



Metastatic Breast Carcinoma Masquerading As Numb Chin Syndrome: A Case Report

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Abstract

Metastatic tumours involving the jaw bones are uncommon but clinically significant entities that often indicate advanced systemic malignancy. They account for approximately 1–3% of all oral cancers and are more frequently observed in jaw bones than in oral soft tissues.^{1,2} The mandible, particularly its posterior region, exhibits a marked predilection for metastatic involvement.^{1,3} Among women, breast carcinoma represents the most frequent primary malignancy metastasizing to the jaws.^{1,7} In certain instances, oral metastasis may constitute the first clinical manifestation of an undiagnosed primary tumor.^{1,3} Because clinical and radiographic features often resemble odontogenic or inflammatory conditions, early recognition is challenging. This case report provides a comprehensive discussion of epidemiology, mechanisms of dissemination, clinico-radiographic features and histopathology of metastatic breast carcinoma to the mandible.

Keywords: Jaw metastasis, Mandibular metastasis, Breast carcinoma, Oral oncology, Numb chin syndrome

Introduction

Metastasis represents the defining characteristic of malignant tumor progression and is responsible for the majority of cancer-related mortality. While distant spread most commonly involves visceral organs and the axial skeleton, the oral and maxillofacial region may occasionally be affected. Metastatic tumors constitute a small fraction of oral malignancies, with reported incidence ranging between 1-3%.^{1,2} Despite this relatively low prevalence, their clinical importance is considerable because they frequently signify disseminated disease and carry an unfavourable prognosis.

Within the oral cavity, metastatic lesions demonstrate a predilection for jaw bones over soft tissues.¹ Among the jaws, the mandible is affected more frequently than the maxilla.^{1,3} This distribution pattern is consistently

reported across multiple retrospective analyses.^{1,3,7} The mandible, especially its posterior part, may contain remnants of active hematopoietic marrow which may serve as a favourable niche attracting tumour cells.⁷ In female patients, breast carcinoma is identified as the most common primary tumor metastasizing to the jaws.^{1,7}

Oral metastatic lesions may present in several clinical contexts: as a complication of previously diagnosed malignancy, as evidence of recurrence following treatment, or as the first detectable manifestation of an occult primary tumor.^{1,3} The latter scenario poses significant diagnostic challenges, particularly when symptoms mimic benign odontogenic pathology. Therefore, a thorough understanding of metastatic behaviour in the jaws is essential for dental and

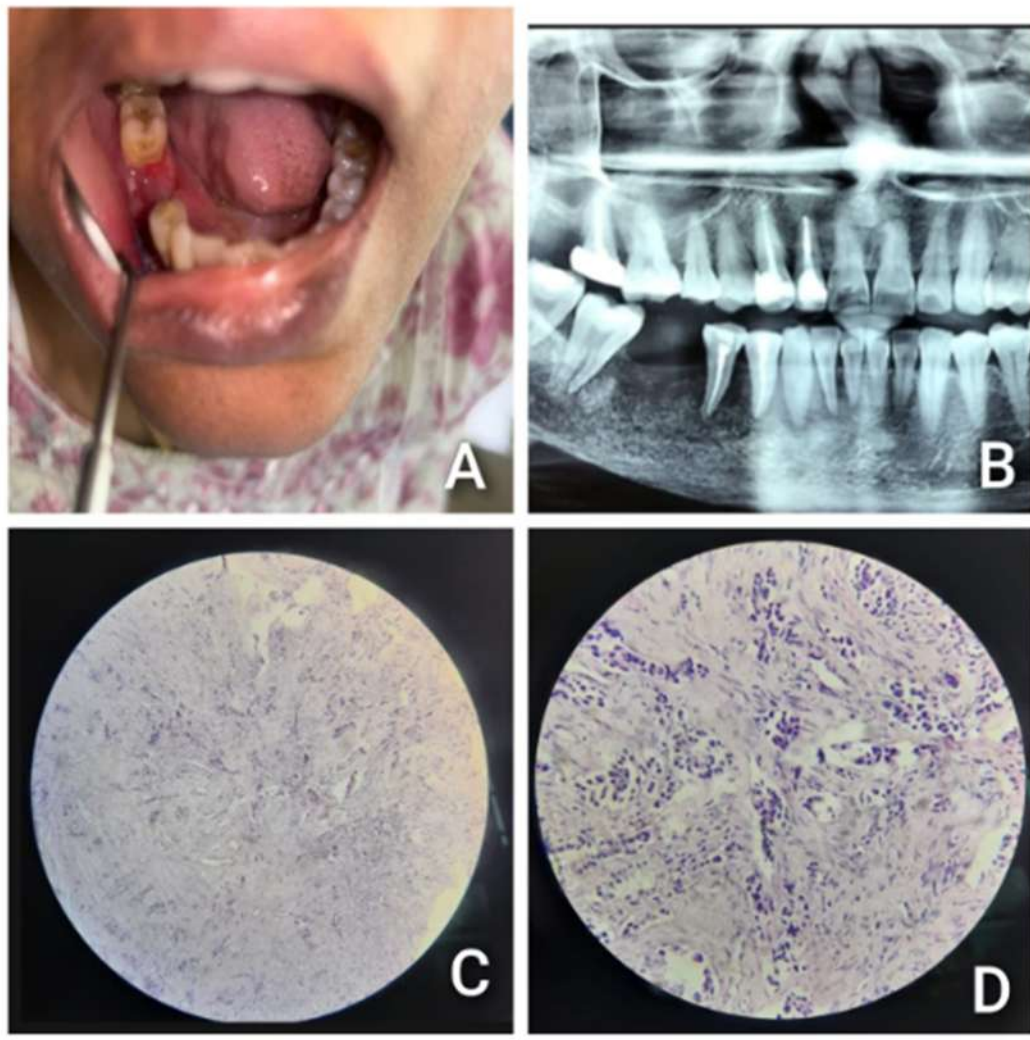
medical practitioners. This case report highlights the significance of parasthesia of lower lip and chin in the diagnosis of carcinoma dissemination.

