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Case Report

Massive tear of an ossified supraspinatus tendon: a case report and review of the literature

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Abstract: Calcific tendinitis of the rotator cuff is often encountered in daily clinical practice, but cases with rotator cuff tears associated with ossification in the rotator cuff are extremely rare. We experienced a 74-year-old male case with ossification in the rotator cuff associated with extensive tearing. At another hospital he had been diagnosed with calcific rotator cuff tendinitis and treated conservatively, although his symptoms did not improve and tended to worsen gradually. His past medical history was unremarkable. On plain radiography a tumor-like shadow was found in the proximal portion of the musculus supraspinatus. On computed tomography the mass was isointense to the epiphysis, and on magnetic resonance imaging almost isointense to the bone marrow, and was judged to be ossification. Extensive tearing of the rotator cuff was also present. Since pain was severe and the range of motion was markedly restricted Reverse shoulder arthroplasty was performed. The postoperative course was favorable with no recurrence of the ossification or pain. Reports of myositis officans in the rotator cuff, an extremely rare condition, have hitherto been limited to 4 cases, 3 of which had ossification in the musculus supraspinatus. Because such lesions may end up being diagnosed as calcinosis, the fact that ossified lesions may develop within the rotator cuff needs to be kept in mind.

Keywords: Ossification, rotator cuff, supraspinatus tendon, reverse shoulder arthroplasty

Introduction

Calcific tendinitis of the rotator cuff is often encountered in the routine clinical setting [1]. On plain radiography conditions in which shadows resemble those of calcific rotator cuff tendinitis include ossified lesions in the rotator cuff. Reports on ossification within the rotator cuff are extremely rare, with hitherto only 4 such cases reported. The lesion in one of these cases developed in the subscapularis and in the other three in the supraspinatus [2-5].

We experienced a 74-year-old male patient with extensive left-sided rotator cuff tearing associated with ossification in the supraspinatus tendon for which ward resection and Reverse Shoulder Arthroplasty (RSA) were performed with favorable results. The patient was informed that his data would be submitted for publication, and gave consent.

Case report

The case was a 74-year-old male agricultural worker. From 2 years previously left shoulder arthralgia had developed in the absence of any known precipitating factor. He consulted a local physician who diagnosed calcific rotator cuff tendinitis and administered injection therapy, but without improvement. He then presented to our hospital because of gradually worsening pain. Hypertension was noted in the past history, but there was no history of trauma to the shoulder joint or other noteworthy findings. At presentation the range of motion was markedly restricted with flexion 40°, extension 30°, abduction 30°, and external rotation 20°. Visual analogue scale was 82 mm, and nocturnal pain was also present. No particular abnormalities were noted on blood biochemical examinations, and there were no systemic bone lesions.

