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To assess the impact of prior urethral dilatation or DVIU on the outcome of anterior urethroplasty.

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Abstract

Background: Background: Male urethral stricture has remained the major problem in urologic practice. Patients presenting with urethral stricture disease are commonly managed by dilatation, DVIU, and urethroplasty.

Methodology: This is a descriptive study of male patients who underwent anterior urethroplasty at our setup from 5th August 2021 to 25th February 2022. We analyzed the age, duration, type, length, and location of the stricture and the surgical treatment outcome after urethroplasty. The post-operative catheter was removed after 3 weeks, and UFM is advised. Qmax (max flow rate) > 15 ml/sec was measured on UFM (uroflowmetry) on the 1st week, 6 weeks, and followed on 3 months. Final outcome in terms of success was assessed by uroflowmetry. A maximum urine flow greater than 15mL/s after 3 months' treatment assessed by uroflowmetry was considered as success.

Results: Results: In our study, the blood loss in group A and group B patients, those patients who had DVIU or dilation in the past, had more bleeding during surgery than those who did not have a history of surgery. 66.67% of group B patients have bleeding from 200 ml to 500 ml, which is higher than group A patients. In our study, we found that if the patient had undergone surgery or no surgery had taken place before urethroplasty, the results in terms of UFM were quite similar, as in group A, 96.69% of patients had UFM more than 15 ml/sec, and in group B 87.88% had UFM more than 15 ml/sec.

Conclusion: Urethral dilatation or DVIU delays definitive treatment and increases operative challenges by increasing the length of stricture, more adhesion, and more fibrosis but has minimal impact on the outcome of urethroplasty success.

Keywords

Urethral Stricture, Urethroplasty, Direct Visual Internal Urethrotomy, Urethral Instrumentation.

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Introduction

Urethral stricture management poses significant challenges for reconstructive urologists, mainly due to factors such as the location of the stricture, fibrosis, and previous surgical interventions[1]. The complex anatomy of the affected area, coupled with prior surgical instrumentation, further complicates the scenario. Historically, the reconstructive ladder concept guided the treatment approach, attempting the simplest procedures first[1]. However, despite its application, the success rates of urethral dilatation and optical urethrotomy for anterior urethral strictures have been disappointingly high[2].

Urethroplasty has emerged as the most effective curative intervention for urethral strictures[2,3]. This technique offers excellent outcomes, including improved urinary flow, fewer operative and post-operative complications, and lower chances of recurrence. Different urethroplasty techniques are employed based on the length, type/etiology, and location of the stricture. For short bulbar urethral strictures (1-2cm), End-to-End urethral anastomosis has shown excellent results[2]. Augmented anastomotic urethroplasty is performed for longer strictures (>3cm) and boasts a success rate of 93.2%[2]. In cases of long strictures, substitution urethroplasty using oral mucosa is considered the gold standard[2].

Nevertheless, despite the expertise and skills of the operative surgeon, procedure failure and short-term and long-term complications are not uncommon in high-volume reconstructive urology units. Several contributing factors can lead to unfavorable outcomes in urethroplasty. The role of previous urethral instrumentation in affecting urethroplasty outcomes has been a subject of debate in the literature. Some studies suggest a higher likelihood of urethroplasty failure after dilatation or direct vision internal urethrotomy (DVIU)[4]. Conversely, there are studies indicating that initial treatment with DVIU does not adversely impact the outcomes of urethroplasty[5]. In 2012, Hidson Sj reported that transurethral instrumentation can increase stricture complexity and delay definitive treatment[6]. A 2018 study by Mainchui A from J. Urol also supported the findings of Hidson's study, stating that repeated transurethral treatments may not be beneficial and can increase stricture complexity[7]. Furthermore, the risk of urethroplasty failure is independently associated with repeated DVIU[8], highlighting the importance of careful consideration and assessment before proceeding with urethral interventions.

The rationale for this study stems from the significant influence of various factors on the success of anterior urethroplasty. The surgical outcomes are intricately tied to the proficiency of the operating surgeon, including their expertise, experience, and precise tissue handling techniques. Additionally, the choice of tissue transfer methods plays a crucial role in determining the effectiveness of the procedure. While prior urethral dilatation or DVIU may postpone the definitive treatment, it has been observed that in skilled hands, its impact on the long-term success of urethroplasty is relatively minimal. Therefore, understanding these factors and their impact on the surgical outcomes is vital to enhance the success rates of anterior urethroplasty and improve patient care.

Methodology

Study Design

This study employed a rigorous and prospective cohort design, which allowed for the systematic observation and analysis of patients with anterior urethral stricture over a specified period.

Setting

The study was meticulously conducted at the esteemed Sindh Institute of Urology and Transplantation, with a particular focus on the Department of Urology. The choice of this renowned medical center ensured access to a diverse patient population.

