

Proximal tibial bone metastases in patient with breast carcinoma: a rare case report

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ABSTRACT

Background: Bone metastases from any carcinoma below elbow and knee are rare, those to tibia are even rarer. Diagnosis sometimes may defer and often be confused with primary bone carcinoma, osteomyelitis or arthritis. Management depends on extent of disease and severity of symptoms. Both radical and palliative treatment are possible, depending on the overall clinical severity.

Case Presentation: We present a case of a 41-year female patient with a history of right breast carcinoma. Previously, she was misdiagnosed as right breast fibroadenoma with sebaceous cyst, a mass measuring 13.1x9.5x6.7 mm³. The patient was then advised to have an excisional biopsy of whole solid mass, which was sent for histopathology examination. The histopathology report revealed that there was cribriform ductal carcinoma in situ intermediate nuclear grade. Before starting any treatment, the patient is advised to have all the required laboratory examinations, CECT chest abdomen and 99mTc-MDP whole body bone scan. Whole body bone scan revealed that there is osteoblastic lesion in shaft of right proximal tibia suggestive of bone metastases which was confirmed with histopathology report.

Conclusion: Proximal tibial bone metastasis in a patient with breast carcinoma is a relatively uncommon, yet challenging.

Keywords: acrometastases, bone metastases, breast carcinoma, bone scintigraphy, case report, tibia.

INTRODUCTION

Tibial bone metastasis from breast cancer is considered a relatively rare presentation, as breast cancer metastases most commonly affect the axial skeleton (spine, ribs, pelvis, skull, and proximal long bones like the femur and humerus). However, there are few case reports and studies that include patients with tibial involvement.^{1,2} Metastases in the bones below the knee, including the tibia and fibula, are uncommon. One large study of 984 patients with bone metastases from breast cancer found that the tibia was involved in only 0.3% of cases.³ Patients typically present with pain in the lower leg, which can lead to difficulty walking or a limp. This pain may be the presenting

symptom leading to the diagnosis of metastasis or a pathological fracture. The metastasis can weaken the bone, leading to a pathological fracture of the tibia. This is a common and serious complication, often presenting with sudden, severe pain. Diagnosis of bone metastases is typically confirmed with imaging studies such as X-ray, Contrast Enhanced Computed Tomography (CECT) scan, Magnetic Resonance Imaging (MRI), and 99mTc-MDP whole body bone scintigraphy (bone scan). A biopsy of the lesion may be performed to confirm the breast cancer origin, especially if it is the first or only site of metastasis.

The management of tibial bone metastasis from breast cancer is multidisciplinary and typically includes a combination of: (I). Systemic Therapy: This is crucial and depends on the molecular subtype of the breast cancer (e.g., hormone receptor status, HER2 status). It may involve:

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Endocrine therapy (for hormone-receptor-positive cancer), Chemotherapy, Radiotherapy and Targeted therapy (e.g., for HER2-positive cancer).² Bone-Modifying Agents (BMAs): Drugs like bisphosphonates (e.g., zoledronic acid) or denosumab are used to reduce bone resorption, alleviate pain, and prevent or delay skeletal-related events (SREs), including pathological fractures.³ (II). Local Treatment (for the tibia lesion): a) Surgery: Often required for impending or actual pathological fractures to stabilize the bone, relieve pain, and improve mobility. Common procedures include open reduction and internal fixation (ORIF), or sometimes prosthetic replacement for extensive joint involvement. Curettage and bone cement may also be used. b) Palliative Radiotherapy (RT): Used to manage pain and potentially prevent fracture in high-risk lesions that are not immediately surgically fixed. RT is highly effective for pain control in bone metastases.²

We report a unique case of right breast cancer presenting with isolated bone metastases involving proximal shaft right tibia. The matters in finding and proposed management are deliberated.

Case Presentation

A 41-year female patient presented to our department with a history of right breast carcinoma to have 99m-Tc-MDP bone scan to rule out bone metastasis. Three months before, the patient was misdiagnosed as right breast fibroadenoma with sebaceous cyst, a mass measuring 13.1x9.5x6.7 mm³ in Ultrasonography (USG) report. Misdiagnosis may be due to the sensitivity, specificity, accuracy of USG is very low as compare to gold standard test i.e. histopathology. The patient was then advised to have an excisional biopsy of whole tumor mass which was sent for histopathological examination to get confirmed diagnosis. The histopathology report revealed that there was cribriform ductal carcinoma in situ intermediate nuclear grade with positive margin. Before starting any treatment, the patient was advised to have all the required laboratory examinations, Contrast Enhanced Computed Tomography (CECT) chest-abdomen and 99mTc-MDP (99m-Technetium-Methylene Diphosphonate) whole body bone scan. CECT revealed breast mass with hepatic solitary lesion. Histopathology slides were again reviewed