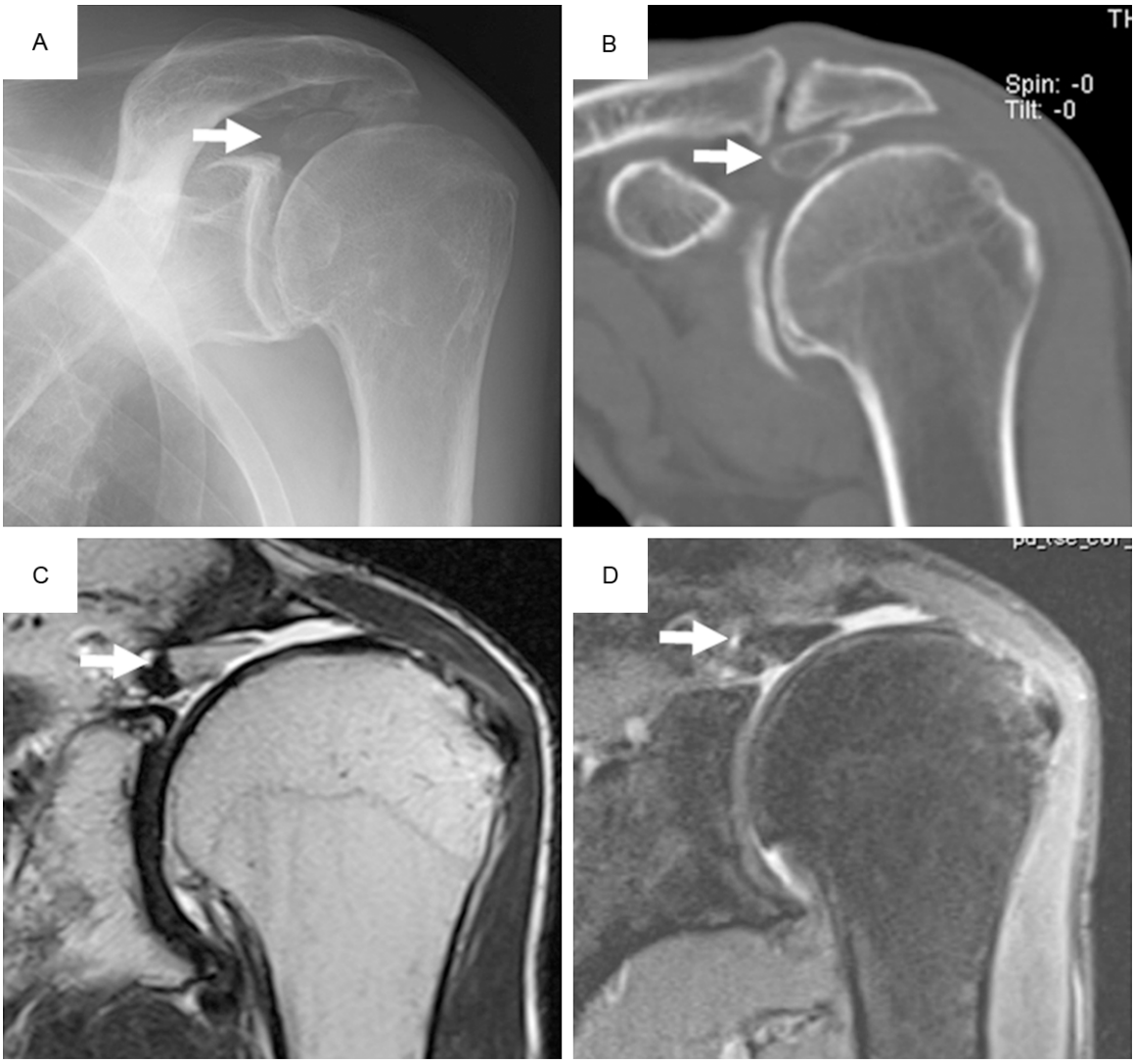

Figure 1. Preoperative radiographic evaluation. A. Preoperative X-ray. A mass shadow is found in the portion thought to be the musculus supraspinatus. The shoulder joint shows mild OA changes. B. Preoperative CT. An elliptical shadow almost isointense to the upper arm epiphysis is found. C. MRI T1-enhanced image. D. MRI T2-enhanced image. A mass almost isointense to bone marrow is found on both T1- and T2-enhanced images. (White arrows).

On radiography (X-ray) a mass shadow was detected in the portion thought to be the musculus supraspinatus (**Figure 1A**). On computed tomography (CT), an elliptical shadow almost isointense to the humerus was found (**Figure 1B**). On magnetic resonance imaging (MRI), a full-thickness tear of the supraspinatus tendon was found, and in the residual tendon a mass almost isointense to bone marrow was seen on both T1- and T2-enhanced images (**Figure 1C**, **1D**). From these findings it was judged that the mass shadow was not a usual calcium deposit, but rather an ossified lesion. Furthermore, since there were no findings of invasion into the surrounding structures and the course was prolonged, we considered that malignancy could be excluded. Finally full-thickness tear of the supraspinatus tendon associated with OA changes and ossification within the supraspinatus tendon were diagnosed, for which resection of the ossified layer and RSA were performed.

