

AMSER Case of the Month

October 2026

36 y.o. female presents to the ED in sickle cell pain crisis.

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Patient Presentation

- HPI: Patient presented with 1x day history of worsening CP, L side and arm pain, and pain in her left hip not relieved by home medications which she felt was consistent with her sickle cell pain.
- PMH: Sickle cell disease, AVN of R hip s/p THA, and recurrent DVTs
- PSH: 9.5 pack year smoking history, discontinued 3 years ago
- Vitals: T 98.6 °F | **BP 156/93** | **HR 117** | RR 18 | SpO2 97%

Pertinent Labs

- WBC elevated to **15.0**
- Hgb 12.3, Platelets 291, Reticulocytes 1.5
- LDH normal at 1.46
- Chest Xray negative for acute chest syndrome

Hospital Course

- Admitted for treatment of sickle cell pain crisis
- Day 6 of admission pain had resolved except for persistently worsening left hip pain

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

^ 1 Clinically suspected osteonecrosis. Initial imaging. 7
Priority Clinical Areas: Hip Pain, Shoulder Pain (to include suspected rotator cuff injury)

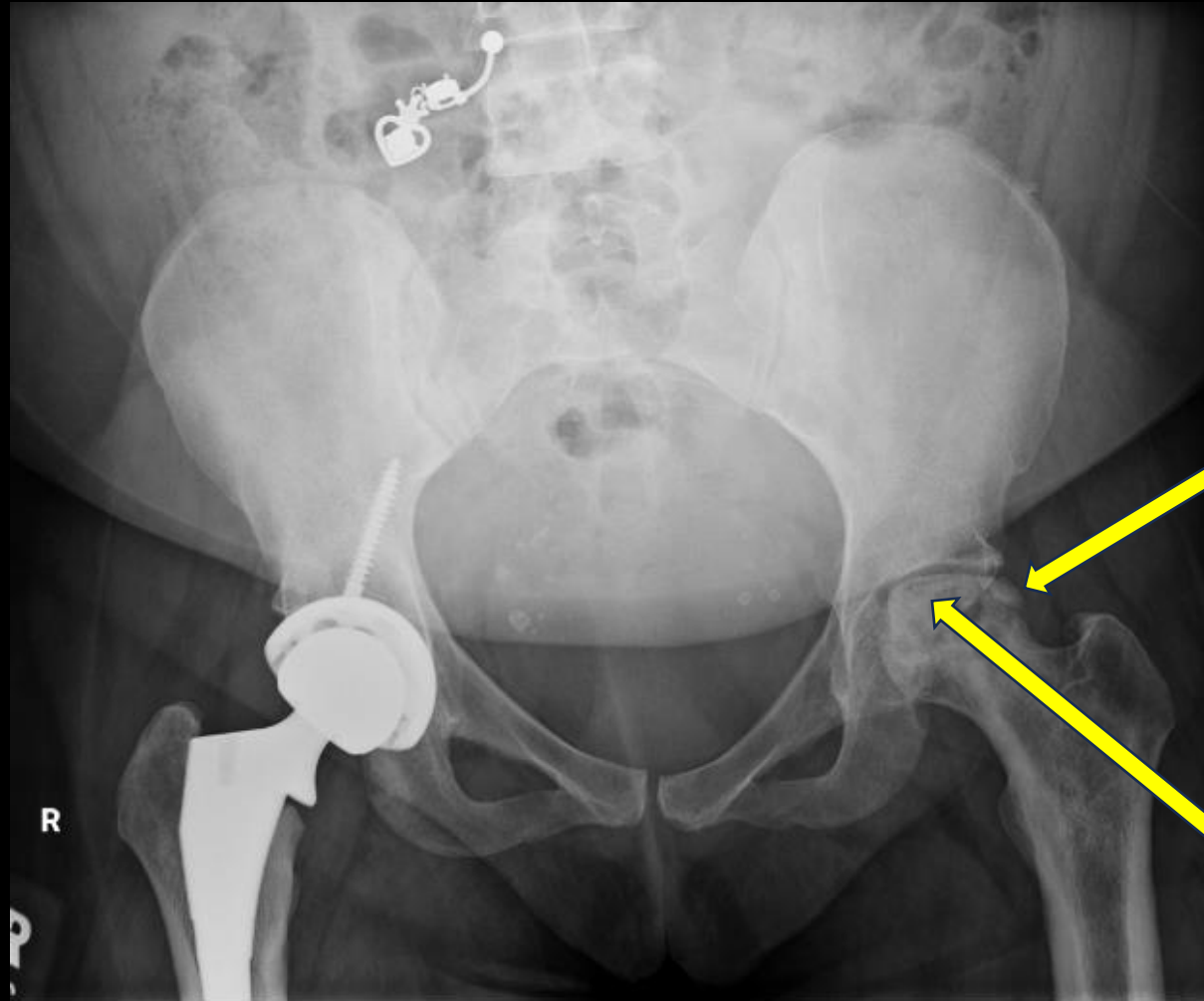
Name	Category	Adult RRL	Peds RRL
Radiography area of interest	Usually appropriate	Varies	Varies
MRI area of interest without and with IV contrast	Usually not appropriate	0 0 mSv	0 0 mSv [ped]
MRI area of interest without IV contrast	Usually not appropriate	0 0 mSv	0 0 mSv [ped]
Bone scan area of interest	Usually not appropriate	☼☼☼ 1-10 mSv	
CT area of interest with IV contrast	Usually not appropriate	Varies	Varies
CT area of interest without and with IV contrast	Usually not appropriate	Varies	Varies
CT area of interest without IV contrast	Usually not appropriate	Varies	Varies

