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Case Series

Comparison of quality of life and sexual function before and after anterior urethral reconstruction surgery

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ABSTRACT

The study assessed the impact of anterior urethral reconstruction surgery on quality of life and sexual function in 22 male patients with anterior urethral strictures. The mean age was 51 years (range: 25–88), and strictures were localized in the bulbar urethra, penile urethra, or both, with an average stricture length of 4.2 cm. Etiologies included trauma, iatrogenic causes, infections, and idiopathic factors. Surgical techniques included end-to-end urethroplasty, dorsal onlay oral mucosa graft urethroplasty, and combined dorsal graft with ventral augmentation. Significant postoperative improvements were noted in urinary symptoms, with IPSS scores reducing from severe to mild in all patients ($p<0.001$) and Qmax increasing from a mean of 3.23 ml/s to 19.46 ml/s ($p<0.001$). Preoperative quality of life, evaluated using EQ-5D and EQ-VAS, showed significant enhancement, with EQ-VAS scores improving from 38.77 to 77.05 ($p<0.001$). Sexual function, assessed via IIEF-5, remained stable, with no significant postoperative decline ($p=0.463$), highlighting the preservation of erectile function. USS-PROM evaluations revealed a substantial reduction in symptom severity and improved patient satisfaction. The findings demonstrate that anterior urethral reconstruction effectively restores urinary function and improves quality of life without compromising sexual health, establishing it as a safe and reliable treatment for anterior urethral strictures.

Keywords: Anterior urethral stricture, IPSS, IIEF-5 and urethral surgery

INTRODUCTION

Urethral strictures are a significant health problem in adult men, particularly affecting the anterior portion of the urethra. These strictures result from the formation of fibrous tissue that narrows the urethral lumen, impeding normal urine flow and causing a variety of urinary symptoms. The condition is typically associated with the formation of scar tissue within the corpus spongiosum a condition referred to as "spongiofibrosis".[1] In certain cases, patients may also suffer from urethral meatal stenosis, a narrowing at the distal portion of the urethra, although it typically does not extend to the navicular fossa. The prevalence of urethral strictures tends to increase with age, with the incidence rising notably after 45 years. Current estimates suggest a rate of 300 cases per 100,000 men globally, with the majority of strictures occurring in the anterior urethra, particularly in the bulbar segment.[2] This region accounts for 46.9% of all anterior urethral strictures, largely due to its anatomical susceptibility to trauma, infection, and iatrogenic damage.[3] The etiology of urethral strictures can vary significantly depending on geographical and healthcare context. In developed nations, idiopathic or iatrogenic

causes are more common. Iatrogenic strictures often occur as a result of medical interventions such as cystoscopy or improper catheterization.[4,5] In contrast, in developing countries, traumatic causes predominate, with urethral injuries resulting from blunt trauma, sexual injury, or improperly placed catheters accounting for a higher proportion of cases.[6,7]

Regardless of the cause, the presence of a urethral stricture leads to a range of lower urinary tract symptoms (LUTS), including urinary frequency, urgency, incomplete bladder emptying, and a weak urinary stream. These symptoms can lead to secondary complications such as urinary tract infections, bladder stones, and acute urinary retention if left untreated.[7] Moreover, urethral strictures are associated with a significant reduction in patients' quality of life, affecting their physical, emotional, and social well-being. Given the close anatomical proximity of the urethra to the neurovascular structures responsible for erectile function, the condition may also have a detrimental effect on sexual function, particularly erectile function.[8] Addressing both the functional and psychological impact of urethral strictures is therefore critical when evaluating treatment outcomes.

The primary objective of this study is to assess the impact of anterior urethral reconstruction surgery on patients' quality of life and sexual function. Specifically, the study compares preoperative and postoperative outcomes using standardized, validated tools, including the International Prostate Symptom Score (IPSS) for urinary symptoms, the International Index of Erectile Function (IIEF-5) for sexual function, the Urethral Stricture Patient-Reported Outcome Measure (USS-PROM) for patient satisfaction and symptom severity, and the maximum urinary flow rate (Qmax) to objectively evaluate urinary function. The hypothesis of this study is that anterior urethral reconstruction surgery will significantly improve both urinary and sexual function, without negatively impacting erectile function, thereby enhancing patients' overall quality of life.

This study was designed as a retrospective, case series analysis conducted between January 2018 and December 2023. A total of 22 male patients, all diagnosed with anterior urethral strictures, were included. The primary endpoints were changes in urinary function, as assessed by the IPSS and Qmax, and sexual function, as assessed by the IIEF-5. Quality of life was evaluated using the USS-PROM and EQ-5D scales. Patient assessments were conducted at two key time points: prior to surgery (preoperative) and six months after surgery (postoperative).

The procedures were performed by experienced urologists using standard anterior urethral reconstruction techniques. The specific technique chosen depended on the location and severity of the stricture. Surgical approaches included excision and primary anastomosis for short strictures and buccal mucosal graft urethroplasty for longer or more complex strictures.

