

Comparative study of various types of reconstructive procedures in facial and oral malignancies at tertiary care hospital: an observational study

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Abstract

The goal of therapy of patient with oral cavity malignancy is not only to cure the tumour, but also provide rehabilitation and try to preserve or restore some reasonable quality of life. Oral cavity reconstruction is not simply based on closure of the wound. Present study describes the various types of reconstructive procedures undertaken and its outcome in the patients at the tertiary care hospital in Miraj district of Maharashtra during the study period. Total of 52 cases were studied. The procedures done were Primary closure in 11 cases, Split Thickness Skin Graft in 2 cases, Local flaps in 11 cases, Myocutaneous flaps in 23 cases and free flaps in 5 cases. Recipient site morbidity in terms of infection was highest in Pectoralis Major Myocutaneous flaps (22%) followed by local flaps (18%) and free flaps (20%). Incidence of orocutaneous fistula was maximum in Pectoralis Major Myocutaneous flaps (13%) followed by free flap (13.3 %). Overall morbidity in terms of duration of operation, hospital stay, and return to operation theatre for evacuation of hematoma was more in free flaps. There was no peri-operative mortality. Post operative mortality was 5 % mainly due to cardiovascular and respiratory causes. Functional and aesthetic results were excellent in patients of free flap repair as compared to other procedures.

Keywords: Skin Graft, Myocutaneous Flap, Free Flap.

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INTRODUCTION

The goal of therapy of patient with oral cavity malignancy is not only to cure the tumour, but also provide rehabilitation and try to preserve or restore some reasonable quality of life. Oral cavity reconstruction is not simply based on closure of the wound. Reconstructive surgery for oral and maxillofacial carcinoma is a challenging procedure and requires a team of specialists. It is performed regularly only in a handful of medical

centers. Till recently the pectoralis major myocutaneous flap (PMMC) was considered to be the best option for oral and maxillofacial reconstruction. This philosophy is changing fast with rapid advancement in reconstructive microsurgery. Years of innovation in reconstructive microsurgery have given us a reasonably good number of very excellent flaps¹. Present study describes the various types of reconstructive procedures undertaken and its outcome in the patients at the tertiary care hospital in Miraj district of Maharashtra during the study period.

METHODS

This study comprises of 52 patients with biopsy proven malignancies in the oral cavity coming to Government Medical College and Hospital, Miraj during the period of July 2008 to October 2010. This hospital is a referral centre for patients with all types of malignancies as in the near vicinity radiotherapy is available only in this hospital. So, many patients with oral malignancies are coming to this hospital. After collecting the preliminary data, name, age, sex occupation, religion etc. a thorough

history was taken in each case. Many of the time patients used to come with obvious diagnosis and histopathological slides of their disease form referring physicians. Such slides were reviewed by pathologist of the hospital. In patients whose lesions were not biopsied outside, we had taken wedge or punch biopsy of the lesion. All 52 patients had biopsy proved carcinomas. A thorough general and systematic examination was carried out for each patient so as to know any associated disease and to judge fitness for general anaesthesia and surgery. In local examination of the lesion, the clinical stage of the tumor was determined by TNM staging. Detail examination of contra lateral as well as ipsilateral side of the neck was done for presence or absence of lymph glands. All routine investigations were carried out. Haematological investigations – haemoglobin estimation, total WBC count, differential WBC count, blood grouping and cross matching. Biochemical investigations as blood sugar, blood urea, liver function tests. Radiological investigations like OPG, oblique and A. P. view of the mandible; chest X-ray, CT neck + PNS, Color Doppler of upper limb were a routine. EKG, cardiologist opinion used to be carried out to judge the fitness for general anaesthesia. Before starting any treatment every patient had dental check up. Generally each case of oral malignancy was discussed in group meetings – combination of surgeon, radiotherapist, physicians, pathologist and a plan of treatment was decided. Patients with history of myocardial infarction within 3 months were considered as an absolute contraindication for surgery. The patient whose growths were inoperable and patients who appeared to be having very high risk for GA had not received surgical treatment as a primary line of treatment. These patients were advised radiotherapy. In all other cases, surgical treatment followed by radiotherapy used to be a general plan. In this study 52 patients had undergone a combined operation (primary growth excision plus modified radical neck dissection) with some form of reconstruction. The histopathological report of the surgically operated specimen used to be thoroughly scrutinized with the special reference to the surgical margins and lymph nodes. For reconstruction before operation some tentative plan of reconstruction was decided such as deltopectoral flap, pectoralis major myocutaneous flap, latissimus dorsi myocutaneous flap, forehead flap free flap. We have done reconstructive surgery and curative (ablative) surgery at the same sitting. Post operatively, all patients were kept for first two days in intensive care unit and then after in general wards. The minimum hospital stay was 10 days. If some post operative complication occurs as flap necrosis,

