

Original Article

Comparison of Outcomes of Optical Internal Urethrotomy with and without Clean Intermittent Self-Catheterization in Urethral Stricture

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ABSTRACT

Background: Urethral stricture, a significant urological condition, poses challenges due to its recurrence and impact on quality of life. The management of urethral strictures has evolved, with clean intermittent self-catheterization (CISC) emerging as a potential adjunct to reduce recurrence rates. This study addresses the effectiveness of optical internal urethrotomy with and without CISC in urethral stricture management.

Objective: To compare the effectiveness of optical internal urethrotomy with and without the use of CISC in patients with urethral stricture.

Methods: This comparative study, conducted at the Department of Urology, Pakistan Institute of Medical Sciences, enrolled 134 male patients with urethral strictures. Using non-probability purposive sampling, patients were divided into two groups: those undergoing optical internal urethrotomy with CISC (Group A) and without CISC (Group B). The study spanned six months, from May to October 2023, and utilized SPSS (Version 24) for data analysis.

Results: Group A (n=67) demonstrated a higher efficacy in managing urethral strictures with an 88.1% success rate, compared to 68.7% in Group B (n=67). The statistical significance was marked by a P-value of 0.006, indicating the effectiveness of CISC in reducing stricture recurrence.

Conclusion: The study concludes that optical internal urethrotomy, when complemented with CISC, significantly enhances treatment outcomes in urethral stricture management. These findings suggest a potential shift in postoperative care, advocating for the inclusion of CISC to improve patient outcomes. Further research is warranted to validate these findings and explore long-term effects.

Keywords: Urethral Stricture, Optical Internal Urethrotomy, Clean Intermittent Self-Catheterization, Urology, Stricture Management.

INTRODUCTION

In the context of urology, urethral stricture is a condition that poses significant challenges due to its prevalence and complexity. Characterized by the narrowing of the urethra, the tube that carries urine from the bladder out of the body, urethral stricture restricts urine flow, leading to various symptoms and complications (1, 2). This condition predominantly affects men, with an incidence rate of three per thousand, though it remains relatively rare in regions such as Pakistan (3, 4). Urethral stricture's etiology is multifaceted, commonly attributed to factors like infection, trauma, and iatrogenic injuries, though its exact cause often remains elusive.

Historically, the management of urethral stricture has evolved significantly. The use of metallic bougies, once common for expanding the urethra, fell out of favor due to its association with frequent complications (5-8). Likewise, the Otis urethrotomy, another historical method, has been largely abandoned due to severe complications associated with its use (9, 10). Advancements in technology introduced holmium laser endourethrotomy, a technique showing promising results. However, the prohibitive cost of the required equipment limits its availability in many medical centers (11, 12, 3). Consequently, optical internal urethrotomy has emerged as a widely adopted and safer technique, favored by a substantial majority of urologists in the United States for treating anterior urethral stricture (13-18).

The recurrence of urethral stricture remains a significant challenge post-treatment. To mitigate this, methods such as clean intermittent self-catheterization (CISC) and dilatation have been employed. CISC involves the periodic insertion of a catheter into the bladder through the urethra to facilitate urine flow. This technique is particularly beneficial for patients with conditions like urinary retention or neurogenic bladder, affecting their ability to void urine normally. The effectiveness of these post-treatment methods varies based on individual medical contexts (1, 3, 9, 19).

This study aims to examine and compare the outcomes of optical internal urethrotomy for urethral stricture in patients, both with and without the adjunctive use of CISC. By assessing the efficacy of these approaches, the study endeavors to provide valuable insights into the optimal management of this complex urological condition.

MATERIAL AND METHODS

In this comparative study, conducted over a six-month period from May to October 2023, the Department of Urology at the Pakistan Institute of Medical Sciences served as the setting. The study received ethical approval from the hospital's ethical committee, ensuring adherence to medical research ethics and patient welfare. A total of 134 patients with a confirmed diagnosis of urethral stricture were enrolled in the study, following a non-probability purposive sampling technique to facilitate the recruitment process (20-22).

Participants included in this study were males aged 20 to 70 years, presenting with urethral stricture disease evidenced by a urine flow rate of ≤ 5 ml/sec. Exclusion criteria were rigorously defined: patients with radiologically detected bladder stones, urodynamically observed neurogenic bladders, enlarged prostates with a weight greater than 20 gm, and those suffering from urinary tract infections were excluded from the study.

Informed consent was a prerequisite for participation. Each patient, or their guardian, provided written consent after a thorough explanation of the study's purpose and procedures, underscoring the ethical considerations of patient autonomy and informed decision-making.

