THE PATTERN, TREATMENT OPTIONS AND EARLY TREATMENT OUTCOMES OF URETHRAL STRICTURE AT MUHIMBILI NATIONAL HOSPITAL AND TUMAINI HOSPITAL, DAR ES SALAAM.

By

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A dissertation submitted in (partial) fulfillment of the requirements for the award of the degree of Master of Medicine (in General Surgery) of Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences

September, 2012

CERTIFICATION

The under signed certifies that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied sciences a dissertation entitled: **"The pattern ,treatment options and early treatment outcome of urethral stricture among patients seeking urology services at Muhimbili National Hospital and Tumaini Hospital from March 2011 to December 2011"** in partial fulfillment of the requirements for the degree of Master of Medicine (General surgery) of Muhimbili University of Health and Allied Sciences.

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Prof. C. Mkony

(Supervisor)

Date _____

DECLARATION AND COPYRIGHT

I, **Nyongole Obadia Venance**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature _____ Date _____

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ACKNOWLEDGEMENT

I am greatly indebted to Prof. Charles Mkony, my supervisor, for the guidance and mentorship he rendered to me during the preparation of this dissertation.
I would like to acknowledge Prof N.A.A Mbembati who was the head of department, followed by Dr. M Mchembe who is the current head of Department of Surgery for their continuous encouragement.

I would like to thank all the Consultants, Specialists, Residents, Registrars and Nurses at Muhimbili National Hospital and Tumaini Hospital for all the invaluable assistance and support they offered me during all the stages in the preparation of this work.

I would like take this opportunity to thank Prof. Karim Hirji, Department of Epidemiology and Biostatistics, who selflessly and freely gave comments on various drafts of this piece of work. I appreciate the valuable statistical advices given by my friend Dr. Benjamin Kamala during analysis.

Last but not least, I want to thank my wife, Gudila, who showed her love and dedication by maintaining good quality of the house and caring for our two sons Joseph and John Goodluck. Her presence made a tremendous difference in my life during some tiring moments in the course of preparation of this dissertation. Our sons always cheered me up during moments when I felt low and exhausted.

Thanks to the Almighty God for giving me good health throughout my study period.

DEDICATION

This dissertation is dedicated to my dear wife, Gudila and lovely children, Joseph and John Goodluck, and their grandmother my mother, Georgina Mhando Mhegele. It is also dedicated to the memory of my late father, Venance Pangachuma Nyongole, who inspired me right from childhood to study hard.

ABSTRACT

Introduction: In Europe, urethral stricture is mentioned in writings dating back to the time of Socrates, Epicurus and Celsus. Its modern definition is fixed anatomical narrowing between bladder neck and the external urethral meatus usually to less than 14F gauge and preventing urethral catheterization. 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**.** Urethral stricture according to the literature may be congenital, iatrogenic, traumatic or inflammatory.

***Broad objective*:** To determine the pattern, treatment options and early treatment outcomes of urethral stricture among patients seeking urological services at Muhimbili National Hospital and Tumaini Hospital, Dar es salaam.

Methodology: The study was conducted at MNH, which is the national referral hospital and Tumaini Hospital which is one of the prominent private hospital with urology bias.
This was a hospital based descriptive, prospective study which involved all patients presenting to urology clinics confirmed to have urethral strictures during the period of study from March 2011 to December2011.

Results

A total of 111 patients with urethral strictures were recruited into the study, 69 patients were from Muhimbili National Hospital (MNH) and 42 patients were from Tumaini Hospital. All were male with mean age of 52.7 years, and age range from 10 years to 97 years.
Trauma was the commonest cause of urethral stricture among patients in age group below 45 years (64.2%) with a mean age of 38.48 years (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]. Eighty six were strictures of bulbar urethra which accounted for 63.2% of all strictures. DVIU constituted 64% of the provided treatments.

Conclusions

Urethral stricture disease remains a predominantly male disease covering a wide range of ages of patients. Iatrogenic and accidental traumas are the commonest causes of urethral stricture cutting across all the age groups. The bulbar urethra remains the commonest site of urethral stricture. DVIU was the commonest mode treatment of patients with urethral stricture seeking urological services at Muhimbili National Hospital and Tumaini Hospital in Dar es Salaam. Treatment outcomes were almost the same for the different options of treatment. However, primary urethroplasty had better outcome than DVIU during the follow up of 3months.

Recommendation

Continuing medical education should be given to health workers all over the country on proper handling of patients with urethral injuries. Urethral catheterization should be made a safe and sterile procedure which should be individualized as per need. Patients with urethral stricture should be handled by the experienced urologist due to complexity in its management to reduce complications and improve treatment outcome.

Proper documentation and long term follow up of patients with urethral stricture disease should be insisted in order to have good outcome.

