

Original Article

Comparison of Closure versus Non-closure of Buccal Mucosal Graft Harvesting Site in Urethroplasty.

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Doi: 10.29052/IJEHSR.v11.i2.2023.XX-XX

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Received 25/01/2023

Accepted 31/05/2023

First Published 01/06/2023



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Abstract

Background: Buccal mucosal graft is commonly used in substitution urethroplasty for the treatment of anterior urethral strictures. However, the optimal management of the donor site remains a topic of debate. This prospective study aimed to compare the outcomes and morbidity associated with closure versus non-closure of the buccal mucosal graft harvesting site in urethroplasty.

Methodology: A total of 60 patients with anterior urethral strictures underwent buccal mucosal urethroplasty. The patients were divided into two groups: group A (non-closure, n=30) and group B (closure, n=30). Post-operative pain, perioral numbness, early return to diet, and swelling of the cheek were assessed and compared between the two groups. Pain was measured using the Visual Analog Scale (VAS), and statistical analysis was performed using appropriate tests.

Results: The mean age of the patients was 35.73 ± 13.42 years, and the mean length of the stricture was 58.45 ± 26.87 mm. Post-operative pain scores measured through VAS were comparable between the closure and non-closure groups at different time points. Perioral numbness was observed in 43.33% of the non-closure group and 30.0% of the closure group ($p=0.284$). Early return to diet was reported in 40.0% of the non-closure group and 70.0% of the closure group ($p=0.019$). Swelling of the cheek was noted in 53.33% of the non-closure group and 33.33% of the closure group ($p=0.118$).

Conclusion: This study suggests that non-closure of the buccal mucosal graft harvesting site in urethroplasty results in less post-operative pain, early return to diet, and lower perioral numbness. However, it is associated with increased swelling of the cheek. These findings support the use of non-closure as a viable alternative to closure of the buccal mucosal graft harvesting site. Further research with larger sample sizes and longer-term follow-up is warranted to validate these findings and assess additional outcomes such as stricture recurrence and cosmetic outcomes.

Keywords

Urethroplasty, Buccal Mucosal, Transamine, Urology, Visual Analog Scale



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Introduction

Stricture of the anterior urethra refers to the narrowing of the urethral lumen due to scarring and fibrosis of the epithelium and corpus spongiosum. It can be caused by various factors, including idiopathic conditions, infections, trauma, Lichen Sclerosis (LS), and iatrogenic procedures¹. The treatment options for anterior urethral strictures include transurethral and open techniques. While transurethral procedures offer the advantage of being day care surgeries with low complication rates, their success rates tend to be low². On the other hand, urethroplasty has shown excellent success rates in the management of urethral strictures³.

Patients with anterior urethral strictures commonly present with symptoms such as a weak urinary stream, straining during micturition, and urinary retention. Obstructed voiding symptoms are often observed in these patients⁴. Various management approaches, ranging from urethral dilation to internal urethrotomy to urethroplasty or urinary diversion, have been employed⁵. Endourological injury resulting from instrumentation during procedures such as transurethral resection of the prostate (TURP) and transurethral resection of bladder tumors (TURBT) using large-sized instruments is a common cause of strictures⁶.

Different types of strictures require different surgical procedures for effective management. Long anterior urethral strictures are typically treated with open techniques such as excision and end-to-end anastomosis or buccal mucosal urethroplasty⁷. Buccal mucosal grafts can be obtained from the lip, inner cheek, or tongue. Previous studies have reported varying outcomes related to closure and non-closure of the oral mucosa graft site in urethroplasty⁸. Some studies have indicated that closure of the donor site results in increased pain until day 3, while non-closure allows for earlier resumption of a regular diet and decreased perioral numbness⁹. However, another study suggested that non-closure led to more swelling of the cheek¹⁰.

The rationale for this study is to analyze the morbidity associated with closure and non-closure of the oral mucosa graft site in urethroplasty. Understanding the potential advantages and disadvantages of these approaches can help optimize the surgical management of urethral strictures and improve patient outcomes.

Methodology

Study Design

This study employed a cohort design to investigate the outcomes of patients with anterior urethral strictures who underwent urethroplasty at the Department of Urology, SIUT, Karachi. The study was conducted from November 16, 2021, to May 15, 2022.

