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FIGURE 1



FIGURE 2



A 68-year-old man presents to the ED with excruciating right lower extremity pain and weakness of a month's duration. He denies any history of trauma. AP and lateral radiographs of the right hip are obtained (Figures 1 and 2).

What is your diagnosis?

Is additional imaging required?

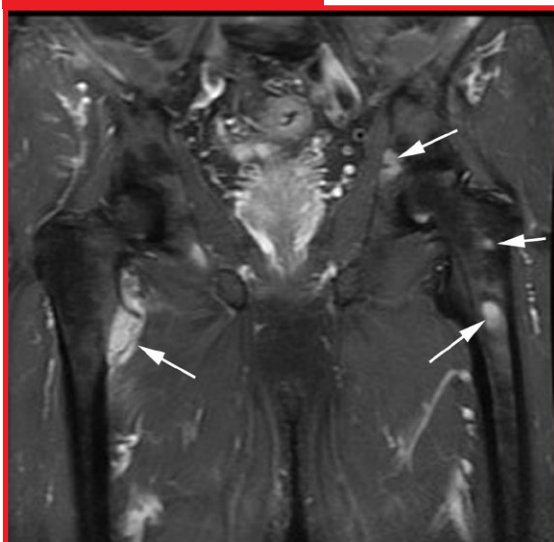
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FIGURE 3



FIGURE 4



ANSWER

The hip radiographs demonstrate an avulsion fracture of the lesser trochanter of the right femur (white arrow, Figure 3). The fracture does not appear to extend into the intertrochanteric region.

Isolated avulsion fractures of the lesser trochanter may occur as a result of acute trauma in children and adolescents: In this age-group, the iliopsoas tendon, which inserts on the lesser trochanter, is stronger than the bone to which it attaches.¹ This is not the case in adults, and isolated fractures of the lesser trochanter in this population should raise suspicion for a pathologic fracture. Most commonly, such avulsion fractures are secondary to a neoplasm. One retrospective study found metastatic disease in 69% of cases.² Primary osseous neoplasms (eg, myeloma, chondrosarcoma, Ewing sarcoma) and benign entities such as weakening of the bone due to chronic systemic illness have also been reported.^{2,3}

In the case presented, the patient's medical history included renal cell carcinoma. MRI was performed due to the high likelihood of pathologic fracture. A coronal STIR (short inversion time inversion-recovery) image demonstrates multiple foci of increased signal (white arrows, Figure 4), a pattern most compatible with metastatic disease. The largest lesion is in the right lesser trochanter, resulting in the pathologic fracture seen in the radiographs. The diagnosis of metastatic disease was confirmed by biopsy, and the definitive treatment for this patient included tumor embolization, resection, and total hip arthroplasty.

In any adult patient with an isolated fracture of the lesser trochanter, a neoplasm must be excluded, whether there is a history of malignancy or not. MRI allows further characterization of the fracture and evaluation of the site around the fracture but is typically not performed to evaluate for disease at distant sites. Though whole-body bone scan may identify additional lesions throughout the skeleton, PET/CT has the ability to identify not only bony lesions but also soft-tissue malignancy—thus making it the test of choice in evaluation for suspected neoplasm. **EM**

REFERENCES

1. Phillips CD, Pope TL Jr, Jones JE, et al. Nontraumatic avulsion of the lesser trochanter: a pathognomonic sign of metastatic disease? *Skeletal Radiol.* 1988;17(2):106-110.
2. James SLJ, Davies AM. Atraumatic avulsion of the lesser trochanter as an indicator of tumour infiltration. *Eur Radiol.* 2006;16(2):512-514.
3. DePasse JM, Varner K, Cosculluela P, Incavo S. Atraumatic avulsion of the distal iliopsoas tendon: an unusual cause of hip pain. *Orthopedics.* 2010;33(8):598.