



Subjective Assessment of Postoperative Morbidity of Closure Versus Non-Closure of BMG Harvest Site in Patients Undergoing BMG Urethroplasty

Shashank Singh, Sajad Ahmad Parra, Mohammad Saleem Wani, Faiz Manzar, Manjul kumar

Department of Urology, SKIMS, Srinagar, 190011, India

*Corresponding Author:

Shashank Singh

Department of Urology, SKIMS, Srinagar, 190011, India

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Objective: To compare the postoperative morbidity of closure versus non closure of the buccal mucosal graft (BMG) harvest site.

Introduction: BMG urethroplasty is an established treatment option for urethral strictures. In this study we studied the effect of closure or leaving the graft site open on post operative morbidity

Methods: Patients who underwent BMG urethroplasty were randomized into 2 groups; in group 1 donor site was closed and left open in group 2. Post-operative pain, loss of sensation at graft site, limitation to mouth opening, speech impairment, difficulty in tolerating liquid and regular diet & resumption of liquid and solid diet were assessed post operatively by using self-made questionnaires.

Results: 42 patients were studied, 21 in each group from January 2020 to May 2022. In most of patient graft was harvested from single cheek. On zero post operative day mean visual analog scales score was 7.9 in Group 1, and 7.1 in Group 2, which was statistically significant. Nearly 90.47% of patients in closure group were able to swallow liquid diet on POD₀ & 95.23% in non-closure group (P = 0.5604). On day 3, 80% of patients in closure group and 95.71% in non-closure group were able to swallow soft diet (P = 0.1604). Return to oral intake of liquid and solid diet was comparable between the groups. Difficulty with mouth opening was maximal during the first week in both groups. On day 3, slurring of speech was more in closure group. Saliva production was significantly increased in open group in the 1st week.

Conclusion: In immediate post operative period pain were worse with suturing of the donor site. However, there is no difference in long term morbidity whether donor site closed or not. So, leaving buccal mucosa harvest sites open may be a good option.

Keywords: Buccal mucosa harvest, post operative morbidity

Introduction

Graft urethroplasty is an established treatment option for urethral strictures not amenable to anastomotic urethroplasty. [1,2] The current suggestions for the use of BMG are for the urethral reconstruction, which includes bulbar, penile, and pan anterior urethral strictures; repair of proximal and distal hypospadias where there is insufficient urethral plate; and crippled hypospadias repair where there is insufficient genital skin, epispadias repair where the penile skin is not sufficient. [2-4]

The advantages of BMG are that it is easily accessible, nonhair bearing, and the source of supply is constant and adequate; the concealed donor site, readily available, and has an excellent cosmetic outcome; and it is rich in elastin and collagen making it easy to handle with minimal tendency to contract. It is less likely to get infected, well acclimatize in moist environment, and has tendency to heals rapidly due to its high vascularity. BMG does not cause

meatal problems of protuberance, excoriation, and encrustation as occur with bladder mucosa graft. [5]

There are very less prospectively done studies having small number of patients which reported about the oral complications and studied the effect of closure or leaving the graft site open on post operative morbidity. So, we prospectively did subjective assessment of postoperative morbidity of closure versus non closure of the BMG harvest site in patients undergoing BMG urethroplasty.

Materials And Methods

This study was conducted from January 2020 to May 2022, in the Department of Urology, SKIMS J&K with the objective to assess the post-operative morbidity of closure versus non closure of the BMG harvest site. A total of 42 patients who underwent BMG urethroplasty were randomized into two groups. Every alternate patient randomized to group 1 (21 patient) in which donor harvesting site was left open and group 2 (21 patient) in which donor site was closed. Patient demographic profile, stricture related characteristics like aetiology, site, length of stricture and type of surgery performed were noted. Buccal mucosa was harvested from cheeks and lower lip depending upon the length required.

