

Chondroblastoma

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11/18-12/13

Diagnostic Radiology – RAD 4001

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Clinical History

- 15 y/o M w/ no significant PMHx who presents with knee pain x1 year
- HPI:
 - worsening L knee pain
 - described as intermittent, briefly relieved with NSAIDs
 - worse with extension
 - wakes up 3x/night due to pain
 - no hx of trauma
- Physical
 - MSK: no erythema or effusion noted; tenderness to palpation over patella and patellar tendon; nl ROM; sensation intact; strength 5/5 in LLE

Relevant Imaging

- XR AP and lateral - 10/30/19

- Post biopsy changes
- Joint effusion
- Sclerotic rim
- Lucent lesion

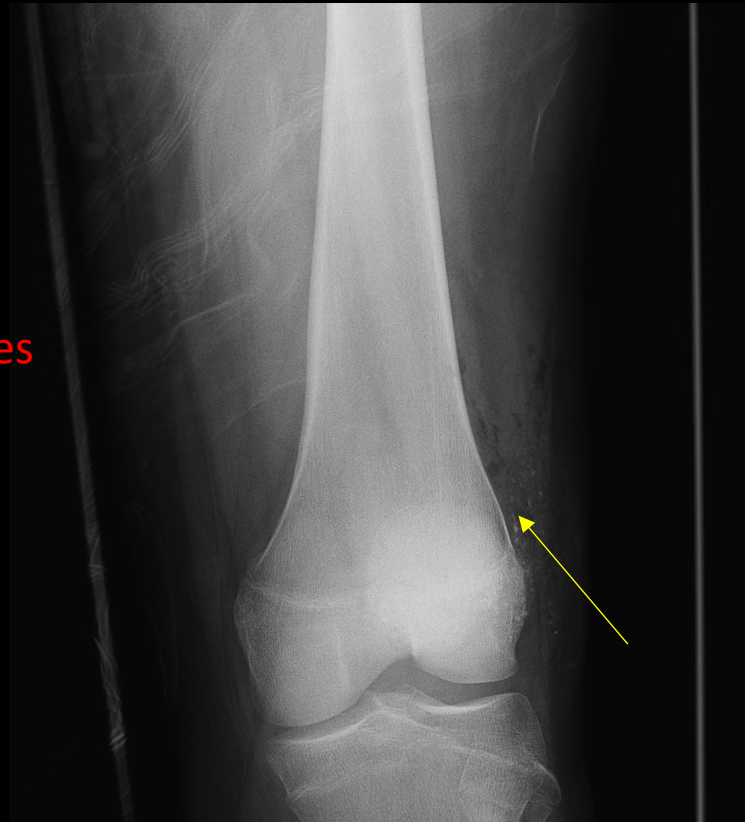


Figure 1: AP XR

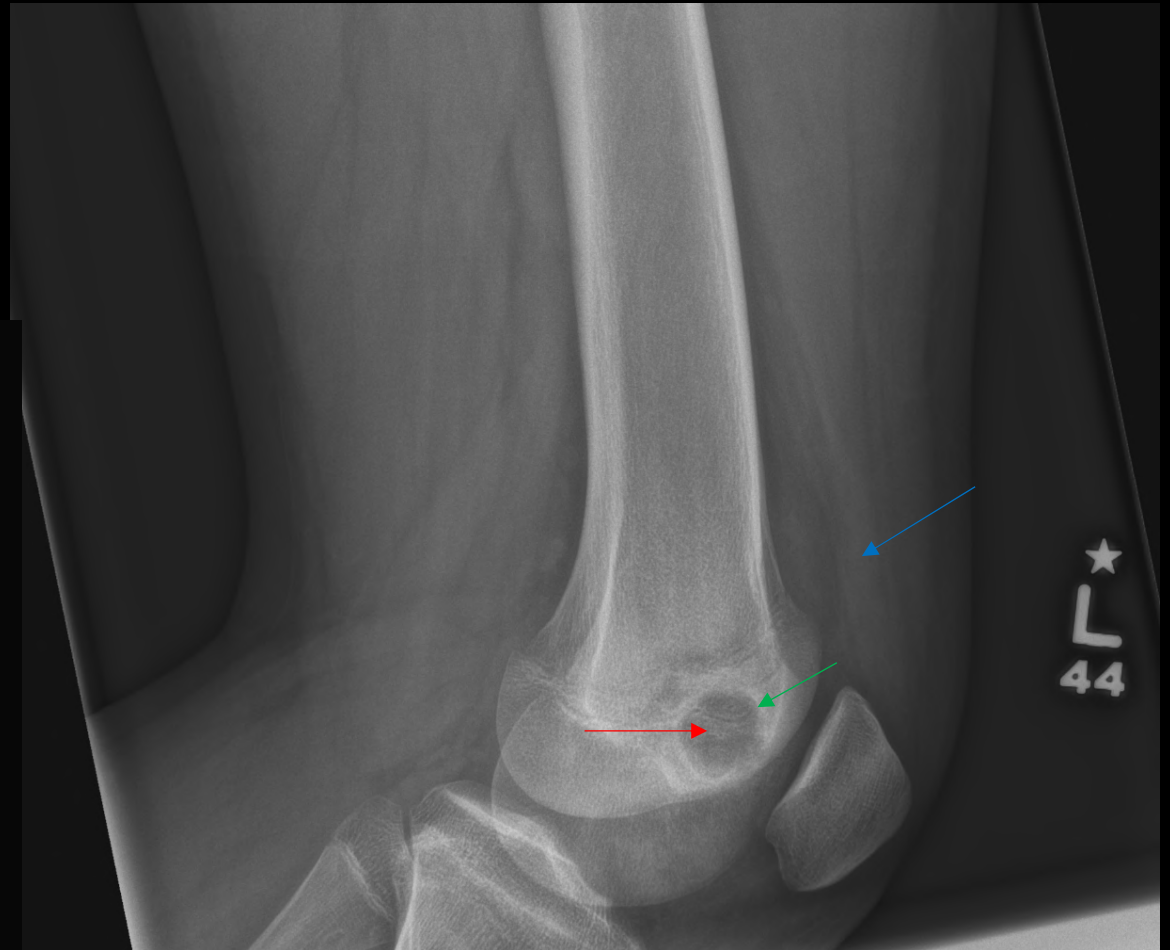


Figure 2: Lateral XR

Relevant Imaging

- MRI w/o contrast – 10/8/19

- Physis
- Fluid-fluid levels
- Bone edema
- Low signal lesion

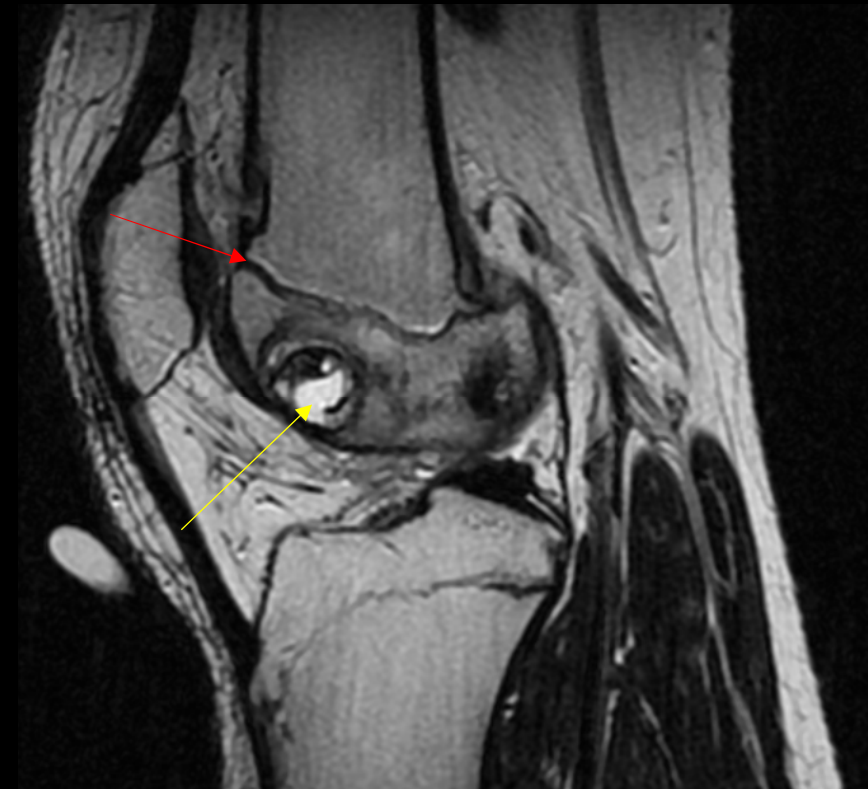


Figure 3: Sagittal T2



Figure 4: Coronal T1

Relevant Imaging

- CT w/o contrast – 10/18/19

- Metaphysis
- Physis
- Epiphysis
- Articular surface

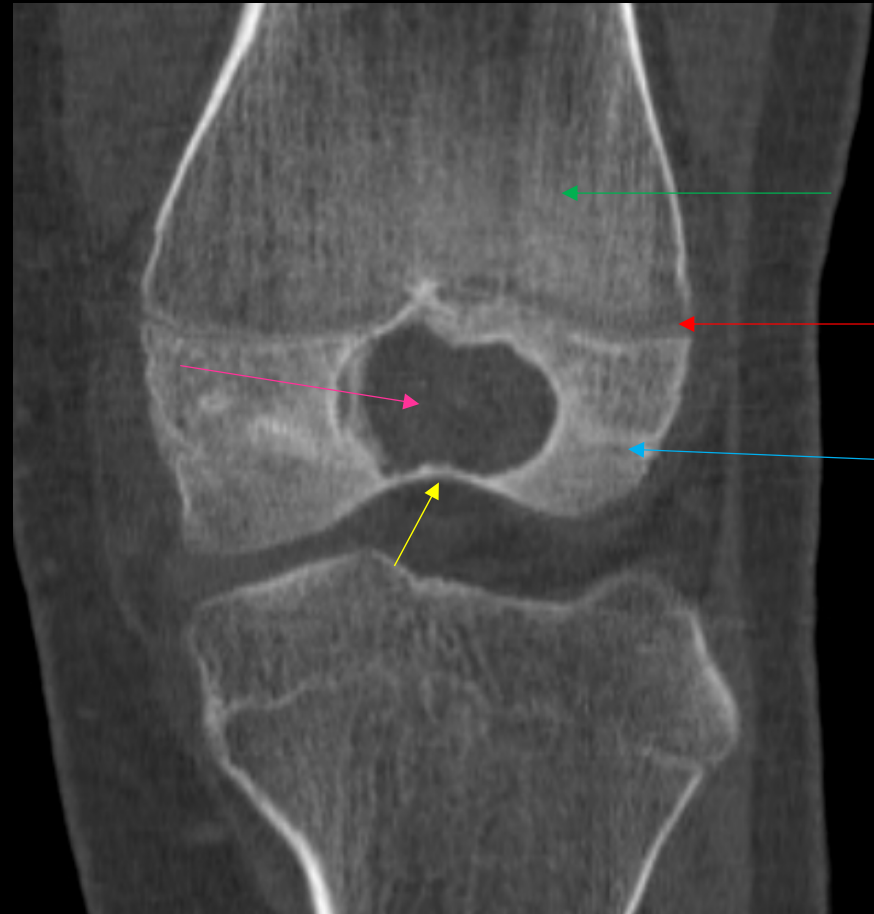


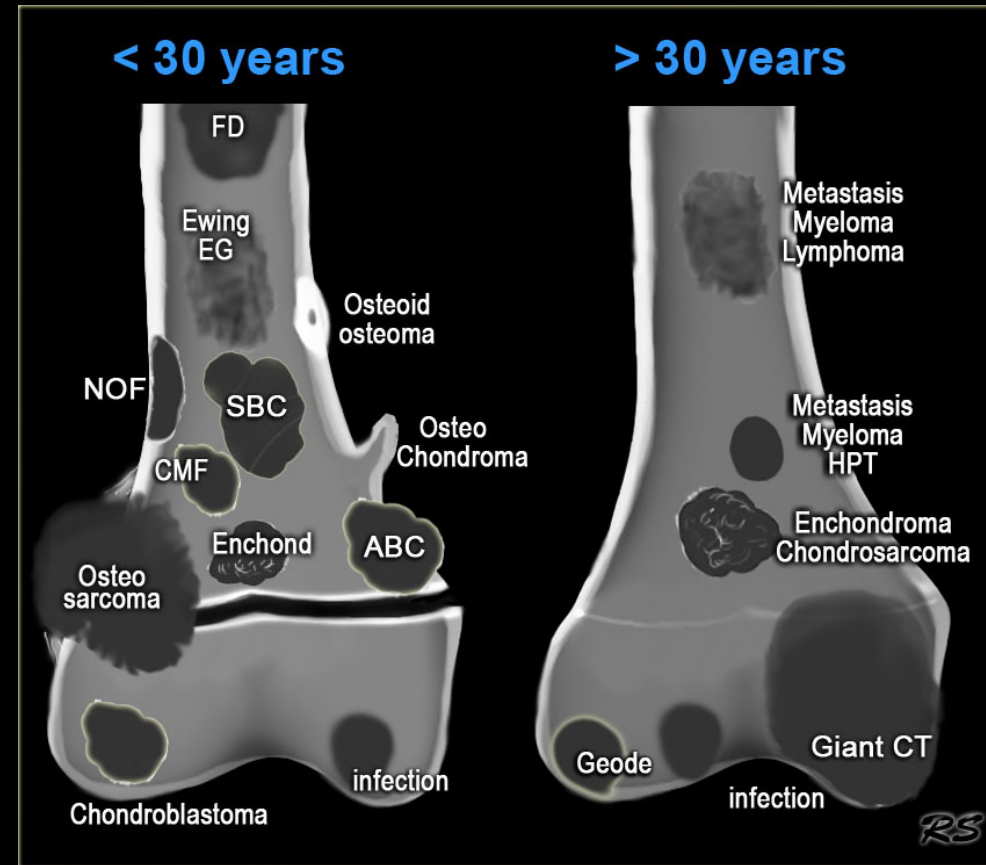
Figure 5: Coronal CT

Key imaging findings

- Large distal femur lucency, measuring about 1.5 cm in diameter, centered in the epiphysis
- CT demonstrates no involvement of the physis or articular surface
- Mixed signal intensity on T2 MRI and **intermediate** intensity on T1 MRI

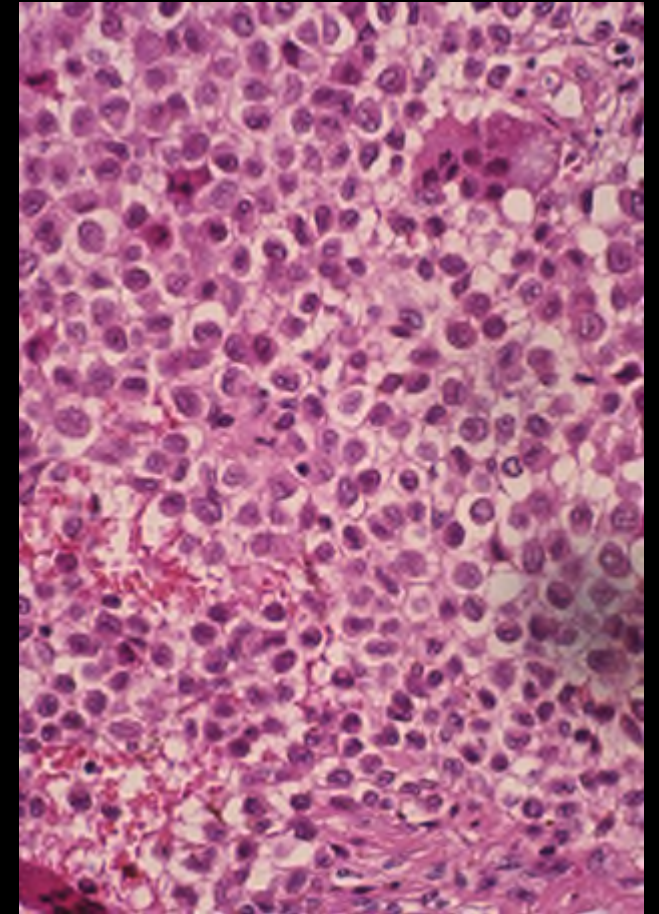
Differential Diagnosis

- 1) Chondroblastoma
- 2) Osteomyelitis
- 3) Giant cell tumor
- 4) Clear cell chondrosarcoma



Discussion – chondroblastoma

- Benign chondrogenic lesion
- Demographics: usually M <25 y/o (average 12 y/o) in distal femur or proximal tibia
- Theory that it arises from cartilaginous epiphyseal plate
- <1% pulmonary mets
- Symptoms: progressive pain with tenderness over affected bone, limping, decreased ROM, effusion
- Histology: chondroblasts in “cobblestone” or “chickenwire” appearance with occasional multinucleated giant cells



Discussion (cont.)

- Additional studies needed:
 - CXR: r/u pulmonary mets
 - if suspicion of malignancy low, biopsy at time of surgery
 - if unclear, core needle biopsy prior to definitive tx
- Follow-up/ prognosis
 - recurrence: average 34 months after surgery
 - monitor patients for several years with serial XR

Final Diagnosis

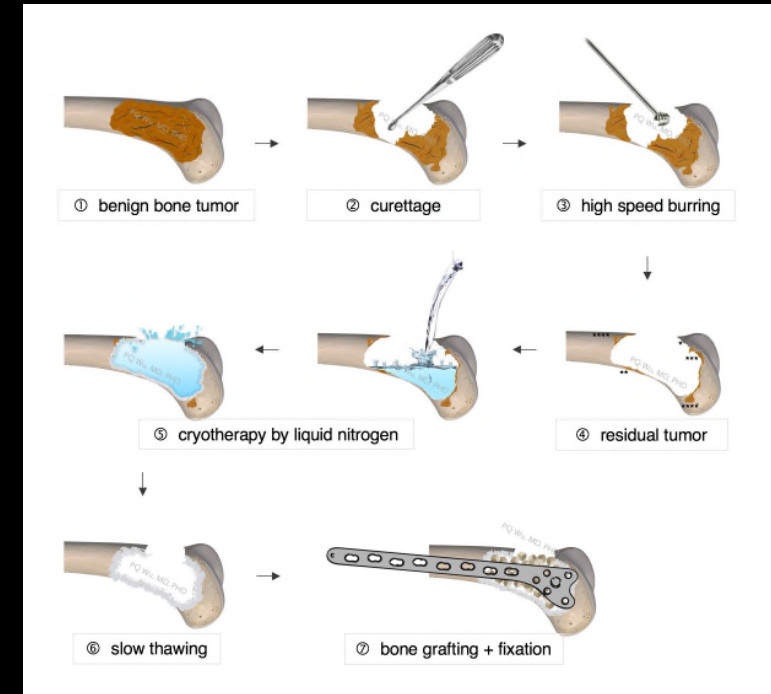
Chondroblastoma

Enneking Classification of Benign Bone Tumours

STAGE	DESCRIPTION	TUMOUR EXAMPLES
1	Inactive	NOF, Enchondroma
2	Active	GCT, ABC, UBC, Chondroblastoma
3	Aggressive	GCT, ABC

Treatment

- Intralesional curettage and bone grafting
 - if symptomatic
 - may do adjuvant local cryotherapy to decrease recurrence
- Surgical resection
 - if pulmonary mets



ACR appropriateness Criteria

Variant 1: Suspect primary bone tumor. Initial imaging.		
Procedure	Appropriateness Category	Relative Radiation Level
Radiography area of interest	Usually Appropriate	Varies
CT area of interest with IV contrast	Usually Not Appropriate	Varies
CT area of interest without and with IV contrast	Usually Not Appropriate	Varies
CT area of interest without IV contrast	Usually Not Appropriate	Varies
FDG-PET/CT whole body	Usually Not Appropriate	⊕⊕⊕⊕
MRI area of interest without and with IV contrast	Usually Not Appropriate	○
MRI area of interest without IV contrast	Usually Not Appropriate	○
Tc-99m bone scan whole body	Usually Not Appropriate	⊕⊕⊕
US area of interest	Usually Not Appropriate	○

Variant 3: Suspect primary bone tumor. Benign radiographic features. Not osteoid osteoma. Next imaging study.		
Procedure	Appropriateness Category	Relative Radiation Level
MRI area of interest without and with IV contrast	May Be Appropriate	○
MRI area of interest without IV contrast	May Be Appropriate	○
CT area of interest without IV contrast	May Be Appropriate	Varies
CT area of interest with IV contrast	Usually Not Appropriate	Varies
CT area of interest without and with IV contrast	Usually Not Appropriate	Varies
FDG-PET/CT whole body	Usually Not Appropriate	⊕⊕⊕⊕
Tc-99m bone scan whole body	Usually Not Appropriate	⊕⊕⊕
US area of interest	Usually Not Appropriate	○

Costs

- XR knee (3 views)
 - Insured: \$770; pt owes \$48
 - Uninsured: \$277
- CT LE w/o contrast
 - Insured: \$3078; pt owes \$517
 - Uninsured: \$1108
- MRI LE w/o contrast
 - Insured: \$4458; pt owes \$1021
 - Uninsured: \$1605

Take Home Points

- Primary bone tumors can mimic simple trauma or inflammatory joint disease at presentation
- Chondroblastoma is characterized by a well-defined lucent lesion in the epiphysis of long tubular bones
- Follow-up is paramount: due to risk of recurrence and potential complications postoperatively

References

- <https://radiopaedia.org/articles/chondroblastoma?lang=us>
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Questions?