TABLE OF CONTENTS

CERTIFICATION ii
DECLARATION AND COPYRIGHT iii
ACKNOWLEDGEMENT iv
DEDICATION v
ABSTRACT vi
TABLE OF CONTENTS viii
LIST OF ABBREVIATIONS x
INTRODUCTION 1
LITERATURE REVIEW 1
PROBLEM STATEMENT 6
RATIONALE OF THE STUDY 6
OBJECTIVES 7
Broad objective 7
Specific objectives 7
METHODOLOGY 8
Study area 8
Study design 8
Study population 8
Inclusion criteria 9
Exclusion criteria 9
Sampling 9
Sample size 9
Data collection techniques 9
Ethical issues 10
Study limitations 10
RESULTS 11
DISCUSSION 17
CONCLUSIONS 20

RECOMMENDATION 20
REFERENCES 21
APPENDIX I 24
Questionnaire 24
APPENDIX II 26
Informed consent Form 26
APPENDIX III 28
Kiswahili version of Informed consent 28

LIST OF ABBREVIATIONS

MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health And Allied Sciences
DVIU	Direct Vision Internal Urethrotomy
TURP	Trans Urethral Resection of Prostate
BPH	Benign Prostate Hyperplasia
KCMC	Kilimanjaro Christian Medical Center

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 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.

LITERATURE REVIEW

The 4cm long female urethra corresponds to the posterior segment of the male urethra[1].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 reasons[2]. Urethral stricture disease antecedes modern history. It could be one of the causes of urinary stones mentioned in the days of Hippocrates.

Aetiology

Urethral Strictures according to literature 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 decreased[4].

Inflammatory strictures are a rare problem in developed countries, while in developing countries they are still a problem. Inflammatory strictures are mostly seen in the bulbous urethra though they may be seen in different portions of the urethra[4, 5].

In most of African countries poor communication, widely scattered and understaffed hospitals and clinics leads to provision of poor health care which contribute to the high prevalence of urethral strictures. Lack of well trained health staff or lack of sterility during catherization has been reported to increase the prevalence of urethral strictures, though accidents remain a major cause of traumatic urethral strictures. It is reported that about 95% of urethral strictures are inflammatory in origin in many tropical countries[5]. Neisseria gonorrhea is reported to be the main aetiologic agent. Thus in 1963, Griffith[6] 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].

Over recent decades, Uganda has been reported to have higher incidence of up to 1500 new cases per year seen at Mulago Hospital in the years 1972-1973[4]. In Tanzania urethral stricture is one of the common causes of urinary bladder outlet obstruction, the commonest being BPH[8].

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[9]. Other causes include gunshot injuries and anti personnel mine injuries[9].

Iatrogenic trauma mainly due to endoscopic procedures or due to catheterization may cause urethral strictures whereby at MNH catheter strictures were found to contribute 13% of all urethral strictures[10]. Introduction of irritating chemicals in the urethra either by installation of lubricants or coated on instruments such as paraformadehyde 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 infants[13.] A congenital stricture may 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 al. 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.

Treatment Modalities

The historical management of urethral strictures constituted regular dilations of the scar tissue but this inevitably failed for long strictures or those subjected to secondary trauma, ischaemia, scarring and further reduction of luminal caliber. A urethral stricture would best be managed by taking into account its aetiology, site, length and caliber as well as applying the right procedure[15, 17]. Length, patient's age and co morbid factors play significant roles in the choice of treatment[1, 5, 17, 18].

With the passing of time, more objective ways of approaching the management of urethral strictures were instituted[2]. Pre operative preparations should enable selection of patients for optimal management so that they are offered the most beneficial procedure.

Conservative management is for patients who either are medically unfit for elaborate surgical interventions or on their own choice prefer it over surgery. Urethral stents get incorporated into the urethral wall and are contraindicated in those with previous reconstructive procedures or those with dense strictures as the end prostheses cause tissue proliferation. They are best reserved for short bulbar strictures. The treatment may be by conservative management (use of suprapubic catheterization, dilatation or placement of permanent stents), by Direct Visual Internal Urethrotomy (DVIU) .[1, 2, 16, 17].

The traditional treatment of urethral strictures has been dilatation with 'sounds'; a name that came about as a result of using probes to sound bladder stones. Hamilton Russell described the first surgical procedure for repair of urethral strictures in 1914[18].

Direct Visual Internal Urethrotomy (DVIU) is best suited for strictures less than one centimeter in length independent of the aetiology or location. DVIU and urethroplasty are primary methods of managing urethral strictures[17, 18]. The principle is to have one DVIU or dilatation before resorting to urethroplasty but primary urethroplasty is cost effective if a DVIU success rate is less than 35%.Direct vision dilatation was introduced but has not gained much popularity[19].

Endoscopic procedures are reserved for patients with short bulbar urethral strictures associated with minimal spongiofibrosis[19]**.** Multiple urethrotomies achieve transient relief and can be compared to dilatation[19, 20].

Proper urethral stricture management should include methods of open reconstructive surgery. Strictures that are recurrent or of greater than one centimeter in length will require open Urethroplaty[21-27]**.**

Indications for open reconstruction include severe voiding symptoms due urethral stricture which is longer than one centimeter, bladder calculi, increased post voiding residual volume,

urinary tract infection and failed conservative management. Where there is urinary tract infection, its control has to be accomplished by adequate antibiotic cover given prior to surgery. Neodymium-YAG-laser core- though urethrotomy has been suggested as an alternative to complex urethroplasties with the advantage of being a day care procedure, although its usefulness is yet to be conclusively ascertained [22,23,24,28].

