

Review on Management of Urethral Stricture Disease at Tertiary Care Centre

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Abstract

Introduction: Urethral stricture disease remains a common cause of morbidity among men. Many questions about the etiology of urethral stricture disease remain unanswered till now. This study was done in a tertiary care center along with a review of the literature to evaluate the etiology of urethral strictures and to determine the factors that may influence possible preventive or curative strategies. **Materials and Methods:** Data collected from Patients visiting the OPD &/or admitted in the IPD for urethral stricture during the August 2015 to December 2017 this period at tertiary care centre with the help of relevant history, clinical examination, appropriate investigation including and treatment which includes medical and surgical intervention. **Results:** In study iatrogenic (40%) was main etiological factor for which H/O catheterization was main contributory factor for about 41% among iatrogenic cause. Direct visual internal urethrotomy was common surgical procedure performed with success rate (58%). Anastomotic urethroplasty was associated with success rate of 87.5%. **Conclusion:** Avoiding unnecessary urethral catheterization and repeated urethral instrumentation can reduce these iatrogenic strictures. Contrast urethrogram was the most common imaging modalities followed by Urethroscopy. Anastomotic urethroplasty had higher success rate as compared to DVIU and Urethral dilatation.

Keywords: Direct Visual Internal Urethrotomy (DVIU), Urethral Stricture, Urethroplasty

1. Introduction

Urethral stricture disease is still a prevalent problem with an estimated incidence of 0.6% in susceptible populations¹. It can result from a multitude of aetiological factors, with iatrogenic causes, infections, trauma and idiopathic strictures responsible for most cases in the contemporary world. A propensity toward recurrence necessitates repeated urethral instrumentation in many patients leading to significant impairment of quality of life. The surgical management of stricture disease can be complex and challenging due to the multiple factors that need to be considered including anatomical location, underlying patho-physiology as well as patient co-morbidity. Despite the prevalence of urethral strictures, there has been a

remarkable lack of consensus on the optimal approach to evaluation and management. The recent International Consultation on Urological Disease (ICUD) panel on urethral strictures (2010) aimed to bring more consistency to the literature in terms of terminology, definitions and specific management recommendations². In this article we review the recent literature on the evaluation and management of urethral strictures.

2. Aims and Objective

1. To determine the causes, modes of presentation and investigations carried out for diagnosis of urethral strictures.

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2. To determine the results of the initial management procedures performed.
3. To determine the complications of all the management procedures performed.
4. To look at the follow-up after the initial management procedure.

3. Materials and Methods

This prospective observational study was conducted on 30 Patients visiting the OPD &/or admitted in the IPD for urethral stricture during the period of August 2015 to December 2017 at tertiary care centre were enrolled in the study with the help of relevant history, clinical examination ,appropriate investigation including and treatment which includes medical & surgical intervention. Patients were included after matching inclusion and exclusion criteria. Institutional ethics committee permission was taken. Written informed valid consent was taken from each patient willing to be a part of this study.

3.1 Eligibility Criteria

3.1.1 Inclusion Criteria

1. Cases of urethral stricture, with or without previous history of any medical or surgical treatment for the same.
2. Cases which are regular for post treatment follow-up.
3. Patients willing to be part of this study.

3.1.2 Exclusion Criteria:

1. Cases which will not come for regular follow-up and who did not get complete or receive any medical or surgical treatment.
2. Patients not willing to be part of this study.
3. Patients who were not followed up in the urology clinic for at least 6 months after the Initial procedure.
4. Patients with posterior urethral valves.

4. Results

As seen in the (Table 1), more than 50 years (40%) was the most common age group amongst study population followed by 41 to 50 yrs (20%), 31 to 40 yrs (16.7%) and 21 to 30 yrs (13.3%) (Figure 1 & Table 1).

Table 1. Age group distribution amongst study population

Age group	Frequency	%
Less than 10 yrs	1	3.3
11 to 20 yrs	2	6.7
21 to 30 yrs	4	13.3
31 to 40 yrs	5	16.7
41 to 50 yrs	6	20.0
more than 50 yrs	12	40.0
Total	30	100.0

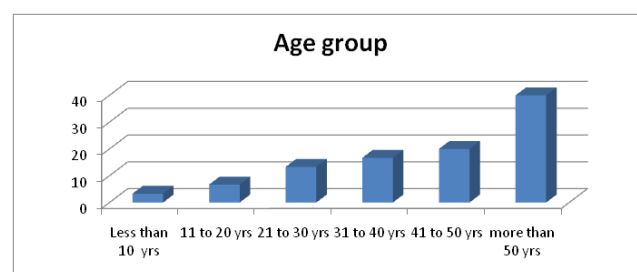


Figure 1. Bar diagram shows age distribution of study population.

