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Case report

Incidentally Detected Abnormal Finding of Femoral Bone Density Image Due to Bone Metastasis of Breast Cancer

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ABSTRACT

Bone mineral densitometry (BMD) is a diagnostic method that determines the presence of osteoporosis based on numerical values. However, the images acquired during BMD can provide additional valuable information about the patient beyond bone density, so careful attention to image interpretation is essential. We report a case involving a 47-year-old woman with a history of breast cancer, in whom an abnormal lesion in the left femur was incidentally identified during a BMD scan. Subsequent PET/CT and bone scintigraphy confirmed bone metastasis. This case highlights the importance of image interpretation during BMD examinations. During a BMD examination, radiologic technologists should provide relevant information to the attending physician—and to the patient if necessary—when abnormalities are detected in the imaging data, in order to support accurate diagnosis and appropriate treatment.

Key words: Bone Mineral Densitometry, Bone Metastasis, Radiologic Technologist

INTRODUCTION

BMD using Dual-energy X-ray absorptiometry is the gold standard for diagnosing osteoporosis and is widely used to monitor treatment response. While the primary utility of BMD lies in quantitative evaluation, the images obtained may reveal clinically significant abnormalities unrelated to osteoporosis. Radiologic technologists must carefully review BMD images, especially when comparing current and prior scans via picture archiving communication system (PACS) and medical records, to identify unexpected findings. Such images obtained from BMD can provide additional information about the patient's condition and can be beneficial for diagnosis and treatment[1-6].

We report a case in which a metastatic lesion in the femoral head was incidentally detected on BMD imaging in a patient with a history of breast cancer.