Open reconstructive surgery for urethral strictures may be a single stage primary anastomotic urethroplasty, staged urethroplasty or the utilization of tissue transfer techniques. The tissue transfer may be free tissue graft (split thickness or full thickness skin grafts, bladder mucosa or buccal mucosa) or pedicled island flaps that may be tubularised or onlay[24-26, 28]. Success in the management is considered to be the absence of obstructive voiding symptoms[24]. Strictures in the distal portion like the fossa navicularis will require cosmetic consideration besides the assumption of effective voiding.

Complications of urethral stricture

Urethral strictures cause both anatomical and physiological complications involving the urinary tract. Key among them are urinary stasis and infection, formation of stones particularly in the bladder, vesicoureteral reflux, urethrocutaneous fistula, hydroureteronephrosis, anatomical bladder anomalies with examples of trabeculation, sacculation and diverticulation and impaired renal function leading to chronic renal failure[1,12,21,29].

Early treatment outcome includes relieving obstructive symptoms without complications within the study period from the treatment date.

PROBLEM STATEMENT

Urethral stricture 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 year[10], yet the pattern is not well documented. Many treatment options are available such as dilation, direct vision internal urethrotomy (DVIU) and urethroplasty. Those treatment options need to be individualized. Urethral stricture needs special attention due to its complexity on the aspect of management options. The Outcome of any treatment option is important, At MNH and Tumaini Hospital there is little documentation of the treatment outcome of patients with urethral strictures.

RATIONALE OF THE STUDY

Urethral stricture is a major problem which involves patients of different ages, yet there are few studies which have been conducted to address the problem in Dar es Salaam despite having many studies about urethral strictures world wide.[24, 25, 29]. This study will document the treatment options used at MNH and Tumaini Hospital in relation to outcome but also there is a need to update the information available at MNH and Tumaini Hospital including the advancement in management of urethral strictures.

Despite the advances made in treatment of urethral stricture, there remain issues and gaps in knowledge. A study in this area will not only share institutional experience but also add to the ways of managing urethral strictures nationally.

OBJECTIVES

Broad objective

- To determine the pattern, treatment and early treatment outcomes of urethral strictures among patients seeking urological services at Muhimbili National Hospital and Tumaini Hospital, Dar es salaam.

Specific objectives

1. To determine the age and sex distribution of urethral stricture patients at MNH and Tumaini Hospital.
2. To identify the common causes of urethral stricture among patients presenting to the hospital.
3. To establish the frequency of urethral strictures at various sites in the urethra.
4. To document the modes of treatment for urethral strictures at MNH and Tumaini Hospital.
5. To determine early treatment outcome in relation to treatment given.

METHODOLOGY

Study area

The study was conducted at MNH, which is the national referral hospital receiving patients from district and regional hospitals within the country but in addition it serves as city hospital by receiving more patients from the three municipalilities in the city and nearby district hospitals of Coast Region due its geographical location. The hospital is a teaching hospital for MUHAS students, both undergraduates and postgraduates located within Dar es Salaam city, which has a population of about 4 million people. The hospital bed capacity is 1500, and surgical wards have 220 beds of which 62 beds are for the urology unit.

Tumaini Hospital is one of the prominent private hospitals with urology bias in Ilala municipality which offers quality urological services in Dar es Salaam. It is located about 1 km from MNH. The hospital has 41 beds which include 3 pediatric beds, 2 postnatal beds and 36 beds are for general use.

Study design

This was a hospital based descriptive, prospective cohort study that involved all patients presenting to urology clinics confirmed by urethrogram and/or urethroscopy to have urethral strictures during the period of study from March 2011 to December2011. Data were collected through personal interviews and from patient case notes which were searched about the patient especially on the treatment modality and treatment outcome during follow up period. Some patients were contacted over the phone for visual flow on their micturating habit during follow up while others were assessed as they came to the clinic.

Study population

The study cohort included in- patients and outpatients attending urology clinics- MNH and Tumaini Hospitals within the period of study, involving female and male patients confirmed to

have urethral stricture regardless of whether they were for treatment for the first time or re attending patients .

Inclusion criteria

All patients with urinary symptoms, and confirmed by urethrogram and/or urethroscopy to have urethral strictures were included.

Only patients who consented were included.

Exclusion criteria

All patients who did not consent to participate in the study.

Very sick patients who needed emergency intervention such as those who had urine retention had suprapubic catheterization done as a temporary measure to relieve the obstruction before enrollment into study.

Sampling

This study was a non random cohort study[30] involving all patients undergoing inpatient and outpatient treatment of urethral strictures at MNH and Tumaini hospital.

Sample size

The sample size calculation formula was not applied since this was a descriptive study; rather all patients with symptoms and signs of urethral strictures confirmed by urethrogram and/or urethroscopy were enrolled (Comprehensive Sampling[30]) to constitute the sample size as they came during the period of study.

Data collection techniques

Structured questionnaires set in the form of closed – ended – questions were used, but also personal face-to-face /over the phone interviews were conducted.

