

Cryosurgery a Local Treatment of Metastatic Breast Squamous Cell Carcinoma in the Mandibular Ramus: Case Report

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Abstract

Introduction: 90% of mouth cancer is squamous cell carcinoma. Oral region metastases are considered uncommon. The most frequent sources of metastatic tumors to the mouth are primary cancers from the lung and breast. Treatment involves surgery, radiation, chemotherapy or in combination. To our knowledge, Cryosurgery has not been reported as a treatment in the field of jaw cancer surgery. Cryosurgery has been successfully used for the treatment of oral lesions including cancer. The main purpose of this study is to present a case of metastatic intraosseous squamous cell carcinoma of the mandible and how to manage it in a suggested alternative approach.

Case Presentation: In this case report, we detail a 37-year-old female patient presented with gradually increasing pain in the left mandible with a final diagnosis of metastatic breast squamous cell carcinoma in the left mandibular ramus. The patient has been successfully treated without esthetic and functional side effects by using cryosurgery.

Discussion: Cryosurgery has been used for various bone tumors including metastatic mandibular bone carcinoma. A three-year follow-up showed no evidence of the tumor and cancer cells in the treated area.

Conclusion: Mandibular metastatic poorly differentiated squamous cell carcinoma, consistent with breast cancer primary was successfully treated using Cryosurgery. It is value promoting this non-aggressive method for current and future use.

Keywords: Cryosurgery; Carcinoma; Mandible; Ramus; Metastasis

Introduction

Roughly 90% of mouth cancers are squamous cell carcinoma (SCC) which accounts for 4% of malignancies in men and 2% in women [1]. The etiology appears to be multifactorial. SCC is presented as a primary or metastatic lesion. Neoplasms can metastasize to the mouth and affect the soft tissue and jaws. Oral cavity metastases are considered uncommon and correspond to approximately 1% of all oral malignancies [2]. The most frequent sources of metastatic tumors to the mouth are primary cancers from the lung and breast with the latter being the most common site for tumors that metastasize to the jawbones [3]. Mandible is the common site for metastases [4]. Conventional treatment modality of SCC is a surgical excision of the tumor which could be associated with or without radiotherapy and chemotherapy [5]. Cryosurgery is a commonly used in-office procedure for the treatment of a variety of benign and malignant lesions [4,5]. There is little work done regarding usage of successful cryosurgery in the treatment of primary or metastatic intra-osseous SCC of the jaws. This case report describes a 35-y-o- female presented with gradually increasing pain and swelling in the left mandibular ramus that was found to be a

metastatic intra-osseous SCC on radiological and histopathological examinations. The patient underwent a successful cryosurgery instead of hemimandibulectomy. Five years after surgery, the patient remains tumor-free whilst maintaining good health. The aim of this article is to present an alternative and unprecedented treatment modality for metastatic mandibular bone carcinoma – cryosurgery.

Case Presentation

On March, 2013 a 35-y-o female house wife presented to our maxillofacial surgery consulting clinic with a gradually increasing pain and a moderate swelling over the left mandibular ramus over several weeks. The patient was a non-alcoholic and non-smoker. Her medical history included confirmed left breast cancer following radiological and histopathological examinations. Nearly three years prior to her visit to our clinic, the patient reported having undergone left and right mastectomy. Extraoral examination: Head and neck were within normal limits except for a swelling in the left mandible. Intraoral examination: the buccal mucosa, retromolar pads, and floor of the mouth were all within normal limits. On April, 2013; a computed tomography (CT), whole body bone scintigraphy with Tc99m DPD and a PET/CT revealed on the level of head and neck a lesion along the medial aspect of the left mandibular ramus (Figure 1, 2 and 3). On

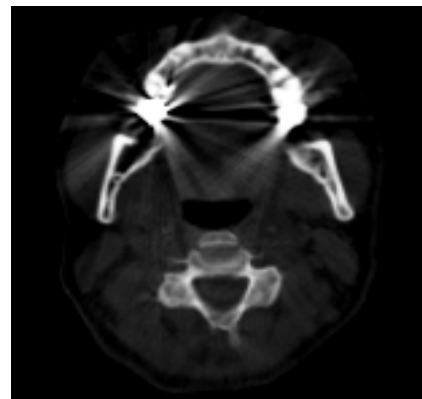


Figure 1: Preoperative axial CT image revealed a intraosseous bony lesion of the left mandibular ramus (03/04/2013).



