# Isolated Donor site Tumour Recurrence at Pectoralis Major Myocutaneous Flap in Oral Cavity Squamous Cell Carcinoma – A Rare Case Report and Review of Literature

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**Case report**

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## Abstract

**Background:** Pectoralis Major MyoCutaneous (PMMC) flap has been commonly used since decades for plastic reconstruction in oral cavity cancer surgery. However, rarely the PMMC donor site develops tumor recurrence. Management includes surgical resection in unifocal lesion or salvage radical chemoradiotherapy in clinico-radiologically nonmetastatic unresectable disease which results in satisfactory tumor related outcomes.

**Case presentation:** A 46 year gentleman known case of Squamous Cell Carcinoma left Retromolar Trigone after surgery and adjuvant radiotherapy presented with isolated recurrence at PMMC flap donor vascular pedicle site which was abutting left subclavian vein and so was managed with concurrent chemo-radiotherapy with curative intent and is on follow up since 2 years with no evidence of recurrence.

**Conclusions:** Isolated PMMC flap donor site recurrence in oral cavity squamous cell carcinoma management is complex, with surgical intervention with excision of such lesions in absence of any other deposits is preferable approach. Concurrent CTRT is an alternative option in curative intent when the lesion is not surgically resectable or the patient refuses surgery.

## Background

Head and Neck Squamous Cell Carcinoma (HNSCC) is a major cancer burden not only in India but also in the world. In India, HNSCC accounts for almost 23% of all cancers in male and 6% in female, out of which almost 80% of patients present in late stages (AJCC Stage III-IV B)[1]. Despite the aggressive multimodality therapy, the local and distant failures are approximately 60% and 40% respectively[2]. However, the cancers of the oral cavity subsite of HNSCC have a favourable prognosis due to the possibility of complete surgical resectability followed by adjuvant radiotherapy(RT) or chemoradiotherapy(CTRT) based on their histopathology. In order to achieve a good and satisfactory oral cavity functional outcome the postoperative tissue defect usually require some form of tissue transfer to achieve an optimal reconstruction. Although there are several plastic reconstructive surgical options available for oral cavity cancer postoperative surgical defects, the Pectoralis Major Myo-Cutaneous Flap (PMMC) based reconstruction is an well established as well as accepted modality due to ease of raising the flap, predictable blood supply, less time consuming, cost effective and reliability[3].

However, in spite of the favourable advantages of the PMMC flap, isolated tumor recurrences have been observed in the PMMC donor site[4,5]. The mechanism of seeding of the primary tumor cells to graft donor site is unclear and controversial, violating the principles of tumor surgery by a poor surgical technique and direct transfer of viable tumor cells from the primary site to the donor site or hematogenous transfer of tumour cells have been described as possible causes[6]. In recurrent and/or metastatic HNSCC, the contemporary treatment options are either local therapy (salvage surgery and/or radiotherapy) or systemic therapy (chemotherapy, biological therapy, immunotherapy). Among the above various treatment modalities, local therapy only yields better durable response in comparison with systemic therapy[7]. The below mentioned case described case highlights the successful curative treatment with concurrent chemoradiotherapy in an unresectable isolated unifocal recurrence in the upper anterior chestwall near PMMC donor site in a previously treated oral cavity SCC with review of literature.

## Case Report

A 46 year gentleman is a k/c/o Squamous Cell Carcinoma(SCC) left Retromolar Trigone. He underwent Wide local Excision with segmental mandibulectomy with left upper alveolectomy with left Modified radical neck dissection with PMMC flap reconstruction on 15/06/2015. Final HPR revealed a well differentiated SCC with size – 3x2.5x2cm, depth of invasion – 4.84mm, All margins (> 5mm) were free of tumour with negative LVI and PNI, out of 31 lymph nodes, no node showed tumour metastasis. Following which he received adjuvant External Beam Radiotherapy of 60Gy/30# from 23/07/15 to 10/09/15 and was on regular follow up.

