Received: 15 March 2023 | Revised: 8 May 2023 | Accepted: 10 May 2023

DOI: 10.1002/osi2.1194

CASE REPORT

Oral Science International
Official Journal of the Japanese Stomatological Society
WILEY

Panoramic radiography and computed tomography of metastatic breast carcinoma in the mandible: Report of a case

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Abstract

Background: Breast carcinoma is a common tumor in women, but it rarely metastasizes to the oral region.

Case presentation: An 83-year-old woman presented with numbness and pain on the right side of the mandible. The patient's medical history included breast cancer that was treated with surgery. Panoramic radiograph showed a radiolucency with ill-defined margin in the right mandible. CT images showed an osteolytic lesion with cortical bone destruction in the right mandible. Histopathological diagnosis was invasive ductal carcinoma.

Conclusion: Dental practitioner should be aware that metastatic tumor of the mandible may occur in the patient with breast cancer.

KEYWORDS
breast neoplasms, mandible, multidetector computed tomography, neoplasm metastasis, panoramic radiography

1 | INTRODUCTION

Metastasis to the oral soft tissues and jawbones is rare and frequently associated with wide spread disease and dismal prognosis.[1–3] Metastatic lesions to the jaws are known to simulate periodontal and pulpal disease and other radiolucent lesions that can occur in the jaws.[4,5]

Breast carcinoma is a common tumor in women, but it rarely metastasizes to the oral region; furthermore, metastases to the oral region occur mainly to the maxillary and mandibular bone and rarely to soft tissue.[6–8] We report metastatic tumor of the mandible on panoramic radiography and multidetector computed tomography (MDCT), especially a case report from the breast cancer.

2 | CASE REPORT

An 83-year-old woman presented with numbness and pain on the right side of the mandible within 1 month. The patient's medical history included breast cancer that was treated with surgery before 15 years and lung and liver metastases without bone metastases that were received chemotherapy. On clinical examination, swelling and redness of the gingiva of the right buccal lower premolar and molar regions were found.

Panoramic radiograph showed a radiolucency with ill-defined margin in the right mandible (Figure 1). Axial soft tissue algorithm MDCT images showed an expansile mass that extended buccally in the right mandible (Figure 2A,B). Axial bone tissue algorithm MDCT images showed an osteolytic lesion with cortical bone destruction in

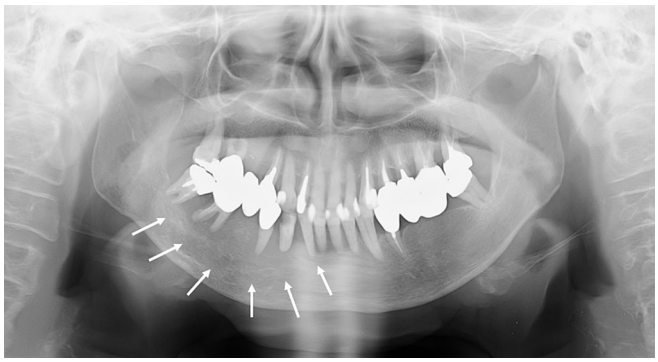

FIGURE 1 Panoramic radiograph showed a radiolucency with ill-defined margin in the right mandible (arrows).

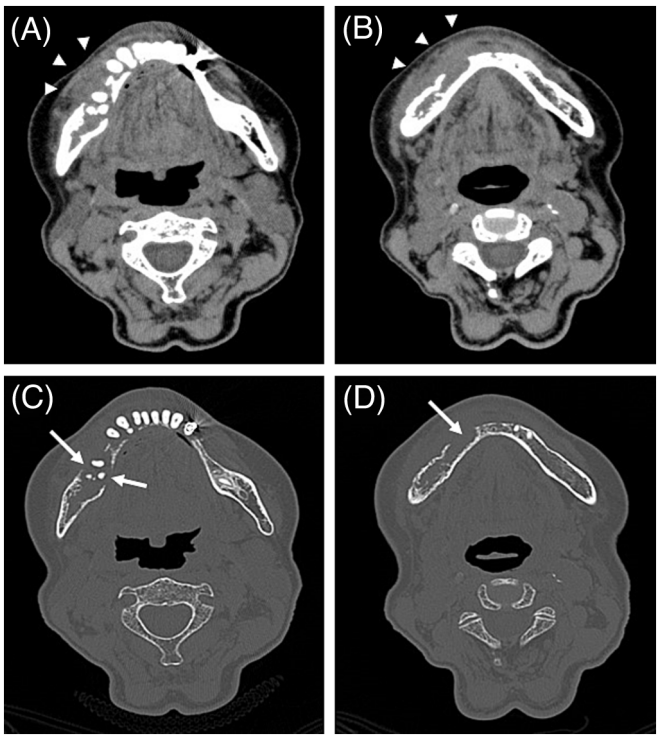

FIGURE 2 (A, B) Axial soft tissue algorithm MDCT images showed an expansile mass that extended buccally in the right mandible (arrowheads). (C, D) Axial bone tissue algorithm MDCT images showed an osteolytic lesion with cortical bone destruction in the right mandible (arrows).

the right mandible (Figure 2C,D). The radiological diagnosis of this mandibular lesion was osteomyelitis or malignant lymphoma.

