success rate	Recurrence rate of stricture
Bulbar urethra.	59.09	40.91
Distal bulbar with penile component	0	100

Table 7: Shows results of correlation of recurrence with the time of removal of catheter

Catheter removal on day	With recurrence
3	35.29%
>3	60%

This study was conducted on 22 male patients with urethral stricture. 6 patients were in the range of 45 - 54 years, 5 patients were in range of 20 - 34 years and 65 years and above, 4 patients were in range of 35 - 44 years and 2 patients in range of 55 - 64 years. (Table 1). The mean age of presentation was 47.45 years.

Poor urinary stream symptoms were the main presenting complaints of the patients with 72.72% followed by prolong urethral catheterisation 50%, recurrent urinary tract infections 22.72%, both dribbling of urine and acute urinary retention contributing to 18.18% of presenting complaints with no periurethral abscess. (Table2).

The most common cause of urethral stricture was iatrogenic (54.54%), seen in 9 patients was due to prolong more than 14 days of insertion of urethral catheter, one case was secondary to transurethral resection of prostate and 2 cases for DJ stent removal following cystoscope, followed by inflammatory (27.27%) 6 patients, and another (13.63%) 3 patients due to idiopathic cause and trauma was the cause for stricture in (4.54%) 1 patient who had history of direct trauma to perineal region. (Table 4).

Most common site was bulbar urethra, 77.27% in 17 patients followed by bulbar combined with penile urethra, 22.72% (5 patients). Among the 17 bulbar urethral stricture, etiology of stricture in one patient was direct trauma to perineum, 12 iatrogenic injury following catheterisation, cystoscopy and TURP, 6 inflammatory in rest 3 patients were due to idiopathic cause. Among the 5 patients with both bulbar combined with penile urethral stricture 3 cases were due to iatrogenic causes, 2 were secondary to inflammatory cause due to recurrent urinary tract infection and most common organism following urine culture was E Coli with urine microscopy showing 2 to 4 pus cell in majority of cases. Strictures of, prostatic urethra, recurrent stricture after initial urethrotomy, meatal stenosis were not included in the study. (Table 3 and 4).

Overall response was excellent with patient satisfied with the procedure in 13 patients (59.09%) and stricture recurrence in 9 patients (40.90%) after an initial stricture free period of 3 months for bulbar urethral stricture and combined bulbar with penile urethral stricture recurrence and the stricture length in all cases was less than 1.5 cm. (Table. 5).

Patients with bulbar urethral stricture who underwent visual internal urethrotomy showed a relatively higher success rate of 59.09% i.e, 13 out of 17 patients were satisfied with the procedure with 4 patients having stricture recurrence during followup,

the recurrence rate of stricture in bulbar urethral stricture who underwent visual internal urethrotomy was 40.91%.

Visual internal urethrotomy for distal bulbar with penile component strictures was associated with no success rate i.e, 5 out of 5 patients with combined urethral strictures who underwent internal urethrotomy showed recurrence that is 0% success rate and 100% failure rate (Table 6).

Early complications like post op infection that is swelling of penis & scrotum leading to founriers gangrene is seen in one patient who underwent debridement of necrotic slough and was discharged on post op day 13 and he didn't had recurrence of stricture during follow up.

Discussion

In the past gonococcal infection causing urethritis was common. The most common cause of urethral stricture was secondary to gonococcal urethritis, but with the advent of effective antibiotic therapy initially the penicillin and now the third generation cephalosporins (ceftriaxone) gonococcal strictures have become less common. The common causes of urethral strictures now are iatrogenic, idiopathy and traumatic.

Urethral dilatation is the oldest and simplest treatment of urethral stricture and remained gold standard for many centuries, and it is still used as an acceptable treatment of urethral stricture. Blind urethral dilatation is associated with complications of false passages, infection, rectal perforation, recurrence of stricture. Balloon dilatation under vision is associated with minimal complications.

In 1974 introduction of movable urethrotome brought revolution in the management of urethral stricture.

Visual internal urethrotomy is now considered as the first line in the management of the urethral stricture disease because it is a safe procedure and is associated with minimal complications.

Optical urethrotomy has a success rate of up to 80%. Other alternative treatment can be considered for urethral stricture only after failure of visual internal urethrotomy.

In our study there were 22 male patients with urethral stricture in whom the outcome of visual internal urethrotomy was assessed. In our study stricture urethra incidence is most commonly seen in 4th and 6th decades of life. In our study maximum incidence 27.27% of patients were around 45 to 54 years (6 Patients).