He developed recurrence at primary site after disease free interval of 3 years and 2 months with on examination had a suspicious node in contralateral neck. Metastatic workup by PET scan was negative for distant metastases and underwent a wide local excision of tumour with tongue flap reconstruction with right MRND and dismantling of PMMC flap on 3/12/18. Final HPR showed moderately differentiated SCC, size – 2.3x1.8x0.9 cm, depth of invasion – 4 mm, LVI present, PNI absent, all margins free, 0/38 lymph nodes positive.

Multidisciplinary tumor board decision was for close observation only. Hence, he was on regular followup till this present episode

After a disease free interval of 11 months on 26/11/2019 patient presented with pain and swelling which was hard and fixed over left upper anterior chest wall corresponding to the site of the vascular pedicle of PMMC flap (Fig. 1A), primary disease site over oral cavity and neck exam was normal, biopsy from the swelling yielded - Metastatic SCC (Fig. 1B). MRI chest showed – Lobulated mass in left infra clavicular region and upper anterior chest wall at caudal aspect of PMMC flap abutting subclavian vein (Fig. 2A-2C). Metastatic workup was done with PETCT which shows no metaststic deposit elsewhere.

Multidisciplinary tumor board decided for salvage radical radiotherapy with concurrent weekly intravenous cisplatin in view of unifocal superficial left upper anterior chestwall recurrence with close abutment of left subclavian vein which precluded for a radical surgery. Hence, he received radical radiotherapy to the gross disease with adequate margins to a dose of 66Gy in 33 fractions over 7 weeks with intensity modulated radiotherapy (IMRT) technique in medical linear accelerator along with radiosensitizing concurrent chemotherapy intravenous cisplatin 35mg/m2 BSA (body surface area)(Fig. 2D). Post-treatment followup after 6 months showed complete clinico-radiological response without any significant late radiotherapy toxicity and is on regular follow up since 2 years. (Fig. 3A-3B)

## Discussion

Radical surgery with appropriate and optimal reconstruction followed by postoperative adjuvant radiotherapy or chemoradiotherapy is the current established standard of care in oral cavity squamous cell carcinoma. Definitive chemoradiotherapy is an alternate option in unresectable case. Out of several options available for head-neck reconstructions, PMMC flap is commonly used as a primary modality as well as a salvage mechanism after failure of a free vascularized flap since last 40 years due to its ease of raising the flap, predictable blood supply, less time consuming, cost effective and reliability[2,3]. The common complications associated with use of PMMC have been described which include flap necrosis, infection, seroma, fistula[2]. The rare complications like rib osteomyelitis, metastasis to donor site of PMMC flap has been described but occur very rarely [4,5]. In PMMC donor site recurrence the underlying cause and mechanism of seeding of the primary tumor to graft donor site is not clear. Although direct contamination by viable tumor cells present on gloves and surgical instruments while performing definitive operation and harvesting autologous graft at the same sitting is most likely, however, it can also be attributed to altered circulation at the healing donor site. Some theoretical and experimental evidence links localization of tumour cells due to surgically induced trauma. Theories supporting this include increased circulating tumor cells occurring during manipulation of primary tumor, damaged endothelium of the microcirculation causing increased adherence of tumor cells, and blood flow or coagulation mechanism alteration in the traumatized graft harvesting site[7].

After a definitive treatment of HNSCC, recurrence and/or distant metastasis happens in approximately 50% of the patients over a period of time[8]. These patients obviously have extremely poor prognosis (median overall survival of 6–12 months)[9]. Although the contemporary established treatment methods for recurrent and/or metastatic HNSCC are either local therapy (salvage surgery and/or radiotherapy) or systemic therapy (chemotherapy, biological therapy, immunotherapy), local therapy only yields better durable response in comparison with systemic therapy[10].

