ISSN- O: 2458 - 868X, ISSN –P: 2458 - 8687

International Journal of Medical Science and Innovative Research (IJMSIR)

IJMSIR : A Medical Publication Hub

Available Online at: www.ijmsir.com

Volume – 2, Issue – 3, May – June - 2017, Page No. : 143 - 148

Use of Nasolabial Flap in Oral Cancer Surgery: Our Experience in 96 Patients.

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Conflicts of interest: None to Declare

Abstract

Surgical defects of oral cavity and orofacial region are challenging because of the aesthetic and functional demands and dynamic nature of the area. Reconstruction of defects following oral cancer surgery can be done with several methods. The flaps can be pedicled or free flaps. PMMC , being the most versatile flap and commonly used flap is relatively bulky. However, great expertise is needed for free flaps like radial free flap and is associated with donor site morbidity. Nasolabial flap is a relatively simple flap and can be of great advantage in reconstruction of small and medium size defects. The first reported use of nasolabial flap as fascio-cutaneous flap dates back to 600BC, as described by Pers and then for many centuries it has been used for nasal and lateral lip reconstruction. Thiersch was the first to use a transbuccal transfer of this flap for closure of palatal fistula and intraoral defects while Esser did a cutaneous nasolabial flap transfer in two stages to increase its reliability. Wallace and Rose later introduced various modifications of the basic flap for single-stage transfer. Further flap modifications were introduced to obtain better cosmetic results and to cover relatively larger defects. The nasolabial flap is a very simple flap used for reconstruction of intraoral defects in the floor of the mouth , cheek, commissures , nose tip, nasal ala, and lower eyelids . The nasolabial flap may be superiorly or inferiorly based. An inferiorly based flap is useful in reconstruction of the lip, oral commissure, and anterior aspect of the floor of the mouth, while superiorly based flaps are utilized for reconstruction of the ala and tip of the nose, and the lower eyelids and cheeks. The choice of pedicle is based on the site of the defect and any need for rotation or advancement of tissue to the site of the defect. The flap may be thick or thin, depending on the requirement of the defect to be addressed and the thickness of the donor tissues. Intraoral reconstruction with a nasolabial flap is a simple and fast procedure with minimum donor defect and complications. This article reviews our experience with nasolabial flaps in the reconstruction of intraoral defects in oral malignancy surgeries.

Keywords: PMMC, Surgical Defects, Oral Cavity

Methods

We conducted a retrospective study on 96 patients undergoing surgery for oral cavity cancers in which reconstruction was done using nasolabial flap. This study was conducted in the period between January 2016 to December 2016 at GCRI, Ahmedabad, a leading cancer hospital of India. Patient demographics, site of lesion, size of lesion and postoperative course was recorded.

A primary tumor was located in the buccal mucosa in 56 patients, the lower alveolus in 12 patients, the upper alveolus in 8 patients, and the commissure and lip in 20 patients.

Anatomical considerations

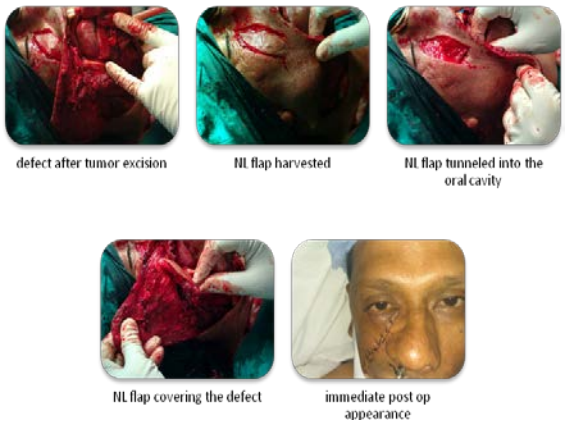
The nasolabial flap is a local arterialized flap with an axial blood supply provided either by the facial artery (inferiorly based flap), or by the superficial temporal artery through its transverse facial branch, and the infraorbital artery (superiorly based flap) and some time random pattern flap. Superiorly based nasolabial flaps can be used for reconstruction of nasal, lower eyelid, and cheek defects; whereas inferiorly based flaps are considered appropriate in reconstruction of defects of the lip, oral commissure and anterior oral cavity.

