

Urethral Stricture as seen in Dar es Salaam, Tanzania.

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Background: Urethral stricture is a common condition in both developed and developing countries, but the pattern of causes in the two situations are different. Urethral Stricture can occur in female as well as in male, but it is far commoner in the male urethra for various anatomical and pathological reasons.

Methods: This was a ten months, hospital based descriptive, prospective study which involved all patients presenting at urology clinics confirmed to have urethral stricture. Patient characteristics were analyzed using SPSS version 18.

Results: A total of 111 patients with urethral strictures were recruited into the study. All were male aged 10 - 97years with a mean of 52.7 years. Trauma was the commonest cause of urethral stricture among our patients in age group below 45 years 64.2% ($p=0.000$). Urethral catheterization was the commonest cause of urethral stricture among patients in age group above 45 years 80.9% [$p= 0.026$]. Most strictures occurred in the bulbar urethra which accounted for 63.2% of all strictures.

Conclusion: Urethral stricture disease remains a predominantly male disease covering a wide age range of patients with social implications. Urethral catheterization and road traffic accident related trauma are the commonest causes of urethral strictures cutting across all the age groups. The bulbar urethra remains the commonest site of urethral stricture.

Introduction

The urethra is the conduit through which urine is evacuated from the bladder to the outside. Its length varies significantly between the sexes. The male urethra is approximately 20cm in length and broadly divided into an anterior and posterior segment. The anterior segment is composed of the meatus, fossa navicularis, the penile or pendulous part and the bulbar portion. The posterior segment is made up of the membranous and prostatic urethra. The 4cm long female urethra corresponds to the posterior segment of the male urethra¹. Urethral stricture is a common condition in both developed and developing countries, but the pattern of causes in the two situations are different. Urethral Stricture can occur in the female as well as in the male, but it is far commoner in the male urethra for various anatomical and pathological reasons². Urethral stricture disease antedates modern history. It could be one of the causes of urinary stones mentioned in the days of Hippocrates.

Urethral strictures may be congenital, iatrogenic, traumatic or inflammatory.³ In the pre-antibiotic era, inflammatory strictures were very prevalent, but with discovery of antibiotics, wide use of condoms and the abandoning of installation of caustic substances in the urethra, the incidence has decreased⁴. Inflammatory strictures are a rare problem in developed countries, unlike in developing countries. They are mostly seen in the bulbous urethra though they may be seen in different portions of the urethra^{4, 5}. It is reported that about 95% of urethral strictures are inflammatory in origin in many tropical countries⁵. Neisseria gonorrhea is reported to be the main aetiological agent. Thus in 1963, Griffith⁶ noted that about 20% of sexually active males in Uganda contracted gonorrhea at least once a year. Organisms that cause non-specific urethritis have increasingly been incriminated as a major etiological factor of inflammatory urethral stricture especially in the developed world. Organisms which fall in this group include *Ureaplasma* (T-strain), *Mycoplasma*, *Trichomonas vaginalis*, *Candida albicans*, and *Haemophilus vaginalis*, *Herpes simplex virus type II*, *Cytomegaloviruses* and *Chlamydia*.⁷

In most of African countries, poor communication, widely scattered and understaffed hospitals and clinics has lead poor health care provision contributing to the high prevalence of urethral strictures. Lack of well trained health staff or lack of sterility during catheterization has been reported to increase the prevalence of urethral strictures, though accidents remain a major cause of traumatic urethral strictures.

Trauma to the urethra either due to road traffic accident with pelvic fracture, bullet injury or falling astride on a metal bar or any heavy objects may cause urethral strictures. Direct external violence to the urethral bulb from a blow on the perineum and injury to the membranous part from the fractured pelvis are the commonest causes of traumatic urethral stricture.^{8,9} Iatrogenic trauma mainly due to endoscopic procedures or due to catheterization may cause urethral strictures whereby at Muhimbili National Hospital (MNH) catheter strictures were found to contribute 13% of all urethral strictures¹⁰. Introduction of irritating chemicals in the urethra either by installation of lubricants or coated on instruments such as paraformaldehyde or formaldehyde also cause urethral injury. Prostatectomy and penile amputation are the other causes of iatrogenic strictures of the urethra^{11, 12}. Congenital urethral strictures occasionally occur in male infants¹³ where they can be single or located at multiple sites anywhere along the urethra and is reported to be due to embryonic narrowing of the channel or failure of tube formation^{13,14}. Malignant strictures of the male urethra are comparatively rare. Balanitis Xerotica Obliterans also known as lichen sclerosus et atrophicus frequently causes penile urethral strictures in India as well as in other countries. In Tanzania that has been explained well by Mchembe et al¹⁵. The two most common sites are in the region of the corona (fossa navicularis) and in the membranous urethra^{14, 15}.

