

Oncological Safety of Contralateral Submental Flap: Case Report and Literature Review

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Abstract

Background: With the development of pedicle lengthening procedures for submental flap pedicle, it has become possible to use this flap based upon the contralateral submental vessels for intraoral reconstruction. The oncological safety of such flap, however, remains to be ascertained.

Materials and Methods: A contralateral submental island flap was harvested to reconstruct a defect over the left alveolus following excision of a squamous cell carcinoma. The patient developed multiple oncological positive lymph nodes in the flap bed and also in the contralateral neck at level III.

Conclusion: While there is not enough data on contralateral flaps, such flaps should be used with extreme caution where there is a possibility of ipsilateral regional disease.

Keywords: Contralateral submental flap, Oncological safety, Squamous cell carcinoma,

Introduction

Since its first inception in 1993 by Martin et al, submental island flap (SMIF) has gradually gained acceptance world-wide in reconstructing orofacial defects.^{1,2} This flap utilizes submental vessel that originates from the facial artery just before it leaves the neck and enters the face. Generally, surgeon faces two dilemmas while utilizing this flap for reconstruction. The first one is limited length of its pedicle. The submental vessel pedicle has usually a maximum of 5 to 6 cm length and is limited in mobility due to its attachment with the main facial artery, which in turn is closely adhered to the mandible at the origin of submental vessel.³ The other dilemma is oncological safety of this flap, where this flap is used to reconstruct defects following resection of primary lesion. Harvesting this flap can potentially leave behind oncologically positive lymph nodes particularly in level Ib.

Over the last decade, various methods have been described in literature to improve the reach and mobility of this flap. These techniques include ligation of the distal facial artery, reverse pattern SMIF and YV procedure.^{4,5,6}

These techniques have enabled surgeon not only to reconstruct distant sites with this flap but that harvesting flap from the contralateral side has also become a possibility in oncological cases. There is, however, very little data on the oncological safety of such flaps since there is always a possibility of presence of occult metastatic disease on the contralateral side. We present here a case report where a contralateral submental island flap (CSMIF) was used to repair an intraoral defect and literature review of available data for its oncological safety.

Case Report

A 63 years old female patient was referred to Maxillofacial clinic as diagnosed case of Squamous cell carcinoma of the left gingival mucosa. Clinically and radiologically, it was a

T2 lesion with a prominent lymph node in the left level Ib region. After discussing in Head and Neck Multidisciplinary meeting, local excision was performed along with left level I to IV Selective Neck Dissection. Area of primary defect was reconstructed using CSMIF. Flap was raised as per standard technique and submandibular gland mobilized to extend the reach of the flap (Picture 1 & 2). Postoperative histopathology report showed that it was indeed a T2 primary lesion that was fully excised along with 6 out of 32 lymph nodes positive for the metastatic disease (pT2N2bM0). Patient was referred for Adjuvant Radiotherapy. Preplanning MRI performed that showed multiple enlarged lymph nodes in the bed of the flap and an enlarged lymph node on the contralateral side at level III (Figure 3).

Surgery was planned again and salvage neck dissection was performed on the ipsilateral side that included remnants of level V and tissue in the flap bed. On the contralateral side Modified Radical neck Dissection was performed. Post operative Histopathology confirmed presence of 8 metastatic lymph nodes in the bed of the flap and a single positive lymph node in the right level III.

Discussion

One of the main contentions in harvesting of the SMIF is its oncological safety. The submental artery passes through submandibular space and preserving it can potentially leave behind lymph nodes that may have occult metastatic disease. Thomas et al presented a large case series of 229 cases where SMIF was used to reconstruct intraoral defects following oncologic resection. Almost 80% of these cases were of tongue carcinoma and were T2 or less. 74 patients (32.3%) were clinically N+ of which 28 (12.2 %) had level Ib involvement. Overall, 39 cases (17.03%) developed recurrence, of which 21 (9.2%) were in the local and 18 (7.8%) were in the neck. Of the regional lymph node metastasis, 12 were on the ipsilateral side while 3 occurred on contralateral. Interestingly, 7 of these regional recurrences occurred at the flap site. Multivariate analysis identified N+ status and tumor differentiation as significant contributory factor.⁷

