

Original Research Article

Clinical study of VIU for short segment bulbar urethral strictures

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Abstract

Background: Visual internal urethrotomy (VIU) followed by intermittent self-dilatation (ISD) is the most commonly performed intervention for urethral stricture disease.

Aim: We predicted the outcome of visual internal urethrotomy (VIU) by measuring the percentage of lumen narrowing at the stricture site on retrograde urethrography (RGU).

Materials and methods: From April 2019 to December 2020, patients with primary bulbar urethral strictures who underwent VIU were selected for the study. Patients with a history of intervention, complete block of the urethral lumen and stricture greater than 2 cm were excluded from study. Urethral diameter at the area of maximum stenosis and at the normal distal urethra was measured on RGU with Vernier caliper and percentage narrowing was derived. Patients were followed 3 times monthly with symptoms, calibration and whenever required with RGU. Recurrence of symptoms, failure to self-calibrate and the need for secondary procedure were considered treatment failure.

Results: Complete follow-up data were available in 60 patients. Idiopathic was the cause of stricture in 32 (53%), trauma the cause in 12 (20%), iatrogenic in 10(16%) and lichen sclerosis in 6(10%) patients. In the Cox proportional hazards model only grade of narrowing had a significant impact on outcome. There were 44 cases of treatment failure in the total follow-up of 20 months. Percentage of narrowing was significantly higher with treatment failure (>60% Vs <60%, p <0.001).

Conclusion: Percentage narrowing of the urethral lumen at the stricture site is a useful predictor of VIU outcome.

Key words

Stricture, Visual internal urethrotomy, Retrograde urethrogram.

Introduction

Urethral stricture is the narrowing of the urethra and is described as a scar of the sub-epithelial tissue of the corpus spongiosum that constricts the urethral lumen. As the constriction progresses, obstruction develops and leads to symptoms either directly related to the obstruction or as secondary consequences. The most common cause is idiopathic in developed countries and trauma to perineum, pelvis or any instrumentation in developing countries [1]. Iatrogenic injuries, such as oversized resectoscope at the time of transurethral surgery and traumatic placement of indwelling urinary catheters, account for 45 percent of all cases [2]. The other causes include infection, hypospadias, skin conditions (most commonly lichen sclerosis), trauma, carcinoma and radiation therapy. Also, stricture urethra gives rise to wide range of symptoms and signs mandating definitive treatment at some point of time in patient's life. There are different treatment modalities available for stricture urethra but among them the internal urethrotomy gained significant level of approach among urologists because of its simplicity, ease and short learning curve [3, 4]. The first blind internal urethrotome by Civiale and Otitis in 18th century but failed to gain much popularity because of their complications and poor result. After the introduction of endoscopic optical system by Hopkins 1960 and later Sachse 1970 much improvement was found in recurrence rate [5]. In spite of its variable success rate, its long term effect is challenging to us. Trials are being conducted to improve its efficacy with adjuvant modalities. Various factors for recurrence following urethrotomy are studied and still research is going on to overcome its limitation [6-10]. In India, considering over the economic background urethrotomy is considered effective for initial management of stricture urethra. Thus it is important to study the role of visual internal urethrotomy in the management of short segment urethral stricture in male.

Materials and methods

The study was conducted as a prospective study in Kakatiya Medical College & Hospital, India.

Aim and objectives

- To evaluate patients with urethral stricture disease at our institution
- To predict the outcome of Optical Internal Urethrotomy for short segment bulbar strictures by measuring the percentage of lumen narrowing at the stricture site on the Retrograde Urethrogram.

