AMSER Case of the Month December 2020 "Bone Pain"

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Patient Presentation
13-year-old male

- CC: 5 months of left knee pain
- PMHx: Right arm fracture
- PSHx: None
- FamHx: Non-contributory
  Social Hx: Lives at home with mom/dad/sister/brother, plays basketball/football.
- Allergies: None
- Vitals: Within normal limits, 5’10”, 55.5 kg.
- Physical Exam: Patient points to tibial tubercle apophyseal region. Able to fully extend knee against resistance without pain. No evidence of joint instability. No overt swelling over the proximal tibial region.
- Labs: Non-contributory

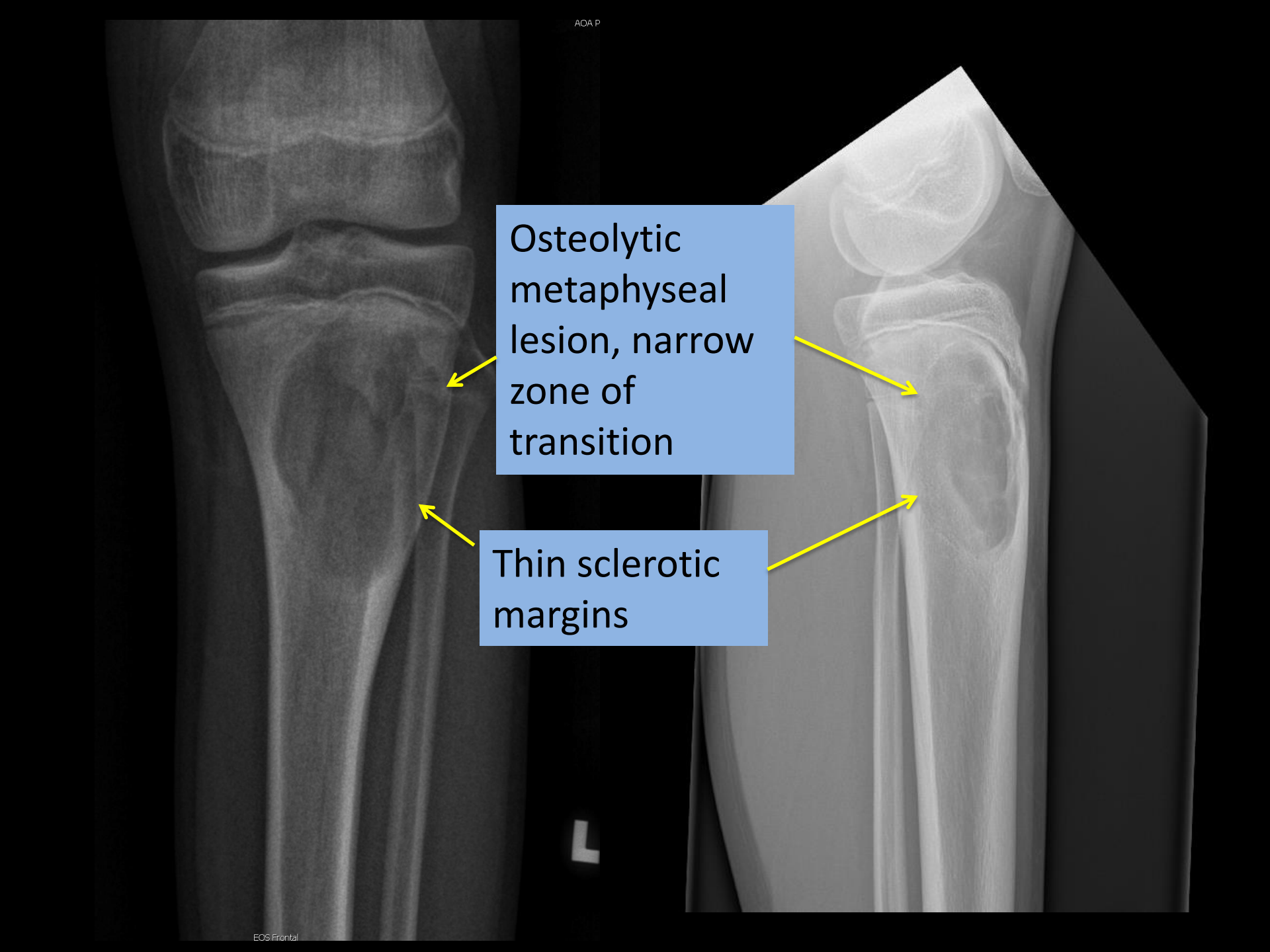
Which imaging should we order?