Case Report

A 41-year-old female patient reported with a swelling on the right lower back tooth region for 3 months. She reported a history of numbness of the chin and lower lip for 1 year. Extra-oral examination revealed a mild swelling with buccal cortical expansion. Intra-orally, the gingiva was inflamed and erythematous with grade 2 mobility of the right lower premolars and grade 1 mobile right lower anteriors. Radiograph showed a diffuse radiolucent lesion with ill-defined borders and loss of trabecular pattern in relation to the right lower premolars. Correlating the clinical and radiographic

features, a differential diagnosis of odontogenic cyst, odontogenic tumour or metastatic lesion were considered. Medical history revealed that the patient was diagnosed with invasive ductal carcinoma 7 years ago and was treated postoperatively with chemotherapy and radiotherapy. At present, incisional biopsies of the oral lesion were performed and histopathologic examination revealed discohesive round to ovoid tumour cells arranged as single files, cords and islands. Tumour cells were monomorphic with hyperchromatic nucleus and scant cytoplasm resembling ductal epithelial cells. Based on the clinical and microscopic findings, an overall diagnosis of “metastatic invasive ductal carcinoma of breast” was rendered and the patient was referred to the Department of Oncology.

Figure 1: A) Intra oral swelling on right lower back tooth, B) Panoramic radiography showing irregular radiolucency with loss of trabecular pattern, C) Tumour cells arranged as single files, cords and islands, H&E x40, D) Tumour cells are monomorphic with hyperchromatic nucleus and scant cytoplasm resembling ductal epithelial cells, H&E x400



Discussion

Comprehensive reviews have established consistent epidemiological trends in jaw metastases. Hirshberg et al. analyzed hundreds of cases and confirmed that metastatic tumors more frequently involve jaw bones than oral mucosa.¹ The mandible accounts for the majority of jaw cases, particularly the posterior body and ramus regions.^{1,3} Gender distribution reflects the prevalence of primary tumors. In men, lung carcinoma is commonly implicated, followed by renal carcinoma.¹ In women, breast carcinoma predominates as the leading source of jaw metastasis.^{1,7} This observation aligns with the overall high incidence of breast carcinoma worldwide. Age distribution typically parallels the peak incidence of systemic malignancies, with most patients presenting in the fifth to seventh decades of life.³ An important clinical observation is that in approximately one quarter of reported cases, oral metastasis represents the first sign of an undiagnosed primary malignancy.^{1,3}

This underscores the diagnostic responsibility of oral health professionals.

Metastasis is a complex multistep process involving detachment of tumour cells from the primary site, invasion into surrounding stroma, intravasation into vascular channels, survival within circulation, extravasation at distant sites, and eventual colonization.² Only a small fraction of circulating tumour cells successfully establish secondary growths. Carcinomas typically disseminate through hematogenous pathways when metastasizing to distant skeletal sites.¹ Batson proposed that the vertebral venous plexus, a valveless vascular network connecting thoracic, abdominal, and craniofacial circulation, is considered a potential route facilitating spread to the jaws without prior pulmonary filtration.^{1,8} This anatomical pathway may partially explain mandibular involvement in breast carcinoma.

The posterior mandible contains remnants of hematopoietically active marrow even in adulthood.^{1,3}

These marrow spaces possess sinusoidal vascular channels characterized by sluggish blood flow, creating a favourable microenvironment for tumor cell entrapment. The “seed and soil” hypothesis put forward by Paget provides a biological framework for understanding why certain tumours, such as breast carcinoma, demonstrate affinity for osseous tissue.⁷ Interactions between tumour cells and bone microenvironment stimulate osteoclast-mediated bone resorption, thereby facilitating tumour expansion.