Inclusion criteria: Patients with primary bulbar stricture

Exclusion criteria:

- Patients with a history of prior intervention
- Complete block of urethral lumen
- Stricture greater than 2 cm

Methodology:

A total number of 60 patients were studied in the above specified period. All patients with primary bulbar urethral stricture were selected. Of those patients, the ones who had any prior intervention in the form of dilatation, Optical Internal Urethrotomy or urethroplasty were excluded. All the patients underwent a standardized preoperative evaluation including basic urine and blood chemistries, uroflowmetry and a good quality Retrograde Urethrogram. On the retrograde urethrogram film, the site of the maximal narrowing was measured. The diameter of the normal lumen distal to the stricture site was also taken. The distal urethral lumen was taken as normal as this part is maximally distended while performing a urethrogram rather than the urethral proximal to the stricture. The percentage narrowing was calculated (**Figure – 1**).

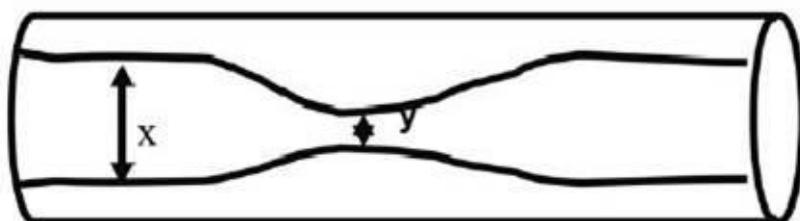
The patients were then subjected to Optical Internal Urethrotomy. Optical Internal Urethrotomy was done using a standard 21 french sachse urethrotome. Following surgery

the patients were advised to self-dilate with 14 french tieman catheter starting from the 3rd day of removal of Foleys. Foleys was removed on the 7th post-op day. The patients were advised to self-dilate for once daily for the first month and

then once in 3 days later. Uroflowmetry was done at 3rd and 6th months. Symptom recurrence, inability to pass the tiemans catheter and the necessity for repeat Optical Internal Urethrotomy were taken as treatment failures.

Figure – 1: Percentage narrowing.

$$\text{Percentage Narrowing} = [(x-y/x) 100]\%$$



Results

In our study of 60 patients, majority of the patients, i.e., 36% of them were in the age group of 31 – 40 years; 16% more than 50 years; 25 % in 41 – 50 years and 21% patients in the age group 21 – 30 year (Table – 1).

Table – 1: Age distribution.

Age in Years	Number of patients	Percentage
21-30	13	21%
31-40	22	36%
41-50	15	25%
>50	10	16%

Table – 2: Etiology.

Etiology	Number of patients	Percentage
Idiopathic	32	53%
Traumatic	12	20%
Iatrogenic	10	16%
Lichen sclerosus	6	10%

In our study, the most common etiology was found to be idiopathic (53%) followed by traumatic (20%), iatrogenic (16%) and finally lichen sclerosus (10%). Iatrogenic causes include traumatic catheterization or instrumentation (Table – 2).

In our study, 20 patients (33%) had a stricture length below 1 cm and 40 patients (67%) had a stricture length between 1 and 2 cm (Table – 3).

Table – 3: Stricture length.

Stricture length	Number of patients	Percentage
< 1cm	20	33 %
1 – 2 cm	40	67%

Table – 4: Percentage narrowing on retrograde urethrogram.

Percentage narrowing	Number of patients	Percentage
40–50%	10	16%
51–60%	6	10%
61–70%	18	30%
71–80%	22	37%
81–90%	4	7%

The percentage narrowing was calculated from the retrograde urethrogram as described previously with the help of a scale or vernier calipers. It was found that out of the 60 cases, 22 patients had a narrowing in the range of 71 – 80%; 18 patients in the range of 61 – 70%; 10 patients in the range of 40 – 50%; 6 patients in the range of 51 – 60% and 4 patients in the range of 81 – 90% (Table – 4).

In our study, out of the 16 patients who did not have recurrence, 10 patients had a percentage narrowing in the range of 40 – 50% and 6 patients had a percentage narrowing in the range of 51 – 60% (**Table – 5**).

Table – 5: Treatment result according to percentage narrowing on the retrograde urethrogram.

