RADY 401 Case Presentation: Psoriatic Arthritis

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Focused patient history and workup

• 64-year-old female
• History of psoriasis, psoriatic arthritis (diagnosed about 20 yr prior) and stage III melanoma status post excision and interferon treatment
• Presenting to UNC Rheumatology Clinic for routine follow-up
• Her arthritis is currently well-controlled on etanercept (Enbrel) and she reports stable restricted range-of-motion and no new joint pain, swelling or stiffness
  • In the past, she has experienced significant joint pain, swelling and stiffness in both hands, esp. in the mornings

Abbreviations: ESR: erythrocyte sedimentation rate, CRP: C-reactive protein, RF: rheumatoid factor, CCP: cyclic citrullinated peptide
Focused patient history and workup

• Physical exam shows chronic arthritic changes in both hands without evidence of active joint inflammation (“synovitis”) & psoriatic plaques over bilateral elbows

• Previous workup: elevated ESR, CRP during flares; RF & CCP negative; dermatopathology confirmed psoriasis; hand x-rays in x3 over about 10 yrs

Abbreviations: ESR: erythrocyte sedimentation rate, CRP: C-reactive protein, RF: rheumatoid factor, CCP: cyclic citrullinated peptide
List of imaging studies

• Bilateral hand x-rays
  - Posteroanterior (PA) view
  - Posterior oblique view
Imaging studies: Bilateral hand x-rays (PA view)
Imaging studies: Bilateral hand x-rays (PA view)

- Multifocal proximal and distal interphalangeal (PIP, DIP) joint narrowing & osseus overgrowth/fusion (blue circles)
- Medial subluxation of the right 3rd PIP joint (blue arrow)
- Multifocal metacarpophalangeal (MCP) joint space narrowing and osseus overgrowth, especially at the right 5th and left 4th-5th MCPs (white arrows)
- Intercarpal narrowing and new bone formation, especially at the right radial styloid process and right trapezium (white circles)
- Multiple interphalangeal joint effusions
Imaging studies: Bilateral hand x-rays (PA view) normal compare

- Joint spaces are preserved
- No bone erosions, osseus overgrowth or joint fusions
- No joint effusions or soft tissue swelling
Imaging studies: Bilateral hand x-rays (Posterior oblique view)

Similar findings to PA view: multifocal joint narrowing and osseus overgrowth typical of psoriatic arthritis
Radiographic disease progression from 2011-Present
Radiographic disease progression from 2011-Present

Progressive narrowing and erosions bilaterally, especially in the right 3rd and 4th digits – correlates with inconsistent biologic treatment due to melanoma diagnosis

No progressive joint space narrowing or erosions, suggesting minimal active inflammation
Patient treatment

- Treated with etanercept (Enbrel) since 2013 with significant symptom relief
- Recent hand radiographs (2022) show no progression of erosive disease compared to prior hand radiographs (2019)
- History and physical examination do not suggest active inflammation
- Plan is to continue etanercept, with routine Rheumatology and Dermatology follow-up

Imaging discussion: Plain radiographs in psoriatic arthritis

• First line imaging study for psoriatic arthritis
  - Establish baseline (how much existing joint damage is present?)
  - Monitor progression of joint disease
• Standard hand views: PA & Norgaard/posterior oblique/ball-catcher (better at demonstrating joint erosions)
• Decent specificity, but low sensitivity for detecting structural bone damage (0.88 and 0.48, respectively)
Imaging discussion: Plain radiographs in psoriatic arthritis

• Not useful for identifying *active* inflammation in joints or soft tissues
  - May see non-specific soft tissue swelling or large joint effusions but not synovitis, enthesitis, etc.
  - Mostly shows chronic / irreversible changes from prior inflammation
• Fast, feasible, and relatively inexpensive ($100-$400)
• Minimal effective radiation dose, especially for extremity films
  - Extremity x-ray: 0.0001 mSv (3 hours natural background radiation)
  - Spinal x-ray 1.5 mSv (6 months natural background radiation)
Plain radiographs can demonstrate the heterogeneity of psoriatic joint disease