Figure 2: PET/CT (axial and coronal after IV injection of a contrast showed increased activity along the left mandibular ramus (03/04/2013).

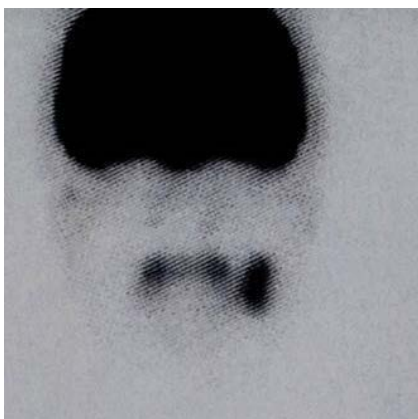


Figure 3: Preoperative whole body bone scintigraphy with Tc99m DPD showed hot spot indicative for metastatic bone disease in the left mandibular ramus (03/04/2013).

April, 2013; MRI-3T of the mandible and temporomandibular joint revealed a tumor involving the left mandibular ramus and extending through the cortex of the medial aspect of the mandible impinging on the medial pterygoid muscle. The main hypothesis was metastasis of breast cancer. On May, 2013 under local anesthesia, the patient underwent intraosseous puncture biopsy. The histopathological analysis of the mandibular intraosseous lesion revealed left mandibular metastatic poorly differentiated carcinoma, consistent with breast cancer primary. On Immunohistochemical analysis, all controls showed appropriate reactivity (tumor cells were positive for estrogen receptors; Invitrogen ID5 (3+ in 90% of tumor cells) and negative for progesterone receptors; Invitrogen P-2C2). Considering the clinical, histopathological, and immunohistochemical features, the diagnosis of metastatic poorly differentiated SCC of the left mandibular ramus was confirmed and consistent with breast cancer as primary lesion. In a meeting with the patient, she was told that the treatment of choice was surgery and would include resection of part of the left mandible followed by a reconstructive surgery. The patient refused the suggested treatment given its severe postoperative side effects mainly, facial disfiguration; and requested an alternative choice of treatment which has minimum side effects especially from the cosmetic point of view. To this end, cryosurgery with no bone excision or facial disfigurement was recommended. The essential summary of the differences between the conventional treatment hemimandibulectomy and cryosurgery are given in Table 1. Following the consent to the latter treatment, an operation was scheduled. Inferior alveolar nerve block was performed with Xylocaine (lidocaine 2% with 1:100 000 Epinephrine). An intraoral incision via a sagittal split osteotomy approach was done along the ramus approximately 15 mm above the occlusal plane downward to the external oblique ridge all the way down to the second molar region. The ramus was then dissected free buccally and lingually. Using a round burr on a straight surgical hand piece, two 2.5 cm bone tunnels -one in the direction of the upper limit of the tumor and one below it were performed. Two 1.7 mm. cryopropes were introduced in the previously prepared bony tunnels. The cryosurgery consisted of 4 cycles. Each cycle consisted of freezing the tumor for 2 minutes then thawing it for another 2 minutes with a 2 minutes rest between cycles. (Figure 4 and 5) The incisions were sutured using

3/0 Vicryl. Postoperative care included oral hygiene instructions and antibiotics. On the first and second postoperative day, no pain was recorded but slight facial swelling and a limited jaw movement was noted. A week later the patient was feeling comfortable with a normal wound healing and jaw movement. The postoperative bone healing was radiologically followed using PET/CT 1 month, 6, 10, and 17 months. The result of the first PET/CT at the level of Head and Neck level showed improvement in abnormal activity associated with the left medial mandibular ramus. At 18-month follow-up the patient was still free of pain, swelling and absent of the tumor was confirmed via the PET/CT, CT and body bone scintigraphy with Tc99m DPD (Figure 6, 7 and 8).At 36 months follow-up, there was no evidence of the tumor and the latest PET/CT and CT images showed sclerosis of the left mandibular ramus (Figure 9 and 10).



Figure 4: Intraoperative view: First freezing cycle was performed by cooling two cryopropes, with a diameter of 1.7 mm to -150 C with liquid nitrogen for 2 minutes (May4, 2013).

