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Outcomes of Initial Management and Follow-Up Procedure in Urethral Stricture Disease

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Abstract

Background: Urethral Stricture Disease is a disease affecting middle-aged men. The causes of urethral stricturecan be categorized as congenital, traumatic, inflammatory, malignant, ischaemicand degenerative. The aim of the study was to compare the short-term treatment outcomes in urethral stricture disease following VIU and Urethroplasty. *Materials and Methods:* It is a non - randomized prospective study conducted in 50 Men with a diagnosis of Urethral stricture disease, who underwent Urethroplasty (n=25), VIU (n=25). Pre-operative symptom assessment and investigations were done and treatment outcomes such as Subjective assessment, Objective tests and complications were studied. *Statistical Analysis*: Chi square test, Cramer's V test, Repeated Measures ANOVA was the tests used for statistical analysis of data using SPSS software. *Result & Discussion:* In the study groups, Uroflowmetry showed significant improvements in both groups at 1, 3- and 6-months follow-up visits. Secondary procedure was required in 28% of the patients, 16% in Group 1 and 40% in Group 2. Although patients in Group 2 required a secondary procedure more frequently than those in Group 1, this difference was not statistically significant (p=0.059). There was a decline in the Qmax during follow-up at 3 and 6 months. The Mean fall in Qmax at 3 months and 6 months was 3.6 ml/sec and 1.56 ml/sec respectively in Group 1, and 5.52 ml/sec and 0 ml/sec respectively in Group 2. Although short-term results with the present study reflect a very high success rate favouring BMG substitution urethroplasty, a larger cohort and a longer follow-up may be required for a better assessment of this modality for management of USD.

Keywords: Urethral Stricture disease; Visual Internal urethrotomy; Urethroplasty; Buccal Mucosa Graft Urethroplasty.

Introduction

Urethral stricture disease dates back to time immemorial with references to the problem and treatment by urethral dilatation appearing in the writing of ancient Indians, Greeks, Egyptians etc. In ancient India, Sushruta described use of a reed catheter lubricated with ghee. Treatment of strictures were essentially by means of intermittent bouginage in early years. Bougies were made of either wax, catgut or silver [1]. The pathology was however not realized until use of microscope to examine human tissues began. Inflammation from any cause was found to lead to granulation tissue formation followed by scarring which led to a stricture in a hollow organ such as urethra.

Chambers et al. noted that the first identifiable change in urethral stricture disease was achange in the nature of the urethral epithelium from a pseudostratified to a columnar type that lacks the water proofing quality of the pseudostratified variant. Consequently, they hypothesized that urine could extravasate and lead to fibrosis. Increased pressure proximal to the narrowed zone leads to further extravasation of urine and subsequent worsening of fibrosis [2]. In case of partial denudation of urethral lining at the bulbo-penile urethra leads to the exposure of the corpus spongiosum. Margins of urothelium are usually approximated butare intermittently opened by voiding streams and the spongy tissue thus exposed become inflamed with gradual subsequent spongio-fibrosis and lumen stenosis [3]. Infected urine, infection of paraurethral glands and hematoma formations exacerbate fibrosis. Complete urethral

disruption with loss of continuity is followed by hematoma formationand subsequent fibrosis. It is worse if the two ends are distracted from each other.

The causes of urethral stricturecan be categorized as congenital, traumatic, inflammatory, malignant, ischaemic and degenerative. A severe degree of urethral stricture causes changes typical of obstruction. They includethe dilatation of proximal urethra [4]. The musculature of the urinary bladder alsohypertrophies to overcome the obstruction. These leads to trabeculations, sacculations and even diverticulae. Hydroureteronephrosis secondary to hypertrophy of uretero trigonal complex and vesicoureteric reflux occurs. These can lead to renal insufficiency [5]. Because of stasis infection occurs which may cause periurethral abscess, prostatitis, cystitis and pyelonephritis which leads to pain. Acute retention of urine is precipitated by oedema mainly due to urethritis, alcoholicexcess and by voluntary retention. In other cases, the narrowness of the stricture results in increasing in ability to expel residual urine and acute on chronic retention or retention with over flow supervenes [5].

