

# Osteosarcoma of talus with heterotopic ossifications and lung metastases

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## Abstract

Osteosarcoma is the most common malignant bone tumor and is known to occur mainly in the metaphyses of long bones. However, a few cases of osteosarcoma in talus have been reported in older patients. We experienced an osteosarcoma of an 80-year-old male patient with a talus which is rarely reported and evaluated disease patterns with four different imaging modalities.

## Introduction

Osteosarcoma is the most common primary bone sarcoma which is derived from tumor cells that make osteoid tissue. It has bimodal peak, with the first peak in the second decade of life and the second smaller peak in the sixth and seventh decades.<sup>1,2</sup> In incidence, it is known that the ethnic component is highest in Asian/Pacific Islanders (5.3 per million) followed by blacks (5.1 per million), Hispanics (4.9 per million), whites (4.4 per million), and American Indian/Alaskan natives.<sup>1</sup> We report a 80-year-old man with osteosarcoma of the talus

with heterotopic ossifications which spreads to the lung at the time of diagnosis.

## Case Report

In April 2016, an 80-year-old male patient visited the hospital in the department of orthopedics. He suffered from Rt ankle pain for three months without a history of trauma. He had high blood pressure, diabetes mellitus as underlying diseases, but his laboratory results were normal other than the elevation of ALP 416 (normal range 104-338 IU/L). He had swelling around Rt ankle and his subtalar movements were restricted with growing pain. Plain films (Figure 1) showed a sclerotic lesion of the Rt talus surrounded with fluffy, cloud-like opacities in adjacent tissue area. The height of the corresponding talus was decreased compared to other side due to the collapse. Magnetic resonance imaging (MRI) (Figure 2) showed abnormal, heterogeneous signal change of Rt talus and soft tissue swelling around Rt ankle. On the other hand, three phase bone scan (Figure 3) showed focally increased perfusion, blood pool and delayed image of Rt talus neck instead of diffuse, mild tracer uptake in the whole talus. Moreover it localized the specific area of ossification in anterior, posterior, lateral and medial portion of tissue around Rt talus which was suspicious in the simple radiograph. Open excisional biopsy (Figure 4) was done under the diagnosis of suspected osteonecrosis. Pathologic diagnosis was confirmed as a conventional type of osteosarcoma producing osteoid matrix. Positron emission tomography (PET) (Figure 5) was obtained for staging and revealed lung metastasis. Single hypermetabolic lung nodule in Lt lower lobe (SUV max 9.38) and multiple small nodules in

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Ethical statement: The study has been performed in accordance with the ethical standards laid down in the 1964 declaration of Helsinki and its later amendments.

Informed consent: The institutional review board of our institute approved this retrospective study, and the requirement to obtain informed consent was waived.

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both lungs demonstrated hematogenous lung metastasis. The patient underwent below-knee-amputation.



Figure 1. Anterior-posterior view (A) and Rt lateral view (B) X-radiographs show sclerotic lesions of the Rt talus with osteoid matrix formation by ill-defined borders.



Figure 2. Coronal section, T1 (A) and sagittal section, PD FS (B) of MRI images demonstrate abnormal medullary signal intensity involving Rt talus.

## Discussion and Conclusions

A physician dealing with pain in the foot with atypical findings in radiographs

must include primary osteosarcoma in the differential diagnoses. XR study is usually enough to diagnose osteosarcoma, but tumor arising from the foot shows nonspecific finding and is therefore prone to misdi-

agnose and delay in the initiation of an adequate treatment.<sup>3-14</sup> For this reason, performing cross-sectional imaging should be considered to help identify mineralized matrix especially for the osteosarcoma of rare loca-

