

The effect of closure versus nonclosure of lingual mucosa graft harvest site on postoperative morbidity in augmentation urethroplasty: A comparative study

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Abstract

Objectives: The objective of this study is to compare postoperative morbidity of closure versus nonclosure of the lingual mucosa graft (LMG) harvest site in augmentation urethroplasty.

Materials and Methods: From January 2015 to November 2016, a total of 42 patients who underwent LMG urethroplasty randomized in 2 groups. In Group 1, donor-harvesting site was left open while in Group 2, donor site was closed. Self-made questionnaires were to assess postoperative pain, difficulty in tongue protrusion, swelling and numbness in graft harvest site, speech impairment, and difficulty in tolerating liquid and regular diet.

Results: Mean visual analog scales score was 7.1 in Group 1, and 7.9 in Group 2 on day 0, which was statistically significant. Nearly 90.47% of patients in closure group and 95.23% in nonclosure group were able to swallow liquid diet on day 0 ($P = 0.5604$). On day 3, 95.71% of patients in Group 1 and 80% in Group 2 were able to swallow soft diet ($P = 0.1604$). Numbness was present in 80.95% Group 1 and 71.42% in Group 2 on day 0, which improved to 28.57% pts in Group 1 and 33.33% in Group 2 on day 3. On day 3, slurring of speech was more frequent in closure group (80%). However, at the end of a week, there was no difference in both groups. Saliva production was significantly increased in Group 1 in the 1st week.

Conclusion: Long-term morbidities of closing or nonclosing the LMG donor site are similar, but in short term, there is less pain, less edema, early recovery of tongue movements in nonclosure groups.

Keywords: Augmentation urethroplasty, donor site, lingual mucosa, open versus closed

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Received: 13.09.2017, **Accepted:** 05.03.2018

INTRODUCTION

Graft urethroplasty is an established treatment option for long anterior urethral strictures not amenable to anastomotic repair.^[1,2] Oral mucosal grafts have been a reliable substitute and are in use for the past few years,^[1-3] but are associated with donor site morbidity such as difficulty in mouth opening and dry mouth.^[4,5]

Simonato *et al.* first described the lingual mucosa graft (LMG) harvesting technique and closed the donor site.^[6,7] There are many series about donor site morbidity, but none have described effects of donor site wound closure or leaving it open on morbidity. Closure brings mucosal ends together, but it may cause compression of lingual muscles

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How to cite this article: 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;11:265-9.

Access this article online	
Quick Response Code:	Website: www.urologyannals.com
	DOI: 10.4103/UA.UA_142_17

which may lead to compartment syndrome. On the other hand, the early disappearance of catgut suture due to the digestion of suture by salivary enzymes defeats the purpose of keeping mucosal edges together for 5–7 days. Good healing properties of oral mucosa are well evident by the fast healing of aphthous ulcers and buccal mucosa harvest site.^[8] Hence, we conducted a randomized prospective trial comparing the effect of wound closure or leaving open on postoperative morbidity of the LMG harvest site in patients undergoing augmentation urethroplasty.

MATERIALS AND METHODS

This study was conducted from January 2015 to November 2016, in the Department of Urology with the objective to assess the morbidity of closure versus nonclosure of the LMG harvest site in the postoperative period. A total of 42 patients who underwent LMG urethroplasty were randomized into two groups. In Group 1 (21 patients), donor harvesting site was left open while in Group 2 (21 patients) donor site was closed. The method of randomization was every alternate patient. Patients' baseline characteristics such as age, stricture length, and graft width were noted; patients with oral cancer, oral ulcer, submucosal fibrosis, poor mouth opening, previous oral surgery, and bilateral lingual harvest site were excluded from the study.

After nasotracheal intubation, a traction suture was applied on the tip of the tongue. The segment to be harvested was marked on the ventrolateral surface and infiltrated submucosally with adrenaline (1:100,000). Graft harvesting was done by standard technique.^[6,7] Tip of the tongue was spared. After graft harvesting, donor site bleed was controlled with bipolar cautery. In Group 1, patient's donor site left open while in Group 2 patients, it was closed with chromic catgut 3-0 suture. Donor site was packed with adrenaline-soaked ribbon gauze which was removed at the end of urethroplasty in both groups.

The postoperative pain was measured by visual analog pain score. The other parameters were assessed by nonvalidated questionnaires [Table 1], which was completed by the patients at day 0, day 3, 1 week, 1 month, and 6 months postoperative. Statistical analysis was performed by SPSS statistics 20th edition. Student's *t*-test for parametric distribution and Mann–Whitney U-test for nonparametric distribution were carried out. *P* < 0.05 was considered statistically significant.

RESULTS

Baseline characteristics were same between the groups. As shown in Table 2, the mean age was 37.71 years and

36.54 years in Group 1 and 2, respectively. Mean stricture length was nearly same in both groups (8.45 cm in Group 1 and 8.63 cm in Group 2). Graft width was also same in both groups (1.5 cm–2.2 cm).

