

Acute Calcific Periarthritis – Radiological Evaluations

1. Definition

Acute calcific periarthritis is an inflammatory condition characterized by the deposition of calcium hydroxyapatite crystals in periarticular soft tissues (tendons, bursae, or ligaments), often presenting with sudden and severe pain. It is considered a localized, acute form of calcific tendinopathies. While the shoulder (supraspinatus tendon) is the most common site, it can also involve the hip, wrist, elbow, and fingers.

2. Pathophysiological Process: Uhthoff and Loehr Staging

The calcification process is academically divided into three main stages:

Pre-calcific Stage: Cellular preparation phase where tenocytes undergo metaplasia into chondrocytes. Usually asymptomatic.

Calcific Stage:

Formative Phase: Crystals accumulate to form a chalk-like hard focus.

Resorptive Phase (Critical Period): Intense vascular invasion and inflammation occur to phagocytose the crystals. Clinical pain is most severe. Crystals liquefy (toothpaste consistency) and may leak into the bursa.

Post-calcific Stage: The stage where crystals are absorbed and replaced by collagen fibers and fibroblastic activity.

Pathogenesis:

The exact cause is unknown. Proposed mechanisms include:

- Tendinous hypoxia
- Metabolic stress
- Microtrauma

The crystals involved are typically hydroxyapatite (not CPPD!).

3. Imaging Findings:

1-Plain Radiograph (X-ray) - Gold Standard

Linear or oval-shaped, amorphous, homogeneous calcific densities are observed.

Typically located outside the joint space in periarticular soft tissues (near tendons).

Acute/Resorptive Phase: Opacity margins become ill-defined, taking on a "cloudy" or amorphous appearance.

Trick: Chronic lesions are well-defined; acute ones appear fuzzy and are surrounded by edematous soft tissues.

2-Ultrasound (US)

Provides rapid diagnosis. Hyperechoic calcific foci are seen.

Surrounding hypoechoic edema, hypervascularity, and tendon thickening may be present.

Dynamic Assessment: Helps localize the point of maximal pain.

Trick: If no posterior acoustic shadowing is present, the calcification is in a softened/resorptive phase → a key clue for the acute phase.

3-Magnetic Resonance Imaging (MRI)

Calcifications appear hypointense (signal void) on all sequences.

Extensive surrounding T2 hyperintense edema, bursitis, or reactive synovitis may be present.

Trick: Calcifications may be overlooked on MRI! Radiologists can miss hypointense areas mixed with edema. Correlation with plain radiograph is essential.

Warning: Intense surrounding edema may mimic infection or tumor. Diagnosis must be confirmed with plain radiographs.

4. Clinical Clue

Sudden onset of severe localized pain, with movement limitation.

Typically involves a single joint.

Systemic findings are rare; CRP/ESR may be mildly elevated.

Usually no history of trauma.

Trick Points (For Radiologists)

1. Location of calcification → Not intra-articular, but periarticular (tendon, bursa).
2. Resorptive phase → Calcification appears hazy, with surrounding edematous appearance → suggests acute phase.
3. If pain location doesn't match the calcification site → rule out other pathologies.
4. If X-ray is negative and clinical suspicion is high → do USG.
5. On MRI, calcifications may not be visible → always correlate with radiographs.
6. While shoulder is the most common site, "atypical locations" such as wrist, hip, knee should be considered.

Clinical vs. Radiological Distinction: Calcific Tendinitis vs. Acute Calcific Periarthritis

While these terms are often used interchangeably, there is a subtle but critical clinical distinction that determines the patient's management.

1. Calcific Tendinitis (The Underlying Condition)

This is an anatomical and pathological diagnosis. It refers to the presence of calcium hydroxyapatite deposits within a tendon, such as the supraspinatus.

Clinical Course: These calcifications can remain stable and asymptomatic for years. At this stage, it is simply "Calcific Tendinitis."

Radiological Appearance: Well-defined, dense, and homogeneous opacities (resembling cortical bone).

2. Acute Calcific Periarthritis (The Acute Event)

This refers to the "flared-up" and clinically loud manifestation of the underlying calcific tendinitis.

Clinical Course: When the body begins to reabsorb the crystals (resorptive phase), an intense inflammatory response occurs. This leads to excruciating pain, localized swelling, and restricted range of motion (pseudoparalysis).

Radiological Appearance: The once solid calcification becomes **amorphous, hazy, or "cloud-like."** This fuzzy appearance indicates that the crystals are liquefying and being resorbed.

Summary of the Relationship:

Calcific Tendinitis: The general name of the disease, covering both dormant and active phases.

