Unusual maxillary osteoblastic and osteolytic lesions presenting as an initial manifestation of childhood acute myeloid leukemia: A case report

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Changes in facial bones may represent a manifestation of systemic disease. Dentists play an important role in the early detection of these manifestations of complex systemic diseases. A case of unusual maxillary mixed (osteoblastic and osteolytic) lesions as an initial manifestation of childhood acute myeloid leukemia (AML) is presented. A 12-year-old male patient was referred to the Department of Oral Medicine complaining of severe swelling in the right buccal region. [18F]-fluorodeoxyglucose (FDG)–positron emission tomography (PET)/computed tomography (CT) showed enhanced FDG uptake in the right maxillary sinus. In addition, PET maximum intensity projection image showed diffused FDG uptake in the entire bone marrow. Bone marrow aspiration was performed on the lumbar vertebra, and fluorescence in situ hybridization (FISH) demonstrated AML. The patient was diagnosed with AML (M5a) and treated with chemotherapy by the pediatric department. Six months later, the patient achieved complete remission. After chemotherapy, the disappearance of the osteoblastic and osteolytic lesion and 18F-FDG accumulation were confirmed by PET/CT. Dentists should be familiar with oral manifestations of leukemia because early detection of oral lesions would increase the life span of the patients and reduce the severity of complications. (Quintessence Int 2017;48:149–153; doi: 10.3290/j.qi.a37383)

Key words: leukemia, mixed lesion, oral manifestation, osteoblastic, osteolytic

Extensive and rapid destruction of bone and generation of osteolytic lesions of the jaws have been reported in some hematologic diseases;¹—⁴ however, osteoblastic lesions of the jaws are rare. Herein, a case of unusual maxillary mixed (osteoblastic and osteolytic) lesions as an initial manifestation of childhood acute myeloid leukemia (AML) is reported. [18F]-fluorodeoxyglucose (FDG)–positron emission tomography (PET)/computed tomography (CT) findings were useful for diagnostic workup. A conference was held, including an oral surgeon, dental radiologist, and medical radiation specialist. Some findings of this case were discussed, and the case was considered to have a systemic lesion rather than a local lesion. The aim of this article is to describe an unusual case of AML, which was initially diagnosed as inflammation of the maxilla, involving the right region, in a private dental clinic.

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CASE REPORT

A 12-year-old male patient was referred to the Department of Oral Medicine in Hokkaido University Hospital complaining of swelling of the right buccal region. At a local dental clinic 1 month previously, the patient had been diagnosed with inflammation of the maxilla. He had a medical history of well-controlled asthma, and was otherwise healthy. Although he had a mild fever (37.5°C), he had no pain or weight loss during the past month. Severe swelling of the buccal region was noted, but there was no swelling and pain of the neck lymph nodes (Figs 1a and 1b). Intraorally, marked swelling, redness, and pressure pain in the gingiva were noted around the right maxillary molar region. Although he had no history of severe dental caries and periodontal diseases, the right maxillary molar and the second primary molar exhibited severe mobility. Enlargement of the gingiva was more pronounced in the attached gingiva and alveolar mucosa. The patient reported optimal oral hygiene and had very little plaque. The maxillary bilateral second primary molar remained in his mouth with surface caries, and the bilateral permanent second molar had not yet erupted. The panoramic image shows diffuse opacification in the right maxillary sinus cavity (Fig 1c). For more detailed evaluation, non-contrast-enhanced multidetector CT (MDCT) was performed. Osteoblastic lesions of the anterior and posterior walls of the maxillary sinus and thickening of the surrounding bone and soft tissue of the right maxilla were observed (Fig 1d).

Blood analysis at first examination demonstrated white blood cell $1.8 \times 10^3/\mu L$ (normal range 3.5 to 9.3), red blood cell $4.16 \times 10^6/\mu L$ (4.0 to 5.6), hemoglobin 12.3 g/dL (13.4 to 17.6), platelets $1.84 \times 10^5/\mu L$ (1.20 to 4.00), Ca 9.9 mg/dL (8.7 to 10.3), alkaline phosphatase (ALP) 1,049 U/L (115 to 359), and C-reactive protein (CRP) 0.11 (0.00 to 0.39). He had no anemia, thrombocytopenia, and hypercalcemia. The white blood cell count was mildly low, and CRP was not elevated in spite of his swollen face and gingiva. Serum ALP was elevated.

The tentative clinical diagnosis was osteosarcoma of the right maxilla. Thereafter, FDG–PET/CT showed enhanced FDG uptake (SUV maximum = 4.1) in the right maxillary sinus (Figs 2a and 2b). In addition, PET maximum intensity projection image showed diffused FDG uptake in the entire bone marrow (Fig 2c). The possibility of systemic disease was considered. The differential diagnoses were osteogenic sarcoma, Ewing’s sarcoma, and hematologic malignancy or metastatic malignancies. A conference was held, including an oral surgeon, dental radiologist, and medical radiation specialist. Findings of this case were discussed, and the case was considered to have a systemic lesion rather than a local lesion. Immediately, a pediatric hematologist was consulted. The patient was referred and immediately admitted to the pediatric hematology/oncology department for systemic investigation. Bone marrow aspiration from lumbar vertebra was carried out, and fluorescence in situ hybridization (FISH) demonstrated AML.