This imaging modality was ordered by the Medicine team

Findings (unlabeled)



Findings: (labeled)



Subchondral
fracturing

Flattening and
depression of
femoral head

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

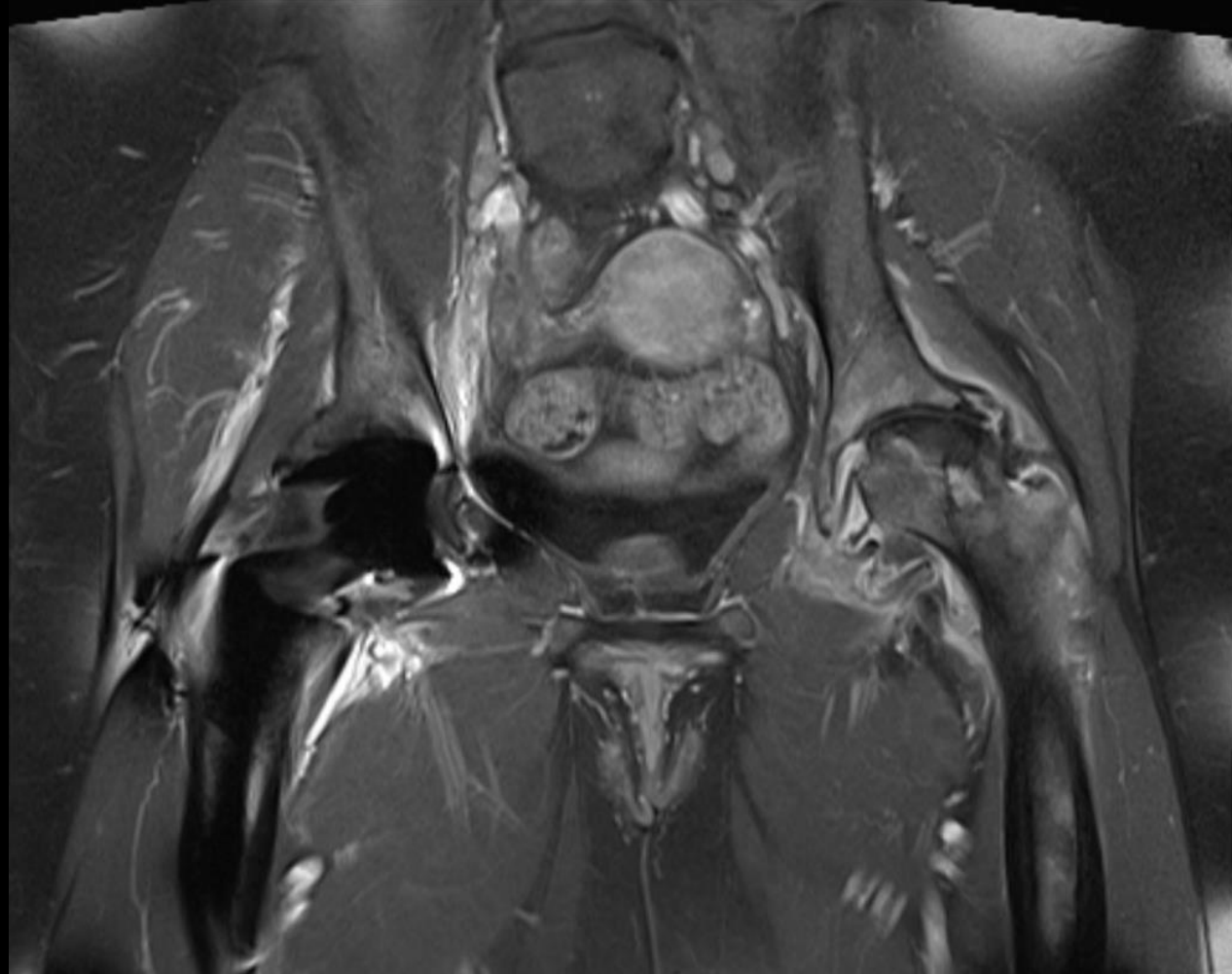
2 Clinically suspected osteonecrosis. Normal radiographs or radiographs that show findings suspicious for osteonecrosis. Next imaging study.
Priority Clinical Areas: Hip Pain, Shoulder Pain (to include suspected rotator cuff injury)

