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Original Article

Repair of Surgical Defect by Pectoralis Major Flap Versus Free Radial Forearm Flap in Buccal Carcinoma: Assessment of Quality of Life

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Abstract:

Background: *Soft tissue reconstruction of the oral cavity is the most critical factor in achieving a successful functional result. Malignant lesions occurring in the buccal area are usually treated with primary surgical and/or radiotherapy of the head and neck region. Depending on the location and size of the buccal tumor, radical surgical treatment often affects all oral function such as speech, swallowing, chewing, oral rehabilitation, nutrition and appearance. To maximize postoperative function, flap repair is currently the preferred method for reconstruction of buccal defects after major surgery. Among the flaps most commonly used are pedicle pectoralis major myocutaneous flap and the free radial forearm fasciocutaneous flap. The choice of the best reconstructive option is still controversial.*

Objective: *To find out the quality of life after repair of surgical defect by pectoralis major flap versus free radial forearm flap in buccal carcinoma.*

Methods: *This prospective study was conducted in the department Otolaryngology-Head & Neck Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka from September 2017 to August 2019. A total number of 44 cases of buccal carcinoma patient who had the inclusion criteria were enrolled as a study sample. These subjects were selected from the Department of Otolaryngology-Head & Neck Surgery, Department of Oral & Maxillofacial Surgery, Bangabandhu Sheikh Mujib Medical University, Shahbag, National Institute of ENT, Tejgaon, Dhaka. Comparison of nominal or ordinal variables between patients who have undergone surgery with either the RFFF or PMMF were analyzed using a chi-square test. The UW-QOL scores were*

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compared for each domain using the nonparametric Mann-Whitney test. P-value < .05 was accepted as the level of significance.

Results: *In this study 40 out of 44 patients were completed UW-QOL questionnaires. The median age was 52 (range 40-65years), the male-female ratio was 1.44:1. All were habituated in either smoking or betel leaf/ nut or alcohol. Most of them were illiterate to the primary level of education and suffering from stage- iii tumor. All these variables were statistically insignificant except gender. Patients reconstructed with RFFF felt better in shoulder domains than PMMF but felt worse appearance domains and these were statistically significant in both 3 months and 6 months postoperatively*

Conclusion: *The study result had shown that reconstruction of the defect after buccal cancer resection using either RFFF or PMMF significantly influences patient's quality of life. This study will provide valuable information for surgeons who will decide reconstruction modalities for buccal cancer and also will help the patients getting a better outcome.*

Key words: *Pectoralis Major Myocutaneous Flap, Free Radial Forearm Flap, Quality of Life.*

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Introduction:

The buccal mucosa is the most common site for oral cancer in South East Asia, up to 40 percent of oral cancers arising at this site. This contrasts with North America and Western Europe where buccal carcinomas only account for 2-10 percent of oral carcinomas The consumption of betel quid, betel nut is socially and culturally embedded in the countries of South-East Asia. Small T1 tumours may be resected & reconstructed by primary closure. But larger tumour requires reconstruction of the buccal defect with flap. Most commonly used flaps are pedicled pectoralis major myocutaneous flap and the free radial forearm flap[1,2,3].

Reconstruction of buccal defect represents a challenge because of the critical role of this area both functionally and aesthetically. The major intended outcome of buccal carcinoma surgery is not only the survival of the patients but also the postoperative quality of life. The quality of life (QoL) indicates about the psychosocial well-being as well as the effects of the disease and its management.

A pectoralis major flap is one of the standard tools for reconstruction of the head and neck. The pectoralis flap provide good postoperative appearance (most desireable colour-texture match to head & neck region) but reduced shoulder mobility and swallowing or speech function[4,5].

Reconstruction of full-thickness buccal defects with folded radial forearm flap was a reliable method with high success rate and good postoperative QoL. All patients were satisfied with the appearance, chewing, swallowing domains of QoL[6].