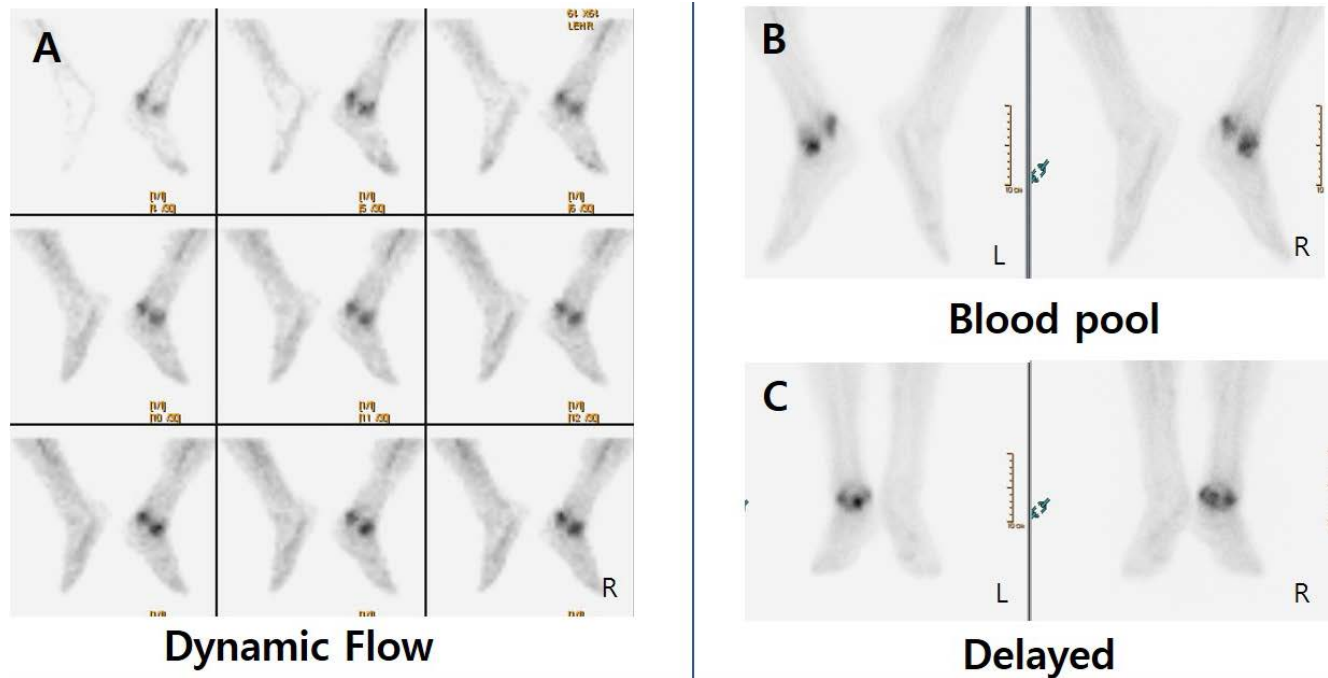
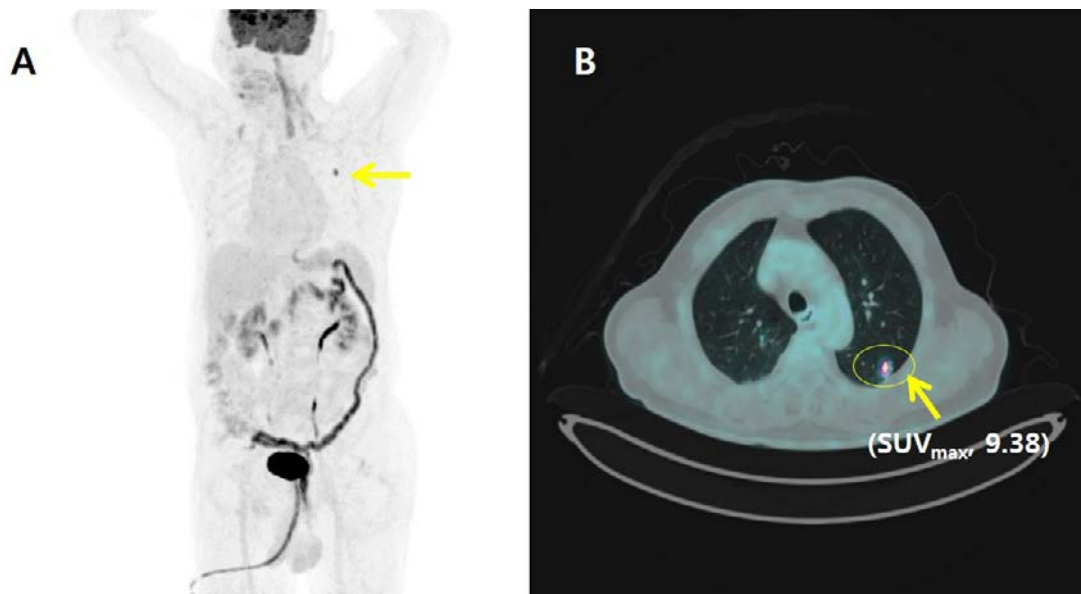


Figure 3. Images of three phase bone scan. A) The flow phase shows increased perfusion in Rt lower leg and foot with localized uptake around Rt ankle. B) The blood pool phase aims vascular flow in equilibrium which shows distribution in the intercellular spaces of Rt ankle. C) The delayed phase shows the areas of the osteoblastic activities and designates multifocal ossification areas.



Figure 4. Open incisional biopsy was done for diagnosis.



**Figure 5.** Maximum-intensity projection image of positron emission tomography (PET) shows lung lesion in the Lt lower lobe (SUVmax 9.38) (A). Transaxial image of the PET-CT fused image (B) revealed lung metastasis.

tion. In this case, three phase bone scan defined range of active cancerous lesion of Rt talus and multiple sites of heterotopic ossification. It has advantages over other modalities designating focus of the primary lesion. Besides, FDG-PET scan showed the distant metastases of lung from talus osteosarcoma.

Besides, elevated alkaline phosphatase suggests osteoblastic activity of the affected area and can be a clue in such cases. ALP level is also known to be associated with 5-year disease-free survival, offers prognostic information.

The reported incidence of osteosarcoma of the foot is low (0.17%-2.08%) and talus origin is extremely rare.<sup>2</sup> A few cases of osteosarcoma of talus have been reported in the literature.<sup>3-14</sup> The average age of patients with osteosarcoma of the foot bones is generally higher than that of other locations: 33 years *versus* 15-20 years.<sup>14</sup> According to one explanation in the literature, osteosarcoma in the tubular bone of the feet arises secondary to another process which takes time. Also, osteosarcomas of the foot are usually low-grade tumors, and survival rates are high.<sup>12,15-18</sup> So appropriate diagnosis and treatment in time should be carried out to take this advantage.

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