Ethical issues

The proposal before being implemented was reviewed and discussed at different levels at MUHAS; finally the research proposal was approved by the MUHAS Research and Publications Committee by giving the ethical clearance, the same ethical clearance was adopted at Tumaini hospital. Patients were informed about the study; those who gave consent were included. However no patient was denied appropriate and adequate treatment upon not consenting. All patient's information was kept confidentially and not to be accessed by people not concerned in the study.

Research managements and monitoring

Daily data collection from the patients, together with preliminary investigations as diagnostic and supportive for all study subjects were reviewed for proper documentation. These helped to identify gaps and problems which could be solved early and avoid affecting the research adversely.

Data processing and analysis

All the collected data were recorded into the checklist for storage of information and were checked by the research team for completeness and consistency.

Data master sheets were used to process and analyze collected data by using tables, figures and charts. Also data collected were analyzed by Statistical Package for the Social Sciences (SPSS) 18 for the Windows program. It was subjected to cross-tabulations to assist in drawing correlates and inferences on the variables. Analysis of the data was followed by interpretation; significance value was taken as less than 0.05.

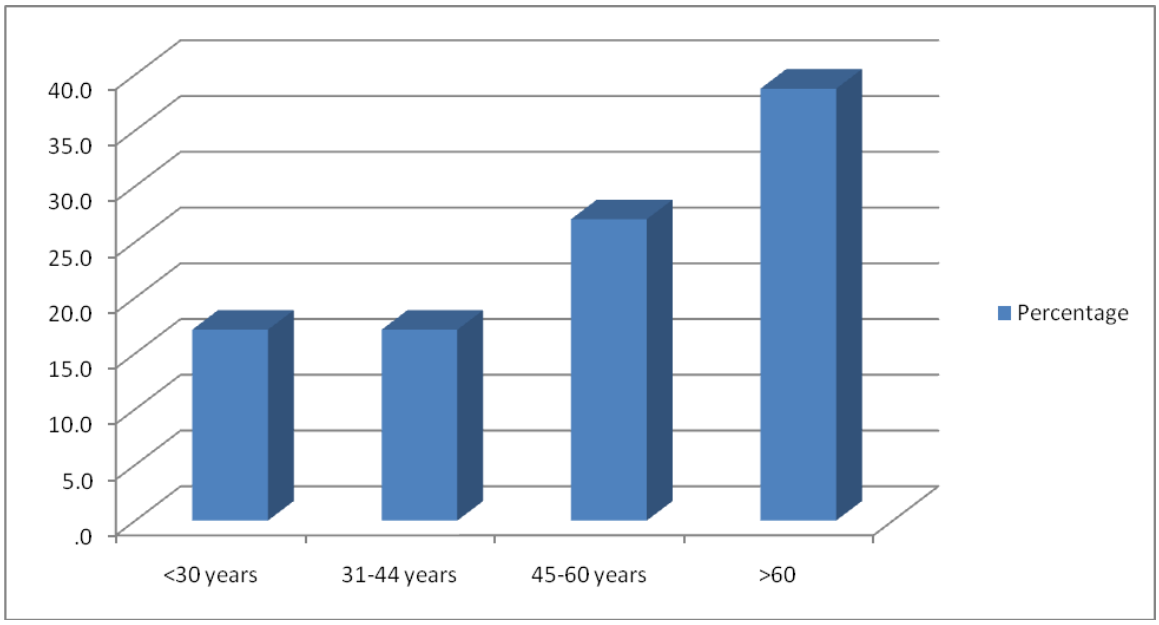
Study limitations

Duration of follow up to assess the treatment outcome was less than 1 year as the success in the stricture management can only be claimed after many years, patients can fare on well for 10 years or more before suffering recurrence.[36]

RESULTS

A total of 111 patients with urethral strictures were recruited into the study**,** 69 patients were from Muhimbili National Hospital (MNH) and 42 patients were from Tumaini Hospital. All were male with mean age of 52.7 years, and age range from 10 years to 97 years.

Figure 1: Distribution of male patients with urethral stricture seeking urological services at MNH and Tumaini Hospital, Dar es Salaam, March-September 2011.

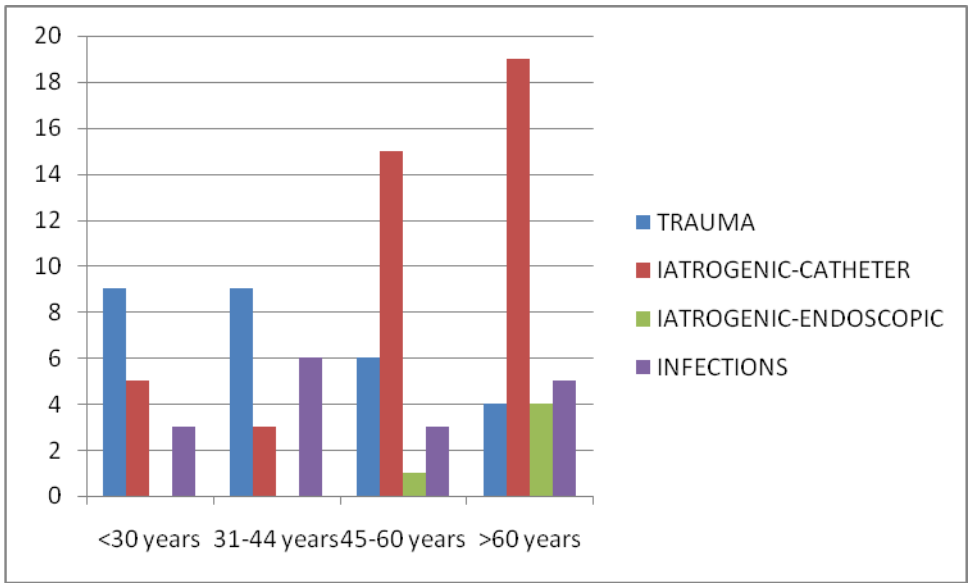


Out of 111 patients, 39% were patients above 60 years, while 27% were patients in age group 45-60years, the age group 31-44and those below 30 years each had 17% of patients.

