

## Management of urethral stricture disease in a tertiary hospital in southern Nigeria

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### Abstract

**Background:** Urethral Stricture Disease (USD) refers to a narrowed segment of the anterior urethra due to a process of fibrosis and cicatrization of the urethral mucosa and surrounding spongiosis tissue (“spongiofibrosis”). Management of USD is challenging. This study describes our experiences in the management of USD.

**Materials and Methods:** This is a six-year retrospective study conducted at the University of Port Harcourt Teaching Hospital. Ethical approval for the study was sought and gotten from the hospital’s ethical committee. The information gotten included history, duration of symptoms, examination findings, age of the patient, stage of disease, intraoperative findings, and post-operative complications. The data from the folders were collected and evaluated. Frequencies, percentages, the mean and standard deviation were used to summarize the data as appropriate.

**Results:** A hospital prevalence of 461/100,000. The mean age  $\pm$ SD of the patients was 44.1  $\pm$ 16.7. The 31 to 40 years old age group had the highest frequency of 46 (29.87%). Patients with a primary level of education had the highest frequency of 56 (50.9%). Most patients were artisans. Most (67.27%) of the strictures were located at the bulbar urethra. The most common procedure for treating USD was a Direct Vision Internal Urethrotomy (DVIU). The most common complication was a recurrence.

**Conclusion:** Patients with urethral stricture disease present late for treatment, the commonest form of treatment was DVIU. The treatment with the best outcome was anastomotic urethroplasty. The commonest complication was a recurrence.

**Keywords:** Urethral stricture disease; Prevalence; Recurrence; Bulbar urethra; Spongiofibrosis; Urethroplasty

### 1. Introduction

Urethral Stricture Disease (USD) refers to a narrowed segment of the anterior urethra due to a process of fibrosis and cicatrization of the urethral mucosa and surrounding spongiosis tissue (“spongiofibrosis”)<sup>1</sup>. It is a scar in the subepithelial tissues of the corpus spongiosum which constricts the lumen of the urethra<sup>2</sup>.

USD is common but its incidence in Nigeria is unknown, its prevalence in the US is around 200/100,000 in younger men and more than 600/100,000 in men older than 65. The estimated annual incidence rate in The US is 0.9%<sup>3</sup>. USD can also affect females although they are rare<sup>4</sup>.

The urethra has glandular, penile, bulbar, membranous and prostatic parts. The disease results in a significant reduction in the quality of life of patients and huge resources are spent yearly in managing it<sup>5</sup>.

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A study by Ekeke et al.<sup>6</sup> on the management of USD was conducted from 2005 to 2015.<sup>6</sup> The authors discussed age, sex, site, and treatment modality. This study continues that by Ekeke et al.<sup>6</sup> from January 2016 to December 2021 and evaluates the relationship between sociodemographic factors and USD. The results of this study will improve the body of knowledge on this topic.

## 2. Material and methods

This was a retrospective study. All patients who presented with features suggestive of USD between January 2016 and December 2021 to the University of Port Harcourt Teaching Hospital UPTH, were included in the study. Port Harcourt is a major capital city in the Niger Delta, the oil and gas zone in Nigeria.

The records of all patients who attended the Urology Outpatient clinic within the period were reviewed and cases who were managed for USD were identified. Data was also obtained from ward admission registers, theatre, and discharge records. The information gotten included the age of the patient, symptoms at presentation, duration of symptoms, complications before presentation, examination findings, diagnostic investigations carried out and findings and treatment received. Patients who had stenosis of the posterior urethra were excluded from the study. All patients with incomplete records were also excluded from the study.

The results of a Retrograde Urethrogram (RUG) or a Micturating Cystourethrogram (MCUG) or both, Urinalysis, microscopy, culture and sensitivity, full blood count and electrolyte urea and creatinine were all retrieved. The treatment received, and complications after treatment were noted. The site of stricture, number of strictures, and length of the stricture were documented. A short segment stricture was defined as one less than 2cm. Any stricture longer than 2cm was considered a long segment stricture. Any stricture with an intervening normal segment was described as being multiple. Every patient had urinary tract infection treated before surgery and had an appropriately sized silicon catheter per urethram for 3 weeks after treatment.