• Various psoriatic arthritis “phenotypes”:
  - Symmetric polyarthritis (“rheumatoid arthritis-like”)
  - Distal arthritis (predominately DIP joints)
  - Asymmetric oligo- or mono-arthritis
  - Arthritis mutilans (marked osteolysis)
  - Axial disease (sacroiliitis, “ankylosing spondylitis-like”)

• Bone/joint changes are characterized by erosions, osteolysis, and new bone formation
  - Osteolysis can lead to the classic “pencil-in-cup” deformity

• Psoriatic arthritis can also have an array of extra-articular manifestations (e.g., rash, enthesitis, plantar fasciitis, tendonitis, uveitis, fingernail disease, etc.)
Plain radiographs can demonstrate the heterogeneity of psoriatic joint disease

Arthritis Mutilans w/ “pencil-in-cup”

Polyarthritis (case patient)

Sacroiliitis

Image Sources (Left to Right): 1) Bell et al. (2011) *The Journal of Rheumatology*, 2) UNC Health Epic, 3) Dafna and Ritchlin (Updated 2022) *UpToDate*
**American College of Radiology**
**ACR Appropriateness Criteria®**
**Chronic Extremity Joint Pain—Suspected Inflammatory Arthritis**

**Variant 2:** Chronic extremity joint pain. Suspect seronegative spondyloarthropathy.

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<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
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<tr>
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**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level*
Ultrasonography for assessing psoriatic arthritis

• High sensitivity compared to radiography
• Especially useful for assessing *current joint inflammation* (i.e., synovitis)
  • 2x sensitivity of U/S vs. physical examination for detecting synovitis in the hands
  • Can identify “sub-clinical synovitis”
• Can also identify extra-articular manifestations (e.g., tendon thickening, tenosynovitis, enthesitis)
• Pros: No ionizing radiation, relatively inexpensive
• Cons: Highly operator-dependent, requires provider training in MSK U/S, scanning multiple small joints takes time
MSK Ultrasound - longitudinal view through a metacarpophalangeal joint with synovitis

• Left image: Gray scale thickening (*) between MCP joint and extensor tendon (dotted line)
• Right image: Increased power Doppler signal indicating hypervascularity, consistent with active synovitis
• Source: Dubash et al. (2020) “Ultrasound Imaging in Psoriatic Arthritis: What Have We Learnt in the Last Five Years?” Frontiers in Medicine, Vol 7.
Utility of MRI in psoriatic arthritis

- Demonstrates active inflammatory lesions and chronic structural damage
- Evaluates peripheral and axial joints as well as soft tissues (entheses, ligaments, tendons)
- Useful tool for detecting early inflammatory disease not visible on x-ray
  - Especially good for early sacroiliitis
- Pros: No ionizing radiation, highly sensitive
- Cons: Takes time, expensive (>2K)
Example MRI from a patient with 9 months of inflammatory back pain and elevated CRP

- Coronal T1 MRI of sacroiliac joints demonstrating early sacroiliitis
- Erosive changes in sacroiliac joints (arrowheads)
- Bone marrow edema indicative of inflammatory changes (arrows)

1. Psoriatic arthritis is a progressive disease characterized by diverse clinical features (i.e., various patterns of joint involvement and extra-articular manifestations).

Plain radiographs should be the **first line of imaging** for affected joints to evaluate for erosive changes and track progression. Ultrasonography and MRI can be used as **adjuncts to radiography** in assessing for active inflammation, early disease, and/or soft tissue involvement.

Image source: [https://www.istockphoto.com/photos/takeaways](https://www.istockphoto.com/photos/takeaways)
UNC Top Three: Psoriatic Arthritis

1. Psoriatic arthritis is a **heterogeneous, progressive disease** characterized by **diverse clinical features** (i.e., various patterns of joint involvement and extra-articular manifestations)

2. **Plain radiographs** should be the **first line of imaging** for affected joints to evaluate for erosive changes and track progression

3. **Ultrasonography** and **MRI** can be used as **adjuncts to radiography** in assessing for active inflammation, early disease, and/or soft tissue involvement

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References


