

Metastasis of Prostate Cancer to the Oro-Facial Region

Kennedy J, Pannu V, Katkar R, Nair MK.

University of Florida, Colleges of Dentistry and Medicine, Oral and Maxillofacial Radiology

Abstract: Metastatic tumors account for approximately 1-3% of oral malignancies seen between the ages of 40-70, with equal gender distribution (1,2,4). The most common site of metastasis is the mandible with the primary sites being the lung, prostate, kidney and liver in males, and breast, adrenals, female genitalia, and colorectum in females (6). Metastatic tumors do not possess a pathognomonic radiographic appearance and may range from the absence of any manifestation to a lytic or opaque lesion with ill-defined margins. This article is an attempt to provide a more detailed description of radiographic appearance of metastatic tumors to the jaws with the purpose of assisting the general practitioner in identification and expedite treatment for the patient.

I. Introduction

Metastasis of cancer is noted in about 1% of all cancers (1), with oro-facial cancers from metastatic lesions accounting for 1.5% of malignant oral neoplasms. Prostate cancer is held as the most commonly diagnosed cancer in men between ages 40-70 years in the United States with up to 70% of advanced prostate cancer patients having metastasis to the bone (2, 12-13). Metastasis involving the oro-facial region is less in frequency as compared to other bones such as ribs, skull, pelvis and vertebrae due to the relatively lower vascularity and red marrow with increasing age; however, oro-facial region remains one of the first sites of metastasis. The aim of this paper is to alert medical and dental practitioners caring for patients with history of, or currently manifesting with malignancy, of the radiographic signs of metastasis to the oro-facial region.

Radiographic signs should be identified along with a referral to the oncology team for follow-up. A variety of presentations of such lesions is noted radiographically in imaging studies of the oro-facial region. However, previous reports note that the most common radiographic appearance of metastasis is a lytic radiolucent lesion with ill-defined margins and/or radiopaque, osteoblastic lesions (2). Metastases from prostate cancer nearly always form osteoblastic lesions in the bone whereas metastases from kidney, lung or breast cancers often appear osteolytic (7-9). These presentations regarded as highly suspicious must be attributed to metastasis of cancer. Multiple sites, and lesion size and shape are noted as described in the cases reported here. The following cases highlight the variations in appearance of the lesions in the maxilla and mandible, necessitating further evaluation and follow-up by the practitioner to determine if metastasis to the oro-facial region has indeed occurred.

II. Materials And Methods

Three male subjects presented to the University of Florida College of Dentistry for oral evaluation. Each subject had panoramic radiographs made, in which there were a series of suspicious radiographic features that called for additional imaging. The three subjects were radiographically identified as having a high possibility of metastatic tumors. Maxillofacial non-contrasted thin-slice Cone Beam Computed Tomography (CBCT) studies were performed on each subject.

Subject 1: 60-year-old male presented with left mandibular swelling.

Subject 1: Maxillofacial non-contrast thin slice cone-beam CT Fig A. Para-axial Fig B. Para-sagittal Fig C. Para-coronal view