Table 2. Various causes amongst study population

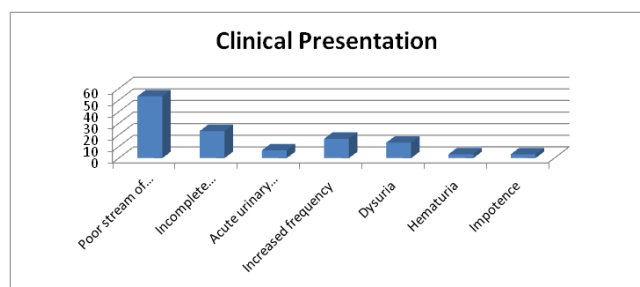
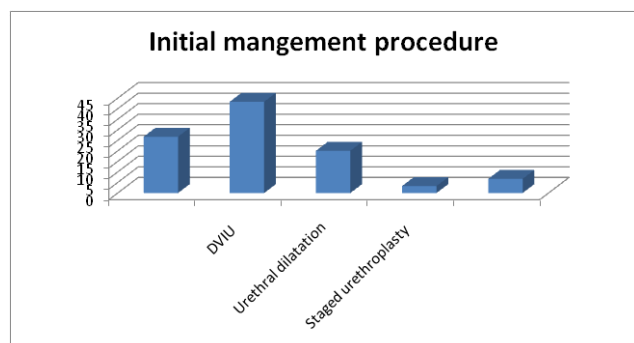
Causes	Frequency	%
Iatrogenic	12	40.0
Bacterial urethritis	6	20.0
Lichen sclerosis	1	3.3
Idiopathic	9	30.0
External Trauma	2	6.7
Total	30	100.0

Table 3. Various Iatrogenic causes amongst study population

Iatrogenic causes	Frequency	%
Transurethral prostate resection	3	25.0
Hypospadias correction	3	25.0
Post catheterization	5	41
Post cystolithotripsy	1	8.3
Total	12	100.0

Table 4. Clinical Presentation amongst study population

Clinical Presentation	Frequency	%
Poor stream of micturition	16	53.33
Incomplete emptying	7	23.33
Acute urinary retention	2	6.67
Increased frequency	5	16.67
Dysuria	4	13.33
Hematuria	1	3.33
Impotence	1	3.33

**Figure 2.** Bar diagram shows percentage of clinical features among study population.**Figure 3.** Bar diagram shows percentage of initial management procedure among study population.**Table 5.** Initial management procedure amongst study population

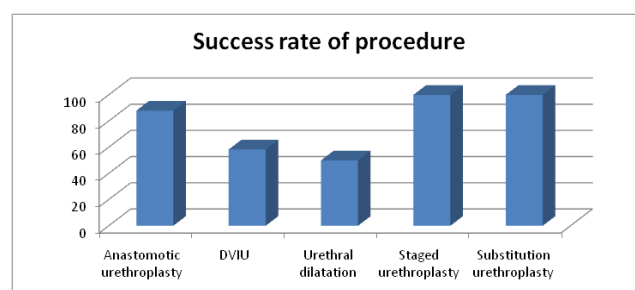
Initial management procedure	Frequency	%
Anastomotic urethroplasty	8	26.7
DVIU	13	43.3
Urethral dilatation	6	20.0
Staged urethroplasty	1	3.3
Substitution urethroplasty	2	6.7
Total	30	100.0

Table 6. Result of Initial management procedure amongst study population.

Result of Initial management procedure	Frequency	%
Good urine stream	24	80.0
Poor urine stream	4	13.3
Acute urine retention	2	6.7
Total	30	100.0

Table 7. Success rate of initial management procedure amongst study population as per good outcome

Initial management procedure	No. patients with a good urine stream	No. of patients with Successful procedures	Success rate %
Anastomotic urethroplasty	8	7	87.5
DVIU	12	7	58.3
Urethral dilatation	2	1	50
Staged urethroplasty	1	1	100
Substitution urethroplasty	1	1	100
Total	24	17	70.83

**Figure 4.** Bar diagram shows percentage of success rate of study population in initial procedures.

5. Discussion

In the present study, more than 50 years (40%) was the most common age group amongst study population followed by 41 to 50 yrs (20%), 31 to 40 yrs (16.7%) and 21 to 30 yrs (13.3%).