In another case series, Zaid et al reported 11 cases of recurrence in a total of 65 patients where SMIF was used to reconstruct primary site after oncological resection. There were 5 cases of isolated local recurrence and 2 cases of isolated nodal recurrence. Additionally, there were 2 cases where both local and nodal metastasis had occurred along with 2 cases where there was distant metastasis. They concluded that SMIF is safe in oncologically negative neck and may be in early (N0, N1). Use of it in

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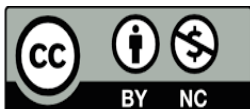
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N2 patients should be with extreme caution.⁸ Wang et al in another large case series presented data of 160 patients where SMIF was used to reconstruct oral tissue following oncological resection. They showed, however, that SMIF did not increase the risk of locoregional recurrence in patients with pN+ T1-2 lesions as compared to pN0T1-2.⁹ Oncological safety of submental flap is usually compared with Radial forearm free arm. Kramer et al compared 45 cases of oral carcinoma where primary site was reconstructed using SMIF with 45 cases where RFFF was used. Over a 5 - year period, in SMIF group 5 patients (11.1%) suffered from local tumor relapse which was same as RFFF group. As for Regional recurrence, 2 patients (4.4%) in SMIF group and 3 patients (6.7%) in RFFF group developed it. They concluded, there was no significant difference in recurrence free survival in both groups.¹⁰

With risk of leaving behind metastatic lymph node always present, particularly in N+ neck, one other alternative is harvesting contralateral SMIF. Contralateral flap is raised as per standard principles but may carry the inherent risk of presence of occult disease. Garcia et al retrospectively analyzed 315 patients of oral squamous cell carcinoma who were operated between 1979 to 1999. They reported that only 18 patients (5.69%) developed contralateral neck metastasis.¹¹ Koo et al in another case series of 66 patients, where contralateral neck dissection was performed for clinically negative neck, reported that 7 (11%) of these patients had occult metastasis. Of the patients who had ipsilateral neck disease, 4 out of 11 (36%) developed contralateral neck metastasis. The rate of contralateral neck metastasis was significantly associated with higher stage disease and with those crossing the midline.¹²

Lim et al in a retrospective study of 54 patients with stage I and II Tongue carcinoma. Along with resection of the primary lesion, all patients underwent elective neck dissection. On the contralateral side, 25 patients underwent elective neck dissection while rests of 29 patients were kept under watchful observation. Only 1 of the 25 patients who had elective neck dissection on the contralateral side showed presence of occult metastasis. They concluded that there it was unlikely to have occult metastasis on contralateral side in early-stage tongue carcinoma and elective neck dissection was unlikely to give any survival benefit.¹³

On literature search, limited number of papers was found that have discussed directly oncological safety of CSMIF. Amin et al in a case series of 41 patients where they performed CSMIF for reconstructing tongue and floor of mouth defects. There were Twenty-four T2, 13 T3 and 4 T1 tumors. All of them were squamous cell carcinomas except 1 that was Adenocystic carcinoma. 22 of these patients were clinically and radiologically N+, 19 were N0. None of these patients had contralateral neck involvement. 11 of these patients developed tumor recurrence (26.8%). 6 were in the local bed (14.6%), 6 were in ipsilateral neck (14.6%), 1 was in contralateral neck (2.4%) and 3 distant metastasis (7.3%). While they did not elaborate upon the possibility of local bed recurrence being caused by tissue transfer during CSMIF harvest, they concluded that CSMIF is reliable and oncologically safe for reconstruction.¹⁴