Intraoperative findings: A delto-pectoral approach was used. Full-thickness tears of the supraspinatus and infraspinatus tendons were found. In the proximal portion of the supraspinatus tendon tear an approximately 23 mm×16 mm×9 mm ossified lesion was noted (**Figure**

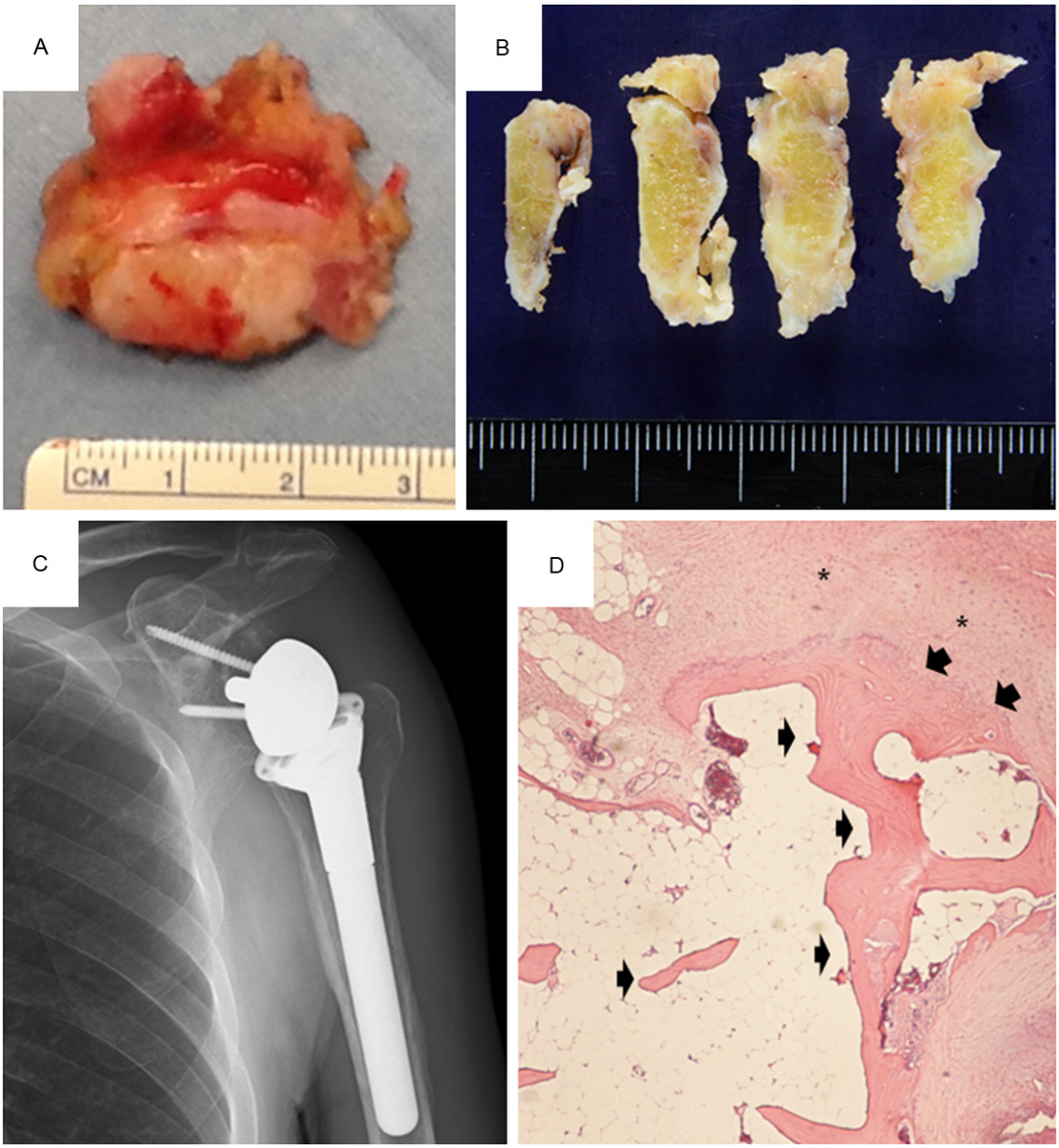

Figure 2. Postoperative evaluation. (A, B) Ossified focus. An ossified focus (23×16×9 mm) in the rotator cuff (A). Its cut surface reveals fatty marrow (B). (C) Postoperative X-ray. After Reverse shoulder arthroplasty the ossified focus has disappeared, and the course is favorable. (D) Histologic evaluation (×20). The tendon tissue is comprised of thick collagen fiber bundles, with ossification associated with chondrometaplasia in its interior. Ossification continuous (Black arrows) from the tendon component (*) is seen, and a non-calcified cartilage layer, calcified cartilage layer, and ossified focus are present. The bone trabeculae contain fatty marrow, with no foci of hematopoiesis present. There are no calcium deposits, and no features of tumorous proliferation or specific inflammation.