Table 8: Showing percentage incidence of urethral stricture in various age groups as obtained in the study

	65 + years	55-64 years	45-54 years	35-44 years	25-34years
McMillan <i>et al.</i> [4]	53.19%	21.27%	10.63%	9.57%	5.3%
Our study	22.72%	9.09%	27.27%	18.18%	22.72%

Age distribution of patients with urethral stricture in our study who were above 65 years were 22.72%, 27.27% of patients in 55-64 age group, which was comparable with other study where 53.19% patients were above 65 years, 21.27% of patients were

between 55-64 years age group,10.63% patients were between 45-54 years age, 9.57% of patients were between 35-44 years age and 22.72% with urethral stricture were in range of 25-34 years age group in our study, whereas it was 5.3% in study by McMillan *et al.* [4].

The mean age of presentation was 47.45 years in our study, which is comparable to Meneghini *et al.* study showed a mean age of presentation at 52 years [5].

The most common presentations of urethral stricture disease in our study were obstructive voiding symptoms that is poor urinary stream & urinary retention. Shaker S *et al.* [6] also found that obstructive voiding symptoms remain the typical reason for evaluating urethral stricture disease (Table 8).

Table 9: Below showing presenting complaints of patients in our study and other studies

Presenting complaints	Authors		Our study
	Muhammad yunus <i>et al.</i> [7]	Shaker <i>et al.</i> [6]	
Poor urinary stream	70%	53.3%	72.72%
Dribbling of urine	16.66%	15.5%	18.18%
Acute retention	10%	11.1%	18.18%
Recurrent UTI	3.3%	-	22.72%
Prolong catheterisation	-	17.7%	40.90%

Poor urinary stream was the presenting complaint in 72.72% of patients and acute retention of urine in 18.18% of patients in our study. Dribbling of urine was the presenting complaint in 18.18% of patients in our study which is comparable to that in the study by Shaker *et al.* [6] where dribbling of urine as presenting complaint was present in 15.5% and 16.66% respectively. Recurrent urinary tract infections was present in 22.72% of patients in our study whereas in the other study it was 3.3%. 9 patients (40.90%) in our study had prolonged history of catheterisation which is significant and is comparable to that in study by Shaker *et al.* [6] that is 17.7% and none presented with periurethral abscess as a complication of bulbar urethral stricture.

Table 10: Shows causes of stricture in various other studies and our study

	Idiopathic	Iatrogenic	Traumatic	Inflammatory
Fenton AS <i>et al.</i> [8]	35%	33%	19%	13%
Zehri AA <i>et al.</i> [3]	32%	35%	16%	17%
Our study	13.63%	54.54%	4.54%	27.27%

The etiology of stricture in our study was mainly iatrogenic (54.54%), whereas study by Fenton *et al.* [8] had 33% incidence and Zehri *et al.* [3] study had 35% incidence of iatrogenic strictures. Stricture secondary to inflammatory cause was seen in 27.27% of patients in our study whereas it was seen in 13% and 17% of patients in study by Fenton *et al.* and Zehri *et al.* respectively. Trauma as the cause of stricture was seen in 4.54% of patients in our study which is comparable to that seen in study by Fenton *et*

al. and Zehri *et al.* with 19.

% and 16% cases respectively and idiopathic cause of stricture was seen in 13.63% of patients in our study which is comparable to that seen in study by Fenton *et al.* and Zehri *et al.* with 35% and 32% cases respectively.

Table 11: Showing site of stricture in other studies and our study

	Bulbar urethra	Membranous urethra	Distal Bulbar with Penile urethral component
Muhammad Yunas <i>et al.</i> ^[7]	73.33%	13.33%	10%
Arif Pervez <i>et al.</i> ^[9]	70.8%	12.5%	3.33%
Our study	77.27%	0%	22.72%

Regarding the site of stricture, in our study bulbar urethral stricture accounts for 77.27% of cases followed by 0% cases of membranous urethral strictures and both bulbar and penile of 22.72% which is comparable to the that seen in study by Arif Pervez *et al.* ^[9] where incidence of bulbar urethral strictures was 70.8%, membranous urethral strictures to be 12.5% and that of multiple that is bulbar and penile urethral stricture is 3.33%. It is also comparable to the study by Muhammed Yunus *et al.* ^[7] where bulbar urethral stricture was seen in 73.33% of patients, membranous urethral strictures in 13.33% of patients and multiple that is both bulbar and penile urethral stricture is 10% (Table 11). Cases of prostatic urethral stricture and only penile urethral stricture were not included in our study.