6

Name	Category	Adult RRL	Peds RRL
MRI area of interest without IV contrast	Usually appropriate	0 0 mSv	0 0 mSv [ped]
MRI area of interest without and with IV contrast	May be appropriate	0 0 mSv	0 0 mSv [ped]
CT area of interest without IV contrast	May be appropriate (Disagreement)	Varies	Varies
Bone scan area of interest	Usually not appropriate	☢☢☢ 1-10 mSv	
CT area of interest with IV contrast	Usually not appropriate	Varies	Varies
CT area of interest without and with IV contrast	Usually not appropriate	Varies	Varies

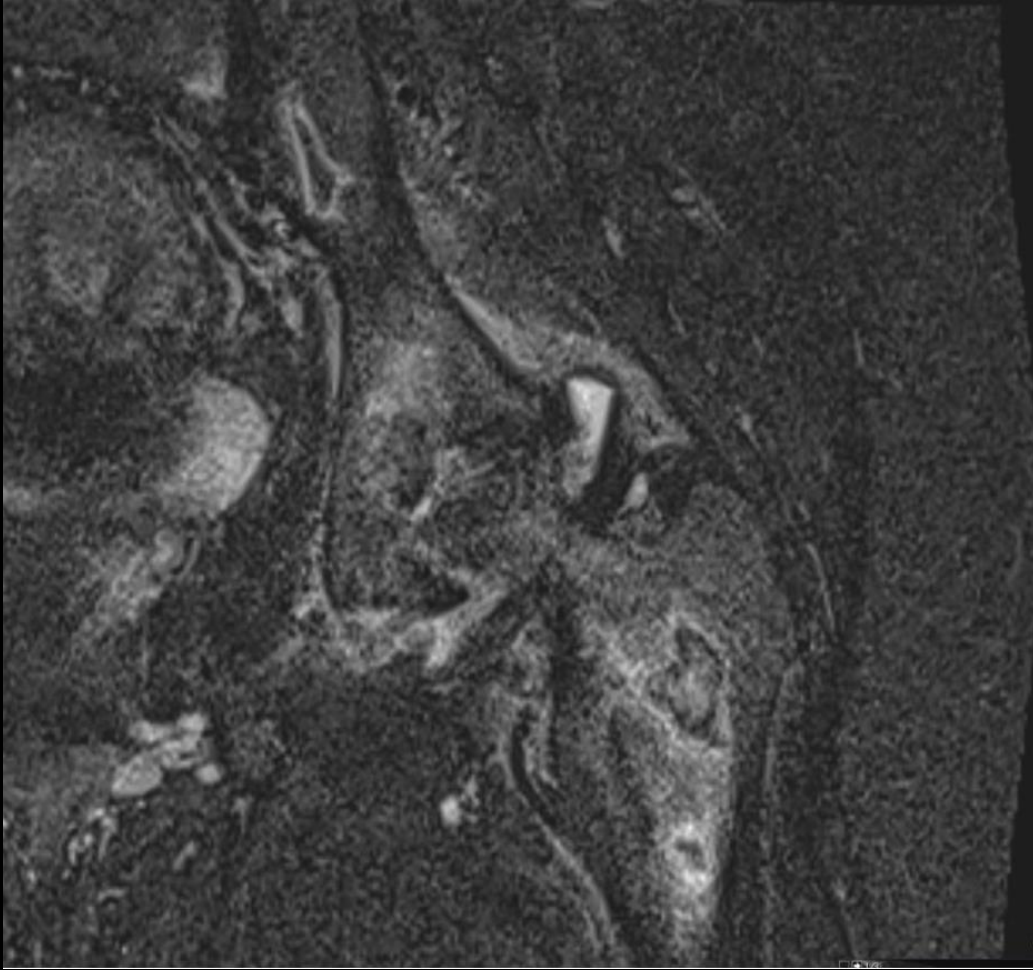
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Findings (unlabeled)

