

## Metastatic implantation of oral cancer in forearm: An unusual presentation

Biswas Nibedita<sup>1</sup>, Dutta Bodhisattwa<sup>2</sup>, R Deb Asit<sup>3</sup>

From <sup>1</sup>Senior Resident, District Oncology Unit, Howrah District Hospital, Howrah, <sup>2</sup>Senior Resident, <sup>3</sup>Professor and Head, Department of Radiotherapy, Medical College Kolkata, Kolkata, West Bengal, India

### ABSTRACT

Metastatic implantation of cancer cells at a free flap graft donor site is a very unusual presentation. The possible mechanism is accidental contamination of the graft site by instruments used for surgery on the primary site. The other potential causes are the hematogenous spread of the tumor and *de novo* tumorigenesis. This report describes the case of a 65-year-old gentleman with carcinoma of the left buccal mucosa, which underwent wide local excision of the growth with type III modified radical neck dissection with radial forearm free flap reconstruction and subsequently developed a metastatic nodule over the graft donor site after 3 months. The nodule was excised with an adequate margin after which the patient refused to undergo any further treatment. Proper care taken while dealing with the tumor as well as the graft donor site shall avoid such iatrogenic complications due to possible accidental contamination of the graft donor area.

**Key words:** Flap, Metastasis, Oral cancer, Reconstruction

The term head-and-neck cancer (HNC) refers to neoplasm arising from the mucosal lining of the upper aerodigestive tract and is located from the skull base to the region of the thoracic inlet. Approximately 90% of HNC is squamous cell carcinoma (SCC). These malignancies can arise from numerous subsites and air spaces present in this region [1]. The oral cavity extends from the vermilion border of the lips to plane between the junction of the hard palate and soft palate and includes buccal mucosa, anterior two-thirds of the tongue, gingiva, retromolar trigone, floor of the mouth, and hard palate. According to GLOBOCAN 2018, the lip and oral cavity cancer is the second most common cancer (10.4%) when both sexes are combined. It also has the highest incidence (16.1%) as well as the highest mortality (12.3%) in males [2,3].

Surgery is the most well-established mode of initial definitive treatment for a majority of oral cancers, with a longstanding history of being the accepted method of treatment for well over a century. After the introduction of ionizing radiation, it became an important means of non-surgical treatment of oral carcinoma. However, in the majority of patients with advanced cancer, a multidisciplinary approach using surgery, chemotherapy, and/or radiotherapy remains the standard mode of treatment. The typical anatomical region makes cosmetic camouflage difficult after surgery and the defect of any size can cause significant functional and cosmetic difficulties with an impact on the patient's quality

of life. Reconstructive surgery plays an important role here. The first choice for repair of large head-and-neck defects is free microvascular tissue transfer. Although results from pedicled flaps such as the pectoralis major have been good, free flaps provide a vibrant blood supply, allowing for more aggressive contouring and better wound coverage [4,5]. The incidence of the development of SCC in post-operative, post-traumatic, or chronic wounds is well recognized, but implantation of metastatic SCC in a free flap donor site is very rare. We report a case of a patient, who underwent wide local excision of buccal mucosal growth with radial forearm free flap reconstruction and subsequently developed a metastatic nodule over the free flap donor site.


### CASE REPORT

A 65-year-old gentleman presented with a complaint of non-healing ulcer over the left side of buccal mucosa for the past 6 months. Family history and medical history were non-significant.

A general survey and systemic examination were unremarkable. The vitals were stable. Locoregional examination revealed an ulceroproliferative growth in the left side of buccal mucosa measuring 2 cm in diameter, spherical in shape, well-defined margins, irregular surface, the floor of the ulcer was covered with slough, indurated base, everted margins, no erythema, and non-tender without any premalignant, or any other lesions in the oral cavity and oropharynx. There was no involvement of the retromolar trigone. On examination of the neck, a single discrete

**Correspondence to:** Dr. Nibedita Biswas, C/O Dr. Swapnil Sen, Flat A101 Anandi Apartment, 463 Baishnabghata Patuli, P.O Panchasayar, Kolkata - 700 094, West Bengal, India. E-mail: nibedita.doctor@gmail.com

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mobile lymph node was palpable in the level II on the left side. It was 1.5 cm in diameter, spherical in shape, firm, non-tender, and well-defined margins. No signs of inflammation were present.

On further investigations, magnetic resonance imaging of the face and neck suggested a neoplastic mass of the left buccal mucosa measuring 2.5×2.1×1.8 cm with the involvement of the left-sided level II cervical lymph node measuring 2.2×1.5×1.8 cm. An incision biopsy was taken from the growing edge of the ulceroproliferative growth, which revealed moderately differentiated SCC. Staging workup revealed it to be a non-metastatic disease. The clinical staging was T2N1M0.

As it was a clinically early-stage carcinoma cheek, upfront surgery was planned. The patient underwent wide local excision of growth with a 1 cm margin along with type III modified radical neck dissection with radial forearm free flap reconstruction in January 2018. The post-operative period was uneventful. The patient was discharged on the 8<sup>th</sup> post-operative day.