Symptoms of the urethral stricture appears after the urethral calibre is reduced to less than 10 French gauge. It includes difficulty in voiding, chronic retention with dribbling of urine. Acute retention of urine may occur especially after secondary infection due to residual urine. At times the stricture is palpable as a thickening of the urethra [6]. Complications may also lead to varying symptoms. Residual volume may give rise tourinary tract infection and epididymitis. Obstructed ejaculation may lead to infertility. Extravasation of urine each time patient passes urine worsens the spongio-fibrosis which can contract longitudinally resulting to a chordee during erection. Abscesses in distended paraurethral glands (paraurethral abscess) may burst in skin resulting into urethra-cutaneous fistulae. Calculi commonly form inside these abscesses and in the infected tissues. Infected urine forced into prostatic ducts due to high pressure results in prostatitis. Squamous cell carcinoma after urothelial metaplasia arises in approximately 1% of patients with long-standing urethral stricture [6]. Hernia, haemorrhoids and rectal prolapse may result due to straining. Septicaemia after urethral instrumentation and extravasation of urine can also occur. Back pressure leads tovesico-ureteric reflux with subsequent features of obstructive uropathy. Urethral diverticulae also occurs after the urinary bladder musculature hypertrophies [5]. In the present study was to compare the investigations carried out for diagnosis of urethral strictures, the initial management and follow up in patients suffering from urethral stricture disease.

Materials and Methods

It is a non - randomized prospective study conducted in 50 Men with a diagnosis of Urethral stricture disease, who underwent Urethroplasty (n=25), VIU (n=25). Data was collected by meticulous history taking, careful examination, and appropriate radiological and haematological investigations and collection of post-operative data with respect to post-operative uroflowmetry findings from the patients presenting to K.R. Hospital, Mysore and diagnosed with Urethral stricture from November 2016 to May 2018.

Males with age more than 18 years, with a diagnosis of primary or recurrent urethral stricture were included in the stud. Male with less than 18 years of age, patients with coexistent benign prostatic hyperplasia, with coexistent neurogenic bladder were excluded.

Pre-operative imaging included a mandatory retrograde urethrogram in all patients. Patients were divided into two groups. with longer strictures planned for urethroplasty (Group 1: mean stricture length 3.7 cms) and shorter strictures planned for VIU (Group 2: mean stricture length 1.3 cms). Symptomatic assessment and Uroflowmetry at 1, 3 and 6 months after catheter removal and any failures were noted. A need for any secondary intervention, including dilatation, within a period of 6 months following the primary treatment modality was considered a failure.

The investigations carried out were, assessment of urine flow rateusing uroflowmetry, contrast urethrogram, urethroscopy and others include sono-urethrography and spongio-sonography. The management procedures for urethral strictures include Urethral dilation, Visual Internal urethrotomy (VIU), Urethral Stenting, Urethroplasty and Clean Intermittent Self Catheterization**.**

Statistical Analysis: All data was entered into a Data Collection Proforma Sheet. Chi square test, Cramer's V test, Repeated Measures ANOVA was the tests used for statistical analysis of data using SPSS software.

Results

The number of patients included in the study was 50. The age of the patients ranged from 14 years

to 65 years with a mean age of 42 years with highest incidence lies between the age group of 31-40 years followed by patients belongs to the age group of 51 – 60 years (Fig. 1).

In our study, we found the commonest clinical presentation is poor stream of urine which occurred in 76% of the patients followed by acute urine retention in 22%. Some of the patients had more than one presenting complaints (Fig. 2).

In the present study 25 patients had urethral stricture size < 2 cm undergone VIU (50%). Remaining 25 patients had urethral stricture size > 2 cm undergone urethroplasty. Out of these 19 patients (38%) undergone anastomotic urethroplasty, 5 patients (10%) undergone BMGU. 1 patient (2%) undergone staged BMGU (Table 1).

In both groups, Uroflowmetry done post-operatively, showed a significant increase in flow rates (Qmax) at 1 month, 3 months and 6 months as compared to pre-operative urine flow. The mean increases in flow rates at 1 month. 3 months and 6 months after catheter removal in group 1 patients

Table 1: Frequency and percentage of patients depending on the types of management of urethral stricture

Type of management	Frequency	Percent
AnastomoticU	19	38.0
BMGU	5	10.0
StagedBMGU	1	2.0
VIU	25	50.0
Total	50	100.0

