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Arthroscopic treatment of bony loose bodies in the subacromial space

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ABSTRACT

INTRODUCTION: Multiple bony loose bodies in the subacromial space caused form cartilage or bone cells and continue to grow.
PRESENTATION OF CASE: A 58-year-old man with two-year history of swelling and pain of the right shoulder. He had no history of tuberculosis and rheumatoid arthritis. Magnetic resonance (MR) images showed some bony loose bodies in the subacromial space. The removal of loose bodies and bursa debridement were performed arthroscopically. Histological diagnosis of them was synovitis with fibrous bodies.
DISCUSSION: Extra-articular loose bodies is extremely rare, especially in the subacromial space, which maybe originated in the proliferative synovial bursa. Most authors recommend open removal to relive the pain, but there were choice to apply arthroscopy to remove them.
CONCLUSION: The mechanism of formation of bony loose bodies is not clear, may be associated with synovial cartilage metaplasia. Arthroscopic removal of loose bodies and bursa debridement is a good option for treatment of the loose body in the subacromial space, which can receive good function.

1. Introduction

Synovial osteochondromatosis which mainly consist of synovium are occasionally observed inside the joints [1,4], rare outside the joints [11]. Its mechanism of formation and characteristics of loose bodies have been studied, there are many treatments. To the loose body outside the joint, open resection is the common choice. Arthroscopic treatment is rare, especially to the multiple bony loose bodies in the subacromial space.

2. Presentation of case

A 58-year-old male in good health visited our hospital in July, 2013 with a two-years history of swelling and mild pain in the right shoulder, but he took no treatment. On physical examination, no soft mass could be touched. There was no pain on movement and negative test for impingement. The ROM of shoulder was normal. X-ray showed the bony loose bodies formation in the subacromial space (Fig. 1), MRI also showed these bony loose bodies (Fig. 2). Laboratory results of blood count、ESR、CRP and the rheumatoid factors were negative. He had history of hepatitis B.

We carried out the arthroscopic removal of loose bodies by forceps and bursa debridement by shaver via posterior and lateral approach. There were a large of synovial hyperplastic tissue and multiple loose bodies (Fig. 3). The operative time was 40 min with blood loss of 10 ml. The eight loose bodies ranged size from 12 mm to 4 mm in diameter (Fig. 2), mostly round shape Fig.4.

Samples of synovial tissue and loose bodies were sent for pathologic analyses. Histologic study showed features of synovial osteochondromatosis. There was hyaline cartilage tissue with proliferation of small blood vessels and infiltration of inflammatory cell, but no apparent calcification was observed in the mass. Postoperative X-ray (Fig. 1) showed the bodies had been removed. At 1 year postoperatively, the patient gained good function.

3. Discussion

The loose bodies were commonly found in the joint, which can be divided into three categories: fibrin, fibrous cartilage or bone. The main source came from osteochondritis dissecans, synovial osteochondromatosis, osteophytes, articular fractures, meniscal injuries. The synovial metaplasia on the bodies can form cartilage or bone cells and continue to grow. Sometimes it may have the same activity of articular cartilage [1]. But collagen fibers secreted by cartilage cells of bodies formed by osteoarthritis or non-osteoarthritis have the different. The chondrocytes of intra-articular bodies of non-osteoarthritis were easy to secrete collagen type [2].