Male patients over the age of 18, diagnosed with anterior urethral strictures.

Patients who had complete medical records with preoperative and postoperative IPSS, IIEF-5, USS-PROM, and Qmax measurements.

Patients without significant comorbidities that could interfere with postoperative recovery or affect the interpretation of quality-of-life or sexual function assessments.

Patients with urethral cancer, severe traumatic injuries post-surgery, or comorbidities that could impact outcomes.

Incomplete medical records or patients without follow-up six months after surgery.

Descriptive statistics (means, standard deviations, ranges) were calculated to provide an overview of the dataset. Paired t-tests or Wilcoxon signed-rank tests were used to compare pre- and postoperative outcomes depending on the distribution of the data. Categorical variables were analyzed using chi-square tests. A p value of less than 0.05 was considered statistically significant.

Table 1: Comparison of urinary flow rates before and after surgery provides a detailed comparison of preoperative and postoperative urinary flow rates.

Parameter	Preoperative (ml/s)	Postoperative (ml/s)
Mean	3.23	19.46
Standard deviation	4.26	4.8
Range	0-13.10	12-31.40

CASE SERIES

This case series describes 22 patients who underwent surgical treatment for urethral stricture at a tertiary care hospital. The average age of the patients was 51 years (range: 25-88 years), all of whom were male. Regarding the location of the stricture, 10 patients had bulbar urethral strictures, 8 had penile urethral strictures, and 4 had combined penile and bulbar strictures. The average length of the stricture was 4.2 cm (range: 0.5-12 cm). The main etiologies were traumatic (8 patients), iatrogenic (6 patients), infectious (4 patients), and idiopathic (2 patients).

The surgical procedures performed included end-to-end urethroplasty in 7 patients, dorsal onlay oral mucosa graft urethroplasty in 13 patients, and combined dorsal graft and ventral augmentation urethroplasty in 2 patients.

Regarding functional outcomes, 82% of the patients presented with severe or very severe urinary symptoms (IPSS) before surgery, while all achieved mild or very mild symptoms after the procedure. In terms of quality of life (EQ-5D), 82% reported poor or very poor preoperative quality of life, improving to 86% with excellent postoperative quality of life. Health perception measured by the EQ-VAS scale improved from an average of 37 points preoperatively to 78 points postoperatively. Concerning erectile function (IIEF-5), 41% had moderate or severe erectile dysfunction before treatment, which decreased to 28% after surgery, with significant recovery in the remaining 72%.

Urinary symptom improvement (IPSS)

The preoperative IPSS results revealed that 68.18% of patients suffered from severe urinary symptoms, reflecting significant lower urinary tract obstruction. These high scores indicated that the majority of patients experienced severe difficulties in voiding, including urgency, frequency, incomplete emptying, and a weak urinary stream. After surgery, there was a dramatic reduction in symptoms, with all patients reporting only mild LUTS six months postoperatively ($p<0.001$). This significant improvement in IPSS scores underscores the effectiveness of anterior urethral reconstruction in resolving voiding difficulties associated with urethral strictures.[9,10]

Urinary flow rate (Qmax)

In addition to symptom improvement, there was a marked increase in the maximum urinary flow rate (Qmax). Preoperatively, the mean Qmax was 3.23 ml/s, indicating a severely obstructed flow. Postoperatively, the mean Qmax improved to 19.46 ml/s, reflecting the restoration of urethral patency and reduced obstruction ($p<0.001$) (Table 1). The substantial increase in Qmax signifies that the surgery effectively improved the anatomical lumen of the urethra, allowing for more efficient bladder emptying and reducing the need for straining during urination.[11,12] This outcome also correlates with a reduction in secondary complications such as urinary tract infections and bladder stones.

Sexual function (IIEF-5)

The evaluation of sexual function using the IIEF-5 scale revealed no significant changes in erectile function pre- and postoperatively ($p=0.463$) (Figure 2). Most patients reported mild erectile dysfunction before surgery, and this remained stable after surgery, indicating that anterior urethral reconstruction did not have a detrimental impact on erectile function.[13,14] This finding is crucial for alleviating patient concerns regarding the potential impact of urethral surgery on sexual health. The preservation of erectile function postoperatively suggests that the surgical techniques used in this study successfully avoided damage to the neurovascular bundles responsible for erections.

Quality of life (EQ-5D and EQ-VAS)

The impact of surgery on quality of life was assessed using the EQ-5D and EQ-VAS scales. Preoperatively, many patients reported significant impairments in their quality of life, largely due to the severity of their urinary symptoms. Common complaints included reduced mobility, difficulty with self-care, and limitations in daily activities due to frequent urination or the fear of incontinence. Pain and anxiety were also prevalent among patients, contributing to a lower overall quality of life.[15] Postoperatively, the majority of patients reported marked improvements across all EQ-5D domains, with significant reductions in pain, anxiety, and mobility limitations ($p<0.001$). The EQ-VAS scores, which reflect patients' overall perception of their health, improved dramatically, rising from a preoperative mean of 38.77 to 77.05 postoperatively ($p<0.001$) (Figure 3). This improvement in quality of life was consistent across both subjective and objective measures, highlighting the comprehensive benefits of urethral reconstruction.