ACR Appropriateness Criteria

Variant 1: **Adult or child greater than or equal to 5 years of age. Chronic knee pain. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Radiography knee	Usually Appropriate	☢
Aspiration knee	Usually Not Appropriate	Varies
CT arthrography knee	Usually Not Appropriate	☢
CT knee with IV contrast	Usually Not Appropriate	☢
CT knee without and with IV contrast	Usually Not Appropriate	☢
CT knee without IV contrast	Usually Not Appropriate	☢
MR arthrography knee	Usually Not Appropriate	O
MRI knee without and with IV contrast	Usually Not Appropriate	O
MRI knee without IV contrast	Usually Not Appropriate	O
Bone scan knee	Usually Not Appropriate	☢☢☢
US knee	Usually Not Appropriate	O
Radiography hip ipsilateral	Usually Not Appropriate	☢☢☢


AOA P
L
EOS Frontal


AOA P
Osteolytic metaphyseal lesion, narrow zone of transition
Thin sclerotic margins
L
EOS Frontal

What is the differential diagnosis?

FOG MACHINES
Lucent/Lytic bone differential

Fibrous dysplasia

Osteoblastoma

Giant cell tumor or geode

Metastasis/myeloma

Aneurysmal bone cyst

Chondroblastoma or chondromyxoid fibroma

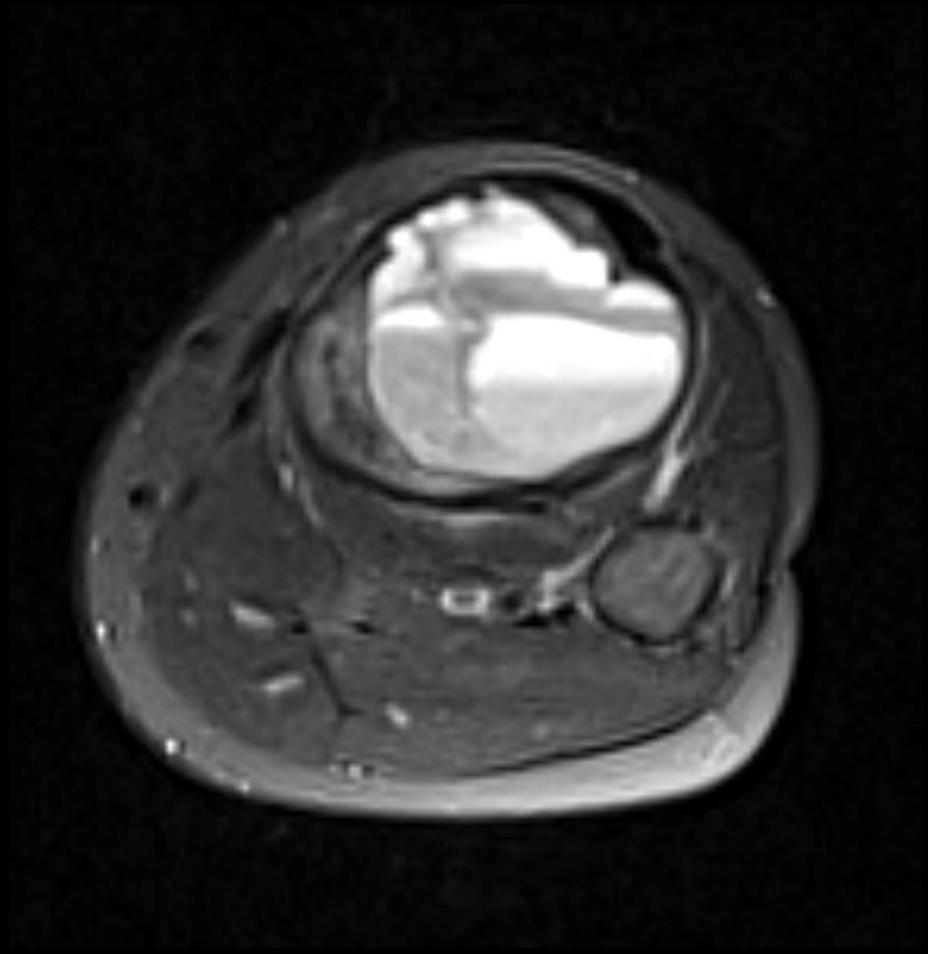
Hyperparathyroidism (brown tumor)