Extra-articular loose bodies are extremely rare, especially in the shoulder space. Mutlu et al., [4] found multiple rice body formation in both the left subacromial-subdeltoid bursa and knee joint in a 4-year-old girl. In this case, we found that eight loose bodies in the elderly subacromial space, which were hard, a maximum

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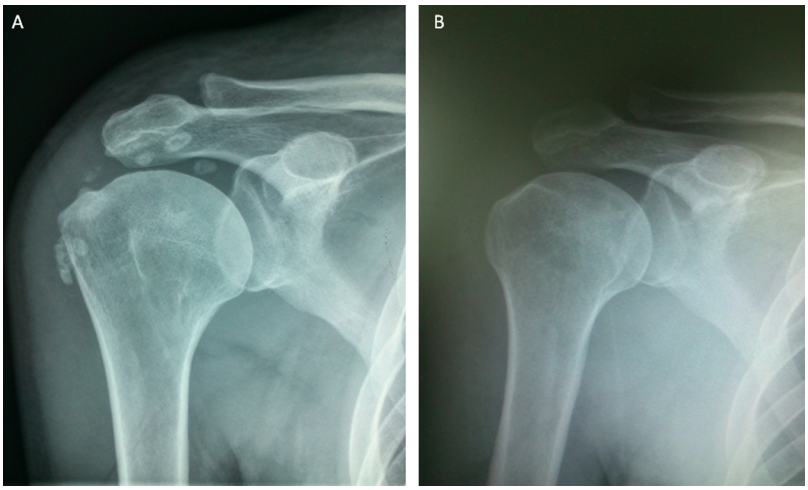

Fig. 1. X-ray of shoulder joint. (**A**) Preoperative X-ray of shoulder joint. (**B**) Postoperative X-ray of shoulder joint.

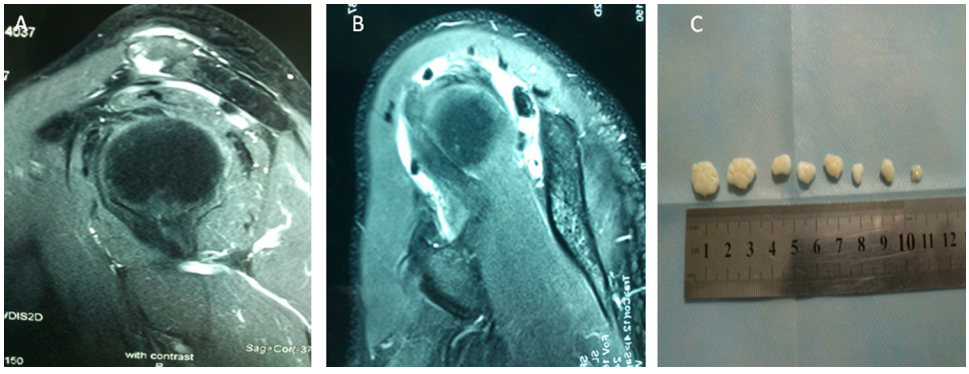

Fig. 2. (**A,B**) Sagittal MRI image of shoulder joint. (**C**) The loose bodies taken from the subacromial space.

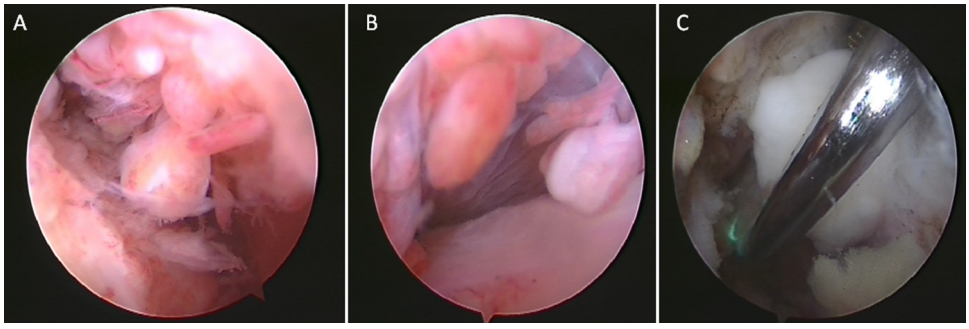

Fig. 3. (**A,B**) Arthroscopic image of loose bodies and hyperplastic tissue in subacromial space. (**C**) Arthroscopic image of subacromial loose bodies taken by the forceps in subacromial space.