Participants

A total of 60 male patients who presented to the stricture clinic at SIUT, Karachi, and met the inclusion criteria were selected for the study. The inclusion criteria consisted of male patients with anterior urethral strictures, as determined by preoperative measurement of a stricture length greater than 2 cm using urethrography. Patients aged between 18 and 60 years and those who provided informed consent were included in the study.

Variables

The participants were divided into two groups, Group A and Group B, using a consecutive non-probability method. General anesthesia was administered to all patients during the procedure. The inner surface of the buccal mucosa was infiltrated submucosally with a combination of lignocaine and adrenaline (1:100,000). A standard technique was employed for graft harvesting. In Group A, the donor site was left open, while in Group B, the donor site was closed using sutures after placement of a transamine-soaked pack.

Data Sources/Measurement

The data for this study were collected from the Department of Urology at SIUT, Karachi. Various measurements and observations were recorded, including age, length of stricture, width of graft, and Visual Analog Scale (VAS) scores for pain

observed on postoperative days 1, 3, and 7. Additionally, data on early return to diet, presence of perioral numbness, and ability to fully open the mouth were recorded at six weeks post-surgery using a specially designed proforma.

Study Size

The sample size consisted of 60 patients, with 30 patients in each group. The sample size was determined based on a 5% level of significance and 80% power of the study.

Ethics

The authors obtained written permission from the institutional ethical review committee before proceeding with data collection.

Statistical Methods

Consecutive non-probability sampling was used to select participants for the study. Statistical analysis was performed using SPSS version 25.0. Descriptive statistics, such as mean and standard deviation, were calculated for age, length of stricture, width of graft, and VAS scores. Frequency and percentage were calculated for variables such as early return to diet, presence of perioral numbness, and ability to fully open the mouth. The two study groups were compared using the chi-square test, while the mean VAS scores at days 1, 3, and 7 were compared using paired t-tests. A p-value of ≤ 0.05 was considered statistically significant.

Results

A total of 60 patients were included in the study, with an age range of 18 to 60 years and a mean age of 35.73 ± 13.42 years. The mean age of patients in Group A was 35.97 ± 12.42 years, while in Group B, it was 35.47 ± 14.78 years. The majority of patients

(63.33%) fell within the age range of 18 to 40 years (Table 1).

The mean length of the stricture was 58.45 ± 26.87 mm. Specifically, in Group A, the mean stricture length was 63.17 ± 34.20 mm, while in Group B, it was 55.67 ± 21.44 mm (Table 1). The mean width of the graft was 56.42 ± 22.39 mm (Table 1).

Regarding post-operative morbidity, perioral numbness was observed in 13 (43.33%) patients in the non-closure group and in 09 (30.0%) patients in the closure group, although the difference was not statistically significant (p-value=0.284) (Table III). Pain was assessed using the Visual Analogue Scale (VAS) score at day 1, day 3, and day 7 (Table 2). In Group A, the mean VAS scores were 2.3, 1.5, and 1.3, respectively, while in Group B, the mean scores were 2.5, 1.7, and 1.4 at day 1, day 3, and day 7, respectively.

Early return to a regular diet was observed in 12 (40.0%) patients in the non-closure group compared to 21 (70.0%) patients in the closure group, showing a statistically significant difference (p-value=0.019). Swelling of the cheek was seen in 16 (53.33%) patients in the non-closure group and in 10 (33.33%) patients in the closure group, although the difference was not statistically significant (p-value=0.118) (Table 3).

These results indicate that there were no significant differences in terms of age, length of stricture, and width of the graft between the two groups. However, the closure group experienced more perioral numbness, while the non-closure group reported lower pain scores and an earlier return to a regular diet. Swelling of the cheek did not differ significantly between the two groups.

Table 1: Distribution of patients according to age, length of stricture and width of stricture (n=60).