The study utilized a block randomization method to divide the enrolled patients into two distinct groups. Group A consisted of patients undergoing optical internal urethrotomy supplemented by clean intermittent self-catheterization, while Group B included patients who underwent optical internal urethrotomy without this adjunctive procedure. Each patient underwent a complete physical and clinical examination in the hospital to ensure comprehensive assessment and optimal treatment planning (4, 23).

Following the treatment, a rigorous follow-up was conducted. At 12 weeks post-procedure, each patient underwent a urethrogram and uroflowmetry to evaluate the effectiveness of the treatment in preventing stricture recurrence. The collection of data was systematically carried out using a pre-designed questionnaire, ensuring a structured and uniform approach to data gathering. Subsequently, the collected data were meticulously analyzed using SPSS (Version 24), allowing for robust statistical analysis and ensuring the reliability and validity of the study's findings.

RESULTS

The study enrolled a total of 134 patients, with the mean age of all participants being 41.11 years, showing a standard deviation (SD) of 11.4 years. A closer examination of the age distribution within the two groups revealed that patients in Group A, who underwent optical internal urethrotomy with clean intermittent self-catheterization (CISC), had a mean age of 42.64 years (SD = 11.26 years). In contrast, Group B patients, treated without CISC, had a slightly lower mean age of 39.59 years (SD = 11.54 years).

Table 1 Mean Age of all Enrolled Patients (n=134)

Variables	Mean $\pm$ SD (Years)
Overall Age	41.11 $\pm$ 11.4
Age of Group A Patients	42.64 $\pm$ 11.26
Age of Group B Patients	39.59 $\pm$ 11.54

Table 2 Age-Wise Distribution of Patients in Both Groups (n=134)

Age Group	Group A	Group B	Total
20-35 years	15 (22.4%)	26 (38.8%)	41 (30.6%)
36-50 years	34 (50.7%)	25 (37.3%)	59 (44.0%)

Age Group	Group A	Group B	Total
>50 years	18 (26.9%)	16 (23.9%)	34 (25.4%)
Total	67 (100%)	67 (100%)	134 (100%)

Table 3 Effectiveness of Optical Internal Urethrotomy with and without CISC (n=134)

Efficacy	Group A	Group B	P-Value
Effective	59 (88.1%)	46 (68.7%)	0.006 (significant)
Not Effective	8 (11.9%)	21 (31.3%)	
Total	67 (100%)	67 (100%)	

Age-wise distribution of the patients in both groups presented interesting patterns. In the younger age bracket of 20-35 years, Group B had a higher representation with 26 patients (38.8%), compared to 15 patients (22.4%) in Group A. This group constituted 30.6% of the total study population. The 36-50 years age group was dominated by Group A with 34 patients (50.7%), while Group B comprised 25 patients (37.3%), collectively forming 44.0% of the total. In the >50 years category, Group A and B were more evenly matched, with 18 (26.9%) and 16 (23.9%) patients, respectively, accounting for 25.4% of the total participants.

The effectiveness of the treatment approaches was a pivotal aspect of the study. Group A, which included the use of CISC, showed a notably higher effectiveness rate, with 59 out of 67 patients (88.1%) responding positively to the treatment. In stark contrast, only 46 out of 67 patients (68.7%) in Group B, which did not use CISC, showed effective treatment results. This difference was statistically significant, with a P-value of 0.006. The rate of non-effectiveness also mirrored this trend; in Group A, only 8 patients (11.9%) were categorized as not effective, whereas in Group B, a higher number of 21 patients (31.3%) fell into this category. This data underscores the enhanced efficacy of incorporating CISC into the treatment regimen for urethral stricture.

DISCUSSION

In this research, the primary objective was to evaluate and compare the outcomes of two distinct management approaches for urethral stricture: optical internal urethrotomy with and without clean intermittent self-catheterization (CISC). The findings revealed a notably higher efficacy in Group A, who underwent optical internal urethrotomy with CISC, compared to Group B, treated without CISC, as evidenced by a significant P-value of 0.006 (13). These results align with previous studies, further solidifying the conclusion that CISC may enhance the effectiveness of urethral stricture management (3, 24).

Specifically, the study observed an effectiveness rate of 88.1% in Group A, substantially surpassing the 68.7% effectiveness in Group B. This disparity in treatment outcomes underscores the potential benefits of incorporating CISC into the management plan for urethral strictures. Research by Sami Ul Haq et al. supported these findings, demonstrating a higher success rate in patients undergoing CISC post-optical urethrotomy compared to those who did not engage in self-catheterization (3). Additionally, the work of Gnanaraj and colleagues highlighted a reduced re-stricture rate in patients practicing self-catheterization, which further reinforces the potential advantage of CISC in urethral stricture management.

