Original Research Article

A Study of Etiology, Clinical Presentation, Management Procedures, and Complications in Patients with Urethral Stricture at a Tertiary Care Hospital

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Abstract

Background: Uethral stricture is narrowing of a segment of the urethra which is surrounded by corpus spongiosum. The overall incidence of stricture disease varies from 0.6% to 0.9% worldwide. Urethral stricture obstructs lower urinary tract, causes micturition disturbances, can also damage the entire urinary tract, resulting in loss of renal function. In present study we aimed to study etiology, clinical presentation, management procedures and complications of urethral stricture at a tertiary hospital. **Material and Methods:** Present study was single-center, prospective, observational study, conducted patients diagnosed to have urethral strictures, underwent initial management during the study period and willing to participate. Patients treated by dilatation, Direct vision internal urethrotomy (DVIU), open surgery (urethroplasty). b This study included 50 patients of male and female genders of different age groups. Male to female ratio was 3.55 : 1. Maximum patients (32%) were from the age-group 31-40 years with mean age of 45.7 +16.59 years. Causes of urethral stricture in most of the patients were infections (30%) and trauma (50%). Most patients are treated by the serial urethral dilatation (58%). Other procedures were visual internal urethrotomy (VIU) (26%) and surgery including buccal mucosal graft (BMG) urethroplasty (16%). Postoperatively out of 50 patients 7 patients experienced Pain [14%] and 43 patients doesn't have pain in postoperative period. [86%]. About 8 patients have fever in postoperative period [16%] and hematuria is seen in 18 patients [36%]. **Conclusion:** Trauma and infections were the leading cause of urethral stricture. Visual Internal Urethrotomy and urethroplasty were the mainstay of treatment with satisfactory outcome.

Keywords: Trauma, infections, urethral stricture, visual internal urethrotomy, urethroplasty

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INTRODUCTION

Urethral stricture is the preferred term for narrowing of a segment of the urethra which is surrounded by corpus spongiosum, i.e., urethral meatus to bulbar urethra.[1] The severity of a urethral stricture is related to the amount of damage to the corpus spongiosum, the investing vascular layer of the urethra, resulting in a progressive process termed spongiofibrosis.[2] Urethral stenosis is the term for narrowing of the urethra lumen that is not surrounded by corpus spongiosum, specifically the membranous and prostatic urethra.[1] Usually, the stenosis is not progressive, like spongiofibrosis, and the extent of obliteration or narrowing of the lumen determined at the time of the traumatic or iatrogenic insult. Urethral stricture is a relatively common disease in men with an associated prevalence of 229-627 per 100,000 males, or 0.6% of the at risk population, who are typically older men.[3] The overall incidence of

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stricture disease varies from 0.6% to 0.9% worldwide.[4] Patients with urethral stricture are considered a vulnerable population as they experienced high rates of UTIs (41%) and incontinence (11%) as sequelae of the disease.[4,5] A study from a tertiary center from Eastern India reported on aetiology from over 400 patients over many years and reported iatrogenic as the most frequent cause. Urethral catheterization was a more frequent cause in this population.[6] A urethral stricture is a narrowing of the urethra caused by scarring, which functionally has the effect of obstructing the lower urinary tract. The consequences of this obstruction can enormously impair the patient's quality of life by causing micturition disturbances; they can also damage the entire urinary tract, resulting in loss of renal function. It is therefore essential that urethral strictures, which can occur at any age, gender should be recognized early and appropriately treated. In present study we aimed to study etiology, clinical presentation, management procedures and complications of urethral stricture at a tertiary hospital.

MATERIAL AND METHODS

Present study was single-center, prospective, observational study, conducted in Department of Urology, Siddhartha Medical college, Karnataka, India. Study duration was of 18 months. Study was approved by institutional ethical committee. Patients visiting as outpatient at surgery OPD and at emergency in tertiary care hospital were considered under study.

INCLUSION CRITERIA

Patients diagnosed to have urethral strictures, underwent initial management during the study period and willing to participate.

EXCLUSION CRITERIA

- Patients whose record were not available
- Patients who were not followed up in the OPD for at least 6 months after the initial procedure.
- Patients unwilling to give their consent.

Patient were evaluated by hematological investigations (complete blood count, liver function test, kidney function test, serum electrolytes, serum proteins, serum calcium, blood group), HIV, HbsAg and Radiological investigations (ultrasonography of abdomen and pelvis, conventional IVU, X-ray KUB and whenever needed CT-IVP) After pre-anesthetic fitness patient were posted for surgery. After discussion with patients and relatives, a written informed consent of patient taken. Patients treated by dilatation, Direct vision internal urethrotomy (DVIU), open surgery (urethroplasty). Operative details, intra operative complications, post-operative complications such as hemorrhage trauma to the urethra, hematuria stricture, hospital stay, relief of symptoms and follow up findings were noted. Stricture was confirmed by postoperative MCU.