The data were entered using Microsoft Excel 2016 version and transferred into the statistical package for social sciences (SPSS) for windows (version 25) (IBM SPSS Inc. Chicago, IL) for analysis. Ninety-five percent confidence interval and a p-value less than 0.05 was considered significant. Frequencies, percentages, the mean and standard deviation were used to summarize the data as appropriate. The distribution of the strictures by the aetiology, type of investigations, length of stricture and the number of strictures was assessed using the chi-square statistic. Continuous variables were presented in means and standard deviation. Results were presented in tables and charts.

## 3. Results

The case notes of a total of 23,882 patients seen within the period were reviewed and 110 cases of urethral stricture disease were identified giving a hospital prevalence of 461/100,000 patients of all ages. 110 patients were identified to have USD and were included in the study. No female patient presented with features of USD. The socio-demographic data are as documented.

**Table 1** Demographic Data of Respondents

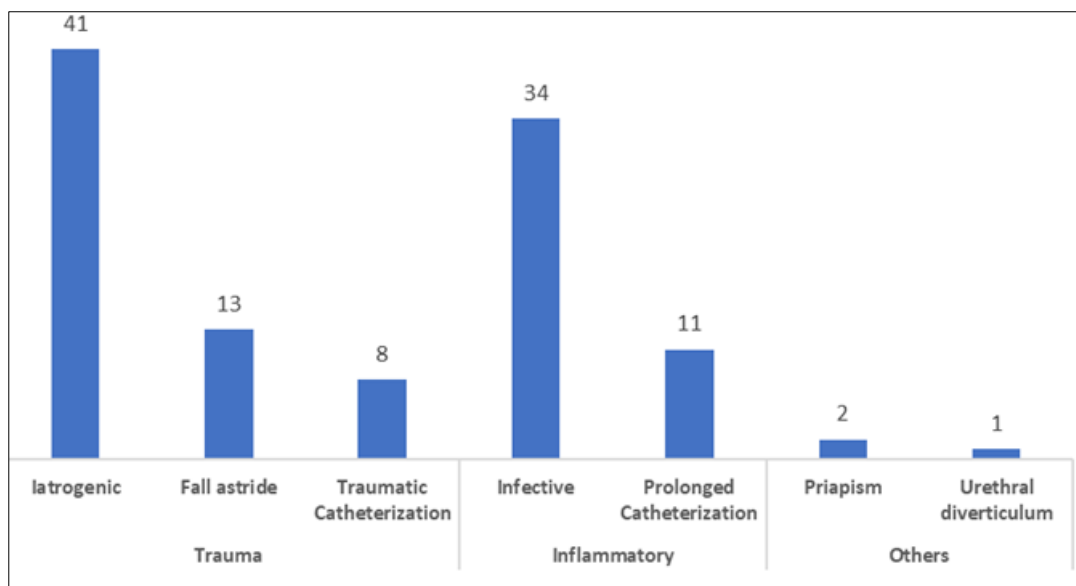
Age groups (years)	Frequency (n=110)	Percentage (%)
≤30	12	3.90
31 – 40	46	29.87
41 – 50	28	27.27
51 – 60	10	12.99
61 – 70	4	6.49
>70	10	19.48
Mean Age ±SD	44.1 ±16.7	

**Table 2** level of education of respondents

Level of Education	Frequency (n)	Percentage %
No formal education	3	2.73
Primary	56	50.90
Secondary	33	30.00
Tertiary	18	16.31
Total	110	100

**Table 3** Occupation of respondents

Occupation	Frequency	Percentage
Artisans	28	25.45
Civil servant	17	15.45
Fisherman	3	2.72
Businessman	26	23.65
Driver	6	5.45
Professional	17	15.45
Farmer	13	11.82
Total	110	100



**Figure 1** Aetiology of strictures

**Table 4** Distribution of Strictures

Site of Stricture	Frequency (n)	Percentage (%)
Bulbar region	74	67.27
Penial urethral	24	21.81
Peno-bulbar	12	10.91
Meatus	2	1.82
Total	110	100.00

**Table 5** Association of strictures and duration of symptoms in subjects

Duration of Symptoms	Bulbar region	Penile urethral	Peno-bulbar	Urethral meatus
≤ 1 day	6(8.11)	2(9.09)	0(0.00)	0(0.00)
1 month	14(18.92)	6(27.27)	0(0.00)	0(0.00)
2- 6 months	7(9.46)	3(13.64)	2(20.00)	2(100.00)
7 - 11 months	13(17.57)	6(27.27)	2(20.00)	0(0.00)
1 - 5 years	18(24.32)	3(12.5)	4(40.00)	0(0.00)
>5 years	16(21.62)	4(18.18)	2(20.00)	0(0.00)
Total	74(100.00)	24 (100.00)	10(100.00)	2(100.00)

Chi-square = 30.90, p = 0.044

The table shows that the distribution of the duration of symptoms across the different strictures was statistically significant. The data showed that most of the persons with bulbar region strictures (24.32%) had symptoms between 1- 5 years. Most of the persons with penial urethral strictures had symptoms for 1 month (27.27%).

