Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology

journal homepage: www.elsevier.com/locate/jomsmp

Case report

Parosteal osteosarcoma of the mandible on CT and MRI findings: A rare case and review of the literature

Mikiko Sue[a,*], Takaaki Oda[a], Yoshihiko Sasaki[a], Junya Ono[b], Yasuo Okada[b], Ichiro Ogura[a]

[a] Radiology, The Nippon Dental University Niigata Hospital, 1-8 Hamaura-cho, Chuo-ku, Niigata 951-8580, Japan
[b] Department of Pathology, The Nippon Dental University School of Life Dentistry at Niigata, 1-8 Hamaura-cho, Chuo-ku, Niigata 951-8580, Japan

ARTICLE INFO

Article history:
Received 11 July 2017
Received in revised form 11 October 2017
Accepted 13 October 2017
Available online xxx

Keywords:
Osteosarcoma
Multidetector computed tomography
Magnetic resonance imaging
Mandible

ABSTRACT

Parosteal osteosarcomas are rare, low-grade juxtacortical variant of osteosarcoma, especially in the jaws, representing 1.6% of all bony malignant tumors and up to 5% of all osteosarcomas. In this article, we report a rare case of parosteal osteosarcoma of the mandible on computed tomography (CT) and magnetic resonance imaging (MRI) findings. We showed the tumor arose at the periphery of the bone by CT and MRI. These findings can be helpful for differentiating parosteal osteosarcoma from other tumors of the mandible.

1. Introduction

Osteosarcoma is a mesenchymal malignancy of bone tissue. It accounts for 20% of all sarcomas and about 5% of all osteogenic sarcomas arise in the head and neck region. It is the most common primary bone malignancy of skeleton other than craniofacial region [1,2]. Primary osteosarcoma in head and neck region is a rare occurrence and presents with distinct biologic behavior as compared to osteosarcoma of long bones [3–5]. Parosteal osteosarcoma is usually delineated from other forms of osteosarcoma by a combination of radiographic and histological characteristics [6–8].

Parosteal osteosarcomas are rare, low-grade juxtacortical variant of osteosarcoma, especially in the jaws, representing 1.6% of all bony malignant tumors and up to 5% of all osteosarcomas [6–8]. Parosteal osteosarcomas can be mistaken for benign lesions as the clinical and radiographic appearances are usually benign [9]. Therefore, characteristic computed tomography (CT) and magnetic resonance imaging (MRI) findings can be helpful for differentiating parosteal osteosarcoma from other tumors. In this article, we describe a rare case of parosteal osteosarcoma of the mandible on CT and MRI findings, and review of the literature.

2. Case report

A 77-year-old female presented with anesthesia on the mental region and swelling on the right side of the mandible within 4 months. On clinical examination, an approximately 2 × 2-cm mass was found to overlay the right side of the mandible. The mass was painless, rubbery, non-tender, and fixed on palpation. On oral examination, the overlying mucosa appeared smooth without mucosal ulceration.

A panoramic image showed sclerotic lesions without bone destruction in alveolar ridge of the lower right molar and premolar teeth (Fig. 1). Sagittal and coronal soft tissue algorithm CT showed a well-circumscribed heterogeneous mass, buccal to right alveolar ridge. CT showed many high-density foci in the region of the right buccal lesion (Fig. 2A and D). We observed a lesion covering the mental foramen (Fig. 2D–F) Contrast-enhanced CT of mass lesion showed heterogeneous (Fig. 2B and E). The bone tissue algorithm CT did not show cortical bone destruction or medullary involvement. The CT image in bone window showed high density change of the body of the right mandible which was near the parosteal osteosarcoma lesion (Fig. 2C and F). The border with neighboring bone is indistinct. The CT image in bone window showed sclerosis of the body of the right mandible which was near the parosteal osteosarcoma.

An axial CT image showed a well-circumscribed heterogeneous mass, buccal to the right alveolar ridge. There were many high-density foci in the region of the right buccal lesion (Fig. 3A).

* Corresponding author.
E-mail address: hamikiko@ngt.ndu.ac.jp (M. Sue).

https://doi.org/10.1016/j.ajoms.2017.10.003

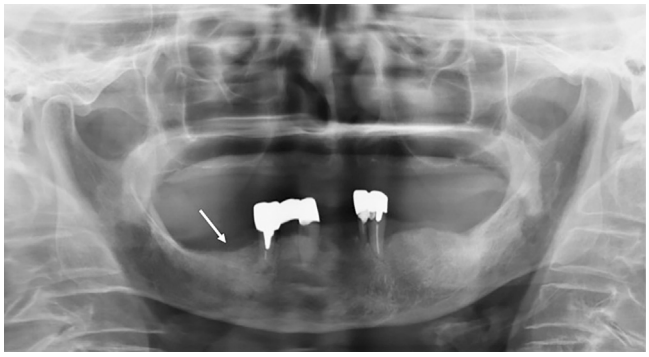

Fig. 1. Panoramic image shows sclerotic lesions without bone destruction (arrow) in alveolar ridge of the lower right molar and premolar teeth.

The lesion showed heterogeneous contrast enhancement on CT (Fig. 3B). In the CT image in bone window, no evidence was found of cortical bone destruction and periosteal reaction. The CT image in bone window showed high density change of the body of the right mandible which was near the parosteal osteosarcoma lesion (Fig. 3C). The CT image in bone window showed sclerosis of the body of the right mandible.

