Case Report # 2

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62 year old presents to the ER with two month history of increasing left hip/thigh pain. Describes the pain as gradual in onset and not associated with prior trauma.
Oblique radiograph of the proximal left femur
AP radiograph of the left proximal femur
Radiological Presentations

Coronal T1
Radiological Presentations

Sagittal STIR
Radiological Presentations

Coronal and sagittal T1 post contrast
Axial CT images of the chest obtained when the patient re-presented to the ER with shortness of breath.
Routine and delayed anterior and posterior whole body planar images
Multiple spot images in different projections
Test Your Diagnosis

Which one of the following is your choice for the appropriate diagnosis? After your selection, go to next page.

- Metastatic osteosarcoma
- Leukemia
- Lymphoma
- Osteomyelitis
- Malignant fibrous histiocytoma
Findings

Initial radiographs of the left femur obtained on presentation to the ER demonstrate an ill defined, intramedullary, mixed lytic and sclerotic lesion with a wide zone of transition in the proximal left femoral shaft with an aggressive sunburst pattern of periosteal reaction and overlying soft tissue swelling.

Subsequent outpatient MRI demonstrates an enhancing mass centered in the medullary cavity replacing the normal T1 hyperintense marrow signal in a patchy distribution. The mass is predominantly T2 hyperintense with extension into the adjacent muscles of the left thigh. These same regions also demonstrate heterogenous enhancement following the administration of contrast.

Patient returned to the ER several weeks later with increasing shortness of breath. CTA chest reveals a large loculated complex right pleural effusion, too numerous to count bilateral calcified metastatic pulmonary and pleural based nodules, and calcified mediastinal and hilar lymphadenopathy.

Whole body bone scan demonstrates avid radiotracer uptake within the left proximal femur with numerous additional foci of abnormal increased uptake in the lungs, right ilium, left pubic body, left scapula, multiple ribs, and sternum.
Discussion

• Metastatic osteosarcoma.
• Biopsy of calcified pleural mass in this patient confirmed high grade metastatic osteosarcoma. The permeative, intramedullary, destructive lesion in this case demonstrates a wide zone of transition, no sclerotic margin, and visible osteoid matrix. Fluid sensitive MR sequences demonstrate peritumoral edema, both in the affected bone and adjacent soft tissues with associated avid enhancement. While the majority (75%) of cases of osteosarcoma occur in patients in the second and third decades, a significant percentage is also seen in the more mature.

• Lymphoma
• While the hyperintense bone marrow signal on T2WI with surrounding inhomegenous enhancement of the bone and associated soft tissues with minimal cortical disruption is typical of lymphoma, the lesion in this case clearly demonstrates osteoid matrix. No true matrix is seen in lymphoma. Additionally, periosteal reaction in lymphoma tends to be lamellated while that seen in this case was more “sunburst” as seen in osteosarcoma.

• Malignant fibrous histiocytoma
• Most are high grade lesions with a lytic destructive pattern similar to primary lymphoma of bone although generally more destructive.
• Nonspecific unless associated with findings of bone infarct or other preexisting lesion, not seen in this case.
Discussion

- **Leukemia**
  - May present as multiple well defined osteolytic lesions with moth eaten or permeative appearance in the setting of diffuse osteopenia, not seen in this case. Periosteal reaction may be smooth, lamellated, or sunburst. MR findings are relatively nonspecific with T1 hypointense leukemic infiltrate replacing high signal intensity marrow fat, T2 hyperintense marrow signal, and hyperintense signal of leukemic marrow on STIR.

- **Osteomyelitis**
  - Results in permeative osseous destruction with dense, linear periosteal reaction acutely with later formation of sequestrum and involucrum. Characteristic MR findings of intramedullary and/or soft tissue abscess as well as systemic symptoms of infection were not present in this case.
Diagnosis

Metastatic osteosarcoma.
References

Diagnostic Imaging for Radiology, STATdx. Retrieved from https://my.statdx.com/
“Lymphoma of Bone and Soft tissue”
“Leukemia, Musculoskeletal”
“Acute Osteomyelitis, Adult”
“Osteosarcoma, Conventional”
“Osteosarcoma, High Grade Surface”
“Osteosarcoma, Low-Grade Intraosseous”