

Pattern of Presentation and Management of Male Urethral Strictures in A Resource-Limited Community: Challenges and Outcome

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ABSTRACT

Background: Urethral stricture is an unnatural narrowing or loss of urethral compliance due to spongiosclerosis that leads to bladder outflow obstruction. Its management is still a great challenge in our region. **Objectives:** To share our experience about urethral strictures managed in a rural tertiary health center in Nigeria. **Method:** Retrospective study of urethral strictures managed over 5-year period at a tertiary health center in Nigeria. Only Patients that had surgical procedures for urethral stricture with at least one post-op follow-up were included. Age, stricture characteristics, and treatment outcome were analyzed. **Results:** Only 74 out of 91 patients have complete records, hence selected and studied. Their mean age was 49.66yr (± 19.41), the principal symptom was a weak urinary stream (86.49%), with acute urine retention in 56.76%. Suprapubic cystostomy was done in 77.03%. The strictures were post-inflammatory (60.81%), Post-traumatic (27.03%) and recurrent (10.81%). The strictures were predominantly bulbar (55.41%). The median duration of symptoms to the time of presentation was 135days. Majority (55.41%) had anastomotic urethroplasty. Post-op complications were seen in 43.24%. Most patients (77.03%) had no significant lower urinary tract symptoms at a median (interquartile range) of 58days (37 to 135) postoperative period. There was a significant improvement in median international prostate symptom score at 6 weeks, 6 months, and 1 year after surgery compared to pre-operative symptoms. **Conclusion:** Financial constraints, inadequate facilities and specialists are the major challenges. Increased patients' health awareness, universal (free or subsidized) healthcare coverage may help in alleviating some of the challenges.

Keywords: urethral stricture, lower urinary tract symptoms, international prostate symptoms score, acute urine retention

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Introduction

Urethral stricture is defined as abnormal narrowing or loss of compliance due to spongiosclerosis leading to bladder outflow obstruction. Its prevalence was put at 0.6% of the at-risk population¹ in the United States of American (USA). In developed countries, aetiology of strictures has since been dominated by iatrogenic and other traumatic causes.^{2,3} In sub-Saharan Africa there is a paucity of data about the epidemiology of strictures with a mixed picture of dominant etiologies of strictures⁴, few reports at urban centres such as the ones by Tijjani et al⁵ and Heyns et al⁶ and Ekeke⁷ revealed trauma as dominant cause, while the majority of reports including the recent ones revealed dominance by post-inflammatory strictures.^{8,9,10,11,12} Management of urethral stricture can be quite challenging especially to the patients in poor resource communities. There is noticeable migration from open surgery (urethroplasty) to minimally invasive surgery such as direct vision internal urethrotomy (DVIU) in developed countries which coincides with the dominant iatrogenic and traumatic type of strictures

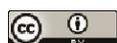
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managed in the region⁶, but the trend remains open surgeries in most poor resource regions.¹³ In Nigeria, in 2016, the cost of treating urethral stricture ranges from N100,000 (\$6,000) to N200,000 (\$12,000) depending on the type of hospital, this cost is more than 5 times the minimum wage in the country. Moreover, due to inadequate health insurance cover in most developing countries including Nigeria, patients have to pay out of pocket to get treated. Even though the prevalence of this disease may be reported as high in poor resource communities, there is still paucity of data on the epidemiology of urethral strictures in these regions.⁴ This study aims to share the experience of our patients' presentation and management of urethral strictures in a rural tertiary health center in Nigeria.

Method

It was a 5 years retrospective study of patients managed for urethral stricture between January 2015 and December 2019. Ethical clearance was obtained from the research and ethics committee of the hospital. Data were retrieved from case notes, registers in accident and emergency, theater, out-patient unit, and wards. Information retrieved included socio-demography variable, clinical presentation, radiological features of the stricture, duration of symptom before presentation, duration between presentation and confirmation of diagnosis, and treatment. The type of treatment offered, and the postoperative outcomes were retrieved. Only patients who had any form of urethral stricture treatment and had at least one follow-up visit after treatment were included. The outcome was measured based on the international prostate symptom score (IPSS) before and after surgery. Success is defined as normal voiding with IPSS score < 8 after removal of the catheter while failure is when there is need of intervention after a single attempt at DVIU or urethral calibration, or IPSS >10. Complication was weighted based on modified Clavien-Dindo classification system.¹⁴

Data were collected and analyzed using Stata® (Stata Statistical Software: StataCorp LLC, 2019. Version 16. Lakeway Drive College Station, TX: 77845 USA.). Descriptive statistics were presented in the form of frequencies, percentages, and proportions for categorical variables. While means and standard

deviations for normally distributed continuous variables, and medians and interquartile range (IQR) for non-parametric continuous variables were used. Statistical significance was defined as a p value < 0.05.

