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Demographics, Clinical Presentation, Management and Outcome of Patients with Urethral Stricture in Qassim Region

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Abstract

***Background*:** Urethral stricture (UrS), a narrowing of the urethra, is caused by many etiologies and can vary in severity. This condition can lead to various urinary symptoms and complications, resulting in emergency room visits and hospital admissions. This study aimed to assess the demographics, clinical characteristics, management, and outcomes of people with urethral stricture in the Qassim Region of Saudi Arabia.

Methods and Results: This retrospective study included all cases of urethral stricture treated at King Fahd Specialist Hospital (KFSH), Buraydah, Saudi Arabia, between October 2017 and July 2024. The complete records of 90 UrS patients of all ages were analyzed. The study recorded the age, clinical characteristics, management, and outcomes of UrS patients. All patients were male.

The mean age of the patients was 41.13±16.61 years, with 55.6% under 41. In most of the cases (95.6%), urethral strictures were symptomatic, commonly presenting lower urinary tract symptoms (87.2%), followed by urinary tract infection (3.4%), acute urine retention (2.3%), and dysuria (2.3%). Regarding the cause, most cases were found to be idiopathic (81.1%), followed by post-infectious causes (6.7%) and traumatic causes (5.6%). Iatrogenic causes were identified in only two patients (2.2%), as well as urethral stones in 2(2.2%) patients. Most strictures occurred in the bulbomembranous region of the urethra (83.5%). Regarding treatment modalities, visual internal urethrotomy was done for 82(91.2%) patients and follow-up for 3(3.3%) patients. In most cases, 64.4% of strictures were successfully treated, while the strictures recurred in 35.6% of patients.

Conclusion: Urethral stricture disease was common among males under 41 who presented with lower urinary tract symptoms and urinary tract infection to King Fahd Specialized Hospital. Most of the cases were idiopathic, followed by post-infectious causes and traumatic causes, and most of the strictures occurred in the bulbomembranous urethra. Visual internal urethrotomy is commonly used for both visualization and treatment of urethral stricture. The study highlights the importance of using modern technology to facilitate a comprehensive and systematic approach to understanding the underlying pathology of urethral stricture. It is particularly important to rule out other potential causes, especially when there was no apparent cause initially.**(International Journal of Biomedicine. 2024;14(4):602-606.)**

Keywords: urethral stricture • urinary tract infection • lower urinary tract symptoms

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Abbreviations

LUTS, lower urinary tract symptoms; **PVR**, post-void residual volume; **UTI**, urinary tract infection; **UrS**, urethral stricture; **VIU,** visual internal urethrotomy.

Introduction

Urethral stricture (UrS) is characterized by the narrowing of the urethral lumen as a result of fibrotic processes and scarring of the spongiosum tissue around the urethra. Inflammatory processes were the most common cause of urethral stricture in the past, but recently, the inflammatory nature of urethral stricture has decreased. At the same time, there has been an increase in the incidence of idiopathic and iatrogenic causes in most cases of strictures.[1] Iatrogenic causes include transurethral endoscopic procedures, urethral catheterization, prostate cancer treatment, and hypospadias surgery.[2] In general, anterior

urethral stricture has been rarely linked to external trauma or inflammation. To decrease the development or worsening of strictures, it is important to avoid unnecessary urethral catheterization and repetitive use of urethral instruments.[3]

Urethral stricture is characterized by several symptoms, the most notable of which are obstructed and irritated urination, micturition that lasts for an extended period of time, and the feeling of incomplete bladder emptying. Storage-voiding symptoms, such as frequency and urgency, may indicate the presence of urethral stricture, especially in patients who have previously undergone transurethral procedures or had a long-term indwelling catheter while being treated for another condition.[4]

Among the complications that might arise from urethral stricture is the risk of experiencing full urine retention. A bladder with inadequate drainage can induce hydronephrosis and renal failure due to obstructive uropathies.[5] Untreated urethral stricture can lead to a variety of complications, including thick-walled trabeculated hypoactive bladder (85%), acute urine retention (60%), prostatitis (50%), epididymo-orchitis (25%), hydronephrosis (20%), periurethral abscess (15%), and bladder or urethral stones (10%).[6]