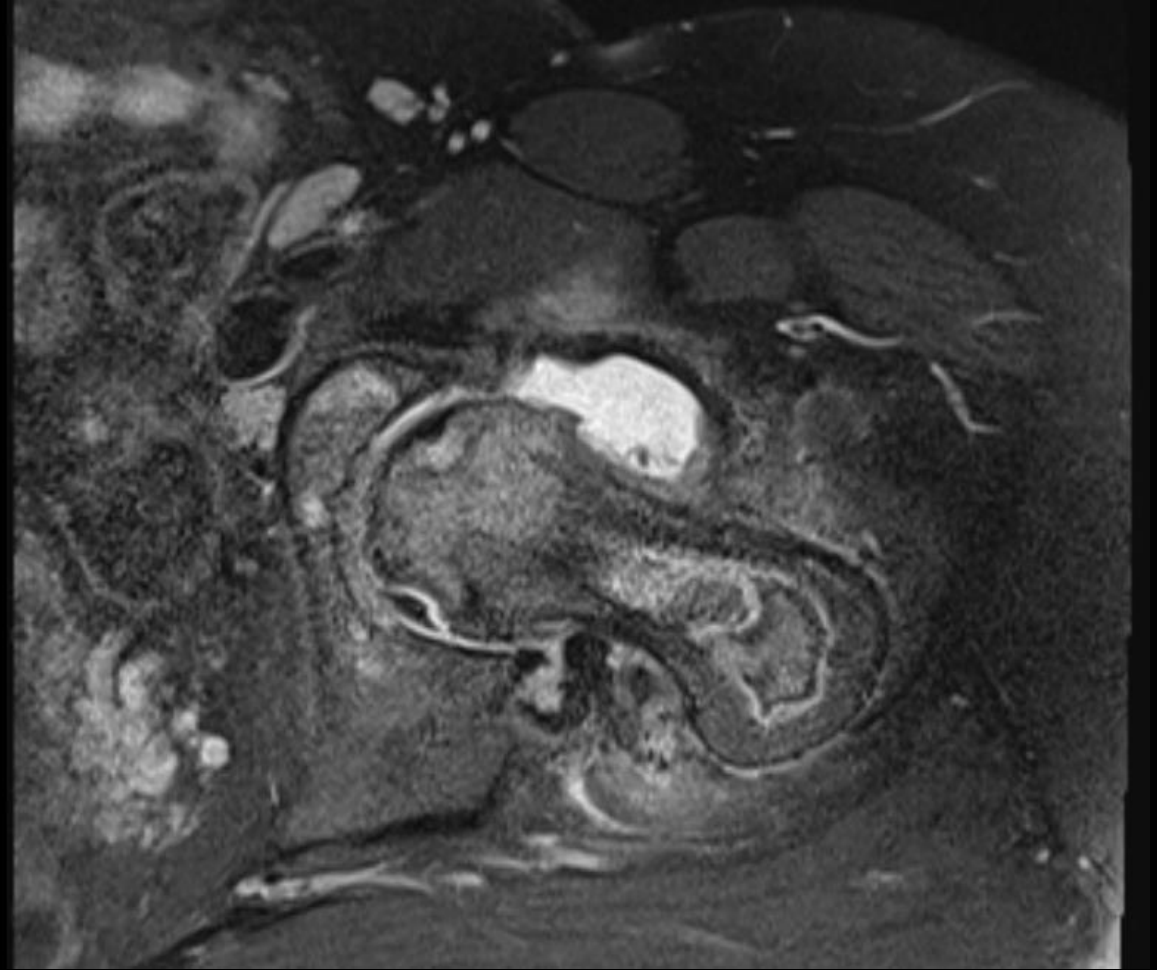


T1 Coronal FS with Contrast

Findings (unlabeled)

