



Progressive Calcification of Supraspinatus Tendon in Patients With Calcific Tendinitis: Two Case Reports

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Abstract

Background. Calcific tendinitis (CT) is a common disease characterized by the presence of calcific deposits in the tendons of the rotator cuff. CT has a wave-like course, and the formed calcification tends to be resorbed. The lysis of the calcium deposits is characterized by a strong pain syndrome, and the site of the calcification is replaced by collagen.

The aim – to demonstrate clinical observations in which the deposited calcification in the rotator cuff did not resorb but increased over time.

Cases presentation. We report on two rare clinical cases of an increase in calcification of the rotator cuff in patients aged 51 and 50 years old. Calcific tendinitis occurred with periods of remission and exacerbation. During exacerbations, conservative treatment was carried out, including courses of massage, physiotherapy, and pain relief therapy. In one case, a single injection of a hormonal drug was performed. Control X-rays and MRI during one of the exacerbations showed an increase in the size of the calcifications. Due to the lack of effect from conservative treatment and the detected increase in calcifications, a decision was made to perform surgical treatment. Arthroscopic removal of calcifications with re-fixation of the supraspinatus tendon and elimination of internal damage was performed on both patients. Good results were noted on the follow-up examination according to the ASES orthopedic score, as well as clinical examination data.

Conclusion. The presented case reports illustrate the possible increase in calcification, unlike the standard course of the disease, in which the calcification is resorbed. Further study of this pathology is necessary to establish the causes and mechanisms of calcification increase over time and its dependence on the phase of the disease.

Keywords: calcific tendinitis, rotator cuff, calcification of the rotator cuff.

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Увеличение кальцината сухожилия надостной мышцы: два клинических случая

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Реферат


Актуальность. Кальцинирующий тендинит (КТ) является распространенным заболеванием, характеризующимся отложением депо кальция в сухожилиях вращательной манжеты плечевого сустава. КТ свойственно волнообразное течение, а сформированный кальцинат имеет тенденцию к рассасыванию. Лизис депо кальция характеризуется сильным болевым синдромом, а место кальцината замещается коллагеном.


Целью данной работы было продемонстрировать клинические наблюдения, в которых депонированный кальцинат вращательной манжеты не рассасывался, а увеличивался со временем.

Описание случаев. В работе приведены два редких клинических случая увеличения кальцината вращательной манжеты у пациенток 51 и 50 лет. Кальцинирующий тендинит протекал с периодами ремиссии и обострений. Во время обострений проводилось консервативное лечение, которое включало курсы массажа, физиотерапии, обезболивающую терапию. В одном случае однократно выполнялась инъекция гормонального препарата. На контрольных рентгенограммах и МРТ во время одного из обострений было отмечено увеличение размеров кальцинатов. Ввиду отсутствия эффекта от консервативной терапии, а также выявленного увеличения кальцинатов принято решение о хирургическом лечении. Обоим пациенткам выполнено артроскопическое удаление кальцинатов с рефиксацией сухожилия вращательной манжеты и устранением внутренних повреждений. На контрольном осмотре отмечены хорошие результаты по ортопедической шкале ASES, а также данным клинического осмотра.

Заключение. Представленные клинические случаи иллюстрируют возможное увеличения кальцината в отличие от стандартного течения заболевания, при котором кальцинат рассасывается. Необходимо продолжить изучение данной патологии для установления причин и механизмов увеличения кальцината с течением времени и его зависимости от фазы заболевания.

Ключевые слова: кальцинирующий тендинит, вращательная манжета, кальцинат вращательной манжеты.

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BACKGROUND

Calcific tendinitis (CT) is a common disease characterized by the presence of calcific deposits in the tendons of the rotator cuff of the shoulder joint [1]. CT is more common in women (up to 79%) at an average age of 55 years (range 31-87 years) [2].

Calcific deposition predominantly occurs in the supraspinatus tendon (51-90%) [2, 3], but can also occur in other tendons of the rotator cuff. Histological analysis of the deposits has revealed carbonate apatite [4, 5]. Complications of CT include adhesive capsulitis, rotator cuff tear, and humeral head osteolysis [2, 6].