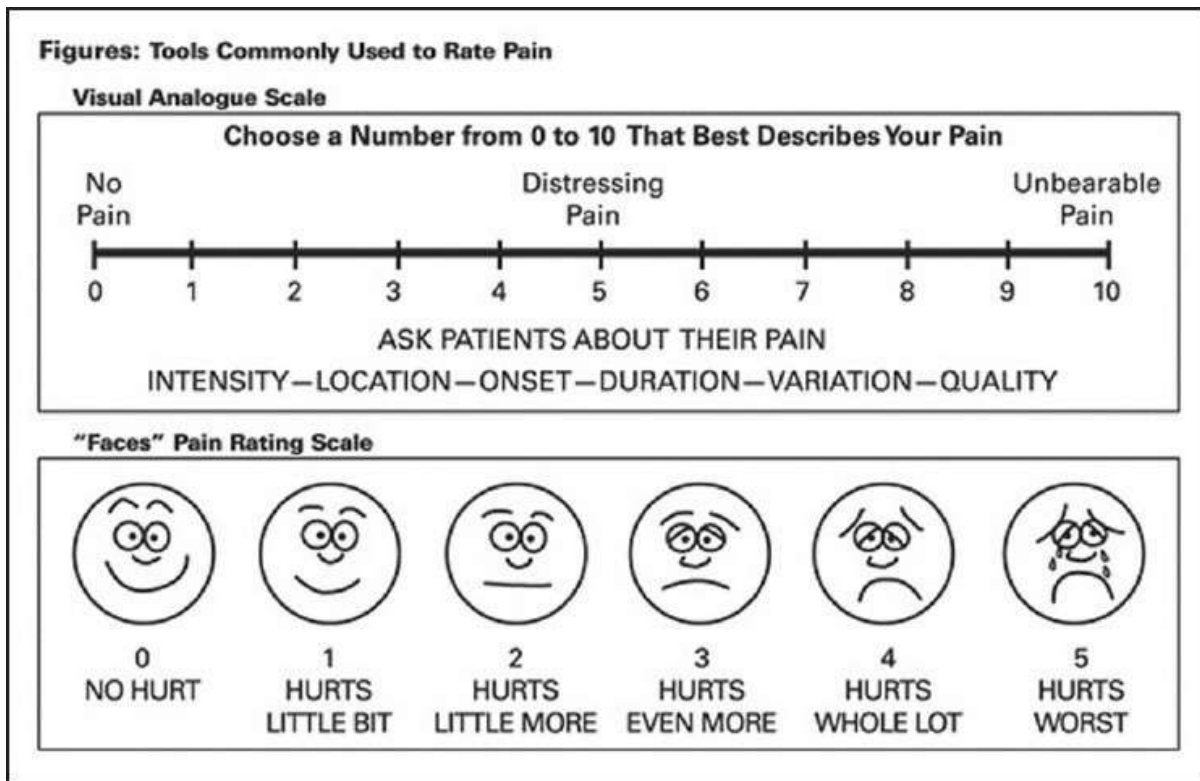
Buccal mucosa graft harvesting technique:

Naso-tracheal/ Endo-tracheal intubation is ensured and to keep the mouth wide open retractor is used. The parotid duct opening is identified and protected. 1% xylocaine and adrenalin solution after dilution with normal saline (1 in 100,000) infiltrated at sub-mucosal plane. The site is marked with a scalpel, stay stitches were taken on buccal mucosa and with fine scissor the flap of buccal mucosa is dissected from underlying buccinator muscle with fine scissor. After harvesting the graft, bipolar electrocautery is used to achieve perfect hemostasis and a gauze piece soaked with adrenalin is left over the harvest site for about 4 to 6 h.

Depending on which group the patient was assigned to, graft harvest site was either closed (group 1) or left open (group 2). In group 1, donor site mucosal edges approximated with continuous interlocking sutures using Vicryl 3-0 while in group 2 donor site kept left open. For assessment of pain, mouth opening and loss of sensation at graft, speech impairment, saliva production site self-made questionnaires were used.

Questionnaire	Yes	No
1) Difficulty in swallowing liquid diet		
2) Difficulty in swallowing soft diet		
3) Difficulty in opening mouth		
4) Swelling of graft harvest site		
5) Numbness at graft harvest site		
6) Speech impairment		
7) Increased saliva production		

Post-operatively for initial 5 days pain score was once daily using visual analog score.



From postoperative day 1- oral intake of liquids, solid diet and any salivatory difficulty were also noted. On follow up at 3- and 6-months same parameter were recorded. Nonparametric Mann Whitney test was done for statistical analysis and a P value of less than 0.05 was considered as significant.

Results

A total of 42 patients (21 in each group) were studied, from January 2020 to May 2022, with a mean age of 37.1 years (range 17-72) in group 1 and 36.54 (range 18-64) years in group 2. The etiology of stricture was mostly iatrogenic i.e. post catheterization, cystoscopy, or TURP in both the groups. The number of patients with panurethral stricture was more in group 2 (3 versus 0 in group 1) and Mean stricture length was nearly same in both groups (4.84 cm in Group 1 and 5.62 cm in Group 2. In both groups graft width was also same (1.5 cm–2.2 cm). Buccal mucosa was most commonly harvested from the single cheek i.e., 21/21 and 18/21 patients in groups 1 and 2, respectively. Two patients in group 2 had buccal graft harvested from the lower lip.

