

The Management of Urethral Strictures and Stenoses at the John F. Kennedy Medical Center

Ayun Cassell III*, Bashir Yunusa, Edet Ikpi, Swalliho Sheriff, Weh-Wesseh, Solomane Konneh

Department of Surgery, John F. Kennedy Referral and Teaching Hospital, Monrovia, Liberia

Email address:

ayuncasselliii@gmail.com (Ayun C. III)

*Corresponding author

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Abstract: Background: A urethral stricture is an abnormal narrowing of the urethra resulting from fibrosis in the surrounding corpus spongiosum. The prevalence is estimated to be 229–627 per 100,000 males and its effects on the quality of life of those with the disease are far-reaching. Documented male-to-female ratio in Port-Harcourt, Nigeria, showed a ratio of 31:1 indicating that urethral stricture is very rare in females. Objective: The objective of the study is to assess the approach and outcome of the management of urethral stricture and stenosis at the John F. Kennedy Medical Center. Material and Methods: This is a 7-month retrospective descriptive study assessing the management of 20 patients with urethral stricture at the John F. Kennedy Medical Center from January 2018 to August 2018. The patient's medical records were retrieved from the record department and reviewed for age, etiology of urethral stricture, site of urethral stricture, procedure performed and postoperative complications. Result: A total of 20 male patients with urethral stricture or stenosis were included in the study. Study revealed that the predominant etiology of urethral stricture was post-traumatic accounting for 35% (7/20). Gonococcal urethritis caused urethral stricture in 30% (6/20) of patients while instrumentation was 20% (4/20). Most of the post-inflammatory stricture involved the bulbar urethra as well as the penile urethra. Urethral Dilatation 9/20 (45%) and resection plus end to end anastomotic urethroplasty 35% (7/20) were the procedures commonly used to manage urethral strictures mostly the bulbar and bulbo-penile parts of the urethra. Conclusion: Urethral stricture disease is a common cause of urological presentation to the urologist worldwide. Urethral dilatation is most commonly performed for urethral strictures due to its feasibility and much less technical challenge. The failure rate is nonetheless high therefore, urethroplasty remains the standard option if possible. Appropriate traffic regulations, judicious use of catheters and proper treatment of urethritis could reduce the incidence of urethral stricture disease.

Keywords: Anastomosis, Post-Inflammatory, Trauma, Urethral Stricture, Urethroplasty

1. Introduction

A urethral stricture is an abnormal narrowing of the urethra resulting from fibrosis in the surrounding corpus spongiosum [1]. The urethra measures about 16 to 22 cm in the adult males and 4 cm in the adult females [2]. In males, it is anatomically divided into posterior and anterior segments [2]. The posterior segment, traditionally referred to as the posterior urethra, measures about 4 cm and traverses the prostate and pelvic membrane beginning at the bladder neck [3]. The anterior urethra which is in continuity with the posterior includes the bulbar and penile urethra [3].

Basically, the term *urethral stricture* refers to anterior

urethral disease by consensus of the World Health Organization conference [4]. In contrast, posterior urethral “strictures” are not included in the common definition of urethral stricture. *Distraction defects* are processes of the membranous urethra associated with pelvic fracture. Other narrowings of the posterior urethra are termed *urethral contractures* or *stenosis* [4].

In the 1960s, gonococcal urethritis was the most common cause of urethral stricture until effective antibiotics became available [5]. Currently, the causes of urethral stricture include trauma, instrumentation, catheterization, transurethral

resection of the prostate (TURP), open prostatectomy, posthypospadias repair, lichen sclerosis, and urethritis [6].

The prevalence is estimated to be 229–627 per 100,000 males and its effects on the quality of life of those with the disease are far-reaching [7].

In the UK, according to NHS statistics, since the start of the 21st century, 12,000 men have required an operation for urethral stricture, at an annual cost of £10 million and with an increasing prevalence in young men to 1 in 1,000 in men >65 years [8]. Ekeke and Amusan documented a male-to-female ratio of 31:1 in Port-Harcourt, Nigeria, indicating that urethral stricture is very rare in females [9].

In the developing world, there are differences and variations in the reported contribution of the different etiologies; however, there is uniformity in reporting trauma as the predominant etiology in the developed world. Many authors have documented the bulbar urethra as being most commonly involved [10, 11].

The treatment of urethral stricture often depends on the expertise available; patients' treatment choices have continued to evolve over the years [12]. Dilatation was the first treatment used, but it has become disfavored with many urologists now preferring urethroplasty, irrespective of the site and etiology [13].

The objective of the study is to assess the approach and outcome of the management of urethral stricture and stenosis at the John F. Kennedy Medical Center. To date, there is no data on the management of urethral stricture in Liberia.

