AMSER Case of the Month February 2026

48-year-old female with right thigh pain

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Patient Presentation

- 48-year-old female with no prior history of injury or trauma presents with a 3-day history of right thigh pain. She describes pain as intermittent and shooting in nature, rating it a 6/10 in intensity. There was no known precipitating event. Symptoms worsen with palpation. She denies numbness or tingling, inability to bear weight, loss of motion, loss of sensation, muscle weakness, fever, and chills. She has not attempted any pain relief measures.

Pertinent Physical Exam and Labs

- PE
  - Right LE: very tender to palpation over the distal right thigh, minimal swelling, no superficial erythema or ecchymosis
- Labs
  - D-dimer: Negative

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 1: **Adult. Acute hip pain, traumatic. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Radiography hip	Usually Appropriate	☢☢☢
US hip	Usually Not Appropriate	O
MRI hip without and with IV contrast	Usually Not Appropriate	O
MRI hip without IV contrast	Usually Not Appropriate	O
Bone scan hip	Usually Not Appropriate	☢☢☢
CT hip with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without and with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without IV contrast	Usually Not Appropriate	☢☢☢

Ordered by orthopedic clinic physician

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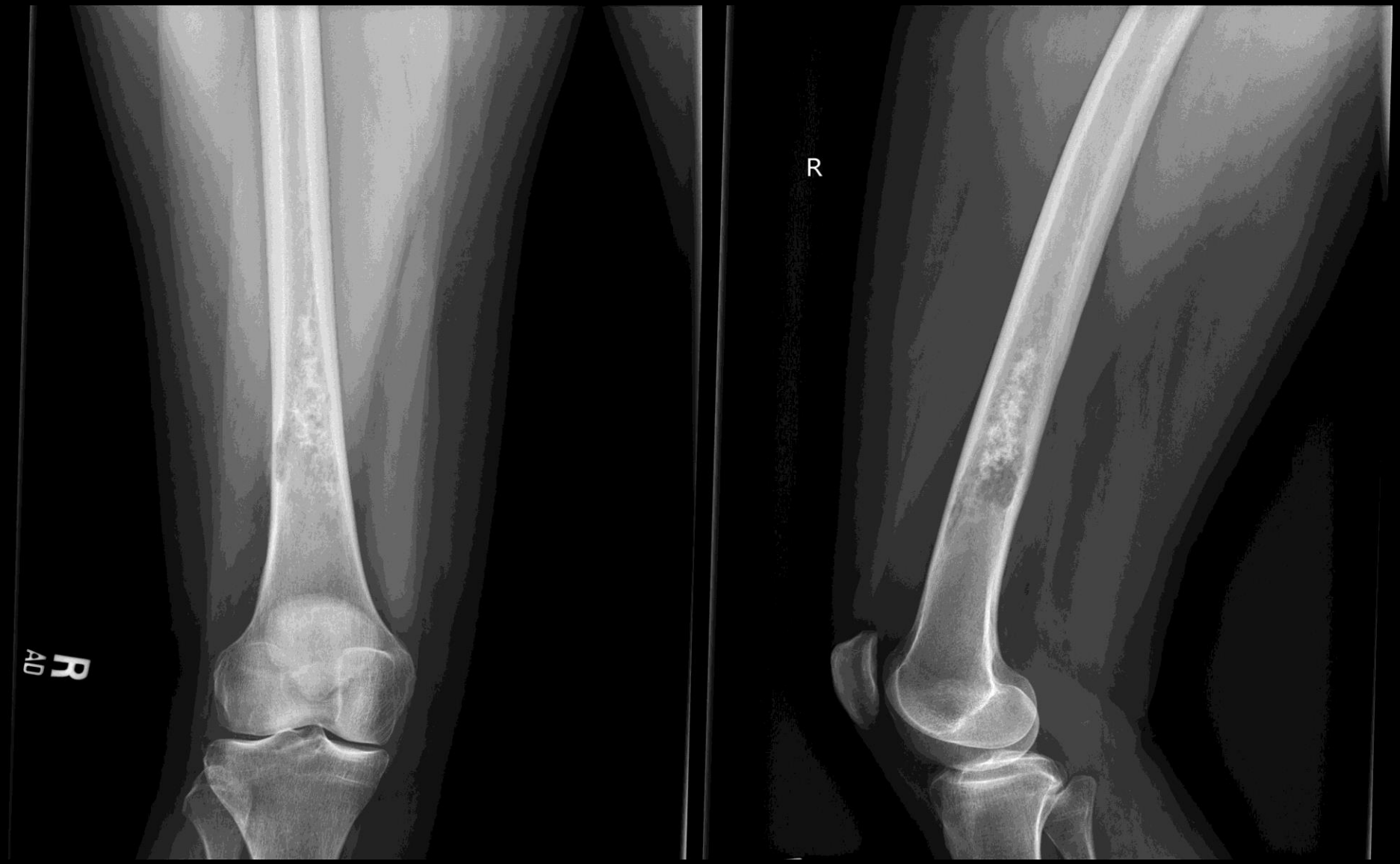
Findings (unlabeled)