Our patient developed an unifocal superficial solid-cystic fixed tender biopsy proven recurrence at left upper anterior chestwall near PMMC donor scar site resembling with above literature described PMMC donorsite recurrence. In view of clinicoradiologically unifocal biopsy proven recurrence, controlled loco-regional disease and good general condition, the institutional multidisciplinary tumor board suggested for a curative intent salvage radical radiotherapy with weekly cisplatin based concurrent chemotherapy over a radical re-do surgery as radiologically the tumor was encasing the subclavian vein. On followup after 6 months of treatment, there was clinico-radiologically complete response. Now he is on regular follow up for last 2 years

Table 1[4,5,11,12,13,14] highlights other similar cases described in literature where oral cavity squamous cell carcinoma recurred over the anterior chest wall at PMMC donor site. The pattern of recurrence can be two types – one is metastases on PMMC vascular pedicle site[4,5,12], which can be attributed mainly to lymphovascular spread of tumour cells occurring through the PMMC flap itself, and second is metastases over sites other than vascular pedicle site – either anterior chest wall[5,11,13], or PMMC flap muscle[14] which can be due to direct transfer of tumour cells as contamination during surgery highlighting importance to change of gloves, thorough wash of surgical site and cleaning of instruments or to use a different set to avoid cross contamination during surgery.

## Conclusion

Management of oral cavity squamous cell carcinoma recurrence in PMMC site is complex and based on primary site disease status, the extent of chest wall involvement and metastases to other distant sites. Surgical intervention with excision of such lesions in absence of any other deposits is preferable approach. Concurrent CTRT is an alternative option in curative intent when the lesion is not surgically resectable or the patient refuses surgery. Palliative approach in cases of multiple sites of metastases and poor general condition of patient.

## Abbreviations

HNSCC
Head and Neck Squamous Cell Carcinoma, LVI–Lymphovascular Invasion, PMMC - Pectoralis Major MyoCutaneous flap, PNI–Perineural Invasion, SCC–Squamous cell carcinoma

## Declarations

Ethics approval and consent to participate: Written informed consent was obtained from the patient for publication of the case report and accompanying images

Consent for publication: Written informed consent was taken from the patient for publication

Availability of data and materials: All data generated or analysed during this study are included in this published article

Competing interests: The authors declare that they have no competing interests

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Authors' contributions:

Prathamesh Chandrapattan- collected and analysed the data of patient and was a part of tumour board in deciding the further course of management of patient and was provided major contribution in writing and editing the manuscript

Sangram Keshari Panda- contributed significantly in writing case report and discussion section on the manuscript

Pradyumna Kumar Sahoo-contributed in editing the table and collecting relevant data related to similar cases and was a part of tumour board in decision making of further line of management

Chira Khadanga – planned and executed adjuvant definitive CTRT to the patient and helped providing treatment related data for the patient with contribution to discussion section in manuscript

Sunil Agrawala- compiled all data of the patient. Communicated with all the authors and final editing of the article with submission of the article for further correspondence

All authors read and approved the final manuscript

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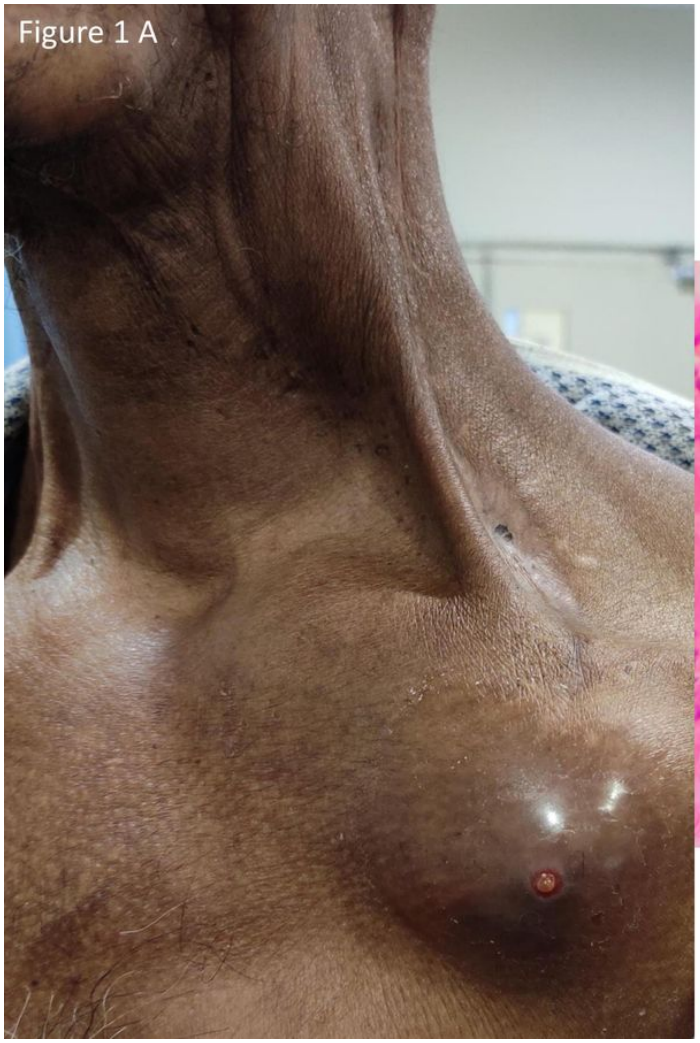
## Tables