orocutaneous fistula then hospital stay was increased. Generally within 25 days the patient received post operative radiotherapy. But due to some complications, the time lag between the surgery and the commencement of radiotherapy may increase. Maximum lag duration was 8 weeks. After discharge patients if undergoing radiotherapy used to visit radiotherapy department. After completion of surgical and radiotherapeutic treatment, patients were tried to follow and maximum attempts to keep a regular follow up were tried. Whenever patient had come for follow up, he used to be examined very thoroughly. Primary site, ipsilateral and contralateral side of neck used to be examined for recurrences. Any suspected lesions were biopsied to rule out or confirm the suspicion of recurrence. Patients were instructed for 3 monthly follow up. (Patients very rarely adhered strictly to the rigid follow up schedule). In suspicious cases chest X-ray, liver function tests were carried out. Clinical profile of the study patients are being published separately. Details of surgical procedure done, surgical defects found, reconstructive procedures and outcome are described here. Functional and aesthetic results were evaluated for the 52 patients by the same physician. The following data were recorded for all patients: quality of oral diet, speech intelligibility, mouth opening and aesthetic outcome. Results were scored from 0 to 2, as follows.

Oral Diet

2: normal

1: moderately impaired, restricted diet, soft diet

0: severely impaired or impossible, requiring maintenance of an enteral feeding tube

Speech Intelligibility

2: normal, easily intelligible,

1: moderately altered, intelligible with effort,

0: severely altered or impossible, patient unintelligible for the listener,

Mouth Opening

2: normal, greater than two fingerbreadths,

1: moderately limited, between 1 and 2 fingerbreadths,

0: severely limited, less than one fingerbreadth.

Aesthetic outcome

2: good,

1: acceptable: moderate deformations, depression or disalignment.

0: poor: severe disfigurement, major deformations depression or disalignment that immediately attract one's attention.

The presented outcomes correspond to the results reported at the last follow up visit.

OBSERVATION

Table 1: Details of various surgical procedures done

LESION	STAGE	W.E	WE + Supraomohyoid Dissection	W.E + MRND	W.E+MRND+ Mandibulectomy	Maxillectomy
CHEEK	I	-	-	-	-	-
	II	-	-	2	-	-
	III	2	-	2	12	-
	IV	-	-	-	5	-
TONGUE	I	-	-	-	-	-
	II	-	2	-	-	-
	III	-	-	2	2	-
	IV	-	-	8	5	-
LIP	I	-	-	-	-	-
	II	-	1	-	-	-
	III	-	1(B/L)	-	-	-
	IV	-	-	3	-	-
L. Alveolus	I	-	-	-	-	-
	II	-	-	-	-	-
	III	-	-	-	3	-
	IV	-	-	-	1	-
U. Alveolus	I	-	-	-	-	-
	II	-	-	-	-	1
	III	-	-	-	-	-
	IV	-	-	-	-	-
Hard Palate	I	-	-	-	-	-
	II	-	-	-	-	1
	III	-	-	-	-	-
	IV	-	-	-	-	-
Floor of the mouth	I	-	-	-	-	-
	II	-	-	-	-	-
	III	-	-	-	-	-
	IV	-	-	-	1	-

Table 2: Types of Surgical defects

Defect Type	No. case	Percentage
Bone Alone	2	3.8%
Mucosa Alone	18	34.7%
Bone + M	24	46.2%
Skin alone	1	1.9%
Mucosa + Skin	4	7.7%
B + M + S	3	5.7%
Type of Bone Defect		
C	4	14.8
L	6	22.2
H	7	26.0
L C	9	33.3
L CH	1	3.7
H C	-	-