Table 1: Base line parameter

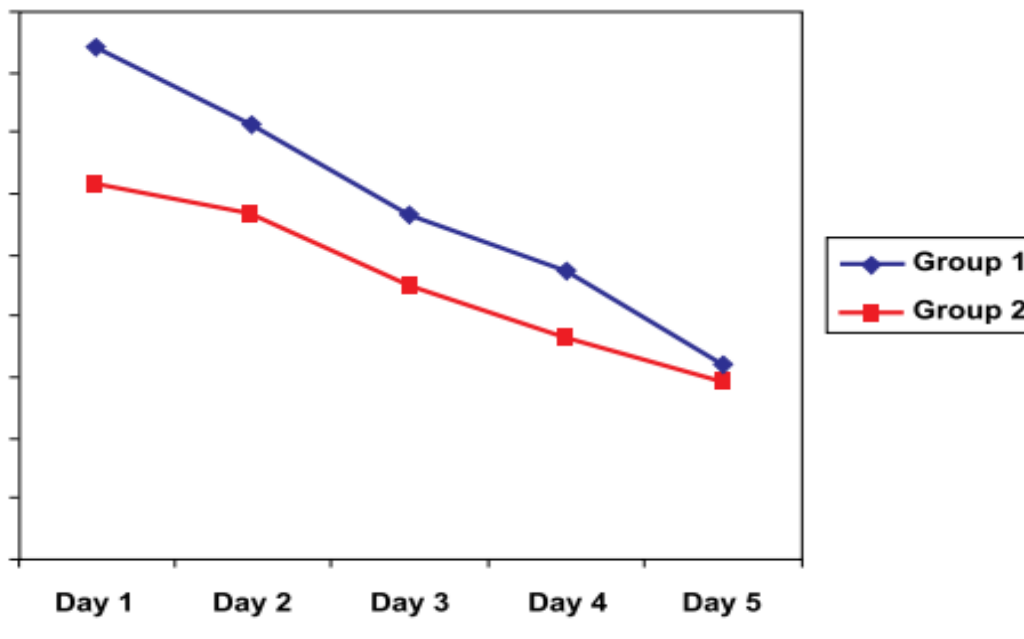
	Group 1	Group 2	P value
Age	37.1	36.5	0.67
Stricture site	Pan urethral 0 Proximal bulbar 7 Distal bulbar 11 Peno-bulbar 5	Pan urethral 3 Proximal bulbar 5 Distal bulbar 5 Peno-bulbar 9	
Mean Stricture length	4.84 cm	5.62 cm	0.75
Graft width	1.5 -2.2 cm	1.5 -2.2 cm	

Mean visual analog scales (VAS) score was 7.9 in Group 1, and 7.1 in Group 2 on day 0, which was statistically significant. Pain on day 3 was 5.01 in Group 1 and 4.8 in Group 2. However, 7th post operative day, VAS was same in both groups.

Table 2: Visual analogue pain score

Mean pain score	Group1	Group2	P value
VAS on day 0	7.90	7.14	0.0002
VAS on day 3	5.09	4.81	0.18
VAS on day 7	2.04	2.02	0.49

At the first post operative day all patients had maximum pain with pain score falling more promptly in group 2 as compared to group 1 on subsequent days.



None of the patients in both groups had significant pain at 3 months and 6 months post operatively

The post operative morbidities after the BMG harvesting are shown in Table 3. Both groups had difficulty in opening the mouth at post operative day three (19 patients in group 1 and 14 patients in group 2) which improved at end of first post operative week (only two patients in group 1 and three patients in group 2 had difficulty in mouth opening at 1 week. From group 2 only two patients had difficulty in mouth opening at end of sixth month. These two patients had undergone double face urethroplasty and buccal mucosa was harvested from both cheeks and lower lip for repair. None of the patients had similar problem from group 1.

Numbness was present in 71.42% Group 1 and 80.95% in Group 2 on day 0 (P = 0.4809), which improved to 33.33% pts in Group 1 and 28.57% in Group 2 on day 3 (P = 0.7460). On 7th day, only three patients in Group 1 and 2 patients in Group 2 had complain of numbness. However, after 1 month, none of the patient of either group had complaints of numbness.