CT is the most common cause of acute shoulder pain without preceding trauma [1, 6]. Three stages of CT are recognized. The first stage is the precalcific stage, where cellular changes predispose tissues to calcium deposition. The second stage is the calcific stage, where calcium is extruded from cells and then consolidated into deposits. Following the formation of calcification, a resting phase begins, which can last for different periods and is painless. The most painful phase follows the resting phase, which is the resorptive phase. The third stage is the postcalcific stage, where calcium deposits are resorbed and replaced by connective tissue [1].

The duration of clinical symptoms varies considerably, as the duration of the disease cannot be predicted. Some patients suffer from recurring symptoms, sometimes for many years, while others experience spontaneous recovery after a single episode of pain [7, 8].

CT is a self-limiting condition [5, 7, 9]. A systematic review by M. Loew et al. showed that deposited calcium tends to dissolve within 1-3 years [7]. Cases of migration of calcification to muscle and the humeral head, as well as progression of humeral head degeneration against the background of calcification, have been described [10, 11]. At present, there is no single concept for treating patients with this pathology, and both conservative and surgical methods are used [12].

The aim of this study was to present clinical examples in which deposited calcification in the rotator cuff did not dissolve over time, but increased.

Case 1

In 2016, a 51-year-old female patient presented to the European Clinic of Sports Traumatology and Orthopedics (ECSTO) with pain syndrome in her right shoulder joint. After examination by a trauma and orthopedic surgeon, she was referred for further tests. CT of the supraspinatus tendon was detected. Conservative treatment was recommended: rehabilitation therapy, NSAIDs, and orthopedic regime. During the treatment, the patient reported improvement with a decrease in pain from 0-1 points on the VAS. The next exacerbation occurred in May 2022, with a gradual progression of pain up to 7-8 points on the VAS.

After clinical examination and analysis of the results of control studies due to an increase in calcium deposition and progression of clinical symptoms, the patient was recommended for surgical treatment.

The dynamics of the increase in calcinate in patient 1 is shown in Figure 1.

The size of the calcinate according to X-ray data in 2016 was 9.2 x 2.7 x 10.0 mm, and in 2022, it was 31.4 x 6.3 x 10.1 mm. According to MRI data in 2016, it was 10.1 x 4.2 x 9.6 mm, and in 2022, it was 25.1 x 3.0 x 1.1 mm.

According to the X-ray classification of B.M. Bosworth [13], the calcinate increased from medium size (up to 1.5 cm) to large (> 1.5 cm). According to the X-ray classification of J. Gärtner and A. Heyer [14], the calcinate corresponded to type 1, which is limited, dense calcinate. According to the MRI classification of M. Loew et al. [15], the CT corresponded to type B — dense, separated, with clean contours.

In May 2022, under general anesthesia, the patient was placed on her nonoperative side, and arthroscopic examination of the shoulder joint was performed through standard portals. Narrowing of the subacromial space, rupture of the upper fibers of the subscapularis tendon, subluxation of the long head of the biceps tendon, and osteophyte of the humeral head were detected.

Thorough bursectomy was performed with visualization of the tendinous-muscular transition of the rotator cuff. Under visual control, signs of the presence of calcinate in the supraspinatus tendon were determined. The location of the calcinate was confirmed under the control of the C-arc.

In the area of the calcinate, incision of the fibers of the supraspinatus tendon was performed from the subacromial space over a length of 10 mm. A cluster of white, paste-like substance was visualized. Aspiration was performed, and the removed material was sent for histological and biochemical analysis. In addition, the lesion was treated with a laser. According to the results of histological and biochemical studies, a degenerative-destructive calcifying tendinosis of the supraspinatus tendon was diagnosed. During the postoperative period, the patient underwent a course of physiotherapy, massage, and rehabilitation exercises. Calcific deposit removal was performed. The residual deficit

of the tendon measured 15x10 mm. Tendon refixation was carried out using a single-row suture. Due to additional joint changes detected, subluxation decompression, coracoplasty, subscapularis tendon refixation, biceps tendon tenodesis, subacromial decompression, acromioplasty, and tuberopecty of the right shoulder joint were performed (Fig. 2).

In the postoperative period, the patient used an abduction brace for 6 weeks. Passive shoulder joint range of motion exercises were allowed starting from the 4th week.

