

Non-ossifying fibroma mimicking distant metastasis of osteosarcoma on ^{99m}Tc -methylene diphosphonate bone scintigraphy: Diagnosis with single photon emission tomography/computed tomography

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ABSTRACT

Non-ossifying fibromas (NOFs) are benign bone lesions with variable appearance on bone scintigraphy. Single photon emission tomography/computed tomography (SPECT/CT) can help in accurate characterization of these lesions. We present a case of 14-year-old boy with recurrent osteosarcoma where NOF was mimicking distant metastasis on ^{99m}Tc -methylene diphosphonate bone scintigraphy. SPECT/CT was able to correctly characterize the lesion as NOF, thereby altering the management.

Keywords: Bone scintigraphy, metastasis, non-ossifying fibroma, single photon emission tomography/computed tomography

INTRODUCTION

Bone scintigraphy is a commonly used investigation for work-up of bone metastasis in patients with known malignancy. Although it is exquisitely sensitive, its limited specificity remains a concern. A wide range of pathologies including benign tumors, infections, trauma, etc., can mimic metastasis on bone scintigraphy. Recently, introduction of hybrid single photon emission tomography/computed tomography (SPECT/CT) and its use in bone imaging has been shown to improve specificity of bone scintigraphy. We here present a case where non-ossifying fibroma (NOF) was masquerading as metastasis on bone scintigraphy in an osteosarcoma patient. SPECT/CT helped in making the correct diagnosis.

CASE REPORT

The present case report is about a 14-year-old male patient with parosteal osteosarcoma of the right proximal femur, who had

undergone surgical resection with intramedullary nailing. At routine follow-up 16 months later, recurrence was noted at local site. He was planned for a second surgery. The patient also gave a complaint of pain around the right knee. To rule out metastasis or infection the treating physician requested bone scintigraphy. Three phase ^{99m}Tc -methylene diphosphonate bone scintigraphy was carried out [Figure 1]. It showed mildly increased flow [Figure 1a, arrow] and pool [Figure 1b and c, arrow] activity in the region of right lower femur. Delayed image revealed focal tracer uptake in lower shaft of right femur [Figure 1d and e, arrow]. To characterize this lesion SPECT/CT was performed. CT [Figure 1f-h] and SPECT/CT [Figure 1i-k] images showed a sharply demarcated, asymmetrical, multiloculated, cortical based radiolucent lesion with sclerotic margins, located in the right femoral metaphysis and showing increased radiotracer uptake (arrow). These findings were classical for a NOF. In addition, local recurrence was seen in right proximal femur [Figure 1d and e, broken arrow] and no other site of skeletal metastasis was seen. The patient underwent re-operation and is undergoing adjuvant chemotherapy. As the NOF was asymptomatic, it required no treatment.

DISCUSSION

NOF are benign lesions, usually arising from the metaphysis of long bones of lower extremity.^[1] They can be seen in about 35% of children and young adults.^[2] NOFs are usually asymptomatic and incidentally diagnosed on routine radiographs.^[3] These are

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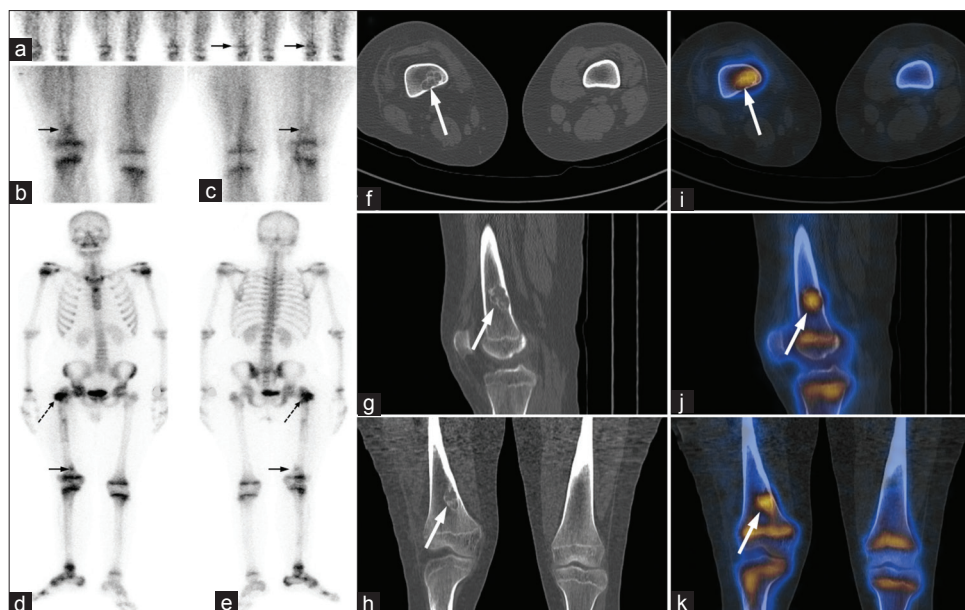


Figure 1: Three phase ^{99m}Tc -methylene diphosphonate bone scintigraphy images of the patient. Mildly increased flow (a, arrow) and pool (b and c, arrow) activity is seen in the region of right lower femur. On delayed image focal tracer uptake is seen in the lower shaft of right femur (d and e, arrow). Also noted was local recurrence in right proximal femur (d and e, broken arrow). No other site of skeletal metastasis was seen. To characterize the lower femoral lesion single photon emission tomography/computed tomography (SPECT/CT) was performed. CT (f-h) and SPECT/CT (i-k) images showed a sharply demarcated, asymmetrical, multiloculated, cortical based radiolucent lesion with sclerotic margins, located in the right femoral metaphysis and showing increased radiotracer uptake (arrow). These findings were classical for a non-ossifying fibroma. Furthermore, there is increased tracer uptake in the right lower limb joints proximal and distal to the femoral lesion-suggestive of associated sympathetic hyperactivity (d and e)

considered “no touch lesions” and treatment is observation.^[4] On three-phase bone scintigraphy appearance of NOF is variable and could either have hyperemia or increased uptake on delayed phase.^[5,6] Due to this non-specific appearance on bone scintigraphy, planar imaging appearance of NOF can be confused with metastasis or infection. SPECT/CT has been shown to be useful for correctly characterizing various bone lesions seen on bone scintigraphy.^[7,8] As the CT appearance is pathognomonic of NOF^[9] SPECT/CT might prove to be very useful for this purpose in NOF. In the present case addition of SPECT/CT was able to correctly identify the lower femoral lesion as NOF thereby avoiding unnecessary biopsy, as well as it ruled out bone metastasis. Majority of NOF do not require any active treatment and can be left alone. Surgical excision is indicated only for lesions with concomitant or high risk of pathological fracture and very rarely for NOF producing phosphaturic peptides, thereby causing tumor induced osteomalacia.^[4]

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