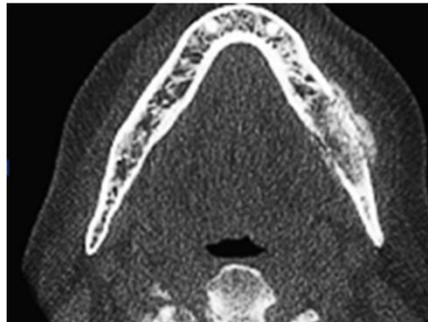


Fig. A Para-axial

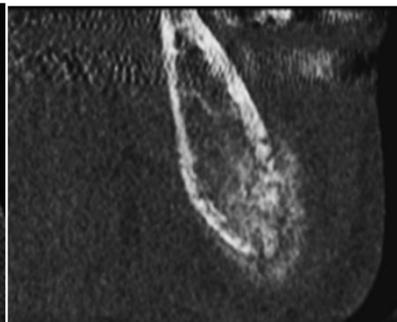


Fig. B Parasagittal

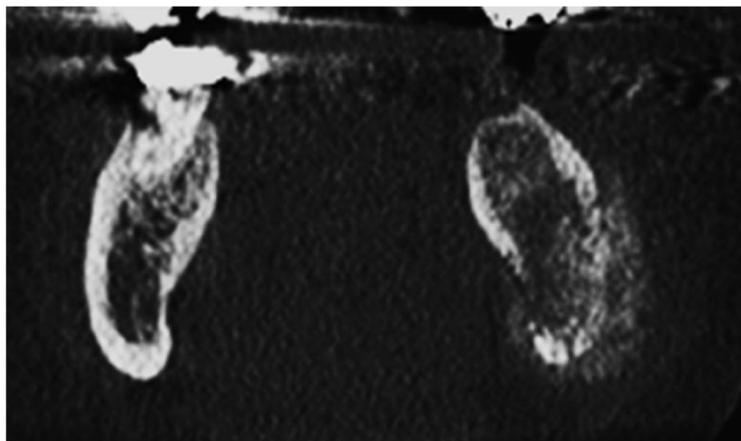


Fig. C Paracoronal

Subject 2: 58-year-old male presented with pain and swelling of left temporomandibular joint and mandible.

Subject 2: Maxillofacial non-contrast thin slice cone beam CT:

Fig. A: Para-axial Fig. B: Para-sagittal Fig. C: Para-coronal views



Fig. A Para-axial



Fig. B Para-sagittal

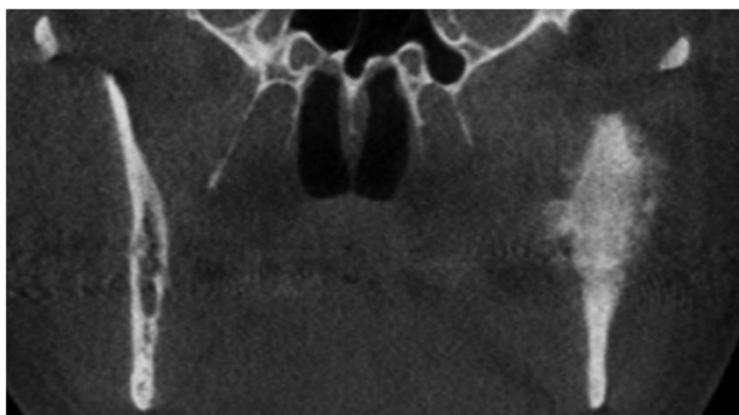


Fig. C Para-coronal

Subject 3: 68-year-old male presented with pain in mandible, implants, history of extractions and grafting in mandible.

Subject 3: Maxillofacial non-contrast thin-slice cone beam CT: Fig A. Para-axial Fig B. Para-coronal