Breast carcinoma is among the most prevalent malignancies affecting women globally and frequently metastasizes to bone. While axial skeletal structures are commonly involved, metastasis to the mandible remains relatively uncommon, but well-documented.^{1,7} Mandibular metastasis from breast carcinoma may develop years after initial diagnosis and treatment, reflecting tumour dormancy and reactivation.⁷ In some cases, mandibular swelling or paresthesia has led to the discovery of previously undiagnosed breast carcinoma.^{1,3}

Vetri et al. reported a case in which metastatic breast carcinoma presented as mandibular swelling associated with sensory disturbances.⁴ Histopathologic examination revealed features consistent with primary breast malignancy, and immunohistochemistry confirmed estrogen receptor positivity.⁴ Such findings highlight the importance of correlating oral lesions with systemic oncologic history. Breast carcinoma metastases to bone are typically osteolytic.⁷ Tumour cells produce mediators that stimulate osteoclastic activity, leading to progressive bone destruction and structural compromise.

The clinical manifestations of jaw metastases are often nonspecific and may resemble odontogenic infections or benign inflammatory conditions.^{1,2,3} This similarity frequently contributes to delayed diagnosis. Soft tissue extension may occasionally be observed, though primary involvement is usually intraosseous.¹ Ulceration may occur secondary to mucosal invasion. Common presenting features include progressive swelling, localized pain, tooth mobility, non-healing extraction sockets, trismus, and, in advanced cases, pathological fracture.^{1,3} Because many of these symptoms overlap with dental pathologies, clinicians must maintain a high index of suspicion, particularly in patients with known malignancy.

A particularly significant sign is paresthesia or anesthesia involving the lower lip and chin due to involvement of the inferior alveolar or mental nerve.¹ This phenomenon, commonly termed “numb chin syndrome,” is considered a red flag for possible metastatic disease. The differential diagnosis for numb chin syndrome includes neoplasm, dental and traumatic injury, toxin or drug-induced infection and inflammatory or autoimmune causes.⁹

Radiographically, metastatic lesions of the mandible most frequently appear as poorly defined radiolucent areas with irregular margins.^{1,3} A “moth-eaten” pattern of bone destruction may be evident. Cortical plate erosion and widening of the mandibular canal have also been described.¹ Breast carcinoma metastases generally demonstrate osteolytic characteristics.⁷ In the present case, panoramic radiography showed irregular radiolucency with loss of trabecular pattern. However, variability may occur depending on tumour biology and host response. Advanced imaging modalities such as computed tomography and magnetic resonance imaging provide superior evaluation of cortical disruption and soft tissue extension.⁴ Importantly, radiographic features are not pathognomonic, and definitive diagnosis cannot rely solely on imaging findings.

Microscopic examination remains the gold standard for diagnosis. Histopathologic features typically resemble the morphology of the primary tumour. In cases of metastatic breast carcinoma, patterns consistent with invasive ductal carcinoma are commonly identified.⁴ Immunohistochemical analysis plays a crucial role in confirming tumour origin, especially when the primary malignancy is unknown. Markers such as cytokeratins establish epithelial origin, while estrogen receptor and progesterone receptor positivity support breast origin in female patients.⁴ HER2 status and proliferation indices may further aid characterization. Correlation between histologic findings and systemic evaluation is essential to establish a definitive diagnosis.

Metastatic lesions must be distinguished from several primary and secondary jaw pathologies. Differential considerations include osteomyelitis, primary intraosseous carcinoma, lymphoma, multiple myeloma, and odontogenic tumors.^{1,2} Because clinical and radiographic features overlap substantially, biopsy with histopathologic examination is mandatory for

accurate diagnosis. The presence of mandibular metastasis generally indicates advanced systemic disease. Management therefore, requires multidisciplinary coordination involving oncologists, maxillofacial surgeons, and dental specialists.^{1,7} Treatment strategies are primarily palliative and aim to alleviate pain, maintain function, and prevent complications. Radiotherapy is commonly employed for local tumour control and symptomatic relief.⁴ Systemic therapy, including chemotherapy, hormonal therapy, or targeted therapy, is guided by tumour receptor status and overall disease burden.⁴ Surgical intervention is typically limited to diagnostic biopsy or management of complications such as pathological fracture.¹ Radical resection is rarely indicated due to systemic disease involvement. Jaw metastasis is associated with a guarded prognosis because it reflects disseminated malignancy.^{1,3} Survival depends on the extent of systemic spread and response to therapy.⁷ While curative treatment is uncommon, early diagnosis contributes to improved symptom control and quality of life.

Conclusion

Metastasis to the jaw bones, though rare, represents a clinically significant manifestation of systemic malignancy. The mandible, particularly its posterior region, is most frequently involved. Among women, breast carcinoma remains the leading primary tumour metastasizing to the jaws. Clinical features often mimic benign dental conditions, making awareness and suspicion essential for timely diagnosis. Histopathologic evaluation supplemented by immunohistochemistry confirms tumour origin. Management is predominantly palliative and multidisciplinary. Early recognition by dental professionals may facilitate prompt oncologic referral and improved patient care.

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