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CASE REPORT

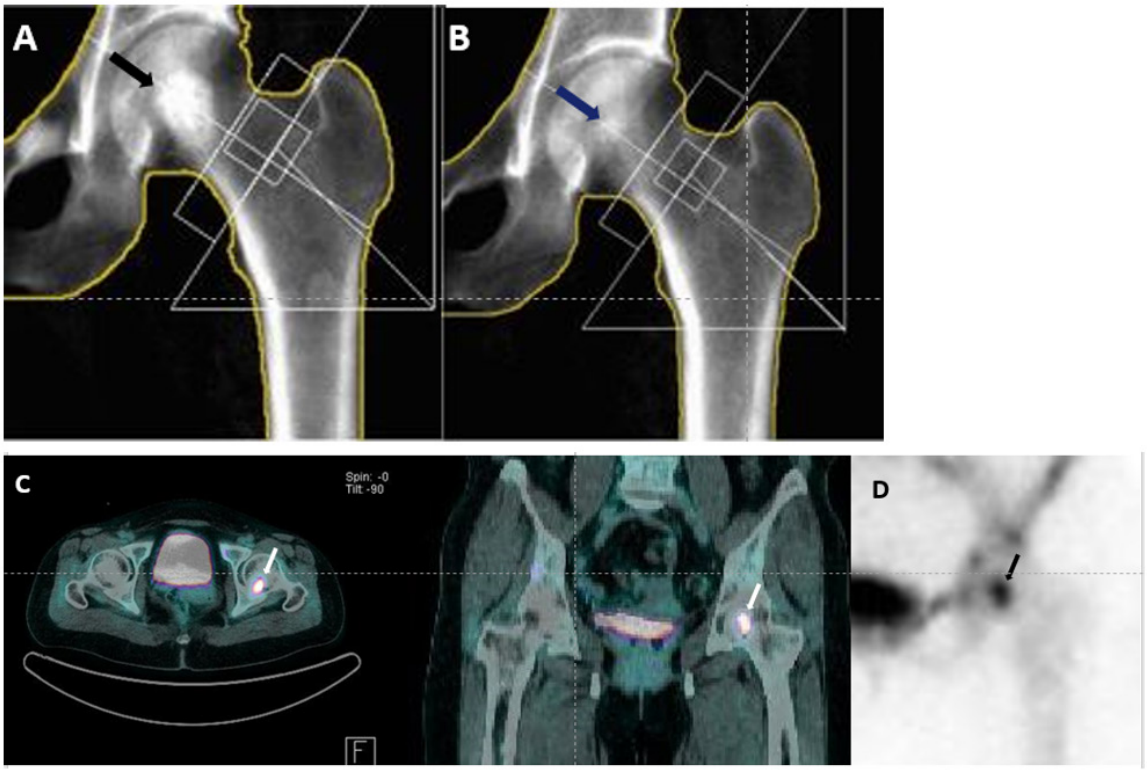

Fig. 1. A 47-year-old woman who had diagnosed a breast cancer underwent a BMD. A large osteoblastic lesion was observed in her left femoral head(A). However, a BMD test performed 7 years ago showed a much smaller osteoblastic lesion in the same area(B). The patient underwent PET/CT(C) and bone scan(D), which revealed the bone metastasis of femural head(arrow).

Chest CT revealed pulmonary lymphangitic metastasis in the right lower lobe and right pleural metastasis. The BMD scan demonstrated a large osteoblastic lesion in the left femoral head(Fig. 1A). A retrospective review of a BMD scan performed 7 years earlier showed a much smaller lesion in the same region(Fig. 1B).

Further evaluation with PET/CT and whole-body bone scintigraphy confirmed metastatic involvement of the left femoral head(Fig. 1C, 1D). The patient is currently undergoing treatment with an aromatase inhibitor to suppress recurrence, a subcutaneous chemotherapeutic agent targeting bone metastasis, and an oral anticancer medication commonly used for breast cancer.

DISCUSSION

Aromatase inhibitors reduce estrogen levels and are standard therapy for postmenopausal women with breast cancer. However, they increase the risk of osteoporosis, necessitating regular BMD monitoring, typically on an annual basis[7].

Bone metastases from breast cancer are typically categorized as osteolytic, osteoblastic, or mixed. Osteoblastic metastases account for approximately 15–20% of breast cancer-related bone lesions[8]. In prior case reports, femoral head metastases detected during BMD scans typically exhibited osteolytic features, often requiring surgical intervention such as intramedullary nailing to prevent pathological fractures[1].

In contrast, the current case presented an osteoblastic lesion, which progressively enlarged over time. This difference in pattern led to a treatment strategy focused on systemic therapy rather than surgery.

Previous studies have described various incidental findings on BMD images. These include femoral masses[2], high-density substances due to residual Lipiodol following lymphangiography[3], and paraffin injections used in cosmetic procedures[4]. These foreign materials may mimic pathological findings or interfere with measurement accuracy, emphasizing the need for technologists to be vigilant during image interpretation.

Measurement inaccuracies in BMD may arise from factors such as excessive abdominal thickness (>30 cm), poor patient positioning, incorrect vertebral identification, improper region of interest selection, device calibration errors, skeletal degeneration, fractures, aortic calcification, or the presence of radiopharmaceuticals and contrast media[9–11]. Technologists should assess for these confounders and consider imaging the contralateral femur when artifacts or foreign materials are present.

Incidental findings of benign cystic lesions[5] or liposclerosing myxofibrous tumors(LSMT) have also been reported. Although rare, LSMT can undergo malignant transformation into osteosarcoma, so follow-up is necessary [6].

In this patient, the osteoblastic lesion was subtle in the earlier scan but became apparent over time. Its detection during routine BMD imaging prompted further evaluation and led to a timely diagnosis of metastasis. This underscores the need for technologists to go beyond numerical T-scores and evaluate the imaging data comprehensively.

CONCLUSION

This case highlights the importance of interpreting BMD images in conjunction with clinical history and prior imaging. Radiologic technologists play a critical role in identifying incidental findings that may indicate serious pathology such as metastatic disease. Early recognition and communication of these abnormalities can significantly impact patient care by facilitating prompt diagnosis and appropriate intervention.

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