A unilateral nasolabial flap can cover a defect of 2 to 3 cm, whereas a bilateral flap is sufficient for a defect 5 × 5 cm. The nasolabial flap is an axial flap but may be utilized as a random flap. This rich vascular anastomosis between all the feeding vessels makes it an ideal and versatile flap for reconstruction of the anterior floor of mouth, lips, and nose tip; hence, superiorly, inferiorly, lateral, or medial based flaps can be raised. Currently the proven reliability of the nasolabial flap, with its predictable functional and acceptable aesthetic results, makes it the ideal local flap for reconstruction of oral defects that are too large for primary closure and too small for conventional musculo-cutaneous and micro vascular free flaps. Other major advantages of this flap are its versatility, easy to raise flap, a quick single stage procedure; and, its viability is not affected by facial artery ligation when synchronous neck dissection is performed in SCC patients. Disadvantages of the nasolabial flap are that there is a limited amount of tissue available, the reconstruction may lead to asymmetry, and a 'pincushioning' effect of the cheek can occur when the flap is used for intraoral reconstruction. Some patient has experienced the problem of trismus post operatively, but that depends on the surgeons skills and patient's compliance for mouth opening exercises.

Technique

The reconstructive flap technique, procedure and the flap design was thoroughly discussed with the patients pre-operatively. The flaps are elevated directly under vision; the plane is deep to the subcutaneous tissue and superficial to the underlying muscles. During dissection, the facial artery, submental artery, and external jugular vein are ligated if the neck dissection is combined with the resection of a primary tumor. For inferiorly based flaps the tip of the flap was extended to a point approximately 15 mm distal to the medial canthus, while the width depended upon the width of the defect. The flap base was situated little below or just above the commissure of the mouth. This flap design allowed a flap length of 5-7cm while width of the flap could be of up to 3-5cm as per requirement of the defect; the donor site was closed primarily with 3/0 vicryl and 3/0 Nylon (Polypropyl-ene) sutures without tension at the donor site. After the flap was raised to the desired extent, it was rotated inwards. Entrance of the flap into the oral cavity was gained by dissecting a transbuccal tunnel just opposite to the oral cavity defect. Care was taken not to injure the parotid duct while dissecting the tunnel. For the single-stage procedure, those parts of the flap pedicle were de-epithelialized carefully which were placed in the tunnel. Ultimately, the skin island covering the intraoral defect was sutured carefully into its final and definitive position with interrupted resorbable sutures and for the double stage we close it without forming an island and keep the fistula and close it after 21 days, both the procedures were carried out at our institute depending on the skills of the surgeon. The mean operating time for flap was 30 minutes ±10 and the range was 25-40 minutes. Functional outcome was assessed based on wound infection, dehiscence, marginal necrosis and flap failure; and cosmetically donor

site scar was assessed as patients' satisfaction whether excellent, good, fair or bad.



Results

Patient characteristics

Of 96 patients, 74 were men and 22 women. The site of the primary tumor was buccal mucosa in 56 patients, the lower alveolus in 12 patients, the upper alveolus in 8 patients and the commissure and lip in 20 patients.

All the patients had T2 or T3 disease with N0/N1 status on clinical examination and computed tomography and none of them received neoadjuvant radiation. Excision of the primary tumor was combined with neck dissection in 84 cases and 12 patients neck was observed. In 54 patients, the facial artery was dissected and preserved and in 30 patients it was sacrificed . In 18 cases this was achieved by intraoral excision, otherwise it was achieved through lip split.

Of the 96 patients 11 patients had bilateral nasolabial flap reconstruction, mainly involving lower alveolus and lip as there primary site and 5 patients had superiorly based flap reconstruction. Of the 96 patients 54 had single stage procedure for nasolabial flap while 42 had primary closure of the defect with the orocutaneous fistula to be closed at the later stage.

Outcome

The cosmetic and function results were satisfactory in all the patients. Ten patients developed wound dehiscence out of the total 96 patients and three developed a leak (an orocutaneous fistula) which were closed with island closure. Apart from these, four patient developed wound infection requiring prolonged nasogastric feeding and antibiotic administration. Only one patient of the 96 developed recurrence in our 6 months follow up. The final outcome was good in all cases, except one patient, who developed recurrence and three patient, who developed an orocutaneous fistula that required secondary closure out of the 54 patients whose closure was done with island formation. We had 42 patients of double stage procedure for fistula closure at the second stage after 21 days. We found no significant difference in the cosmetic and functional outcome in these 2 groups of patients only the need of fistula closure to be done at a later stage. Although it was a small procedure which is carried out in local anesthesia and done on opd basis. Twelve of the total 96 patients developed trismus. No patients developed parotid duct injury and significant parotitis. No nodal failure was encountered. After the flap was healed, all the patients who were requiring radiotherapy received radiotherapy to primary and neck. The flap had good cosmetic and functional outcomes in almost all patients. Almost all patients were able to complete their adjuvant treatment without any iatrogenic delay. 10 patients developed wound dehiscence. Out of 10, 9 were successfully managed conservatively and one patient had complete flap loss. We found no significant difference in outcome of results with respect to ligation of or preserving the facial artery.