Radiograph right femur AP (left) and lateral (right)

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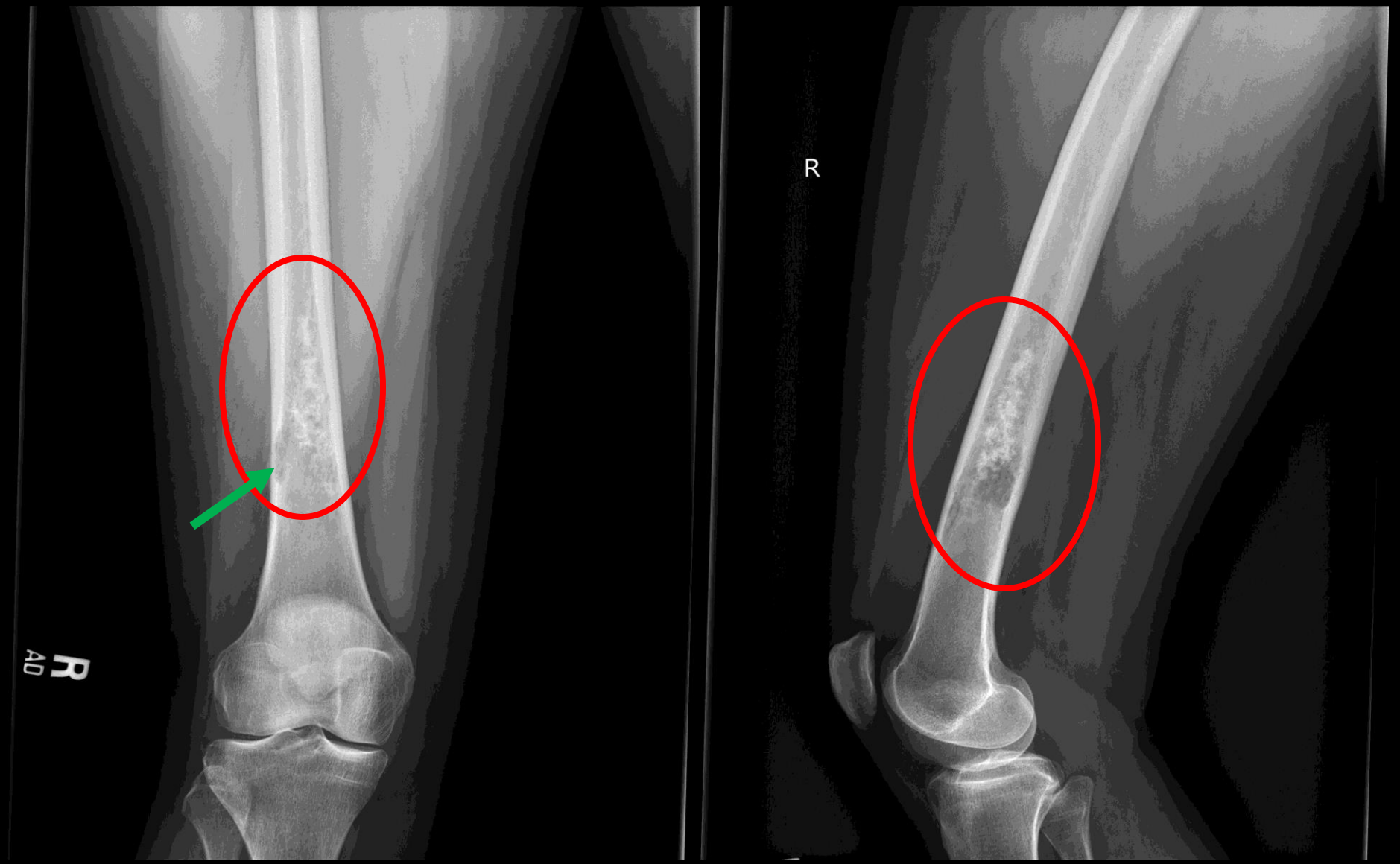
Findings: (labeled)