In the present study, Iatrogenic (40%) (Table 2) was the most common etiology amongst study population followed by Idiopathic (30%), Bacterial urethritis (20%), External Trauma (6.7%) and Lichen sclerosis (3.3%). There are several explanations for the so called idiopathic stricture. It may be the delayed manifestation of unrecognized (childhood) trauma³, congenital in origin⁴ (possibly due to an incomplete rupture of the urogenital membrane and related to what is called Cobb's collar⁵ by some and Moorman's ring⁶ by others) or mainly ischemic in origin, especially in elderly men⁷.

Patient age is also relevant in deciding on the cause of a stricture: In patients younger than 45 years, hypospadias correction and pelvic trauma are most commonly defined as the cause, while transurethral interventions are most common in those aged over 45⁸.

In the present study, amongst Iatrogenic causes post catheterization (41%) was the most common etiology amongst study population followed by transurethral prostate resection (25%), Hypospadias correction (25%) and Post cystolithotripsy (8.3%) (Table 3). These findings correlated well with the study conducted⁹ in which urethral catheterization contributed 35.9% of total iatrogenic causes in both age subgroups. It may typically occur at the junction of the bulbar and penile urethra or in the proximal bulbar urethra. But penile urethra, pan urethra, and multifocal anterior urethral involvement are also common. Improper urethral catheter insertion causes 3.2 urethral injuries per 1,000 patients¹⁰. Prolonged catheterization leads to urethral inflammation and ischemia, and leads ultimately to urethral stricture¹¹. Leaching of toxic compounds from poor quality catheters and microvascular disease (as in smokers and in diabetics) may increase the risk^{10,12}. Adequate and strict indications for urinary catheterization, skilled urethral catheter insertion, and the consideration of suprapubic catheter placement in prolonged catheterization may decrease the incidence of these iatrogenic strictures.

Iatrogenic strictures occur at any age, commonly involving the membranous urethra and urethral sphincter mechanism, after Trans-Urethral Resection of the Prostate (TURP) (so-called "sphincter strictures")¹³. Similarly in the study conducted^{14,15} the incidence of iatrogenic stricture by TURP (2.2 to 9.8%) or radical (8.4%) or simple prostatectomy (1.9%) are higher in the older group patients. The probable causes of stricture after TURP are traumatic insertion of the resectoscope with perforation of the bulbous urethra, instrument friction at the penoscrotal angle (as

the instrument moves up and down within the urethra some 800 times), and monopolar current leakage due to insufficient resectoscope insulation^{14,16}. In younger patients, hypospadias surgery is the most important iatrogenic cause. Urethral stricture incidence after hypospadias surgery varies from 2.5% to 11% of patients^{17,18}.

In the present study, Bulbar (53.33%) was the most common etiology by stricture site amongst study population followed by Penile (36.7%), Penile and bulbar (6.67%) and panurethral (3.3%). This findings is in agreement with the study conducted¹⁹ in which bulbar urethra (46.9%), followed by penile (30.5%), penile and bulbar (9.9%), and panurethral (4.9%) strictures. These strictures are more prevalent in the bulbar area.

In the present study, poor stream of micturition (53.33%) was the most common clinical feature amongst study population followed by Incomplete emptying (23.3%), Increased frequency (16.67%), Dysuria (13.33%), acute urinary retention (6.7%), Hematuria (3.3%) and Impotence (3.3%). This finding is in agreement with the study conducted²⁰ in which Weak stream (49%), incomplete emptying (27%) and frequency (20%) were noted to be the most prevalent symptoms for patients (Table 4, Figure 2).

In the present study, Contrast urethrogram (70%) was the most common investigations amongst study population followed by Urethroscopy (30%) and Urine cultures (26.7%). Urethrogram has been the gold standard for urethral stricture diagnosis²¹.

The goal of treatment of a urethral stricture is a patent, continent urethra without jeopardizing any sexual function present. Accordingly, the results were classified as good and poor outcome. Good was when the urine stream was good, no incontinence, retention and no recurrence of symptoms within 6 months. Poor was when there was a poor urine stream after the procedure or incontinence of urine or acute retention of urine.

In the present study, DVIU (43.3 %) was the most common surgery amongst study population followed by Anastomotic urethroplasty (26.7%), Urethral dilatation (20%), and Substitution urethroplasty (6.7%) and Staged urethroplasty (3.3%). Direct Visual Internal Urethrotomy (DVIU) treats the stricture directly by incision. Patients who have superficial spongiofibrosis may benefit from DVIU when the incision is carried out through all depths of the scar²². Predictors of success include stricture length and degree of spongiofibrosis²². According to American urological association²³ that DVIU or urethral dilatation has a long success rate of 50-60% if the above criteria are

met. DVIU success can be improved if urethral dilation is performed greater than 1 year. DVIU can offer an overall stricture free rate of approximately 55% in short, soft bulbar strictures. These have the most favourable outcome, and the likely success rate declines with longer strictures and those in the penile urethra. Whilst these success rates are: significantly lower than those demonstrated by EPA (90%-95%) (Figure 3, Table 5).