Table 12: Success rate of internal urethrotomy in different studies and our study

Author	Success rate (%)
Smith <i>et al.</i> ^[10]	82%
Gaches <i>et al.</i> ^[11]	81%
Holm Neilson <i>et al.</i> ^[12]	77%
Shaker <i>et al.</i> ^[6]	66.6%
Our study	59.09%

The patients in our study were followed for a period ranging from 2 months to 15 months with a mean follow up duration of 5.7 months. In our study all the patients with stricture length less than 1.5 cm were chosen because stricture recurrence has been shown to be directly proportional to stricture length. Pansadoro *et al.* ^[2] demonstrated high recurrence rate for strictures greater than 1 cm. The response to visual internal urethrotomy in our study was excellent in 13 patients (59.09%) and stricture recurrence was seen in 9 patients (40.90%). Other studies with similar success rates are shown in the (Table. 12) above. The results of success rate in visual internal urethrotomy in our study of 59.09% with mean followup of 5.5 months was comparable to that seen in studies by various authors, Smith *et al.* ^[10] study had a success rate of 82% (mean

followup 1 year), success rate in study by Gaches *et al.* ^[11] (mean followup of 4 years) and Holm Neilson *et al.* ^[12] (mean followup duration not specified) was 81% and 77% respectively. 66.6% success rate for visual internal urethrotomy was seen in study by Shaker *et al.* ^[6].

Table 13: Below table shows comparison of success rate of single internal urethrotomy and recurrence rate after single urethrotomy for short segment stricture of bulbar urethra, with the study by Pansadoro *et al.* ^[2], with our study

Author	Success rate of single internal urethrotomy	Recurrence rate of stricture
Pansadoro <i>et al.</i> ^[2]	42%	58%
Peter Albers <i>et al.</i> ^[13]	66%	26.9%
Our study	59.09%	40.91%

Visual internal urethrotomy for bulbar urethral stricture was associated with an overall success rate of 59.09% and a recurrence rate of stricture of 40.91%. For multiple that is both bulbar and penile urethral strictures internal urethrotomy was associated with no success rate of zero and a stricture recurrence rate of 100%. Study by Pansadoro *et al.* ^[2] had a success rate of about 42% after single urethrotomy and recurrence rate of 58% for bulbar urethral strictures. Study by Albers *et al.* ^[13] had a success rate of 66% after single urethrotomy for bulbar urethral strictures and recurrence rate of 26.9%.

The overall recurrence rate of stricture in our study was 40.90% with recurrence occurring within an average followup period of 5.5 months which is comparable to a study which shows a stricture recurrence rate of 16.7% with recurrences occurring in a mean follow up of 11.9 months. There was a favourable response to inflammatory strictures on internal urethrotomy in our study with 6 patients (27.27%) having excellent outcome among 2 patients (9.09%), stricture recurrence was seen in 4 patients. This is comparable to the study by Peters Albers *et al.* ^[13] where patients in the groups one and two had a success rates of 64% and 68% for inflammatory strictures respectively, most common cause iatrogenic (post catheterization) in our study with 12(54.54%) having excellent outcome among 9 patients (75%), stricture recurrence was seen in 3 patients (25%). This is comparable to the study by where patients in the groups one and two had a success rates of 65% and 56% for iatrogenic strictures respectively. The good success rates for internal urethrotomy and the relatively low recurrence rate of stricture for bulbar urethral stricture, in our study was observed because of the stricture length less than 1.5 cm.

Table 14: Below table shows comparison of catheter dwell times <5 days associated with recurrence and without recurrence with the study by Emrah Yuruk *et al.* ¹⁴ with our study

Author	Catheter dwell times <5days associated Without recurrence	Catheter dwell times <5days associated With recurrence
Emrah Yuruk <i>et al.</i> ^[14]	50.68%	20%
Our study	68.42%	31.57%

Regarding the catheter dwell time affecting the recurrence rates after internal urethrotomy, in our study with catheter dwell time <5days the recurrence is observed in 31.57% and 68.42% shows no recurrence. which is comparable to the that seen in study by Emrah Yuruk *et al.* ^[14] with catheter dwell time <5days the recurrence is observed in 20% and 50.68% shows no recurrence.

Conclusion

From our study in 22 patients we conclude that visual internal urethrotomy is safe first line treatment in urethral stricture associated with low morbidity, most common cause being iatrogenic and overall success rate of 59.09% and recurrence rate of 40.90% with short segment strictures.

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