**Table 6** Treatment received by respondents

Treatment received	Frequency (n)	Percentage (%)
Dilatation	23	20.91
DVIU	57	51.82
Anastomotic urethroplasty	25	22.73
Staged urethroplasty	2	1.81
Buccal mucosa graft urethroplasty	3	2.72
Total	110	100

**Table 7** Distribution of Complications after treatment

Complications	Frequency	Percentage
None Recorded	82	74.55%
Surgical site infection	6	5.45%
Recurrence	15	13.64%
ED	5	4.55%
Septic shock	2	1.82%
Total	110	100%

**Table 8** Distribution of comorbidity

Comorbidity	Frequency	Percentage
No comorbidity	96	87.27%
Hypertension	4	3.64%
Asthma	2	1.82%
Pott's dx	2	1.82%
Rvd nephropathy (hivan)	2	1.82%
Fibromyalgia	2	1.82%
Diabetes	2	1.82%
Total	110	100.00%

#### 4. Discussion

Urethral stricture is a narrowing of the urethral lumen as a result of ischaemic spongiofibrosis<sup>7</sup>. USD is one of the oldest pathologies of the urethra, for discussions on diagnosis and management of the condition to still be ongoing shows that its management is still a challenge<sup>8</sup>. USD can have significant adverse effects on physical and psychosocial well-being<sup>7,9</sup>.

The mean age in this study was  $44.1 \pm 16.7$  as seen in Table 1. A similar result was noted in a study carried out in Lagos with a mean age of 43.1 years<sup>10</sup> but at variance with another study carried out in Osogbo with a mean age of 52.3 years<sup>11</sup>. The difference in the mean ages may be because the commonest cause of USD in Osogbo was an inflammatory stricture which takes a longer time to develop. In the index study, the commonest cause was iatrogenic.

Fifty-six (50.90%) patients with USD in this study had only a primary level of education and eighteen (16.31%) had a tertiary level of education as seen in Table 2. Level of education seems to be a factor in the aetiology of stricture, those with a higher level of education tend to avoid activities and lifestyles that predispose to stricture formation. The most common occupation in the study group was artisans made up of carpenters, bricklayers, technicians, plumbers, and welders. This follows the argument above. Artisans make up 25.45% of the population as seen in Table 3. Studies have revealed that the disease afflicts people with poor socioeconomic status<sup>11-15</sup>.

The most common site of urethral stricture was the bulbar urethra as shown in table 4, 74 (67.27%) patients presented with bulbar urethral stricture. The curve of the bulbar urethra, located beneath the pubis and the presence of periurethral glands explain this fact<sup>15,16</sup>. Several other studies have noted that bulbar stricture is the most common<sup>6,10,11,13</sup>. The iatrogenic stricture was the most common in this study as shown in Figure 1. Similar findings were noted in other studies<sup>3,17</sup>.

Patients with USD present with symptoms of lower urinary tract obstruction<sup>7</sup>. Lower urinary tract symptoms are divided into voiding and storage. The poor stream seems to be a common symptom in USD<sup>1</sup>.

Most patients in the study presented after they had endured their symptoms for 1 to 5 years, especially for patients with bulbar urethral strictures and this finding was statistically significant. Inflammatory strictures evolve so many patients ignore the symptoms, hence the late presentation. Another factor that can lead to late presentation is ignorance and the poor socioeconomic factors already highlighted<sup>14,15</sup>.

In the management of patients with USD, treatment is individualized and depends on numerous factors such as the patient's age, sex, comorbidity, length, depth, size, site and number of strictures<sup>18,19</sup>. It also depends on the skill of the surgeon and his preference. Symptom score analysis is important for patient evaluation and follow-up<sup>20</sup>. Patient Recorded Outcome Measure (PROM) can be used to assess patients with USD preoperatively and postoperatively. PROM assesses lower urinary tract symptoms, Quality of life, voiding chart and overall health-related quality of life. Urinalysis, microscopy culture and sensitivity are important to identify any infection in urine and the antibiotic needed to treat the infection<sup>21,22</sup>. Uroflowmetry is needed for patients with incomplete urethral strictures to evaluate the urine flow rate<sup>3</sup>. Urethral strictures typically produce a plateau at the level of maximum flow rate. Ideally, uroflowmetry studies should be of more than 150mL in volume to yield reliable results<sup>3,23</sup>. This test is unnecessary for patients with complete strictures since they cannot void per urethram.