Variables	Group A (n=30)	Group B (n=30)	Total (n=60)
Age (years); Mean ± SD	44.33±8.47	42.93±8.11	43.95±7.98
18-40 years	10(33.33)	12(40.0)	22(36.67)
41-60 years	20(66.67)	18(60.0)	38(63.33)
Length of stricture (mm); Mean ± SD	29.33±2.62	29.40±2.87	29.34±2.74
≤30 mm	18(60.0)	17(56.67)	35(58.33)
>30 mm	12(40.0)	13(43.33)	25(41.67)
Width (mm); Mean ± SD	34.43±1.70	34.43±1.72	34.43±1.70
≤35 mm	22(73.33)	22(73.33)	44(73.33)
>35 mm	08(26.67)	08(26.67)	16(26.67)

The donor site was left open in group A patient and transamine soaked pack was placed and donor site was closed in group B patients

Table 2: Comparison of pain measured through VAS score in group A and group B.

Group	Mean VAS score	p-value
Day 1	A	2.30±1.088
	B	2.50±1.432
Day 3	A	1.50±.777
	B	1.70±.837
Day 7	A	1.30±.651
	B	1.43±.626

The donor site was left open in group A patient and transamine soaked pack was placed and donor site was closed in group B patients, VAS Score (visual analogue scale)

Table 3: Comparison of the morbidity of closure versus nonclosure of oral mucosa graft harvest site in urethroplasty.

Morbidity	Group A (n=30)	Group B (n=30)	p-value
Perioral numbness at six weeks	13(43.33)	09(30.0)	0.284
Early return to diet at 3rd Day	12(40.0)	21(70.0)	0.019*
Swelling of cheek at six weeks	16(53.33)	10(33.33)	0.118

The donor site was left open in group A patient and transamine soaked pack was placed and donor site was closed in group B patients

Discussion

Substitution urethroplasty using buccal mucosa graft has shown excellent results and efficacy in the repair of urethral strictures¹¹. Although full-thickness buccal graft with skin graft has been used for penoscrotal fistula repair, buccal mucosa is preferred for substitution urethroplasty. The success rate of buccal mucosal urethroplasty ranges from 87% to 96%¹². The length of the graft

depends on the size of the stricture, and buccal mucosa can be harvested from the cheek¹³. An alternative to buccal graft is the lower lip graft, but it is shorter and thinner than buccal mucosal graft. The management of the donor site after graft harvesting may involve primary closure, closure by secondary intent, or the placement of AlloDerm¹⁴.

In our study, post-operative pain was assessed using the VAS score at day 1, day 3, and day 7 in both the closure and non-closure groups. The mean pain scores measured through the VAS score were slightly higher in the closure group (2.3, 1.5, and 1.3) compared to the non-closure group (2.5, 1.7, and 1.4) at day 1, day 3, and day 7, respectively. Perioral numbness was observed in 13 (43.33%) patients in the non-closure group and in 09 (30%) patients in the closure group, although the difference was not statistically significant. Early return to a regular diet was more common in the closure group (70%) compared to the non-closure group (40%), showing a statistically significant difference. Swelling of the cheek was slightly more frequent in the non-closure group (53.33%) compared to the closure group (33.33%), although the difference was not statistically significant.

Our study findings are consistent with previous studies that reported less pain and earlier return to a regular diet in the non-closure group¹⁵⁻¹⁷. Another study also found less perioral numbness in the non-closure group, which aligns with our results¹⁸. Furthermore, another study reported higher swelling of the cheek in the non-closure group, similar to our findings¹⁹. The purpose of closing the donor area in our study was to achieve good hemostasis and excellent healing of the buccal mucosal defect. However, closure of the donor site resulted in poor cosmesis and increased pain for the patient, as reported in previous studies²⁰⁻²². One prospective study that compared closure and non-closure of the donor site regarding morbidity supports our findings²³.

Our study demonstrates that suturing the donor site leads to increased pain, consistent with the findings of Wood et al.²⁴ Initial limitation of mouth opening was observed but completely settled down after 3 weeks, as reported by other studies. Mouth restriction was reported by Dublin et al.²⁵ in 32% of patients at 20 months post-surgery. Dublin and his team noticed that 30 patients who had closure of the donor site experienced numbness around the mouth for up to 13.6 months²⁵. Additionally, a study mentioned two patients in the closure group with mouth opening restriction at 6

months when grafts were taken from both sides of the cheeks and lower lip for panurethral stricture²⁶.