and report revealed invasive carcinoma with immunohistochemistry (IHC) was triple negative breast cancer (TNBC). Whole body bone scan revealed that there was isolated osteoblastic lesion in the shaft of the right proximal tibia suggestive of bone metastases (Figure 1). CT guided Fine Needle Aspiration Cytology (FNAC) performed from the focus present in the proximal 1/3rd of the shaft of the right tibia revealed metastatic carcinoma.

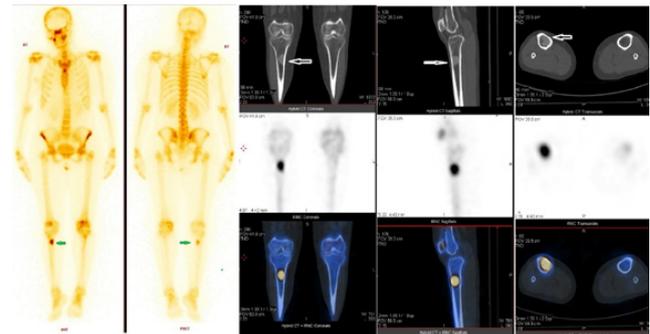


Figure 1: Tc-99m-MDP Whole Body Bone Scintigraphy and SPECT/CT shows there is increased radiotracer in the proximal shaft of right tibia likely metastases.

Patient underwent for right breast modified radical mastectomy (MRM) followed with chemotherapy and local external field beam radiation therapy (30Gy/10#/ 2weeks). Later, she complained of severe pain below the left knee for which she also received local field radiation (20Gy/5#/1week). The symptoms decreased, allowing her to resume her daily routine. Tamoxifen was continued at 20mg/day. She is recovering well now and in regular follow-up.

DISCUSSION

Metastatic bone disease is the most common form of bone cancer found in oncology practice. Its incidence varies from 6% to 85% in several studies, and bone is the third most common site of metastases after lung and liver.⁴ The primary cancers most commonly associated with bone metastases are: - Lung, Breast, Prostate, Thyroid and Kidney.⁵ The spine appears to be the most affected bony site followed by the pelvis, ribs, skull and the upper arm bones. Breast cancer and lung cancer (which is 20% of cases) are the most common causes of distal or below elbow

and below-knee metastases.⁶ A literature review shows below-knee and below elbow metastases are found in only about 7% of cases. The tibia alone is affected in 4.4% while the foot and the ankle are involved in 1% each.⁷ Most of these cases of acral metastases have been found to arise from bronchogenic carcinoma followed by renal cell carcinoma and breast cancer. The cause of the rarity of acral metastases is the relative lack of active hematopoietic bone marrow in these sites.⁸ There have been reports of lung and breast cancers spreading to the thumb, or presenting just as an isolated metastases in the talus, or even to the phalanx.⁹

About 70% of cases with bony metastases are detected radiographically and 85% show lytic changes. Bone scans are not done routinely for early-stage breast cancer and is recommended in stage II tumors >3 cm and high histologic grade, and in stage III and IV cancers.¹⁰ On the other hand, stage II patients and stage I should only undergo for bone scans if the patients have bone pains. Hematogenous spread has been documented as the most common and important mechanism of bone involvement.¹¹ Metastases most often occur in red marrow, which are present in cancellous bone in vertebrae throughout adult life, hence the high frequency of spinal spread.

Metastases to peripheral skeleton distal to the elbows and knees are uncommon, hence a high index of suspicion needs to be maintained for diagnosis and effective management, especially in patients with prior cancers. Any suspected cases found through physical exams and imaging must be histopathological examination for definitive confirmation. While the general approach is palliative, surgical intervention might be an option for limited disease. In such cases, CT or MRI is essential to map the local extent of the spread. Aggressive management may be beneficial for patients with contained disease who have a favorable prognosis. Radiotherapy is a key tool for managing pain, and the specific systemic therapy regimen is determined by the primary tumor's characteristics.

CONCLUSION

In summary, a case report of tibial bone metastasis

in a breast cancer patient highlights an uncommon site of spread that typically requires aggressive local management (often surgery and/or radiation) in addition to ongoing systemic therapy and bone-modifying agents to manage symptoms, prevent SREs, and maintain the patient's quality of life and function.

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