



ORIGINAL RESEARCH PAPER

Plastic Surgery

Evaluating the One-stage Islanded Pedicled Nasolabial Flap as an alternative to Free Microvascular Tissue Reconstruction in Composite Soft Tissue Intra-oral Defects in a Developing Country- A Retrospective Study in a Tertiary Government Hospital.

KEY WORDS: one stage nasolabial flap, oral reconstruction.

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ABSTRACT

INTRODUCTION- Small to moderate sized soft tissue defects of the oral cavity after tumor resection involving tongue, buccal mucosa, floor of mouth require complex reconstruction with a pliable soft tissue bulk and lining epithelium. Free microvascular tissue transfer in the form of radial forearm flap, anterolateral thigh flap or others is required in such cases as ideal tools of reconstruction. The conventional alternative options are primary closure and other workhorse flaps like pectoralis musculocutaneous, deltopectoral, forehead flaps. Hence in small to moderate defects of the oral cavity, when options of higher or extensive reconstructions are not available due to lack of infrastructure or finance, locoregional pedicled tissue transfer like the nasolabial flap provides an excellent alternative.

AIMS AND OBJECTIVES- , To evaluate the one stage pedicled nasolabial flap as a viable option of reconstructing versatile, small to medium sized (upto 6cm) soft tissue intra-oral defects following resection of tumors as an alternative to free microvascular tissue reconstruction.

METHODOLOGY- In this retrospective, descriptive, purposive, non-randomised study with convenience sampling, patients with Stages I, II and III oral CA involving tongue, buccal mucosa, floor of mouth and gingivobuccal sulcus aged between 20 to 70 years were included in this study, who were counselled, informed consents taken, pre anaesthetic check up done and operated with single stage nasolabial flap with primary closure of the donor site. They were postoperatively monitored for complications and flap viability, discharged and followed up regularly at OPD.

RESULTS- Over a study period of 1 year, we operated on 12 patients with intraoral malignancies for whom the post tumor ablative defects were reconstructed with the single-stage nasolabial flap. The site of tumor was tongue in 50% cases, buccal mucosa in 25%, floor of mouth in 16.67%, gingivobuccal sulcus in 8.33% cases. The mean size of defect created after excision of tumor was 5.0x2.92 cm length and breadthwise. Out of 12 flaps 11 flaps survived with excellent results in functional and anatomical restoration of oral cavity in the long term follow up.

CONCLUSION- In a developing country with financial constraints, increased patient load and scarcity of resources for higher forms of microvascular free tissue transfer, the one stage pedicled nasolabial flap forms a viable option of reconstructing versatile, small to medium sized (upto 6cm) soft tissue intra-oral defects following resection of tumors with an acceptable donor site scar, functions of deglutition, mastication and speech and simplicity of the procedure without a steep learning curve. Also the flap provided an excellent pliable soft tissue cover which can withstand post-operative radiotherapy well.

INTRODUCTION

Oralmalignancyinvolvingthetongue,floorofmouthandbuccal mucosa entails wide local excision, neck dissection and reconstructionwithasoftwaretissuewithanepitheliallining^[1]. Free microvascular tissue transfer in the form of radial forearm flap, anterolateral thigh flap and others, though regarded as the gold standard of reconstruction now, is not feasible in all cases especially in developing countries where there are financial constraints,lackofinfrastructureandwillingnesstotake therisk of failure. Also not every case would require conventional workhorse flaps like pectoralis, deltopectoral, forehead and others to reconstruct these defects. In such scenario the nasolabial flap as a means of locoregional pedicled tissue transfer provides an excellent and viable means of reconstruction.

Thepediclednasolabialflapisanaxialflap^[2,3,4] (maybeusedasa random pattern also) with blood supply provided either by the angular branch of the facial artery (inferiorly based flaps) or the transverse facial artery and the infraorbital artery (superiorly based flaps). Unilateral flaps can cover defects upto 3 cm in largest dimension while larger defects upto 5 cm in largest dimensionrequirebilateralflapharvest^[1].

