# Metastatic Breast Cancer

Patrick Graham

## Introduction

Approximately 237,000 cases of breast cancer are diagnosed in women, nearly 2,100 in men, each year in the United States (Centers for Disease Control and Prevention, 2017). Recent studies have estimated that more than 150,000 female patients are also living with distant metastatic disease, bone being the most common site (Mariotto, Etzioni, Hurlbert, Penberthy, & Mayer, 2017; O'Carrigan et al., 2017; Wu & Lu, 2018). Associated with sites of osseous metastatic disease, presenting symptoms are typically noted as progressive pain, which is increased with weight-bearing activities but can be present at rest, associated swelling, and feelings of instability or weakness given location. These symptoms do not relieve with typical conservative management and lead to further disability (Peabody & Attar, 2014).

## Case Presentation

A 68-year-old woman presented with approximately 3 months of atraumatic left knee and thigh pain. She described aching and throbbing pain aggravated with weight-bearing activities. She noted mild swelling of the thigh. Symptoms initially relieved with rest and use of ibuprofen, but this gave way to a constant aching pain despite those measures. She saw a community orthopaedist who diagnosed knee arthritis and provided her an intra-articular steroid injection. When this did not provide relief, she returned to the outside provider to have a second injection. When that did not provide relief, she presented to this advanced practice provider for a second opinion. Her medical history was significant for breast cancer treated with total mastectomy without chemotherapy or radiation.

Upon presentation was an alert, oriented, affected-appropriate female in no apparent distress. She ambulated with an antalgic gait, using a cane to offload the left side. There was mild swelling about the distal thigh and knee. There was diffuse, exquisite tenderness about the distal thigh and knee. Her range of motion was limited by pain, tolerating an arc of 10°–100°. Strength was also pain limited, noted to be at least 4/5, and able to perform a straight leg raise with noted distal thigh discomfort. Compartments were soft and supple. She was found to be distally neurovascularly intact.

Radiographs obtained in the clinic did reveal advanced medial compartment joint space narrowing and osteophyte formation. More concerning, though, especially in light of her history of malignancy, was the mottled appearance of the distal femur (see Figure 1).

## Management

Initial management included protected weight bearing with the use of a walker, instruction on fall prevention, activity modification, ice, and a combination of nonsteroidal anti-inflammatory drug and hydrocodone as needed for pain. To assess for occult fracture, as well as to better characterize the osseous lesion, a computed tomographic (CT) scan was then obtained (see Figure 2). Although unrevealing for occult fracture, this did better define the diffusely abnormal areas of lucency, loss of cortex, and demineralization of the distal femur. Magnetic resonance imaging (MRI) would also be a useful tool in assessing for stress reaction but contraindicated, given the presence of breast tissue expander (Peabody & Attar, 2014).

Given concerning appearance of radiographs and CT scan, the patient was referred for a whole-body bone scan (see Figure 3). This was revealing for avid metabolic activity in the left distal femur, a concerning finding that is consistent with potential metastatic disease (Peabody & Attar, 2014). In considering the whole of these results, the patient was referred to interventional radiology for a biopsy of the distal femur lesion (see Figure 4). Tissue analyzed by pathology confirmed the presence of metastatic breast carcinoma with biomarkers consistent with her primary malignancy from previously resected breast. The patient was then referred back to her oncologist for staging and discussion of systemic therapy that routinely includes the use of bisphosphonates to help slow bone resorption and promote healing of treated lesions (O'Carrigan et al., 2017; Wu & Lu, 2018).