Infection or infarction

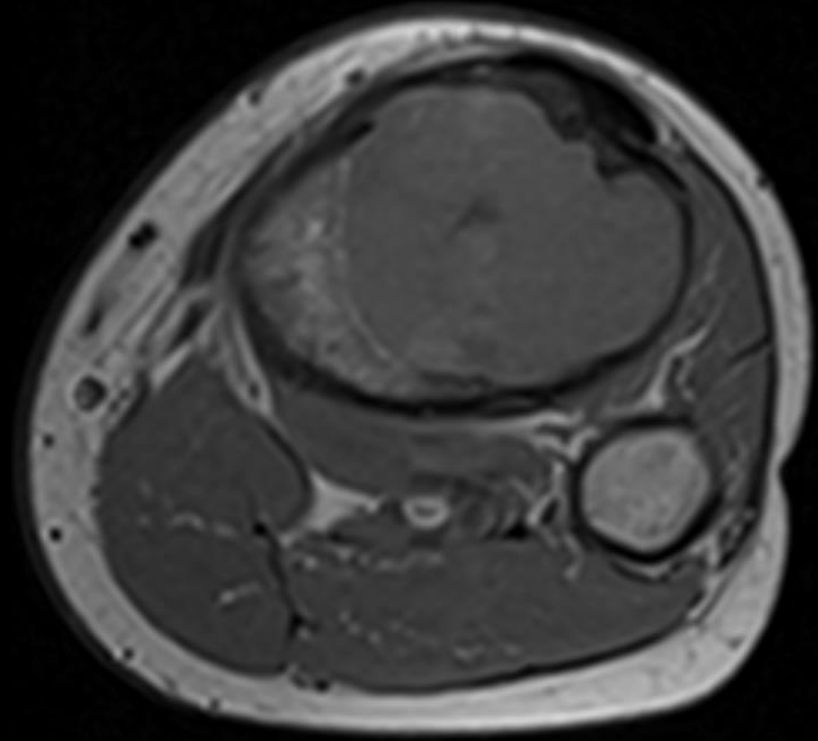
Non ossifying fibroma

Enchondroma or eosinophilic granuloma

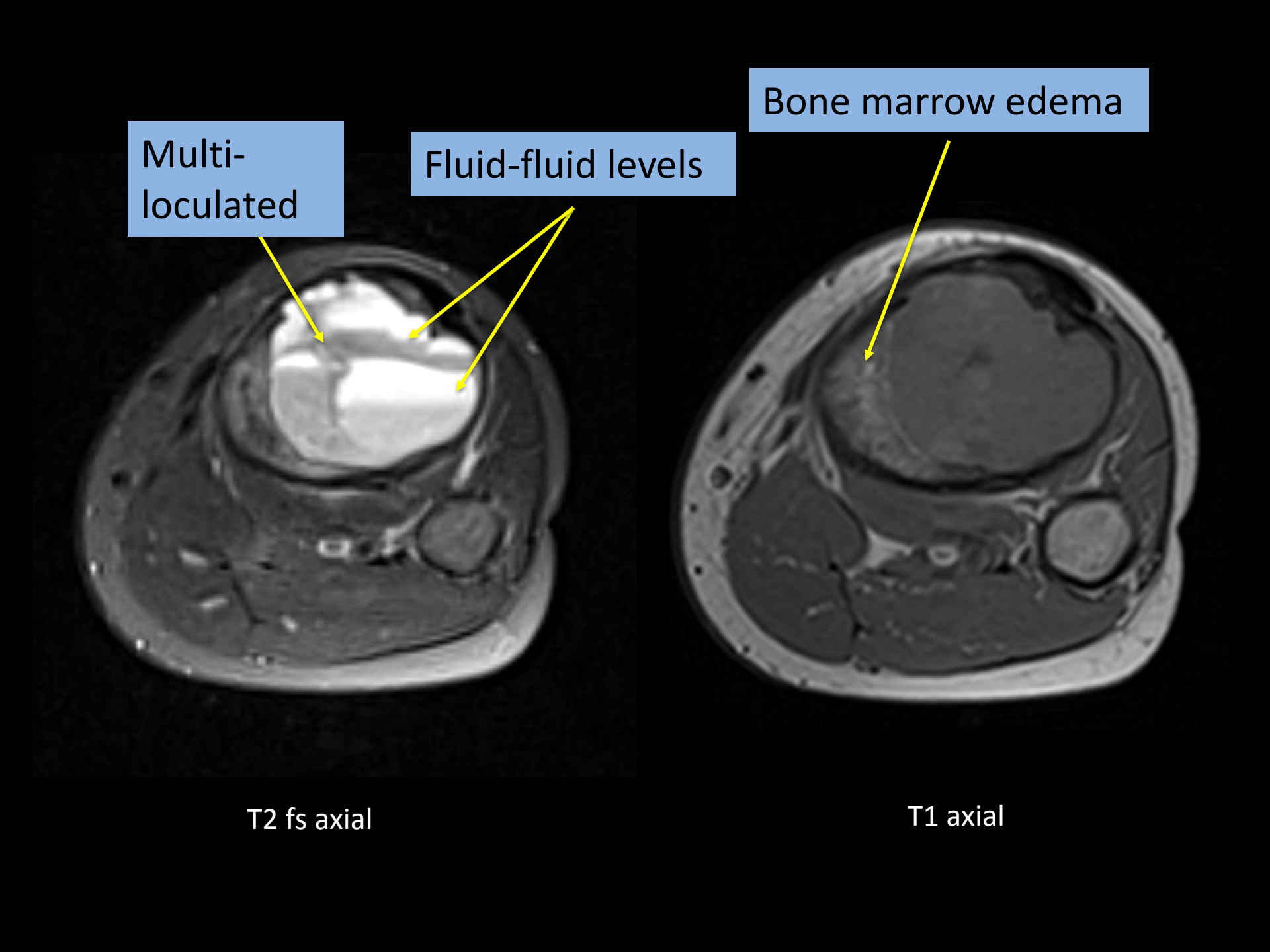
Simple (unicameral) bone cyst

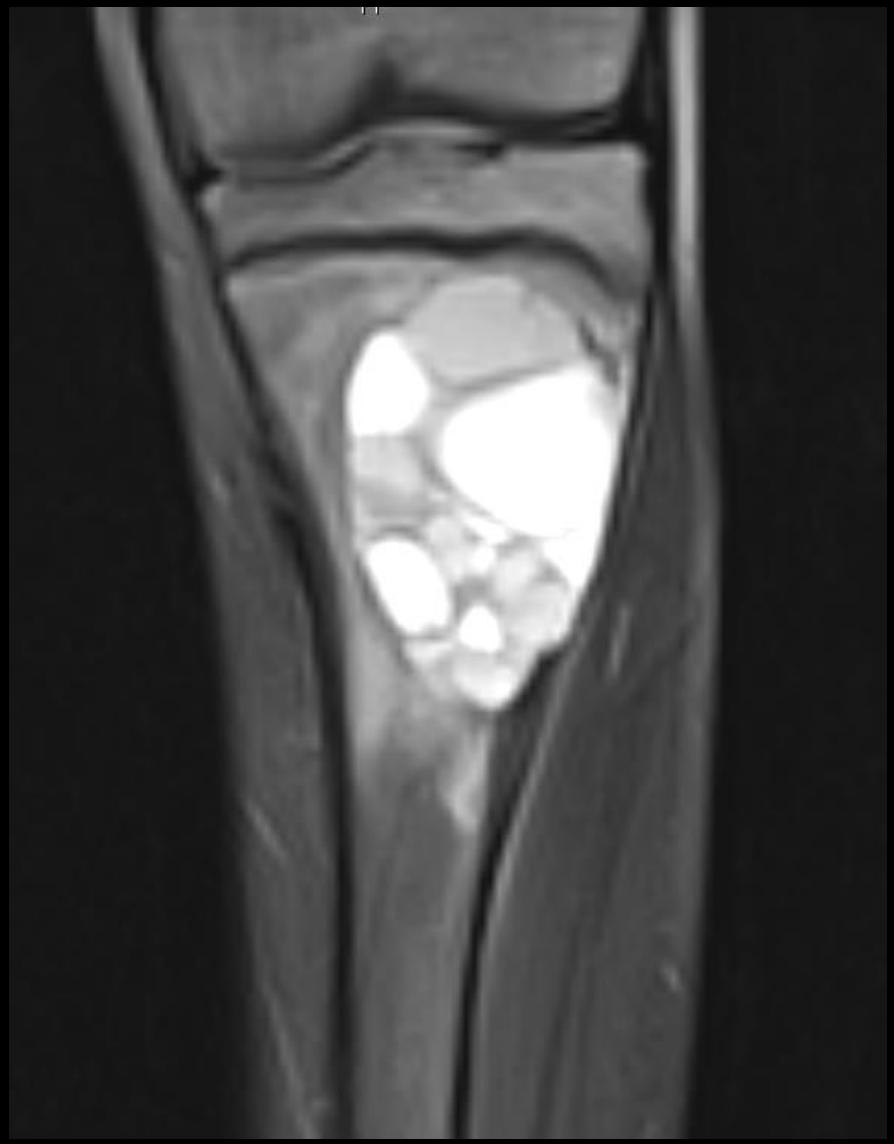


T2 fs axial



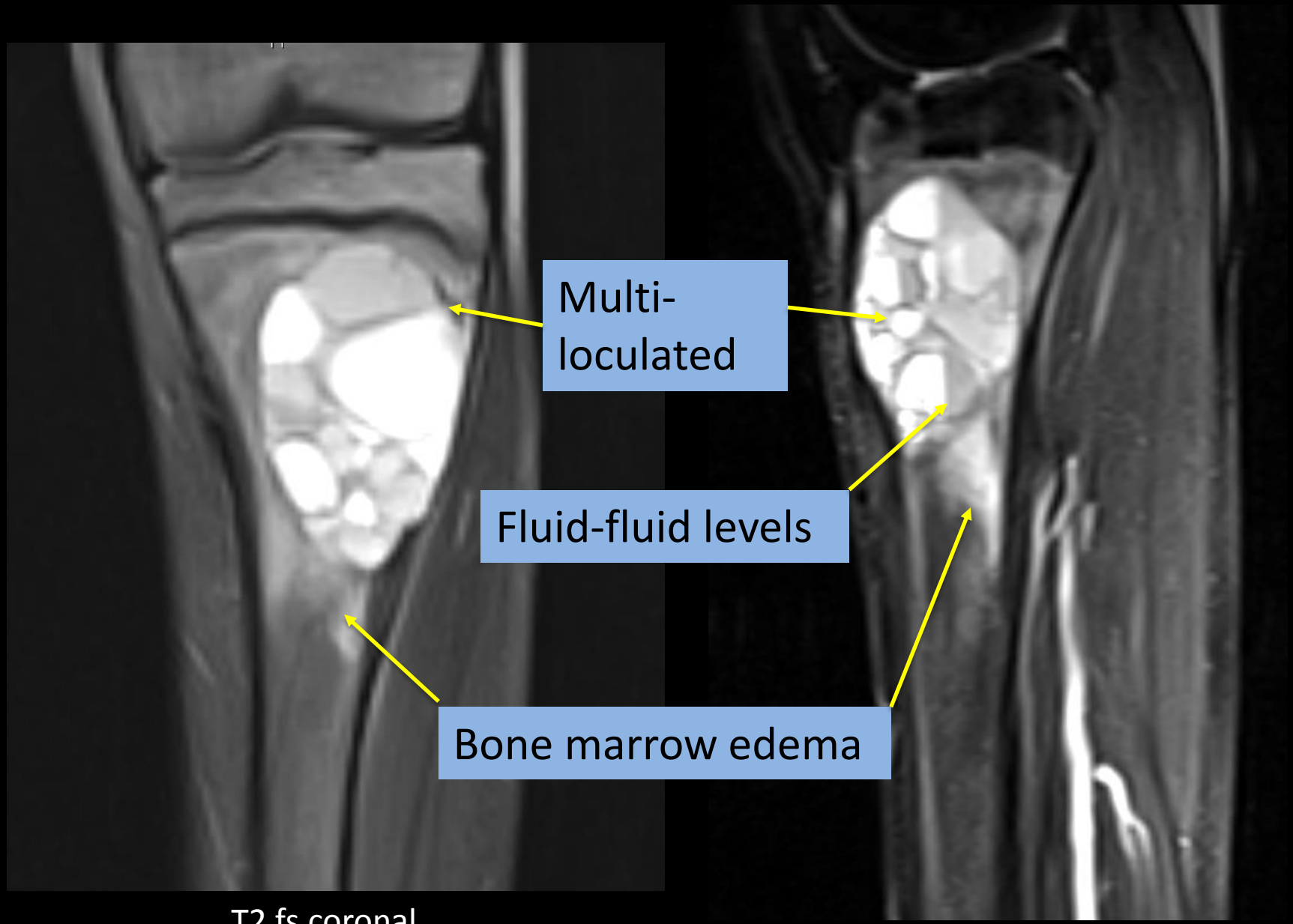
T1 axial


Multi-loculated
Fluid-fluid levels
Bone marrow edema
T2 fs axial
T1 axial



T2 fs coronal

STIR sagittal


Multi-loculated
Fluid-fluid levels
Bone marrow edema
T2 fs coronal
STIR sagittal

Aneurysmal bone cyst

Epidemiology: 9% of all benign bone tumors. 80% occur in adolescence, girls>boys