An incisional biopsy of the gingival region was performed. Histopathological examination of the biopsy specimen revealed findings consistent with invasive ductal carcinoma, similar to the specimen of the breast carcinoma (Figure 3A–C). Immunohistochemical staining showed that the nuclei of tumor cells were positive for GATA3, estrogen receptor (ER), and progesterone receptor (PGR) (Figure 3D–F). Ki-67 immunostaining labeling index was 52%. However, we cannot show the immunoreactivity in the primary breast carcinoma because the patient was treated with surgery for breast cancer at another hospital. Consequently, histopathological diagnosis was metastatic tumor of the right mandible from the breast cancer (invasive ductal carcinoma).

The patient was transferred to another hospital for chemotherapy.

3 | DISCUSSION

Metastatic tumors to the oral and maxillofacial region are rare, comprising 1–3% of all malignant oral neoplasms.[2] Bodner et al.[1] indicated eight cases of metastatic tumors occurring in the jaw bones, (1) the patients, ranged in age from 44 to 80 years, with a mean of 64.5 years; (2) the primary malignant sites, the lung, the breast, the rectum, the thyroid, the uterus, and the parotid gland; (3) the site of oral involvement, seven mandible and one maxilla; and (4) no gender difference. Nel et al.[2] reported that lesions with poorly demarcated margins with cortical destruction, accompanied by clinical signs of swelling, pain, and paraesthesia in the absence of any inflammatory process, should raise suspicion for metastasis. Ho et al.[3] showed that the 40 metastatic tumors to the oral soft tissues and jawbones (22 men and 18 women) included 18 cases (45%) involved the gingiva, 16 (40%) the gingiva and jawbones, 5 (12.5%) were exclusively intraosseous, and 1 affected (2.5%) the tongue. Regarding the organ of primary malignancy, the lung was the two most frequent primary site in both men ($n = 6$, 27.3%) and women ($n = 5$, 27.7%), followed by the colon ($n = 4$, 18.2%) and kidney ($n = 3$, 13.7%) in men, and colon ($n = 4$, 22.2%) and breast ($n = 3$, 16.6%) in women. Furthermore, clinicians should remain cognizant of such lesions since they frequently mimic inflammatory, reactive, or benign neoplastic processes. We reported metastatic tumor of the mandible from the breast cancer in an 83-year-old woman presented with numbness, pain, swelling, and redness of the gingiva of the right buccal lower premolar and molar regions. We consider that most studies included in our case report showed similarities regarding older patients, mandible and numbness, pain, and swelling.

In this report, panoramic radiograph showed a radiolucency with ill-defined margin in the right mandible, and soft tissue algorithm MDCT images showed an expansile mass that extended buccally in the right mandible; furthermore, bone tissue algorithm MDCT images showed an osteolytic lesion with cortical bone destruction in the right mandible. Kuttan et al.[4] reported a case of metastatic tumor of the mandible from the colon carcinoma; metastatic lesions to the jaws are known to simulate periodontal and pulpal disease and other radiolucent lesions that can occur in the jaws. Kameta et al.[5] reported a case of metastatic tumor of the mandible from the colon adenocarcinoma, panoramic radiograph revealed a radiolucency with ill-defined margin, and CT showed an osteolytic lesion with cortical bone destruction.

Regarding the differential diagnosis including oral mucosal origin malignancies prior to the biopsy and the anti-resorptive agent-related osteomyelitis of the jaw, Ogura et al.[9–11] showed CT imaging of mandibular malignant tumors and inflammatory lesions (malignant lymphoma, osteolytic lesion with the destruction; squamous cell

