

Comparison of Closure Versus Non-Closure of Buccal Mucosal Graft Harvest Site Outcomes in Urethroplasty

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ABSTRACT

Background: Urethroplasty is open surgical reconstruction of urethral stricture disease and it depends on the site of stricture and the used technique either by excision and primary anastomosis, on-lay repair, stricture excision and augmented anastomosis, flap-based repair, and staged repair. **Objective:** This study aimed to improve postoperative outcomes of the buccal mucosal graft harvest site by comparing closure versus non-closure of the harvest site.

Patient and Methods: This prospective comparative study was conducted on 34 patients with urethral stricture planned to be managed by buccal mucosal graft (BMG) urethroplasty. Those 34 patients attended to urology outpatient clinic at Zagazig university hospital from September 2019 to December 2020.

Results: Intraoperatively, two patients were found to have short stricture (approximately 1 cm) with dense spongiofibrosis and they were managed by anastomotic urethroplasty. Post-operative pain was maximal on the first day in both groups but it was more significant in the closure group by the second day.

Conclusions: Buccal mucosal graft harvesting is well tolerated by all patients. The pain appears to be worse in the immediate postoperative period after suturing the harvest site.

Keywords: Buccal mucosal graft (BMG), Urethroplasty, Urethral stricture

INTRODUCTION

Urethral stricture is a urological disease that affects up to 0.6% of the male population and its surgical repair can represent a challenge⁽¹⁾.

Endoscopic management of urethral stricture disease is more common than open surgical reconstruction and it is achieved by direct visual internal urethrotomy (DVIU) which has the advantages of being a simple transurethral approach with low morbidity and minimal invasiveness compared to open urethral reconstruction⁽²⁾.

Urethroplasty is open surgical reconstruction of urethral stricture disease and it depends on the site of stricture and the used technique either by excision and primary anastomosis, on-lay repair, stricture excision and augmented anastomosis, flap-based repair, and staged repair⁽³⁾.

In cases where the simple excision and primary anastomosis of the stricture cannot be achieved, a urethral substitute is a must in these cases to maintain the continuity of urethral passage. The process of using a urethral substitute is called substitution or augmentation urethroplasty which involves augmentation or replacing the circumference of the diseased urethra using a patch or tube respectively of suitable material derived from genital or extra-genital tissue flaps or grafts⁽⁴⁾.

Barbagli *et al.*⁽⁵⁾ described the dorsal onlay free graft urethroplasty which is subsequently used worldwide for the treatment of bulbar and pendulous urethral strictures.

After that, some modifications for this technique have been used including dorsal inlay, dorsolateral and ventral onlay graft urethroplasty and according to the

characters of stricture and the surgeon preference, one of these techniques is used⁽⁶⁾.

This study aimed to improve postoperative outcomes of the buccal mucosal graft harvest site by comparing closure versus non-closure of the harvest site.

PATIENTS AND METHODS

Study design: Thirty-four patients underwent BMG urethroplasty and were randomized into two groups depending upon whether the graft harvest site was closed (group 1) or left open (group 2). The method of randomization was every alternate patient (1:1 ratio) undergoing buccal mucosal harvesting assigned to group 1 or 2. Four patients lost to follow-up. Only 30 patients completed the study.

Inclusion criteria: Patients with urethral stricture disease undergoing urethroplasty using buccal mucosal graft attending urology department during the study period from September 2019 till December 2020.

Exclusion criteria: Bleeding tendency, oral pathology, and constraints of harvesting buccal mucosa.

Ethical Consideration:

Written Informal consent was obtained from the patient and relative to participate in the study. Informed consent from each patient after being informed in detail about the procedure. The approval for the study was obtained from the Urology Departments of Zagazig University Hospitals after the approval of the Institutional Review Board (IRB). The work was carried out



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following the Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Methods:

A history taking with particular emphasis on oral pathology and urological history was taken from each patient as well as evaluation and examination of the oral cavity and external genitalia.

Laboratory investigations include; Complete blood count (CBC) and coagulation profile (PT, PTT, INR), Kidney and Liver function tests, random blood sugar, urine analysis as well as urine culture & sensitivity.

Stricture assessment investigations include retrograde urethrography (RGU), uroflow test, urethral ultrasound to determine stricture length and degree of spongiofibrosis and pelvic ultrasound to assess post voiding residual urine (PVR) as well as Cystourethroscopy. Also, preoperative mouth wash with povidone-iodine for 48 hours.

Statistical analysis

The collected data were coded, processed, and analyzed using the SPSS (Statistical Package for Social Sciences) version 22 for Windows® (IBM SPSS Inc,

Chicago, IL, USA). Data were tested for normal distribution using the Shapiro Walk test. Qualitative data were represented as frequencies and relative percentages. Chi-square test (χ^2) to calculate the difference between two or more groups of qualitative variables. Quantitative data were expressed as mean \pm SD (Standard deviation). Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P-value < 0.05 was considered significant.