Signs/symptoms: Localized pain, swelling, limping. Can lead to pathological fractures as they grow

Risk Factors: Usually idiopathic. Some association with other bone tumors (giant cell, osteosarcoma, fibrous dysplasia)

Pathology: Nonmalignant, expansile vascular lesions consisting of blood-filled channels separated by bone and osteoid containing connective tissue.

Location: Any bone, but most common in posterior spinal elements (neuro sx), femur, and tibia. Most commonly in metaphysis of long bones.

Common Radiographic Findings

XR: Sharply circumscribed, aggressive, expansile lytic lesions. Eggshell sclerotic rim. Soap bubble appearance. +/- periosteal reaction, associated fractures

MRI: Multiple fluid filled cavities with septations and fluid-fluid levels. Soft tissue/marrow edema. Septal and wall enhancement with contrast on T1. Focal areas of hyperintensity on T1 and T2 2/2 blood in the cysts

Treatment

Surgical intervention usually required

- Intralesional curettage +/- bone grafting
- En bloc excision
- Chemical cauterization or cryotherapy
- Preop embolization to reduce operative bleeding

Medical management if not surgical candidate or difficult to operate area (spine, pelvis)

- Denosumab (Ab against RANK-L) – prevents bone resorption

References

Park HY, Yang SK, Sheppard WL, et al. Current management of aneurysmal bone cysts. Curr Rev Musculoskelet Med. 2016;9(4):435-444. doi:10.1007/s12178-016-9371-6

ACR Appropriateness Criteria https://acsearch.acr.org/list

Tis, MD, J., 2020. Uptodate. [online] Uptodate.com. Available at: <https://www.uptodate.com/contents/nonmalignant-bone-lesions-in-children-and-adolescents> [Accessed 25 August 2020].

Gaillard, F. (n.d.). Aneurysmal bone cyst: Radiology Reference Article. Retrieved August 25, 2020, from https://radiopaedia.org/articles/aneurysmal-bone-cyst?lang=us