Post-operative histopathology report revealed moderately differentiated SCC, 2.5 cm in its greatest axis, 5 mm depth of invasion, without any lymphovascular, or perineural invasion. All the margins were free and 2 out of 19 cervical lymph nodes showed metastasis without any extranodal extension. The pathological stage was T2N2bMx.

The patient was planned for adjuvant radiotherapy, as there were multiple positive neck nodes. Five weeks after the surgery, the patient was treated with external beam radiotherapy, using conventional fractionation, that is, 2 Gy per fraction, 5 days a week, 30 fractions to a total dose of 60 Gy.

On his first follow-up, approximately 3 months post-surgery, clinical examination of the oral cavity and the bilateral neck was unremarkable (Fig. 1). A response assessment contrast-enhanced computed tomography face and neck was done which did not suggest any disease at the primary site or in the neck. However, the patient complained of a nodule over the free flap donor site.

On examination, it was a 1×1 cm firm nodule with a surrounding area of induration, spherical in shape, non-tender, and well-defined margins. Hence, we performed an excision biopsy of the nodule with a 1 cm margin (Fig. 2). The histopathological examination showed it as moderately differentiated SCC without any lymphovascular or perineural invasion and the margins were clear (Fig. 3). The patient was unwilling to undergo any type of further therapy and so, we decided to keep the patient under close follow-up. The patient was disease free till his last follow-up in February 2019 but passed away in October 2019 due to acute myocardial infarction.

## DISCUSSION

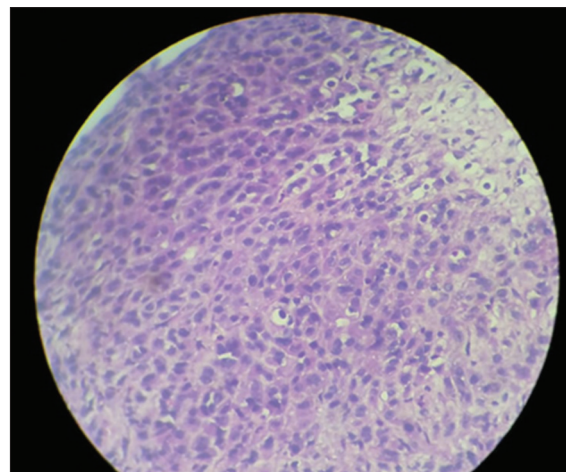
Skin graft reconstruction following tumor excision is a safe and reliable technique. The occurrence of tumor at the donor site is very uncommon. Surgical implantation of tumor cells was first described by Gerster in 1885 [6]. After that, Lack (1896) and Ryall (1907) thought that “infection” by malignant cells could occur and suggested contaminated surgical instruments were responsible for implantation [7]. Since then, there are various



**Figure 1:** Post-operative picture of the patient following excision of buccal mucosal growth and reconstruction



**Figure 2:** Forearm free flap after excision of metastatic nodule



**Figure 3:** Microscopic appearance of the metastatic nodule showing moderately differentiated squamous cell carcinoma

descriptions of implantation of SCC, including breast cancer seeding along the needle track of core biopsy [8], chest wall implantation following lung tumor biopsy, or abdominal wall implantation following a percutaneous endoscopic gastrostomy (PEG) tube insertion [9]. Few cases of donor site metastasis after pectoralis major myocutaneous flap reconstruction for oral SCC

have been reported till date [10,11], but the implantation of SCC at the free flap donor site is relatively rare, only a small number of cases have been reported in the literature [12].

The possible mechanism of spread in our case is accidental contamination of flap handling instruments with tumor cells resulting in metastatic implantation at the donor site. There have been reported cases where the tumor seeding to split-thickness skin graft (STSG) occurred from the hollow needle used to infiltrate local anesthetic in the tumor area and the same needle was used to anesthetize the STSG donor site [13]. The other possible explanations are systemic spread or a new primary lesion. Systemic hematogenous spread of malignant melanoma to split skin graft donor site has been reported earlier, but in our case, the clinical and the histological features were suggestive of local implantation.

*De novo* SCC at skin graft site is relatively common in literature [14], but in our case, it is very unlikely that two different primary SCCs with the same degree of differentiation occurred within such a short interval of time. Survival of implanted tumor cells is rare, presumably because the normal body defense mechanisms operate. The head and neck with its excellent blood supply may be a protected site. Another factor in tumor cell survival is the depression of host resistance, with failure to mount normal cellular and humoral immune surveillance.

Several recent works have proved that the surgical wound provides an environment that enhances the tumorigenicity of implanted cells [15]. The surgical wound is rich in several growth factors, such as epidermal growth factor, platelet-derived growth factor, and insulin-like growth factor, which allows the implanted tumor cell to survive and develop into a tumor. Surgery-induced immunosuppression through neuroendocrine mechanisms also favors the growth of malignant cells [16].

## CONCLUSION

We have reported a case that demonstrates the ability of SCC to implant into exposed normal tissue during manipulation of tumor. We suggest that proper care should be taken during handling of tumor, as donor sites for a skin graft, pedicled, and free flaps, blood vessels, etc., are the potential sites for quasi-local recurrence. The surgeons should use different sets of instruments for the primary site and graft site and should change their gloves. This report reinforces the need for meticulous surgical techniques to avoid

contamination of the “clean” areas that might not be included in adjuvant radiotherapy fields.

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