- Mixed sclerotic and lytic lesion within distal femoral diaphysis
- High-grade cortical thinning along lateral margin with overlying periosteal reaction

What Imaging Should We Order?

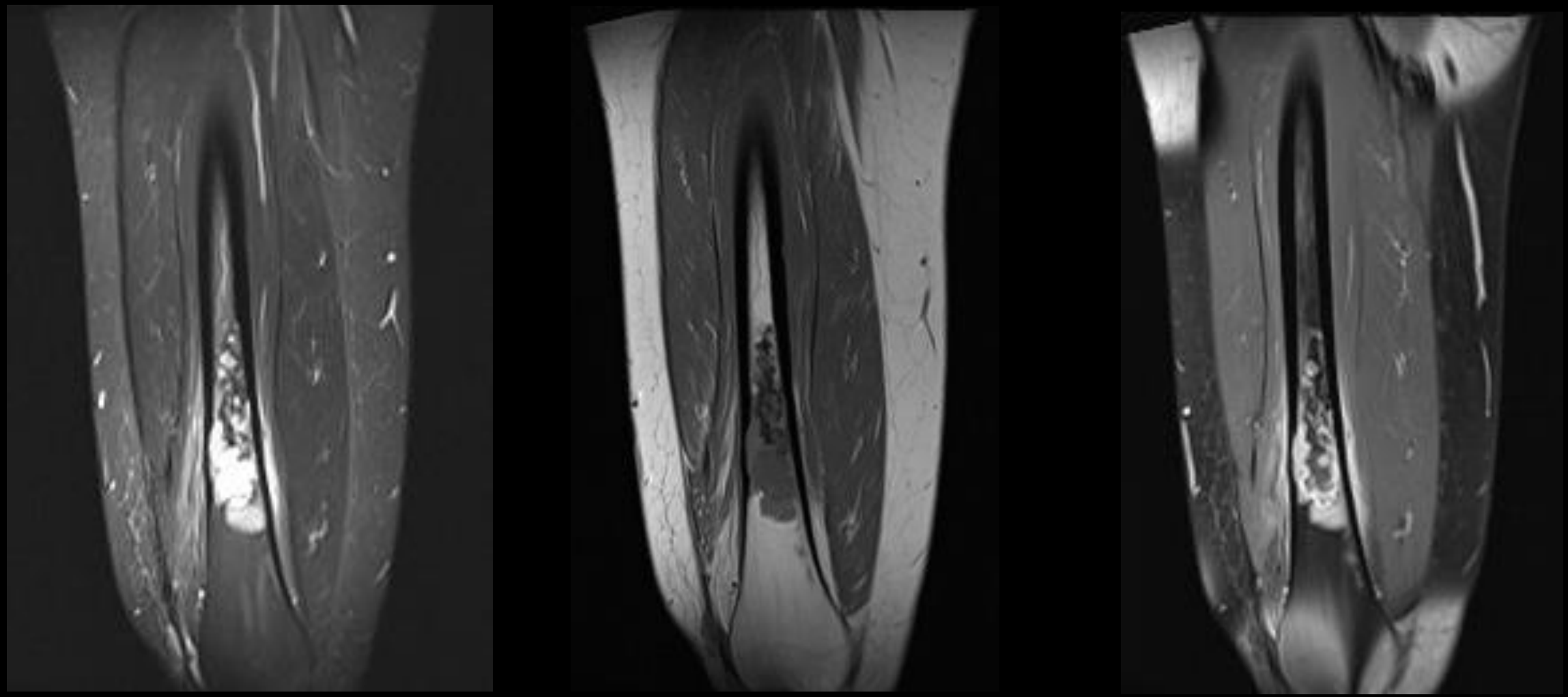
Select the applicable ACR Appropriateness Criteria