The dynamics of the shoulder joint condition according to the validated ASES scale [16] are presented in Figure 3.

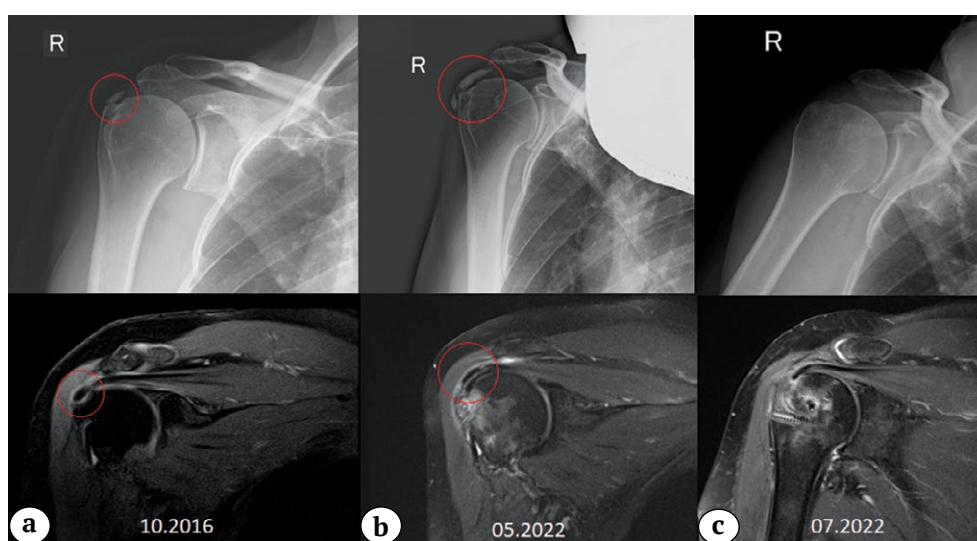


Fig. 1. Case 1. Dynamics of the increase in calcification of the rotator cuff according to X-ray and MRI in the PD mode:

a – initial visit: calcification of the supraspinatus tendon; b – increase in calcification after 6 years; c – shoulder joint after removal of the calcium deposit and refixation of the rotator cuff.

Red circle – location of the calcification



Fig. 2. Case 1. Arthroscopic removal of calcification with subsequent refixation of the rotator cuff; a – calcium deposit in the supraspinatus tendon; b – calcium deposit removed, partial tear of the supraspinatus tendon; c – installation of a fixing anchor

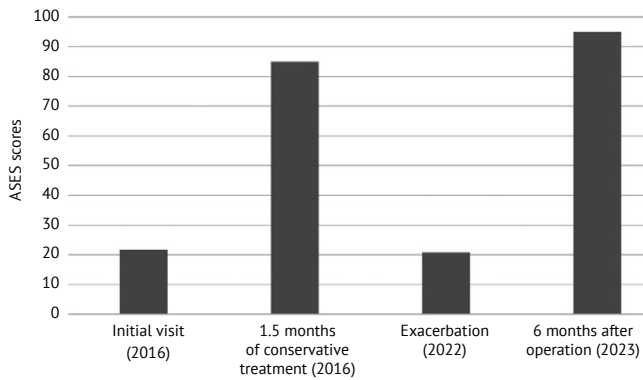


Fig. 3. Case 1. Dynamics of indicators according to the ASES

Case 2

A 50-year-old female patient presented to the European Clinic of Sports Traumatology and Orthopedics (ECSTO) in 2016 with complaints of pain (8 points according to the VAS) in the right shoulder joint. A positive effect was observed for 6 months against the background of conservative treatment (rehabilitation therapy, NSAIDs).

A recurrent exacerbation and the reappearance of pain occurred in May 2018. A positive effect was achieved with repeated conservative treatment and the intra-articular and subacromial injection of Diprophos, which lasted for 4 years. The dynamics of the calcification progression are shown in Figure 4. The calcinate's dimensions according to the X-ray in 2016 were 7.9x5.3x9.6 mm; in 2018, 9.6x4.2x10.5 mm; and in 2022, 16.5x6.1x17.9 mm.