Results

In Total, 91 patients had the diagnosis of urethral stricture, out of which, records of 12 patients were missing and 5 patients had incomplete records. Seventy-four patients were finally analyzed. All patients were males with a mean age (\pm SD) of 49.66yr (\pm 19.41) and an age range of 4yrs to 85yrs. There were 6 Children \leq 15yr (8.11%) seen in this study. The predominant presenting symptom was a weak urinary stream which was seen in 64 (86.49%) patients, while 42 (56.76%) patients had acute urinary retention (AUR) at presentation. Suprapubic cystostomy was done on 57 patients (77.03%) for varying indications. Most of the stricture, 45 cases (60.81%) were post-inflammatory, while 8 patients (10.81%) came with recurrence stricture mainly after anastomotic urethroplasty. Half of the patients (37 patients) came with various forms of complications at presentation as shown in Table 1. The strictures were predominantly bulbar, 41 cases (55.41%), with median length (IQR) on retrograde urethrogram of 3 (2 to 5) cm as shown in Table 2. The median (IQR) duration of symptoms before presentation, presentation to retrograde urethrogram (RUG), and RUG to surgery was 135 (15 to 720), 52 (22 to 118), and 48 (27.75 to 95.25) days respectively, as shown in Table 3. Most of the patients, 41 cases (55.41%) had anastomotic urethroplasty, while the rest had Buccal Mucosal Graft (BMG) and Quartey urethroplasties as shown in Figure 1. Postoperative complications were seen in 32 patients (43.24%) most falls into modified Clavien-Dindo grade II as depicted in Table 4. Most of the patients, 57 (77.03%) had Lower Urinary Tract Symptoms (LUTS) at a median (IQR) follow-up of 58days (37 to 135) postoperative period. There was a significant improvement in median IPSS before surgery when compared at 6 weeks, 6 months, and 1 year after surgery. However no improvement in median IPSS was observed in the patients at 3yrs follow-up as shown in Table 5, this means that the IPSS of the 4 patients remained almost the same before surgery and after 3 years of urethroplasty (that is, no improvement).



Table 1: Patients' demographics and pre-operative characteristics

Total Number of patients	n=74
Biodata	
Age	
Mean (\pm SD) years	49.66(\pm 19.41)
Range (years)	4 - 85
Age group	
Children	6(8.11%)
Adult	68(91.89%)
Presentation	
Weak urinary stream	64 (86.49%)
AUR at presentation	42(56.76%)
Urethrocutaneous fistula	10(13.51%)
Aetiology of stricture	
Post-inflammatory	45 (60.81%)
Post-traumatic	20(27.03%)
Recurrent	8(10.81%)
Catheter induced	1(1.35%)
Total	74
Complications at presentation before urethroplasty.	
Urosepsis	16(21.62%)
Urethrocutaneous fistula	10(13.51%)
Hernia	6(8.11%)
Uremia	5(6.76%)
Total	37(50%)

AUR: Acute Urine Retention, SD: Standard Deviation



Table 2: Characteristics of stricture on retrograde urethrogram

Location	N (%)
Posterior	2 (2.70%)
Bulbomembranous	8(10.81%)
Bu;bar	41(55.41%)
Bulbopenile	13(17.57%)
Penile	7(9.46%)
Pan-anterior	3(4.05%)
Length	
<2cm	23(31.08%)
≥2cm	51(68.92%)
Median (IQR) length (cm)	3(2 – 5)
Minimum length (cm)	1
Maximum length (cm)	15
Number of strictures	
Single	71(95.95%)
Multiple	3(4.05%)
Degree of stricture	
Complete	10(13.51%)
Incomplete	64(86.49%)

IQR: Inter-Quartile Range



Table 3: Duration of the various stages in the management

Event	Median (IQR) days
Duration of symptoms before presentation	135(15 - 720)
From Presentation to RUG	52 (22 - 118)
RUG to definitive treatment	48 (27.75 - 95.25)

RUG: Retrograde Urethrogram

Table 4: Postoperative complications with corresponding Clavien-Dindo grading¹⁴

Postoperative complications	N (%)	Clavien-Dindo grade
Early (\leq 1 week)		
Surgical site infection	9(12.15%)	II
Post-operative pyrexia	2(2.70%)	I
Intermediate (1 to \leq 4 weeks)		
Urinary tract infection	8(10.80%)	II
Sepsis	1(1.35%)	IIIA
Late (> 4 weeks)		
Recurrence	9(12.15%)	IIIB
Urethrocutaneous fistula	3(4.05%)	IIIB
Total	32(43.24%)	