The nasolabial crease runs obliquely from 1 cm superior to

lateralalarrimto1cmlateralto cornerofmouth.^[1,3,6]Facialartery lies deep to the risorius and zygomaticus major muscles but superficial to buccinators. There exist small perforators supplyingtheskinintheformofsubdermalplexus.Theflapmay be used as a random pattern flap also with classical length : breadthratioof3:1.The donorsiteisprimarilyclosedtoorientthe resultantscarinthenasolabialcrease line.

Theflapmaybeusedasvariantsof advancementtype, islanded pedicled transposition type, turnover type or perforator flap according to need.^[3,6] The islanded perforator type is used to increase the arc of movement for reconstructing mobile structures like tongue. The flap can be superiorly or inferiorly based. In many cases it has been done without strictly incorporatingthefacialvessels.

Soft tissue defects in the oral cavity which are small to medium sized in the regions of tongue (upto two third), gingivobuccal sulcus without mandibulectomy, buccal mucosa, floor of mouth need soft tissue bulk with lining epithelium.^[2,3] The nasolabial flapcanbeusedtotailorsuchcomplexreconstructiontoprovide anatomical restoration,deglutitionandspeech.

METHODOLOGY

Over 1 year (August, 2017 to July 2018) we operated on oral

malignancies involving tongue, buccal mucosa and floor of mouth and resurfaced the defects with nasolabial flaps in 12 patients at Medical College, Kolkata, India. Retrospectively the data was retrieved from the OT register and medical records and the cases being followed up on long term basis at OPD.

Patients with Stages I, II and III oral CA involving tongue (upto two third resection), buccal mucosa, floor of mouth and gingivobuccal sulcus (involving only soft tissue without mandibular resection) aged between 20 to 70 years, without any comorbidities of peripheral vascular disease, connective tissue disorders, atherosclerosis, uncontrolled diabetes and with a history of prolonged heavy smoking were included in this study. Patients were counselled, informed consents taken, pre anaesthetic checkup done and scheduled for operation.

OPERATIVE STEPS – In most cases a fusiform shaped flap was marked with the medial flap border on the nasolabial groove. A pencil Doppler probe was used to locate and delineate the course of the angular branch of the facial artery along with the perforators over the proposed flap skin territory. The mean flap dimensions taken were 5.25 cm in length and 3.92 cm in breadth, depending on the laxity of the skin for primary closure. The superior border of the flap was inferior to the medial canthus along the nasofacial junction and the inferior border was determined according to the defect maximum upto the superior border of the mandible body.^[3,4,5,6,7,8]

General anaesthesia with nasotracheal intubation or tracheostomy was advocated with the patient in supine position and neck extended. The neck dissection was done in the beginning as per stage of the malignancy; thereafter the oral resection done and a template of the defect was made with sterile lint piece to ascertain and confirm the dimensions of the flap marked preoperatively so that adequacy of the tissue and overlined skin as lining was maintained.

Under loupe magnification the flap skin incision was made through the dermis and the subcutaneous fat till the level of the underlying muscles and the plane of dissection was made superficial to the buccinator but deep to the superficial mimetic muscles (zygomaticus major and risorius) to incorporate the axial vessel within the flap. The flap was raised generally from the superior to inferior direction and lateral to medial axis. The parotid duct was identified and preserved. The superior labial artery was ligated in most of the cases. The incision was committed all around and the flap islanded taking care not to injure the vessel. According to the type and need of reconstruction it was turned over or tunnelled through a full thickness defect created for that purpose medially along the nasolabial groove or it was pedicled and passed at a

subcutaneous level inferiorly, retrieved into the neck and inserted through the mylohyoid into the floor of mouth. The flap inset was given. The donor site defect was closed in layers. [Fig. 1] Depending on the type of defect and reconstruction, staged division of the pedicle or the flap margin in turned over flaps was done in some cases. The mean duration of operation was 4.4 hours.