According to the X-ray classification of B.M. Bosworth, the calcinate's size increased from medium (up to 1.5 cm) to large (>1.5 cm). According to the X-ray classification of J. Gärtner and A. Heyer, the calcinate corresponded to type 1 – limited and dense calcinate. According to the MR-classification of M. Loew et al., it corresponded to type B – dense, separated, with clear contours. The calcinate's dimensions according to the MRI in 2016 were 9.7x3.8x8.2 mm; in 2018, 12.4x4.7x7.7 mm; and in 2022, 17.3x4.1x16.4 mm.

Due to the recurrence of pain and the increasing calcium deposit, the patient was recommended for surgical treatment.

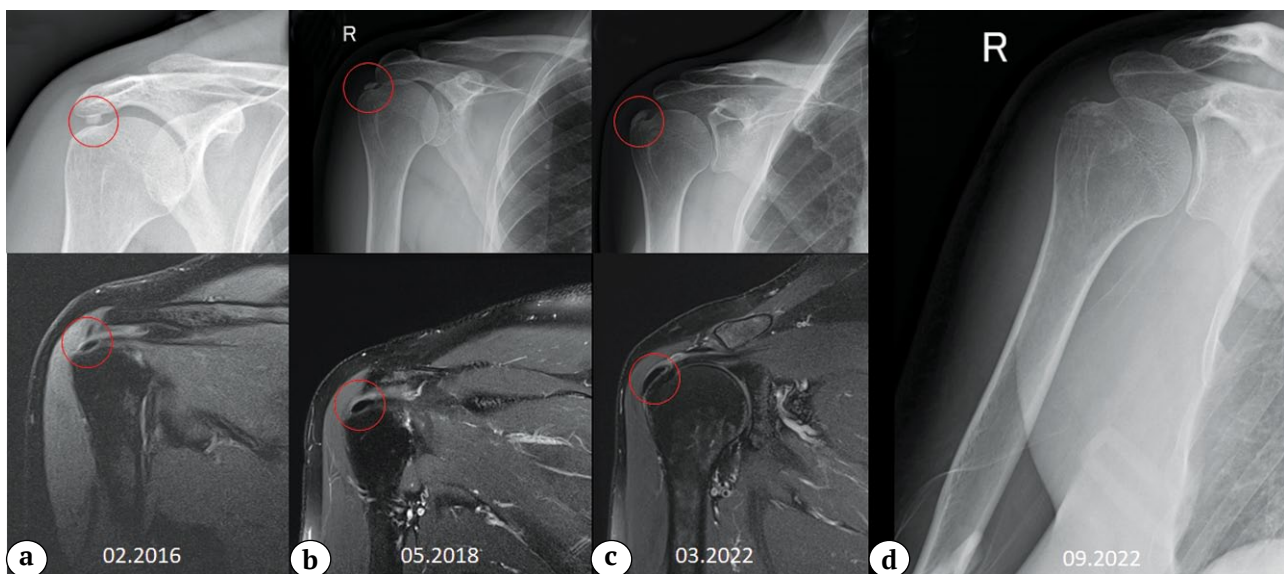


Fig. 4. Case 2. Dynamics of the increase in calcification of the rotator cuff according to X-ray and MRI in the PD mode:

- a – at the initial visit (calcification of the supraspinatus tendon);
 - b, c – increase in calcification;
 - d – X-ray of the shoulder joint after removal of the calcium deposit.
- Red circle – location of the calcification

Under general anesthesia, the patient was placed on her nonoperative side, and arthroscopic revision of the right shoulder joint was performed. Subluxation of the long head of the biceps tendon and a rupture of the upper fibers of the supraspinatus muscle were detected. Removal of the calcinate and its visualization were performed using the method described in the previous clinical case. Due to the incomplete layer defect of the rotator cuff after the calcium deposit removal, the supraspinatus tendon was refixed

with a single-row suture. Due to the additional changes found in the joint, a tenodesis of the long head of the biceps tendon of the shoulder was performed in the proximal areas of the intertubercular sulcus, refixation of the supraspinatus tendon (one P-shaped suture), and subacromial decompression of the right shoulder joint (Figure 5).

The postoperative protocol was similar to the one described in the first clinical case. The dynamics of ASES score indicators in patient 2 are shown in Figure 6.

