AMSER Case of the Month
November 2021

46-year-old male presents with increasing pain and swelling in hand

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Patient Presentation

- HPI: 3 weeks prior, patient hit hand off bed rail. Pain continued even after immobilization, rest, and pain meds. He now presents with increasing pain and swelling.

- PMHx: Depression, Anxiety

- PSHx: Non-Recent Bilateral Carpal Tunnel Release

- Vitals: 134/81, 97.3 F, HR 80, SpO2 99%

- Physical Exam: Stiffness and swelling in right wrist and hand radiating to forearm
What Imaging Should We Order?
Select the applicable ACR Appropriateness Criteria

This imaging modality was ordered by the physician.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
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<tbody>
<tr>
<td>Radiography area of interest</td>
<td>Usually Appropriate</td>
<td>Varies</td>
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<tr>
<td>CT area of interest with IV contrast</td>
<td>Usually Not Appropriate</td>
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<td>US area of interest</td>
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X-rays 3/25/21

No abnormalities noted
X-ray PA Unilateral 4/10/21 (unlabeled)
X-ray PA Unilateral 4/10/21 (labeled)

Interval new diffuse soft tissue swelling throughout hand

Interval new periarticular osteopenia
X-ray Bilateral 4/10/21 (unlabeled)
X-ray Bilateral 4/10/21 (labeled)

Normal Left Hand vs. Symptomatic Right Hand
X-ray Comparison: 3/25/21 vs. 4/10/21 (unlabeled)
X-ray Comparison: 3/25/21 vs. 4/10/21 (labeled)

Note the stark differences especially between the carpals/metacarpals
Select the applicable ACR Appropriateness Criteria

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This imaging modality was ordered by the physician
CT Coronal MPR (labeled)

Widespread Periarticular Osteopenia and Subperiosteal Bone Resorption
Final Dx:

Complex Regional Pain Syndrome (CRPS)
Case Discussion (1-3 slides)

• Epidemiology:
  • Typically females > males in their 40s-50s
  • Most commonly from trauma: crush injuries, fractures, sprains, surgery
    • Many cases are idiopathic, however
  • Associated with history of psychological factors such as anxiety

• Pathophysiology
  • Multi-factorial
    • Initial Inflammatory Response: Proinflammatory Neuropeptides & Cytokines
      • Warm edematous skin
    • Peripheral & Central Nociceptive Sensitization: Bradykinin & Substance P
      • Hyperalgesia & Allodynia
    • Altered Sympathetics: Catecholamine Hypersensitivity
      • Cool & clammy skin
Case Discussion (1-3 slides)

• Classic Presentation
  • Seen 4-6 weeks post-trauma
  • “Warm” CRPS → Acute
  • “Cold” CRPS → Chronic
  • Can be Type 1 (no nerve lesion) or Type 2 (nerve lesion)
  • Symptoms:
    • Sensory: Hyperalgesia, Allodynia
    • Vasomotor: Tissue Texture & Color Changes
    • Sudomotor/Edema: Edema, Abnormal Sweating
    • Motor/Trophic: Decreased ROM, Motor Dysfunction
Case Discussion

• Diagnostics:
  • Budapest Criteria: MUST HAVE ALL 4
    1. Persistent disproportionate pain to initial injury
    2. At least 1 symptom in 3 of the 4 categories reported by PATIENT: sensory, vasomotor, sudomotor/edema, motor/trophic
    3. At least 1 symptom in 2 of the 4 categories assessed by PHYSICIAN: sensory, vasomotor, sudomotor/edema, motor/trophic
    4. Exclusion of other differentials (infection, neuropathy, etc.)

• Imaging:
  • X-ray: Patchy demineralization & subperiosteal bone resorption w/ joint space preserved
  • CT: “Focal areas of osteoporosis in a Swiss cheese-like appearance”
  • Bone Scintigraphy: ↑ radiotracer uptake during all 3 (especially mineralization) phases
Case Discussion

• Treatment Modalities
  • Therapy 1st line
    • PT/OT
      • Mirror Visual Feedback Therapy: describe limb with eyes closed and then observe in mirror
      • Graded exposure to problematic/feared activities
      • Range of Motion exercises
  • Medical
    • NSAIDs/Glucocorticoids
    • Bone Resorption Inhibitors
  • Psychotherapy
    • CBT
References:

- American College of Radiology ACR Appropriateness Criteria Radiologic Management of Hand/Wrist Trauma. [https://acsearch.acr.org/list](https://acsearch.acr.org/list)

