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ORIGINAL RESEARCH

Patient satisfaction and associated factors after urethroplasty for urethral stricture disease in northern Tanzania: a prospective cohort study

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Purpose: Patient satisfaction after urethroplasty is underexplored, as traditional outcome assessments rely on objective measures, like imaging and invasive tests, overlooking patients' perspectives and the associated factors that influence their overall experience.

Materials and methods: A prospective cohort study was conducted between August 2024 and July 2025 at Kilimanjaro Christian Medical Centre (KCMC), a tertiary referral hospital in northern Tanzania. Male patients undergoing urethroplasty for urethral stricture disease were consecutively enrolled using convenience sampling. Preoperative and three-month postoperative assessments were done using the Urethral Stricture Surgery Patient-Reported Outcome Measure (USS-PROM) tool. Data on demographics, clinical characteristics, symptoms, postoperative treatment satisfaction at three months, and quality of life (QoL) were collected using a Swahili-translated questionnaire. Data were analysed using IBM SPSS version 25, with paired t-tests and relative risk used to assess changes and associations.

Results: A total of 32 male patients (mean age 54 ± 19 years) underwent urethroplasty. Trauma was the most common cause (75%), and the bulbar urethra was the most affected site (78%). At the three-month follow-up, 81.3% of patients reported being very satisfied with their surgical outcomes, while 18.7% were dissatisfied. Among satisfied patients, significant improvements were observed in lower urinary tract symptom (LUTS) severity, QoL, and urine stream ($p < 0.001$). Dissatisfaction was associated with age ≥ 45 years, immediate postoperative complications, stricture recurrence, and lower USS-PROM score reductions in LUTS and QoL domains ($p < 0.05$).

Conclusion: Most patients reported high satisfaction with urethroplasty outcomes. However, dissatisfaction was linked to older age, complications, and poor symptom improvement. Our findings underscore the value of incorporating patient-reported outcome measures (PROM) in routine postoperative follow-up.

Keywords: USS-PROM, urethral stricture, urethroplasty, satisfaction, dissatisfaction

Introduction

Urethral stricture disease is a leading cause of LUTS in men, typically resulting from fibrosis and scarring of the anterior urethra and surrounding tissues. It commonly affects men over 55, with a mean onset age of 45 years, and the bulbar urethra is involved in about 47% of cases.[1] In developing countries, trauma is the most frequent cause, reflecting higher rates of road traffic injuries and weaker healthcare infrastructure. In contrast, strictures in developed countries are often of unknown origin. These patterns highlight the impact of socio-economic and healthcare differences on disease prevalence and aetiology.[2]

Urethral stricture disease in sub-Saharan Africa is a major health burden among men, with complications such as acute urine retention (14–52%), urinary tract infections (14–61%), fistulas (4–7%), chronic renal impairment (6%), and urolithiasis (3–10%). Hospitalisation and surgical needs were reported in 11% and 7% of cases, respectively. Leading causes include trauma (33–74%), iatrogenic injury from catheterisation (45–56%), and urethritis (44–97%). Urethroplasty was the primary treatment in 28–68% of cases, though its overall success rate is unclear in the available data.[3]

Urethroplasty is considered the gold standard for managing urethral stricture disease due to its higher success rate compared with endoscopic treatments or dilatations.[4] However, this shift has raised concerns among reconstructive urologists regarding subjective postoperative evaluation. Surgical techniques used in urethroplasty may risk damaging the cavernous or perineal nerves, potentially affecting erectile function through reflex mechanisms, as well as compromising bulbar artery flow. These factors may contribute to postoperative erectile dysfunction, highlighting the need for careful assessment of functional outcomes beyond anatomical success.[5]

Urethroplasty outcomes have long been evaluated using objective tools like retrograde urethrogram (RUG), uroflowmetry, and urethroscopy, focusing on physician assessments. However, these methods often overlook key aspects of patient satisfaction, which can only be captured through subjective follow-up evaluations.[6] Current guidelines recommend the use of PROMs as predictors of urethroplasty success, since they are equally important as objective measures for effective reporting of urethroplasty outcomes, which include assessment of subjective voiding symptoms, pain, mobility, and health-related QoL.[7]

Traditionally, urethroplasty success is assessed using the International Prostate Symptom Score (IPSS) or the American Urological Association Symptom Score (AUA-SS), both designed to evaluate LUTS due to benign prostatic obstruction. However, these tools may overlook important aspects specific to urethral reconstruction.[7] Given the broader physical and emotional effects

of urethral stricture disease, ranging from voiding and sexual dysfunction to psychological distress, a comprehensive, disease-specific tool (the USS-PROM) has been developed and is now recommended for postoperative evaluation during follow-up visits.[1]