In the present study, result of initial management procedure like good urine stream, poor urine stream and acute urine retention was observed in 80%, 13.3% and 6.7% respectively amongst study population (Table 6).

In the present study, Success rate of Anastomotic urethroplasty, DVIU, Urethral dilatation, Staged urethroplasty and Substitution urethroplasty was observed in 87.5%, 58.3%, 50%, 100%, respectively amongst study population. Staged urethroplasty is usually reserved for long strictures especially full length, after previous unsuccessful repair attempts, strictures due to balanitis xerotica obliterans²⁴. This could explain why it was performed as an initial procedure in only 1 patients (Figure 4, Table 7).

The success rate for anastomotic urethroplasty was higher (87.5%) as compared to DVIU (58.3%). This is consistent with previous studies^{23,25}. Urethroplasty is the most effective method for definitive correction of urethral stricture disease and this approach is generally considered to be the gold-standard treatment^{26,27}.

This is due to the fact that in DVIU the wound contraction tries to approximate the edges before epithelization is complete while in anastomotic urethroplasty the area of fibrosis is totally excised and anastomosis is widely spatulated creating a large ovoid anastomosis. Urethral dilatation had a poor outcome as expected²³. Its outcome is usually improved by serial dilatations but in this study many of the patients came back for repeat dilatations only after the recurrence of the symptoms²⁸.

6. Summary

- The most common age group amongst study population was more than 50 years (40%) was followed by 41 to 50 yrs (20%), 31 to 40 yrs (16.7%) and 21 to 30 yrs (13.3%).
- Iatrogenic (40%) was the most common etiology amongst study population followed by Idiopathic (30%), Bacterial urethritis (20%), External Trauma (6.7%) and Lichen sclerosis (3.3%).

- Amongst Iatrogenic causes post catheterization (41%) was the most common etiology amongst study population followed by transurethral prostate resection (25%), Hypospadias correction (25%) and Post cystolithotripsy (8.3%).
- Bulbar (53.33%) was the most common etiology by stricture site amongst study population followed by Penile (36.7%) and Penobulbar (6.67%).
- Poor stream of micturition (53.33%) was the most common clinical feature amongst study population followed by Incomplete emptying (23.3%), Increased frequency (16.67%), Dysuria (13.33%), acute urinary retention (6.7%), Hematuria (3.3%) and Impotence (3.3%).
- Contrast urethrogram (70%) was the most common investigations amongst study population followed by Urethroscopy (30%) and Urine cultures (26.7%).
- DVIU (43.3%) was the most common procedure performed amongst study population followed by Anastomotic urethroplasty (26.7%) and Urethral dilatation (20%), Substitution urethroplasty (6.7%) and Staged urethroplasty (3.3%).
- Result of initial management procedure like good urine stream, poor urine stream and acute urine retention was observed in 80%, 13.3% and 6.7% respectively amongst study population.
- Complications of anastomotic urethroplasty like anastomotic stricture, erectile dysfunction and bleeding post operatively was observed in 12.5% , 12.5% and 12.5% respectively amongst study population.
- Complications of DVIU like bleeding post operatively and UTI was observed in 7.7% and 7.7% respectively amongst study population. .
- Complications of urethral dilatation (POS) like false passage, bleeding post operatively was observed in 16% and 16% respectively amongst study population.
- Success rate of Anastomotic urethroplasty, DVIU, Urethral dilatation, Staged urethroplasty and Substitution urethroplasty was observed in 87.5%, 58.3%, 50%, 100%, respectively amongst study population.

7. Conclusion

Urethral stricture disease is common and accounts for substantial morbidity and cost to the medical system. Our

results showed that iatrogenic and idiopathic strictures are surprisingly common. Avoiding unnecessary urethral catheterization and repeated urethral instrumentation can reduce these iatrogenic strictures. Diagnosis and planned repair of strictures involves the use of imaging modalities, amongst which contrast urethrograms was the most common imaging modalities followed by Urethroscopy. Several methods are available for managing strictures, including Anastomotic urethroplasty, DVIU, Urethral dilatation, Staged urethroplasty and Substitution urethroplasty. Anastomotic urethroplasty had higher success rate as compared to DVIU and urethral dilatation.

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