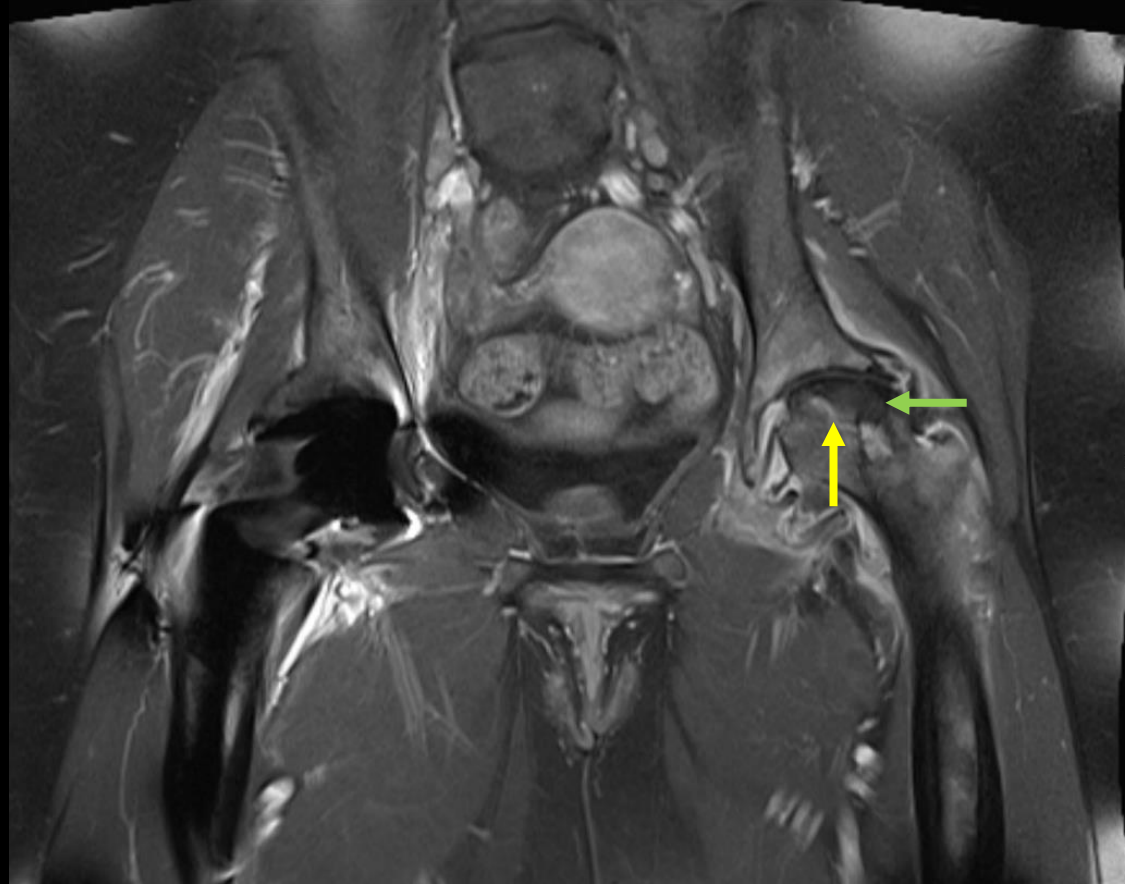


T2 Coronal STIR