This study assessed patient satisfaction after urethroplasty and identified factors linked to dissatisfaction. A Swahili-translated version of the USS-PROM was used during three-month follow-ups to capture patients' subjective experiences. The study's findings may reduce reliance on costly, invasive follow-up procedures by using patient-reported outcomes to assess surgical success. This approach can improve time management, reduce hospital visits, and support the revision of local clinical guidelines, ultimately promoting more effective, patient-centred care and better QoL for those affected.

Materials and methods

This was a three-month prospective cohort study conducted between August 2024 and July 2025, assessing patients preoperatively to obtain baseline scores and at three months postoperatively to assess changes in their USS-PROM satisfaction scores. The study included all male patients diagnosed with urethral stricture disease who underwent urethroplasty during the study period. It excluded patients planned for urethroplasty who were postponed due to uncontrolled blood pressure or blood glucose levels, an unknown human immunodeficiency virus viral load, or those scheduled for first-stage urethroplasty.

The Swahili-translated USS-PROM questionnaire was pretested for cultural adaptation before recruitment of the first participant. Written informed consent was obtained from all participants, and de-identifiers were used instead of names. A convenient sampling technique was used, and all eligible patients were enrolled consecutively during the study period until the minimum sample size was reached. Ethical approval was sought from the College Research Ethics and Review Committee of Kilimanjaro Christian Medical University College (PG 198/2024).

Variables and data collection

Independent variables included age, comorbidity, area of residence, presence of a suprapubic catheter before surgery, preoperative urine sterility, stricture aetiology, location, urethral stricture calibre and length, type of surgery, and immediate postoperative complications. The dependent variable was the PROM score, assessing preoperative and postoperative patient satisfaction.

Patients confirmed with urethral stricture disease were recruited after admission. Data were collected using a Swahili-translated USS-PROM questionnaire, comprising five sections: (A) demographic data, (B) LUTS severity and impact on QoL, (C) a Peeling's pictorial voiding diagram to rate urine stream strength, (D) treatment satisfaction and reasons for dissatisfaction, and (E) overall health-related QoL. Furthermore, any history of wound complications, stricture recurrence, and postoperative sexual dysfunction was recorded.

The LUTS domain included six symptom questions scored 0–4 (total 0–24). The LUTS-specific QoL question assessed symptom interference in daily activities. Peeling's voiding picture provided a visual assessment of urine flow. Treatment satisfaction was measured by patients' overall contentment with their surgery and willingness to repeat the procedure.

Data analysis plan

All the obtained data were entered, cleaned, and analysed using IBM SPSS version 25 for Windows. Continuous data were summarised by measures of central tendency (mean and standard deviation). Proportion and frequency tables were used to summarise categorical variables. A paired t-test was used to assess mean changes of USS-PROM parameters at follow-up points. Relative risk was used to assess the association between factors of dissatisfaction and the level of dissatisfaction. Statistical significance was considered at $p < 0.05$.Figure 1: Study flow chart

Results

A total of 32 patients (mean age 54 ± 19 years) underwent urethroplasty for urethral stricture disease between August 2024 and July 2025. Upon clinical evaluation, only 11 participants (34%) had comorbidities. The most common stricture aetiology was trauma (24, 75%), and 25 participants (78%) had a bulbar urethral stricture. Of the participants, 53% had incomplete strictures, and the mean stricture length was 21.30 ± 13.04 mm. In preoperative urine sterility evaluations, 53% of samples showed evidence of bacterial infection on urine culture. Anastomotic urethroplasty was the most frequently performed surgery in 21 patients (65.6%) (Table I).