Table 1
– Oral cavity squamous cell carcinoma cases with recurrence at PMMC flap donor site

| Author | Year | Age at presentation | Sex | Index lesion site | Index lesion type | Index lesion stage | Initial treatment | Recurrence at the primary site | Site of recurrence | Duration to recurrence | Management | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bansal et al[11] | 1965 | 45 | M | Left lower alveolus | SCC | Stage III | Surgery with adjuvant radiation | No | PMMC donor site | 2 months | NA | N |
| Badellino et al[4] | 1988 | 37 | M | Floor of Mouth | Grade 2 SCC | T4N1 | BL MRND, Adjuvant RT and Adjuvant CT (Vinblastine, Bleomycin and Methotrexate, 4 courses) f/b composite resection of primary site | Yes | PMMC flap vascular pedicle base | 8 months | Palliative RT | D n |
| M Jog et al[5] | 2001 | 53 | M | Right Tonsil with right RMT extention | SCC | T3N1 | Surgery, Adjuvant RT | No | PMMC Donor site | 1 year | Surgery Excision of tumour with anterior chest wall and modified deltopectoral flap reconstruction f/b RT to anterior chest wall | D b w t |
| M Jog et al[5] | 2001 | 61 | M | Oral tongue and tongue base | SCC | T3N1 | Surgery, Adjuvant RT | No | PMMC vascular pedicle base | 8 months | Local RT | D n o e |
| Senniappan Kartikeyan et al[12] | 2009 | 35 | F | Oral tongue | Grade 2 SCC | | Surgery, Adjuvant RT | Yes | PMMC flap vascular pedicle base | 6 months | Patient refused surgery. Palliative oral methotrexate | N |
| Vasu Reddy C et al[13] | 2012 | 35 | M | Right Buccal Mucosa | Grade 2 SCC | NA | One cycle CT (Cisplatin, 5FU) f/b surgery, Adjuvant RT | No | PMMC donor site and Right temporal area | 2 months | Concurrent CTRT | N |
| Kain et al[14] | 2018 | 50 | M | Right Alveolus SCC | Grade 2 SCC | T2N0 | Surgery with Adjuvant RT | No | PMMC flap muscle | 3 months | Excision | F |