About 90.47% patients in closure group i.e., group 1 and 95.23% i.e., group 2 in non-closure group were able to swallow liquid diet on day 0, (P = 0.5604). On day 3, 80% of patients in Group 1 and 95.71 of patients in Group 2 were able to take soft diet, (P = 0.1604). However, after 1-week, regular diet taken by all patient

Speech impairment was present among all patients in both group on day 0. Slurring of speech was more frequent in closure group (80%) on day 3, but this was not significant between the groups ($P = 0.4809$). However, at the end of a week, none of the patients reported difficulty in speech

Saliva production was significantly more in Group 2 i.e., open group patients till 1 week ($P = 0.0302$). In each groups mean hospital stay was 4.2 days. None of these patients from either group had develop retention cyst, significant bleeding, hematoma, or wound healing problems.

Table 3: Post operative morbidity

Post-operative morbidity	Day 0			Day 3			Day 7		
	Group 1	Group2	p-value	Group 1	Group 2	p-value	Group 1	Group2	p-value
1) Swallowing liquid diet (num.)	19	20	0.5604	21	21		21	21	
2) Eating soft diet (num.)	-	-		17	20	0.1604	21	21	
3) Difficulty in opening mouth	21	21		19	14	0.0623	2	3	0.6436
4) Swelling of graft harvest site	0	0		0	0		0	0	
5) Numbness at graft harvest site	15	17	0.4809	7	6	0.7460	2	3	0.6436
6) Speech impairment	21	21		16	17	0.7151	4	5	0.7151
7) Increased saliva production	12	18	0.0413	6	13	0.0302	0	3	0.0754

Discussion

Buccal mucosa urethroplasty has been more popular in the last few years, after recognition of its feasibility and very good outcome as well as its low morbidity at the reconstruction site.[6] Most commonly buccal mucosa harvested from the cheek, unilateral or bilateral, depending upon the length of graft required. In most of studies cheek is the preferred site as it provides wide and long grafts. [7-8]. An alternative to harvest mucosa is the lower lip but its width limits the size of the graft, so when the required length of graft is more it can be used along with cheek mucosa. Kamp et al, reported that long lasting mental nerve neuropathy due to harvesting of buccal graft from the lower lip resulted in a significantly greater long-term morbidity, which resulted in a lower proportion of satisfied patients [9]. Lip mucosa closure may also lead to eversion of vermilion and lip contracture. In our series, mucosa

from the lower lip was used in two cases, all of which required graft length more than 10 cm and harvest site was left open in all cases. There were no long-term morbidity or cosmetic deformities noted.

Commonly, the donor area used to be closed after the graft harvesting mainly because of concerns about the hemostasis and adequate healing of the raw area but due to stretching of the mucosal edges it results in increased pain and poor cosmesis especially in lower lip. There are only a smaller number of prospective studies which has studied the effect of non-closure of graft harvest site on post operative morbidity compared with a group of patients in which graft harvest site was closed.^[10-11]

In post operative period, pain in the oral cavity was the most predominant symptoms, for which visual analog pain score used to evaluate pain symptoms. In previous studies, pain was found to be significant in early postoperative period (day 0–1) even when

donor site was closed similarly in the present study early postoperative donor site pain was significantly more in closure group.

In our study, mean pain score on day 3 was 5.2 in Group 1 and 4.8 in Group 2, which was not significant. According to Rourke *et al.*, in closure group of BMG patients pain at donor site decreased with time which may be due to decrease in inflammation and oedema after 48 hr.^[12]

Patients in which donor site closed, local oedema over wound closure site may be the main distressing problem especially in whom wound approximation was under excessive tension. So, by leaving the wound open we can avoid this morbidity. In our study, four patients in Group 1 developed oedema over suturing site which decreased after 3–4 days and completely resolved after 1 week. Furthermore, at the end of 1 week, patients of both groups had nearly similar donor site pain.

Patient were allowed to take liquid diet on the day of surgery. All patients except two patients in Group 1 and one patient in Group 2 were able to swallow liquid diet. On postoperative day 3, all our patients of closure group had difficulty in chewing soft. This might be due to initial edema which subsequently subsided. All of our patients were able to take regular diet after 1 week.