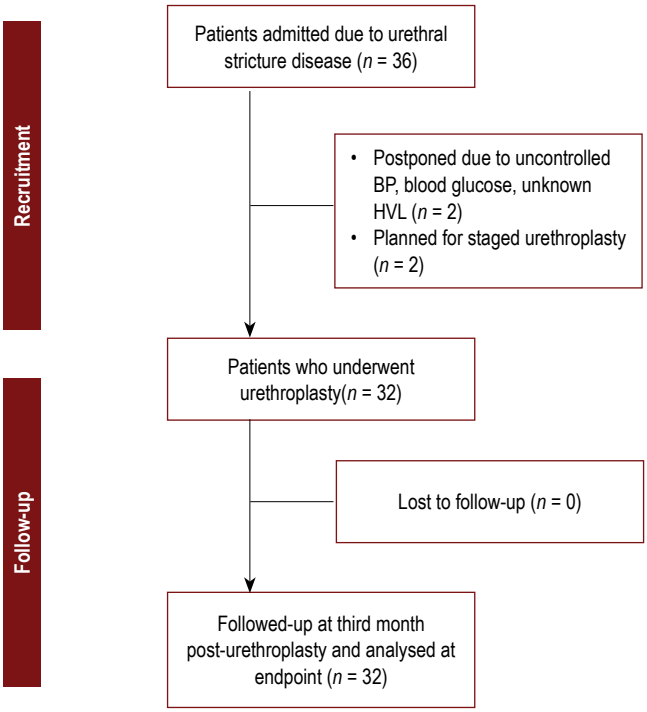

Figure 1: Study flow chart
BP – blood pressure, HVL – human immunodeficiency virus viral load

Table I: Socio-demographic and baseline characteristics of patients who underwent urethroplasty (*n* = 32)

Variables	*n*	%
Age (years)		
≤ 45	9	28.1
> 45	23	71.9
Mean (SD)	54.69 (19.16)	
Comorbidity status		
Comorbid	11	34.4
Non-comorbid	21	65.6
Stricture aetiology		
Trauma	24	75.0
Infection	8	25.0
Stricture site		
Bulbar urethra	25	78.1
Bulbomembranous urethra	6	18.8
Penile urethra	1	3.1
Stricture calibre		
Incomplete	17	53.1
Complete	15	46.9
Stricture length (mm)		
< 20	15	46.9
≥ 20	17	53.7
Mean (SD)	21.30 (13.04)	
Preoperative urine sterility		
Infected	17	53.1
Non-infected	15	46.9
Procedure performed		
Anastomotic	21	65.6
Buccal mucosal graft	9	28.1
Second-stage	2	6.3

SD – standard deviation

Satisfaction of patients who underwent urethroplasty using USS-PROM after three months

All 32 participants enrolled during the study period reached the third month of follow-up post-urethroplasty (Figure 1) and completed the USS-PROM questionnaire, as they had before surgery. Of the participants, 26 (81.3%) reported being very satisfied with the urethroplasty outcome, while 6.3% and 12.5% reported being unsatisfied and very unsatisfied, respectively. Among the six dissatisfied participants, four (66.7%) reported that their condition (voiding) did not improve after surgery (Table II).

Table II: USS-PROM treatment satisfaction at three months among patients who underwent urethroplasty (*n* = 32)

Satisfaction level	*n*	%
Yes, very satisfied	26	81.3
No, unsatisfied	2	6.3
No, very unsatisfied	4	12.5
Among participants who were "unsatisfied" or "very unsatisfied" (*n* = 6)		
The urinary condition did not improve	4	66.6
The urinary condition improved, but developed another problem	1	16.7
The urinary condition did not improve, and there was another problem	1	16.7

USS-PROM – Urethral Stricture Surgery Patient-Reported Outcome Measure

Distribution of parameters in USS-PROM treatment satisfaction groups

When evaluating the distribution of USS-PROM parameters and their changes from baseline to three months in satisfaction groups, there was no significant decrease in mean LUTS severity or QoL scores among participants who were dissatisfied with their surgical outcome. However, the mean Peeling's voiding picture score decreased significantly [LUTS: Mean Difference (MD) = 3.5; p = 0.139, QoL: Mean Difference (MD) = 1.33; p = 0.062, and Peeling's voiding picture score: Mean Difference (MD) = 1.0; p = 0.041, respectively]. All these parameters decreased significantly among participants who reported being satisfied with their surgery outcome (Table III).

Factors associated with dissatisfaction among patients managed by urethroplasty for urethral stricture disease

On assessing factors associated with dissatisfaction, participants aged ≥ 45 years had a five-fold higher risk of dissatisfaction with urethroplasty outcomes compared with their counterparts (relative risk [95% confidence interval]: 5.11 [1.13 to 23.19]; p = 0.038). Also, participants who experienced postoperative complications immediately after surgery and those who had a recurrence of stricture within three months after surgery had a 27-fold higher risk of dissatisfaction with the outcomes of urethroplasty (p < 0.001).