RESULTS

A total of 30 patients (15 in each group) were studied and followed up with a mean age of 35.47 years (range 17-46) in group 1 and 36.93 (range 18-63) years in group 2. The percentage of patients with comorbidities was 46.67% in group 1 and 40% in group 2. The number of patients with previous intervention (VIU or urethroplasty) was 3 in group 1 (20%) and 5 in group 2 (33.33%). The mean stricture length was significantly more in group 2 as compared to group 1 i.e., 6.77 cm (range 2.7-12 cm) and 4.42 cm (range 2.5-8.3 cm), respectively. Correspondingly, the area of the harvested graft was significantly more in group 2 as compared to group 1 (7.65 cm vs 5.16 cm) **Table (1).**

Table (1): Patient and stricture characteristics

Characteristics	Group 1 (Closure) (n=15)	Group 2 (Non closure) (n=15)	P-Value	Sig.
Age in years (mean, range)	35.47 (17 – 64)	36.93 (18 – 63)	>0.05	NS
Comorbidities yes (n, %), no (n, %)	Yes (7 patients, 46.67%) No (8patients, 53.33%)	Yes (6 patients, 40%) No (9 patients, 60%)	>0.05	NS
Previous surgery yes (n, %), no (n, %)	Yes (3 patients, 20%) No (12 patients, 80%)	Yes (5 patients, 33.33%) No (10 patients, 66.67%)	>0.05	NS
Stricture length in cm (mean, range)	4.42 (2.5 - 8.3) cm	6.77 (2.7 - 12)	<0.05	SN
Graft length in cm (mean, range)	5.16 (3 - 9) cm	7.65 (3 - 14)	<0.05	SN

The post-operative morbidities after buccal mucosal harvesting are shown in **Table 2**. All patients had maximal pain on the first day post-operative. And according to the pain score, statistically, there was no significant difference between the two groups after one day, five days, and one month postoperatively. But the significant difference in pain score appeared on the second day post-operative as it was more significant in group 1 compared to group 2. Four patients in group 1 and 3 in group 2 complained of perioral numbness at post-operative day 1 which had improved significantly at one week post-operatively. Only two patients in group 1 and one patient in group 2 had perioral numbness after one week. The perioral numbness persisted in one patient in group 1 and one patient in group 2. The majority of patients in both groups had difficulty in opening the mouth at postoperative day one (13 patients in group 1 and 14 patients in group 2) which improved at one week post-operative (only one patient in group 1 and three patients in group 2 had difficulty in mouth opening at 1 week). After one month post-operative, only one patient in group 2 had difficulty in mouth opening. This patient had undergone 1st stage urethroplasty and buccal mucosa was harvested from both cheeks for first stage repair. None of the patients from group 1 had a similar problem.

Table (2): Post-operative morbidity after buccal mucosal graft harvesting

Characteristics	Group 1 (Closure) (n=15)	Group 2 (Non closure) (n=15)	P-Value	Sig.
Pain score (Mean ±SD)				
At day 1	4.33±1.11	3.80±.94	0.17	NS
At day 2	3.33±.72	2.73±.80	0.04	SN
At day 5	1.60±.63	1.40±.74	0.43	NS
At month 1	1.13±.52	.87±.64	0.22	NS
Perioral numbness Yes (n, %), No (n, %)				
At day1	Yes (4, 26.67), No (11, 73.33)	Yes (3, 20.0), No (12, 80.0)	>0.05	NS
At week1	Yes (2, 13.33), No (13, 86.67)	Yes (1, 6.67), No (14, 93.33)	>0.05	NS
At month1	Yes (1, 6.67), No (14, 93.33)	Yes (1, (6.67), No (14, 93.33)	>0.05	NS
Difficult mouth opening Yes (n, %), No (n, %)				
At day1	Yes (13, 86.67), No (2, (13.33)	Yes (14, 93.33), No (1, 6.67)	>0.05	NS
At week1	Yes (1, 6.67), No (14, 93.33)	Yes (3, 20.0), No (12, 80.0)	>0.05	NS
At month1	Yes (0, 0.0), No (15, (100.0)	Yes (1, (6.67), No (14, 93.33)	>0.05	NS
Tolerate liquids at day 1 yes (n, %), no (n, %)	Yes (13, 86.67), No (2, 13.33)	Yes (14, 93.33), No (1, 6.67)	>0.05	NS
Tolerate solids at day 3 yes (n, %), no (n, %)	Yes (12, 80.0), No (3, 20.0)	Yes (13, 86.67), No (2, 13.33)	>0.05	NS
Salivatory problems yes (n, %), no (n, %)	Yes (2, 13.33), No (13, 86.67)	Yes (0, 0.0), No (15, (100.0)	>0.05	NS

The donor site of almost all the patients in group 2 showed excellent healing on postoperative day 3 (**Figure 1**). Almost all the patients were tolerating liquids on postoperative day 1 (13 patients in group 1 and 14 patients in group 2) and the majority of patients could tolerate a solid diet at postoperative day 3 (12 patients in group 1 and 13 patients in group 2).



Figure (1): Non-closed buccal mucosa donor site on postoperative days 0,2,3 (A, B & C respectively).