Variant 5: **Adult or child. Suspected primary bone tumor. Lesion on radiographs. Indeterminate or aggressive appearance for malignancy. Next imaging study.**

Procedure	Appropriateness Category	Relative Radiation Level
MRI area of interest without and with IV contrast	Usually Appropriate	O
MRI area of interest without IV contrast	Usually Appropriate	O
FDG-PET/CT whole body	Usually Appropriate	☢☢☢☢
Bone scan whole body with SPECT or SPECT/CT area of interest	May Be Appropriate	☢☢☢
CT area of interest with IV contrast	May Be Appropriate	Varies
CT area of interest without and with IV contrast	May Be Appropriate	Varies
CT area of interest without IV contrast	May Be Appropriate	Varies
US area of interest	Usually Not Appropriate	O
Image-guided biopsy area of interest	Usually Not Appropriate	Varies
Bone scan whole body	Usually Not Appropriate	☢☢☢

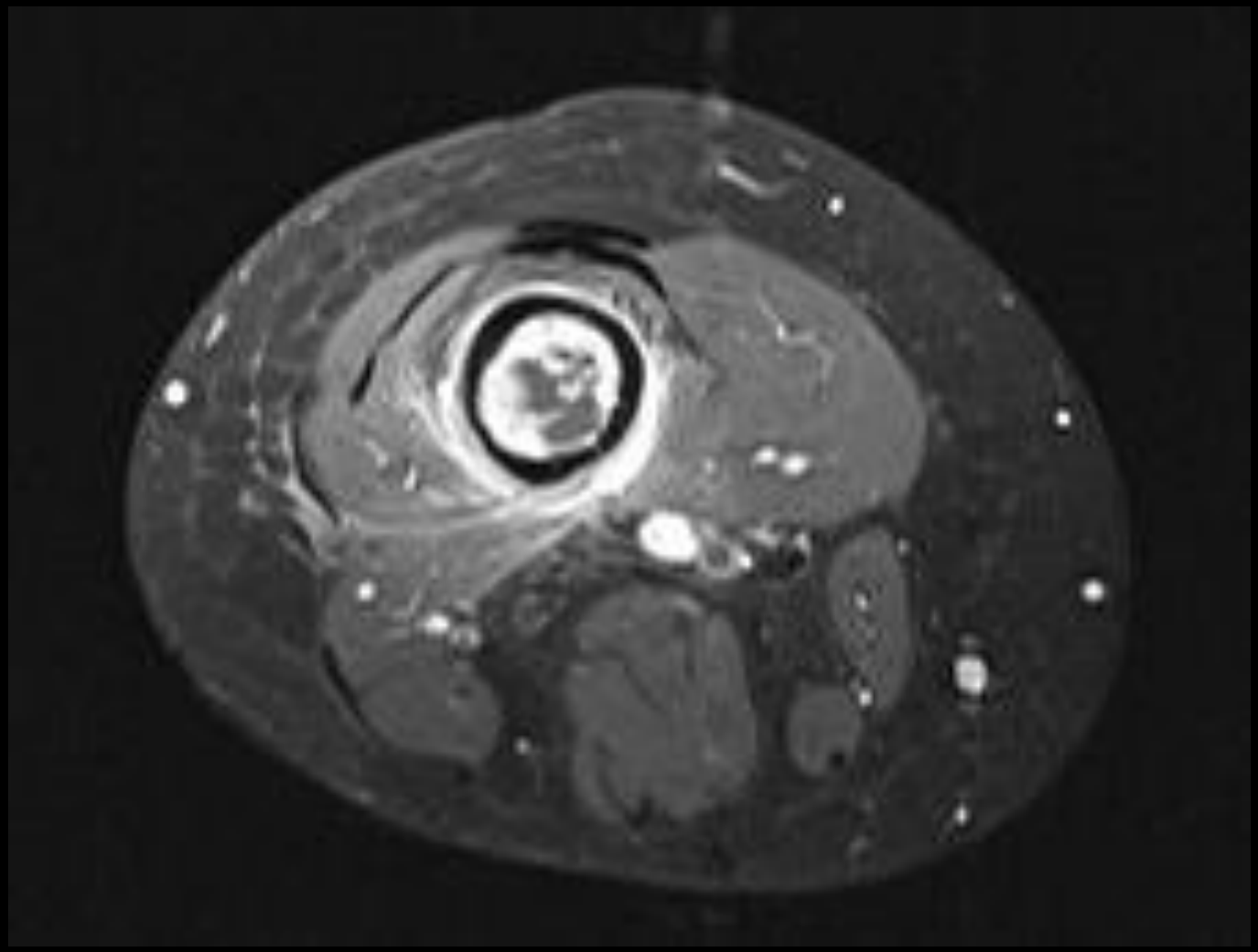
Ordered by orthopedic clinic physician

Findings (unlabeled)



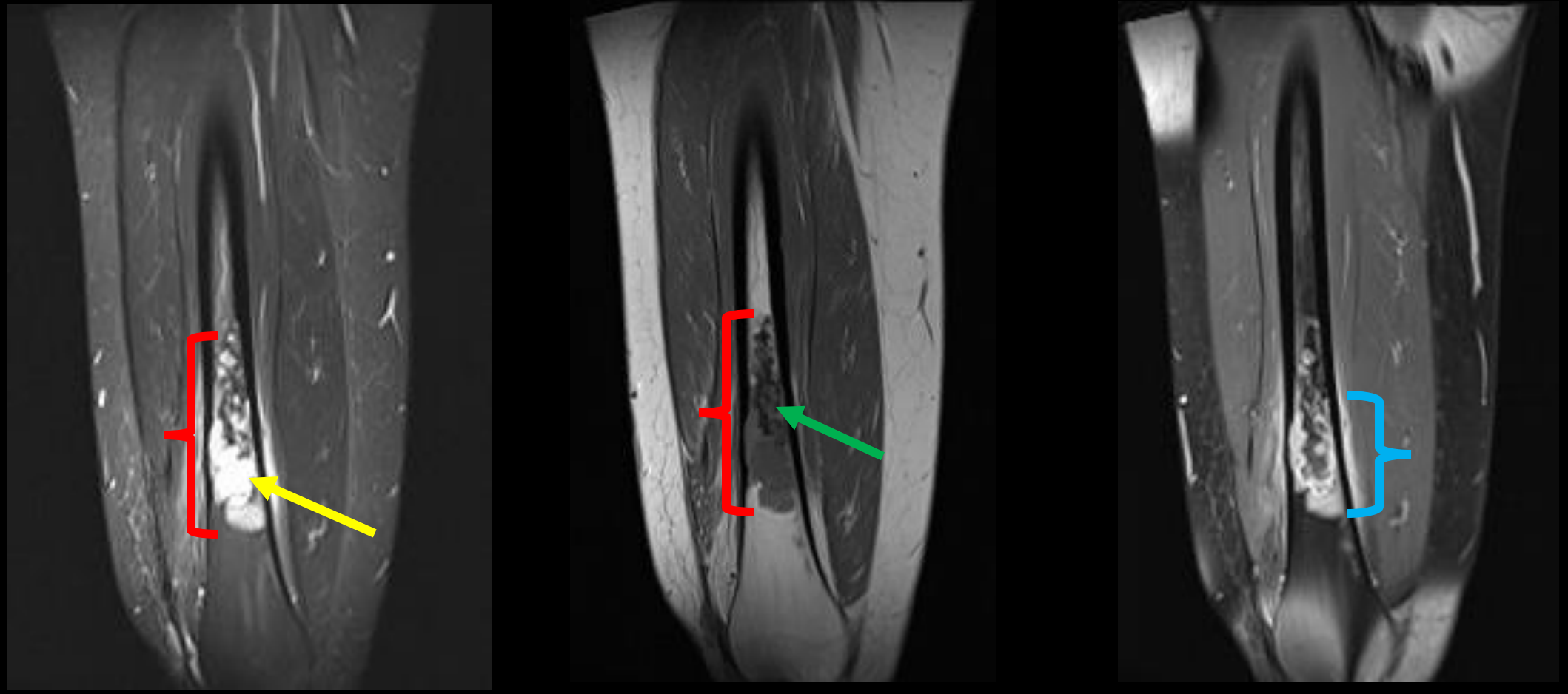
MRI right femur coronal STIR (left), coronal T1 (middle), coronal fat saturated T1 w/ contrast (right)