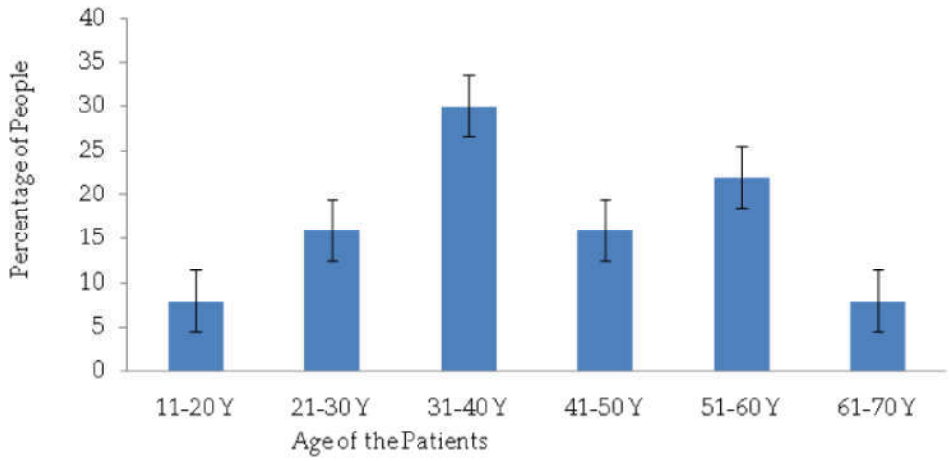

Fig. 1: Frequency of age of the patients included in the study

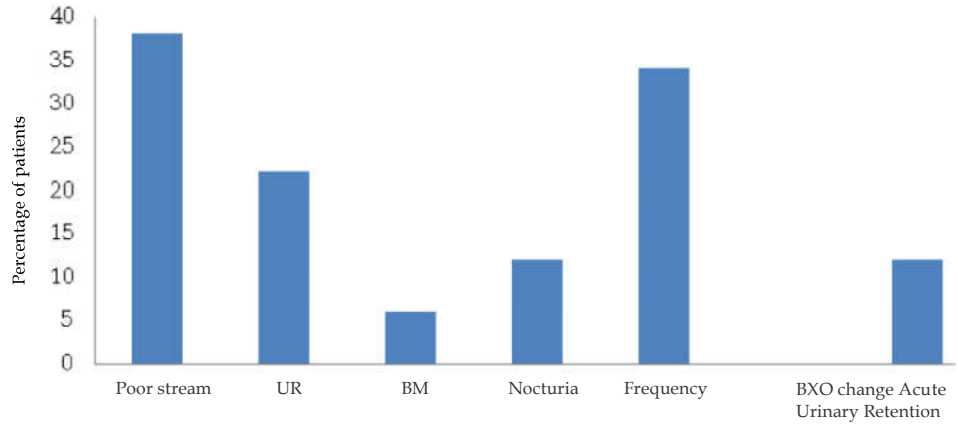

Fig. 2: Frequency of various types of clinical presentation in the recruited subjects

Table 2: Descriptive statistics showing the rate of urine flow as recorded by Uroflowmetry at different point of time

Change in the rate of urine flow	Group	Mean	Std. Deviation	N
1 Month-uroflow Qmax	G1	33.4000	4.56435	25
	G2	26.2400	2.45425	25
3 Month-uroflow Qmax	G1	29.8400	5.24944	25
	G2	20.7200	4.80902	25
6 Month-uroflow Qmax	G1	28.2400	5.50212	25
	G2	20.8000	3.95811	25

Table 3: Comparison of number of patients needed second intervention in less than 6 months versus group

			Group		Total	P value
			G1	G2		
Number of patients need second intervention in <6months	Yes	Count	4	10	14	0.059
		% within Group	16.0%	40.0%	28.0%	
	No	Count	21	15	36	
		% within Group	84.0%	60.0%	72.0%	
	Total	Count	25	25	50	
		% within Group	100.0%	100.0%	100.0%	

was 33.4 ml/sec, 29.8 ml/sec and 28.24 ml/sec respectively. Whereas in Group 2, the mean increase in flow rate at 1,3 and 6 months of catheter removal was 26.24 ml/sec, 20.72 ml/sec and 20.8 ml/sec respectively (Table 2). There was a decline in the Qmax during follow-up at 3 and 6 months. The Mean fall in Qmax at 3 months and 6 months was 3.6 ml/sec and 1.56 ml/sec respectively in Group 1, and 5.52 ml/sec and 0 ml/sec respectively in Group 2.

Table 2 explains the need for secondary intervention within a period of 6 months following the primary procedure was also assessed in both groups. Secondary procedure was required in 28% of the patients, 16% in Group 1 and 40% in Group 2. Although patients in Group 2 required a secondary procedure more frequently than those in Group 1, this difference was not statistically significant (p=0.059).

