RADY 401 Case Presentation

Craig Sweeney, MS4
June 15, 2020
Focused Patient History and Workup

• 31 year old with a history of bipolar disorder and polysubstance abuse
• Presents with 2 days of subjective fever, chills, malaise, and 1 month of atraumatic central low back pain with radiation down both posterior thighs
• Surgical, medical, and family histories otherwise non-contributory

  • Vitals: HR 105, BP 128/69, 37 C, RR 12, SpO2 99%, BMI 28.3
  • PE: Tachycardic, tender to palpation of mid-lumbar spine, positive straight leg test bilaterally, 5/5 strength throughout, intact sensation to light touch throughout, otherwise normal

  • Labs:
    • CBC: Hg 9.8, WBC 9.0, Plt 344
    • BMP: Cr 1.06, otherwise WNL
    • ESR: 37 (0-15 mm/h)
    • CRP: 50.9 (<10 mg/L)
List of Imaging Studies

- Lumbar spine x-ray
- Lumbar spine MRI, with and without contrast
- Cervical spine x-ray
- Cervical and thoracic spine MRI, with and without contrast
Lumbar Spine X-Ray

“Narrowing at the L2-3 intervertebral disc (white oval).
Mildly indistinct endplates at L2, consistent with discitis.
Mild narrowing at L4-5 and L5-S1 but no fracture or other osteolysis (white circle).”
Lumbar Spine MRI

T1: Decreased signal in L2-L3 vertebral bodies, loss of endplate definition (white arrow).

T2: Circumscribed region of increased signal in spinal canal at levels L3-L5 (white arrow).
Lumbar Spine MRI

T2 STIR: Increased signal in vertebral bodies of L2-L3. Loss of endplate definition. (white arrow)

T1 Post Gd:
Enhancement of adjacent L2-L3 endplates extending intradurally. Circumscribed non-enhancing region consistent with epidural abscess (white arrow).
Lumbar Spine MRI: 6 Weeks After Presentation

“L2-L3: Erosion of vertebral endplates. Extension of avidly enhancing tissue posteriorly into the ventral epidural space as well as intrathecally into the spinal canal consistent with phlegmon (white circle).

L3: Abscess formation within the intradural space extending inferiorly to the L5-S1 level (white arrow).

Smaller nonenhancing central abscess at L5 and S1 (white arrow).

Above this level, there is extensive leptomeningeal enhancement coating the nerve roots and spinal cord extending to the thoracic spine as outlined above (astericks). Inflammatory changes extend to the right L2-L3 neural foramen (white circle).”
"Extensive bone destruction affects the inferior endplate of C5 and superior endplate of C6, and there is mild retrolisthesis at C5-6, loss of intervertebral disc height and focal kyphosis at this level (white oval). There is also prominent soft tissue swelling anteriorly, and there are small bone fragments anterior to the destroyed C5-6 intervertebral disc. There is also associated widening of the interspinous space and facet joints at C5-6."
“Marked T2 hyperintense signal of the intervertebral disc at C5-C6 with involvement of the vertebral bodies of C5 and C6 which appear moderately reduced in height with mild C5-C6 retrolisthesis (white oval).

Moderate-marked narrowing of the spinal canal at C5-6 with complete effacement of the CSF space and indentation/deforrmity of the ventral cord from C4-5 through C6-7. There may be mild T2 hyperintensity within the cord suggesting edema at the C4-5 and C5-6 levels.”
Patient Treatment and Outcome: Chronic Osteomyelitis

- Initially received 6 weeks IV antibiotics (vancomycin, Zosyn)
- MRI showed worsening osteomyelitis/discitis in addition to cervical spine disease, received additional antibiotics
  - 6 weeks vancomycin/meropenem
  - 6 weeks daptomycin/meropenem
- Multiple admissions and courses of IV/oral antibiotics
  - Many negative blood cultures (x6)
  - Bone biopsy grew MRSA (obtained 4 months after initial presentation)
  - Eventually on continual suppressive antibiotics (2.5+ years and counting)
- Eventual surgeries (2+ years after initial presentation)
  - C5-6 anterior corpectomy, C4-7 laminectomy, C3-T1 posterior fusion
  - C2-3 and C4-5 anterior dissection and fusion, C2-T2 revision posterior fusion
Imaging in Acute/Subacute Back Pain

**Clinical Condition:** Low Back Pain

**Variant 1:** Acute, subacute, or chronic uncomplicated low back pain or radiculopathy. No red flags. No prior management.