DISCUSSION

A total of 30 patients (15 in each group) were studied and followed up with a mean age of 35.47 years (range 17-46) in group 1 and 36.93 (range 18-63) years in group 2. The percentage of patients with comorbidities was 46.67% in group 1 and 40% in group 2. The number of patients with previous intervention (VIU or urethroplasty) was 3 in group 1 (20%) and 5 in group 2 (33.33%). The mean stricture length was significantly more in group 2 as compared to group 1 i.e., 6.77 cm (range 2.7-12 cm) and 4.42 cm (range 2.5-8.3 cm), respectively. Correspondingly, the area of the harvested graft was significantly more in group 2 as compared to group 1 (7.65 cm vs 5.16 cm).

In our study, we compared the effect of BMG harvest site wound closure versus leaving it for open healing on postoperative morbidity and oral complications in patients who underwent BMG urethroplasty. Post-operative pain was maximal on the first day in both groups but it was more significant in the closure group by the second day. Post-operative perioral numbness, salivatory problems, and difficult mouth opening were noticed in some of our patients with no significant differences between the two groups. Rapid return to consume oral fluids and solid food was noticed in the majority of patients. None of the patients from both groups had significant wound healing problems.

Multiple studies were done to compare postoperative pain in closure and non-closure techniques of BMG harvest site in urethroplasty with variable results. BMG harvest site closure may lead to more pain due to the tension made by the approximating sutures on the mucosal edges. There is a prospective study that has reported the effect of non-closure of BMG harvest site on postoperative morbidity compared to the closure of the harvest site⁽⁷⁾. In this study, the mean pain score for patients with harvest site closure was significantly higher than that for patients without harvest site closure. In 2011, there was a comparable study completed with 10 patients in each arm showed that the early average pain scores are lower in the closure group with an increase noted late in follow up⁽⁸⁾. In our study, pain was the most common symptom in the postoperative period and was maximal on the first postoperative day in both groups. On the second day postoperative, the mean pain score was significantly higher in the 1st group than in the 2nd group despite the larger mean area of harvested graft (7.65 cm in group 2 and 5.16 cm in group 1). This showed that non-closure of the harvest site leads to lesser pain than that pain occurs when the harvest site closed.

In our study, difficult mouth opening was the most annoying problem in the first few postoperative days. It was seen in almost all the patients and resolved completely by three weeks except for one patient in group 2 (7% of this group patients) who had a persistent

problem for 2 months. In this patient, the buccal mucosa was harvested from both cheeks for first-stage urethroplasty. **Dublin et al.**⁽⁹⁾ reported that 32% of patients who underwent buccal mucosal harvesting had difficult mouth opening at the end of 20 months, where the buccal mucosal harvest site was closed in all patients. **Wong et al.**⁽¹⁰⁾ and **Soave et al.**⁽¹¹⁾ have found that difficult mouth opening is higher in patients with sutured graft site in the first postoperative day with no difference between both groups beyond the follow-up period. No significant differences in perioral numbness were reported between closure and non-closure groups during the follow-up period.

In our study, four patients in group 1 and three patients in group 2 complained of transient perioral numbness which had improved in the majority of patients after 1 week and only one patient from group 1 and another one from group 2 had persistent perioral numbness for six weeks (7% of each group patients). **Dublin et al.**⁽⁹⁾ reported that 16% of patients had persistent perioral numbness for approximately one year after surgery (all patients in this study had harvest site sutured).

In our study, transient salivatory problems in the form of parotid sialadenitis occurred in 13% of group 1 patients which resolved spontaneously after one month. In the study reported by Wood et al, 11% of patients reported changes in salivation and 2% had mucous retention cyst that required excision⁽⁷⁾.

Rapid return to consume liquid diet was seen in all patients except two patients in group 1 and one patient in group 2. Eighty percent of patients in group 1 and 87% of patients in group 2 were able to tolerate a normal diet by the end of the third postoperative day. Similar observations have been reported by others **Dublin et al.**⁽⁹⁾ and **Wood et al.**⁽⁷⁾. **Barbagli et al.**⁽¹²⁾ reported that 58.6% of their study patients were able to resume a normal diet 3 days after surgery. The studies by **Wong et al.**⁽¹⁰⁾ and **Soave et al.**⁽¹¹⁾ reviewed their results on postoperative discomfort or impairment of oral fluid and solid food intake. These studies demonstrated significantly higher pain discomfort or impairment for fluid intake on postoperative day-1 in the non-closure group. Although, solid intake discomfort was higher in the non-closure group in postoperative day-3.

In this study, only one patient from group 2 had postoperative bleeding after taking anticoagulants for treating postoperative deep venous thrombosis. On the contrary, other studies reported that no postoperative bleeding or wound healing problems had occurred.

CONCLUSION

Buccal mucosal graft harvesting is well tolerated by all patients. Pain appears to be worse in the immediate postoperative period after suturing the harvest site. It may be better to leave the harvest site

open unless there is a plan for an early restart of anticoagulants or antiplatelet drugs. we recommend non-closure of BMG harvest site in urethroplasty.

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