## Figures



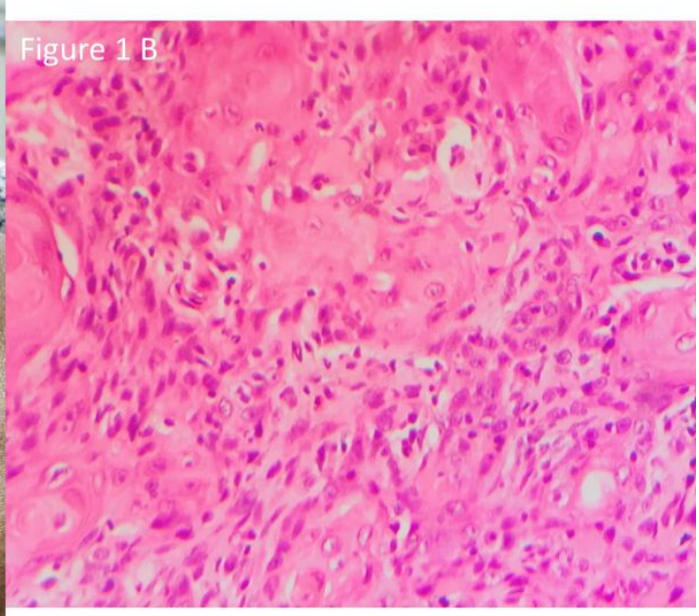




**Figure 1**

A – Clinical picture at presentation. B – Histopathological picture 40x.