Findings (unlabeled)



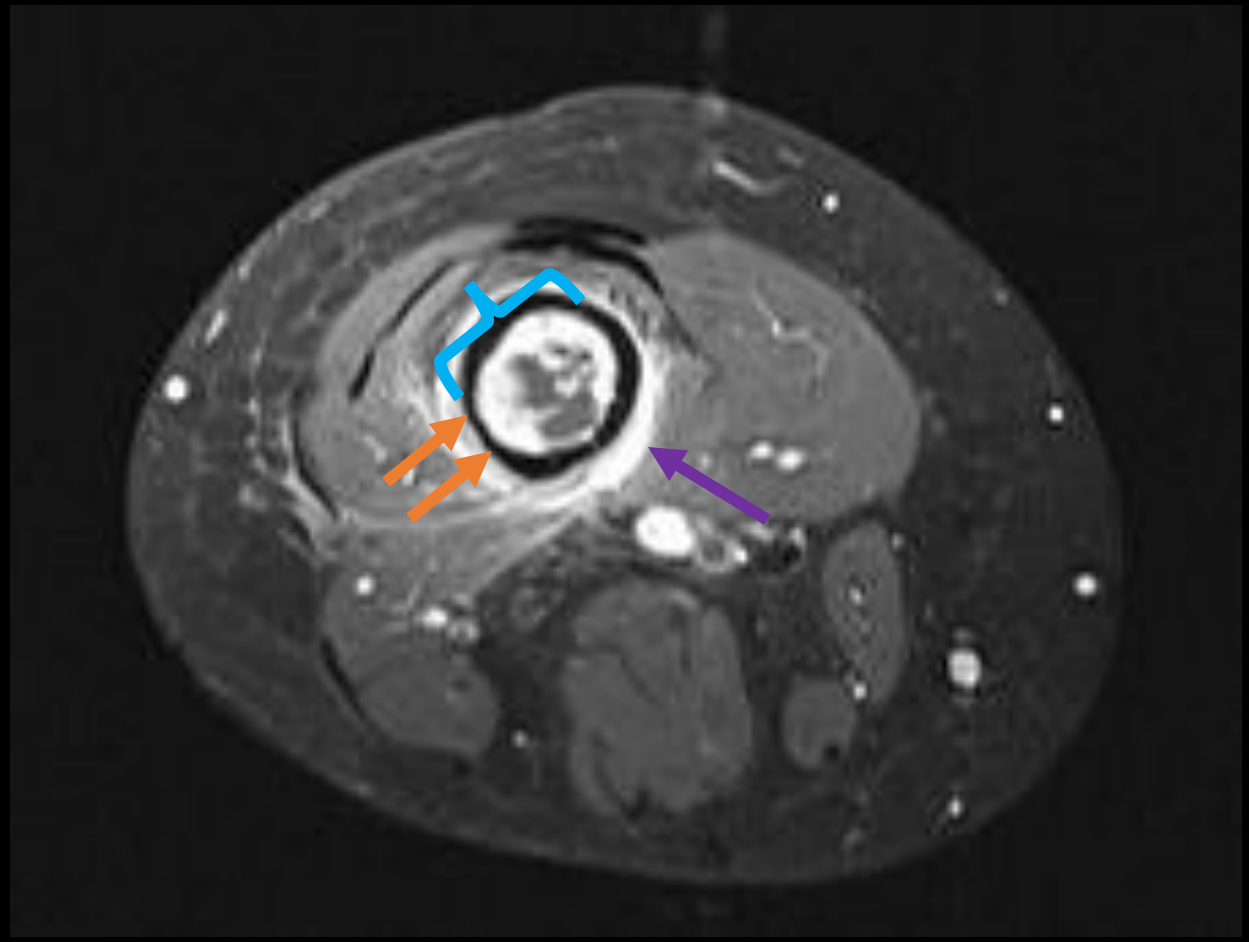
MRI right femur axial fat saturated T1 w/ contrast