Statistical analysis was done using descriptive statistics (frequency, percentage).

RESULTS

In the present study, we assessed prospectively the effectiveness of Open surgery and VIU for treatment of urethral stricture. This study included 50 patients of male and female genders of different age groups. Gender distribution in the current study was 78% males and 22% female. Male to female ratio was 3.55: 1 In the present study, out of 50 study subjects maximum 16 (32%) were from the age-group 31-40 years followed by 11 (22%) study subjects from the age-group of 41-50 years with mean age of 45.7 ±16.59 years.

Table 1: Age wise Distribution of patients according to sex.

Age (years)	Males	Female	Total	Percentage
1-10	1	0	1	2%
11-20	2	0	2	4%
21-30	3	0	3	6%
31-40	14	2	16	32%
41-50	8	3	11	22%
51-60	1	4	5	10%
61-70	7	1	8	16%
71-80	3	1	4	8%
Total	**39**	**11**	**50**	**100%**

Table 2: Etiology distribution

Etiology	No of patients	Percentage
Infection	15	30
Trauma	25	50
Iatrogenic / Instrumentation	5	10
BXO / spongiofibrosis	5	10

In current study 80 % patients presented with the symptom of sense of incomplete evacuation of urine other symptoms were straining and dribbling during micturition pain, fever and hematuria. In current study 11 patients are vegetarian diet [22%] and 39 patient have non-vegetarian diet [78%]. 46 patients (92%) normal KFT profile and most of the patients had hemoglobin more than or equal to 10 gm%. (96%)

Table 3: Symptoms and diet distribution with percentage

Symptoms	No of patients	Percentage affected
Sense of incomplete micturition	40	80%
Straining	35	70%

Pain	31	62%
Fever	10	20%
Hematuria	10	20%
Diet		
Vegetarian	11	22%
Non vegetarian	39	78%
Biochemical profile		
Normal KFT	46	92%
Normal hemoglobin values	48	96%

All the patients are ope4ated under Local / Spinal / Intravenous sedation anesthesia. Most of the patients requiring urethral dilatation and visual Internal Urethrotomy were operated under local anaesthesia and intravenous sedition (84%). Remaining 16% of patients who underwent BMG urethroplasty were given spinal anaesthesia. Most patients are treated by the serial urethral dilatation (58%). Other procedures were visual internal urethrotomy (VIU) (26%) and surgery including buccal mucosal graft (BMG) urethroplasty (16%).

Post-operative complications affect the hospital stays of patients. In current study, 42 patients including 31 male and 11 females stayed for less than 5 days while only 8 male patients stayed for more than 5 days.

Table 4: Operative characteristics

Characteristic	No of patients	Percentage
Anaesthesia given		
Local Anaesthesia + IV sedation	42	84%
Spinal Anaesthesia	8	16%
Procedure		
Serial urethral dilatation	29	58
Visual Internal urethrotomy	13	26
Open surgery	8	16
Hospital stay (days)		
≤ 5	42	84%
> 5	8	16%

In the study, out of 50 patients,1 female and 5 males noted to require 30 min while 6 males and 4 females required 45 min for operation. 60 min time was utilized for the surgery of 5 female and 23 males

Table 5: Time required for operation

Time required [min]	Male	Female	Total
30	5	1	6
45	6	4	10
60	23	5	28
75	1	1	2
90	4	0	4

In current study intraoperative complications occurred are mucosal injury and urethral bleeding and poor vision during cystoscopy. Bleeding was managed by normal saline irrigation during the surgery. No patient had urethral perforation. Postoperatively out of 50 patients 7 patients experienced Pain [14%] and 43 patients doesn't have pain in postoperative period. [86%]. About 8 patients have fever in postoperative period [16%] and hematuria is seen in 18 patients [36%]

Table 6: complications

Complication	No of patients	Percentage
Intraoperative complications		
Mucosal injury	05	10
Bleeding /poor vision	15	30
Perforation	00	00
Postoperative complications		
Pain	7	14%
Fever	8	16%
Hematuria	18	36%