Percentage Narrowing	Treatment Success	Treatment Failure
40 – 50%	10	-
51– 60%	6	-
61 – 70%	-	18
71 – 80%	-	22
81 – 90%	-	4

Table – 6: Time of recurrence in failure cases.

Time of Recurrence	Number of Patients
5 – 7 months	28
8 – 10 months	10
>10 months	6

Most of the recurrences in the failure patients occurred in the first 5 to 7 months. In our study, out of the 44 treatment failure cases, around 28 patients failed in the first 5 to 7 months. Around 10 patients failed in the first 8 to 10 months and the remaining 6 failure patients had recurrence after 10 months (**Table – 6**).

Discussion

Visual Internal Urethrotomy (VIU) is a very safe and relatively easy procedure to perform and to learn [11]. This attribute has made it as the procedure of choice among many urologists worldwide for the treatment of short segment bulbar urethral stricture. But when juxtaposed with urethroplasty, the success rate of Optical Internal Urethrotomy is modest, i.e., 50% compared with 83% at 5 years and at 10 years it is around 33% [12, 13, 14]. Although Optical Internal Urethrotomy is being employed so widely, the fact remains that strict guidelines governing the indications and the frequency of Optical Internal Urethrotomy are lacking. Similarly, there may be evidence in literature to suggest that repeat Optical Internal Urethrotomy

may actually aggravate the condition of the stricture [15, 16, 17]. Therefore it is wise to have some parameters that may be employed to predict the outcome of Visual Internal Urethrotomy in a particular patient so that it may be used more judiciously and on evidence basis.

Objective variables that may forecast a better or a poorer outcome in a particular patient undergoing Visual Internal Urethrotomy may be extremely useful in patient selection and avoidance of unnecessary OIU [18, 19, 20].

The commonest imaging done to evaluate a patient of stricture urethra is Retrograde Urethrogram. But a minor disadvantage with it is that at times it may underestimate the true length of the stricture. In spite of the above minor disadvantage, in regular urological practice it is the commonest imaging modality employed to decide upon Visual Internal Urethrotomy as a management choice for short segment bulbar stricture [21, 22].

The wall of normal urethra is relatively thin, smooth and pliable as evidenced by a normal Retrograde Urethrogram. But in cases of stricture or any other urethral pathology, there is frequently fibrosis of the wall of the urethra thus making it non-pliable and thick-walled. This fibrosis of the corpus spongiosum can be objectively assessed by the extent of the narrowing of the urethral lumen on Retrograde Urethrogram [23, 24, 25]. In other words, the degree of spongiofibrosis is considered to be a crucial parameter that influences appropriate choice of treatment and the outcome.

Usually, sonourethrogram is the modality that has been traditionally used by urologists to assess the degree of spongiofibrosis at the stricture site by comparing the lumen at the stricture site with that of the normal urethra distal to the stricture site [26, 27, 28]. Although sonourethrogram is a good investigation to assess the degree of spongiofibrosis, it is hampered by the fact that it is not widely available, it is more operator

dependent and has a relatively low sensitivity and specificity.

Our present study which employs the technique of measuring the percentage narrowing at the site of maximal narrowing on the retrograde urethrogram is more or less an extension of the scientific precept of assessing spongiofibrosis on a sonourethrogram.

As in sonourethrogram where the degree of spongiofibrosis is measured by measuring the degree of encroachment of the lumen at the stricture site, here also the narrowing at the maximal stricture site is measured on the Retrograde urethrogram. In other words, the extent of the luminal narrowing on the retrograde urethrogram may be considered a surrogate marker for the degree of spongiofibrosis at that site. It should also be remembered that this measurement is usually not influenced by the position of the patient since the direction of the x-ray beam is almost at right angles to the length that is measured [23, 24, 28].

In our study, the degree of narrowing or in other words, the percentage of narrowing at the maximal stricture site on the retrograde urethrogram was found to be associated with the outcome of Optical Internal Urethrotomy.