N: Number

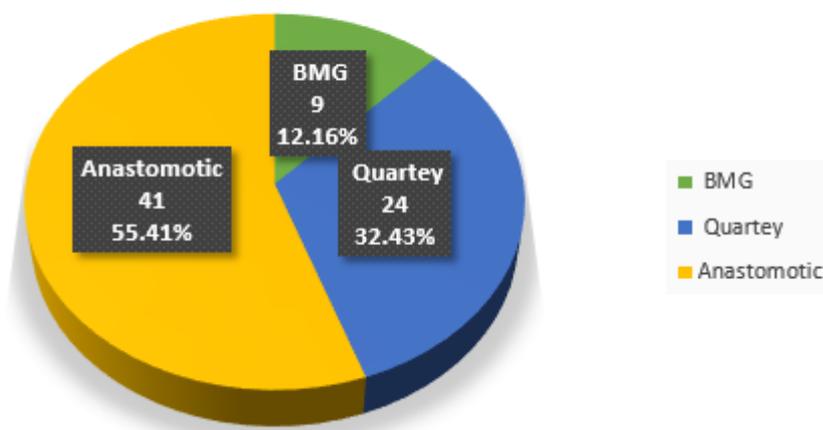


Table 5: Pre and post-urethroplasty IPSS comparison during each follow-up

Time of follow-up	Number of patients available for assessment	Median IPSS	IQR of IPSS	P-value.
At 6 weeks	46	4	3 - 8	0.0000
At 6 months	22	6	5 - 28	0.0003
At 1 year	8	11	4 - 33.5	0.0193
At 3 years	4	26.5	11 - 35	0.3532

IPSS: International Prostate Symptoms Score

Fig. 1: Types of urethroplasty



BMG: Buccal Mucosal Graft

Discussion

Urethral stricture is an abnormal narrowing of the urethra due to spongiofibrosis, which leads to obstructive voiding dysfunction, and sometimes associated complications at first presentation. Complications may also occur after treatment which can be classified and managed accordingly using the Modified Clavien-Dindo Classification.¹⁴ Urethral stricture is a common lower urinary tract problem

afflicting mainly males as found in this study. Female urethral stricture is uncommon in our region, usually constituting less than 3% as found in previous reports.^{7, 15} The male urethra is longer and has a pendulous part, hence more predisposed to trauma and infections as compared to females.

The average age of the patients in this study was 49.66yrs, this is closely related to previous findings



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by Olajide et al⁸ and Yaméogo et al¹⁰ as 52.3 and 50.5yrs respectively. In this study, only 6 children (8.11%) were reported to have strictures, this further reaffirm the rarity of this condition, as reported previously.¹⁶

Sixty four patients (86.49%) complain of a weak urinary stream, as was expected in most bladder outlet pathology. In urethral stricture, the symptoms were usually progressive and may lead to acute urine retention as seen in our 42 patients (56.76%) similar to findings by Nuss et al.¹⁷ But, a study by Rourke et al¹⁸ which was also commented by Goel et al on the same issue, found that 22.3% of their patients did not present with either LUTS or urine retention as their presenting complaint. Goel et al¹⁹ commented that patients in low economy countries could present with recurrent epididymo-orchitis, scrotal sinus (due to rupture of the abscess in the epididymis), infertility (due to recurrent epididymo-orchitis) or recurrent pyelonephritis (due to development of secondary vesicoureteral reflux) as their primary presenting complains in urethral strictures.

Although IPSS has been used widely to assess the severity of symptoms in a patient with LUTS, its application in poor resource settings like ours is highly difficult. Most patients were illiterate making it difficult for the self-administration of the questionnaire, as such most of the assessments were done by the physician and this may lead to some level of bias. In this study, the preoperative median (IQR) IPSS was found to be 32 (26 – 35) which showed that most of our patients have severe LUTS at the time of presentation. This could be as a result of late presentation until the symptoms get severe or the patients go into AUR as noted in a review by Eshibo et al.⁴ Due to the poor availability of resources, a more objective assessment tool such as urine flow rate could not be done. This requires a uroflowmeter which was not available in the hospital at the time of this study.

Most of the strictures, 45 (60.81%) were post-inflammatory in this study. This is similar to findings typically seen in poor resource communities.⁸⁻¹² A paradigm shift from post-inflammatory to post-traumatic strictures reported in few African urban Tertiary centres⁵⁻⁷, which could be as a result of improved access to healthcare service with prompt diagnosis and adequate treatment of urethritis, which might have reduced the frequency of resultant

urethral strictures. The other possible reason may be due to a high level of urbanization with a potential high of rate road traffic accidents and concomitant urethral injuries.

