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Original Research Article

A clinical study of evaluation of different modalities of treatment and etiologies of stricture urethra

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ABSTRACT

Background: Urethral strictures are a common urological problem presenting in day to day urological practice. There has been change in the etiology of urethral strictures with traumatic one's accounting for majority of them in recent times. Newer treatment modalities like VIU and various kinds of urethroplasty have revolutionized its management and significantly contributed towards improvement of quality of life among these patients. The objective for this study were to study the various aetiologies and different modalities of treatment for urethral strictures.
Methods: A 23 cases of urethral strictures aged 5-75 years admitted in the surgical wards of KIMS, Hubballi were included in the present study. Mean age of presentation was 34.5 years. Detailed history and physical examination were recorded. Relevant investigations like ASU and MCU were performed and recorded. These patients were treated by various surgical procedures considered appropriate as per the patient individual needs.
Results: Mean age was 34.5 years in the present study. Most of the patients presented with obstructive voiding symptoms, straining (65.1%) and poor stream (56.4%). Majority of strictures were of traumatic etiology (60.8%) followed by inflammatory (34.7%) and iatrogenic strictures (4.3%) in the present study. Bulbar urethra was the most commonly involved site (65.1%) followed by posterior urethra (30.4%), penile urethra (17.4%) and meatal stricture (4.3%). Most of the patients presenting with retention of urine were managed by SPC. Both VIU and urethroplasty had good success rates of 72.7% and 80% respectively.
Conclusions: Most of the strictures were of traumatic etiology. VIU and urethroplasty were found to be effective means of treating urethral strictures.

Keywords: Etiology, Evaluation, Stricture urethra, Treatment

INTRODUCTION

Urethral injury is a scar, the natural result of urethral injury or destruction. A scar tends to contract length wise and if it's arranged in a circle, scar contracture shortens the circumference of the circle and hence the area of lumen.[1] Of all the skills which a surgeon must acquire, perhaps there is none which demands so much deftness and gentleness as the proper dilation of a urethral stricture. Strictures of urethra have always posed a challenge to urologist and surgeons. Urethral stricture is one of the common causes of bladder outflow obstruction. These strictures manifest as weak stream, hesitancy, straining, dribbling, retention etc., and are therefore responsible for psychological and social trauma to the patients.[2] Any process that injures the urethral epithelium or the underlying corpus spongiosum to the point that healing results in a scar can cause an anterior urethral stricture. Posterior urethral distraction injuries, traumatic by definition, results in strictures that are associated with extensive fibrosis interposed between the distracted ends of the urethra.[3]

Inflammatory strictures following inadequately treated gonorrhea occur due to infection persisting in the peri urethral glands which spreads to peri glandular tissue. This peri glandular tissue is infiltrated with round cells and fibroblasts. Gradually the infiltrated the peri urethral tissues contrast with the formation of scar tissue, localized thrombophlebitis of the corpus spongiosum playing a part in the denser varieties. Most strictures develop during the first year after gonorrheal infection, but they may not give rise to difficulty in maturation for 10 to 15 years. Multiple strictures are relatively common with the deepest being the narrowest.[2] BXO usually begins with inflammation of the glans and inevitably causes meatal stenosis if not a true stricture of fossa navicularis. The progression of the stricture to eventually involve the entire anterior urethra may be due to high pressure voiding that causes intravasation of urine into the glands of Littre, inflammation of these glands and perhaps micro abscesses and deep spongiofibrosis.[3] In urethral distraction injuries, although it is possible to totally disrupt the urethra with a straddle injury, these injuries most commonly involve only the bulbous urethra. However, the ensuing spongio-fibrosis can be associated with complete obliteration of the urethra. The most frequent point of distraction is at the departure of membranous urethra from the bulbospongiosus.

The distraction can however involve all or any portion of the membranous urethra between the departure of the bulbospongiosus and the apex of the prostate.[3] It was popular belief in the past that once a stricture always a stricture. Now, it is almost always possible to repair or substitute the hopelessly injured urethra and that there now hardly exists an indication for a permanent supra-pubic diversion because of stricture. In the past few decades newer modalities of therapy have come up due to better understanding of the pathophysiology of urethral strictures. There has been introduction of numerous modifications so basic procedures based on principles of regeneration, resection anastomosis and substitution, each having its own merits and demerits. In the present study an attempt was made to evaluate cases of stricture urethra for their etiologies and various treatment modalities.

