

## Calcific tendinopathy of the supraspinatus tendon

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### Abstract

Calcific tendinitis of the rotator cuff may have an acute or chronic presentation. It occurs due to deposition of calcium hydroxyapatite crystals within the tendon. Supraspinatus is most commonly involved. In this case report, the radiological imaging features and various treatment modalities including newer methods of treatment have been discussed.

### Keywords

Tendinitis; supraspinatus; hydroxyapatite; imaging; treatment.

### Introduction

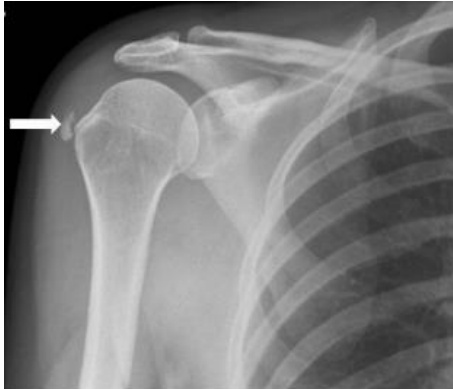
Calcific tendinopathy of the rotator cuff is characterized by calcium hydroxyapatite crystals in the rotator cuff or in the subacromial-subdeltoid bursa. It is more common in middle aged women and unilaterally. It may be discovered asymptotically or patients may complain of pain or present with symptoms of neuropathy. The most commonly affected area is the critical zone of the supraspinatus tendon followed by the inferior infraspinatus and the preinsertional region of the subscapularis tendon [1].

### Case Presentation

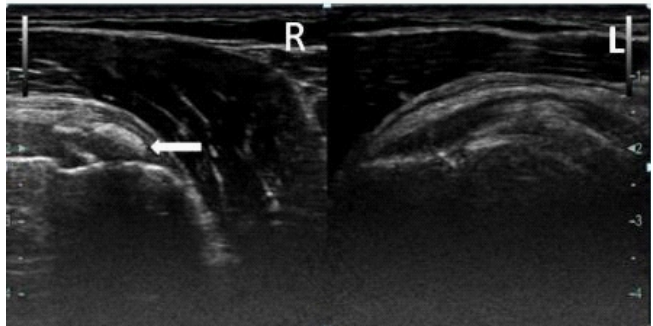
Forty-two year male presented with pain in the right shoulder radiating to right arm since two months. He had difficulty in picking up heavy weights. There was no history of trauma or surgery. On examination he was afebrile with no swelling or signs of inflammation over the shoulder. He had mild restriction of movements.

An anteroposterior radiograph of the right shoulder revealed a nodular, dense calcification in the region of the supraspinatus tendon. An ultrasound examination of the right rotator cuff revealed ovoid, nodular calcifications with posterior acoustic shadowing in the supraspinatus tendon at its insertion in

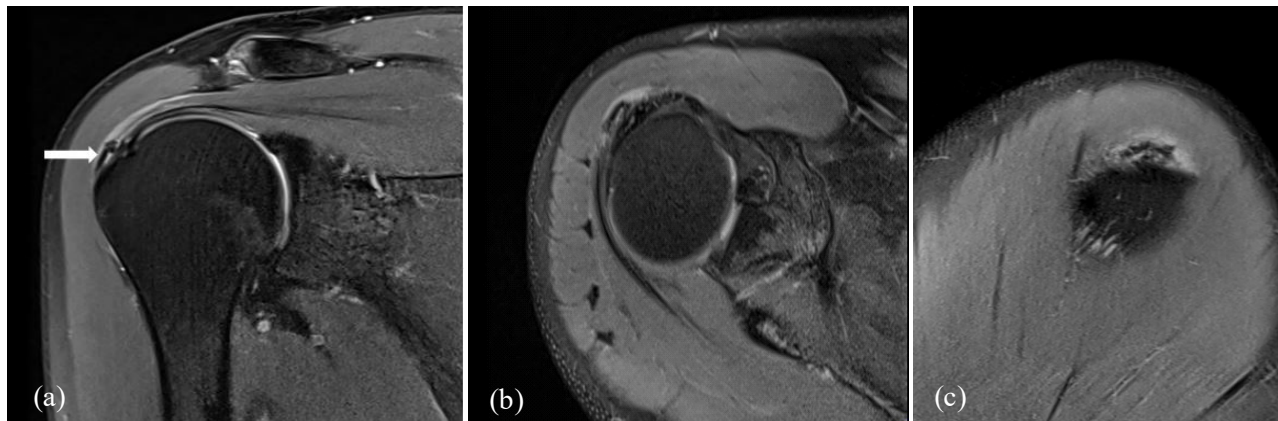
the head of the humerus. The contralateral shoulder appeared normal. Magnetic Resonance Imaging (MRI) was performed. T2 weighted and PD fat suppressed images showed a well-defined arc like hypointensity along the bursal side of the supraspinatus tendon at its insertion. There was surrounding hyperintensity, representing edema. A partial thickness tear of the tendon was present involving its bursal surface with no retraction of its fibers. There was no muscle atrophy. Glenoid labrum and rest of the rotator cuff muscles appeared normal. A diagnosis of supraspinatus calcific tendinopathy was made and the patient was managed conservatively.