A comparison between free radial forearm flap and pectoralis major flap reconstruction showed equal postoperative QoL in terms of speech but the better cosmetic appearance and swallowing domains comparing to pectoralis major flap reconstruction[7]. This study aimed to compare the quality of life after repair of surgical defect by pectoralis major flap versus free radial forearm flap in buccal carcinoma.

Materials and Methods:

This prospective study was conducted in the department Otolaryngology-Head & Neck Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka from September 2017 to August 2019. After obtaining clearance and

approval from Institutional Review Board, total, 44 cases of buccal carcinoma patient were selected by purposive sampling who had the inclusion criteria were enrolled as a study sample.

Study Procedure:

Patients with buccal carcinoma patient who were admitted in the Department of Otolaryngology-Head & Neck Surgery, Department of Oral & Maxillofacial Surgery, Bangabandhu Sheikh Mujib Medical University, Shahbag, National Institute of ENT, Tejgaon, Dhaka and fulfil the inclusion and exclusion criteria were recruited as subjects in this study. After taking informed written consent, detail history was taken. Thorough ENT examination and related systemic examinations were done. Diagnosis of buccal carcinoma was confirmed by histopathological examination. Relevant investigations were done. The patency of the ulnar artery was ensured by carrying out the Allen test[8]. When a pectoralis major flap was used, the skin paddle was designed medial to the nipple, at about the level of the sixth rib. Pectoralis major flap in females was considered the inframammary incision as for the preferred approach[9].

Patients who were received free radial forearm flap were needed donor site partial thickness skin graft for flap wound healing. Surgery was performed with an operating loop for vascular anastomosis. Vascularity was checked for graft survival. In the case of pectoralis major group, vascular anastomosis was not required. Postoperative radiotherapy was advised to all of the subjects.Each patient was assessed after surgery at 3 months and 6 months using scores of items and scales of the UW-QOL questionnaire.

Translation & validation of UW-QOL questionnaire:

UW-QOL questionnaire was translated in Bengali. Then it was evaluated by 25 doctors which include residents, medical officers, consultants and assistant professors. Then it was tested among 20 patients.

Data Processing and Analysis:

Data were edited, checked and verified manually. Qualitative data were expressed as a percentage and quantitative data were expressed as mean, standard deviation. A chi-squared test was performed to compare all the qualitative parameters between both groups (age, Sex, T classification). The UW-QOL scores were compared for each domain using the nonparametric Mann-Whitney test. P-value < .05 was accepted as a level of significance.

Results:

Total 44 patients were included. Among them, 3 patients had died due to cardiac arrest within 1 month of postoperative period and 1 patient missed the follow-up. 40 patients who completed UW-QOL questionnaires. The postoperative follow-up period ranged from 3 months to 6 months.

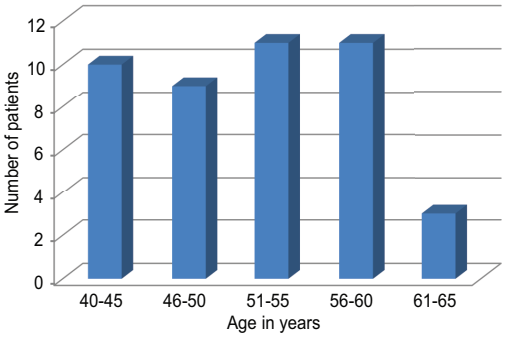

Fig.-1: *Distribution of patients according to age (years) (n= 44)*

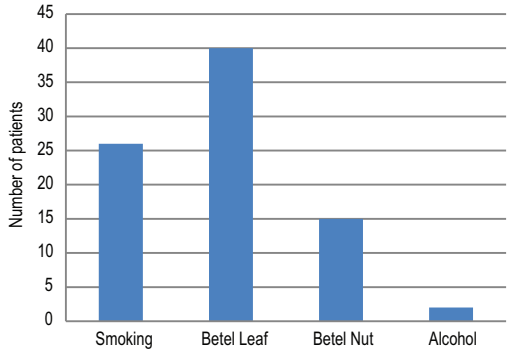

Fig.-2: *Distribution of patients according to habit (n= 44)*

Table I: *Clinical data analyses of buccal carcinoma patients ho underwent PMMF or RFFF for reconstruction*