For every 100,000 males, there are between 229 and 627 cases of urethral stricture, making it a quite common disorder among patients. This represents about 0.6% of the population that is at risk, and UrS was responsible for approximately 5,000 inpatient admissions and more than 1.5 million outpatient visits each year.[7,8]

The surgical approaches range from minimally invasive to complex procedures. Endoscopic interventions, like urethrotomy and dilation, are some of the most performed treatments for urethral stricture. Unfortunately, the recurrence rate reported is approximately 40% following endoscopic urethrotomy, which is quite high. On the other hand, urethroplasty, although a more invasive procedure, has shown a higher success rate of 90%. However, the success rate of urethroplasty decreases in situations where endoscopic therapy has been previously attempted multiple times, which will make the fibrosis and the surgery more challenging. Despite a significant amount of research that strongly supports urethroplasty as a more affordable alternative, endoscopic treatments continue to be predominantly used because of the simplicity of the procedure and the presence of less expert reconstructive surgery in the region. Al Khayal et al. [9] reported a preference for and probably misapplication of endoscopic procedures by urologists in Saudi Arabia to treat urethral stricture. This could be due to a lack of experience or knowledge in the most definitive interventions, like urethroplasty.[9,10]

Overall, many successful treatment modalities exist, including visual internal urethrotomy (VIU), drug-coated balloon dilator, and urethroplasty.

This study aimed to assess the demographics, clinical characteristics, management, and outcomes of people with urethral stricture in the Qassim Region of Saudi Arabia.

Materials and Methods

This retrospective study included all cases of urethral stricture treated at King Fahd Specialist Hospital (KFSH), Buraydah, Saudi Arabia, between October 2017 and July 2024. The complete records of 90 UrS patients of all ages were analyzed. The study recorded the age, clinical characteristics, management, and outcomes of UrS patients. All patients were male.

Statistical analysis was performed using the statistical software package SPSS version 26.0 (SPSS Inc, Armonk, NY: IBM Corp). Baseline characteristics were summarized as frequencies and percentages for categorical variables and mean (M) ± standard deviation (SD) for continuous variables. Group comparisons with respect to categorical variables are performed using the chi-square test. A probability value of $P<0.05$ was considered statistically significant.

Results

The study included complete records of 90 male UrS patients of all ages. The mean age of the patients was 41.13±16.61 years, with 55.6% under 41. Most patients (87.8%) were Saudi Arabian nationals (Table 1).

Table 1.

Demographic characteristics of the study patients (N=90)

Demographic parameters	Category	Frequency and percentage
Age (years)	Mean ± SD	41.13 ±16.61
	<20	7 (7.8%)
	20-30	19 (21.1%)
	31-40	24 (26.7%)
	41-50	16 (17.8%)
	51-60	11 (12.2%)
	>60	13 (14.4%)
Gender	Male	90 (100.0%)
	Female	0 (0.0%)
Nationality	Saudi	79 (87.8%)
	Non-Saudi	11 (12.2%)

In most of the cases (95.6%), urethral strictures were symptomatic, commonly presenting lower urinary tract symptoms (LUTS) (87.2%), followed by urinary tract infection (UTI) (3.4%), acute urine retention (2.3%), and dysuria (2.3%). Regarding the cause, most cases were found to be idiopathic (81.1%), followed by post-infectious causes (6.7%) and traumatic causes (5.6%). Iatrogenic causes were identified in only two patients (2.2%), as well as urethral stones in 2(2.2%) patients. Most strictures occurred in the bulbomembranous region of the urethra (83.5%). Regarding treatment modalities, VIU was done for 82(91.2%) patients and follow-up for 3(3.3%) patients (Table 2).

Nine patients had complications related to the management, with bleeding per urethra being the most frequent, occurring in three patients. In most cases 64.4% of strictures were successfully treated, while the strictures recurred in 35.6% of patients.

Table 2.
Clinical characteristics of the study patients.