**Figure 1:** Anteroposterior radiograph of the shoulder shows a well-defined, dense calcification in the region of the supraspinatus tendon.



**Figure 2:** Ultrasound image shows ovoid, nodular calcifications with posterior acoustic shadowing in the supraspinatus tendon with normal supraspinatus tendon on the contralateral side.



**Figure 3:** (a) Coronal PD fat suppressed image shows a well-defined arc like hypointensity in the bursal side of the supraspinatus tendon at its insertion. There is surrounding hyperintensity, representing edema. Partial thickness tear of the fibers of the bursal surface with no retraction is present.

(b) Axial PD fat suppressed image shows arc like hypointensity in the bursal side of the supraspinatus tendon at its insertion with surrounding edema. There is no joint effusion.

(c) Sagittal PD fat suppressed image shows hypointense calcifications at the insertion of the supraspinatus tendon with surrounding edema.

## Discussion

Calcium hydroxyapatite crystals have been classified by Chiou et al into four types based on their shape-arc type (curvilinear with posterior acoustic shadowing), fragmented type (at least two hyperechoic foci, with or without shadowing), nodular type (hyperechoic nodule without shadowing), and cystic type (cystic with surrounding echogenic wall). Three stages have been described according to Uhthoff et al - a) Pre calcific stage- fibrocartilaginous transformation of the tendon, b) Calcific stage- calcium hydroxyapatite crystals formation followed by their resorption, and c) Post calcific stage- stage of remodeling and tendon healing [2]. Conventional radiography is widely used for the diagnosis and follow-up of this condition. It

can also detect incidental calcification in patients undergoing the examination for other indications. The radiographic appearances of calcific tendinopathy are homogeneous, amorphous densities without trabeculation, which allows for differentiation from heterotopic ossification or accessory ossicles. The other modalities for diagnosis include ultrasound, CT and MRI [2]. On ultrasound calcifications may be nodular or arc type or fragmented, with (type 1) or without (type 2 and 3) posterior acoustic shadowing. The appearance depends on the type, as type 1 corresponds to the formative phase while type 2 and 3 correspond to the resorptive phase. CT is not commonly performed for the diagnosis but it may be used to exclude underlying trauma. On MRI, calcifications appear hypointense and surrounding edema may be present [3].

Calcific deposits can occur in any tendon such as pectoralis major, flexor carpi ulnaris, flexor tendons of fingers and insertion of gluteus maximus tendon. The most frequently affected site is the critical zone of the supraspinatus tendon followed by the infraspinatus, and then the pre insertional region of the subscapularis tendon. The characteristic location of calcifications and absence of a soft tissue mass can help to differentiate from malignancy. Intramuscular or intraosseous migration is known to occur. CT and MRI can be used to assess such complications [4]. Dominant arm involvement, bilateral disease, female gender, higher number of calcifications and longer duration of symptoms has been linked to a worse prognosis. No intervention is required for asymptomatic individuals. Recurrence can occur several years after conservative management, non-steroidal anti inflammatory drugs and/or ultrasound-guided dry needling in symptomatic patients [5]. Although calcification shape and density are important factors for determining the most suitable treatment option, most available invasive methods have significant limitations. Shockwave therapy has very variable success rate ranging from 50% to 90%. Ultrasound-guided percutaneous treatment is most useful in removing type 2 or type 3 calcifications. Platelet-rich plasma injections have shown success in a few refractory cases [2,3]. Arthroscopic surgery has high success rate but it is invasive and requires a post procedural hospital stay. It is thus considered as a last option in chronic cases in which other measures have failed [1].

## Final diagnosis

Supraspinatus calcific tendinopathy

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**Manuscript Information:** Received: February 22, 2021; Accepted: June 24, 2021; Published: June 30, 2021

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**Citation:** Prasad N. Calcific tendinopathy of the supraspinatus tendon . Open J Clin Med Case Rep. 2021; 1766.

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