TABLE 1: Age groups distribution of causes of urethral stricture among male Patients seeking urological services at MNH and Tumaini Hospitals, Dar es Salaam, March-September, 2011

CAUSES	AGE GROUPS				TOTAL
	<30	31-44	45-60	>60	
TRAUMA	9(32.1%)	9(32.1%)	6(21.4%)	4(14.3%)	28(100%)
IATROGENIC-CATHETER	5(11.9%)	3(7.1%)	15(35.7%)	19(45.2%)	42(100%)
IATROGENIC-ENDOSCOPIC	0	0	1(25%)	4(75%)	5(100%)
INFECTIONS	3(17.6%)	6(35.3%)	3(17.6%)	5(29.4%)	17(100%)
OTHERS	2(9.5%)	0	6(28.6%)	13(61.9%)	21(100%)
TOTAL	19(16.8%)	18(15.9%)	31(27.4%)	45(39.8%)	113(100%)

Figure 2:The pattern of causes of urethral stricture



NB: The total number is 113 instead of 111 because 2 patients had more than one cause, also" other causes" included 12 patients who had stricture due to open prostatectomy ,1 patient had stricture due to carcinoma of bulbar urethra,1 patient had stricture due to penile amputation and 7 patients had unexplained cause of urethral stricture. All other causes accounted for 18%. Urethral strictures due to iatrogenic catheterization accounted for 37% followed by strictures from road traffic accidents or astride injuries (24%) while infections accounted for 15% as a cause of urethral stricture, endoscopic procedures such as TURP and Urethrocystoscopy contributed 4% as a cause of urethral stricture. Trauma was the commonest cause of urethral stricture among patients with age group below 45 years (64.2%) with a mean age of 38.48 years [p= 0.000]. Urethral catheterization was the commonest cause of urethral stricture among patients in age group above 45 years by (80.9%) [p= 0.026].

TABLE 2: Site of urethral stricture by age groups among male patients seeking urological services at MNH and Tumaini Hospital, Dar es Salaam, March-September, 2011

SITE	AGE GROUPS				Total
	<30	31-44	45-60	>60	
PROSTATIC URETHRA	0	0	0	5(100%)	5
MEMBRANEOUS URETHRA	8(26.7%)	7(23.3%)	5(16.7%)	10(33.3%)	30
BULBAR URETHRA	13(15.1%)	12(14%)	27(31.4%)	34(39.5%)	86
PENILE URETHRA	2(13.3%)	3(20%)	5(33.3%)	5(33.3%)	15
TOTAL	23(16.9%)	22(16.2%)	37(27.2%)	54(39.7%)	136(100%)

NB: 25 Patients had strictures in more than one segment of the urethra giving a total frequency of 136 from 111 patients.

Eighty six were strictures of bulbar urethra which accounted for 63.2% of all strictures. Strictures of the anterior urethra (bulbar and penile) accounted for 74.3% of all while membranous urethra accounted for 22% and Prostatic urethra accounted for 4%.