T1-weighted MR image lesion showed signal intensity similar to that of muscle and low signal intensity of medullary bone (Fig. 3D). T1-weighted MR images obtained after administration of intravenous gadolinium chelate demonstrate well-defined juxtacortical soft-tissue mass (Fig. 3E). T2-weighted MR image revealed heterogeneous high signal intensity in the soft-tissue mass (Fig. 3F). The periosteum showed low signal intensity on T1-weighted image and high signal intensity on contrast enhanced T1-weighted image. On T2-weighted MR image, a thin high signal intensity line was seen between the tumor and underlying bone and corresponds to the periosteum. MRI T1-weighted and T2-weighted images showed low signal intensity in the body of right mandible. We found that a lesion covered the mental foramen on CT and MRI. But no evidence was found of cortical bone destruction and periosteal reaction in CT and MRI images. We showed the tumor arose at the periphery of the bone by CT and MRI.

A biopsy was performed, and histopathological examination of the biopsy specimen exposed irregular spindle or angular shaped cells with atypia and mitoses, neoplastic osteoid matrix with calcification, and fibrous stroma (Fig. 4A). The tumor was consecutive from cortical bone (Fig. 4B). Under general anesthesia, a segmental mandibulectomy was performed. The tumor was observed external side of mandible (Fig. 5A and B). Histopathological examination of the resected specimen revealed irregular spindle or angular shaped cells, which produce bony, osteoid and cartilage (Fig. 5C). The tumor showed streamers of trabecular bone with intervening neoplastic spindle cell stroma (Fig. 5C). The tumor invaded the mandibular bone marrow via the mental foramen. We could confirm that lesion infiltrated it in mandibular bone from mental foramen. Histopathological diagnosis was parosteal osteosarcoma. The patients was followed up with every 6 months recalls, and showed no recurrence.

3. Discussion

Gnathic osteosarcoma is broadly categorized into central (intramedullary) and peripheral (surface) subtypes. Surface tumors are further divided into parosteal well-differentiated (low-grade), periosteal low- to intermediate-grade and high-grade surface osteosarcomas [6]. In a number of reports, juxtacortical osteosarcoma had been used to describe both the parosteal and periosteal variants, while in others, the terms parosteal and juxtacortical are considered to be synonymous [9–11]. Some consider juxtacortical osteosarcoma as only an umbrella term for surface osteosarcomas and that it should be divided into two distinct entities of parosteal and periosteal osteosarcoma [9,12]. Huang et al. [9] have adopted the last definition due to the distinct clinical, radiographic and histologic differences between the two lesions. In this article, we described a rare case of parosteal osteosarcoma of the mandible on CT and MRI findings, and review of the literature.

Osteosarcoma is a malignant tumor that forms osteoid, fibrous, and chondroid tissues. Its radiographic features depend largely on the degree of ossification and mineralization of the tumor, which can range from completely lytic to totally sclerotic [1,13]. Radiographic evaluation is important for making the diagnosis, because the clinical symptoms, such as pain, paresthesia, swelling, and loose teeth, are not specific [1,14]. CT allows excellent detection of tumor calcification, cortical involvement, and, in most instance, soft-tissue and intramedullary extension [1,15]. MRI essentially

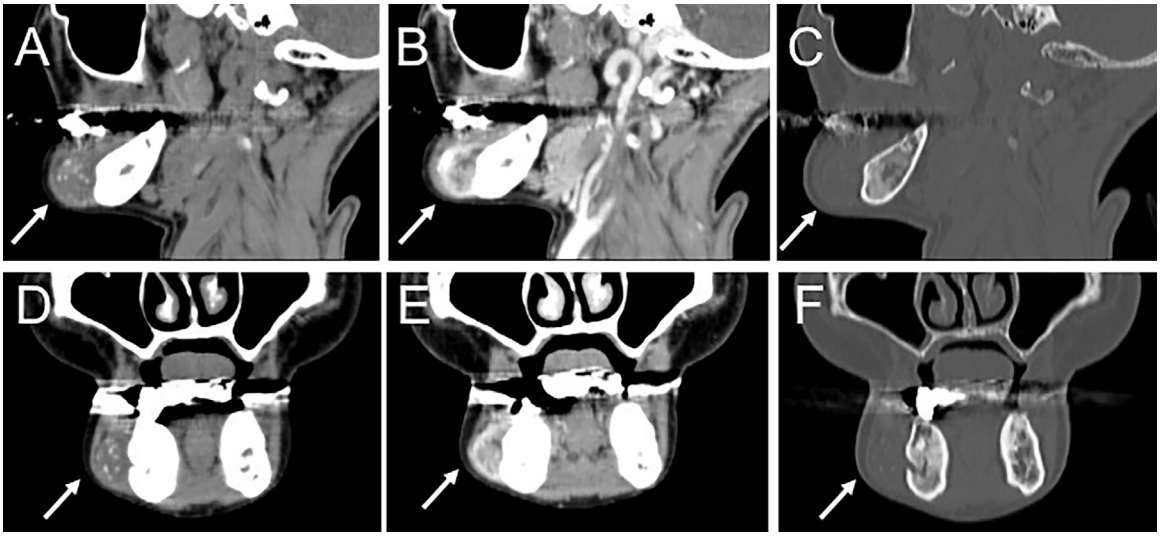

Fig. 2. Sagittal and coronal soft tissue algorithm CT (A and D) show a well-circumscribed heterogeneous mass (arrow), buccal to right alveolar ridge. Contrast-enhanced CT (B and E) of mass lesion show heterogeneous (arrow). The bone tissue algorithm CT (C and F) show many calcified foci in the region of the right buccal lesion (arrow). The bone image does not show cortical bone destruction or medullary involvement, and shows sclerosis of the body of the right mandible which was near the parosteal osteosarcoma lesion.

Please cite this article in press as: Sue M, et al. Parosteal osteosarcoma of the mandible on CT and MRI findings: A rare case and review of the literature. J Oral Maxillofac Surg Med Pathol (2017), https://doi.org/10.1016/j.ajoms.2017.10.003