Classification of Jewer *et al*²: type C central defect, type L lateral defect, type H lateral defect including the condyle

Table 3: Various type of reconstructive procedures

Reconstruction	No. of Cases	M : F
Primary Closure	11	9:2
Stsg	2	2:0
Local Flaps	11	8:3
Myocutaneous Flaps	23	20:3
Free Flaps	5	2:3
Total	52	41:11

Table 4: Various types of reconstructions in relation to sex

Lesion	Primary Closure		STSG		Local Flaps		Myocutanous Flaps		Free Flaps		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
Cheek	1	1	2		1		14	2	1	1	23
Tongue	8	1			2	2	2		1	1	17
L. Alveolus							3	1			4
Floor							1				1
Upper						1					1
Hard Palate										1	1
Lip					5						5
Total	9	1	2		8	3	20	4	2	3	52

Table 5: Various types of reconstructive procedures in relation to age

Age	Site	Procedure										Total	
		Primary Closure		STSG		Local Flaps		Myocutanous Flaps		Free Flaps			
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female		
21—30	Cheek							1			1		2
	Tongue	1				1							2
31—40	Cheek	1				1		4	1				7
	Tongue	2	1			1					1		5
	Lip					2							2
	L. Alveolus								1				1
41—50	Floor Of the mouth												
	Cheek			1				5	1		1		8
	Tongue	1					2						3
	Lip					1							1
	L. Alveolus								1				1
	Floor Of the mouth								1				1
51—60	Cheek		1	1				1					3
	Tongue	3						2			1		6
	Lip					1							1
	L. Alveolus								1	1			2
	U. Alveolus							1					1
	Floor Of the mouth												
61—70	Hard Palate											1	1
	Cheek							2					2
	Tongue												
	Lip					1							1
	L. Alveolus												
	U. Alveolus												
71-- and above	Floor Of the mouth												
	Hard Palate												
	Cheek							1					1
	Tongue	1											1
	Lip												
	L. Alveolus												
Total		9	2	2	0	8	3	20	3	2	3	3	52

Table 6: Various types of myocutaneous flaps

Lesion	PMMC	Bipaddled PMMC FLAP	Osteocutaneous PMMC FLAP	Deltopectoral Flap	Lattisimus Dorsi Flap	Total
Cheek	11	2	1	2		16
Tongue	2					2
L. Alveolus	1		2	1		4
Floor	1					1
Total	15	2	3	3		23

Table 7: Various types of free flaps

Flap Type	No. of Cases	Percentage
Radial forearm	4	80.0
Fibular	1	20.0

Table 8: Complications after surgical treatment

Complications	No. of Cases	Rate
Major		
1 Flap Necrosis	5	9.6%
2 Mortality	3	5.7%
Minor		
1 Recipient Site Morbidity		
A Infection	8	15.3%
B Fistula	5	9.6%
C Haematoma	1	1.9%
D Delayed Healing	5	9.6%
2 Donor site morbidity		
A Infection	4	7.7%

Table 9: Flap necrosis in relation with various reconstructive process

Type Of Reconstruction	Flap necrosis			
	Partial		Complete	
	No. of Cases	Percentage	No. of Cases	Percentage
Primary STSG				
Local Flap	1	9.1		
Myocut Flap	2	8.7	1	4.3
Free Flap	1	20.0		

Table 10: Recipient Site Morbidity

Type Of Reconstruction	Recipient Site Morbidity							
	Infection		Fistula		Haematoma		Delayed Healing	
	No. of Cases	Rate	No. of Cases	Rate	No. of Cases	Rate	No. of Cases	Rate
Primary STSG	2	18.2						
Local Flap	1	9.1	1	9.1			2	18.2
Myocutaneous Flap	5	21.7	3	13.1	1	4.1	3	13.1
Free Flap			1	20.0				

Table 11: Donor Site Morbidity

Type Of Reconstruction	Donor Site Morbidity			
	Infection		Haematoma	
	No. of Cases	Percentage	No. of Cases	Percentage
Primary STSG				
Local Flap				
Myocutaneous Flap	2	8.6		
Free Flap	1	20.0		

