Fibrous dysplasia is a common benign disorder of bone in which normal bone marrow is replaced with fibro-osseous tissue. As PET/CT is increasingly used for the staging of different malignant disease, incidentally found fibrous dysplasia with increased FDG uptake may mimic metastasis. We report on a 46-year-old woman with fibrous dysplasia who underwent PET/CT because of suspected recurrence of breast cancer and was misdiagnosed as a bony metastasis with a focal FDG uptake on left proximal femur. This lesion was interpreted as fibrous dysplasia based on MRI in addition to the plain radiographs. We conclude that MRI in addition to radiography may help to differentiate fibrous dysplasia mimicking metastasis on PET/CT in the patients with malignancy.

Key words: fibrous dysplasia, PET/CT, MRI

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Case Report

A 46-year-old woman underwent a wide excision and adjuvant chemotherapy for breast cancer. At six months after the surgery, a focal hot uptake was found in left proximal femur on bone scintigraphy and was interpreted as a possible metastasis (Fig. 1A). Three days later, the patient underwent PET/CT. A focal FDG uptake was observed in left proximal femur on PET/CT and was interpreted as a single metastasis (Fig. 1B). The surgeon concluded the femoral lesion as an osteoblastic metastasis based on the findings on bone scintigraphy and PET/CT in addition to the sclerotic lesion on plain radiographs (Fig. 2). The patient had radiation on the lesion of left proximal femur. In five months after radiation, she was admitted for intermittent left hip pain for one month. She underwent MRI. There was a well-defined lesion in left proximal femur. It was hypointense on T1- and T2-weighted images (Fig. 3A, B). Moderate perilesional hyperintense signal was seen on fat-suppressed T2-weighted images (Fig. 3C). The mass showed mild contrast enhancement on contrast-enhanced T1-weighted images (Fig. 3D, E). Mild post-radiation edema was observed in adjacent soft tissue. MR images were interpreted as fibrous dysplasia in the left proximal femur after reviewing the plain radiographs. Limb salvage operation including a wide excision of left proximal femur was performed one week later. A pathologic examination revealed that fibrous tissue blended into the bone spicules, which had irregular shapes and

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imperceptible osteoblast rimming. Final diagnosis was made as a fibrous dysplasia (Fig. 4).

**Discussion**

PET/CT is essential for the staging and localization of the metastatic lesion in the management of the patients with breast cancer. The skeleton is the most common site of distant metastases in patients treated with mastectomy and adjuvant chemotherapy. PET/CT and bone scintigraphy have been shown to be complementary in the detection of skeletal metastases. PET/CT is more sensitive than bone scintigraphy for the detection of lytic metastases or lesions predominantly involving the bone marrow, whereas bone scintigraphy is more sensitive than PET/CT for the detection of osteoblastic metastases.6)

PET/CT findings of fibrous dysplasia are less well known since PET/CT does not have a role in the assessment of benign disease. However, as PET/CT is increasingly used for the staging of different malignant disease incidentally found fibrous dysplasia on PET/CT is reported on several papers.1-5) In our case fibrous dysplasia in left femur had a focal FDG uptake on PET/CT and this lesion was mis-interpreted as a single metastasis from breast cancer.

Fibrous dysplasia is a benign disorder of unknown cause in which the normal bone structure is replaced by fibrous connective tissue. Radiography and CT can reveal the characteristic sclerotic and hyperplastic change in bone in fibrous dysplasia. MRI has been reported to identify specific findings of fibrous dysplasia.7-9) The characteristic MR findings of fibrous dysplasia are hypointense signal intensity on T2-weighted images in the substantial number of cases.9) Signal intensity on T1- and T2-weighted images and the degree of contrast enhancement on T1-weighted images depend on

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**Figure 1.** A 46-year-old woman with breast cancer. Bone scintigraphy (A) shows a focal hot uptake (arrow) in left proximal femur. PET/CT (B) shows a focal FDG uptake (arrow) in left proximal femur and was mis-interpreted as a single metastasis from breast cancer.

**Figure 2.** Radiograph in a 46-year-old woman shows an intramedullary lesion with a diffuse sclerotic lesion (arrow) on left proximal femur.
Figure 3. A 46-year-old woman who underwent MRI for intermittent left hip pain after radiation for one month. Left proximal femoral lesion was interpreted as a fibrous dysplasia based on MR findings. T1-weighted (A) and T2-weighted (B) coronal images show a well-defined hypointense lesion (arrows in A and B) in left proximal femur. Fat-suppressed T2-weighted coronal image (C) shows moderate perilesional hyperintense signal (arrowheads) on the left proximal femur suggesting post-radiation edema. Contrast-enhanced T1-weighted coronal image (D) shows mild contrast enhancement in the mass (arrow). Axial fat-suppressed contrast-enhanced T1-weighted image (E) also shows mild contrast enhancement in the mass. Adjacent muscles in the medial compartment of the thigh shows relatively well-demarcated contrast enhancement, suggesting post-radiation edema.

Figure 4. In microscopic examination, fibrous tissue blended into the bone spicules, which had irregular shapes and imperceptible osteoblast rimming (H&E ×100).

the amount of bony trabeculae, cellularity, collagen, and cystic and hemorrhagic changes. Fibrous dysplasia was interpreted based on MRI in addition to plain radiographs in our case. We conclude that MRI may help to differentiate fibrous dysplasia from metastasis in addition to the radiographic findings, which may mimic metastasis on PET/CT in a patient with primary malignancy.

References


2. Stegger L, Juergens KU, Kliesch S, Wormanns D, Weckesser M. Unexpected finding of elevated glucose uptake in fibrous dysplasia mimicking malignancy: contradicting metabolism