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PATTERNS OF URETHRAL STRICTURE DISEASE IN ADULT MALES REFFERED FOR RETROGRADE URETHROGRAPHY IN PORT HARCOURT METROPOLIS RIVERS STATE, NIGERIA

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ABSTRACT

Background: Urethral stricture refers to abnormal narrowing of the urethral lumen and is one of the major causes of Bladder Outlet Obstruction (BOO). Urethral Stricture Disease (USD) imposes great burden on both health and quality of life of not only the affected person but also that of the immediate family members. The causes of USD are numerous and the aetiological pattern is changing with time. Trauma related urethral strictures are frequently encountered in our environment and statistical documentations are scanty. **Objective**: In this study was designed to document the demographic and aetiological patterns of urethral stricture disease in Port Harcourt metropolis. **Materials and methods**: This is a cross-sectional retrospective study, which involved review of all urethrogram and radiological reports of patients that underwent Retrograde urethrography from May 2012 to July 2017 in three Diagnostics Centers in Port Harcourt, Rivers State, Nigeria. All radiological reports with demographic variables such as age

and clinical indications and with stricture as the findings were included in this study. A total of 80 cases of urethral strictures were identified and selected purposively for this study based on the inclusion criteria set for this study. Ethical approval and permission to collect data used for this study were obtained from the human research and ethics committees of the various study centers. Descriptive analysis was done using statistical package for social sciences (SPSS) version 21.**Results:** The mean age of the patients was 52.75±4.79 years (mean± standard deviation) and age range of 20 to 79 years. Majority of the subjects were within age group 50-59 years 37.50% (n=30) and the least were within age group 20-29 years 6.25% (n=5). Out of 80 cases of urethral strictures, 46. 25% (n=37) were caused by trauma as the highest and the least was post-prostatectomy 10% (n=8). Of the 80 cases studied, multiple urethral stricture accounted for 68.75% (n=55) and the least single urethral stricture 31.25% (n=25). **Conclusion:** The most common age group was 50-59 years and traumatic aetiology preponderance was noted. Most of strictures were located in the anterior urethra.

Keywords: Aetiological pattern, Urethral stricture disease

INTRODUCTION

Urethral stricture is one of the commonest conditions in urological practice universally with attendant high morbidity [**1, 2, 3]**. It has been documented that Urethral stricture is one of the oldest known burden of the male urethra [**4, 5**] and it refers to abnormal narrowing of the urethral lumen with Bladder Outlet Obstruction (BOO) as a major complication. The urethra in males serves dual function being an outflow pathway for urination and ejaculation of seminal fluid and disturbance with any of these functions often imposes great burden on both health and quality of life of not only the affected person but also that of the immediate family members [**6]**. The real incidence of urethral strictures is not known [**7, 8]**, but it has been estimated that USD affects about 0.6% of the at risk male population [**9**, **10]**,

Urethral stricture is a disease of the anterior urethra according to World Health Organization [**11]**. Some researchers have described the anterior urethral stricture as stricture that affects the male urethra between the tip of the penis and the apex of the prostate [**9]**. The anatomy is important here because male urethral strictures differ in etiology, diagnosis, and management based upon stricture locations.

The urethra is a fibromuscular tube that conducts urine from the bladder (and semen from ductus deferens) to the exterior. It

begins at the neck of the bladder, traverse the pelvis and urogenital diaphragms and ends at the external urethral orifice. Its length varies from 17.5 to 20 cm and consists of anterior and posterior portions, each of which is subdivided into two parts. The anterior urethra is about 15cm long and extends from the external meatus to the inferior edge of the urogenital diaphragm, coursing through the corpus spongiosum. The anterior urethra is conventionally divided into the penile (or pendulous) and bulbous parts at the penoscrotal junction on the basis of clinical and imaging findings.

The posterior urethra is divided into the prostatic and membranous urethras. The prostatic urethra is the widest part of the urethra and is approximately 3.5 cm long. The membranous urethra is so called as it traverses the membranous urogenital diaphragm, which forms (voluntary) external urethral sphincter. It is the narrowest part of the urethra and is about 2cm long. The proximal urethra is prone to injury with pelvic fracture due to the fixed attachment of the distal prostatic and membranous urethras to the pelvic bones [**12]**

The aetiological factors of acquired USD are numerous and their changing patterns in recent times are well documented by many researchers. These causes vary depending on the patient age, race, geography, and socioeconomic status **[2, 10]**. The four major causes of urethral stricture are trauma, inflammation, iatrogenic, and idiopathic [**13]**. Iatrogeny includes healthcare interventions such as instrumentation, catheterization, transurethral resection of the prostate (TURP), open prostatectomy, posthypospadias repair and radiotherapy. In developed countries, the aetiological factors of urethral strictures have been attributed to either iatrogenic or idiopathic depending on the geographical location, while trauma is considered the most frequent cause in developing countries [**14, 15].**