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
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</thead>
<tbody>
<tr>
<td>MRI lumbar spine without IV contrast</td>
<td>2</td>
<td></td>
<td>⬜️</td>
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<tr>
<td>X-ray lumbar spine</td>
<td>2</td>
<td></td>
<td>⬜️⬜️⬜️</td>
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<tr>
<td>CT myelography lumbar spine</td>
<td>2</td>
<td></td>
<td>⬜️⬜️⬜️ ⬜️</td>
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<tr>
<td>Tc-99m bone scan with SPECT spine</td>
<td>2</td>
<td>If there is concern for spondyloysis in a young patient, SPECT/CT remains the gold standard.</td>
<td>⬜️⬜️</td>
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<tr>
<td>CT lumbar spine without IV contrast</td>
<td>2</td>
<td></td>
<td>⬜️⬜️⬜️</td>
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<tr>
<td>CT lumbar spine with IV contrast</td>
<td>2</td>
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# Imaging in Osteomyelitis/Discitis

**Clinical Condition:** Low Back Pain

**Variant 3:** Acute, subacute, or chronic low back pain or radiculopathy. One or more of the following: suspicion of cancer, infection, or immunosuppression.

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<tbody>
<tr>
<td>MRI lumbar spine without and with IV contrast</td>
<td>8</td>
<td>Contrast is useful for neoplasia patients suspected of epidural or intraspinal disease.</td>
<td>O</td>
</tr>
<tr>
<td>MRI lumbar spine without IV contrast</td>
<td>7</td>
<td>Noncontrast MRI can be sufficient if there is low risk of epidural and/or intraspinal disease.</td>
<td>O</td>
</tr>
<tr>
<td>CT lumbar spine with IV contrast</td>
<td>6</td>
<td>MRI is preferred. CT is useful if MRI is contraindicated or unavailable and/or for problem solving.</td>
<td>+++</td>
</tr>
<tr>
<td>CT lumbar spine without IV contrast</td>
<td>6</td>
<td>MRI is preferred. CT is useful if MRI is contraindicated or unavailable and/or for problem solving.</td>
<td>+++</td>
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<tr>
<td>X-ray lumbar spine</td>
<td>5</td>
<td></td>
<td>+++</td>
</tr>
<tr>
<td>Tc-99m bone scan whole body with SPECT spine</td>
<td>4</td>
<td>SPECT/CT can be useful for anatomic localization and problem solving, in particular if looking for widespread tumor burden. It is valuable when multifocal metastases are suspected.</td>
<td>+++</td>
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Back Pain Red Flags\textsuperscript{2,3}

- History of cancer
- Unexplained weight loss
- Prolonged use of steroids
- Significant trauma related to age
- Bladder or bowel incontinence
- Urinary retention
- Fever
- Saddle anesthesia
- Pain that increases or is unrelieved by rest

- Risk factors for infection:
  - Immunosuppression
  - Recent IVDU
  - Current hemodialysis
  - Recent epidural/spinal procedure
  - Recent bacteremia/endocarditis

- NOT red flags:
  - Radiculopathy attributable to a single nerve root level
  - Stable symptoms due to spinal stenosis
Imaging Findings in Osteomyelitis/Discitis

- Radiographs:
  - May be normal for 1-4 weeks after onset of infection
  - Findings: loss of intervertebral disc height, loss of definition at vertebral endplates, occasional erosions

- MRI:
  - T1: Low signal intensity abnormalities, heterogeneous contrast enhancement
  - T2: High signal abnormalities (especially STIR), loss of intranuclear cleft in disc, erosions and cortical disruptions at vertebral body endplates
  - May see extension into thecal sac, spinal canal, or epidural abscess
Imaging in Osteomyelitis/Discitis

• Radiographs\textsuperscript{5}:
  • Sensitivity: 54%
  • Specificity: 68%
  • Radiation\textsuperscript{6}: 0.5-1.8 mSv
    • 1.5 mSv = 6 mo background radiation
  • Cost: (UNC Chargemaster)
    • Lumbosacral: $399
    • Cervical: $380

• MRI\textsuperscript{7}:
  • Sensitivity: 93-96%
  • Specificity: 92-97%
  • Radiation: None
  • Cost: (UNC Chargemaster)
    • Lumbar w/ contrast: $3,373
    • Lumbar w/o contrast: $2,437
    • Cervical w/ contrast: $3,559
    • Cervical w/o contrast: $3,182
UNC Top Three

• Remember back pain red flags. Sciatica and stable spinal stenosis do not constitute red flags

• MRI is the imaging modality of choice for evaluating infectious or neoplastic causes of back pain and spinal cord disease

• Initial changes may be nonspecific and sensitivity of MRI (and x-ray) increases with time, and unfortunately progression of disease
References