Table III: Distribution of parameters in USS-PROM treatment satisfaction groups (*n* = 32)

USS-PROM treatment satisfaction		Baseline mean (SD)	Three-month mean (SD)	Mean difference (SD)	95% CI	*p*-value
Unsatisfied/very unsatisfied	LUTS severity scores	13.50 (2.26)	10.00 (6.59)	-3.50 (4.85)	-10.02 to 2.02	0.139
	LUTS-specific QoL question	3.00 (0.00)	1.67 (1.37)	-1.33 (1.37)	-2.77 to 0.10	0.062
	Peeling's voiding picture scores	3.67 (0.52)	2.67 (0.52)	-1.00 (0.89)	-1.94 to -0.06	0.041
Very satisfied	LUTS severity scores	15.77 (3.60)	0.27 (0.67)	-15.50 (3.59)	-16.95 to -14.05	< 0.001
	LUTS-specific QoL question	2.92 (0.27)	0.04 (0.19)	-2.88 (0.33)	-3.02 to -2.75	< 0.001
	Peeling's voiding picture scores	3.38 (0.64)	1.54 (0.65)	-1.85 (0.54)	-2.07 to -1.63	< 0.001

CI – confidence interval, LUTS – lower urinary tract symptoms, QoL – quality of life, SD – standard deviation, USS-PROM – Urethral Stricture Surgery Patient-Reported Outcome Measure

Table IV: Factors associated with dissatisfaction among patients who underwent urethroplasty (*n* = 32)

Variable	Satisfaction			RR (95% CI)	*p*-value*
	Total (*n* = 32)	Dissatisfied (*n* = 6)	Satisfied (*n* = 26)		
Age (years)					
≥ 45	23 (71.9)	4 (44.4)	5 (55.6)	5.11 (1.13 to 23.19)	0.038
< 45	9 (28.1)	2 (8.7)	21 (91.3)		
Comorbidity status					
Comorbid	11 (34.4)	2 (18.2)	9 (81.8)	0.96 (0.21 to 4.42)	1.0
Non-comorbid	21 (65.6)	4 (19.0)	17 (81.0)		
Stricture aetiology					
Trauma	24 (75.0)	5 (20.8)	19 (79.2)	1.67 (0.23 to 12.22)	1.0
Infection	8 (25.0)	1 (12.5)	7 (87.5)		
Stricture site					
Bulbar urethra	25 (78.1)	5 (20.0)	20 (80.0)	1.40 (0.19 to 10.11)	1.0
Non-bulbar	7 (21.9)	1 (14.3)	6 (85.7)		
Stricture calibre					
Complete	15 (46.9)	5 (33.3)	10 (66.7)	0.18 (0.02 to 1.35)	0.076
Incomplete	17 (53.1)	1 (5.9)	16 (94.1)		
Stricture length (mm)					
≥ 20	17 (53.1)	1 (6.7)	14 (93.3)	0.23 (0.03 to 1.73)	0.178
< 20	15 (46.9)	5 (29.4)	12 (70.6)		
Procedure performed					
Anastomotic	21 (65.6)	5 (23.8)	16 (76.2)	2.62 (0.35 to 19.73)	0.637
Buccal mucosal graft/second stage	11 (34.4)	1 (9.1)	10 (90.9)		
Immediate postoperative complication					
Complication	5 (15.6)	5 (100)	0 (0.0)	27.0 (3.94 to 184.79)	< 0.001
No complication	27 (84.4)	1 (3.7)	26 (96.3)		
Recurrence of stricture within three months					
Yes	5 (15.6)	5 (100.0)	0 (0.0)	27.0 (3.95 to 184.79)	< 0.001
No	27 (84.4)	1 (3.7)	26 (96.3)		
Decrease in USS-PROM LUTS domain score					
≤ 10 points	8 (25.0)	5 (62.5)	3 (37.5)	15.0 (2.05 to 109.99)	0.002
> 10 points	24 (75.0)	1 (4.2)	23 (95.8)		
Decrease in USS-PROM LUTS-related QoL score					
< 3 points	7 (21.9)	4 (57.1)	3 (42.9)	7.14 (1.63 to 31.25)	0.012
≥ 3 points	25 (78.1)	2 (8.0)	18 (92.0)		
Decrease in USS-PROM Peeling's picture score					
< 2 points	10 (31.2)	2 (40.0)	6 (60.0)	4.4 (0.96 to 20.19)	0.06
≥ 2 points	22 (68.8)	4 (9.1)	20 (90.1)		

* Fisher's exact test
CI – confidence interval, LUTS – lower urinary tract symptoms, QoL – quality of life, RR – relative risk, USS-PROM – Urethral Stricture Surgery Patient-Reported Outcome Measure

Furthermore, participants who experienced a decrease in their LUTS domain score of less than 10 points and QoL score of less than 3 points after three months had 15- and 7-fold higher risks of dissatisfaction with urethroplasty outcomes, respectively, compared with their counterparts (Table IV).

Discussion

Using a validated USS-PROM is strongly recommended in recent urological guidelines, including the European Association of Urology's guideline. This is due to its psychometric validity in assessing patient-derived benefit from urethroplasty and its impact on QoL among men.[1]

In our study, we found that 81% of study participants were satisfied with the outcomes of urethroplasty surgery after the third month. The remaining participants were dissatisfied because their urinary conditions did not improve. This is consistent with findings from the United Kingdom, Russia, Brazil, and Kenya, where the USS-PROM satisfaction rate among men undergoing urethroplasty ranged between 77% and 87%.[8-11]

The consistency in overall satisfaction could be attributed to the similarity in the types of urethroplasties performed, in which all studies incorporated anastomotic and buccal mucosal grafts – techniques with reportedly higher success rates. Furthermore, all studies observed a significant decrease in LUTS severity as determined by the USS-PROM. This reflects patients' relief from obstructive and storage urinary symptoms, resulting in a noticeable improvement in their QoL after surgery.[12]

The satisfaction rate was higher among Indian and Colombian men who underwent urethroplasty, ranging from 93% to almost 97%.[13,14] This difference might be attributed to the techniques used in the Indian study, which employed only non-transecting methods. These have minimal effect on the erectile function of patients, and assessment was done after 12 months; therefore, psychological improvement in patients' sexual function could overrule the impact of surgery.[15] Furthermore, in the eastern Colombian study, a retrospective assignment of the USS-PROM tool was used, which might have subjected patients to recall bias.

In our study, the independent factors for dissatisfaction with urethroplasty outcomes were age ≥ 45 years, immediate postoperative complications (like chordee), failure of a trial of voiding, stricture recurrence, a decrease in the USS-PROM LUTS domain score by less than 10 points, and a decrease in interference with QoL by less than 3 points. All these factors had a statistically significant association with dissatisfaction with urethroplasty outcomes, as determined by the USS-PROM.

These findings are consistent with the body of literature, wherein studies in the United States, Japan, India, and Kenya reported that increasing age, LUTS, Peeling's scores, stricture recurrence, and postoperative complications are independently associated with patients' dissatisfaction.[7,16-18] The reason is the lack of changes in LUTS severity, reflecting surgical failure and the need for reintervention. Furthermore, the psychological impact of surgical complications and the need for reoperation negatively impact patients' satisfaction.[19] This puts more emphasis on the importance of attending to patients' psychological needs in the aftermath of surgical complications.

A study in Germany found that oral morbidity was independently associated with patients' dissatisfaction with surgical outcomes; however, this was because the main surgical intervention performed during the study period was anterior buccal mucosal graft urethroplasty.[20] Therefore, most patients experienced oral morbidity postoperatively and were not satisfied with it, while only 28% of the current study participants were treated with this technique.

This study serves as a pioneering effort to apply a validated PROM tool to urethral stricture patients in a Tanzanian setting, focusing on a patient-centred perspective on outcomes to enhance comparability during follow-up. The findings emphasise the need to integrate PROMs into routine urology follow-up in resource-limited settings. The study is limited by the inability to perform robust multivariate analysis due to the small sample size and the lack of confounder adjustment. Furthermore, the short follow-up time limited the assessment of late postoperative outcomes.

Conclusion

High patient satisfaction was observed following urethroplasty, although dissatisfaction was associated with older age, postoperative complications, and stricture recurrence. Routine incorporation of USS-PROM in postoperative evaluation can enhance patient-centred care and early detection of adverse outcomes. We emphasise preoperative patient counselling and the management of expectations regarding complications and stricture recurrence.

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Conflict of interest

The authors declare no conflict of interest.

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Ethical approval

Before study commencement, ethical approval was obtained from the College Research Ethics and Review Committee of Kilimanjaro Christian Medical University College, Moshi, Tanzania (certificate number PG 198/2024). All patient information was kept confidential. Permission to conduct the study was granted by the Executive Director of KCMC Hospital. All procedures were in accordance with the ethical standards of the responsible committee on human experimentation and the Helsinki Declaration of 1975, as revised in 2008. Informed written consent was obtained from all patients included in the study.

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