Duration of Study

The study spanned an extensive period, commencing on 5th August 2021 and concluding on 25th February 2022. This duration was chosen deliberately to ensure that a substantial number of patients could be enrolled and followed up

adequately, thereby yielding robust and reliable findings.

Sample Technique

To ensure a robust and comprehensive sample, a non-probability consecutive sampling technique was judiciously employed. This technique facilitated the inclusion of patients consecutively as they presented with anterior urethral stricture during the study period. This approach allowed for a diverse and representative sample, enhancing the generalizability of the study's results.

Sample Size

The determination of the sample size was carried out meticulously using the WHO calculator, taking into account key parameters such as prevalence success rate from previous literature (72.2%), a confidence level of 95%, and an absolute precision of 11%. The calculated sample size for the study was n=66, which was deemed adequate to achieve the study's objectives and to draw meaningful conclusions.

Selection Criteria

- **Inclusion Criteria**

Patients aged between 18 to 70 years, diagnosed with anterior urethral stricture and underwent initial urethral instrumentation, urethral dilation, or direct visual internal urethrotomy (DVIU) and Patients with anterior urethral stricture who did not undergo any transurethral instrumentation were included in this study.

- **Exclusion Criteria**

Patients with lichen sclerosus, renal failure, an enlarged prostate and bladder neck obstruction were excluded. Moreover, Patients with more than two chronic illnesses or with a history of previous failed urethroplasty or urinary tract infection (UTI) pre or post-procedure and transurethral resection of the prostate (TURP) were carefully excluded from the sample.

Data Collection

All male patients meeting the inclusion criteria and diagnosed with anterior urethral stricture, with or without transurethral instrumentation, were included in the study. The patients were divided into two groups: Group A, comprising patients without any previous urethroplasty, and Group B, consisting of patients who had undergone previous surgery.

Detailed histories of the patients were recorded, including disease duration and previous procedures. Pre-operative workup, including uroflowmetry and urethrogram, was performed, and ultrasonography was conducted to assess spongiofibrosis around the stricture.

Surgery was performed by an experienced surgeon, and intraoperative findings were noted in the proforma. Variables such as age, disease duration, type of transurethral instrumentation, and surgical findings during urethroplasty were documented. Postoperative outcomes after anterior urethroplasty were followed up for 3 months using uroflowmetry.

Data Analysis

Data were entered and analyzed using SPSS version 20. Descriptive statistics, such as mean and standard deviation, were calculated for age, operative time, postoperative uroflowmetry, etiology of disease, fibrosis during surgery, and bleeding (expressed in frequency and percentage). Effects modifiers like age and previous treatment were controlled through stratification, and post-stratification chi-square tests were applied, with a significance level of $p \leq 0.05$.

Results

Table 1 shows that the most common cause of stricture in both Group A and Group B patients was trauma, accounting for 81.81% and 60.60%, respectively. Infective causes were observed in 18.18% of patients in both groups, while iatrogenic causes were reported in 0% of Group A and 21.21% of Group B patients, indicating a significant difference (p=0.018). Group A comprised patients without a history of prior surgery, whereas Group B included patients who had undergone surgery in the past.

Table 2 illustrates the blood loss during surgery in both groups. Patients who had previous DVIU or dilation experienced more bleeding during surgery compared to those without such a history. In Group B, 66.67% of patients had blood loss ranging from 200ml to 500ml, which was higher than the 15.16% observed in Group A patients (p<0.001).

Regarding the operative time (Table 3), 78.79% of Group B patients had prolonged surgical duration lasting from 2 hours to 5 hours, while the majority of patients in Group A had an operative time of less than 2 hours. Patients with a history of surgery had significantly longer operative times than those without prior procedures (p<0.001).

Table 4 presents the findings of fibrosis during surgery. Notably, 75.76% of patients in Group B exhibited fibrosis during surgery, whereas only 3.03% of Group A patients showed signs of fibrosis. This difference in fibrosis between the two groups was highly significant (p<0.001).

In terms of postoperative uroflowmetry (UFM) results at 3 months after surgery (Table 5), the success rates were quite similar in both groups. In Group A, 96.97% of patients had UFM measurements greater than 15ml/sec, while in Group B, 87.88% of patients achieved UFM values greater than 15ml/sec. The difference in success rates between the two groups was not statistically significant (p=0.163).

Table 1: Causes of Urethral Stricture in the Study Groups.

Cause of stricture	Group A (n =33)	Group B (n=33)	P-Value
Trauma	27(81.81)	20(60.60)	0.018*
Infective	6(18.18)	6(18.18)	
Iatrogenic	0(0)	7(21.21)	

*P<0.05 is considered statistically significant.

Table 2: Blood Loss during Surgery in the Study Groups.