Figure 3:Distribution of urethral stricture by sites

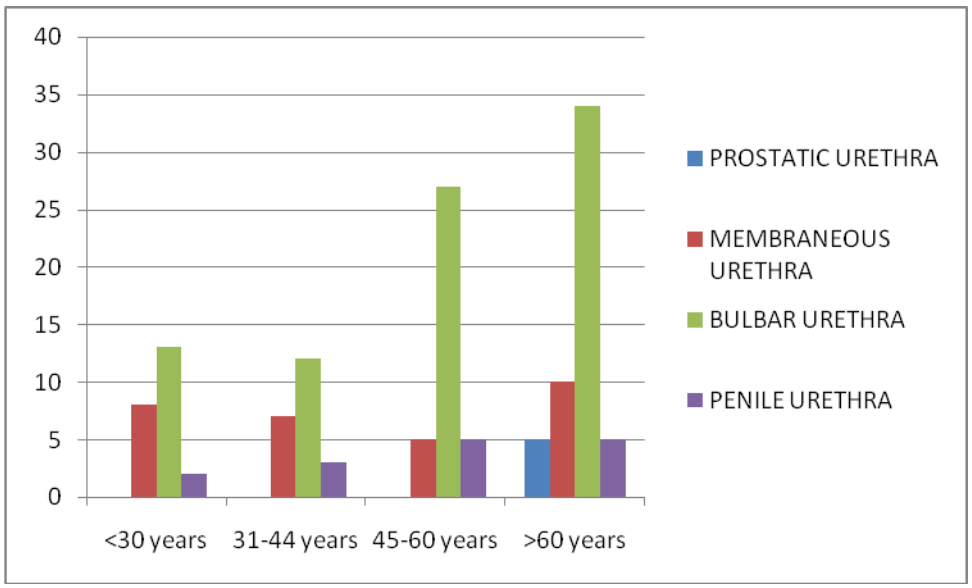
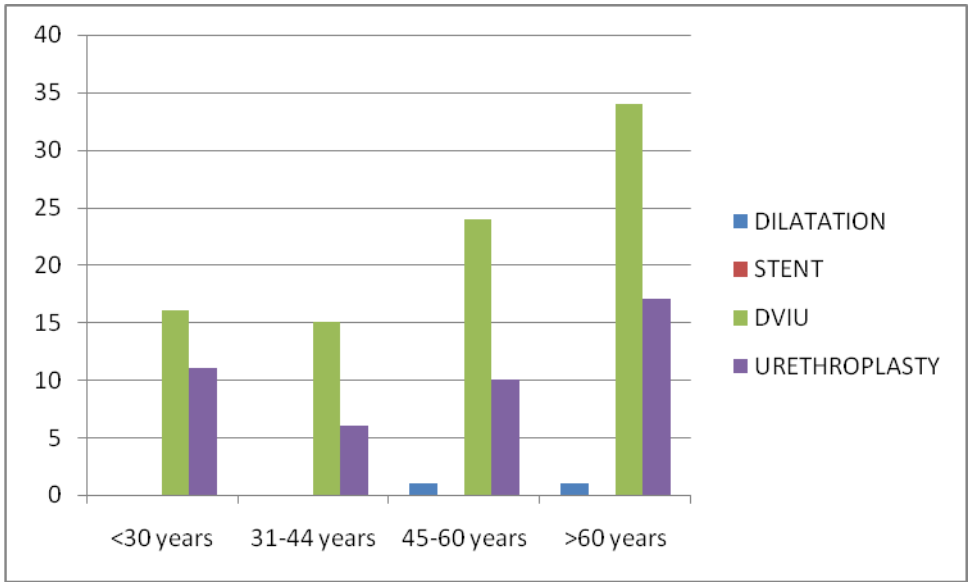


TABLE 3: Mode of treatment by age group for urethral stricture among male Patients seeking urological services at MNH and Tumaini Hospital, Dar es Salaam, March-September, 2011.

TREATMENT GIVEN	AGE GROUPS				Total
	<30	31-44	45-60	>60	
DILATATION	0	0	1(50%)	1(50%)	2
STENT	0	0	0	0	0
DVIU	16(18%)	15(16.9%)	24(27%)	34(38.2%)	89
PRIMARY URETHROPLASTY	8(22.2%)	6(16.7%)	7(19.4%)	15(41.7%)	36
MULTISTAGE URETHROPLASTY	3(37.5%)	0	3(37.5%)	2(25%)	8
OTHER TREATMENT	1(50%)	0	0	1(50%)	2
Total	28	21	35	53	137

Figure 4: Treatment options



DVIU constituted 64% of the provided treatments followed by primary (one stage) urethroplasty (26%) then multistage urethroplasty (6%), while dilatation accounted 2%. One patient received chemotherapy with excision and anastomosis of tumour free margins while one patient had glanduloplasty done post penile amputation together with primary end to end anastomosis, both accounting for 2%.

Early treatment outcome of urethral stricture in relation to treatment given among male patients seeking urological services at MNH and Tumaini Hospital, Dar es Salaam, March-December , 2011.

Out of 111 patient who were enrolled in this study 108(97.3%) successful contacted after 3months for the treatment outcome (3 were missed). Ninety three percent (101) of those who were successfully followed were symptom free, 5 %(6 patients) had recurrence and 1 %(1 patient) had symptom persistence. No complications such as bleeding, infections, extravasations of urine or urethrocutaneous fistula noted during study period.

In 6 patients in whom symptoms recurred, 2 patients were treated by DVIU alone, 2 patients were treated by multistage urethroplasty alone, 1 patient was treated by DVIU and primary urethroplasty (one stage), and one patient was treated by DVIU, primary urethroplasty and multistage urethroplasty.

Symptoms persisted in 1 patient who was treated by DVIU, primary urethroplasty and multistage urethroplasty including the treatment received before enrolenment into the study. All patients were followed for 3months in order to have consistency on treatment outcome.

DISCUSSION

Urethral strictures are rare in women. 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[2,10,32]. As in the findings of this study urethral stricture remains predominantly a disease of males.

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 catherization. This also explains why males are highly predisposed to urethral stricture.

Zango and Kambou in Burkina Faso found an age range of 17-90 years in patients with urethral strictures[31]. Also Mteta and collegues in Moshi, Tanzania found an age range of 3-95 years[32]. Those findings have been reflected in this 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%) with a mean age of 38.48 years [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 injuries leading to urethral strictures: Roehrborn and McConnel had similar findings[33]. 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 could be due to early onset of geriatric diseases such as Hypertensive stroke which predisposes the patient to prolonged catheterization which again predisposes the patient to acute urethral stricture disease. This is similar to what was found by Piechota and colleagues that 12.6% of all hospitalized patients will be catheterized at some point, which goes with the attendant risk of subsequently developing a stricture[34].