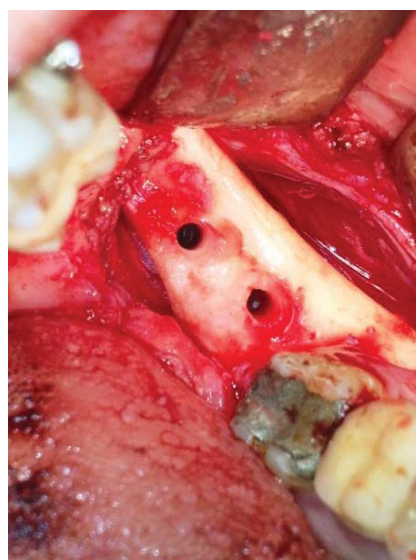


Figure 5: Intraoperative view: Condition of the operative field following removal of the cryopropes. Note the bony tunnels created to insert the cryopropes (May4, 2013).

Table 1: Comparison between two types of treatments of intra-osseous Squamous Cell Carcinoma (SCC) of the mandible with different variables: Hemimandibulectomy VS. Cryosurgery.

Type of treatment	Time consuming	Hospital stay	Anesthesia	Site of incision	Reconstructive surgery	Pain	Healing time	Disfigurement
Hemimandibulectomy	5h to 15 h and could be more	7 – 14 days or more	General	External	Highly recommended	Moderate to severe	At least 3 weeks or more	Yes
Cryosurgery	60 min. - 90 min.	1 – 2 days	Local or general	Internal	No need	Mild	At least week	No

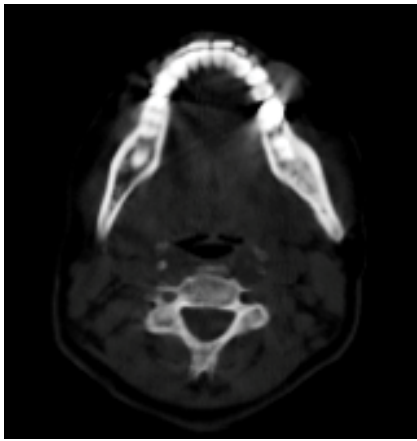


Figure 6: Postoperative axial CT image showed complete bone healing in the left mandibular ramus (24/06/2014).

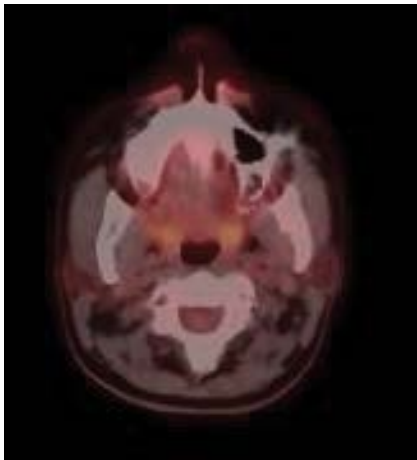


Figure 7: Postoperative axial and coronal PET/CT after IV injection of a contrast showed complete absence of these abnormal activity associated with the medial aspect of the left mandibular ramus (24/06/2014).



Figure 8: Postoperative whole body bone scintigraphy with Tc99m DPD revealed absence of hot spots in the left mandibular ramus (24/06/2014).

Discussion

Metastatic tumors are of great clinical importance, as their manifestation may be the first signal of an undiscovered malignancy at a distant primary site, or the first evidence of dissemination of a known tumor from its primary site as in our case report.

Metastatic lesions may occur in the oral soft tissues, in the jawbones or in both of them. Breast cancer is the common source for metastatic tumors to the jawbones. In the jawbones the mandible is the most common location for metastases, with the body and ramus being the most frequently involved sites [3,4].

In our case the patient was a female with breast cancer as the

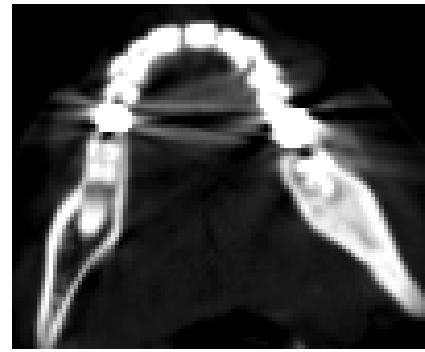


Figure 9: Postoperative axial CT image showed absence of the tumor and sclerosis of the left mandibular ramus (02/03/2016).