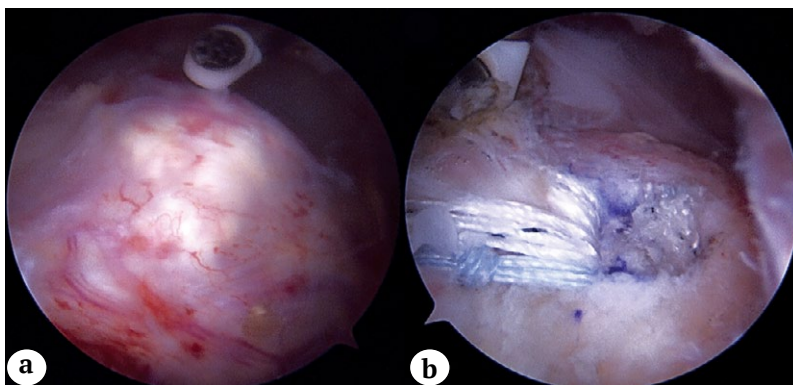


Fig. 5. Case 2. Calcific tendinitis of the supraspinatus tendon: a – calcification; b – refixed supraspinatus tendon after removal of the calcium deposit

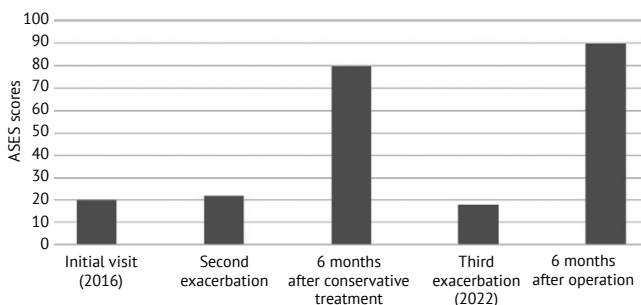


Fig. 6. Case 2. Dynamics of indicators according to the ASES

DISCUSSION

Calcific tendinitis (CT) of the rotator cuff is a common disease and is the main cause of shoulder pain without a preceding traumatic factor [1, 2, 3, 7]. For example, the incidence of rotator cuff tear with CT in Korean residents is up to 15% [2]. The mechanism and causes of CT are currently unknown [17]. Several possible causes are identified, such as microtrauma to the tendon and various metabolic disorders.

In the world literature, there is a lot of data indicating that CT has a wavy course and the

formed calcification tends to dissolve [1, 5, 7, 8, 9, 17]. Calcium deposit lysis is characterized by severe pain syndrome, and the site of calcification is replaced by collagen [5].

In our report, we present two clinical cases of increased calcification of the rotator cuff. The disease progressed with periods of exacerbation and pronounced pain syndrome. According to the literature, some patients with CT require surgical treatment due to a pronounced pain syndrome and a lack of effect from conservative treatment [7, 8]. Perhaps, it is the increase in calcification over time that leads to exacerbation of pain sensations.

Arthroscopic removal of calcification is the optimal treatment method in the absence of effect from conservative treatment [18, 19]. Surgical treatment of CT within 1 to 5 years of observation shows good long-term results with a low number of complications [20].

In both clinical cases described by us, after the removal of calcification, a partial-thickness tear of the supraspinatus tendon was revealed, which was then repaired.

The long-term results of treatment of patients in the clinical cases described by us are similar to those published in the literature. For exam-

ple, in the study by C.H. Cho et al., ASES scores increased by more than 75% after 6 months of treatment [18]. In the work of J.J. Ernat et al., an improvement in ASES scores from 59.4 to 88.0 points was noted during the observation period of at least 2 years [21].

CONCLUSION

Calcific tendinitis is a multifactorial disease with a phase character of the course. We presented two clinical cases of an increase in the calcification of the rotator cuff. In the absence of effect from conservative treatment, surgical removal of the calcification is recommended, which shows good results. Further study of this pathology is necessary to establish the causes and mechanisms of an increase in calcification over time and dependence on the phase of the disease.

DISCLAIMERS

Author contribution

All authors made equal contributions to the study and the publication.

All authors have read and approved the final version of the manuscript of the article. All authors agree to bear responsibility for all aspects of the study to ensure proper consideration and resolution of all possible issues related to the correctness and reliability of any part of the work.

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Ethics approval. Not applicable.

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