NL flap intraoral results

NL flap external cosmesis

with oro cutaneous fistula

Discussion

There are many options available for reconstruction of the oral cavity defects following oral cancer surgery, depending upon the site, size and other requirements of the defect. For reconstruction of smaller defects of the oral cavity options range from primary closure to secondary healing from mucosalisation, or covering the defect site with split thickness skin grafts. Most of these modalities may result in speech and swallowing problems. The versatility and the usefulness of nasolabial flap is now well recognized in oro-facial reconstruction and intraoral use of the nasolabial flap is a simple, fast and reliable procedure and minimizes the morbidity related to speech and swallowing difficulties to a great extent. The flap has a good vascular supply; hence, survival is high. An abundant blood supply allows for a length to breadth ratio of 3:1. The flap is good for small and intermediate (T1 to T3) intraoral defects measuring from 3-5 cm as per literature we had 4 patients whose defect was more than 5 cm in greatest dimension which was covered by nasolabial flap. The blood supply of the nasolabial flap is attributed mainly to the facial artery. However, this artery was ligated in the neck dissection in the some of our cases without any adverse effect on the viability of the flap, indicating that it may not be the facial artery but is more probably the rich subdermal plexus that supplies the skin flap . The fact that this flap withstands radiotherapy signifies its excellent vascularity.

The disadvantage of this method of reconstruction is the need for a second-stage procedure in some of the cases, where a buccal tunnel is used for insetting the flap or a second-stage commissural correction is required. These procedures are minor and so can be done under local anaesthesia. But this can be avoided with the closure of the donor site with formation of island of de-epithilised skin.

There may be other problems, such as cheek biting or a bulky base of the flap passing over the alveolus, causing problems in those wearing dentures, especially when the flap is used to repair alveolar defects . Dental implants may provide a good solution to this problem. Possible post-reconstruction outcomes are flap necrosis due to hematoma, infection, or tension on the suture line, where further surgery may be required. Although rare, one may encounter wound complications and partial or total reconstruction failure owing to insufficient arterial flow or venous drainage . Flap survival depends on the early recognition of flap compromise, such as ischemia and necrosis.. Hematoma formation may reduce tissue perfusion and can lead to ischemia and necrosis by inducing vasospasm and stretching of the subdermal plexus or by separating the flap from its recipient bed.

Congestion is the most common problem associated with facial flaps. Venous congestion can lead to arterial compromise and flap necrosis. Infection can also complicate flap healing. The postoperative wound infection rate is 2.8% for facial surgery, with higher rates in facial reconstruction using local flaps. The use of flaps for reconstruction may interfere with the normal sensation

and neurological afferent control that provides sensory guidance to speech and swallowing. Furthermore, especially in men, if a flap is taken from hair-bearing skin to reconstruct a surgical defect, then that area of tissue will continue to grow hair. This can be prevented by outlining the flap. It can also be seen that postoperative radiotherapy may decrease the growth of hair and ultimately lead to mucosalization of the flaps. There may also be a pincushioning effect around the nasolabial folds, which could be avoided by using a rhomboid design . An ipsilateral nasolabial flap can cover small defects up to 2 cm but if a larger defect of size approximately 5 × 5cm or more is to be reconstructed, a bilateral nasolabial flap can be utilized successfully.

Conclusions

As even small and medium size defects following oral cancer surgery require reconstruction, the nasolabial flap is versatile and has proven to be a useful and reliable alternative without causing much morbidity to the donor site in selected patients. However, this type of reconstruction is not particularly suitable when teeth are present in the area to be reconstructed and biting on the pedicle may even damage the skin. Thus, the nasolabial flap is a reliable local flap for reconstruction of oral cavity defects with predictable functional and reasonably good aesthetic outcome.

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