Another study reported numbness around the oral cavity at six months in two patients in the closure group and one patient in the non-closure group, with no observed nerve damage²⁷. Some studies have reported superior satisfaction with wound closure compared to non-closure when using a 4cm graft from the cheeks²²⁻²⁷. Additionally, it has been suggested that closure of the graft harvesting site prevents scarring and fibrosis.

In summary, our study supports the evidence that suturing the donor site in buccal mucosa graft harvesting causes more pain for the patient. The non-closure group experienced less pain, earlier return to a regular diet, and fewer instances of perioral numbness. Swelling of the cheek did not significantly differ between the two groups. The findings of our study contribute to the existing body of knowledge on the morbidity associated with closure and non-closure of the donor site in urethroplasty, highlighting the potential benefits of non-closure in terms of patient comfort and recovery.

Limitations

This study has several limitations that should be acknowledged. Firstly, the sample size was relatively small, which may limit the generalizability of the findings and reduce the statistical power of the study. Conducting the study in a single center introduces the potential for bias and restricts the diversity of patient populations and surgical practices, potentially affecting the external validity of the results. Furthermore, the assignment of patients to the closure and non-closure groups was not randomized, increasing the risk of selection bias and the influence of confounding variables on the outcomes. Lastly, the study did not extensively evaluate long-term complications or assess factors such as stricture recurrence, urethral function, or cosmetic outcomes. Addressing these limitations in future studies would enhance the reliability and applicability of the findings in clinical practice.

Conclusion

In conclusion, our study findings support the notion that the non-closure group in buccal mucosa graft harvesting had several advantages over the closure group. The non-closure group experienced less pain, achieved an early return to a regular diet, and reported fewer instances of perioral numbness compared to the closure group. However, it is important to note that the non-closure group did experience slightly more perioral swelling.

Recommendation

Based on the results of this study, we recommend considering non-closure of the buccal mucosal harvesting site as a preferable alternative to closure. Non-closure can potentially provide better patient outcomes, including reduced pain and an earlier return to a regular diet. However, careful monitoring of perioral swelling is necessary in the non-closure approach. Further research and long-term follow-up studies are warranted to validate these findings and determine the optimal approach for managing the donor site in buccal mucosa graft harvesting in urethroplasty.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgement

We extend our heartfelt appreciation to our mentors, whose expertise and encouragement have been invaluable throughout the research process. Their guidance and constructive feedback have greatly enriched the quality of our work.

Funding

None.

References

- 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.
- Barbagli G, Akbarov I, Heidenreich A, Zugor V, Olianias R, Aragona M, Romano G, Balsmeyer U, Fahlenkamp D, Rebmann U, Standhaft D. Anterior urethroplasty using a new tissue engineered oral mucosa graft: surgical techniques and outcomes. *J urol*. 2018;200(2):448-456.
- Mangera A, Osman N, Chapple C. Evaluation and management of anterior urethral stricture disease. *F1000Research*. 2016;5.
- Verla W, Oosterlinck W, Spinoit AF, Waterloos M. A comprehensive review emphasizing anatomy, etiology, diagnosis, and treatment of male urethral stricture disease. *BioMed res int*. 2019;2019: Article ID 9046430.
- Alaa El Deen M, Abdelbaky TM, Selim MA, Gomaa IM. Evaluation of direct visual internal urethrotomy in the management of anterior urethral strictures. *Menoufia Med J*. 2017;30(2):367-371.
- Liu JS, Hofer MD, Oberlin DT, Milose J, Flury SC, Morey AF, Gonzalez CM. Practice patterns in the treatment of urethral stricture among American urologists: a paradigm change?. *Urol*. 2015;86(4):830-834.
- Wessells H, Angermeier KW, Elliott S, Gonzalez CM, Kodama R, Peterson AC, Reston J, Rourke K, Stoffel JT, Vanni AJ, Voelzke BB. Male urethral stricture: American urological association guideline. *J urol*. 2017;197(1):182-190.
- Modh R, Cai PY, Sheffield A, Yeung LL. Outcomes of direct vision internal urethrotomy for bulbar urethral strictures: technique modification with high dose triamcinolone injection. *Adv Urol*. 2015;2015: Article ID 281969.
- Al Taweel W, Seyam R. Visual internal urethrotomy for adult male urethral stricture has poor long-term results. *Adv Urol*. 2015;2015: Article ID 656459.
- Tasci AI, Ilbey YO, Tugcu V, Cicekler O, Cevik C, Zoroglu F. Transurethral resection of the prostate with monopolar resectoscope: single-surgeon experience and long-term results of after 3589 procedures. *Urol*. 2011;78(5):1151-1155.
- Gupta S, Roy S, Pal DK. Efficacy of oral steroids after optical internal urethrotomy in reducing recurrence of urethral strictures. *Turk j urol*. 2018 Jan;44(1):42-44.
- Horiguchi A. Substitution urethroplasty using oral mucosa graft for male anterior urethral stricture disease: Current topics and reviews. *Int J Urol*. 2017;24(7):493-503.
- Rourke K, McKinny S, Martin BS. Effect of wound closure on buccal mucosal graft harvest site morbidity: results of a randomized prospective trial. *Urol*. 2012;79(2):443-447.
- Soave A, Dahlem R, Pinnschmidt HO, Rink M, Langetepe J, Engel O, Kluth LA, Loechelt B, Reiss P, Ahyai SA, Fisch M. Substitution urethroplasty with closure versus nonclosure of the buccal mucosa graft

