

Unexpected Metastasis to Breast, Lymph Node, Subcutaneous, Abdominal Wall, Intraabdominal, and Bone in Osteogenic Osteosarcoma: An Unusual Presentation on Bone Scintigraphy

Abstract

Osteogenic osteosarcoma is an aggressive malignant bone tumor with the tendency for local invasion and early metastases. Radionuclide bone scans play an important role in disease management by identifying other areas of skeletal involvement as well as extraosseous metastases. Osteogenic sarcoma metastasis is known to accumulate bone-avid agents due to their osteogenic potential. Here, we report a case of osteogenic osteosarcoma of distal femur with the absence of pleural effusion but extensive extraosseous areas of metastatic involvement in distant lymph nodes, subcutaneous planes (in the form of nodules), abdominal wall, multiple intraperitoneal deposits, breast, and bone metastases visualized on preoperative Tc-99 m methylene diphosphonate bone scan.

Keywords: Bone scan, extraosseous metastasis, osteogenic osteosarcoma

Case Summary

A 30-year-old female presented with a history of recent onset, progressive pain, swelling in the right thigh, and pathological fracture of the right femur on further evaluation. The patient's laboratory results showed elevated levels of lactate dehydrogenase and alkaline phosphatase and slightly elevated level of serum calcium. Histopathological examination of distal right femur lesion established the diagnosis of osteogenic osteosarcoma. Magnetic resonance imaging of both thighs revealed heterointense lesions in the right and left distal femora. Contrast-enhanced computed tomography thorax revealed a pleural-based nodule of size ~3.5 mm × 2.7 mm in the apical segment of the right upper lobe with no evidence of pleural effusion or parenchymal disease. She also complained of a recent onset palpable nodule in the right chest wall, biopsy from which confirmed the features of metastatic osteosarcoma. 99m Tc-methylene diphosphonate bone scan acquired subsequently demonstrated intense tracer uptake in the right distal femur (primary site), left distal femur, left 4th rib, left head, and proximal humerus [Figure 1]. In addition, there was increased tracer uptake in multiple

regions, namely, calcified bilateral cervical, supraclavicular, axillary, sternal notch lymph nodes, para cardiac lymph nodes, and right breast [Figure 2].

Furthermore, there were unsuspected areas of increased activity in the secondary deposits in anterior chest wall (subcutaneous nodules), bilateral abdominal wall, intraabdominal in subhepatic, peripancreatic, splenic, perirenal, and mesenteric regions [Figure 3]. A soft tissue deposit in the proximal right thigh was also noted.

Biopsy of the right breast deposit revealed metastatic origin from the known primary osteosarcoma, ruling out the possibility of dual malignancy.

Discussion

Osteosarcoma is a high-grade primary skeletal malignancy commonly diagnosed in the second and third decades of life, with mostly occurring in patients between the ages of 10 and 20 years.^[1] It is characterized by primitive bone-forming cells responsible for the formation of osteoid matrix. The metaphysis of long tubular bones is most frequently affected, specifically the distal femur followed by proximal tibia and humerus and proximal region of the femur and pelvis.^[2]

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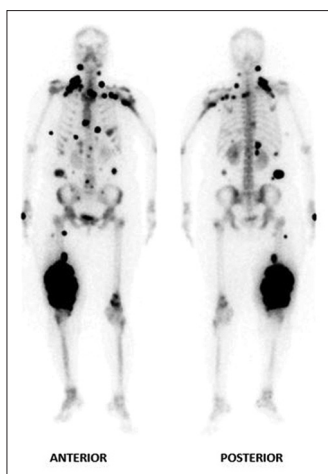


Figure 1: Anterior and posterior projections of ^{99m}Tc-methylene diphosphonate bone scan showing tracer avid lesions in the distal half of the right femur; left distal femur, left 4th rib, left head, and proximal humerus. Extrasosseous increased tracer uptake in the bilateral cervical, supraclavicular, anterior chest wall, abdominal viscera, lumbar regions, and right breast

