CLINICAL CASE - TEST YOURSELF | Musculoskeletal Imaging

Acute Shoulder Pain with Inflammatory Imaging Features: A Diagnostic Challenge

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PART A

Clinical History

A middle-aged patient presented with acute, rapidly progressive shoulder pain of a few days' duration. The pain was severe, associated with marked restriction of both active and passive shoulder movement and local tenderness. Low-grade fever was reported. Laboratory tests demonstrated elevated inflammatory markers and leukocytosis, raising clinical concern for an infectious process. There was no history of trauma, previous shoulder disease, or recent intervention.

Figure 1: *Axial PD- FAT SAT.*

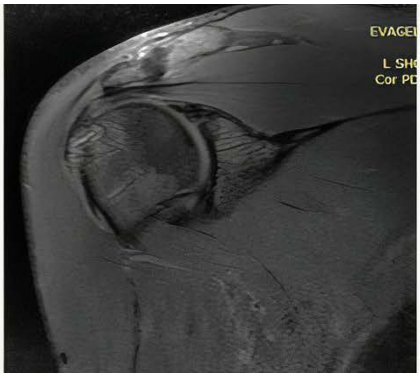

Figure 2: *Coronal PD- FAT SAT.*

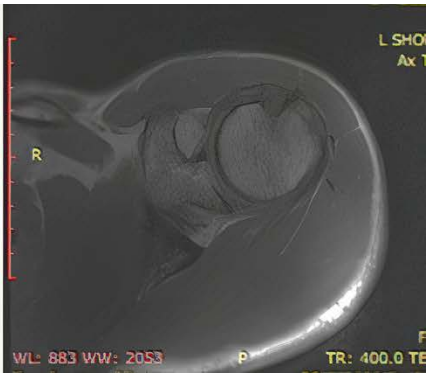

Figure 3: *Axial T1.*

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Based on the clinical presentation and imaging findings, the differential diagnosis includes both infectious and non-infectious conditions.

The combination of acute pain, raised inflammatory markers, and extensive bone marrow edema raises concern for osteomyelitis; however, the presence of focal low-signal material on all MRI sequences and the absence of aggressive features suggest an alternative diagnosis. Careful correlation with radiographic findings is essential.

Part B

Diagnosis

Intraosseous migration of calcific tendinopathy of the rotator cuff with associated calcific osteitis

Discussion

Calcific tendinopathy is a common condition characterized by deposition of calcium hydroxyapatite crystals within tendons, most frequently involving the rotator cuff [1]. Although the imaging appearance of typical calcific tendinopathy is well recognized, extension of calcific material beyond the tendon, particularly into adjacent bone, is uncommon and may pose a significant diagnostic challenge [2].

Intraosseous migration is believed to occur during the acute resorptive phase, when intense local inflammation and increased intratendinous pressure cause cortical erosion and penetration of calcific material into the adjacent humeral head [1,2]. The resulting intraosseous lesion often has a cyst-like appearance and is commonly associated with extensive bone marrow oedema, which may appear disproportionate to the size of the lesion itself [2] (Figures 1,2,3).

On plain radiographs, calcific tendinopathy typically appears as amorphous peri-tendinous calcifications adjacent to the greater tuberosity [3]. Subtle cortical irregularity may be present in cases of intraosseous extension, although radiographs frequently underestimate the extent of osseous involvement [4].

MRI is particularly valuable in recognizing this entity and avoiding misdiagnosis. Characteristic findings include a central focus of very low signal intensity on all sequences, corresponding to calcific material, surrounded by pronounced bone marrow oedema [2]. Associated findings may include reactive changes of the adjacent tendon and subacromial–subdeltoid bursitis, which may itself contain calcific deposits [3] (Figure 4). Gradient-echo sequences are helpful in demonstrating blooming artefact, further confirming the presence of calcium [2] (Figure 5).

Clinically, patients often present with severe acute pain, functional impairment, and occasionally systemic inflammatory features, including fever and raised inflammatory markers [1].

This combination of clinical and imaging findings may closely mimic osteomyelitis, leading to unnecessary biopsy or antibiotic treatment if the diagnosis is not recognized [2].

Figure 1. *Axial PD- FAT SAT: Cystic lesion with central calcium deposition and reactive bone marrow edema.*

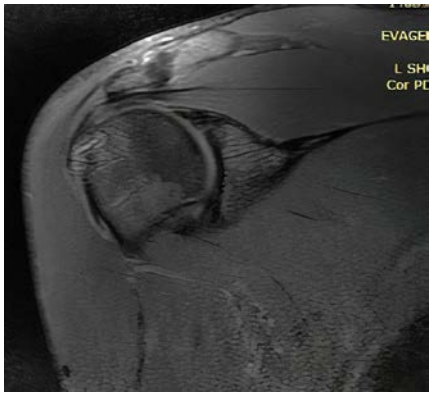

Figure 2. *Coronal PD- FAT SAT: Associated tendon abnormalities.*

Figure 3. *Axial T1: Bone erosion related to calcium migration.*

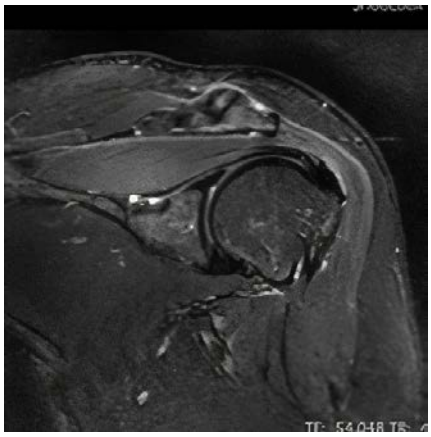

Figure 4. *Fluid collection within the bursa and calcific tendinitis.*

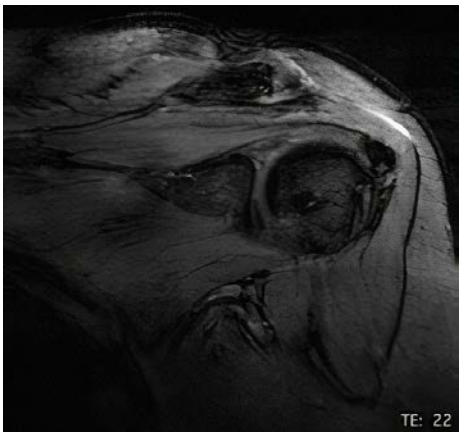

Figure 5. *T2-blooming artifact.*

The main differential diagnoses include osteomyelitis, occult fracture, primary or metastatic bone tumors, and rotator cuff tears with reactive marrow changes [2,4]. The absence of aggressive features such as cortical destruction, periosteal reaction, soft tissue mass, or true abscess formation favors a benign inflammatory process [2]. Awareness of intraosseous migration of calcific tendinopathy and careful correlation with radiographs are essential for radiologists, allowing accurate diagnosis and appropriate conservative management [1,2]. **R**

References

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Key words: Calcific Tendinopathy, Rotator Cuff, Radiology, MRI

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