The flap was monitored postoperatively every 4 hourly for the first 24 hours and later on thrice daily for the next 3 days. The average time of hospital stay postoperatively was 5.5 days. Nasogastric feeding was started on the second post-operative day. The facial skin sutures were removed after 7 days postoperatively. The patients were subsequently followed up at OPD at 2 weekly intervals, referred to Radiation and Medical oncology for the first 2 months and at monthly interval for the next 4 months. [Follow up pictures are depicted in Figs. 2 and 3]

RESULTS AND ANALYSIS

Among the 12 study patients, 8 were males, 4 females. Mean age was 51.17 years. The site of the tumor resection was tongue in 6 cases (50%), buccal mucosa in 3 cases (25%), floor of mouth in 2 cases (16.67%) and gingivobuccal sulcus in 1 case (8.33%) cases. 6 cases (50%) belonged to Stage III CA, 5 cases (41.67%) belonged to Stage II CA and 1 case (8.33%) belonged to Stage I CA. Final histopathology report was Squamous cell CA (well to moderately well differentiated) in all cases with resection margins 1 cm beyond the tumor all around. No neo-adjuvant chemotherapy was administered in any case. The mean size of defect created after excision of tumor was 5.0x2.92 cm length and breadthwise. Average flap dimensions was 5.25x3.92cm length and breadthwise. Inferiorly based flaps were done in 10 cases (83.33%) and superiorly based in 2 cases (16.67%). Mean operative time was 4.4 hours for wide local excision, neck dissection and reconstruction. Facial artery was preserved in all the cases. Mean post-operative hospital stay was 5.5 days. Among the short term complications flap necrosis was reported in 1 patient (8.33%) due to venous congestion on 3rd post-operative day and donor site wound dehiscence was present in 2 patients (16.67%). The same 2 patients (16.67%) with wound dehiscence presented with wide donor area scar that needed subsequent scar revision for aesthetics, 1 patient (8.33%) had restricted tongue mobility and 1 patient (8.33%) with flap failure for which primary closure was done subsequently had functional loss of speech and impaired swallowing in the long term follow up. The functions of speech, deglutition and mastication were optimum in all other cases. There was no incidence of oro-cutaneous fistula. Adjuvant radiation was given in 91.67% cases post-operatively and well tolerated without any flap complications. There was no recurrence noted in any case at 6 monthly follow up.

Table 1. Showing the patient details, sites of lesions, stages of malignancy, defects created, type of nasolabial flap advocated and the complications.

S.NO.	AGE (YRS)	SEX	SITE OF TUMOR	STAGE OF MALIGNANCY	DEFECT SIZE (IN cm)	TYPE OF FLAPS (SUPERIORLY / INFERIORLY BASED)	SHORT TERM COMPLICATIONS	LONG TERM COMPLICATIONS
1	34	M	Tongue	T2N0M0 (Stage II)	5x3	INFERIORLY	NIL	NIL
2	54	M	Floor of mouth	T2N0M0 (Stage II)	5.5x3	INFERIORLY	NIL	NIL
3	59	M	Tongue	T2N1M0 (Stage III)	5x3	INFERIORLY	DONOR SITE DEHISCENCE	WIDE DONOR SITE SCAR, NEEDED SCAR REVISION
4	45	F	Tongue	T3N0M0 (Stage III)	6x3	INFERIORLY	DONOR SITE DEHISCENCE	WIDE DONOR SITE SCAR, NEEDED SCAR REVISION
5	55	F	Buccal mucosa	T2N0M0 (Stage II)	4.5x3	SUPERIORLY	NIL	NIL
6	68	M	Buccal mucosa	T2N1M0 (Stage III)	4.5x2.5	INFERIORLY	NIL	NIL
7	29	M	Tongue	T2N1M0 (Stage III)	5.5x4	INFERIORLY	NIL	NIL