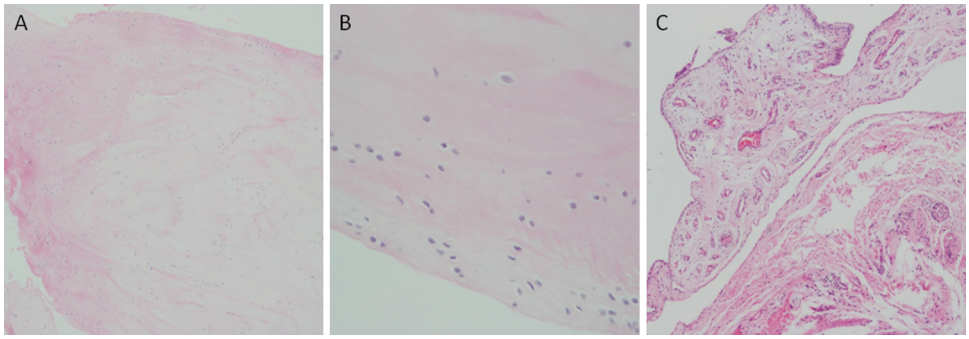

Fig. 4. Histopathology of loose bodies and hyperplastic tissue (Hematoxylin-eosin stain, original magnification × 200). (A) Fibrin-like node of collagen fibers;(B) Some chondrocytes in the cartilage tissue; (C) The hyperplasia tissue.

diameter more than 10 mm. For the diagnosis of loose bodies, X-ray and clinical manifestation were generally taken; Ultrasound can be performed to prove its intra-articular location and rule out para-articular calcification. The size, position (recess, bursa), and macroscopic composition (osseous, osteochondral) of loose bodies can be reliably evaluated [4]. In this case, we use MRI, which can clearly show the size and position of the free body.

The loose bodies can be found in the subacromial space, which can shift from the upper subacromial space to the lower visible deltoid. The loose bodies were free to move without tissue adhesion when these were removed. The synovial hyperplasia could been found in operation, which have closed relative to chronic synovitis. Articular cartilage may be a complication of chronic subacromial bursitis [5–7], the bodies can be generated even among tenosynovitis and synovial bursa [7] in this embodiment. In this case, the bodies probably also generated from the synovial bursa.

For removals of loose bodies, arthroscopy was commonly used, even within deep joint of hip, removal of loose body can be challenging because of the inner position of the acetabulum, but it also successed [8]. For the distribution of extra-articular loose bodies, many of them using open surgery. We use the characteristics of arthroscopy, in-depth observation of the entire subacromial bursa and round organizations, to find out and remove all loose bodies. It is also minimally invasive, and has many advantages over traditional open surgery. But in this surgery, loose bodies, previously shown in the joints, loose bodies after operation recovered better in a lower rate of recurrence and got more better effect to patients [9,10]. In this operation, mechanism of formation is not clear, may be associated with synovial cartilage metaplasia, and therefore loose bodies was removed with proliferative synovial bursa clean-up, which show the symptoms of this patient improved well.

4. Conclusion

Multiple bony loose bodies in the subacromial space are extremely rare. The clinical features and imaging studies were not typical for 8 loose bodies in subacromial space. The loose bodies maybe come from the proliferative synovial bursa. The patient was successfully treated with arthroscopy and the symptoms of this patient improved well.

Conflict of Interest

The authors have no conflict of interest in the work.

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Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Wei Li contributions to operation, design, manuscript, images and interpretation.Deming Xiao contributions to manuscript.Chang-qing Jiang contributions to operation of the patient, images.Wen-tao Zhang contributions to operation of the patient, images.Ming Lei contributions to manuscript.

Key learning points

The loose bodies maybe come from the proliferative synovial bursa. The arthroscopic removal of loose bodies and bursa debridement is an effective alternative for treating bony loose bodies formation in the subacromial space, which has many advantages over traditional open surgery.

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