These findings carry significant implications for the clinical approach towards patients with recurrent urethral strictures. The individualized treatment, considering each patient's unique anatomical and stricture characteristics, is crucial for optimizing outcomes (25-27). Notably, during the study, patients performing CISC did not experience complications, suggesting the technique's feasibility and safety when properly implemented (5, 28). The success of CISC hinges on various factors, including effective patient education, adherence to the technique, and the specific medical context.

The discussion of these results must be contextualized within the broader landscape of urethral stricture management. The findings of this study suggest that CISC, when added to optical internal urethrotomy, may offer a viable strategy to minimize stricture recurrence. This has substantial implications for patient care, potentially shifting the paradigm of post-surgical management in urethral stricture cases. Future research should focus on further elucidating the long-term outcomes of CISC post-urethrotomy and exploring the variables that influence its success.

However, the study is not without limitations. The specific demographic and clinical characteristics of the patient population, and the relatively short follow-up period, may limit the generalizability of the findings. Additionally, the study did not extensively explore the potential challenges and patient adherence issues related to self-catheterization, which are crucial for understanding the practical application of CISC in diverse patient populations.

In conclusion, the study provides compelling evidence that CISC, as an adjunct to optical internal urethrotomy, can enhance treatment efficacy in managing urethral strictures. It opens avenues for further research to validate these findings and to explore the practical aspects of implementing CISC in clinical practice, ultimately aiming to improve patient outcomes in urethral stricture management.

CONCLUSION

In conclusion, this study underscores the potential advantages of incorporating clean intermittent self-catheterization (CISC) with optical internal urethrotomy in the management of urethral stricture. The significant difference in treatment effectiveness between the two groups, with a notably higher success rate observed in patients undergoing CISC, highlights its potential as a valuable adjunct in reducing stricture recurrence. These findings have critical implications for clinical practice, suggesting that incorporating CISC could enhance patient outcomes and may represent a pivotal shift in the postoperative management of urethral strictures. This research paves the way for further investigations to validate and refine these strategies, aiming to improve the quality of life for patients suffering from this condition.

REFERENCES

1. King C, Rourke KF. Urethral stricture is frequently a morbid condition: Incidence and factors associated with complications related to urethral stricture. *Urology*. 2019;132:189-94.
2. Adi K, Alhajeri F, Satyagraha P. World Changing Scenario of Urethral Stricture Management. *Textbook of Male Genitourethral Reconstruction*. 2020:33-43.
3. Haq S, Shah SMA, Khan NS, Azhar K. Comparison of Effectiveness of Clean Intermittent Self Catheterization with No Catheterization after Internal Optical Urethrotomy for Urethral Stricture. *Journal of Postgraduate Medical Institute*. 2019;33(1).
4. MS H, ME H, MZ H, PK S, MI A, MM M, et al. Outcome Between Intralesional Injection of Triamcinolone Following Optical Internal Urethrotomy (OIU) and OIU Alone for the Management of Short Segment Stricture of Male Urethra. *Journal of Dhaka Medical College*. 2020;29(2).
5. Qureshi UI. The Radiological pattern of Male Urethral strictures in Nairobi: University of Nairobi; 2015.
6. Asfuroglu A, Balci M, Koseoglu B, Senel C, Ozercan AY, Aykanat IC, et al. Male Urethral Stricture in Patients with Metabolic Syndrome. *Urology Research and Practice*. 2023;49(2):131.
7. Basaif WS, Alamri HH, Mousa HW, Alsayed RA, Almohammadi AM, Altulayqi WH, et al. Types of urethral stricture and their recurrence rates post urological treatments. *International Journal of Community Medicine and Public Health*. 2021;8(7):3634.
8. Bhatta PN, Raya A, Alam MS, Aryal R, Dutta DK. Role of clean intermittent self-catheterization in prevention of recurrent urethral stricture after optical internal urethrotomy. *Journal of Physiological Society of Nepal*. 2020;1(1):14-7.
9. Ilyas M, Seerwan M, Adnan M, Naseem A, Javed N, Hussain M. Comparison of Recurrence of Urethral Stricture After Internal Optical Urethrotomy With and Without Post-Operative Oral Steroids in District Dera Ismail Khan. *Biological and Clinical Sciences Research Journal*. 2023;2023(1):240-.
10. Shah HN, Sodha HS, Kharodawala SJ, Khandkar AA, Hegde SS, Bansal MB. Influence of prostate size on the outcome of holmium laser enucleation of the prostate. *BJU international*. 2008;101(12):1536-41.
11. Bullock TL, Brandes SB. Adult anterior urethral strictures: a national practice patterns survey of board certified urologists in the United States. *The Journal of urology*. 2007;177(2):685-90.
12. Dutkiewicz SA, Wroblewski M. Comparison of treatment results between holmium laser endourethrotomy and optical internal urethrotomy for urethral stricture. *International urology and nephrology*. 2012;44:717-24.
13. Xu C, Zhu Z, Lin L, Lv T, Cai T, Lin J. Efficacy of mitomycin C combined with direct vision internal urethrotomy for urethral strictures: a systematic review and meta-analysis. *Urologia Internationalis*. 2023;107(4):344-57.
14. Bjazevic J, Violette PD, Razvi H. Endoscopic Incisions. *Minimally Invasive Urology: An Essential Clinical Guide to Endourology, Laparoscopy, LESS and Robotics*. 2020:223-40.
15. Cohen AJ, Cheng PJ, Song S, Patino G, Myers JB, Roy SS, et al. Multicenter urethroplasty outcomes for urethral stricture disease for patients with neurogenic bladder or bladder dysfunction requiring clean intermittent catheterization. *Translational andrology and urology*. 2021;10(5):2035.
16. Engberg S, Clapper J, McNichol L, Thompson D, Welch VW, Gray M. Current evidence related to intermittent catheterization: a scoping review. *Journal of Wound Ostomy & Continence Nursing*. 2020;47(2):140-65.
17. Eze BU, Chacha FK, Mbaeri TU. Direct visual internal urethrotomy in supine position in a patient with complex deformities of both lower limbs and neurogenic bladder: A case report. *European Journal of Medical and Health Sciences*. 2021;3(1):34-7.