About half of our patients, 37(50%) have varying forms of urethral stricture complication at the time of presentation. The commonest was urosepsis seen in 16 (21.62%), followed by urethrocutaneous fistula seen in 10 cases (13.51%), these complications were usually seen in the resource-scarce communities due to delay in presentation and poor health-seeking behavior.²⁰ Treatment for these types of complicated strictures will usually demand a longer period and has financial challenges, to await for the complications to resolve before the definitive treatment as noted by Olajide et al.⁸ The pathogenesis of Some of the complications such as urethrocutaneous fistula may lead to severe spongiofibrosis, longer stricture lengths resulting in difficult surgery with its attendant high risk for recurrence.²¹

In our study, long segments strictures (≥ 2 cm) were seen in 51(68.92%) patients and were mainly located in the bulbar region. The median (IQR) length of the stricture on RUG was 3cm (2 – 5). This is similar to the findings in other studies.^{22, 23} Most patients present late, with a median length (IQR) between the onset of symptoms and presentation of 135 (15 – 720) days. This is relatively shorter compared with the findings by Olajide et al who found the mean duration of symptoms before the presentation of 3 years and 1 month (2 months to 8 years).⁸ The reason for the delay was mainly ignorance and poverty.²⁴ Furthermore, it took a median (IQR) of 52 (22 – 118) days, before the patients got a confirmatory investigation in the form of RUG. This may be due to lack of money to do the RUG, complications at the time of presentation that may need to be treated before the RUG, large patients' load, limited facilities for RUG; or industrial actions by health workers.⁸ It also took a median (IQR) of 48 (27.75 – 95.25) days for the patients to have definitive surgery after confirmation of the diagnosis. This used to be the case in most poor resource communities. The cost of surgery which can be more than 5 to 10 times the minimum wage in these countries has been a major hindrance to getting definitive treatment. Moreover, due to poor coverage of the health insurance schemes, patients have to pay out of pocket to get treated. As such, most of the patients can afford only



one surgery in their lifetime and this has a detrimental impact on the outcomes of treatment of this disease. Furthermore, the high load of patients awaiting various urological surgeries not only urethroplasty by the same surgeons, coupled with limited operating rooms may contribute to this delay. This makes management of urethral stricture to be quite challenging not only to the patients but to the surgeon as well.

More than half of the patients had anastomotic urethroplasty, this could be explained by the median length of the stricture (3cm) and the predominant location of the stricture (bulbar). There is controversy on the best treatment option for bulbar urethral stricture.^{25, 26} Generally, most urologists do anastomotic urethroplasty for posterior urethral distraction defects and short segment bulbar strictures¹⁷; and substitutions in the form of buccal mucosa graft for long segment bulbar strictures¹⁸, and penile flap for long segment penile strictures⁴. Of importance, is the surgeons' preference of the surgical technique and experience as highlighted by many reports.^{4, 27} Even though varying success, failure and recurrence rates were reported in the literature, it seems that there was a high recurrence of the stricture following anastomotic urethroplasty for most post-inflammatory stricture because the adjoining urethra is diseased.¹⁸

Post-operative complications were noticed in less than half of the patients. They were mainly in the first-week post-operative period and surgical site infection seems to be the commonest in this period. This is similar to findings in many reports from poor resource communities.^{4, 8, 28}

Recurrence was the most dreaded complication of this condition, especially in poor resource settings. It can be a nightmare not only to the patient but to the relatives and even to the surgeons. It was noticed in 11 (14.86%) of our patients. This is slightly lower when compared with some studies that found a recurrence rate of 25 - 26%^{27, 29}, but similar to findings by Shalkamy et al.³⁰ The average time taken before a recurrence in our study was 569 days (18.97 months) with a range of 35 to 1588 days (1.17 to 52.93 months), this was similar to findings by Zaid et al.²⁰ However, some studies recorded a shorter duration of 8.0 (0.5 - 88.0) months before recurrence⁵, while Han et al also reported an average of 34 months (range 5-87) as the time it takes before recurrence.²⁹ The fact is that most patients that were successful

never come back, as such they are lost to follow up as can be seen in this study, at one year only 8 patients were available for follow-up.

It was also observed that at a median (IQR) follow-up of 58(37 to 135) days postoperative period, the majority of the patients 57 (77.03%) had no LUTS. There was also a significant improvement in IPSS in the first two years of surgery when compared with the pre-operative IPSS. However, after three years, this was not significant. There is growing concern about the use of IPSS alone as a measure of success or diagnosis of recurrence in the management of urethral stricture.^{31,32} Uroflowmetry, Retrograde urethrography, and Cystourethroscopy are more objective ways of assessing success.^{33,34}

There were many limitations of this study, especially the retrospective nature of the study makes it difficult to standardize some of the information obtained. There was no uroflowmeter to assess more objectively the urine flow rate before and after surgery. Some relevant complications such as erectile dysfunction were not assessed before and after surgery.

Conclusion

Management of urethral stricture poses a significant urological challenge in resource-limited settings. Financial constraints, inadequate facilities and specialists are the major challenges. Increased health awareness, universal (free or subsidized) healthcare coverage may help in alleviating some of the challenges these patients were undergoing.

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Conflict of Interest:

None declared.

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