Variables	Total no. of patients (%)	No. of patients (%) PMMF n=22)	RFFF (n=22)	p
Age				
40-45 years	10(22.72%)	7(31.81%)	3(13.63%)	
46-50 years	9(20.45%)	5(22.72%)	4(18.18%)	
51-55 years	11(25.00%)	3(13.63%)	8(36.36%)	0.354
56-60 years	11(25.00%)	5(22.72%)	6(27.27%)	
61-65 years	3(7.89%)	2(9.09%)	1(4.54%)	
Gender				
Male	26(59.09%)	17(77.27%)	9(40.90%)	0.014
Female	18(40.90%)	5(22.72%)	13(59.09%)	
Educational level				
Illiterate	11(25.00%)	7(31.81%)	4(18.18%)	
Primary	19(43.18%)	9(9.09%)	10(45.45%)	0.141
Secondary	8(18.18%)	2(9.09%)	6(27.27%)	
Higher Secondary	6(13.63%)	5(22.72%)	1(4.54%)	
Occupation				
Housewife	18(40.90%)	5(25.00%)	13(54.16%)	
Farmer	19(43.18%)	14(70.00%)	5(20.83%)	0.006
Hawker	3(6.81%)	1(5.00%)	2(8.33%)	
Driver (Bus)	2(4.54%)	0(0.00%)	2(8.33%)	
Retired service holder	2(4.54%)	0(0.00%)	2(8.33%)	
T classification				0.784
T2	17(38.63%)	7(41.17%)	10(37.03%)	
T3	27(61.36%)	10(58.83%)	17(62.97%)	

* P-value was obtained by chi-square and Fisher's exact test

There were also significant differences between the PMMF and RFFF groups in operation time (360±50 versus 480±75 minutes). The patients were assessed according to UW-QOL (University of Washington- Quality of Life) questionnaires at 3 months and 6 months postoperatively. There were no significant differences between the 2 groups for the pain, activity, recreation, swallowing, chewing, speech, taste, saliva, mood and anxiety domains. But there were significant differences between the groups at 3 months postoperative period for the appearance (PMMF VERSUS RFFF, 68.05±19.66 versus 47.72±16.70, p=0.0009) and shoulder (PMMF VERSUS RFFF, 50.55±20.55 versus 70.45±16.36, p=0.004) domains.

Table II: *Means of scores of items and scales of UW-QOL, 3months after surgery.*

Domains	PMMF (no. of patients = 22)				RFFF (no. of patients = 22)				P
	Mean	SD	Median	Range	Mean	SD	Median	Range	value
UW-QOL									
Pain	61.11	15.48	61.11	25-75	65.90	16.07	75	25-100	0.390
Appearance	68.05	19.66	75	0-100	47.72	16.70	50	25-75	0.0009
Activity	73.61	14.05	75	25-100	70.45	14.37	75	50-100	0.841
Recreation	81.94	21.05	81.94	0-100	84.09	24.47	100	0-100	0.529
Swallowing	73.33	21.32	70	30-100	75.00	25.18	70	30-100	0.960
Chewing	66.66	26.11	58.33	0-100	63.63	30.82	50	0-100	0.631
Speech	74.44	14.83	70	30-100	77.72	17.30	70	30-100	0.944
Shoulder	50.55	20.55	50.55	0-70	70.45	16.36	70	30-100	0.004
Taste	72.77	23.89	71.39	30-70	75	25.18	70	30-70	0.992
Saliva	57.77	21.64	63.89	30-100	60.45	27.71	70	30-100	0.674
Mood	62.50	24.13	68.75	0-100	71.59	24.18	75	25-100	0.153
Anxiety	62.22	27.88	70	0-100	73.63	14.93	70	30-100	0.0989

* P-value was obtained by non-parametric Mann-Whitney tests

There were also no significant differences between the 2 groups for the pain, activity, recreation, swallowing, chewing, speech, taste, saliva, mood and anxiety domains. But there were significant differences between the groups at 6 months postoperative period for the appearance (PMMF VERSUS RFFF, 69.44±19.29 versus 50.00±16.85, p=0.001) and shoulder (PMMF VERSUS RFFF, 52.77 ±20.40 versus 73.63 ±15.28, p=0.002) domains.