In addition, the site, number, severity and length of the stricture were assessed with a Retrograde Urethrograph (RUG) and Micturating Cystourethrograph (MCUG)<sup>3,24</sup>. Ultrasonography was used to assess the depth of spongiofibrosis and the presence of hydronephrosis and residual bladder volume<sup>3,25</sup>. No patient in this study was evaluated with an MRI. MRI to evaluate USD seems like an overkill, but in cases of suspected urethral cancer, it is a valuable tool<sup>3</sup>. In trauma to the perineum, MRI can detect cavernosal injury and this may predict ED<sup>7</sup>. Flexible urethroscopy through the suprapubic cystostomy site was also used to complement the assessment by RUG and MCUG<sup>24,26</sup>.

Urinary diversion to relieve retention is sometimes needed before definitive surgery. Seventy-eight percent of patients had suprapubic cystostomy before definitive surgery. Patients who presented in acute or chronic retention had a cystostomy done. Most had a percutaneous suprapubic cystostomy while 8 had an open suprapubic cystostomy. Patients with multiple perineal fistulae (watering can perineum) had open cystostomy because we could not attain a full bladder. Patients with bladder calculi also had open cystolithotomy before definitive surgery. Cystostomy also helped to control the urinary tract infection before surgery.

Twenty-three (20.91%) patients had urethral dilatation for USD as shown in table 6. Urethral dilatation is the oldest form of treatment for urethral stricture, it is indicated for incomplete urethral stricture. Dilatation is usually palliative except in a short segment stricture with minimal scarring. The use of dilatation as a treatment method has become less popular since the advent of Direct Vision Internal Urethrotomy (DVIU). Urethral dilatation can be carried out using various instruments such as flexible filiform bougies and followers, curved steel dilators and balloon dilators<sup>6,18</sup>. The goal of dilatation is to stretch the scar without tearing it.<sup>18</sup> Bleeding after dilatation may mean that the scar has been torn and not stretched. The least traumatic method to stretch the urethra is to use a soft instrument over multiple treatment sessions. Using a firm guidewire placed endoscopically to guide the dilatation seems to prevent a false passage<sup>18</sup>. Complications of dilatation include false passage, bleeding, and sepsis<sup>27</sup>.

In this study 57(51.82%) patients had DVIU as shown in table 6. Internal urethrotomy refers to any procedure that opens the stricture by incising it transurethrally.<sup>18</sup> It is also known as optical urethrotomy. This technique has gained popularity because of the short duration of hospital stays. The procedure can be carried out on patients with poor performance status. It is also indicated for passable urethral strictures with minimal spongiofibrosis. After the procedure, a urethral catheter is passed and retained until wound contraction occurs<sup>18</sup>. The most common complication of DVIU is a recurrence<sup>18,28</sup>. In this study intraurethral instillation of steroids and steroid injections were used to prevent a recurrence. Tissue engineering and scar modulation are also techniques used to prevent recurrence but were not used in this study<sup>28,29,30</sup>. Other complications following DVIU include UTI and extravasation of irrigation fluids.

Anastomotic urethroplasty is the technique that gives the highest success rate in good hands<sup>18,31</sup>. It is believed that the best substitute for the urethra is the urethra, so excising the fibrotic stricture segment, spatulating the urethral ends and creating a tension-free anastomosis yields the best outcome. It can be carried out for complete strictures too. Short-segment bulbar strictures are best managed using this technique. Urethroplasty as an intervention with a higher long-term success rate should be offered earlier in USD management since it has the best outcome instead of other endoscopic techniques<sup>31</sup>. The reconstructive ladder in the management of USD is no longer advocated<sup>15</sup>. In this study twenty-five patients had anastomotic urethroplasty as shown in Table 6<sup>18</sup>. Sometimes the urethroplasty can be staged, and a perineal urethrotomy is created in the first stage with the stricture segment anastomosed to the perineal skin. This is subsequently tabularized in another stage. In the index study, two patients had staged urethroplasty.