Discussion

In the present study, Symptomatic assessment and Uroflowmetry at 1, 3 and 6 months after catheter removal and any failures were noted. A need for any secondary intervention, including dilatation, within a period of 6 months following the primary treatment modality was considered as failure.Pre-operative Uroflowmetry confirmed poor flow in all patients with a mean Qmax (Maximum flow) being only 5.76 ml/sec. This was consistent with other studies which have shown the average maximum flow to be around 8 ml/sec. Management ofstrictures was based on stricture length and location as assessed by RGU and cystoscopy. In Group 1, 19 patients underwent anastomotic urethroplasty except and 6 patients underwent BMGU. Group 2 had patients who underwent VIU for short segment strictures involving the bulbar or peno-bulbar urethra. Clinical outcome was considered a failure when the criteria as previously described were met. Secondary interventions were undertaken to deal with the failures.

The urine flow rate was assessed with uroflowmetry and was categorized as Normal flow rate > 15 ml/sec, Mild obstruction 10-15 ml/sec, Moderate obstruction 4-10 ml/sec and Severe obstruction <4 ml/sec. Contrast urethrogram was performed, which gives information aboutthe site, length, number and calibre of the stricture. The length of the strictured segment may be overestimated or underestimated as a result of incomplete filling of prostatic urethra or urinoma cavity connected with the proximal segment respectively [7].

Urethroscopy gives useful information about the appearance of urethral lining immediately distal and proximal to the stricture and so gives a better estimate of the spongio-fibrotic length. It is useful also for follow-up of treated strictures [6]. As management procedures for urethral strictures, urethral dilatation, visual internal urethrotomy, urethral stenting, urethroplasty and clean intermittent self-catheterization was performed.

In the present study, the need for secondary procedure was considerably higher in patients post VIU, who needed dilatation, repeat VIU or urethroplasty following the initial procedure (40%). In comparison, patients in Group 1 who underwent Urethroplasty required no further intervention, except for the four patients who required cystscopic dilatation following an anastomotic Urethroplasty. However, this difference had not reached a level of statistical significance. This may be due to the low number of participants in the present study.

Many studies have shown that flow studies done at follow-up visits show significantly better and a lasting improvement with urethroplasty than with VIU. Based on a short-term follow-up, we found that BMG Substitution urethroplasty had a high success rate of 100%, as compared to VIU which had a 60% success rate at 6 months. These results are similar to the study done by Kulkarni S and Barbagli G, who presented their results following one-sided or dorso-lateral onlay buccal graft technique [8,9]. They reported a success rate of 92%; considering a long follow-up period of 22 months.

Although short-term results with the present study reflect a very high success rate favouring BMG substitution urethroplasty, a larger cohort and a longer follow-up may be required for a better assessment of this modality for management of USD. The short comings of the study are short term follow up and small cohort. It is to be understood that VIU and Urethroplasty are entirely different procedures and cannot bevis a vis. A randomized comparison between holmium lasers VIU versus cold knife VIU may be a future direction along with randomized comparison of VIU in small and medium sized strictures of urethra.

Conclusion

Although there are various studies comparing one modality with the other, management of urethral stricture in any patient does not follow a fixed protocol. It needs to be customized and tailored, based on the stricture characteristics local adverse factors, and the management protocols of the attending surgeon.

References

1. Attwater HL. The history of urethral stricture B.J. Urol. 1943;15:31.
2. Chambers RM, Baitera B. The anatomy of the urethral stricture, Br. J. Urol. 1977,49: 545-51.
3. Turner- Warwick R. Urethral stricture surgery. In Current Operative Surgery; Urology, ed. Mundy AR 5th Ed. New York: Churchill Livingstone, 1989: 215-8.
4. Heyns CF, Steenkamp JW, De Kock ML, Whitaker P. Treatment of male urethral strictures: is repeated dilation or internal urethrotomy useful? JUrol, 1998; 160(2):356–8.
5. Bailey and Love. Urethral strictures. Short Practice of Surgery 27th Ed. London:Chapman and Hall, 2000.pp.1261-64.
6. John Blandy. Urethral strictures. Lecture Notes on Urology 4th edition. Oxford:Blackwell 1991.p.261.
7. Koraitim MM. Posttraumatic posterior urethral strictures in children: A 20-years' experience. J. Urol. Feb. 1997;157(2):641.
8. Kulkarni S, Andrich DE, Mundy AR. Urethral strictures and their surgical treatment. B.J. Urol. 2000;86:571-80.
9. Barbagli G, Palminteri E, Balò S, Vallasciani S, Mearini E, Costantini E, Mearini L, Zucchi A, Vivacqua C, Porena M. Lichen sclerosus of the male genitalia and urethral stricture diseases. Urologiainternationalis. 2004;73(1):1-5.