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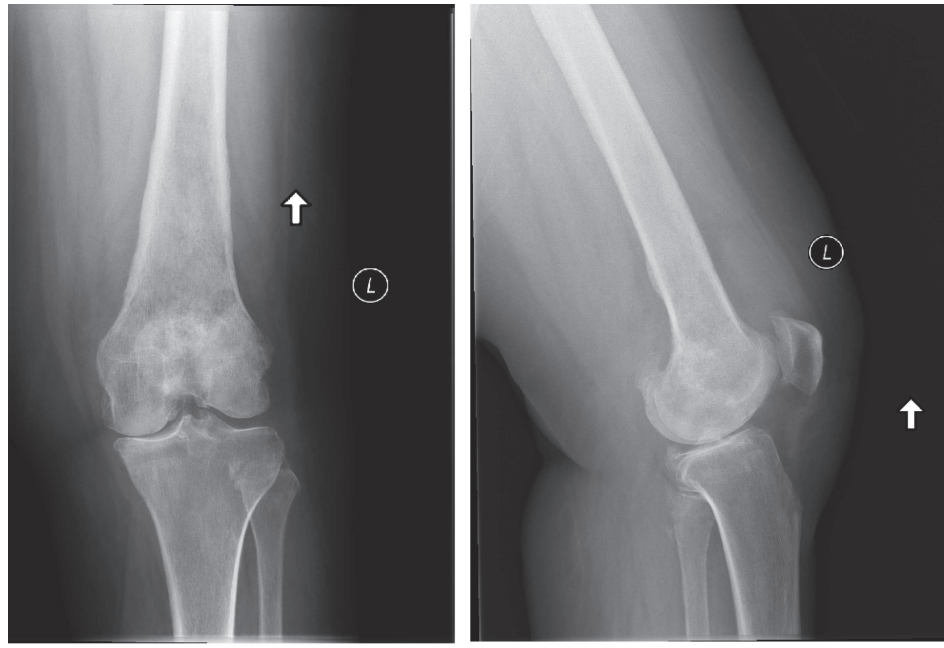

FIGURE 1. Anteroposterior and lateral radiographs of the left knee. Note the mottled and permeative appearance of the distal femur. There is also severe medial joint space narrowing with osteophyte formation medial, posterior, and within the patellofemoral joint.

## Discussion

Although uncommon, the advanced practice provider should keep potential metastatic disease in the list of differentials for any patient with a known history of malignancy. This is especially true in the setting of abnormal, albeit sometimes subtle, imaging findings. Associated symptoms are typically atraumatic,

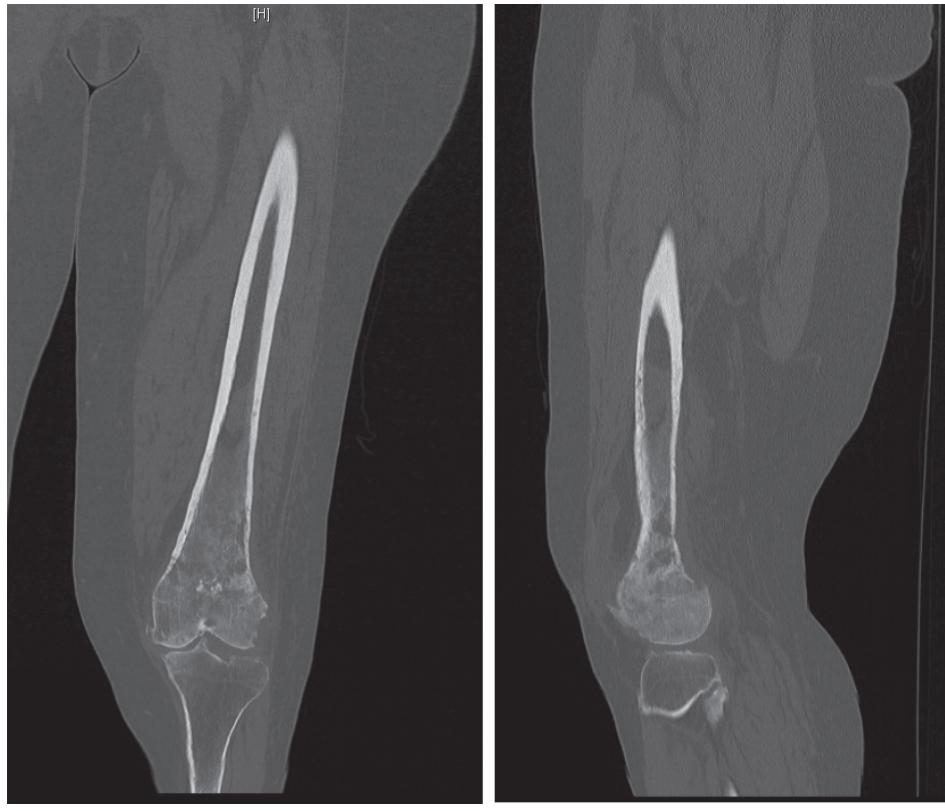

FIGURE 2. Coronal and sagittal computed tomographic scans of the left femur. Concerning areas of demineralization and scattered lucency/"moth-eaten" appearance present. There was no noted pathological fracture.