METHODS

A prospective study was design study was carried out in surgical wards of Karnataka Institute of Medical Sciences, Hubballi, Karnataka, India.

During the study period, the sample size was possible to include 23 patients presenting with features of urethral strictures. Present study was carried out from April 2004 to March 2005.

Inclusion criteria

- Patients with confirmed diagnosis of stricture urethra,
- Admitted for operative treatment.

Exclusion criteria

- Patients with stricture urethra with associated co morbid conditions where surgery was deferred,
- Patients not willing for surgery.

This prospective study included 23 patients presenting with features of urethral stricture who were admitted in surgical wards of Karnataka Institute of Medical Sciences, Hubballi, Karnataka, India. Detailed history was recorded from the patients and thorough clinical examination was performed. The findings were recorded in the proforma. Diagnosis of urethral stricture was suspected on the basis of symptoms like difficulty in voiding, weak stream, dysuria, increased frequency etc. past history of trauma, instrumentation and surgery to the urethra provided clue to the diagnosis. Meatal stenosis, palpable stricture, evidence of operative scar (supra pubic cystostomy, perineal scar) distension of bladder etc, aided the diagnosis. Hemoglobin percentage, urine for gross, microscopy and culture and sensitivity, blood urea and serum creatinine levels were the basic investigations done for all the patients. Blood sugar levels, serum for VDRL, Chest X-ray and ECG were done when indicated.

In patients where the clinical diagnosis of urethral stricture was made, a maturating cystourethrogram (MCU) and ascending urethrogram (ASU) were performed. Ultrasonography of abdomen and or X ray KUB was done when required. Endoscopic assessment was done in some patients. Since we do not have the facilities of rurodynamic studies, we had to rely mainly on patient's symptoms, MCU, ASU and endoscopic findings to evaluate the nature and degree of bladder outflow obstruction and improvement in it. Patients who presented with acute retention of urine were initially treated with catheterization and in those patients in whom it was not possible to pass a catheter, supra pubic cystostomy was done. The surgical methods employed were as per the standard procedure described for a particular condition.

Statistical analysis

The data was analyzed using proportions.

RESULTS

Table 1 shows distribution of study subjects as per age. Majority of the patients with stricture urethra were seen in the age group of 20-30 years as well as 30-40 years of age group i.e. seven patients in these two age groups each. There were three patients (13.04%) in the age group of 10-20 years. There was only one patient in the age group of 0-10 years.

There were two patients in the age group of 40-50 years of age. There was one patient in the age group of 50-60 years of age. The youngest patient was of five years old and the oldest patient was of 75 years of age.

Table 1: Distribution of study subjects as per age.

Age (years)	Number	Percentage
0-10	1	4.34
10-20	3	13.04
20-30	7	30.38
30-40	7	30.38
40-50	2	8.68
50-60	1	4.34
60-70	1	4.34
70-80	1	4.34
Total	23	100

The average age of incidence of stricture of the urethra was noted to be 34.5 years.

Table 2: Presenting symptoms of the stricture of the urethra.

Symptoms	Number	Percentage
Straining	15	65.1
Weak stream	13	56.4
Dysuria	10	43.4
Increased frequency	10	43.4
Burning maturation	10	43.4
Urgency	6	26.04
Retention of urine	10	43.4
Urethral discharge	4	17.4

Table 2 shows presenting symptoms of the stricture of the urethra. Straining, weak stream, dysuria, increased frequency and burning maturation were the commonest symptoms. Straining was seen in 15 (65.1%) patients. This was followed by the symptom in 13 (56.4%) of the cases.

Table 3: Various etiologies of the urethral strictures.

Etiology	Number	Percentage
Trauma	14	60.8
Inflammatory	8	34.8
Iatrogenic	1	4.4
Total	23	100

Dysuria, increased frequency, burning maturation and retention of urine was seen in 10 (43.4%) cases each. Six cases presented with urgency of urine. Four cases presented with urethral discharge. Most of the patients presenting with acute retention of urine had urethral stricture of traumatic etiology while very few patients of inflammatory stricture presented with retention. More than 75% of the patients had two or more symptoms. Table 3 shows various etiologies of the urethral strictures. The most common cause of the stricture of the urethra was found to be the trauma in 14 cases i.e. 60.8% of the cases. Next most common cause was inflammatory in nature i.e. in 8 cases which amounted to 34.8% of the cases. In the present study, author encountered one case of stricture of the urethra of iatrogenic etiology. Thus, the trauma was the most common cause of the stricture of the urethra.