Statements	Categories	Frequency and percentage
Clinical presentation	Symptomatic	86 (95.6%)
	Incidental	4 (4.4%)
If symptomatic, the main presenting symptom for seeking medical attention	Acute urine retention	2 (2.3%)
	Dysuria	2 (2.3%)
	Ejaculatory dysfunction	1 (1.2%)
	Genitourinary pain	1 (1.2%)
	LUTS	75 (87.2%)
	Penile swelling	1 (1.2%)
	PVR dribbling and terminal hematuria	1 (1.2%)
	UTI	3 (3.4%)
Cause	History of Foleys catheter 1 year ago	1 (1.1%)
	Iatrogenic	2 (2.2%)
	Idiopathic	73 (81.1%)
	Post-infectious	6 (6.7%)
	Traumatic	5 (5.6%)
	Urethral fibrosis after meatotomy	1 (1.1%)
	Urethral stone	2 (2.2%)
Location of the urethra stricture	Two rings bulbar urethra	1 (1.1%)
	Anterior bulbomembranous	1 (1.1%)
	Bulbar urethra pinpoint stricture	1 (1.1%)
	Bulbomembranous	75 (83.5%)
	Distal	3 (3.3%)
	Membranous urethral strictures	1 (1.1%)
	Penile urethral stricture ring-like	1 (1.1%)
	Pinpoint bulbar urethral stricture	1 (1.1%)
	Pinpoint urethral stricture	1 (1.1%)
	Posterior urethra stricture + multiple urethral ring	1 (1.1%)
	Posterior bulbomembranous	3 (3.3%)
	Proximal, distal bulbomembranous	1 (1.1%)
Management	Follow up	3 (3.3%)
	Meatotomy	2 (2.2%)
	Optilume	1 (1.1%)
	Urethral balloon dilation	1 (1.1%)
	Urethroplasty	1 (1.1%)
	VIU	82 (91.2%)
Are there any complications of the management?	Yes	9 (10.0%)
	No	81 (90.0%)
If yes, what is the complication?	Bleeding per urethra	3 (33.3%)
	Erectile dysfunction	1 (11.1%)
	Hematuria	2 (22.2%)
	Urine retention	1 (11.1%)
	UTI	2 (22.2%)
What was the outcome of the chosen treatment?	Recurrence of stricture	32 (35.6%)
	Successful resolution of stricture	58 (64.4%)

A statistically significant association was established between the patients' main presenting symptoms and their management. Notably, most patients with LUTS and UTI were treated using VIU (Table 3).

Discussion

The increasing need to understand the causes of urethral stricture has highlighted the necessity to examine demographic features, clinical presentations, treatments, and outcomes of this condition among patients in the Qassim region of Saudi Arabia. Understanding these aspects will enable more personalized and effective care, ultimately enhancing patient quality of life and improving treatment success.

In our study, all patients were men, indicating a higher prevalence of urethral stricture among men. The studies of Anger et al.[11] and Schwender et al.[12] showed that urethral strictures are common among men and rare among women. Urethral stricture is more common among men under 45,[13]

Table 3.
The patients' main presenting symptoms and their management.

	Management						
Main presenting symptom	Follow-up	Meatotomy	Optilume	Urethra balloon dilation	Urethroplasty	VIU	*P*-value
Acute urine retention	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (100.0%)	<0.001
Dysuria	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (50.0%)	1 (50.0%)	
Ejaculatory dysfunction	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	
Genitourinary pain	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
LUTS	2 (2.7%)	2 (2.7%)	1 (1.3%)	1 (1.3%)	0 (0.0%)	69 (92.0%)	
Penile swelling	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	
PVR dribbling and terminal hematuria	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	
UTI	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (100.0%)	

which was also noted in our study, in which, the mean age of men was 41.13±16.61 years, with 55.6% under 41.