Postoperative pain is shown in Table 3. All patients had maximum pain on the day of surgery. Mean visual analog scales (VAS) score was 7.1 in Group 1, and 7.9 in Group 2 on day 0, which was statistically significant. Pain on day 3 was 4.8 in Group 1 and 5.01 in Group 2. However, on day 7, VAS was same in both groups.

Postoperative morbidity till day is shown in Table 4 and till 6 months in Table 5. About 90.47% patients in closure group and 95.23% in nonclosure group were able to swallow liquid diet on day 0, (*P* = 0.5604). On day 3, 95.71% of patients in Group 1 and 80% of patients in Group 2 were able to swallow soft diet, (*P* = 0.1604). However, after 1 week, all patients were able to take regular diet.

Numbness was present in 80.95% Group 1 and 71.42% in Group 2 on day 0 (*P* = 0.4809), which improved to 28.57% pts in Group 1 and 33.33% in Group 2 on day 3 (*P* = 0.7460). On day 7, only two patients in Group 1 and 3 patients in Group 2 were complaining of numbness. However, after 1 month, no patient had complaints of numbness.

Speech impairment was present in all patients on day 0, regardless of closing of donor site or not but on day 3, slurring of speech was more frequent in closure

Table 1: Questionnaire parameters

Parameters	Yes	No
1 Difficulty in swallowing liquid diet		
2 Difficulty in eating soft diet		
3 Difficulty in eating regular diet		
4 Difficulty in tongue protrusion		
5 Swelling of the graft harvest site		
6 Numbness of the graft harvest site		
7 Dysgeusia		
8 Speech impairment		
9 Increase saliva production		

Table 2: Baseline parameters

	Group 1	Group 2	<i>P</i>
Age (years)	37.714±9.258	36.545±9.138	0.6792
Length of stricture (cm)	8.45±1.052	8.63±1.034	0.7531
Width of graft (cm)	1.838±0.262	1.886±0.273	0.5668

Table 3: Visual anal pain score

	Group 1	Group 2	<i>P</i>
VAS on day 0	7.143±0.573	7.905±0.625	0.0002
VAS on day 3	4.810±0.680	5.095±0.700	0.1873
VAS on day 7	2.190±0.680	2.048±0.669	0.4964

VAS: Visual analog scale

Table 4: Postoperative morbidity

	Day 0		P	Day 3		P
	Group 1 (%)	Group 2 (%)		Group 1 (%)	Group 2 (%)	
Pain at the graft harvest site (mean VAS score)	7.1	7.9	0.0002	4.8	5.09	0.1873
Number of patient with difficult tongue protrusion (number)	21	21		14 (66.66)	19 (90.47)	0.0623
Number of patients swallowing liquid diet at day 0 (number)	20 (95.23)	19 (90)	0.5604	21	21	
Swelling of the graft harvest site (number)	3 (14.28)	0	0.0754	2 (9.52)	0	0.1546
Increase saliva production (number)	18 (85.71)	12 (57.14)	0.0413	13 (61.90)	6 (28.57)	0.0302
Eating soft diet (number)	-	-		20 (95.23)	17 (80.95)	0.1604
Eating regular diet (number)	-	-		-	-	
Numbness of the graft harvest site (number)	17 (80.95)	15 (71.42)	0.4809	6 (28.57)	7 (33.33)	0.7460
Dysgeusia (number)	21	21		17 (80.95)	16 (76.91)	0.7151
Speech impairment (number)	21	21		15 (71.42)	17 (80.95)	0.4809

VAS: Visual analog scale

Table 5: Postoperative morbidity

	Day 7		P	One month		6 month	
	Group 1	Group 2		Group 1	Group 2	Group 1	Group 2
Pain at the graft harvest site (mean VAS score)	2.1	2.04	0.4964	-	-	-	-
Number of patient with difficult tongue protrusion (number)	2 (9.5)	3 (14.2)	0.6436	1	1	0	0
Number of patients swallowing liquid diet at day 0 (number)	21	21	-	21	21	21	21
Swelling of the graft harvest site (number)	0	0	-	0	0	0	0
Increase saliva production (number)	3 (14.2)	0	0.0754	0	0	0	0
Eating soft diet (number)	21	21		21	21	21	21
Eating regular diet (number)	21	21		21	21	21	21
Numbness of the graft harvest site (number)	2 (9.5)	3 (14.2)	0.6436	1	0	0	0
Dysgeusia (number)	5 (23.8)	4 (19.0)	0.7151	0	0	0	0
Speech impairment (number)	4 (19.0)	5 (23.8)	0.7151	1	1	0	0

VAS: Visual analog scale

group (80%), but this was not significant between the groups ($P = 0.4809$). However, at the end of a week, there was no difference in both groups. At 1 month, one patient in both the groups had developed minor speech difficulty, which was relieved with physiotherapy. By the end of 6 months, none of the patients had difficulty in speech.

