Fibrous Dysplasia Mimicking Bone Metastasis on Both Bone Scintigraphy and ^{18}F -FDG PET-CT: Diagnostic Dilemma in a Patient with Breast Cancer

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Bone is the most common distant site to which breast cancer metastasizes [1]. Commonly used imaging modalities for imaging bone metastasis are bone scintigraphy, plain radiography, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET) [1]. Although bone scintigraphy has high sensitivity for detecting bone metastasis, its specificity is low [2]. This is because of the fact that bone scintigraphy images secondary changes in bone rather than just tumor cells. ^{18}F -fluorodeoxyglucose

(^{18}F -FDG) PET-CT, on the other hand, directly images the tumor cells' glucose metabolism [3]. Unfortunately, similar to bone scintigraphy, benign bone conditions can also show increased ^{18}F -FDG uptake on PET-CT, and PET-positive asymptomatic fibrous dysplasia can be misinterpreted as a metastasis [4]. Fibrous dysplasia of bone has wide skeletal distribution, with variability of ^{18}F -FDG uptake and CT appearance [5, 6]. It is therefore important to recognize the characteristics of this skeletal dysplasia, to allow differentiation from skeletal metastasis [6, 7]. Bone lesions with ^{18}F -FDG uptake need to be carefully interpreted when evaluating patients with known malignancy [8]. In doubtful cases, fibrous dysplasia should be given as a differential diagnosis and histopathological diagnosis may be warranted, as highlighted in the present case (Fig. 1).

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Fig. 1 A 62-year-old woman had undergone modified radical mastectomy, followed by chemotherapy, radiotherapy, and tamoxifen for medullary carcinoma of the left breast. She developed vague discomfort in the left side of the chest 5 years post surgery. ^{99m}Tc -Methylene diphosphonate bone scintigraphy was done to rule out bone metastasis. Bone scintigraphy showed focally increased radiotracer uptake in the left 9th rib postero-laterally (**a**, **b**, **arrow**), suspicious for metastasis. ^{18}F -FDG PET-CT was done to look for metastasis to other organ. On maximum intensity projection PET images, solitary hypermetabolic focus was seen in the left postero-lateral chest wall (**c**, **arrow**). CT (**d**, **arrow**) and PET-CT (**e**, **arrow**) images showed an expansile lytic

lesion of the 9th rib postero-laterally. This rib lesion was a new lesion during follow-up and was not seen previously. Therefore, a diagnosis of solitary rib metastasis was made on ^{18}F -FDG PET-CT as well, without any metastasis to other organs. Given the solitary metastasis and on the patient's request the left 9th rib was excised. Postoperative histopathology of the lesion revealed stromal spindle cells (without atypical mitosis or necrosis) with interspersed small bony spicules and osteoid, and absence of rimming by osteoblasts, suggestive of fibrous dysplasia. The patient was asymptomatic and doing fine at the 2-year follow-up

Conflicts of Interest None.

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