Blood loss	Group A (n =33)	Group B (n =33)	P-Value
<200 ml	28(84.84)	11(33.33)	<0.01*
200 ml-500 ml	5(15.16)	22(66.67)	

*P<0.05 is considered statistically significant.

Table 3: Operative Time During Surgery in the Study Groups.

Operative time	Group A (n =33)	Group B (n =33)	P value
1-2 hours	29(87.78)	7(21.21)	<0.01
2-5 hours	4(12.12)	26(78.79)	

*P<0.05 is considered statistically significant.

Table 4: Finding of Fibrosis During Surgery in the Study Groups.

Fibrosis during surgery	Group A (n=33)	Group B (n=33)	P-value
No	32(96.97)	8(24.24)	<0.01*
Yes	1(3.03)	25((75.76)	

*P<0.05 is considered statistically significant.

Table 5: Postoperative Uroflowmetry (UFM) at 3 Months after Surgery in the Study Groups.

UFM	Group A (n=33)	Group B (n=33)	P-value
<15 ml	1(3.03)	4(12.12)	0.163
>15 ml	32(96.97)	29(87.88)	

*P<0.05 is considered statistically significant.

Discussion

Urethral stricture is a prevalent condition with an estimated incidence of 4-5%[9-11]. The exact prevalence in the general population remains unknown, but a retrospective study spanning 37 years (1972 to 2009) reported 1600 patient entries[12]. In Western countries, the reported incidence is around 8-10 cases per million population[13]. Urethral strictures are commonly caused by road traffic accidents, infectious agents, and iatrogenic factors, with pelvic trauma being the most frequent cause, particularly in young adult males[1].

Over the years, the management of urethral strictures has evolved, and tissue transfer techniques, such as using oral mucosa, especially buccal mucosa, have shown promising results in long strictures[14-16]. In contrast, the use of skin for urethroplasty has decreased due to poor long-term outcomes, such as skin contraction, hair growth, recurrent urinary tract infections, and stone formation[17]. Urethral strictures often require treatment in dedicated centers with expertise in reconstructive urology, as the complex anatomy and challenging nature of the procedures demand specialized skills[18].

The success of urethroplasty, which ranges from 80-90%, depends on various factors, including the etiology and site of the stricture, its length, and the patient's history of urethral instrumentation or previous urethroplasty (16). Urethroplasty failure, which occurs in up to 30% of cases, is characterized by a Qmax <15ml/sec or the need for post-operative dilatation or DVIU. Factors such as catheter-induced long or multiple strictures, BXO (L.S) with pan-urethral strictures, and post-hypospadias repair strictures contribute to poorer outcomes[19].

In this study, Trauma was the most common cause of strictures in both groups, followed by infectious and iatrogenic causes related to instrumentation. Patients in Group B had higher blood loss and prolonged surgical duration compared to Group A, indicating the potential challenges associated with prior surgical interventions.

Interestingly, the study showed that the success of urethroplasty was comparable between the two groups, with good uroflowmetry results in both. This suggests that the surgeon's expertise plays a crucial role in overcoming issues related to previous instrumentation, as good tissue handling, meticulous hemostasis, and tension-free anastomosis are essential for favorable outcomes.

Overall, urethral stricture management requires a comprehensive understanding of the patient's history, etiology, and surgical considerations. With continued advancements in reconstructive urology techniques and the expertise of skilled surgeons, urethroplasty remains a promising curative intervention for this challenging condition.

Limitations

This study has several limitations that should be acknowledged. The study was conducted at a single center, which may limit the generalizability of the results to a broader population. The patient population at this center may not fully represent the diverse characteristics of urethral stricture patients seen in other healthcare settings. Additionally, the relatively small sample size of the study may have limited the statistical power and precision of the results. A larger sample size would provide more robust evidence and potentially uncover additional associations. Moreover, the follow-up period of three months after surgery may not be sufficient to capture long-term outcomes and complications that may arise later.

Longer-term follow-up is needed to assess the durability of the surgical outcomes and to detect any delayed complications.

Conclusion

In conclusion, this study provides valuable insights into the management of urethral stricture disease, particularly the impact of previous surgical interventions on urethroplasty outcomes. The study revealed that patients with a history of prior surgeries, such as dilatation or direct vision internal urethrotomy (DVIU), had higher rates of bleeding during surgery, prolonged operative time, and a higher incidence of fibrosis during surgery compared to patients without previous surgeries. However, despite these challenges, the overall success rates of urethroplasty were comparable between the two groups, indicating that skilled surgical expertise can overcome the negative effects of prior instrumentation.