2A, **2B**), and after resecting the entire ossified layer including the amputation stump of the supraspinatus tendon, RSA was performed (**Figure 2C**). Pathological study of the resected specimen revealed a rich bone marrow, ossified foci, cartilage layer, and ligamentous fibrous tissue (**Figure 2D**).

Pain disappeared from early in the postoperative period, and at present 12 months postoperatively no recurrence of the ossification has been noted. The range of motion has improved to flexion 120°, abduction 130°, external rotation 30°, and extension 40° permitting the manipulations of daily life to be conducted with-

out difficulty, and the patient's degree of satisfaction with his treatment has continued to be extremely high.

Discussion

Only extremely few reports are available on ossification in the supraspinatus tendon [3-5]. In none of these previously reported cases has RSA been performed.

Because the present case was resistant to conservative therapy, surgery was selected. And although it would have been possible to limit the intervention to resection of the ossified layer alone, because of the co-existent rotator cuff tear this was considered unlikely to achieve symptomatic improvement. Furthermore, with regard to the suture technique for the rotator cuff, since the rotator cuff tear was full-thickness and the ossification was large, resection of only the ossified layer was not chosen because it was considered that the tear would have become even more larger and repair more difficult, in addition to which the range of motion was very poor and pain extremely severe. In our case the pain disappeared completely after RSA, at present 12 months postoperatively no recurrence of the ossification has been noted, the movements of daily life can be performed without difficulty, and the course has been favorable. RSA is a total artificial shoulder joint replacement method that allows reconstruction of the shoulder joint even in the absence of the rotator cuff, and since relatively favorable postoperative results have been reported, we considered it the operative procedure of choice for this case [6].

The diagnosis of this condition is extremely important. At presentation if plain radiography alone is relied on, the shadow seen in this case would be likely to be misdiagnosed as calcification within the rotator cuff. This is because on plain radiography calcification and ossification show very similar shadows, and since in daily clinical practice it is calcific rotator cuff tendinitis that is usually encountered, this is the condition that clinicians feel more comfortable diagnosing. On CT the differentiation between calcification and ossification is to a certain extent feasible, while MRI is very useful to achieve a more reliable differentiation between them, with a mass depicted as isointense to bone and bone marrow easily diagnosed as an ossified lesion. When symptoms like pain and a markedly restricted range of motion are present the therapy for the two conditions also differs in part. In the case of calcific rotator cuff tendinitis for example conservative therapies such as aspiration and elimination as well as external shock wave application can also be considered therapeutic options [7, 8], whereas in ossified lesions no favorable effect can be anticipated. For this reason, to decide the therapeutic strategy a firm early diagnosis is important.

Since this condition is extremely rare, the details of the mechanisms underlying ossification in the rotator cuff remain obscure. In general, a well known example of ossified ligament and tendon tissue lesions is ossification of the posterior longitudinal ligament, and while pathological studies suggest that the formation and extension of spinal column ligament ossification depends on endochondral ossification, much about the underlying pathophysiological mechanisms remains unclear [9]. In the present case too, histopathologically an ossified layer, calcified cartilage layer, and non-calcified cartilage layer were found, and mature cartilage cells were seen to grow. Also, fibroblasts collected around microvessels. These findings suggest that endochondral ossification may be the underlying process. On the other hand, whether in this case, ossification preceded the formation of the tear in the rotator cuff or conversely the rotator cuff tear provoked the development of ossification is unclear.

In the routine clinical setting pain in and around the shoulder joint is an extremely common finding, and since therapy differs according to whether the rotator cuff is calcified or ossified, in cases in which on radiography a shadow is found around the rotator cuff the possible presence of ossified lesions should be kept in mind.

Disclosure of conflict of interest

None.

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