Fig C. Reformatted panoramic views

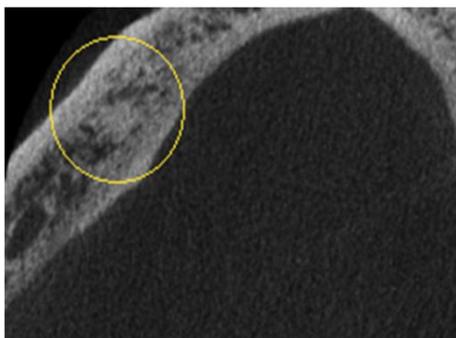


Fig. A Para-axial

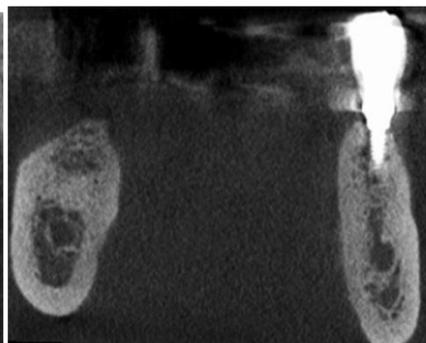


Fig. B. Paracoronal

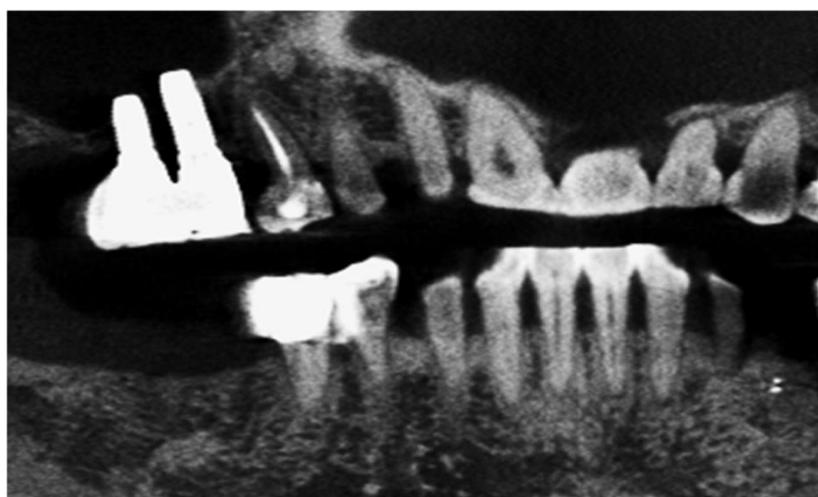


Fig. C. Reformatted panoramic views

III. Results

In subject 1, CBCT study revealed a poorly-defined, mixed-density, sun-burst appearance in the left posterior body of the mandible in #17-20 area extending to the right ramus, with evidence of permeative osseous resorption extending to the inferior alveolar neurovascular canal. In subject 2, CBCT revealed a dense expansile lesion with loss of cortical integrity, extending from the left temporomandibular joint to the mid-ramus of the mandible, and suspected immature osteoid formation. In subject 3, CBCT revealed multiple, sclerotic, high-attenuation areas in the inferior right mandible with no evidence of osteolysis but smaller foci mimicking dense bone islands. The appearance of unique radiographic findings prompted further follow-up with the oncology team to determine if metastasis was indeed present. Metastasis was confirmed via histopathologic evaluation and nuclear medicine studies.

IV. Discussion:

The appearance of oral metastatic lesions is a sign of advanced-stage malignant disease with multiple metastases (23). In such situations, oral lesions rarely represent the only expression of metastatic disease. Radiographic signs should be immediately identified and an urgent follow-up exam with oncologist is strongly recommended. Several presentations of metastatic lesions are exhibited radiographically in the oro-facial region. However, previous reports note that the most common radiographic appearance of metastasis is seen as lytic radiolucent lesion with ill-defined margins and radiopaque osteoblastic lesions (2). Within all three studies it was identified that metastases from prostate cancer nearly always form osteoblastic lesions in the bone whereas metastases from kidney, lung or breast cancers often appear osteolytic (7-9). These presentations can be regarded as highly suspicious to be attributed to metastasis of cancer. Multiple sites and lesion size and shape are noted in these studies. The radiographic features in this article are not difficult to identify and describe, yet can be easily misinterpreted. It is therefore imperative to implement a standard of care for radiographically identifying suspected signs of metastasis in patients with history of cancer. If several radiographic entities are identified in the maxilla and mandible, routine investigation by the practitioner is needed to determine if metastasis to the oro-facial region has occurred.

The prognosis of most patients with oral metastatic disease is very poor, with a 4-year survival rate as low as 10%. (22) Creating a differential diagnosis of a metastatic lesion based solely on radiographic features is

very difficult, yet, it is seen in the oral cavity as the first manifestation of neoplasia (11). The clinical significance of identifying this is to uncover and formulate any hidden pathoses. A combination of clinical and radiographic history should be acquired.

The most frequent radiographic pattern was the lytic type (52%), followed by osteosclerotic, mixed, lytic vs. mixed and osteosclerotic vs lytic patterns (16). Most of the mandibular metastasis of prostate the radiographic examination reveals a radiopaque or a mixed image. In a minority of cases there is only a radiolucent zone or a complete lack of radiographic evidence. In some patients, an important finding is a pathological fracture (5, 14). Tumors which originate from the prostate prefer the jaw bones as their metastatic targets (3). However, due to the rare nature of metastases it is difficult to identify both radiographically and clinically and may simulate a benign entity (10). Due to the difficulty in identifying a metastasis in the oro-facial region the possibility of detecting late stage additional malignancies in the body is increased. With a discovery of an oral metastasis there is a greater likelihood of follow-up and treating patients accordingly (4). Dentists should consider in their general physical exam the suspicion of a mandibular metastasis in cases with atypical symptoms, especially in patients with a well-known malignant disease.

V. Conclusion

Metastatic tumors in the oro-facial region are rare and can be misdiagnosed as odontogenic pathoses, osteonecrosis, or osteomyelitis, depending on the radiographic appearance and history. Patterns noted vary from a lytic to a mixed-density or fully radiopaque appearance, with single/multiple foci, and with/without osteoid formation producing a sun-burst appearance. Radiographic review of these cases augments further investigation with multidisciplinary teams to assist in the diagnoses. Recognition of these lesions is important to institute appropriate care. This report serves to highlight the variations in appearance as noted on commonly used imaging studies in order for the dental or medical practitioner to recognize the possibility of orofacial metastasis so that further management and referral can be instituted. Correlation of radiographic findings with histopathologic and clinical findings is paramount in ensuring that the patient receives appropriate and continued interventional or palliative care.

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