Findings: (labeled)



- Marrow-replacing signal abnormality measuring up to 10.6 cm
- Lobular hyperintense T2-weighted signal
- Decreased signal intensity associated with chondroid mineralization
- Lobular and septal enhancement

Findings: (labeled)



- Lobular and septal lesion enhancement
- Periosteal enhancement extending into adjacent quadriceps
- Deep endosteal scalloping of lesion laterally

Final Dx following biopsy:

Dedifferentiated chondrosarcoma

Case Discussion

- Chondrosarcoma is a malignant, cartilaginous tumor typically arising in pelvis, scapula, rib cage, femur, and humerus
  - 20% of all primary malignant bone neoplasms
  - Most commonly affects adults between 4th and 6th decades of life
- Conventional chondrosarcoma arises from bone and represents 85-90% cases
  - Non-conventional is rare and can be clear cell, mesenchymal, or dedifferentiated (Grade IV) chondrosarcoma
  - Grade IV defined by high-grade, spindled or pleomorphic tumor without significant cartilaginous matrix and confers a poor prognosis
- Presents as progressive bone or joint pain and swelling, often persisting for 10-15 months prior to diagnosis
  - Primary site of metastasis is lungs
- Definitive diagnosis typically made by biopsy

Case Discussion

- Radiographs = initial imaging
  - Conventional well-differentiated chondrosarcomas are mixed lytic and sclerotic lesions with calcification pattern showing “rings” and “arcs” representing chondroid matrix
  - Higher grade tumors exhibit larger lesions with less mineralization, causing permeative bone destruction and extensive endosteal scalloping
- MRI with and without contrast = further characterization
  - Assesses extent of tumor and invasion into surrounding soft tissue as well as presence of skip lesions
  - Lobulated lesion with high signal intensity on T2 and low signal intensity on T1
- Tissue biopsy = gold standard
  - Histopathological grading of most aggressive portion required to differentiate between other bone tumors and determine optimal management
  - Most important predictor of local recurrence/metastasis and prognosis
  - Dedifferentiated chondrosarcoma characteristically starts as a conventional low-grade chondrosarcoma and abruptly transitions to area of high-grade sarcoma

Case Discussion

- Treatment depends on tumor location, grade, presence of metastases
- Surgical excision = first-line treatment
  - Intralesional curettage for low-grade
  - Wide excision for large tumors, axial or pelvic tumors, or tumors with soft tissue involvement
  - Wide en bloc resection for intermediate- or high-grade
- Chemotherapy and radiation used as adjuvant for high-grade/recurrent tumors or for unresectable tumors
- Reconstruction options depend on patient age, comorbidities, and tumor characteristics
  - Endoprosthetic reconstruction is most common, followed by allograft or allograft composites
- Amputation reserved for extensive invasive disease as last resort

References:

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