Recommendations

Advancements in tissue transfer techniques, particularly the use of buccal mucosa, have shown promising results for long strictures. Continued research and innovation in tissue transfer methods may further improve surgical outcomes for patients. Lastly, a multidisciplinary approach involving urologists, reconstructive surgeons, and other specialists should be considered for complex cases of urethral stricture. Collaborative decision-making and treatment planning can provide more personalized and comprehensive care, ultimately improving patient outcomes.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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References

1. Míka D, Krhut J, Ryšánková K, Sýkora R, Luňáček L, Zvara P. One-year follow-up after urethroplasty, with the focus on both lower urinary tract and erectile function. Scand J Urol. 2020;54(2):150-154.
2. Hussain M, Khan MS, Lal M, Hashmi A, Naqvi SA, Rizvi SA. Stricture of urethra: patterns and outcomes of management from a single centre in Pakistan over 7 years. J Coll Physicians Surg Pak. 2020;30(1):79-84.
3. Hamid R, Khan M, Hussain M, Askari H, Hashmi A, Rizvi SA, Mubarak M. Success rate and complications of different urethroplasty techniques at a single center in Pakistan. Pak J Surg. 2017;33(2):110-114.
4. Barbagli G, Montorsi F, Balò S, Sansalone S, Loreto C, Butnaru D, Bini V, Lazzeri M. Treatments of 1242 bulbar urethral strictures: multivariable statistical analysis of results. World J Urol. 2019;37:1165-1171.
5. Tinaut-Ranera J, Arrabal-Polo MÁ, Merino-Salas S, Nogueras-Ocaña M, López-León VM, Palao-Yago F, Arrabal-Martín M, Lahoz-García C, Alaminos M, Zuluaga-Gomez A. Outcome of urethral strictures treated by endoscopic urethrotomy and urethroplasty. Can Urol Assoc J. 2014;8(1-2):E16–E19.
6. Hudak SJ, Atkinson TH, Morey AF. Repeat transurethral manipulation of bulbar urethral strictures is associated with increased stricture complexity and prolonged disease duration. Urol J. 2012;187(5):1691-1695.
7. Horiguchi A, Shinchi M, Masunaga A, Ito K, Asano T, Azuma R. Do transurethral treatments increase the complexity of urethral strictures?. Urol J. 2018;199(2):508-514.
8. Viers BR, Pagliara TJ, Shakir NA, Rew CA, Folgosa-Cooley L, Scott JM, Morey AF. Delayed reconstruction of bulbar urethral strictures is associated with multiple interventions, longer strictures and more complex repairs. urol J. 2018;199(2):515-521.
9. Hamid R, Khan M, Hussain M, Askari H, Hashmi A, Rizvi SA, Mubarak M. Success rate and complications of different urethroplasty techniques at a single center in Pakistan. Pak J Surg. 2017;33(2):110-114.
10. Rassweiler J, Teber D, Kuntz R, Hofmann R. Complications of transurethral resection of the prostate (TURP)—incidence, management, and prevention. Eur urol. 2006;50(5):969-980.
11. Kulkarni SB, Joglekar O, Alkandari M, Joshi PM. Management of post TURP strictures. World J Urol. 2019;37:589-954.
12. Santucci RA, Joyce GF, Wise M. Male urethral stricture disease. urol J. 2007;177(5):1667-1674.
13. Fall B, Sow Y, Diallo Y, Sarr A, Zeondo C, Thiam A, Sikpa KH, Diao B, Fall PA, Ndoye AK, Ba M.

Urethroplasty for male urethral strictures: Experience from a national teaching hospital in Senegal. Afr J Urol. 2014;20(2):76-81.

14. Tinaut-Ranera J, Arrabal-Polo MÁ, Merino-Salas S, Nogueras-Ocaña M, López-León VM, Palao-Yago F, Arrabal-Martín M, Lahoz-García C, Alaminos M, Zuluaga-Gomez A. Outcome of urethral strictures treated by endoscopic urethrotomy and urethroplasty. Can Urol Assoc J. 2014;8(1-2):E16–E19.
15. Hosseini SJ, Kaviani A, Vazirnia AR. Internal urethrotomy combined with antegrade flexible cystoscopy for management of obliterative urethral stricture. Urol J. 2008 Summer;5(3):184-187.
16. Diao B, Diallo AB, Ndoye AK, Fall PA, Sylla C, Ba M, Diagne BA. Urétroplastie par lambeau pénien pédiculé selon Quartey. Ann Urol. 2003;37(4):203-6.
17. Andrich DE, Mundy AR. Fellowship curriculum in reconstructive urological surgery: when does a trainee become a trainer?. Urol J. 2008;179(4S):9-.
18. Falandry L. Sténoses de l'urètre masculin: reconstruction canalaire en un temps par greffe cutanée à pédicule nourricier «mobile»: 245 observations personnelles. Progrès en urologie (Paris). 1993;3(5):753-770.
19. Aghaji AE, Odoemene CA. One - stage urethroplasty for strictures: Nigerian experience. Int J Urol. 2001;8(7):380-385.