Out of the 60 patients who had undergone Optical Internal Urethrotomy in our study period, 16 patients who had a narrowing of less than 70% had a good outcome. In particular, all the 16 patients who had a narrowing in the range of 40 – 60% had good outcome with no recurrence till date. On the other hand, out of the remaining 44 patients who had a narrowing of more than 60 % on the Retrograde Urethrogram 44 patients had treatment failure and required repeat treatment at some point during the follow-up.

Thus this method of using the percentage narrowing at the stricture site on a good Retrograde Urethrogram is a very useful method of judging the degree of spongiofibrosis at the stricture site which in turn can be used to predict

the outcome of Optical Internal Urethrotomy [18, 21].

Factors which can influence the measurement are under-distension and over-distension of the distal urethra thus affecting the calculation of the percentage since the lumen of the distal urethra forms the denominator in our calculation. In order to ascertain correct filling of the distal urethra, a few hints may be taken into consideration. If there is entry of contrast into posterior urethra, it suggests a correct filling the distal urethra. In the same way if there is intravasation of contrast, it denotes overfilling and such urethrograms must be excluded and a fresh retrograde urethrogram may be ordered [19, 24].

Other factors like length of the stricture, site of the stricture and etiology of the strictures being equal, the degree of narrowing on the Retrograde Urethrogram may play a crucial role in the result of Optical Internal Urethrotomy. Thus it may be used in prognosticating or predicting the outcome of Optical Internal urethrotomy.

Studies have also indicated that a repeat Optical Internal urethrotomy does not alter the overall results, thus a repeat Optical Internal Urethrotomy may not after all be a good option in cases of failures [28, 24].

Though there is nothing in the literature to say that multiple Optical Internal Urethrotomies may influence the outcome of a future urethroplasty, it would be prudent to restrain from doing multiple OIUs in a particular patient as there is a chance of worsening the fibrosis and increasing the length of the stricture thereby precluding the possibility of a anastomotic urethroplasty and necessitating a substitution urethroplasty [24, 25].

Based on our present study, though the sample size is not great, there is a rough indication that those patients with a percentage narrowing of less than 60% on the Retrograde Urethrogram had a better outcome with Optical Internal Urethrotomy than those with a percentage

narrowing of more than 60%. This result was found to be statistically significant with a p-value of $<0.001^{**}$.

One of the limitations which we had encountered in our study was in the follow-up of the patients and the compliance of the patients to our instructions. Though we had given explicit instructions to the patient with regard to the follow-up timetable, many patients turned up late and a few did not turn up at all who were excluded from the study [21, 28]. In the same way, though the patients were properly instructed and demonstrated on the Clean Intermittent Self Catheterisation technique, a few patients had not performed it. Another issue was the tool used to measure the degree of narrowing on the Retrograde Urethrogram. Vernier calipers or a conventional foot scale was used for measuring. Sometimes the x-ray quality was not good enough to allow precise measurement of the degree of narrowing especially conventional film x-rays. With digital x-rays it was possible to measure the narrowing on the console. These issues may have to be addressed and taken into consideration when conducting and interpreting any study of this nature and similarity [26, 28].

Conclusion

Though Optical Internal Urethrotomy is a simple and safe procedure for bulbar urethral stricture patients it should not be used indiscriminately. Improper selection of patients may necessitate multiple procedures on the same patient thus adversely affecting the quality of life and economic well-being of the patient.

An easy way to assess the degree of spongiofibrosis without using a sonourethrogram is calculating the percentage narrowing at the maximal site of stricture on a Retrograde Urethrogram. This may be used to predict the outcome after Optical Internal Urethrotomy. In our study, patients with percentage narrowing of less than 60% on Retrograde Urethrogram had a better outcome than patients who had a percentage narrowing of more than 60% (p-

value 0.001^{**}). Thus alternate treatment may be considered for such patients who have a high degree of narrowing on the Retrograde Urethrogram.

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