Table 4: Distribution of cases as per the various sites.

Site of structure	Number	Percentage
Posterior	7	30.4
Bulbar	15	65.1
Anterior (penile)	4	17.4
Meatal	1	4.3

Table 4 shows distribution of cases as per the various sites. From the table, it is evident that urethral strictures were most common seen in the bulbar part of urethra (65.1%), posterior urethra being the next common site in 30.4% of the cases. Penile urethral strictures were seen in 17.4% of the cases and meatal stenosis was seen in one case i.e. 4.3% of the cases. Also, four patients (17.4%) had stricture involving more than one part of urethra. Most of the inflammatory strictures were either in the bulbar or penile urethra or involving both. Most of the posterior urethral strictures were of traumatic etiology but bulbar urethra was the most commonly involved site in the stricture urethra of traumatic etiology in nine cases.

Table 5: Distribution of the cases as per the various complications encountered.

Complications	Number	Percentage
Urethral diverticulum	1	4.3
Vesicle calculus	2	8.6
Urethral fistula	2	8.6

Table 5 shows distribution of the cases as per the various complications encountered. Out of 23 cases studied, only five patients had complications.

Out of these five patients who had various complications, it was found that one case had urethral diverticulum. Two cases had vesicle calculus and two cases had urethral fistula. Overall the rate of complications was very low as per the present study findings. Table 6 shows initial management of retention with strictures. Out of 23 patients who were studied as cases in the present study, 10 were found to have presented with the retention of the urine.

These 10 patients underwent initial treatment. Out of these 10 patients, eight patients were treated initially by using the supra pubic cystostomy technique.

Table 6: Initial management of retention with strictures (N = 10).

Initial treatment	Number	%
Catheterization	02	20
Supra pubic cystostomy	08	80
Total	10	100

Other two patients were treated initially by doing catheterization. Thus, most of the patients required supra pubic cystostomy in the present study who were presented to us with retention of the urine

Table 7: Various treatment modalities used for stricture urethra.

Treatment method adopted	Number	%
Visual internal urethrotomy	11	47.7
Urethroplasty	12	52.3
Total	23	100

Table 7 shows various treatment modalities used for stricture urethra. Out of 23 patients studied in the present study who were found to have the diagnosis of the stricture of the urethra, 11 patients were operated using visual internal urethrotomy technique. 12 patients of the stricture of the urethra were operated using urethroplasty technique. Thus, majority of the patients underwent urethroplasty and then followed by visual internal urethrotomy. But the difference in the numbers is apparently does not seem to have any statistical significance as the numbers are 11 and 12 respectively.

Table 8: Incidence of recurrence after various treatment modalities of the present study.

Procedure used	No.	Recurrence	
		Number	%
Visual internal urethrotomy	11	3	27.2
Urethroplasty	12	2	16.7
Total	23	5	21.7

Table 8 shows incidence of recurrence after various treatment modalities of the present study. The overall incidence of the recurrence was found out to be 21.7% i.e. in five cases out of 23 cases. The recurrence rate was more i.e. 27.2% when visual internal urethrotomy procedure was adopted compared to the recurrence rate of 16.7% i.e. in only two cases when the urethroplasty technique was adopted. Out of 11 patients treated with visual internal urethrotomy, three patients had recurrence of stricture and one patient was lost to follow up. After three failed attempts of VIU, these patients were treated with Blandy's flap urethroplasty in two patients and excision and anastomotic urethroplasty in one patient. Among the twelve patients treated with urethroplasty, two had recurrence of stricture and three patients were lost to follow up. These two patients with recurrence were treated with urethroplasty.

DISCUSSION

Urethral strictures have always posed a challenge to surgeons who over decades have attempted to tackle this problem. There has been a change in the etiology of urethral strictures in recent times, with a decrease in the number of inflammatory strictures. Various modalities of treatment have evolved over time with major advances in recent decades.[3]

In the present study, 23 patients were admitted in surgical wards with urethral stricture evaluated and treated with various modalities.