The stricture location varies within the urethra and this largely depends on the aetiology. Therefore, a good knowledge of the etiology is essential as it envisages the stricture location and the success rate of reconstructive surgery [**9]**. Strictures in the bulbar urethra preponderate over other anatomic locations; nevertheless, certain causes are closely associated with an anatomic segment of the urethra [**14]**. The occurrence of idiopathic strictures is frequently in the bulbar urethra **[7**]. Iatrogenic strictures are caused primarily due to instrumentation and tend to occur frequently in the bulbar urethra [**7]**. Trauma to the anterior urethra in the form of blunt

straddle injury occurs commonly in the bulbar urethra, resulting in urethral strictures [**16, 17]**. Strictures associated with hypospadias repair and lichen sclerosus are commonly found in the penile urethra.

The symptoms of urethral stricture are ambiguous and may overlap with other common conditions including lower urinary tract symptoms (LUTS) and urinary tract infections (UTI) causing a mix-up in early diagnosis [**15]**. Urethral stricture most frequently present with progressive decrease in urinary stream and a feeling of incomplete bladder emptying. Other patterns of presentation include decreased force of ejaculation, lower urinary tract symptoms, urinary tract infection, rising post-voidal residual urine volume as well as urinary spraying, dysuria and sometime epididymitis [**18]**.

The magnitude of the complications of USD is enormous. Roughly 90% of men with urethral stricture disease present with complications **[7]** and topmost among these complications include urinary tract infections, bladder calculi, and sepsis. Late complications of urethral stricture such as urinary retention, renal failure and watering can perineum may cause serious challenges to treatment [**19]**. In addition, sexual dysfunction such as erectile dysfunction (ED) and ejaculatory dysfunction may be a complication of urethral stricture disease [**20, 21]**.

In recent times, there are many imaging tools for the confirmation of urethral strictures. However, Retrograde Urethrography (RUG) a time-tested imaging technique remains the best initial investigation for urethral and periurethral imaging in men and is indicated in the evaluation of urethral injuries, strictures, and fistulas [**22, 23]**. It facilitates proper definition of the location, length, number, and degree of strictures as well as the periurethral abnormality. The sensitivity of RUG in the evaluation of urethral strictures is about 75–100% with specificities in the range of 72–97% [**24]**. Retrograde urethrography is a straightforward easy to perform, readily available, reproducible and cost-effective examination that can detect clinically relevant strictures involving the anterior urethra as well as those with extension into the membranous urethra [**25-27]**. RUG may be combined with Voiding Cystourethrography (VCUG) for the evaluation of posterior urethra. Flexible cystoscopy and other radiological imaging modalities such as Ultrasonography, Magnetic Resonance Image (MRI) and computerized tomography (CT) are useful adjunctive diagnostic tools [**28]**.

Surgical therapeutic options abound for the correction of USD but none of these options, according to researchers, is suitable for all types of stricture [**29]**. The treatment modalities are continuously evolving and new techniques are being developed.

There is a surge in civil violence and use of transurethral instrumentation either for therapeutic or diagnostic purposes in our environment and traumatic as well as iatrogenic urethral strictures are becoming important. In this study, we sought to bring to bear the burden of urethral stricture disease in Port Harcourt metropolis taking cognizance of its demographic and aetiological patterns.

MATERIALS AND METHODS

This is a cross-sectional retrospective study, which involved review of all urethrogram and radiological reports of patients that underwent retrograde urethrography from May 2012 to July 2017 in three Diagnostics Centers in Port Harcourt, Rivers State, Nigeria. All radiological reports with demographic variables such as age and clinical indications and with stricture as the findings were included in this study. A total of 80 cases of urethral strictures were identified and selected purposively for this study based on the inclusion criteria set for this study. Ethical approval and permission to collect data used for this study were obtained from the human research and ethics committees of the various study centers. Descriptive analysis was done using statistical package for social sciences (SPSS) version 21(SPSS Inc Chicago., ILL USA).

RESULTS

A total of 80 urethral stricture cases with a mean age of the patient's 52.75±4.79 years (mean± standard deviation) and age range of 20 to 79 years. Majority of the subjects were within age group 50-59 years 37.50% (n=30), followed by 40-49 years 18.75 % (n=15) and the least were within age group 20-29 years 6.25% (n=5) (Table1). Out of 80 cases of urethral strictures, 46. 25% (n=37) were caused by trauma as the highest, followed by inflammatory urethritis 30% (n=24). Iatrogenic causes accounted for 23.75 %(n=19) out of which, post-prostatectomy was 10% (n=8) and prolonged catheterization 13.75% (n=11) (Table 2). Of the 80 cases studied, multiple urethral stricture accounted for 68.75% (n=55) and the least was single urethral stricture 31.25% (n=25) (Figure1). Anterior urethral stricture was 76.25 % (n=61), while posterior stricture was 23.75% (n=19) (Figure 2).

Table 1.0: Frequency and percentage distribution of age group of urethra stricture cases

Age Group (Years)	Frequency (n)	Percentage (%)
20 – 29	5	6.25
30 – 39	8	10.00
40 – 49	15	18.75
50 – 59	30	37.50
60 – 69	12	15.00
70 – 79	10	12.5
Total	80	100

Table 2.0: Frequency and percentage distribution of causes of urethra stricture

Causes of urethra Structure	Frequency (n)	Percentage (%)
Traumatic	37	36.25
Purulent Urethritis	24	30.00
Post Prostatectomy	8	10
Prolonged Catheterization	11	13.75

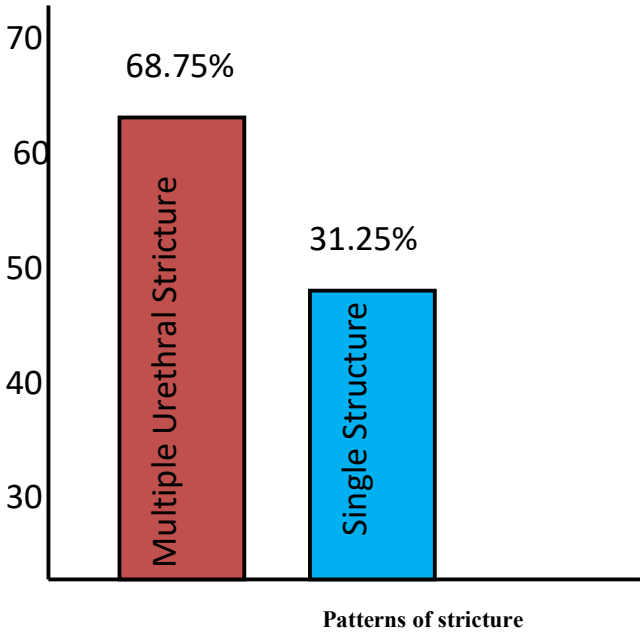

Figure 1: Frequency and percentage distribution of patterns of the urethral stricture

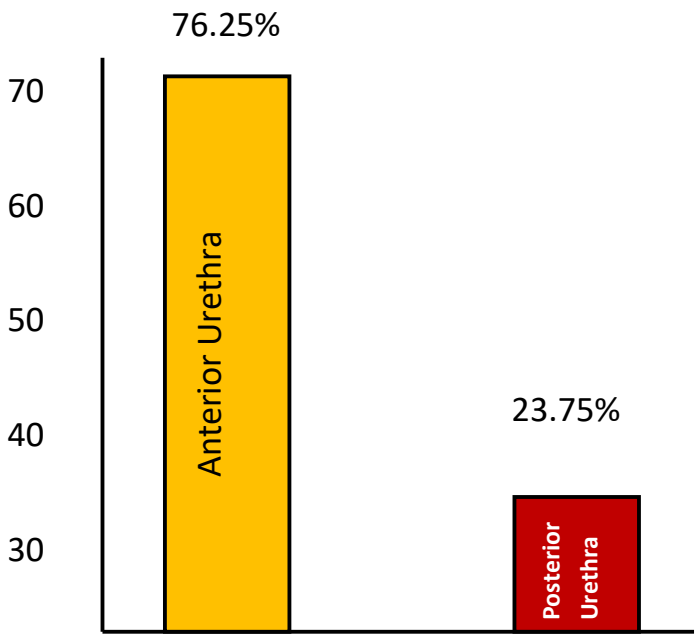

Figure 2: Frequency and percentage distribution of the urethral stricture

DISCUSSION

Accurate diagnosis and proper classification of a disease condition are key elements to successful treatment outcomes in any discipline. This is particularly relevant in the evaluation of urethral stricture as management of urethral stricture has remained a major challenge to the urologist till date [**30**]. Urethral stricture disease is relatively common in men and is multiaethiological with demographic and regional variations**.**

Dermographic variations have been observed with urethral stricture disease. In our study, majority of the urethral stricture cases, were within the age group of 52.75 ± 7.79 years. This finding is in keeping with the findings of similar studies conducted by Irekpita [**4**] in Irrua and Olajide et al., [**31**] in Oshogbo. The mean age of the patients in Irekpita study was 53.11 ± 17.64 years, while Olajide et al., **[31]** reported 52.3 years as the mean age of patients. This is in disagreement with the studies conducted by Weese **[6]** and Ekeke and Amusan [**32**]. In their studies, they reported mean age of 39.8 years and 48 ± 9.24 years respectively. The discrepancies between our findings could be attributed to the different sample size and nature of the study.

The aetiological factors of urethral stricture may be congenital or acquired and in recent times the changing pattern of acquired causes of urethral stricture has been reported. The

most common cause of urethral stricture identified in this study was trauma. This finding is in agreement with findings of similar studies conducted by Stein et al., [**14**], Weese et al., [**6**], Nwafor and Ugezu [**33**] in Nnewi South east Nigeria, Tijani et al., [**34**] in Lagos and Ekereke and Amusen [**32**] in Port Harcourt, Rivers State, Nigeria. In Weese et al., **[6]** study, trauma was reported to be the commonest cause of Urethral Stricture. Nwafor and Ugeze in Nnewi also reported trauma as the commonest cause of urethral stricture 32(51.6%) out of 62 patients. In Ekeke and Amusen **[32**] study, out of 194 patients evaluated, 144 cases (74.22%) were caused by trauma. In Tijani et al., **[34]** study in Lagos, out of 84 patients with urethral strictures, 60 (72.35%) were caused by trauma. Majority of the trauma cases were attributed to Road Traffic Accidents (RTA), ascribed to bad roads, poor road network, poor knowledge of traffic regulations, consumption of alcohol, drugs including marijuana and tramadol [35]. Port Harcourt the administrative headquarters of Rivers State of Nigeria is located in the Niger Delta region with native population balkanized into Upland and Riverine inhabitants. This implies that while RTA is responsible for trauma cases upland, water traffic accidents in the riverine areas account for a considerable number of trauma cases.

In recent times, accidents in the water ways in the Niger Delta region of Nigeria as a contributing factor of trauma is on the increase due to increasing oil bunkering activities and military incursion especially in the narrow and tortuous creeks crisscrossing one another. This was also corroborated by Ekeke and Amusan **[32]**, who in their report linked the causes of trauma as a major aetiological factor of urethral stricture to rise in civil violence especially cult-related activities and accidents following boat mishaps, fall astrides over the edge of canoe and gunshot injuries particularly in the Niger Delta region of Nigeria. In contrast to our finding, Irekpita **[4]** in Irrua, Olajide et al., **[31]** in Oshogbo, Ibrahim et al., [**35**] in Maiduguri reported inflammatory urethritis as the most common cause of urethral stricture. In Irekpita **[4]** study, out of 46 patients 14(30.4%) of the urethral strictures cases were cause by urethritis. Ahmed and Kalayi [**36**], reported 66.5% of the cases were caused by infection while trauma contributed 31.7%. In Ibrahim et al study, out of 91 patients, 53(58.2%) were infective strictures as against post traumatic causes 30 (32.9) in Zaria. Olajide et al., **[31]** in Oshogbo in Nigeria especially reported

infection as the commonest cause of urethral stricture, 58.3% out of 84 cases identified in their study. The discrepancies noted in our studies could be attributed to the difference in sample size, nature of the studies and the geographical variations. In addition, regional differences in etiology, to a large extent, reflect the level of economic and social variations between these regions and in effect, the available health-care resources. In our study we recorded multiple urethral strictures as highest when compared with single stricture. This finding is consistent with the finding of the study conducted by Ahidjo et al., [**26**], which evaluated the radiographic pattern of male urethral strictures in Nigeria. In their study, multiple strictures accounted for 68.9% of cases, while single in 31.1%.

Also in our study, anterior urethral strictures accounted for over 70% of the total cases evaluated with majority involving the bulbar region. This is in agreement with similar studies conducted by Ekeke and Amusan **[32]**. Olajide et al **[31],** Irekpita **[32]** and Ahidjo et al**[26].** In their studies, anterior urethral strictures involving more of the bulbar urethra was found to be highest. According to Ahidjo et al., [**26**] reported 99(96.9%) cases of anterior urethral stricture. Anterior urethral stricture commonly involving the bulbar region of the urethra has been attributed to the inferior position of the urethra relative to the pubis **[12]** predisposes it to astride crush injury following a fall, which is common in this study. The double curve in the bulbar urethra reduces urine flow in that segment as well as the presence of the periurethral glands and abundant corpus spongiosum predisposes the bulbar urethral to infection [**4, 37**].

CONCLUSION AND RECOMMENDATION

The most common age group affected by urethra stricture identified in this study was 50-59 years and traumatic aetiology preponderance was noted. Most of strictures were located in the anterior urethra and multiple strictures were common.

Accidents can be reduced by building of good roads, maintenance of existing ones and compulsory training of drivers in government approved driving schools. Intending drivers should have prescreening assessment such as eye test, alcohol and psychiatric evaluations. Diversification of the economy with purposeful engagement as well as psychological reorientation will reduce unwholesome attitude of the youths. Retrograde Urethrogram should be done and interpreted by the radiologists and timely treatment of urethral injuries by the urologists should be emphasized.

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