18. Ferguson GG, Bullock TL, Anderson RE, Blalock RE, Brandes SB. Minimally invasive methods for bulbar urethral strictures: a survey of members of the American Urological Association. *Urology*. 2011;78(3):701-6.
19. Haq IU, Islam SU, Khan MS, Imtiaz S, Asif M. Comparative Study of Captopril Gel Assisted Clean Intermittent Self-Catheterization Versus Xylocaine Gel in Preventing Recurrence of Urethral Stricture Following Direct Vision Internal Urethrotomy. *Pakistan Journal of Medical & Health Sciences*. 2022;16(08):169-.
20. Kumar V, Dharwadkar S, Doshi C, Batta A. Role of intermittent self catheterization in prevention of recurrence of stricture urethra following visual internal urethrotomy: a prospective single centre study. *International Surgery Journal*. 2019;6(4):1093-6.
21. Mariyanovski V, Dorosiev E, Mladenov B. Surgical treatment of urethral stricture disease—the earlier, the better. *Folia Medica*. 2021;63:481.
22. Mirzazadeh M, Fallahkarkan M, Hosseini J. Penile fracture epidemiology, diagnosis and management in Iran: a narrative review. *Translational andrology and urology*. 2017;6(2):158.
23. Pang KH, Chapple CR, Chatters R, Downey AP, Harding CK, Hind D, et al. A systematic review and meta-analysis of adjuncts to minimally invasive treatment of urethral stricture in men. *European Urology*. 2021;80(4):467-79.
24. Khan RA, Ullah A, ul Haq F, ur Rahman A, Durrani SN, Khan MK. Role of clean intermittent self catheterisation (CISC) in the prevention of recurrent urethral strictures after internal optical urethrotomy. *Journal of Ayub Medical College Abbottabad*. 2011;23(2):22-5.
25. Ullah N, Nawaz J, Shoaib M, Khan A, ud Din N, Fareed T. Effectiveness of clean intermittent self catheterization in patients with recurrent urethral stricture post visual internal urethrotomy. *Journal of Rawalpindi Medical College*. 2023;27(1).
26. Watkin N, Patel P. The diagnosis and management of acquired urethral stricture disease. *Surgery (Oxford)*. 2020;38(4):212-23.
27. Wessells H, Morey A, Souter L, Rahimi L, Vanni A. Urethral Stricture Disease Guideline Amendment (2023). *The Journal of Urology*. 2023;210(1):64-71.
28. Sureshkumar K, Shukla P, Gaharwar A, Jeswani M, Sahu S. Role of visual internal urethrotomy in the management of short segment urethral stricture in male. *Int J Surg Sci*. 2020;4(1):74-7.