Substitution Urethroplasty can also be carried out in which substitutes such as buccal mucosa, bladder mucosa and penile skin can be used to reconstruct the urethra in a single stage or staged procedure. Irekpita et al<sup>15</sup>. in Irrua, offer buccal mucosa graft urethroplasty for bulbar urethral strictures and Johanson's two-stage urethroplasty for penile strictures. Patients in this study had buccal mucosa graft as a staged procedure as shown in Table 6.

Urethroplasty should be carried out for patients who are fit with good performance status. In this study 96 (87.27%) patients had no comorbidity. The relatively young mean age (44.1±16.7) of the patient can account for this finding. No patient with severe comorbidity had urethroplasty.

After urethroplasty patients were followed up for at least 6 months. Eighty-two (74.55%) patients had good urine flow rate on uroflowmetry. The most common complication in this study was a recurrence of the stricture with 15 (13.64%) patients presenting with recurrence. Only one patient who had anastomotic urethroplasty had a recurrence. Two patients had septic shock after DVIU and had to be managed with judicious antibiotics and dopamine. Five patients had ED after urethroplasty as shown in the table, four of them sustained a traumatic urethral injury which led to the stricture. We feel the trauma could have led to the ED.

## 5. Conclusion

Patients with urethral stricture disease present late for treatment, the commonest form of treatment was DVIU. The treatment with the best outcome was anastomotic urethroplasty. The commonest complication was a recurrence.

### *Recommendation*

- Early presentation to the hospital with early symptoms of bladder outlet obstruction
- Proper patient selection to prevent a recurrence.

### *Limitations of study*

- Small sample size
  - Retrospective study
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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors declare no conflict of interest.

### *Statement of ethical approval*

Ethical approval was sought and obtained from the Hospitals' ethical committee.

### *Statement of informed consent*

This was a retrospective study, no informed consent was obtained from patients.

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## References

- [1] Lumen N, Campos-Juanatey F, Greenwell T, Martins FE, Osman NI, Riechardt S, Waterloos M, Barratt R, Chan G, Esperto F, Ploumidis A. European Association of Urology guidelines on urethral stricture disease (part 1): management of male urethral stricture disease. *European Urology*. 2021 Aug 1, 80(2):190-200.
- [2] Reynard J, Brewster S, Biers S. *Oxford Handbook of Urology*. Third edition. UK: Oxford University Press, 2013:124-127.
- [3] Abdeen BM, Badreldin AM. Urethral Strictures. *StatPearls [Internet]* 2021 Jul 28. StatPearls Publishing.
- [4] Smith AL, Ferlise VJ, Rovner ES. Female urethral strictures: successful management with long-term clean intermittent catheterization after urethral dilatation. *BJU international*. 2006 Jul, 98(1):96-9.
- [5] Santucci RA, Joyce GF, Wise M. Male urethral stricture disease. *The Journal of urology*. 2007 May, 177(5):1667-74.
- [6] Ekeke ON, Amusan OE. Clinical presentation and treatment of urethral stricture: Experience from a tertiary hospital in Port Harcourt, Nigeria. *African Journal of Urology*. 2017 Mar 29, 23(1):72-7.
- [7] Mangir N, Chapple C. Recent Advances in treatment of urethral stricture disease in men. *F1000Research*. 2020, 9.
- [8] Favorito LA. Urethral stricture: the oldest urologic disease in 2017. *International Braz j Urol*. 2017 Jan, 43:1-2.
- [9] Whybrow P, Rapley T, Pickard R, et al.: How Men Manage Bulbar Urethral Stricture by Concealing Urinary Symptoms. *Qual Health Res*. 2015, 25(10):1435–42. 10.1177/1049732315573208