Figure 10: Postoperative axial, sagittal and coronal PET/CT after IV injection of a contrast showed complete absence of these abnormal activity associated with the medial aspect of the left mandibular ramus (02/03/2016).

primary lesion and signs of necrotic bones in the left mandibular ramus which proved to be metastatic mandibular carcinoma. A broad variety of clinical signs and symptoms may be seen in association with metastatic tumours of the mouth, with the most common being moderate to severe pain, swelling, paraesthesia and soft tissues masses. In the case presented the patient had gradually increasing pain and swelling and paraesthesia of the lower lip. The CT changes in the jaw bones, found in our case, were mainly mineral loss in the area of tumor, as compared to the adjacent bone. In addition, body bone scintigraphy, MRI, and PET/CT were also performed [6,7]. The definitive diagnosis of metastatic tumors in the oral cavity is challenging, both to the clinician and to the pathologist and difficult due to their unusual occurrence. An intraoral Incisional biopsy and histopathological examination are the means to verify and identify a malignant tumor and potentially its metastatic origin. If any history of a prior tumor exists; the microscopic findings of the metastatic lesion should be compared with that of the primary tumor. In the case we have presented, left mandibular ramus bone biopsy was done and the microscopic results were compared with that of the primary tumor leading to a diagnosis of metastatic poorly differentiated mandibular SCC consistent with breast cancer primary. Oral cancer treatment is a matter of surgical intervention especially in cases of mandibular tumor invasion. Neither the irradiation therapy nor the chemotherapy seem that they yielded better treatment results than complete surgical eradication in case of the mandibular metastatic SCC [5]. The major disadvantages of surgical excision of neoplasms of the jaws relate to its consequences which, in the case of mandibular intra-osseous SCC, often result in cosmetic and functional defects. Despite recent advances in reconstruction techniques, the functional and cosmetic ramifications are still major, so more conservative techniques are highly recommended in respect to mandibular preservation. However, failure to remove the mandible when carcinoma has invaded it allows progression of disease. The oral complications of head and neck radiation such as mucositis, xerostomia and osteoradionecrosis and chemotherapy as osteochemonecrosis and stomatotoxicity will negatively affect the quality of life [8]. After all, we found that previous and recent concepts in treatment of oral neoplasms that occupy the jaws are primarily focused on preservation of the jaws due to their

esthetic, functional, and psychological aspects of the human. Here is the conflict, which type of treatment could be advocated to minimize the post operative side effects both on the cosmetic and functional aspect. On the mean time, the only curative management option for jawbones cancer is surgical resection. Particularly over the last decade, attempts to increase the number of curable cancer at the same time developing less invasive approaches to the destruction of the tissue involved by the tumor, has led to the emergence of a number of novel ablative methods, which are often specifically for unresectable primary or secondary carcinoma by inducing *in situ* coagulative necrosis. Cryosurgery is one of the important ablation techniques and may be used as an alternative of surgical removal of the malignant tumors, mainly is adjustable for patients who cannot endure surgical intervention due to co-morbidity, and patients who reject operation due to cosmetic consideration. Cryosurgery is suitable for bone cysts and for bone malignant lesions as in vertebral and pelvic lesions [9]. Different techniques have been devised in the use of cryosurgery of lesions. They include the applicator technique, the cryopropes method and spray freeze technique. Adverse effects of Cryotherapy are usually minor and short-lived [10]. After this review of the most important treatment modalities of oral cancer including primary and metastatic jaw bone neoplasms, and regarding their positive and negative features we noticed that cryosurgery has the least adverse side effects from the cosmetic and functional point of view. On February, 2018 we carried out a series of searches via **MEDLINE**[®] and **PubMed**[®] in English (over the time period 1985 to 2018) using the following Medical Subject Headings and terms: oral SCC, cryosurgery, mandible, mandiblectomy, chemotherapy, radiotherapy. We then crossed the same terms with the terms treatment of mandibular SCC, primary and metastatic jaw cancer. Other references were obtained from citations from retrieved articles related to case series of patients with primary or metastatic intra-osseous SCC of the jaws. No similar reported case or documentation regarding cryosurgery of the metastatic mandibular ramus SCC was obtained [11,12]. In this case report, the rejection of the patient to undertake a conventional treatment of metastatic SCC of her left jaw was due to a psychological and cosmetic perspective. But after assuring her that her face and overall wellness will remain intact, the patient approved to take on this first operation of its kind despite the risks and it was eventually worth the risks.

Conclusion

Cryosurgery can be a good alternative to the routine treatment of

mandibular carcinoma by de-bulking the lesion and without affecting the aesthetics and function of the mandible. Further cases will be required in the future to confirm our results.

Acknowledgment

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