17-Year-Old Male who presents with painful scoliosis

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Patient Presentation

- **HPI:** 17 YO male who presents for a scoliosis evaluation with history of chronic back pain. Pt does have a family hx of scoliosis and has never been evaluated for scoliosis previously. Pt is active in marching band and competitive bowling league.

- **PMhx:** None

- **Medications:** None

- **Social Hx:** NA
Patient Objective Data

• **MSK Exam:**
  - **Gait:** Upright normal gait, no leg length discrepancy present
  - **Adam’s test:** Right thoracic rib hump, while standing there is a right-sided truncal shift, no shoulder asymmetry
  - **ROM:** Full active range of motion in forward, extension, and lateral bending

• **Neuro:**
  - **Strength:** Normal: 5/5 in all extremities
  - **Reflexes:** Normal: 2+ Patellar tendon
  - **Babinski:** Negative
  - **Clonus:** Positive, abnormal sustained clonus in LLE
What Imaging Should We Order?
Select the applicable ACR Appropriateness Criteria

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Radiation Dose</th>
<th>Radiation Risk</th>
<th>Appropriateness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiography complete spine</td>
<td>Null</td>
<td>0.3-3 mSv [ped]</td>
<td>Usually appropriate</td>
</tr>
<tr>
<td>MRI complete spine without IV contrast</td>
<td>0 mSv O</td>
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*Adam’s Forward Bending test: Screening test for scoliosis, examinee bends over with feet together and touches their feet. An examiner is looking for the following: unlevel shoulders, scapular asymmetry, unlevel hips, or a rib hump.
Findings: (labeled)

In office reading: Atypical scoliosis, right thoracic curvature. Curvature is from T4-L3 is approximately 30 degrees

Closer look at T11 demonstrates a sclerotic focus projecting just below the left pedicle (yellow arrow)
• Considering the upper motor neuron findings, sustained clonus of the right lower extremity. These findings cannot be adequately explained considering the x-ray findings.

• What should we order next? What is ACR appropriate?
Select the applicable ACR Appropriateness Criteria

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This imaging modality was next ordered by the Orthopaedic physician.

Since patient had positive clonus on physical exam, a MRI complete spine without IV contrast was appropriately ordered.
Findings: (Unlabeled)
Findings: (labeled)

Green Arrow: Axial T2 weighted MRI. Marrow edema in the left posterior vertebral body, pedicle, and transverse process of T11.

Red Arrow: Sagittal T2 weighted MRI. Marked edema in the left paraspinal musculature around T11. Low signal focus within the left T11 pedicle corresponding to the area of X-ray finding.
Select the applicable ACR Appropriateness Criteria

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<td>Usually appropriate</td>
</tr>
<tr>
<td>MRI thoracic spine without IV contrast</td>
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<td>May be appropriate</td>
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<td>MRI thoracic spine without and with IV contrast</td>
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<td>May be appropriate</td>
</tr>
<tr>
<td>Bone scan whole body with SPECT or SPECT/CT spine</td>
<td>1-10</td>
<td>May be appropriate</td>
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This imaging modality was next ordered by the Orthopaedic physician.

MRI findings suggestive of a reactive inflammatory process secondary to potential osteoid osteoma. CT Spine was appropriately ordered to further evaluate etiology of inflammatory response.
Findings: (unlabeled)
Findings: (labeled)

Red Arrows: Sclerotic nidus in the left T11 pedicle and pars interarticularis junction with lucent soft tissue rind. Perilesional sclerosis in the pedicle and articular facet.

Green Arrow: T11 left pedicle with a central sclerotic nidus
Final Dx:

Osteoid Osteoma
Case: Osteoid Osteoma

• Epidemiology:
  • Osteoid Osteoma accounts for roughly 10% - 12% of benign bone tumors and 3% of all primary bone tumors
  • Commonly develops between 5 to 25 years of age
  • Male predominance 2:1 to 3:1
  • Approximately 6% – 20% occur in the spine

• Symptoms:
  • Severe localized pain that is often worse at night
  • Relieved with NSAID or aspirin

• Pathology:
  • Concentric lesion with a nidus of dilated vessels, osteoblasts, osteoid and woven bone. The nidus releases prostaglandins which causes localized pain.
Case: Osteoid Osteoma

• Case:
  • CT thoracic spine was ordered following an incidental finding on MRI of thoracic spine depicting marrow edema of the posterior vertebral body of T11 with extension into the left posterior 11th rib, left 11th pedicle and transverse process
    • Determined to be an osteoid osteoma and no medical intervention has been discussed at this time
  
• Patient has been managing back pain with OTC NSAID’s with relief
Case: Osteoid Osteoma

• **DDX:**
  
  • *Brodie abscess:* radiolucent center and surrounding reactive sclerosis can mimic osteoid osteoma. Intracortical appearance is irregular verse intracortical margins of osteoid osteoma are smooth.

  • Can be distinguished from other primary bone tumors based on size, location, pathology, and clinical symptoms.
Case: Osteoid Osteoma

- **Treatment:**
  - **Non-operative:**
    - NSAID or aspirin therapy for pain management
  - **Surgical Management:**
    - Reserved for pts where NSAID therapy has failed, in pts not willing to tolerate the pain, or at high risk for long-term renal and GI complications from continuous NSAID use
  - **En Bloc Resection:**
    - For sx relief, entire nidus has to be excised
  - **CT guided percutaneous techniques:**
    - Trephine excisions, cryoablation, radiofrequency ablation, laser thermocoagulation
    - RF ablation as a tx has a 91% of clinical success, brief recovery and low complication rate
References:

