58-year-old male presents for back pain

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Patient Presentation

• 58-year-old obese, white male presented to his rheumatologist for worsening pain in his back and right foot pain

• 2 weeks prior to presentation, the patient was working on a vehicle and began having severe right-sided leg cramps
  • This progressed to leg weakness

• Patient reports mid-back pain rated a 6/10 on the pain scale, increased neck pain, and deep groin pain

• He had stopped his Humira (adalimumab) for 4 weeks due to concerns about COVID-19

• PMHx: Type II diabetes mellitus, gout, ankylosing spondylitis, osteoarthritis, coronary artery disease

• PSHx: Appendectomy, cervical laminectomy w/ arthrodesis, femur/knee surgery, triple coronary artery bypass grafting

• Family Hx: Type II diabetes mellitus, hypertension, heart disease
Physical Exam

- **Blood pressure:** 130/82
- **Pulse:** 62
- **Respirations:** 17
- **Weight:** 283 lbs (128.4 kg)
- **General:** Obese man in no acute distress, no diaphoresis
- **Neck:** Limited range of motion (unchanged), no thyromegaly
- **Musculoskeletal:** Kyphosis of thoracic spine, mid-thoracic tenderness, right-sided tenderness from thoracic to lumbar spine, negative modified straight leg raise on right, negative leg roll on right, mild joint line tenderness on bilateral knees
- **Neurologic:** 4/5 strength in right leg, no focal deficits, no abnormal muscle tone, normal coordination
What Imaging Should We Order? Why?
**ACR Appropriateness Criteria**

**Clinical Condition:** Chronic Back Pain: Suspected Sacroiliitis/Spondyloarthropathy

**Variant 5:** Spine ankyloses. Suspected fracture.

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
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</thead>
<tbody>
<tr>
<td>CT spine area of interest without IV contrast</td>
<td>9</td>
<td>Required as standard of care for exclusion of fracture in patients with ankylosis.</td>
<td>Varies</td>
</tr>
<tr>
<td>X-ray spine area of interest</td>
<td>8</td>
<td>If negative, additional imaging required.</td>
<td>Varies</td>
</tr>
<tr>
<td>MRI spine area of interest without IV contrast</td>
<td>8</td>
<td>This procedure should be performed in patients with neurologic symptoms.</td>
<td>O</td>
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<tr>
<td>Tc-99m bone scan with SPECT spine</td>
<td>2</td>
<td>This procedure may be helpful to localize source of pain, but generally not helpful for establishing an inflammatory diagnosis.</td>
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<tr>
<td>CT spine area of interest with IV contrast</td>
<td>1</td>
<td></td>
<td>Varies</td>
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<tr>
<td>CT spine area of interest without IV contrast</td>
<td>1</td>
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<td>Varies</td>
</tr>
<tr>
<td>MRI spine area of interest without and with IV contrast</td>
<td>1</td>
<td></td>
<td>O</td>
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<tr>
<td>FDG-PET/CT whole body</td>
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</table>

**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level*

**What was ordered by rheumatologist**

**Why?**

- Because of known Ankylosing spondylitis, DDx included fracture
X-Rays of Thoracic and Lumbar Spine (unlabeled)

- Sagittal Thoracic
- AP Lumbar
- Sagittal Lumbar
X-Rays of Thoracic and Lumbar Spine (labeled)

Sagittal Thoracic

Cervicothoracic fusion – transpedicular screws

Normal thoracic kyphosis

Disc space narrowing

Bridging syndesmophytes

T8

AP Lumbar

Bridging syndesmophytes

Joint space narrowing and partial ankylosis of left SI joint

L5

Enthesopathic changes to iliolumbar ligament

Osteoarthritis

Sagittal Lumbar

Disc space narrowing

Normal lumbar lordosis

Severe facet arthropathy

Anterior longitudinal ligament ossification

L5

L

Cervicothoracic fusion – transpedicular screws
Final Dx:

Ankylosing Spondylitis with Partial Ankylosis of Left Sacroiliac Joint

No Fractures
Treatment

• Given a 7-day prescription of methylprednisolone for his leg pain and weakness
• Instructed to continue his Humira
• Counseled on weight loss and core strengthening to maintain joint and muscle health
Case Discussion: Ankylosing Spondylitis

• Ankylosing spondylitis
  • Chronic inflammatory disease spondyloarthropathy - affects the sacroiliac joints and spine
  • Seronegative → rheumatoid factor negative
  • Also known as Bechterew disease and Marie Strümpell disease

• Differential Diagnoses: Other spondyloarthropathies
  • Psoriatic arthritis
  • Inflammatory bowel disease-related arthritis
  • Reactive arthritis
Case Discussion: Ankylosing Spondylitis

• Epidemiology
  • Peak onset: 20 to 30 years old
  • 80% develop first symptoms before age 30
  • Male to female ratio 2-3:1
  • Human leukocyte antigen (HLA)-B27 positive
    • 90% of ankylosing spondylitis patients are HLA-B27 positive
    • 5-6% of HLA-B27 positive patients will develop ankylosing spondylitis

• Risk Factors
  • Increased risk among relatives
    • Monozygotic twins – highest risk
    • First-degree relatives > second-degree relatives > third-degree relatives
Case Discussion: Ankylosing Spondylitis

• Signs/Symptoms
  • Back pain
    • Spine and sacroiliac joints
    • Improves with exercise and NSAIDs
    • Pain at night/with decreased activity
  • Peripheral arthritis
  • Costovertebral, manubriosternal, sternoclavicular, and costochondral inflammation
  • Enthesitis - inflammation of extraspinal connective tissue between tendon/ligament and bone
  • Dactylitis
  • Impaired spinal mobility
  • Postural abnormalities – hyperkyphosis

• Complications and Comorbidities
  • Low bone mineral density
  • Spinal fragility fractures
    • Three-column “chalk stick” fractures can be a serious complication
  • Atlantoaxial subluxation
  • Nerve root compression
  • Renal disease
    • Glomerulopathy
    • IgA nephropathy
    • Renal amyloidosis
  • Cardiovascular disease
  • Anterior uveitis
  • Apical pulmonary fibrosis
  • Psychosocial health problems
Case Discussion: Ankylosing Spondylitis

• Diagnosis
  • X-ray of the pelvis and lumbar spine – look for sacroiliitis
  • If radiographs are negative:
    • Test for HLA-B27 and C-reactive protein
    • MRI:
      • With inflammatory sacroiliac symptoms \(\rightarrow\) with and without contrast
      • With inflammatory back symptoms \(\rightarrow\) without contrast
Case Discussion: Ankylosing Spondylitis

- Radiographic findings
  - Grading sacroiliitis
    - Grade 0 - normal
    - Grade 1 – some blurring of the joint margins
    - Grade 2 – minimal sclerosis with some erosions
    - Grade 3 – definite sclerosis on both sides of joint OR severe erosions with widening of the joint space, with or without ankylosis
      - Seen in this patient
    - Grade 4 – complete ankylosis

**Case Discussion: Ankylosing Spondylitis**

- **Shiny Corner sign**
  - Reactive sclerosis – inflammatory erosions at the superior and inferior endplates of the vertebral bodies

- **Bamboo spine**
  - Vertebral body fusion by syndesmophytes
  - Posterior vertebrae elements may also fuse

- **Dagger sign**
  - Ossification of the supraspinous and interspinous ligaments
Case Discussion: Ankylosing Spondylitis

- **Treatment**
  - **Initial therapy**
    - Non-pharmacologic
      - Education about their disease and life-long exercise and postural training
      - Smoking cessation
      - Depression screenings and psychosocial support
      - Physical therapy – postural training, range of motion exercises, stretching
      - Manipulation techniques – manual massage, mechanical vibrations, indirect osteopathic manipulative treatments
    - Pharmacologic
      - NSAIDs – naproxen, celecoxib, or ibuprofen
  - NSAID therapy failure
    - Inadequate response of 2 different NSAIDs for 2-4 weeks each
    - Tumor necrosis factor-alpha inhibitors - adalimumab, certolizumab, etanercept, golimumab, infliximab
    - Interleukin-17 inhibitors - Secukinumab, Ixekizumab
References: