AMSER Case of the Month

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“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?
### Variant 1:

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

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
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</thead>
<tbody>
<tr>
<td>Radiography knee</td>
<td>Usually Appropriate</td>
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<tr>
<td>Aspiration knee</td>
<td>Usually Not Appropriate</td>
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<tr>
<td>CT arthrography knee</td>
<td>Usually Not Appropriate</td>
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<td>CT knee with IV contrast</td>
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<tr>
<td>Bone scan knee</td>
<td>Usually Not Appropriate</td>
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<td>US knee</td>
<td>Usually Not Appropriate</td>
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<tr>
<td>Radiography hip ipsilateral</td>
<td>Usually Not Appropriate</td>
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Osteolytic metaphyseal lesion, narrow zone of transition

Thin sclerotic margins
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
Multi-loculated

Fluid-fluid levels

Bone marrow edema
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


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