Pathology and Pathogenesis

Urethral stricture is the result of disorder in wound healing in which the urothelium and corpus spongiosum heals with scarring, contracture and reduction of the luminal caliber. As the narrowing progresses, the urinary flow gets affected in terms of laminar flow and in due course the resistance to flow overcomes the voiding pressure, leading to urinary retention.^{1, 10, 16} Due to narrowed lumen and associated spongiofibrosis, urethral catheterization cannot be achieved. It is one of the major causes of urinary bladder outlet obstruction among patients seeking urological services at Muhimbili National Hospital and Tumaini Hospital, going by the estimate of 150 urethral strictures treated at MNH in a year¹⁰, yet the pattern is not well documented. This study was set to document on the pattern of urethral strictures among our urology patients.

Patients and Methods

This was a hospital based descriptive, prospective study carried out at Muhimbili National Hospital and Tumaini Hospital from March to December, 2011. Permission to conduct this study was obtained from Muhimbili University of Health and Allied Sciences (MUHAS) Institutional Review Committee and informed consent obtained from patients. All patients who presented at our urology clinics and wards with a confirmed diagnosis of urethral stricture either by urethrogram and/or urethroscopy were recruited. A Structured questionnaire was administered and it captured patient demographic particulars, causes, and investigation findings demonstrating sites of the strictures. Data was cleansed, coded and entered into SPSS software version 18 where statistical analyses was performed to get frequencies and other variables. Where comparison was done, a p – value of 0.05 was taken as significant.

Results

A total of 111 patients with urethral strictures were recruited into the study, 69 patients were from MNH and 42 patients were from Tumaini Hospital. All were male aged 10 – 97 years with a mean of 52.7. Most of our patients with urethral stricture were above 60 years of age 39% (43), followed by 45 – 60 years at 27% (30), 31 – 44 and below 30 years at 17% (19) each (Figure 1).

Two patients in our study had more than one cause of urethral stricture giving a frequency of 113 (Table 1). Urethral stricture occurred following traumatic catheterization in 42 (37%) of the patients, road traffic accidents or falling astride injuries were recorded in 28 (24%), infections in 15 % (17) and endoscopic procedures such as TURP and Urethrocystoscopy in 4% (5) of our cases. Other causes, 18% (21) included 12 patients who had stricture due to open prostatectomy, one patient each had stricture due to carcinoma of bulbar urethra, and penile amputation and 7 patients had unexplained causes of urethral stricture.

Trauma, including urethral catheterization, was the commonest cause of urethral stricture among patients in the age group below 45 years at 64.2% 18 (p= 0.000). Urethral catheterization was the commonest cause of urethral stricture among patients above 45 years of age by 80.9% (34/42) [p= 0.026] who also had the highest frequency of other causes (unaccounted for) by 19/21(90.5%).

Twenty five patients had strictures in more than one segment of the urethra giving a total frequency of 136 from 111 patients. Bulbar urethra had the highest frequency of strictures at 63.2% followed by membranous urethra at 22 %.. Across all age groups, bulbar urethra was the most affected part of urethra affecting more those aged above 45 years (Table 2).