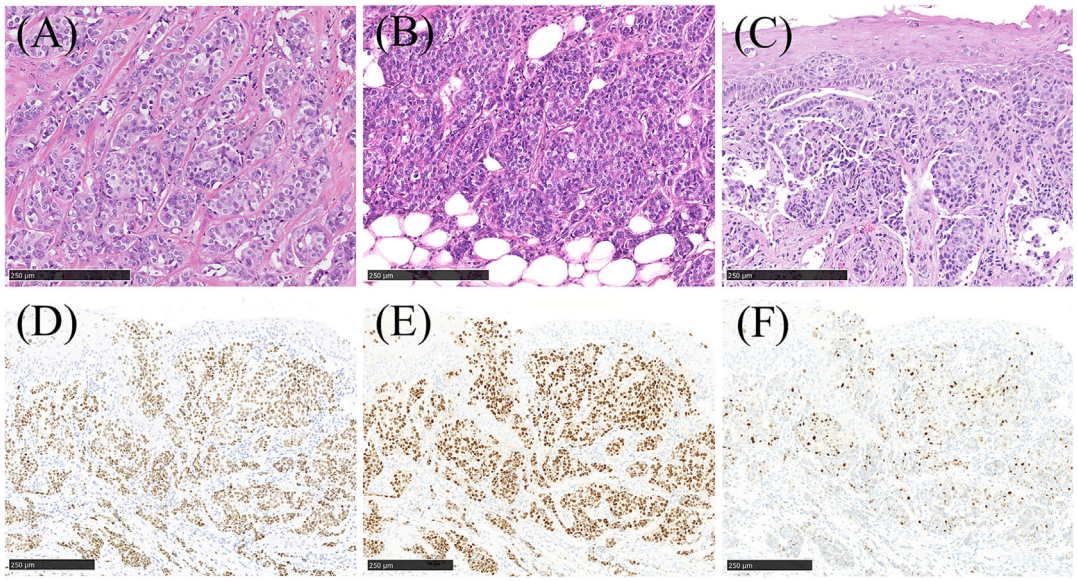

FIGURE 3 Histopathological and immunohistochemical findings. (A, B) Histopathological finding of breast carcinoma (invasive ductal carcinoma) of the primary site (H–E). Proliferation of atypical cells form nests (A) and sheets (B) of tumor is observed. (C–F) Histopathological and immunohistochemical findings of metastatic tumor (breast carcinoma) to the mandible. (C) Infiltration of tumor nests formed by breast cancer-like cells is observed under the gingival epithelium (H–E). (D) The nuclei of tumor cells are positive for GATA3 immunostaining. (E) The nuclei of tumor cells are positive for ER immunostaining. (F) The nuclei of small number of tumor cells are positive for PGR immunostaining. Scale bars: 250 μm

carcinoma, osteolytic lesion with the destruction; medication-related osteonecrosis of the jaw, osteolytic change, sclerotic lesion, sequestrum, and periosteal bone proliferation; osteoradionecrosis, osteolytic change, sclerotic lesion, and sequestrum; osteomyelitis, osteolytic change and sclerotic lesion). Furthermore, Ogura et al.[12] indicated that the CT images of mandibular bone invasion by gingival squamous cell carcinoma were classified into four types: Class I, no bone invasion; Class II, invasion confined to the alveolus; Class III, invasion extending to the bone area between the alveolus and the mandibular canal; and Class IV, invasion beyond the mandibular canal. Minami et al.[13] showed that CT showed focal erosion of the maxilla by follicular lymphoma. We consider that the findings of extranodal malignant lymphoma originated from gingiva not gingival squamous cell carcinoma, such as the osteolytic lesions and erosion of the jaw, were similar to ours. Therefore, although the image findings in our case indicated that the lesion was a malignant tumor, they were not specific to the metastasis from the breast cancer. For a definitive diagnosis, histological evaluation is necessary. Recently, diffusion-weighted MR imaging[13] and SPECT/CT[14] have been applied for jaw pathologies. We consider that the diffusion-weighted MR imaging and SPECT/CT can be an effective tool for the quantitative evaluation of jaw pathologies.

4 | CONCLUSION

We report metastatic tumor of the mandible on panoramic radiography and MDCT, especially a case report from the breast cancer. Dental practitioner should be aware that metastatic tumor of the mandible may occur in the patient with breast cancer.

AUTHOR CONTRIBUTIONS

Ichiro Ogura and Yasuo Okada wrote the manuscript with support from Fumi Mizuhashi, Ryo Mizuhashi, Makoto Oohashi, and Hisato Saegusa. All authors analyzed and interpreted the data. All authors have read the final submitted version of the manuscript and approve of its publishing.

ACKNOWLEDGMENTS

None.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest.

PATIENT CONSENT STATEMENT

Informed consent was obtained from all individual participants included in the study.

CLINICAL TRIAL REGISTRATION

N/A

ANIMAL STUDIES

N/A

DATA AVAILABILITY STATEMENT

Contact the corresponding author for data requests.

ETHICS STATEMENT

The study was approved by the institutional review board of The Nippon Dental University School of Life Dentistry at Niigata (approved

No. ECNG-R-400). All procedures performed in studies involving human participants were in accordance with the Helsinki declaration as revised in 2013 and its later amendments.

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How to cite this article: Ogura I, Okada Y, Mizuhashi F, Mizuhashi R, Oohashi M, Saegusa H. Panoramic radiography and computed tomography of metastatic breast carcinoma in the mandible: Report of a case. Oral Sci Int. 2024;21(1):155–158. https://doi.org/10.1002/osi2.1194