Table 12: Peri operative and post operative morbidity and mortality

Type Of Reconstruction	Duration of Operation	duration of hospital stay	Return to OT		Mortality
	in Hrs.	in days	No. of Cases	Percentage	No. of cases
Primary	2.5	11			
STSG	3	11			
Local Flap	3	15			
Myocut Flap	4	16	2	8.3	3
Free Flap	7.5	24	1	20.0	

Table 13: Functional and aesthetic outcome

Score	Primary Closure	STSG	Local Flaps	PMMC Flaps	Free Flaps
Oral Diet					
2	5		2	11	3
1	5	2	6	11	2
0	1		3	1	
Speech Intelligibility					
2	2		3	10	3
1	3	2	6	12	2
0	6		2	1	
Mouth Opening					
2	3		2	12	4
1	6		9	11	1
0	2	2			
Aesthetic Outcome					
2	2		5	11	3
1	9	2	6	12	2
0					

DISCUSSION

Table no 3 shows various types of reconstructions carried out. PMMC Flap repair was done in 23 cases of which in 3 cases osteomyocutaneous repair with rib was done. In 5 cases free flap repair was done. Radial forearm flap reconstruction was done in 4 cases while in 1 case fibular free flap reconstruction was done. In 11 cases local flap repair was done. In 15 cases PMMC flap repair was done while in 3 cases D –P flaps repair was done. PMMC flap with rib repair was done in cases of the cheek where bone reaction involved more than half of bone. Bipaddled flap was used in 2 cases where resection area was very large. As almost all cases were situated anteriorly or laterally and no case was in posterior triangle so L-D flap was not used. It also required change of position during operation. Free flap repair results are more satisfactory in cases where bone was involved as compared to cases where only mucosa was involved. Free flaps repair was done more in females while PMMC flap repair was done more in males. Success rate of flap repair was more in PMMC flap as compared to other types of flaps. In our study there was only one case of PMMC flap failure. Rest of cases flap acceptance was 100%. There was no case of flap failure in free flap. In flap necrosis majority of cases were of partial flap necrosis. In our series we managed flap failure conservatively due to limited resources. Depending upon the types of flap used, mean duration of

hospitalization was 2-4 weeks in our series. Length of hospital stay was significantly longer for defects requiring bone reconstruction than for other types of defects as in free flap. These dates are frequently reported in literature^{3, 4}. Other factors which increase the length of hospitalization are age, comorbidity and post operation complications^{5,6}. Table no 8 shows level of complications at recipient site in relation to various reconstructive procedures. It is similar to various published series^{7,8}. Most frequent complication was infection. Most common complication was infection at recipient site. Infection was more common in PMMC flap most of time infection started at the junction of graft and recipient site. For all case of infection culture was done and antibiotics were started according to sensitively. Most of cases were due to gram positive cocci sensitive to third generation cephalosporins. Occurrence of post operative salivary fistula was higher in PMMC flap. Most of fistulas well managed conservatively. Most of the time fistula leading to wound dehiscence resulted in delay for radiotherapy. Maximum lag time was 8 weeks in our series. This is one major factor for recurrence of tumour. It is said that the disease control rate deteriorates if post operative radiation therapy is delayed for more than 6 weeks. To conclude, PMMC flaps are obvious choice for intra oral reconstruction in majority of male patients who require single intraoral paddle and have segmental

mandibulectomy done as it is hardy, easy to harvest, minimum post operative complication, covers vital structures and provides bulk. Microvascular free tissue transfer is preferred in females, for bipaddled flaps and where large segment of bone has to be replaced. They are better choice for tongue reconstruction. In centers where facilities for microvascular surgery exist; free flaps offer excellent option for oral cavity reconstructions with regard to ultimate cosmesis, function and less complication. Primary closure and STSG can be done in cases where defect is very small or only mucosal so they don't have broad spectrum of use. Apart from it; functional outcome is not satisfactory. Local flaps again are used for small defect and they can't be used to close larger defect including bone although morbidity is low as compared to PMMC and free flaps. At the end of the study our conclusion is that PMMC flap is preferred type of reconstruction of oral cavity after excision of tumour as compared to other types of reconstructions or flaps as it is easy to harvest, have good vascularity, provides bulk, can reach up to infraorbital region, cost effective, with minimum acceptable complications.

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