DISCUSSION

Almost all urethral strictures for which a cause can be identified are acquired8,9. The largest group (45%) are iatrogenic and result from urethral manipulations (traumatic indwelling catheter, transurethral interventions, correction of hypospadias, prostatectomy, brachytherapy).[7,8] Another cause of urethral stricture is traumatic urethral rupture associated with pelvic fracture. Bacterial urethritis can also lead to stricture (around 20% of cases); classically, these are cases of untreated gonorrhea. Another inflammatory disease associated with (distal) urethral stricture is balanitis xerotica obliterans, a chronic inflammatory disease whose exact etiology is unknown.[9] Around 30% of urethral strictures are idiopathic8. In these cases the most likely trigger is considered to be some forgotten minor trauma that occurred a long time in the past (e.g., perineal injury while riding a bicycle).[10] In present study, gender distribution in the current study was 78% males and 22% females. Male to female ratio in this study was 3.55:1. In study done by O.N. Ekeke*etal*,[11] there was a male preponderance with a male-to-female ratio 31.3:1 in 194 patients. A study done by Nyongole Obadia Venance[12] found that out of 111 patients, 39% were above 60 years, while 27% were patients in age group 45-60years and mean age of the patients was 48 ± 9.24 years. Similar findings were noted in present study. In the present study, Most of the patients are treated by the serial urethral dilatation (58%). Followed by visual internal urethrotomy (26%) and urethroplasty (16%). A study done by Nyongole Obadia Venance[12], DVIU constituted 64% of the provided treatments followed by primary (one stage)

urethroplasty (26%) then multistage urethroplasty (6%), while dilatation accounted 2%. Dr. K. Subramaniyan[13] noted that out of 40 patients, 4 underwent Optical internal urethrotomy, 30 underwent Perineal end to end urethroplasty and 6 patients underwent transpubic urethroplasty. In study by O.N. Ekeke *etal.*,[11] urethroplasty (48.98%) was most common procedure followed by direct vision internal urethrotomy (DVIU) (31.44%), serial urethral dilatation (19.07%) had and 1 patient with malignant urethral stricture had total penectomy. In current study intraoperative complications occurred are mucosal injury and urethral bleeding and poor vision during cystoscopy. Bleeding occurred was overcome by normal saline irrigation during the surgery. No patient had urethral perforation. K. Subramaniyan[13] 2 patients had associated bladder injuries, repaired and SPC diversion was done. 2 patients had only urethral injuries with huge retropubic pelvic hematoma, , managed by only SPC diversion and later planned for definitive repair. In present study postoperatively out of 50 patients 7 patients experienced Pain [14%] and 43 patients doesn‘t have pain in postoperative period. [86%]. About 8 patients have fever in postoperative period [16%] and hematuria is seen in 18 patients [36%] And no patient have reported for post- operative stricture formation. O.N. Ekeke*etal.*,[11] noted that 21.64% patients had various types of post-operative complications. 11.3% had re-stricture and 3.6 % patients (epididymoorchitis in 2 patients who had DVIU while 5 patients had surgical site infection following urethroplasty). Bleeding occurred in 6.70% patients (in 4.12% patients who had DVIU). Also 4 patients had bleeding after urethral dilatation though these were minimal and 4 patients had re-stricture due to poor compliance with dilatation schedule. Post-operative complications affect the hospital stays of patients. In current study, 42 patients including 31 male and 8 females stayed for less than 5 days while only 8 male patients stayed for more than 5 days. Thus, the data demonstrated that urethral dilatation and the Visual internal urethrotomy is good option to minimize the operation time and also the post-operative hospital stay of these patients than the open surgery. Most patients can be discharged from the hospital on the second or third postoperative day with the indwelling catheter in place. At that moment, instructions for wound care should be provided, which are specifically important in patients with a perineal wound.[14] K.Subramaniyan[13] noted 50% success rate in Optical internal urethrotomy, 83.33% success rate in Perineal end to end urethroplasty and 83.33% success rate in Transpubic urethroplasty. According to MM Koratim *et al.*[15] the success rate of perineal urethroplasty was 95%. For transpubic urethroplasty the success rate was 95- 98%. DVIU represents the basis of endoscopically treating urethral strictures, involves an intervention which is guided by the direct vision of the surgeon. The sole indication for DVIU is a primary, isolated, short (<1.5 cm), bulbar urethral stricture.[16,17] DVIU for primary urethral strictures <1.5 cm entails the best surgical outcome, with success rates ranging up to 80% in case of strictures <1 cm[18] Limitations of present study were small sample size and short follow up. Larger sample studies with adequate follow-up are required to confirm findings.

CONCLUSION

Trauma and infections were the leading cause of urethral stricture. Visual Internal Urethrotomy and urethroplasty were the mainstay of treatment with satisfactory outcome. Direct visual internal urethrotomy is relatively new, and has been gaining acceptance for single, short segment urethral stricture. The use of uroflowmetry and other imaging studies have provided objective assessment of the success rate.

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