The patient was diagnosed with AML (M5a) and treated with chemotherapy by the pediatric hematology/oncology team. Six months later, the patient achieved complete remission. Disappearance of the osteoblastic and osteolytic lesion and 18F-FDG accumulation by PET/CT after chemotherapy were confirmed (Figs 3a and 3b). PET maximum intensity projection image revealed disappearance of FDG uptake from the bone marrow (Fig 3c).

The patient is disease-free and is doing well after treatment.

DISCUSSION

This paper reports occurrence of an unusual osteoblastic and osteolytic lesion of the maxilla as an initial manifestation of childhood AML. In this case, FDG-PET/CT findings were useful for diagnostic workup of AML and monitoring of chemotherapy in the case of leukemia.5,6 The differential diagnoses were osteosarcoma, Ewing’s sarcoma, and hematologic malignancy or metastatic malignancies. The clinical findings and blood analysis and image findings (panoramic image, MDCT, PET) were fully discussed. Thereafter, this patient was considered to have a systemic lesion rather than a local lesion.
Since blood disease was suspected, the patient was referred early to the pediatric hematology/oncology team where he underwent bone marrow aspiration from lumbar vertebra.

Furthermore, since the diagnosis was established from early bone marrow aspiration from lumbar vertebra, a maxillary bone biopsy was not performed on agreement between the dentists and the pediatric hematologist. Bone biopsy may be helpful for diagnosis of undetected leukemia. Although biopsy may reveal the extent of leukemic cell infiltration in periodontal tissues, additional bone biopsy for diagnosis would...
have been less beneficial in this case, considering the risks associated with the invasive procedure. If biopsy had been performed for the present patient, diffuse proliferation of poorly differentiated leukocytes with prominent nuclei and high mitotic index would have been expected.\textsuperscript{2,7}

Leukemia is a malignant disease of hematologic origin, occurring from either disorganized proliferation or increased life span of leukocytes. Because of the growing accumulation of blast cells initially in the bone marrow, other normal hematopoietic cells are suppressed. As the disease progresses, the excess blasts may spread to the bloodstream and infiltrate organs and tissues. Oral manifestations such as gingival swelling and bleeding are associated with leukemia.\textsuperscript{3,8} Gingival swelling is the most common sign in untreated patients. In addition, it is reported that gingival bleeding is the more common initial oral sign in both acute and chronic leukemia.\textsuperscript{9} A total of 30\% to 65\% of patients with leukemia exhibited oral signs and symptoms such as gingival bleeding, petechiae, and gingival enlargement in the course of their disease.\textsuperscript{3,8} Dentists should be familiar with oral manifestations of leukemia, since patients with gingival problems usually visit dentists. Early detection of oral lesions would increase the life span of the patients and reduce the severity of complications. Moreover, close attention should be paid to the symptoms, medical histories, and local and systemic findings of these patients. In particular, abnormal findings of panoramic radiography and MDCT may indicate severe problems.
In the present case, the panoramic radiograph showed diffuse opacification in the right maxillary sinus cavity, and the MDCT showed mixed (osteoblastic and osteolytic) lesions in the right maxillary bone, which is very unusual.

The present case showed mixed (osteoblastic and osteolytic) lesions in the right maxillary bone. It was hypothesized that this unique mixed bone lesion might come from the dysregulated bone remodeling, especially in patients with hematologic malignancies such as precursor B-cell lymphoma. Considering the bone remodeling, the present patient was a child and bone remodeling was active compared to adult patients; hence, dysregulated bone remodeling might induce bone osteogenesis of the maxilla. Furthermore, the presence of some osteotropic factors because of leukemia might lead to locally mediated destruction of the right maxilla and osteogenesis. Some case reports of precursor B-cell lymphoma presenting as lytic bone lesions have been published. Recine et al described an interesting case of precursor-B cell leukemia that initially presented as an osteoblastic bone lesion of calvarium with spiculated new bone formation along the inner table.

The present case was unique in that the clinical presentation was unusual maxillary mixed (osteoblastic and osteolytic) lesions presenting as an initial manifestation of childhood acute myeloid leukemia. Although this case may be rare, the initial symptoms of swelling of the face and gingiva were similar to those often seen by general dentists. The panoramic radiograph taken in the private dental office showed diffuse opacification in the right maxillary sinus cavity. The private dentist then contacted our department, because he thought “something is strange”. This uncertain feeling of the private dentist was very important, and it highlights the importance of sharing and improving knowledge of the oral manifestations of leukemia with general practitioners.

To the present authors’ knowledge, there have been few reports of maxillary mixed (osteoblastic and osteolytic) lesions in AML. This report is of an unusual case of AML, which was initially diagnosed as inflammation of the maxilla, involving the right maxillary region, in a private dental clinic. General practitioners, dentists, and doctors of oral surgery should be aware of these oral manifestations, as these patients may be seen routinely in the dental clinic.

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REFERENCES