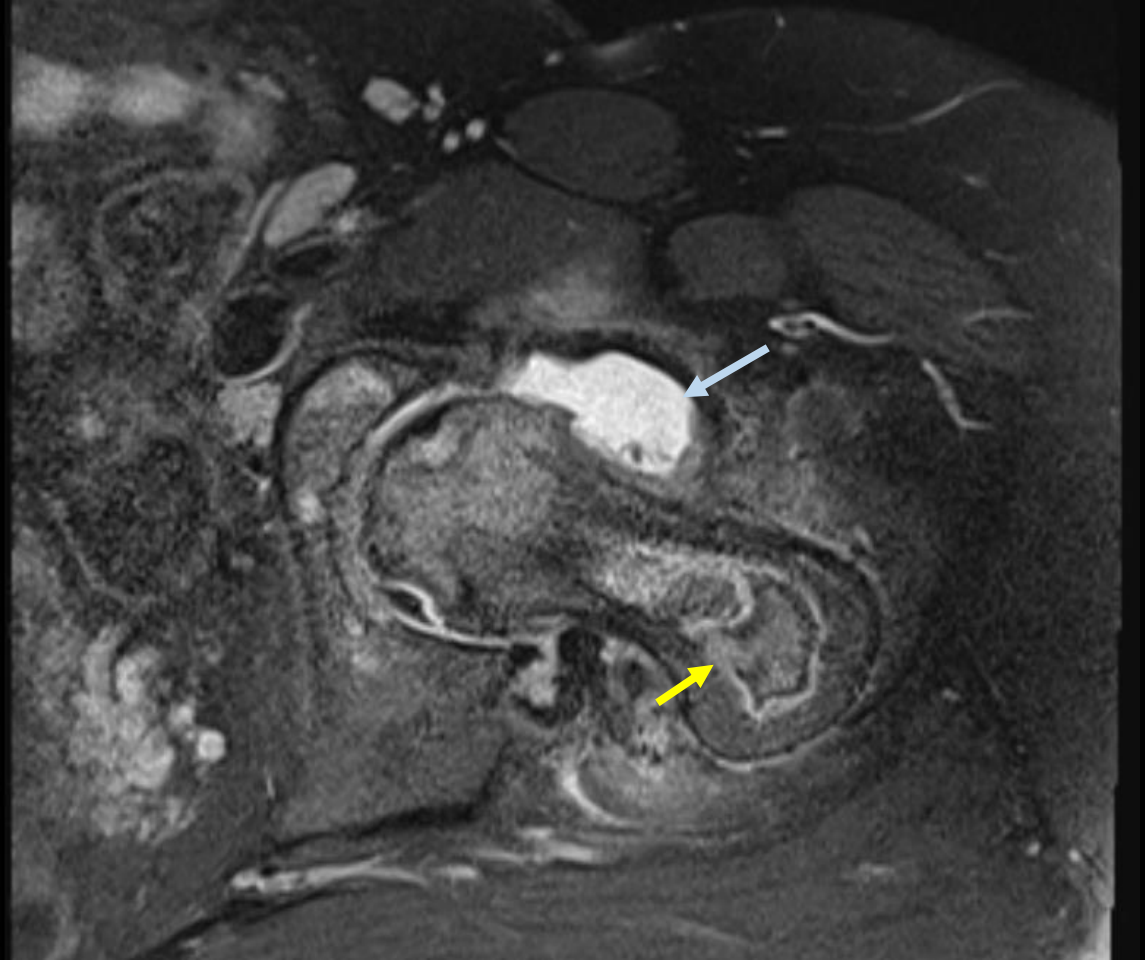
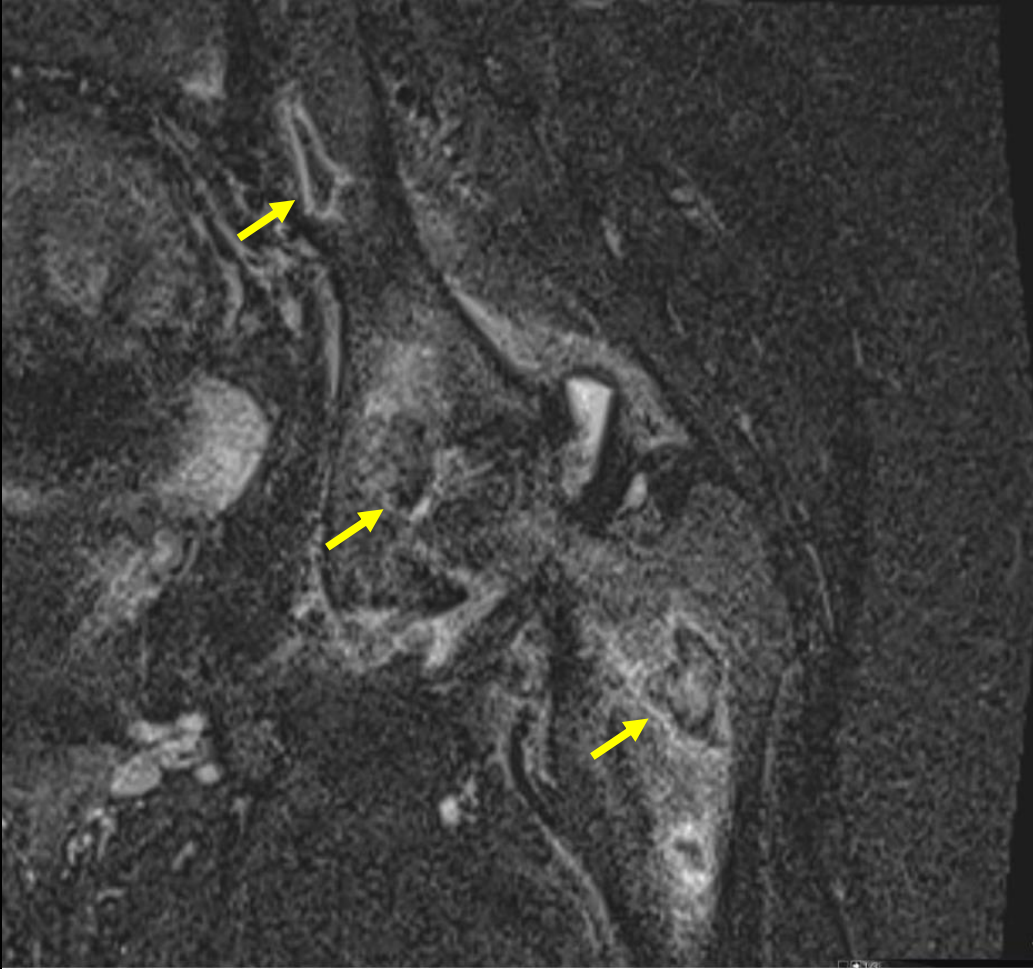
T2 Axial STIR