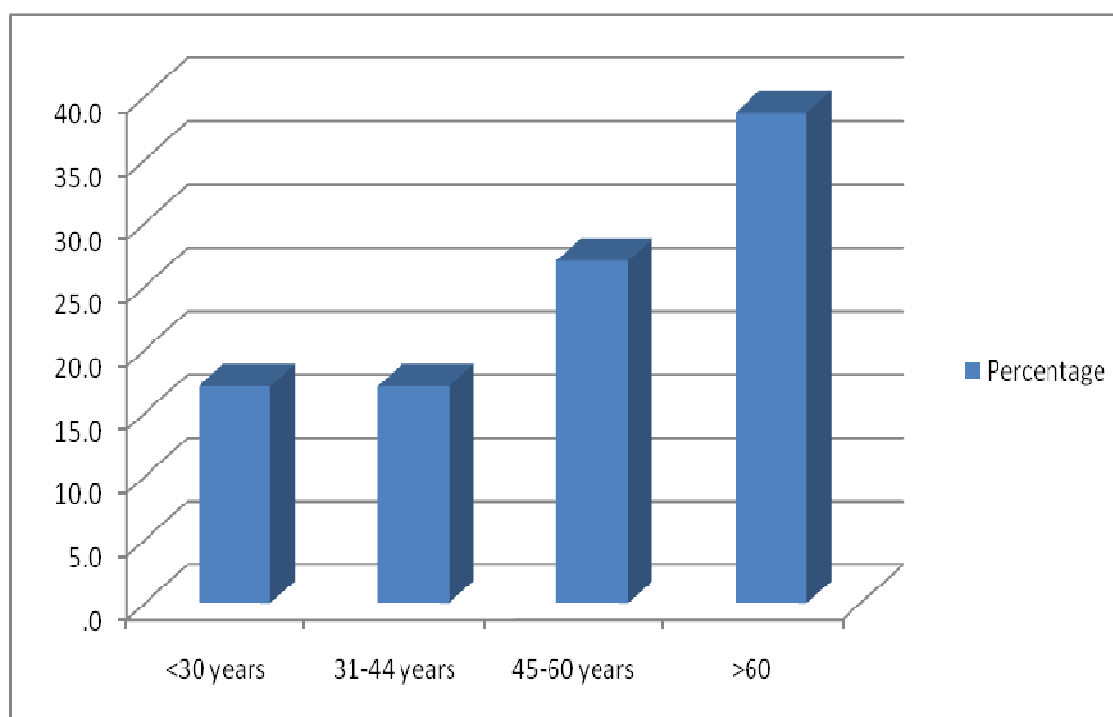


Figure 1. Occurrence of Urethral stricture by Age.

Table 1. Distribution of causes of urethral stricture by Age

Causes	Age Distribution				Total
	<30	31-44	45-60	>60	
Trauma	9(47%)	9(50%)	6(19%)	4(9%)	28 (24%)
Iatrogenic Catheter	5(26%)	3(17%)	15(48%)	19(42%)	42(37%)
Iatrogenic Endoscopic	0	0	1(3%)	4(9%)	5(4%)
Infections	3(16%)	6(33%)	3(10%)	5(11%)	17(15%)
Others	2(11%)	0	6(19%)	13(29%)	21(19%)
Total	19(16.8%)	18(15.9%)	31(27.4%)	45(39%)	113(100%)

Table 2. Site of urethral stricture by age groups

Site	Age Distribution				Total
	<30	31-44	45-60	>60	
Prostatic urethra	0	0	0	5(100%)	5(4%)
Membranous Urethra	8(26.7%)	7(23.3%)	5(16.7%)	10(33.3%)	30(22%)
Bulbar Urethra	13(15.1%)	12(14%)	27(31.4%)	34(39.5%)	86(63.4%)
Penile Urethra	2(13.3%)	3(20%)	5(33.3%)	5(33.3%)	15(11%)
Total	23(16.9%)	22(16.2%)	37(27.2%)	54(39.7%)	136(100%)

Discussion

Our study did not find any woman with urethral stricture, hence predominantly a male disease. This was also observed by Smith and colleagues in the USA in an active search for urethral stricture in women where they found only 7 women within a period of six years^{2,10,21}. In males the urethra is long with anatomical turns and curves with mobile junctions which make it more vulnerable to disruption in pelvic trauma and during catheterization. This also explains why males are highly predisposed to urethral stricture.

Mteta and colleagues²¹ in Moshi, Tanzania found an age range of 3-95 years while Zango and Kambou²² in Burkina Faso reported an age range of 17-90 years in patients with urethral strictures. Those findings have been reflected in our study where the age range was 10-97 years, the most affected age group being those above 60 years.

Trauma due to accidents or catheterization in this study was found to be the leading cause of urethral stricture across all the age groups although trauma due to road traffic accidents was the commonest cause of urethral strictures among patients in age group below 45 years (64.2%) [p= 0.000]; this is probably due to sudden increase of road accidents especially due to inappropriate use of motor cycles in the country which has increased the number pelvic injuries

with urethral injuries²³. Urethral strictures due to urethral catheterization was found to be the commonest cause of urethral strictures regardless of the types of catheter either latex or silicone or quantity of jelly used among patients in age groups above 45 years 80.9% { $p=0.026$ }. This is the age group with benign prostatic hyperplasia and is likely to have more frequency of catheterization.

This study did not look at catheterization practices but as was documented by Mkony et al¹⁰ a decade ago, conditions that increase the risk are inadequately trained staff, poor quality and wrong size catheters, inadequate or insufficient lubrication, inability to catheterize aseptically, prolonged catheterization and ease of developing infections.¹⁰ This is similar to what was found by Piechota and colleague²⁴ in Germany that 12.6% of all hospitalized patients will be catheterized at some point, which goes with the attendant risk of subsequently developing a stricture. Urethral stricture due to urethritis in this study accounted for 15% with the age group 45-60 years being mostly affected though it was not statistically significant. This is similar to the findings of Webster and others¹⁷ of 22% of urethral strictures in 100 patients being due to inflammatory causes. Although the trend seems to be a tendency towards a decrease, this probably is due to erratic use of antibiotics and condom use.

The distribution of urethral strictures by site in this study was 74.3% in the anterior urethra. This is the general finding that urethral strictures are to be found more in the anterior urethra than posterior urethra as it was found by Rourke and colleagues²⁵. Mteta and colleagues²¹ also found that 61.4% were strictures in the anterior urethra.

Conclusions

Urethral stricture disease remains a predominantly male disease covering a wide age range of patients with social implications. Urethral catheterization and road traffic accident related trauma are the commonest causes of urethral strictures cutting across all the age groups. The bulbar urethra remains the commonest site of urethral stricture.

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