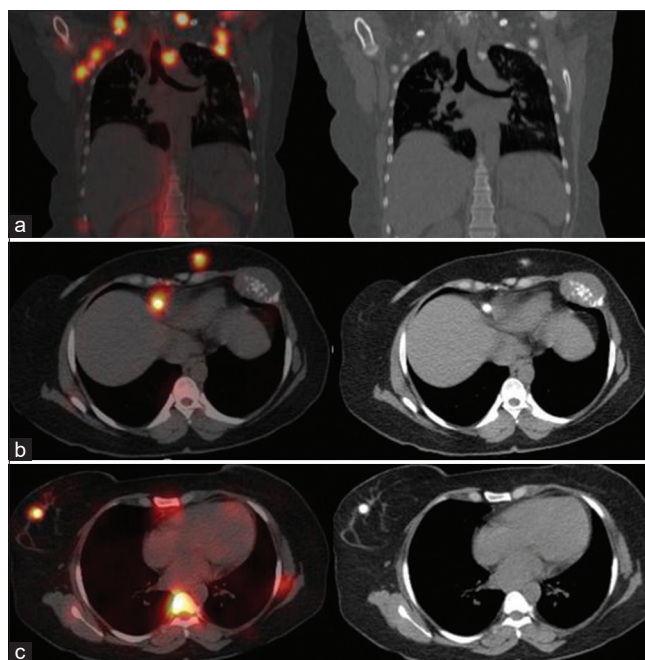


Figure 2: Transaxial sections of hybrid single-photon emission computed tomography/computed tomography and corresponding computed tomography images of the thoracic region (a-c) showing tracer avid diffuse calcified deposits in bilateral cervical, supraclavicular, and axillary lymph nodes; (a), anterior chest wall in the form of subcutaneous nodule and paracardiac lymph node; (b), right breast; (c)

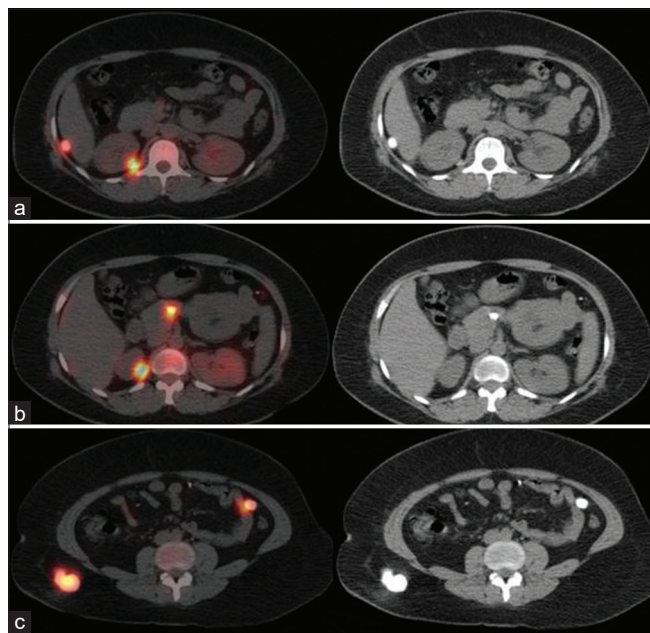


Figure 3: Transaxial sections of single-photon emission computed tomography/computed tomography and corresponding computed tomography images of the abdominal region (a-c) showing tracer avid diffuse calcified deposits in subhepatic and peri-renal; (a), peri-pancreatic; (b), mesenteric and right posterior abdominal wall; (c)

Metastatic dissemination in osteosarcoma usually occurs hematogenously, with lungs and bones being most frequently involved metastatic sites, unlike the findings in our case.^[1,3-5] Although, microscopic metastases are usually present at the time of diagnosis but only 15% accounts for radiologically detected metastases.^[5]

Some authors have previously reported unusual distant metastases from osteogenic sarcoma, but rarely with the degree of aggressiveness as in our case.^[2,5,6]

In only 2.3% to 10% of patients, lymph node metastasis is reported.^[6] Furthermore, unusual metastases to the muscles, stomach, intestine, and soft tissue have been previously reported.^[7] However, metastasis of this tumor to the breast is extremely uncommon.

The presence of such aggressiveness is usually associated with lower overall survival. The impact of the extensive regional nodal involvement and extrapulmonary metastasis in bones and widespread distant metastatic secondary deposits adversely affects individuals with otherwise localized disease. The management and prognosis of osteosarcoma depends on the extent and number of metastases.

Widespread metastasis is usually treated with systemic chemotherapy, but still, the survival is limited as in our case due to the extensive dissemination.^[8,9]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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