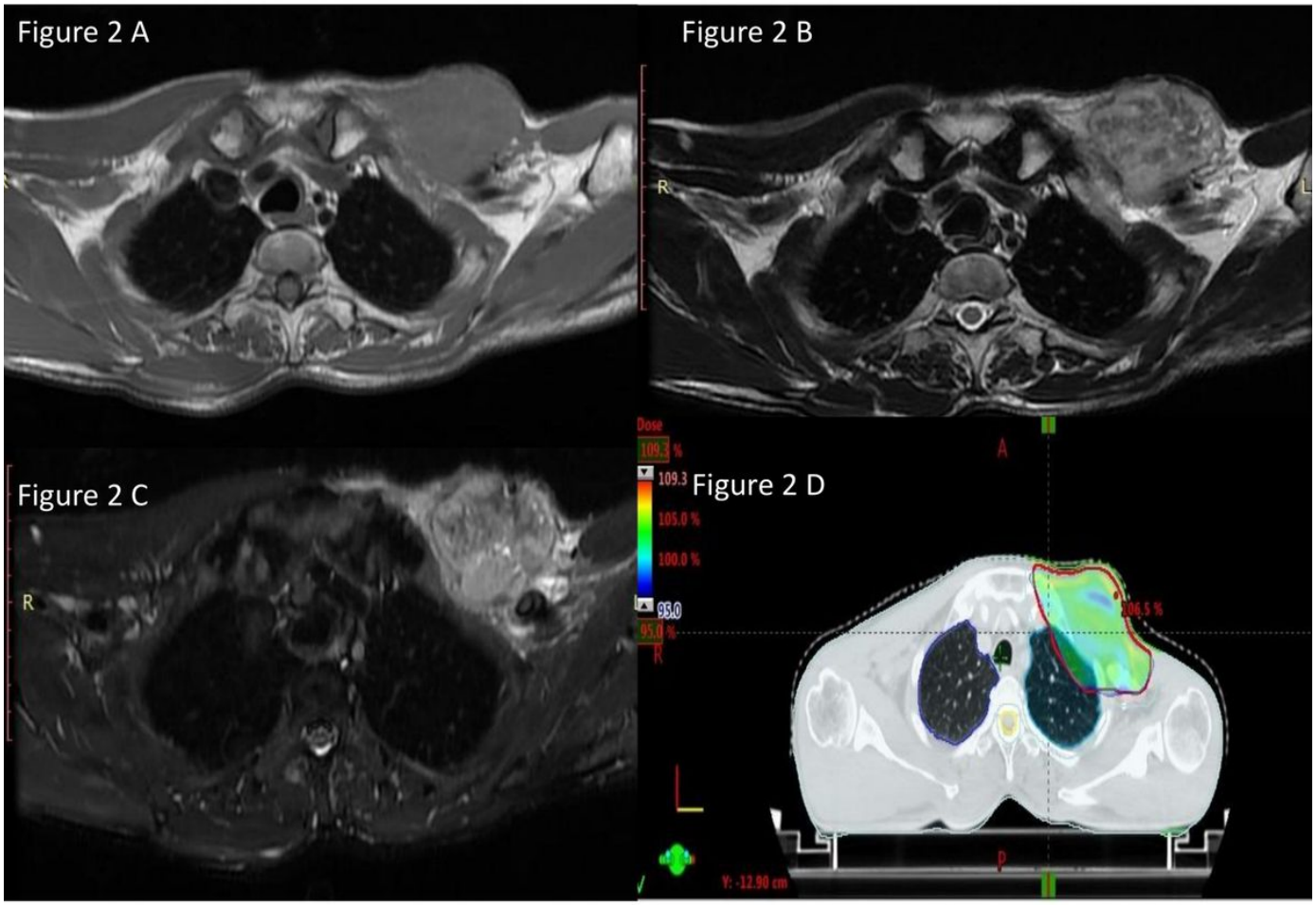



**Figure 2**

A – Pre CTRT MRI T1W Axial. B – Pre CTRT MRI T2W Axial. C – Pre CTRT MRI STIR Axial. D – IMRT Plan Axial.

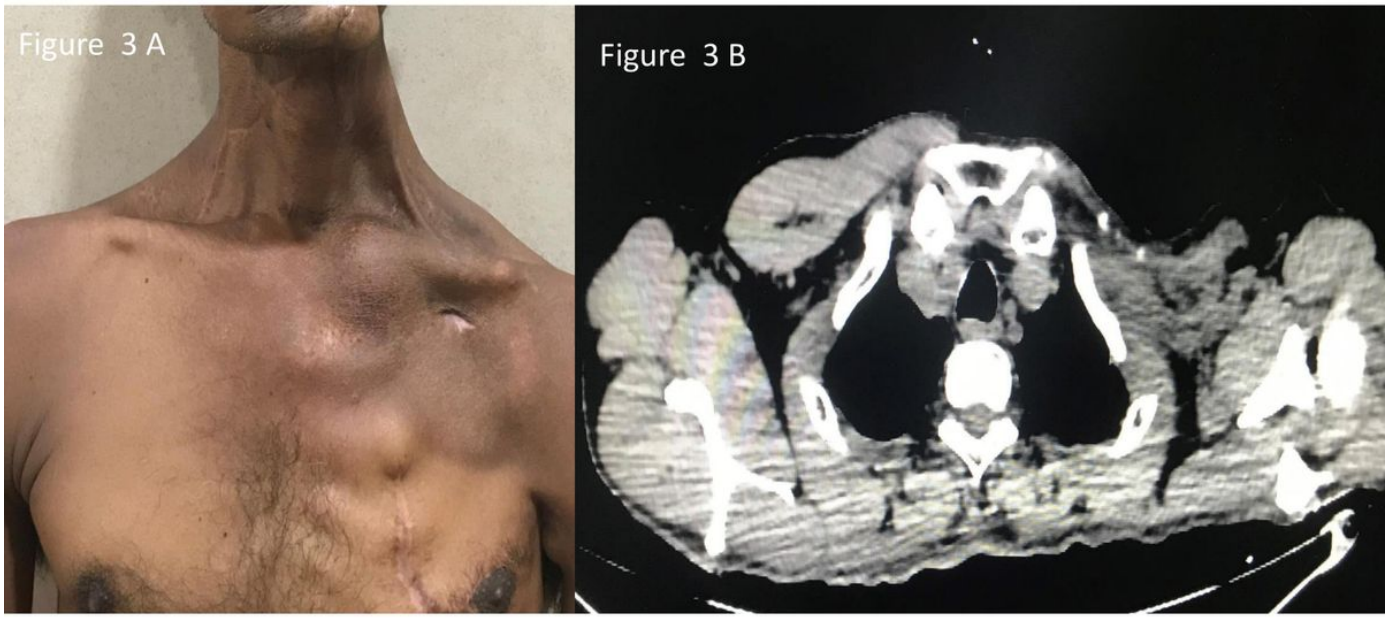



**Figure 3**

A – Post CTRT Clinical photograph at follow up. B – Post CTRT CT scan Axial.