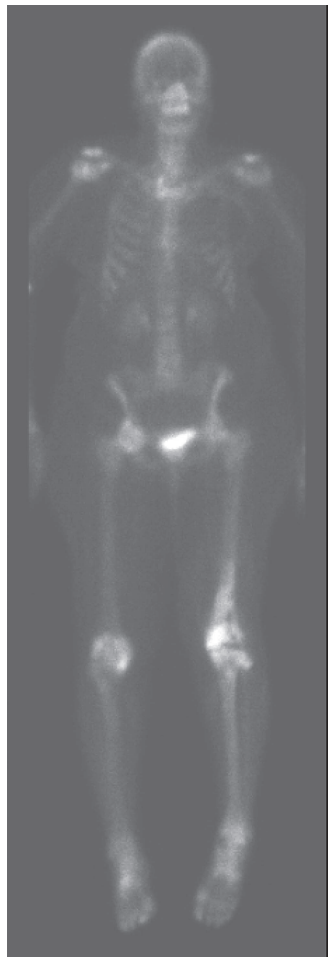

**Figure 3.** Whole-body bone scan. Note increased uptake in the distal left femur that is more avid than the uptake noted in other joints affected by arthritic disease. Given the patient's history, this is highly concerning for metastasis.

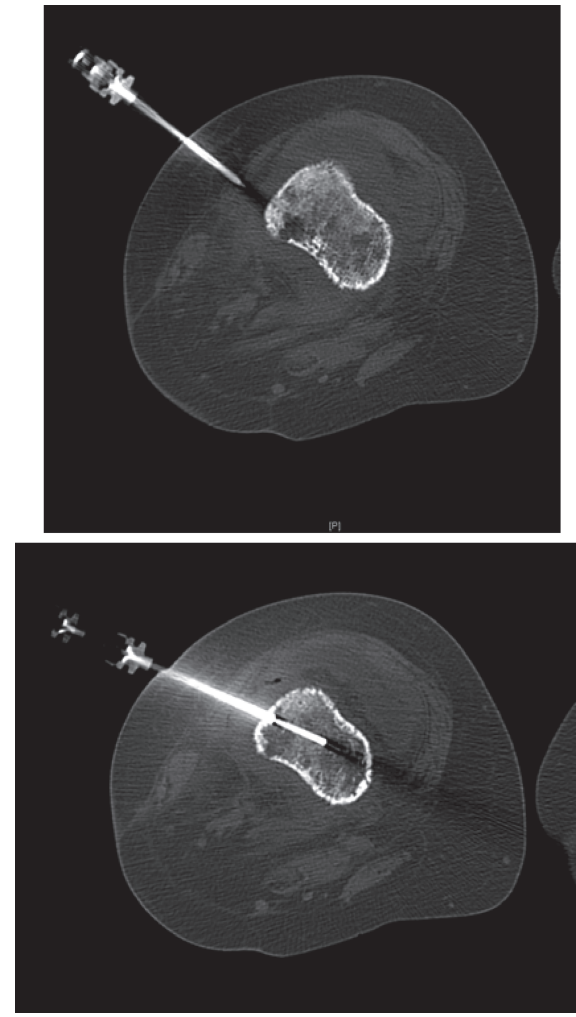

**Figure 4.** Axial computed tomographic scans from bone biopsy performed in interventional radiology.

progressive, and do not respond to interventions as expected. In this case, one would anticipate relief of symptoms, even if for a short duration, following intra-articular steroid injection was the underlying cause of truly knee osteoarthritis. Lack of anticipated response should cue the provider to reassess pertinent studies and investigate other potential causes for the continued symptoms.

Advanced imaging, be it CT or MRI, is valuable in assessing the extent of osseous involvement, characterizing lesions that may display an internal matrix, any potential soft tissue extension, and the associated zone of transition, in determining concern for a benign versus malignant process (Peabody & Attar, 2014). If imaging reveals a bony lesion, the most appropriate next step is referral to an orthopaedic-oncologist for further workup and confirmation of diagnosis. This is of utmost importance if a lesion is found absent a known primary malignancy.

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