2. Materials and Methods

This is a 7-month retrospective descriptive study assessing the management of 20 patients with urethral stricture at the John F. Kennedy Medical Center from January 2018 to

August 2018. The patient's medical records were retrieved from the record department and reviewed for age, etiology of urethral stricture, site of urethral stricture, procedure performed and postoperative complications.

The study included only male patients with urethral stricture that were operated as elective case. Posterior distraction defect and meatal stenosis were also included in the study. All cases of urethral stricture presenting with complications requiring urinary diversion were excluded from the study awaiting proper workup.

All the patients were insured a sterile urine culture and sensitivity before inclusion. A retrograde urethrography and a micturating cystourethrogram were used to assess the length of the stricture. Ten patients were assessed with flexible cystourethroscopy for the caliber of the stricture. No urethronosogram was performed.

Procedural failure for urethral stricture included recurrence, anastomotic stenosis or recurrent lower obstructive urinary symptoms one month following urethral dilatation or urethroplasty.

The data was analyzed using Microsoft Excel 2016. Frequency tables, Pie Charts and Bar charts were used to represent the variables.

This research proposal was first presented to the ethical review board of the Department of Surgery for ethical clearance.

3. Result

A total of 20 male patients with urethral stricture or stenosis were included in the study and underwent either a urethral dilatation, resection plus end to end anastomotic urethroplasty or a pedicle flap urethroplasty.

Table 1. Distribution of Urethral Stricture by Age.

Age Range of Patients	Frequency	Percentage
Less than 35 years	10 patients	50%
35 years to 50 years	4 patients	20%
Above 50 years	6 patients	30%

Table 1 50% of patients with urethral stricture were less than 35 years. Another 30% was above 50 years while a few as 20% were between 35 years to 50 years.

Table 2. Etiology of Urethral Stricture.

Etiology	Frequency	Percentage
Traumatic Catheterization	2/20	10%
Gonoccal Urethritis	6/20	30%
Post-Prostatectomy	1/20	5%
Instrumentation	4/20	20%
Post-Traumatic	7/20	35%

Table 2 The Study revealed that the predominant etiology of urethral stricture was post-traumatic accounting for 35% (7/20). Gonoccal urethritis caused urethral stricture in 30% (6/20) of patients while instrumentation was 20% (4/20). The least cause included traumatic catheterization and post-prostatectomy accounting for 10% (2/20) and 5% (1/20) respectively.

Table 3. Site of Urethral Stricture in Relation to Etiology.

	Traumatic Catheterization	Gonoccal Urethritis	Post-Prostatectomy	Instrumentation	Post-Traumatic
Membranous	1/20	0/20	1/20	1/20	1/20
Bulbar	1/20	3/20	0/20	2/20	2/20
Penile	0/20	2/20	0/20	0/20	0/20
Bulbo-Penile	0/20	1/20	0/20	1/20	2/10
Meatal Stenosis	0/20	0/20	0/20	0/20	1/20

Table 3 Most of the post-inflammatory stricture involved the bulbar urethra as well as the penile urethra. The study revealed that the post-traumatic and catheter related urethral stricture involved the membranous urethra as well as the bulbar urethra.

Table 4. Age Range in Relation to Etiology.

	Traumatic Catheterization	Gonoccal Urethritis	Post-Prostatectomy	Instrumentation	Post-Traumatic
Less than 35 years	1/20	0/20	0/20	2/20	7/20
35 years to 50 years	1/20	2/20	0/20	1/20	0/20
Greater than 50 years	0/20	4/20	1/20	1/20	0/20

Table 4 Post-traumatic urethral strictures 35% (7/20) were common in the age group below 35 years while Post-inflammatory urethral strictures were more in those above 50 years 20% (4/20).

Table 5. Site of Urethral Stricture in Relation to Management.

	Dilatation	Meatotomy	Anastomotic Urethroplasty	Graft Urethroplasty	Flap Urethroplasty
Membranous	2/20	0/20	2/20	0/20	0/20
Bulbar	4/20	0/20	4/20	0/20	0/20
Penile	0/20	0/20	0/20	0/20	2/20
Bulbo-Penile	3/20	0/20	1/20	0/20	0/20
Meatal Stenosis	0/20	1/20	0/20	0/20	0/20

Table 5 Urethral Dilatation 9/20 (45%) and resection plus end to end anastomotic urethroplasty 35% (7/20) were the procedures commonly used to manage urethral strictures mostly the bulbar and bulbo-penile parts of the urethra. A pedicle flap urethroplasty was performed for the two penile urethral strictures. No substitution urethroplasty was reported in the study.

Table 6. Postoperative Complications in Relation to Management.

	Dilatation	Meatotomy	Anastomotic Urethroplasty	Graft Urethroplasty	Flap Urethroplasty
Wound Infection	0/9	0/1	3/7	-	0/2
Recurrence	2/9	0/1	0/7	-	0/2
Urinary Tract Infection	3/9	0/1	1/7	-	1/2
Incontinence	0/9	0/1	0/7	-	0/2
Failed Procedure	2/9	0/1	1/7	-	0/2

Table 6. Wound infection and urinary tract infection were the commonest postoperative complications following anastomotic urethroplasty and urethral dilatation respectively. A 22% (2/9) procedural failure rate was seen with urethral dilation while a 14% (1/7) failure rate was associated with end to end anastomotic urethroplasty.

4. Discussion

Urethral stricture disease is prevalent, and it is a common cause of presentation to the urologist worldwide [14]. A total of 20 male patients with urethral stricture or stenosis were reviewed in this study and underwent either a urethral dilatation, resection plus end to end anastomotic urethroplasty or a pedicle flap urethroplasty.

This Study revealed that the predominant etiology of urethral stricture was post-traumatic accounting for 35% (7/20). Gonoccal urethritis caused urethral stricture in 30%

(6/20) of patients while instrumentation was 20% (4/20). In the 1960s, gonococcal urethritis was the most common cause of urethral stricture until effective antibiotics became available [5]. Currently, the causes of urethral stricture include trauma, instrumentation and catheterization [6].

50% of patients with urethral stricture were less than 35 years. Another 30% was above 50 years while a few as 20% were between 35 years to 50 years. This finding is consistent with other studies that showed more urethral stricture in men below 45 years due to the increasing trauma rate and iatrogenic injuries [15].

Post-traumatic urethral strictures 35% (7/20) were common in the age group below 35 years while Post-inflammatory urethral strictures were more in those above 50 years 20% (4/20). This observation may be attributed to the fact that trauma is known to be more common in active highly mobile young men while post-inflammatory stricture becomes symptomatic about 20-25 years later following

urethritis. The increased frequency of iatrogenic trauma is related to increased use of catheterization and transurethral urological procedures, and the increased prevalence of external trauma may be due to increased road traffic density and higher levels of violence [16].

Most of the post-inflammatory stricture involved the bulbar urethra as well as the penile urethra. The study revealed that the post-traumatic and catheter related urethral stricture involved the membranous urethra as well as the bulbar urethra. Previous studies have suggested that inflammatory strictures usually involve the bulbar urethra and are mostly multiple, whereas traumatic strictures commonly involve the membranous urethra and are single, and iatrogenic strictures due to catheterization involve the penile urethra and are often multifocal or panurethral [18]. However, other studies have indicated that inflammatory strictures most often involve the penile urethra, whereas iatrogenic strictures are predominant in the bulbar urethra [17].

In the study, urethral Dilatation 9/20 (45%) and resection plus end to end anastomotic urethroplasty 35% (7/20) were the procedures commonly used to manage urethral strictures mostly the bulbar and bulbo-penile parts of the urethra. A pedicle flap urethroplasty was performed for the two penile urethral strictures. No graft urethroplasty was reported in the study. In most studies, including Akyuz *et al.* showed that urethral dilatation is one of the most performed procedure for urethral stricture [20]. The technique does not require as much expertise and the procedures are usually short.

Nevertheless, there is a high failure rate associated with urethral dilatation as such it's being used in some centers as a temporizing intervention. Our review displayed A 22% (2/9) procedural failure rate associated with urethral dilation while a 14% (1/7) failure rate was associated with end to end anastomotic urethroplasty.

Several studies have shown that open urethroplasty is the best and most definitive surgical technique in strictures in which minimally invasive techniques failed, cases with complete stricture, long and multiple strictures and in serious spongiofibrosis [19, 20]. This technique which requires technical skills and good experience has a success rate of about 90-95% and a recurrence rate of 2-7% [19].

Results from several surveys comparing the techniques used in open urethroplasty, revealed that end-to-end anastomosis was more frequently used than graft techniques [20]. The reason for more frequent use of end-to-end anastomosis rather than graft techniques may have been that most urologists were not willing to combine several complicated procedures for a single case [20]. However, as a treatment for long bulbar strictures and all penile strictures, graft urethroplasty has become standard [21].

5. Conclusion

Urethral stricture disease is a common cause of urological presentation to the urologist worldwide. Urethral dilatation is most commonly performed for urethral strictures due to its

feasibility and much less technical challenge. The failure rate is nonetheless high therefore, urethroplasty remains the standard option if possible.

Appropriate traffic regulations, judicious use of catheters and proper treatment of urethritis could reduce the incidence of urethral stricture disease.

Conflict of Interest

The authors declare no conflict of interest regarding this publication.

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