According to the results of our study, the most common presenting symptoms in men with urethral stricture were LUTS (87.2%), which is consistent with Lepor et al.,[14] who also reported that LUTS were particularly common in UrS men, especially those over 50. The current study noted that in most cases (81.1%), urethral stricture was considered idiopathic, which is contrary to other studies [15,16] that found trauma to be the leading cause of urethral stricture worldwide. However, in our study, traumatic causes accounted for only 5.6% of cases. This discrepancy in results highlights the need for a thorough evaluation of the patient's history and physical examination to establish the underlying cause of the stricture and exclude secondary causes.

Our study showed that iatrogenic causes were identified in only two patients (2.2%). The rarity of this cause has been highlighted in other studies in Saudi Arabia.[5,8] However, it is worth noting that there has been an increase in iatrogenic causes in recent times, possibly related to the development and implementation of endourology in clinical practice, the lack of adequate protocols for its use, and the inexperience of healthcare providers.[17]

Notably, most strictures occurred in the bulbomembranous urethra (83.5%). Nwofor and Ugezu[18] found that the penile urethra was the favorite seat of the urethral stricture in 70% of cases.

Regarding the treatment method, VIU was performed for most of the patients (91.2%), highlighting the increasing importance of this surgical method in treating urethral stricture. Visual internal urethrotomy involves direct visualization and dissection of the stricture under direct vision. Importantly, VIU was used to treat most patients with both LUTS and UTI.

In our study, urethroplasty was performed in only one patient (1.1%) despite this surgical procedure being the gold standard for treating urethral stricture. Another study conducted in Saudi Arabia found that endoscopic interventions such as urethroplasty and urethrotomy ranged from minimally invasive to complex yet effective procedures. Urethroplasty has demonstrated a success rate of nearly 90% in the treatment of initial strictures.[9]Although the current study reported only one patient who underwent urethroplasty, studies from Saudi Arabia suggest this procedure is more effective and cost-effective. This is due to its potential to prevent recurrence and reduce the need for subsequent procedures.[9,10] Due to lower complication rates, urethroplasty has largely replaced endoscopic surgery as the primary treatment for urethral stricture. Urethroplasty involves urethra reconstruction, which can provide longer-term results and fewer complications than endoscopic techniques.[6,19] This highlights the continued preference for and adherence to urethroplasty for treating urethral stricture in modern urology practice.

The current study found that Optilume drug-eluting balloon technology was not widely used in treating urethral stricture, as evidenced by the fact that only one patient (1.1%) was treated with this technology. Other studies conducted in Saudi Arabia highlighted Optilume, a type of drug-eluting balloon coated with therapeutic agents designed to prevent the recurrence of urethral stricture. These agents promote healing, reduce inflammation, and help prevent recurrent urethral stricture.[20,21] The study highlights the need for acceptance, adoption, and increased awareness of the use of modern technologies in the treatment and management of urethral stricture.

In the current study, the majority (64.4%) of strictures were successfully treated, while in 35.6% of cases, strictures recurred. We identified complications in only 10.0% of patients. In a study by Blaschko et al.,[22] of 1156 urethral reconstructions, 168 patients underwent repeat urethroplasty after at least one previous failed urethroplasty. Overall, 102(78.5%) of 130 patients were successfully treated. Two or more previous failed urethroplasties and comorbidities related to UrS disease were associated with an increased risk of repeat urethroplasty failure.

The main limitation of this analysis is that the type of data collected and the features of urethral stricture were obtained from patient files, which may have affected the data quality due to erroneous and incomplete recordings. Given the retrospective nature of this study, causality determination and generalizability of the results were limited.

Conclusion

Urethral stricturedisease was common among males under 41 who presented with LUTS to King Fahd Specialized Hospital. Patients frequently presented with LUTS and UTI. Most of the cases were idiopathic, followed by post-infectious causes and traumatic causes, and most of the strictures occurred in the bulbomembranous urethra. Visual internal urethrotomy is commonly used for both visualization and treatment of urethral stricture. The study highlights the importance of using modern technology to facilitate a comprehensive and systematic approach to understanding the underlying pathology of urethral stricture. It is particularly important to rule out other potential causes, especially when there was no apparent cause initially.

Competing Interests

The authors declare that they have no competing interests.

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