Locally the conditions that increase the risks such as inadequately trained staff, poor quality and wrong size catheters, inadequate or insufficient lubrication, inability to catheterize aseptically, prolonged catheterization and ease of developing infections and others were addressed in the study which was done by Mkony and colleagues[10]. 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 others of 22% of urethral strictures in 100 patients being due to inflammatory causes[24]. Although the trend seems to be a tendency towards a decrease, this probably is due to erratic use of antibiotics**.**

The distribution of urethral strictures by site in this study was 74.3% in the anterior urethra and the rest were strictures in the posterior 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 colleagues (52.9%[20)]. Mteta and colleagues also found that 61.4% were strictures in the anterior urethra[32].

DVIU constituted 64% of the provided treatments followed by primary (one stage) urethroplasty (26%) in this study. This is similar to what has been reported in the Urology Clinics of North America[3, 22]. This is also similar to what was reported at KCMC[32] where DVIU was used in 50% followed by urethroplasties 43.2%. Direct Visual Internal Urethrotomy (DVIU) is best suited for strictures less than one centimeter in length independent of the aetiology or location. DVIU and urethroplasty are primary methods of managing urethral stricture with excision of stricture and primary anastomosis for stricture management with intent to cure[18, 19]. The principle is to have one DVIU or dilatation before resorting to urethroplasty but primary urethroplasty is cost effective if a DVIU success rate is less than 35% [21] or in more than a single recurrence after DVIU[28] and in young patients[20]. In this study multistage urethroplasty was done in those patients with longer or multiple strictures accounting for 6% of the provided treatments this was complemented by clean intermittent catheterization(CIC). This is similar to what was reported by Webster et al that the most

important consideration in stricture management is length with multistage repairs being reserved for long or multiple strictures[24, 26]. Success in the treatment of urethral stricture is considered to be absence of obstructive symptoms[27]. In this study 101 patients (91%) were symptom free, in 6(5.4%) patients symptoms recurred during follow up period while in 1(0.9%) patient the symptoms persisted despite the treatment given, therefore the three months overall success rate of 91% was significant although successful DVIU depends on a length less than 1cm, single site, stricture on original as opposed to a neourethra and a caliber more than 15F[19].

Failed urethral stricture repair complicates management due to fibrosis impaired vascularity and limited urethra available for mobilization[35]. This could be the same in those patients who had recurrent stricture or persistent stricture in this study. The duration of follow up of three months was short to assess the treatment outcome. This also could probably explain why few patients reported complications. It was observed that the number of patients with urethral stricture who were awaiting treatment at MNH was high; this could be explained by shortage resources such as urethroplasty kits but also limited number of operating days of patients with urethral stricture. This was contrary to Tumaini Hospital where despite having a small bed capacity it serves a significant number. This may be due to good hospital policy and admistration including having motivated and committed staff.

CONCLUSIONS

Urethral stricture disease remains a predominantly male disease covering a wide range of ages of patients. Iatrogenic and accidental trauma are the commonest causes of urethral strictures cutting across all the age groups. The bulbar urethra remains the commonest site of urethral stricture. Four treatment options of urethral stricture DVIU, primary urethroplasty, multistage urethroplasty and dilatation including clean intermittent catheterization (cic) were adopted as modes of treatment of patients with urethral stricture seeking urological services at Muhimbili National hospital and Tumaini hospital in Dar es Salaam. DVIU remains the commonest mode treatment of patients with urethral stricture seeking urological services at Muhimbili National Hospital and Tumaini Hospital in Dar es Salaam.

Treatment outcomes were similar for the four modes of treatment. However, primary urethroplasty had better outcome than DVIU during the follow up of 3months.

RECOMMENDATION

Continuing medical education should be given to health workers all over the country on proper handling of patients with urethral injuries. Urethral catheterization should be made a safe and sterile procedure which should be individualized as per need including use of K-Y jelly. Patients with urethral stricture should be handled by the experienced urologist due to complexity in its management to reduce complications and improve treatment outcome.

Proper documentation and long term follow up of patients with urethral stricture disease should be insisted in order to have good outcome.

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APPENDIX I

Questionnaire

PATIENT'S NAME: …….

HOSPITAL NUMBER: ……..

PATIENT'S MOBILE NUMBER: ……..

Questionnaire serial number…… **Code number……**

SEX **1**. Male

2. Female

AGE:……. . ……

SYMPTOMS

1. Urine retention Duration ……..……..
2. Poor stream Duration ……..……
3. Dribbling Duration ……..…..
4. High frequency of micturation Duration ……...…….
5. OTHERS (Specify)……

CAUSES 1.Trauma

a) Road traffic accident

b) Bullet injury

c) Falling astraddle on metal bar or heavy objects

d) Direct external violence

e) Others (specify)…….

2. Iatrogenic

a). Catheter

b). Endoscopy 1) TURP

2) Urethrocystoscopy

3 .Infections

4. Dilatation

5. Others (SPECIFY)…….

SITES 1.Prostatic urethra Number of strictures…….