Findings (Labeled)



- Subchondral collapse of the femoral head with necrotic region of femoral head in the hypointense region
- High inner signal intensity band through the femoral head with outer low enhancing line (double line sign)

Findings (Labeled)



- Multiple serpiginous enhancing lesions consistent with bone infarcts with reactive marrow changes seen throughout the femoral head and neck with an enhancing lesion also identified in the left iliac bone.
- Left hip joint effusion

Final Dx:

Avascular Necrosis of femoral head secondary to sickle cell disease

Case Discussion

- Sickle cell disease is caused by a mutation in the HBB gene¹
 - This leads to an abnormal hemoglobin formation that can become sickle shaped
- Avascular necrosis of the femoral head is seen in up to 30% of patients sickle cell disease but may occur in any joints²
 - 75% of patients are between 30 and 60 when they are diagnosed³
- This condition is defined as a disruption in blood supply to the femoral head^{3,4}
 - Causing sclerosis and subchondral collapse of the femoral head
- The femur is susceptible due to its limited blood supply and high weight bearing loads⁴

Case Discussion

- Osteonecrosis is often clinically silent until later in the disease process where a secondary arthritis develops^{4,5}
- MRI is the most sensitive and specific imaging modality for diagnosis⁴ (>99% sensitivity and specificity)
- Treatment depends upon staging of the femoral head^{3,5}
 - Collapse is defined as >2mm of femoral head depression⁵
 - Pre-collapse treatment possibilities
 - Core decompression with or without bone grafts⁵
 - Bisphosphonates
 - Anticoagulants and vasodilators
 - Limited weight bearing
 - Post-Collapse
 - THA is the gold standard treatment⁵

References:

1. Elendu C, Amaechi DC, Alakwe-Ojimba CE, et al. Understanding Sickle cell disease: Causes, symptoms, and treatment options. *Medicine (Baltimore)*. 2023;102(38):e35237. doi:10.1097/MD.00000000000035237
2. Adesina OO, Neumayr LD. Osteonecrosis in sickle cell disease: an update on risk factors, diagnosis, and management. *Hematology Am Soc Hematol Educ Program*. 2019;2019(1):351-358. doi:10.1182/hematology.2019000038
3. Piuzzi NS, Anis HK, Muschler GF. Osteonecrosis of the femoral head with subchondral collapse. *Cleve Clin J Med*. 2019;86(8):511-512. doi:10.3949/ccjm.86a.19004.
4. Khired Z, Alzain KO, Hakami AA, et al. Osteonecrosis of the femoral and humoral heads in sickle disease patients: Risk factor, comorbidities. *Clin Epidemiol Glob Health*. 2024;27:101618.
5. Tripathy SK, Goyal T, Sen RK. Management of femoral head osteonecrosis: Current concepts. *Indian J Orthop*. 2015;49(1):28-45. doi:10.4103/0019-5413.143911