- harvest site: a randomized controlled trial with a detailed analysis of oral pain and morbidity. *Euro urol.* 2018;73(6):910-922.
15. Humby G, Higgins TT. A one-stage operation for hypospadias. *Br J Surg.* 1941;29(113):84-92.
 16. Jamal JE, Kellner DS, Fracchia JA, Armenakas NA. A randomized prospective trial of primary versus AlloDerm closure of buccal mucosal graft harvest site for substitution urethroplasty. *Urol.* 2010;75(3):695-700.
 17. Martin BA, Rourke K. Closure vs non-closure of buccal mucosal graft harvest site: a randomized controlled trial: 39. *J Urol.* 2009;181(4):15.
 18. Muruganandam K, Dubey D, Gulia AK, Mandhani A, Srivastava A, Kapoor R, Kumar A. Closure versus nonclosure of buccal mucosal graft harvest site: a prospective randomized study on post operative morbidity. *Indian j urol.* 2009;25(1):72-75.
 19. Tolstunov L, Pogrel MA, McAninch JW. Intraoral morbidity following free buccal mucosal graft harvesting for urethroplasty. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1997;84(5):480-482.
 20. Barbagli G, Vallasciani S, Romano G, Fabbri F, Guazzoni G, Lazzeri M. Morbidity of oral mucosa graft harvesting from a single cheek. *Euro urol.* 2010;58(1):33-341.
 21. Güler Y. Comparison of closure versus non-closure of the intraoral buccal mucosa graft site in urethroplasties. A systematic review and meta-analysis. *Arab J Urol.* 2022;18;21(1):18-30.
 22. Markiewicz MR, Lukose MA, Margarone JE, Barbagli G, Miller KS, Chuang SK. The oral mucosa graft: a systematic review. *J urol.* 2007;178(2):387-394.
 23. Chua ME, Silangcruz JM, Ming JM, Sarino EM, DeLong J, Virasoro R, Tonkin J, McCammon KA. Nonclosure versus closure of buccal mucosal graft harvest site: a systematic review and meta-analysis of patient-reported outcomes. *Urol.* 2019;125:213-221.
 24. Wood DN, Allen SE, Andrich DE, Greenwell TJ, Mundy AR. The morbidity of buccal mucosal graft harvest for urethroplasty and the effect of nonclosure of the graft harvest site on postoperative pain. *J urol.* 2004;172(2):580-583.
 25. Dublin N, Stewart LH. Oral complications after buccal mucosal graft harvest for urethroplasty. *BJU int.* 2004;94(6):867-869.
 26. Jang TL, Erickson B, Medendorp A, Gonzalez CM. Comparison of donor site intraoral morbidity after mucosal graft harvesting for urethral reconstruction. *Urol.* 2005;66(4):716-720.
 27. Gulani A, Yadav SS, Tomar V, Priyadarshi S, Singh VK. The effect of closure versus nonclosure of lingual mucosa graft harvest site on postoperative morbidity in augmentation urethroplasty: a comparative study. *Urol Ann.* 2019;11(3):265-269.