8	44	M	Lower gingivobuccal sulcus	T1N0M0 (StageI)	3.5x2	INFERIORLY	NIL	NIL
9	53	F	Tongue	T3N1M0 (StageIII)	6.5x3.5	INFERIORLY	NIL	RESTRICTED TONGUE MOBILITY
10	60	M	Floorofmouth	T2N0M0 (StageII)	4x2.5	INFERIORLY	FLAP NECROSIS	FUNCTIONAL LOSS OF SPEECH, IMPAIRED SWALLOWING
11	57	F	Tongue	T2N0M0 (StageII)	5x2.5	INFERIORLY	NIL	NIL
12	56	M	Buccal mucosa	T3N1M0 (StageIII)	6x3	SUPERIORLY	NIL	NIL



Fig.1-A 54 Year old male with CA floor of the mouth post-excision defect of 5.5x3 cm resurfaced with left sided unilateral islanded inferiorly based pedicled Nasolabial flap. (A- Flap planned, B- Harvesting of flap, C and D- Flap and pedicles shown, E- Flap inset given, F- Donor site closed)



Fig.2 A and B- Follow up photos of two patients with well settled flaps and acceptable donor site scars.



Fig.3A-B- 57 year old female with CA tongue post-excision defect 5 x 2.5 cm being resurfaced with unilateral islanded inferiorly based pedicled Nasolabial flap, **B**- Follow up picture of the flap and donor area scar.

DISCUSSION

The mean age of patients was 51.17 years from our study while 60 years^[2], 62.3 years^[6] as per other studies, male : female ratio from our study was 2:1, while 1.46:1^[2], 3:2^[6] as per other studies. Stage of oral CA from our study comprised of 50% stage III, 41.67% stage II, 8.33% stage I while Stage I and II comprised of 100%^[6] as per one study and Stage II and III 100%^[1] as per another study. Squamous cell CA constitute 100% of the pathology in our series and also in other studies.^[2]

The site of tumor was tongue in 50% cases, buccal mucosa in 25%, floor of mouth in 16.67%, gingivobuccal sulcus in 8.33% cases from our study while 15.38% tongue, 42.31% buccal mucosa^[1], 40% floor of mouth^[6], 31.3% tongue, 9.4% buccal mucosa, 1.3% floor of mouth^[2] as per other studies. Wound healing problems, dehiscence and scar that required further revision was 16.67% from our study as compared to 10% to 11.54% in literature.^[1,6] The mean size of defect created after excision of tumor was 5.0x2.92 cm length and breadthwise from our study while 3.5 x 4.5 cm^[6] and upto 5 x 5 cm using unilateral nasolabial flaps^[3,5] as per literature. From our study superiorly based flap was used in 16.67% cases, inferiorly based flaps in 83.33% while 100% inferiorly based flaps^[6], 88.4% inferiorly based flaps and 10.71% superiorly based flaps^[2] as per other studies. Average flap dimensions from our study were 5.25x3.92cm length and breadthwise while 7 x 2.5 cm^[2] as per other studies. Incidence of flap loss was 8.33% as per our study while 0%^[6], 5-6.5%^[9], 12.5%^[2] as per literature. We did one-stage reconstruction in 100% cases as opposed to one-stage reconstruction in one study^[6] and multiple stage reconstruction in others.^[2] Functional loss of deglutition, speech, mastication as per our study is 8.33% while 30%^[6] and 25.82%^[2] as per literature. Aesthetic deformity from our study was 16.67% while 10%^[6] as per literature.

CONCLUSION

In a developing country with financial constraints, increased patient load and scarcity of resources for higher forms of microvascular free tissue transfer, the one stage pedicled nasolabial flap forms a viable option of reconstructing versatile, small to medium sized (upto 6cm) soft tissue intra-oral defects following resection of tumors with an acceptable donor site scar, functions of deglutition, mastication and speech and simplicity of the procedure without a steep learning curve. Also the flap provided an excellent pliable soft tissue cover which can withstand post-operative radiotherapy well.

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