2. Bulbar urethra Number of strictures…….

3. Membranous urethra Number of strictures……

4. Penile Urethra Number of strictures…….

TREATMENT GIVEN

1. Dilatation
2. Stent
3. DVIU
4. Primary urethroplasty 1) Excision and end to end anastomosis

2) Substitutional or onlay urethroplasty

5. Multi stage urethroplasty
6. Others (specify)……

TREATMENT OUTCOME

1. On treatment
2. Symptoms free
3. Symptoms persisted
4. Symptoms recurred
5. Others (specify)……..….

COMPLICTIONS of treatment if any mention…….…….

Duration of follow up from time of treatment…….……..

APPENDIX II

Informed consent Form

ID no _____

Consent to participate in the study assessing the pattern, treatment options and early treatment outcome of urethral strictures among patients seeking urology services at Muhimbili National Hospital and Tumaini Hospital

Greetings! My name is Dr Obadia Venance Nyongole, a postgraduate student at Muhimbili University of Health and Allied Sciences

The purpose of the study

To evaluate the pattern, treatment options and early treatment outcome of urethral strictures among patients seeking urology services at Muhimbili National Hospital, in Dar es Salaam and Tumaini Hospital.

What participation involves

If you agree to participate in the study, you will be requested to submit various supportive documents about your illness to the researcher but also you will be requested to answer the questions on the questionnaire.

Confidentiality

All information collected on questionnaires will be entered into computer with identification number. The questionnaires will be handled with great secrecy in order to maintain confidentiality throughout the study.

Risks

There is no direct risk associated with this study.

Right to withdraw and alternatives

Taking part in this study is completely voluntary. If you choose not to participate in the study, you will continue to receive all services that you would normally get from the hospital.

Benefits

If you agree to take part in this study, you will benefit from knowing fine details about your illness but also close follow up will be beneficial.

In case of any injury

Apart from you providing us various supportive documents about your illness, we do not expect any harm from your participation.

Who to contact

If you have any question about the study, you should contact Dr Obadia V. Nyongole on +255713 535 907.

If you have any questions/concerns about your rights as a participant, you may contact Prof M. Aboud, Chairman of MUHAS Research and Publications Committee. P.O.BOX **65001 Dar es Salaam. Tel 2150302-6**

Signature

I …… have read the content of this form .My questions have been answered. I agree to participate in this study**.**

Signature of participant …….

Signature of witness ……..

Date of signed consent …/…/ 2011

Participant agrees☐ / Participant does NOT agree ☐

APPENDIX III

Kiswahili version of Informed consent

ID no _____

Hati ya ukubali wa kushiriki kwenye utafiti Unaoangalia tatizo,matibabu yanayotolewa na matokeo ya matibabu ya ugonjwa wa kuziba njia ya mkojo katika wagonjwa wanatibiwa hospital ya taifa muhimbili na Hospital ya Tumaini.

Salaam! Naitwa Daktari Obadia Venance Nyongole, mwanafunzi wa uzamili katika chuo kikuu cha Tiba za Afya cha Muhimbili.

Lengo la utafiti

Kuangalia ukubwa wa tatizo, matibabu yatolewayo na matokeo ya matibabu ya ugonjwa wa kuziba njia ya mkojo katika wagonjwa wanaotibiwa katika kitengo cha mkojo hospiali ya Taifa Muhimbili na hosptali ya Tumaini, Dar es salaam.

Ushiriki wako ni wa namna gani?

Ukikubali kushiriki, utaombwa kutoa vielelezo vihusuvyo ugonjwa wako pamoja na kujibu maswali yaliyopo kwenye dodoso.

Usiri

Taarifa zote zilizochukiliwa kupitia dodoso letu, pamoja na vipimo vitatambulika kwa namba na siyo jina ili kuongeza usiri. Usiri huo utalindwa hata baada ya kukamilika kwa utafiti huu.

Madhara

Mbali na muda utakaotumika kwa mahojiano, hatutegemei kwamba utapata madhara yoyote.

Faida

Kama ulikuwa haujui undani juu ya tatizo, utapata bahati ya kufahamu.

Pia tatizo lako litafuatiliwa kwa kina zaidi.

Haki ya kujitoa

Ushiriki wako ni wa hiari, unaweza kujitoa wakati wowote katika utafiti huu. Ukiamua kutokushiriki, utaendelea kupatiwa huduma kama kawaida.

Mawasiliano

Ukiwa na maswali kuhusu utafiti huu, au umeshindwa kuhudhuria cliniki, wasiliana nami **Dr. Obadia Venance Nyongole** kwa nambari ya simu +255713 535907

Ukiwa na maswali kuhusu haki yako kama mshiriki, wasiliana na Prof. Muhsin Aboud, mwenyekiti wa Kitengo cha Utafiti wa Chuo Kikuu cha Afya ya Tiba Muhimbili S.L.P **65001 Dar es Salaam. Tel 2150302-6**

Sahihi

Mimi _____ nimekubali kushiriki utafiti huu baada ya maswali yangu yote kujibiwa.

Sahihi ya mshiriki _____

Sahihi ysa shahidi _____ Tarehe __/___/2011

Mshiriki amekubali ☐ / Amekataa ☐