Table III: *Means of scores of items and scales of UW-QOL, 6 months after surgery.*

Domains	PMMF (no. of patients = 22)				RFFF (no. of patients = 22)				P
	Mean	SD	Median	Range	Mean	SD	Median	Range	value
UW-QOL									
Pain	68.05	12.62	75	50-100	68.18	17.15	75	25-100	0.638
Appearance	69.44	19.29	75	0-100	50.00	16.85	50	25-75	0.001
Activity	75.00	16.85	75	25-100	72.72	14.90	75	50-100	0.561
Recreation	79.16	21.65	77.08	0-100	81.81	21.56	87.5	25-100	0.779
Swallowing	75.55	19.12	70	30-100	76.81	23.23	70	30-100	0.968
Chewing	63.88	25.25	50	0-100	61.36	29.89	50	0-100	0.589
Speech	76.11	15.07	70	30-100	79.09	17.81	70	30-100	0.904
Shoulder	52.77	20.40	61.38	0-70	73.63	15.28	70	30-100	0.002
Taste	66.66	25.93	70	30-70	70	27.63	70	30-70	0.459
Saliva	61.11	24.65	65.55	30-100	62.27	26.95	70	30-100	0.703
Mood	59.72	24.00	59.72	0-100	67.04	24.29	75	25-100	0.267
Anxiety	53.88	28.14	53.88	0-100	66.81	20.08	70	30-100	0.0929

* P-value was obtained by non-parametric Mann-Whitney tests

Discussion:

The present study was undertaken to observe the postoperative quality (QoL) of buccal carcinoma patients who underwent PMMF or RFFF reconstruction. For this study, a total of 44 patients of buccal carcinoma (stage II, III) who have the inclusion criteria were enrolled as a study sample.

In this study, we found that patients who had undergone reconstruction with the PMMF had a better score in the appearance domain (of QoL) when compared with patients who had undergone RFFF reconstruction. This is may be due to the donor site of RFFF is more exposed whereas it is closed and hidden for PMMF. Another issue is the most desireable colour-texture match to head & neck with PMMF reconstruction then RFFF. So the patient can easily accept this morbidity. They[10] found a similar outcome in their study.

In the current study, we found a better score for shoulder domain (of QoL) in RFFF than PMMF. This may be due to pain, reduced strength and range of motion in the shoulder in case of PMMF. In a previous study[11] also found that PMMF reduced the range of motion as well as strength of the shoulder.

We also found there were no significant differences between the two groups for speech, swallowing, chewing, taste, saliva, mood, pain & anxiety. Several previous studies also found similar findings[10,12].

In the present study majority of cases were older age group (50-60 years). This may be due to longer use of betel leaf, betel nut and tobacco. But there was no significant statistical difference between the PMMF and RFFF group. In a study[12] they found similar findings.

This study showed the majority of the study population were male and 42% were female. There was a significant difference between both groups. Most of the female patients received RFFF due to avoidance of breast deformity. Another study also reported similar findings[13].

In the study reconstruction with RFFF had a longer operative time than PMMF. Microvascular anastomosis in RFFF is the probable main cause for a longer duration of the procedure. There was a similar finding to another study[13].

In the current study majority of cases were stage III of buccal carcinoma. There was no significant statistical difference between both groups. The previous study also found no significant statistical differences between RFFF and PMMF[10].

Conclusion:

Patients reconstructed with RFFF had better shoulder domain whereas appearance domain had better in patients with PMMF reconstruction. This study will help for future surgical planning for better outcome of patients.

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