Patient satisfaction and symptom perception (USS-PROM)

The USS-PROM provided an additional layer of insight into the subjective experiences of patients. Preoperatively, most patients reported severe or very severe symptoms, which greatly affected their daily activities and overall well-being. The postoperative results of the USS-PROM showed significant improvements, with the majority of patients reporting only mild or very mild symptoms ($p<0.001$). This reduction in symptom severity, as perceived by the patients themselves, underscores the success of anterior urethral reconstruction not only from a clinical standpoint but also in terms of patient satisfaction.[15]

The subjective nature of the USS-PROM allowed us to capture a more holistic picture of how patients experienced their recovery. While objective measures such as Qmax and IPSS provide quantifiable outcomes, the USS-PROM offers valuable insights into patients' personal perceptions of their symptom relief, satisfaction with the surgery, and overall quality of life. This dual approach—using both clinical and patient-reported outcomes—helps ensure that the full spectrum of patient health and well-being is addressed postoperatively. The improvement in patient satisfaction further validates the effectiveness of the surgical interventions performed in this cohort of patients.

DISCUSSION

The results of this study clearly demonstrate that anterior urethral reconstruction surgery provides significant benefits for patients suffering from anterior urethral

strictures. The substantial improvements in both urinary function and quality of life, as evidenced by the marked increase in Qmax and the reduction in IPSS scores, highlight the effectiveness of the surgical intervention in resolving urethral obstruction and restoring normal urinary flow. These improvements are critical in reducing the risks associated with chronic bladder outlet obstruction, including recurrent urinary tract infections, bladder stones, and the potential for upper urinary tract deterioration.[16-17] The absence of significant changes in erectile function postoperatively is particularly noteworthy. Many patients express concerns regarding the potential for urethral surgery to negatively impact sexual function, particularly given the proximity of the urethra to the neurovascular bundles responsible for erectile function. However, our results, consistent with findings from previous studies, suggest that anterior urethral reconstruction does not compromise sexual health when performed using careful and meticulous techniques.[18,19] The preservation of erectile function postoperatively is a reassuring outcome for patients who may be hesitant to undergo surgery due to fears of sexual dysfunction.

The improvements in quality of life, as measured by the EQ-5D and EQ-VAS, further emphasize the broader impact of anterior urethral reconstruction on patient well-being. Preoperatively, many patients experienced a significant reduction in their quality of life due to the physical discomfort and emotional distress associated with urethral strictures. The frequent need to urinate, coupled with the fear of urinary incontinence or retention, can lead to social withdrawal, anxiety, and depression. Postoperatively, the marked improvements in both physical and emotional well-being indicate that successful surgical intervention not only resolves the mechanical aspects of urethral obstruction but also has profound effects on the psychological and social dimensions of health.[20-22]

The inclusion of the USS-PROM in this study provides a unique perspective on how patients perceive the success of their surgery. While traditional clinical measures such as Qmax and IPSS provide essential objective data, they do not fully capture the patient experience. The USS-PROM, by contrast, allows patients to express their satisfaction with the surgery and the degree to which their symptoms have improved from their own perspective. This patient-centered approach ensures that the success of the surgery is evaluated not only by clinical standards but also by the personal experiences and satisfaction of the patients themselves.[23,24]

CONCLUSION

Anterior urethral reconstruction surgery is a highly effective and safe treatment option for patients with anterior urethral strictures.[25-27] The procedure leads to significant improvements in both urinary function and quality of life, as evidenced by the substantial increase in Qmax and the marked reduction in IPSS scores.[28-31] These findings confirm that anterior urethral reconstruction effectively alleviates the symptoms of urethral strictures, restoring normal urinary flow and reducing the risk of long-term complications such as urinary tract infections, bladder stones, and acute urinary retention.[32-34]

Importantly, the surgery does not adversely affect sexual function, as shown by the stable IIEF-5 scores pre- and postoperatively.[35-37] This finding is critical for patients who are concerned about the potential impact of surgery on their sexual health. The preservation of erectile function postoperatively further supports the safety and efficacy of the surgical techniques used in this study, suggesting that the neurovascular bundles responsible for erections are adequately protected during anterior urethral reconstruction.[38]

The combination of objective measures, such as Qmax and IPSS, with patient-reported outcomes, such as USS-PROM, provides a comprehensive evaluation of the success of the surgery. This dual approach ensures that both clinical outcomes and patient satisfaction are taken into account when assessing the overall success of the surgical intervention.[39] Anterior urethral reconstruction should therefore be considered a gold-standard treatment for patients with anterior urethral strictures, offering both functional relief and significant improvements in quality of life.[40]

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