Decreased sensation at the graft harvest site referred as numbness. At the end of one month no patient had complaints of numbness. No patient suffered any nerve injury and along nerve territories no change in sensation was reported. Dublin *et al* from a retrospective study of 30 patients (all patients had donor area closed), reported that 16% of patients had oral numbness for a mean duration of 13.6 months.^[13]

Irritation of oral mucosa leads to increases production of saliva from graft harvesting site. Therefore, salvia production significantly increased in non-closure group till day 3; this may be due to the presence of raw donor surface, and it decreases gradually. On the other hand, may be due to the irritation of oral mucosa by suture material albeit on a small raw area only few patients in closure group had a complaint of increased saliva production. Excessive salivation stopped in both groups after donor site raw surface gets re-epithelized.

Slurring of speech universally in all patients in immediate post op period regardless of closure of donor site but on day 3, slurring of speech was more in Group 1 patients but not significant. This might be due to tightness of closed wound and edema, which resolved by the time and at the end of a week in both group we did not find any difference.

In our study, the complications like salivatory problems, mucous retention cysts occurred & other problems related to graft harvest like hematoma at harvest site, persistent bleeding requiring revisit to operation theatre or packing, or any wound healing problems were not seen in our series. It shows that the donor area can be left open without causing additional problem once the perfect hemostasis of that area achieved.

Conclusion

Although most of surgeons prefer to close the donor site, but in our study, we did not find any difference in long-term morbidities of closing or non-closing the BMG donor site. In short term, pain appears to be worse in the immediate post operative period after suturing the harvest site. There were minimal chances of hematoma or rebleeding from graft site which may require reintervention once hemostasis achieved perfectly. Although saliva production is significantly increased in non-closure group initially, there is no difference in wound healing process postoperatively, so in our opinion, we can leave open BMG harvest site.

References:

1. Chapple C, Andrich D, Atala A, Barbagli G, Cavalcanti A, Kulkarni S, *et al.* SIU/ICUD consultation on urethral strictures: The management of anterior urethral stricture disease using substitution urethroplasty. *Urology* 2014;83:S31-47.
2. Morey AF, Watkin N, Shenfeld O, Eltahawy E, Giudice C. SIU/ICUD consultation on urethral strictures: Anterior urethra – Primary anastomosis. *Urology* 2014;83:S23-6. Duckett JW, Coplen D, Ewalt D, Baskin L. Buccal mucosa in urethral replacement. *J Urol* 1995;153:1660-3.
3. Dessanti A, Rigamonti W, Merulla V, Falchetti D, Caccia G. Autologous buccal mucosa graft for

- hypospadias repair: An initial report. *J Urol* 1992;147:1081-3.
4. El-Kasaby AW, Fath-Alla M, Noweir AM, el-Halaby MR, Zakaria W, el-Beialy MH. The use of buccal mucosa patch graft in the management of anterior urethral strictures. *J Urol* 1993;149:276
 5. Strachan DS, Avery JK. Histology of the oral mucosa and tonsils In: Avery JK, editor. *Oral Development and Histology*. NY: Thieme Medical Publishers; 2001. p. 243.
 6. Markiewicz MR, Lukose MA, Margarone JE 3rd, Barbagli G, Miller KS, Chuang SK. The oral mucosa graft: A systematic review. *J Urol* 2007;178:387-94
 7. Dublin N, Stewart LH. Oral complications after buccal muscosal graft harvest for urethroplasty. *BJU Int* 2004;94:867-9.
 8. Jang TL, Erickson B, Medendorp A, Gonzalez CM. Comparison of donor site intraoral morbidity after mucosal graft harvesting for urethral reconstruction. *Urology* 2005;66:716-20
 9. Kamp S, Knoll T, Osman M, Häcker A, Michel MS, Alken P. Donor-site morbidity in buccal mucosa urethroplasty: Lower lip or inner cheek? *BJU Int* 2005;96:619-23
 10. 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;172:580-3
 11. Muruganandam K, Dubey D, Gulia AK, Mandhani A, Srivastava A, Kapoor R, et al. Closure versus nonclosure of buccal mucosal graft harvest site: A prospective randomized study on post operative morbidity. *Indian J Urol* 2009;25:72-5
 12. Rourke K, McKinny S, St Martin B. Effect of wound closure on buccal mucosal graft harvest site morbidity: Results of a randomized prospective trial. *Urology* 2012;79:443-7
 13. Dublin N, Stewart LH. Oral complications after buccal muscosal graft harvest for urethroplasty. *BJU Int* 2004;94:867-9.