Zhi – Jun et al in another case series presented 18 cases where CSMIF was used following intraoral oncological resection. Of these, 16 resections were for squamous cell carcinoma while 2 were for adenocystic carcinoma. Primary tumor size was T2 in 10, T3 in 3 and T4 in 4 cases. In 4 patients, there was N2 disease while in 1 patient, T3 disease was found. They reported only 1 case of tumor recurrence, though the site of this recurrence is not mentioned. They concluded that CSMIF was safe for reconstruction of composite defects of malignant tumors without contralateral

lymph node metastasis.¹⁵ In another study, Jamali et al compared outcome of primary closure Vs CSMIF reconstruction for cT1-T2 tongue squamous cell carcinoma patients. In both groups there were 32 patients in each. 2 parameters were assessed, the incidence of local recurrence and functional outcome. In intention to treat analysis, there was 1 recurrence in CSMIF group as compared to 3 in PC group at 1 year. Speech was found significantly superior in CSMIF group. They concluded that CSMIF was not inferior to PC group regarding local recurrence at 1 year.¹⁶

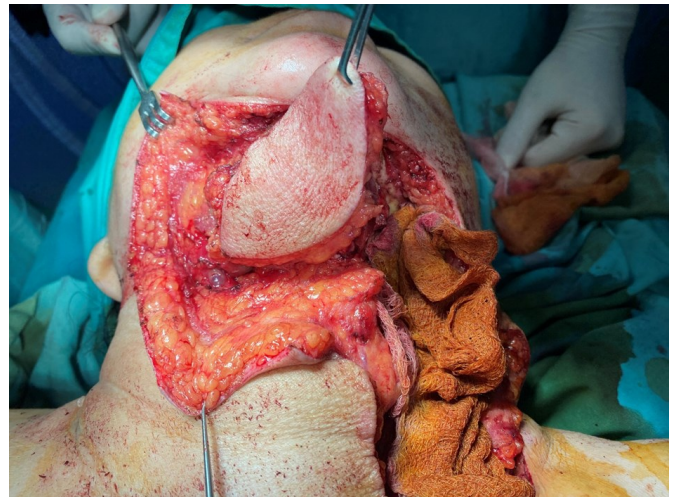


Figure 1. Submental flap harvest



Figure 2. Reconstruction of the defect with submental flap

Conclusion

On the available data, CSMIF may be considered a safe option for reconstructing defects where primary lesion is early and well lateralized with no evidence of regional metastasis. For lesions lose to midline that may have clinical or radiological evidence of regional metastasis, this flap may be used with extreme caution.

CONFLICT OF INTEREST: None

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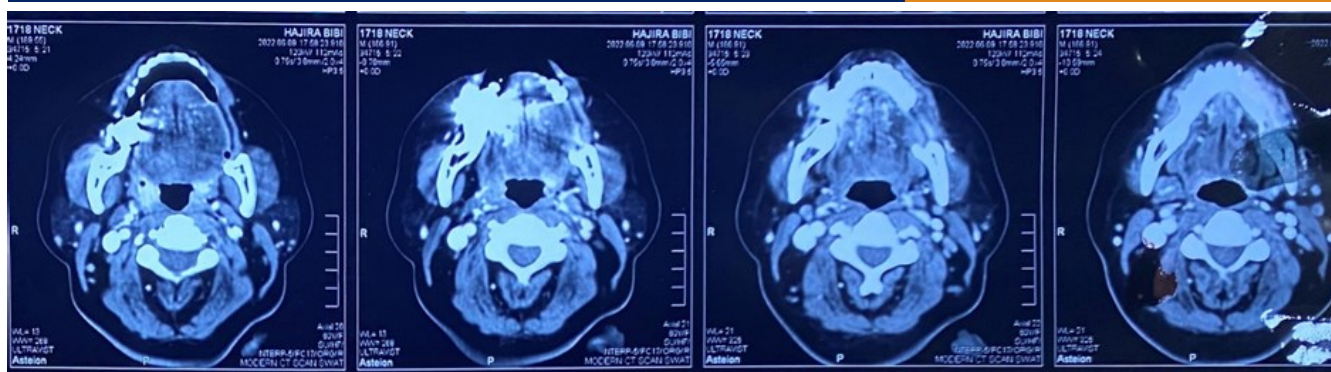


Figure 3. Tumor recurrence in flap bed

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Author Contributions

1. **Taj Uddin:** Data Collection and manuscript writing
2. **Imran Mohib:** Critical review of the manuscript.
3. **Zubair Durrani:** Conceptualization of the study and critical review manuscript.