In the present study, the commonest age group of patients presenting with urethral strictures was between 20-40 years, mean age of presenting was 34.5 years. A study by Sandozi S et al, showed that the mean age of presentation was 44.8 years in their study and Heyns CF et al, showed that the average age of patients with stricture was 48 years. The high incidence of stricture during this age group was due to young individuals being more prone to accidental injuries and exposure to gonococcal infection.[4-6]

Most of the patients in our study presented with obstructive voiding symptoms like straining (65.1%) and poor stream of urine (56.4%). Significant number of patients also presented with retention of urine. (43.4%). This correlates well with literature which states that most of the patients present with obstructive voiding symptoms. Also, more than 75% of the patients presented with more than two symptoms.[3]

The main etiological factor in this series was found to be traumatic seen in 14 patients (60.7%). The rest of the cases were of inflammatory origin (34.7%). We encountered just one case of iatrogenic stricture urethra. Traumatic injuries were most commonly due to accidents. In their study, Sandozi et al, reported that iatrogenic etiology constituted 39.9% followed by inflammatory strictures (19.6%) and traumatic (9.1%). Bhandari et al, in their study reported that 86.4% of strictures were of inflammatory etiology and 13.6% were of traumatic etiology.[4,6,7]

Today most of the urethral strictures, of both anterior and posterior urethra are due to trauma. The decrease in the incidence of inflammatory urethral strictures in recent years is due to the advent of effective antibiotics. Unfortunately, iatrogenic trauma to urethra still exists, but with the development of small endoscopes, fewer iatrogenic strictures are seen today than in the past.[3]

In this study, the most common site of involvement of stricture was the bulbar urethra in 15 patients (65.1%) followed by posterior urethra in seven patients (30.4%). Penile urethral stricture was seen in four patients and meatal stricture in one patient, one patient involving both. Fenton et al, in their study have shown bulbar urethra to be the most common site of anterior urethral strictures.[8] Most of the posterior urethral were of traumatic etiology, but bulbar urethra was the most commonly involved site in stricture urethra of traumatic etiology (9 cases). This correlates well with the study of Park et al, who concluded that after blunt straddle injury the primary morbidity was anterior urethral stricture.[9] Most of the

posterior urethral strictures were of traumatic etiology and just one patient had inflammatory etiology. This correlates well with the study of Koraitim et al, who reported that 87% of posterior urethral strictures were traumatic and 13% inflammatory.[10]

Also, four patients had involvement of more than one site.[8-10] In the present study five patients had complications of urethral stricture. One patient had urethral diverticulum, two patients had vesicle calculus and two more had perineal urethral fistula. In the present study, ten patients presented with acute retention of urine for which eight patients underwent supra pubic cystostomy and two patients were catheterized periurethral. This correlates well with the study of Park et al, in which initial acute management was supra pubic cystostomy in 81% of the cases.[9]

In the present study, out of 23 patients, 11 patients were treated with VIU and 12 patients with urethroplasty. Most of the patients treated with VIU had short segment bulbar urethral stricture and three patients had posterior urethral stricture. This is in accordance with the study by Antony et al, in which 80% of the patients were treated by VIU had bulbar urethral stricture.[11] Six patients required one urethrotomy, two required 1-3 urethrotomies and three patients had recurrence after three VIUs.

Present study correlates with studies of Antony J et al, and Pansadoro et al, who reported moderately long-term success rate of 85% and 74% respectively. But this study had the limitation of shorter follow up ranging from 3-9 months, whereas studies by Antony J et al, and Pansadoro et al, had mean follow up of up to three years and eight years respectively.[11,12]

In the present study, twelve out of twenty-three patients underwent urethroplasty for repair of stricture urethra. Most of the patients underwent Marion's excision of stricture segment and re-anastomosis in ten out of twelve patients and two patients had buccal only urethroplasty. Of the ten patients treated by anastomotic urethroplasty eight patients had no recurrence indicating a success rate of 80% which correlates well with the study by Bhandari et al, who quoted success rate of 87.5% in their study.[13]

CONCLUSION

It is a mistake to look upon the various types of urethroplasty and visual urethrotomy as competitive with each other or to speak of one versus another for a particular case of stricture. Actually, these procedures should be considered as different complementary means available for the cure of different types of strictures each with its indications as well as limitations. Hence, it is essential to thoroughly evaluate the stricture and then selectively institute such modality of treatment which is suitable to that patient.

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