We found no difference between the groups according to taste sensation in long term, but in short term on day 3, 28% pts in Group 1 and 30% in Group 2 reported change in the taste which was not significant. Saliva production was significantly more in Group 1 patients till 1 week ($P = 0.0302$).

All patients on day 3 had difficulty in tongue protrusion. On day 3, 90.45% of patients in Group 2 and 66.66% of patients in Group 1 had difficulty in tongue protrusion which was not significant, but after 1 week only 14% patients in Group 2 and 9.5% patients in Group 1 faced difficulty in tongue protrusion ($P = 0.6436$).

DISCUSSION

Lingual mucosa has become an attractive and favorable donor site for substitutional urethroplasty, after buccal mucosa. Graft from Lingual mucosa is easy to harvest, resistant to infection, compatible with a wet environment, and has a thick epithelium along with thin lamina propria

and high capillary density. Donor site morbidities such as pain, numbness, difficulty in mouth opening are also less than buccal mucosa.^[9] Simonato *et al.* described the technique of graft harvesting from ventrolateral surface of the tongue. Considering vascularity of the tongue, he chose the donor site for preventing postoperative bleeding.^[6]

Subsequently, many series presented pain, slurring of speech and numbness as donor site morbidity of lingual mucosa.^[10-12] In all these series, donor site was closed to reduce wound size and eliminate postoperative bleeding. However, closure of donor site may be associated with tension in lingual tissue and stretching of mucosal edges.^[12,13] Pain in the oral cavity was the most predominant symptom in postoperative period. We used visual analog pain score to evaluate pain symptoms. In earlier studies, pain was found to be significant in early postoperative period (day 0–1) even when donor site was closed while in the present study early postoperative donor site pain was significantly more in closure group.^[12-14]

In our study, mean pain score on day 3 was 4.8 in Group 1 and 5.2 in Group 2, which was not significant between the groups, whereas in another study pain score was 5 in LMG group in which donor site was closed.^[13,14] According to Rourke *et al.*, pain decreased with time in closure

group in BMG patients which may be due to decrease in inflammation and edema after 48 h.^[15]

Local edema over wound closure site may be the main distressing problem in wound closure patients especially in whom wound approximation was under excessive tension. This morbidity may be avoided by leaving the wound open. In our study, four patients in Group 2 developed edema over suturing site which decreased after 3–4 days and completely resolved after 1 week. Furthermore, after 1 week, patients of both groups had nearly similar pain at donor site.

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

Numbness is related to decreased sensation at the graft harvest site. Patients of both groups had numbness of graft site at the end of 1 month.

Increased saliva production after graft harvesting may be due to irritation of oral mucosa. We found significantly increased saliva production in nonclosure group till day 3; this may be due to the presence of raw surface and decreases gradually. On the other hand, only few patients in closure group had a complaint of increased saliva production which may be due to the irritation of oral mucosa by suture material albeit on a small raw area. Once raw surface gets re-epithelized, excessive salivation stopped in both groups.

Speech impairment was present in all patients on day 0, regardless of closure of donor site but on day 3, slurring of speech was more in Group 2 patients but not significant. This might be due to edema, deformed tongue and tightness of closed wound, which resolved by the time and at the end of a week we did not find any difference in both the groups. Kumar *et al.* found difficulty in speech in only 20% patients on day 1,^[10] whereas Sharma *et al.* found slurring of speech in all of their patients.^[13] In our study, at 1 month one patient in both groups had minor speech problems, mostly in uttering words which require tongue contact with the upper palate, for example, D L, T, N, G, and especially S and SH. This speech impediment was relieved with physiotherapy, and by the end of 6 months, no patient had any speech difficulty, like other study.^[10]

On day 3, 80% pts in Group 1 and 76% in Group 2 reported change in taste and difference was not significant, but later on it normalized in both groups. Kumar *et al.* and Das *et al.* found no change in taste sensation on day 6 after LMG graft, but Xu *et al.* found 24% have dysgeusia in early postoperative period.^[12]

Difficulty in tongue protrusion is also a short-term morbidity after LMG graft harvesting. Earlier a study showed all patients on day 3 have difficulty in tongue protrusion which improved with time and 30% patients were able to protrude the tongue on day 7.^[12] In our study, difficulty in tongue protrusion in Group 2 on day 3 may be explained by pain, edema, and excessive tension over wound which restrict mobility, but after 1 week, there was no difference between the 2 groups in tongue protrusion.

CONCLUSION

Although most surgeons prefer to close the donor site, we in our study did not find any difference in long-term morbidities of closing or nonclosing the LMG donor site, but in short term, there is less pain, less edema, early recovery of tongue movements in nonclosure groups. Once adequate hemostasis was achieved, there were minimal chances of hematoma or rebleeding from graft site which may require reintervention. Although saliva production is significantly increased in nonclosure group initially, there is no difference in wound healing process postoperatively, so in our opinion, LMG harvest site may be left open.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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