Acute Calcific Periarthritis: The most painful and acute "attack" phase, characterized by significant periarticular edema and a "melting" appearance of the calcification on imaging.

The Radiologist's Pearl:

Well-defined, dense calcification: Indicates the **Dormant/Formative Phase** (Chronic Calcific Tendinitis).

Fuzzy, ill-defined, cloud-like calcification: Indicates the **Active/Resorptive Phase** (Acute Calcific Periarthritis).

Summary

The combination of clinical findings + radiography + USG is usually sufficient for diagnosis.

Most commonly affects the shoulder, but any periarticular region may be involved.

The most distinguishing finding is amorphous periarticular calcification.

Calcifications may be missed on MRI – always correlate with X-ray.

Be cautious in differentiating from CPPD, as location and crystal type differ.

5. Differential Diagnosis

Differential	Radiologic Distinction
Septic arthritis	Joint effusion, synovitis, bone destruction. Prominent systemic symptoms.
Gout Tophus:	heterogeneous, irregular densities; may show bone erosions.
CPPD (pseudogout)	Calcifications are usually intra-articular, often involve triangular fibrocartilage, showing chondrocalcinosis pattern.
Traumatic hemarthrosis	History of trauma, joint effusion, accompanying bone marrow edema.
Tendinopathy/tendinitis	No calcification, tendon thickening; edema on MRI.
Rotator cuff tear	Not calcification; tendon discontinuity + edema.

Differential Diagnosis Spectrum

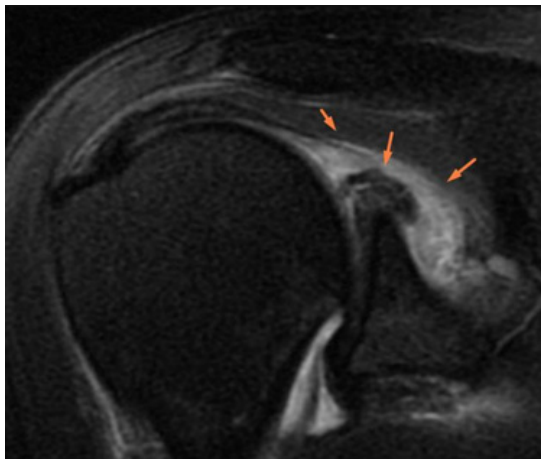
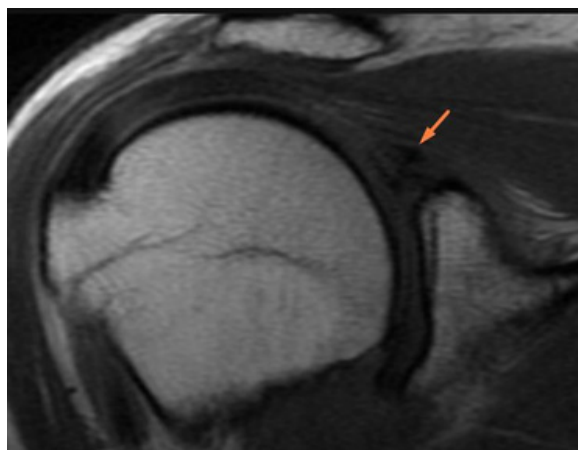
Feature	Acute Calcific Periarthritis	CPPD (Pseudogout)	Septic Arthritis
Crystal Type	Calcium Hydroxyapatite	Calcium Pyrophosphate	N/A (Bacterial Pathogen)
Location	Periarticular (Tendon / Bursa)	Intra-articular (Cartilage / Meniscus)	Intra-articular (Joint Space)
X-ray Appearance	Amorphous, "cloudy" or hazy focus	Linear calcification (Chondrocalcinosis)	Joint space narrowing, bone destruction
Clinical Presentation	Acute localized pain, "pseudo-cellulitis"	Acute arthritis (joint swelling)	High fever, systemic leukocytosis
MRI Findings	Perilesional edema, focal signal void	Intra-articular low signal, synovitis	Large joint effusion, marrow edema

Trick: CPPD → Intra-articular, acute calcific periarthritis → Periarticular!

Reporting Template Example (Shoulder)

>On plain radiograph, an amorphous dense opacity measuring approximately 6 mm is seen in the periarticular soft tissues at the level of the supraspinatus tendon near the glenohumeral joint. The findings are consistent with acute calcific periarthritis. If there is associated peritendinous edema and acute pain, the lesion may be in the resorptive phase. Clinical correlation and ultrasound evaluation are recommended.

Visual Spot Check



Images courtesy of Radiopaedia.org