- [10] Tijani KH, Adesanya AA, Ogo CN. The new pattern of urethral stricture disease in Lagos, Nigeria. *The Nigerian postgraduate medical journal*. 2009 Jun 1, 16(2):162-5.
- [11] Olajide AO, Olajide FO, Kolawole OA, Oseni I, Ajayi AI. A retrospective evaluation of challenges in urethral stricture management in a tertiary care centre of a poor resource community. *Nephro-Urology Monthly*. 2013 Nov, 5(5):974.
- [12] Rourke K. The epidemiology, clinical presentation, and economic burden of urethral stricture. In: *Advanced Male Urethral and Genital Reconstructive Surgery 2014* (pp. 83-93). Humana Press, New York, NY.
- [13] Bello JO. Impact of preoperative patient characteristics on post urethroplasty recurrence: the significance of stricture length and prior treatments. *Nigerian Journal of Surgery*. 2016 Sep 12, 22(2):86-9.
- [14] Mondal S, Bandyopadhyay A, Mandal MM, Pal DK. Erectile dysfunction in anterior urethral strictures after urethroplasty concerning vascular parameters. *medical journal armed forces India*. 2016 Oct 1, 72(4):344-9.
- [15] Irekpita E. A 10-year review of urethral stricture management in Irrua, Nigeria. *Nigerian Journal of Surgery: Official Publication of the Nigerian Surgical Research Society*. 2017 Jul, 23(2):119.
- [16] Rourke KF, Welk B, Kodama R, Bailly G, Davies T, Santesso N, Violette PD. Canadian Urological Association guideline on male urethral stricture. *Canadian Urological Association Journal*. 2020 Oct, 14(10):305.
- [17] Tritschler S, Roosen A, Füllhase C, Stief CG, Rübber H. Urethral stricture: aetiology, investigation and treatments. *Deutsches Ärzteblatt International*. 2013 Mar, 110(13):220
- [18] McCammon AK, Zuckerman JM, Jordan GH. Surgery of the Penis and Urethra. In: Kavoussi LR, Partin AW, Peters CA (Editors). *Campbell Walsh Urology*. 11th edition, Philadelphia, USA: Elsevier Saunders, 2016: 907- 935.
- [19] Reynard J, Brewster S, Biers S. *Oxford Handbook of Urology*. Third edition. UK: Oxford University Press, 2013:74-76.
- [20] Victor A, Okigbeye D. Benign Prostatic Enlargement, the International Prostate Symptoms Score and a Review of Other Symptom Scores. *Open Journal of Urology*. 2022 Aug 18, 12(8):427-39.
- [21] Reiss CP, Rosenbaum CM, Becker A, Schriefer P, Ludwig TA, Engel O, Riechardt S, Fisch M, Dahlem R. The T-plasty: a modified YV-plasty for highly recurrent bladder neck contracture after transurethral surgery for benign hyperplasia of the prostate: clinical outcome and patient satisfaction. *World journal of urology*. 2016 Oct, 34(10):1437-42.
- [22] Eshioho I, Ehizomen E, Omosofe F, Onuora V. Buccal mucosal graft urethroplasty for proximal bulbar urethral stricture: A revisit of the surgical technique and analysis of eleven consecutive cases. *Nigerian Medical Journal: Journal of the Nigeria Medical Association*. 2016 Sep, 57(5):266.
- [23] Tam CA, Voelzke BB, Elliott SP, Myers JB, McClung CD, Vanni AJ, Breyer BN, Erickson BA. Critical analysis of the use of uroflowmetry for urethral stricture disease surveillance. *Urology*. 2016 May 1, 91:197-202.
- [24] Gelman J, Furr J. Urethral stricture disease: Evaluation of the male urethra. *Journal of Endourology*. 2020 May 1, 34(S1) :S-2.
- [25] Theisen KM, Kadow BT, Rusilko PJ. Three-dimensional imaging of urethral stricture disease and urethral pathology for operative planning. *Current urology reports*. 2016 Aug, 17(8):1-7.
- [26] Chapple C, Andrich D, Atala A, Barbagli G, Cavalcanti A, Kulkarni S, Mangera A, Nakajima Y. SIU/ICUD consultation on urethral strictures: the management of anterior urethral stricture disease using substitution urethroplasty. *Urology*. 2014 Mar 1, 83(3): S31-47.
- [27] Archampong EQ, Naaeder SB, Ugwu B (editors). *Principles and practice of surgery including pathology in the tropics* 5th edition, Accra: Assemblies of God Literature Centre Ltd, 2009: 941- 945.
- [28] Gallegos MA, Santucci RA. *Advances in urethral stricture management*. F1000Research. 2016, 5.
- [29] Veeratterapillay R, Pickard RS. Long-term effect of urethral dilatation and internal urethrotomy for urethral strictures. *Current opinion in urology*. 2012 Nov 1, 22(6):467-73.
- [30] Smith III TG. Current management of urethral stricture disease. *Indian journal of urology: IJU: journal of the Urological Society of India*. 2016 Jan, 32(1):27.
- [31] Moynihan MJ, Voelzke B, Myers J, Breyer BN, Erickson B, Elliott SP, Alsikafi N, Buckley J, Zhao L, Smith T, Vanni AJ. Endoscopic treatments before urethroplasty: trends in the management of urethral stricture disease. *BMC urology*. 2020 Dec, 20(1):1-6.