

Multiple extra-articular synovial cysts accompanied by rheumatoid arthritis in the bilateral elbow joints

A case report

Jingfeng Zhang, MD, PhD^{a,*}, Junli Wang, MS^a, Xiongwei Mao, BS^b, Zhengang Li, BS^a

Abstract

Rationale: Synovial cysts are well known in rheumatoid arthritis (RA), and most common in the popliteal fossa. They may produce lots of local symptoms and complaints, which may present initially as an unrelated clinical condition. Few studies have reported multiple extra-articular synovial cysts (MESCs) in the RA patients. Early diagnosis is crucial for patient treatment.

Patient concerns: A 50-year-old man without any special clinical histories found a soya bean size bump at the left elbow medially, then multiple lumps were found at bilateral elbows and gradually increasing. No pain, no activity, no redness, and swelling. Magnetic resonance imaging (MRI) showed multiple cystic lesions in the bursa and surrounding soft tissue of bilateral elbow joints. In addition, the elbow joint bursa was swollen and the synovial membrane was significantly thickened.

Diagnoses: The man was diagnosed as RA with multiple extra-articular synovial cysts formation.

Interventions: The patient was performed tyelectomy of the right elbow. Other lumps were punctured and injected with compound betamethasone injection.

Outcomes: The bumps were reduced in size and the swelling relieved, and the patient was sent to the department of rheumatology and immunology for further treatment.

Lessons: In this case, it is difficult for the diagnosis of RA because of no relative histories and simultaneously multiple cystic lesions in multiple joints. Imaging examinations can show the characteristics of such kind of disease and be very helpful for the diagnosis and differentiate diagnosis.

Abbreviations: ADC = apparent diffusion coefficient, ANA = antinuclear antibodies, C3 = complement 3, CCP = anticyclic citrullinated peptide antibody, CRP = C-reactive protein, CT = computed tomography, DS-DNA = double-stranded DNA, ESR = erythrocyte sedimentation rate, IgA = immunoglobulin A, IgG = immunoglobulin G, MESC = multiple extra-articular synovial cysts, MRI = magnetic resonance imaging, RA = rheumatoid arthritis.

Keywords: computed tomography, elbow joint, magnetic resonance imaging, multiple extra-articular synovial cysts, rheumatoid arthritis, X-ray

1. Introduction

Synovial cysts can originate from not only joints but also bursa and tendon sheaths,^[1,2] so synovial cysts can be multiple.

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^a Department of Radiology, the First Affiliated Hospital, School of Medicine, Zhejiang University, ^b Department of Radiology, Hospital of Zhejiang University, Hangzhou, China.

* Correspondence: Jingfeng Zhang, Department of Radiology, the First Affiliated Hospital, School of Medicine, Zhejiang University Hangzhou, Zhejiang Province, 310003, China (e-mail: jingfengzhang73@zju.edu.cn).

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However, multiple extra-articular synovial cysts (MESCs) are rarely reported in rheumatoid arthritis (RA), and simultaneously involved multiple joints.^[3] Sometimes, they may be confused to differential diagnosis between synovial cysts and soft tissue masses without imaging modalities. Some imaging techniques such as X-ray, computed tomography (CT), and magnetic resonance imaging (MRI) have a great potential to detect joint diseases including RA. MRI can not only differentiate cysts from soft tissue masses but also detect fluid collection and proliferated synovial tissues as high signal on T2-weighted image. At the same time, MRI can detect bone erosion and bone edema. We report a case of an adult with RA and analyze a series of imaging techniques indicated inflammatory features with MESC.

2. Case presentation

This Health Insurance Portability and Accountability Act (HIPAA) compliant study was approved by the institutional review board of the First Affiliated Hospital, Zhejiang University, and the requirement for informed consent was waived because of the study's retrospective nature.

A 50-year-old man without any clinical and family histories found a soya bean size bump at the left elbow medially 7 months ago, and then there was a lump at the right elbow 4 months ago.

No pain, no mobility, and no treatment was performed. The lesions at both elbows were gradually increasing, without redness and swelling, but with slightly pain. At the same time, an egg size bump was found at the left elbow laterally. So, the patient visited our outpatient clinic for further diagnosis and treatment.

Physical examination showed several soft and flexible bumps at bilateral elbows (Fig. 1). The proximal interphalangeal and metacarpophalangeal joints of the left 1~4 fingers were swelling. The left wrist was swollen and tenderness.

Laboratory examination showed rheumatoid factor (RF) 57.1 U/mL, erythrocyte sedimentation rate (ESR) 58 mm/h, C-reactive protein (CRP) 29.20 mg/L; antinuclear antibodies (ANA) +1:320, soluble nucleoprotein antibodies positive; immunoglobulin A (IgA) 333.0 mg/dL, immunoglobulin G (IgG) 1990.0 mg/dL, IgM 70.1 mg/dL; complement 3 (C3) 140.0 mg/dL, C4 40.0 mg/dL; double-stranded DNA (DS-DNA), anti-cyclic citrullinated peptide antibody (CCP), Sm, and RNP negative; SSa, ssa52, anti-SSB, and Rib positive; anti Jo-1, anti Scl-70, nucleosome antibody, histone proteins, centromere antibodies negative; anti-mpo antibody 0.1.

The patient was taken to perform several imaging examinations. Frontal radiographs of bilateral elbow joints showed multiple soft tissue masses around the elbows, and the bones were not involved (Fig. 2). CT examination of elbow joints displayed multiple cystic lesions with low attenuation around bilateral elbows (Fig. 3). Ultrasound indicated the lumps of the elbows were solid-cystic. MRI showed multiple cystic lesions in the elbow joints' capsules and surrounding soft tissues, part of which was displayed envelope or septa with low signal. The lumps' signal was similar to muscles on T1-weighted images, which mainly displayed high signal with internal spots of slightly lower

signal on T2-weighted images. Pseudocolor map of apparent diffusion coefficient (ADC) parameter showed red area in the lump without diffusion restriction. After intravenous administration of Gd-DTPA, the lumps were demonstrated multilocular cystic lesions with enhanced septa obviously (Fig. 4). The joint capsule was swollen, and the synovial tissue was significantly thickened, which displayed apparent enhancement after intravenous administration of contrast agent.

Twelve days after admission to the hospital, the patient was taken to perform the tylectomy of right elbow. During the operation, the lump with complete envelope was located in the medial elbow. After complete resection, the cyst was opened and yellow fruit-like mucus was seen.

Pathological examination of the submitted synovial tissue revealed central caseous necrosis, with epithelioid cells and Langerhans' giant cells around, and fibrous hyperplasia and lymphocytes infiltration. But the acid-fast staining was negative. The histopathological examination confirmed the diagnosis of synovitis of left elbow with synovial cyst (Fig. 5). Other lumps were punctured and injected with compound betamethasone injection, the size of which was reduced, and the swelling was relieved. Ultimately, the patient was sent to the department of rheumatology and immunology for further treatment.

3. Discussion

RA is a kind of chronic systemic inflammatory disease of the joints, characterized by persistent nonspecific synovitis, and positive autoantibodies particularly RF.^[4,5] The process is progressive and erosive, with many small joints involved and causing pain and stiffness. RA first involves the synovium,



Figure 1. Flexible lumps (arrows) were seen at bilateral elbows (A, B).

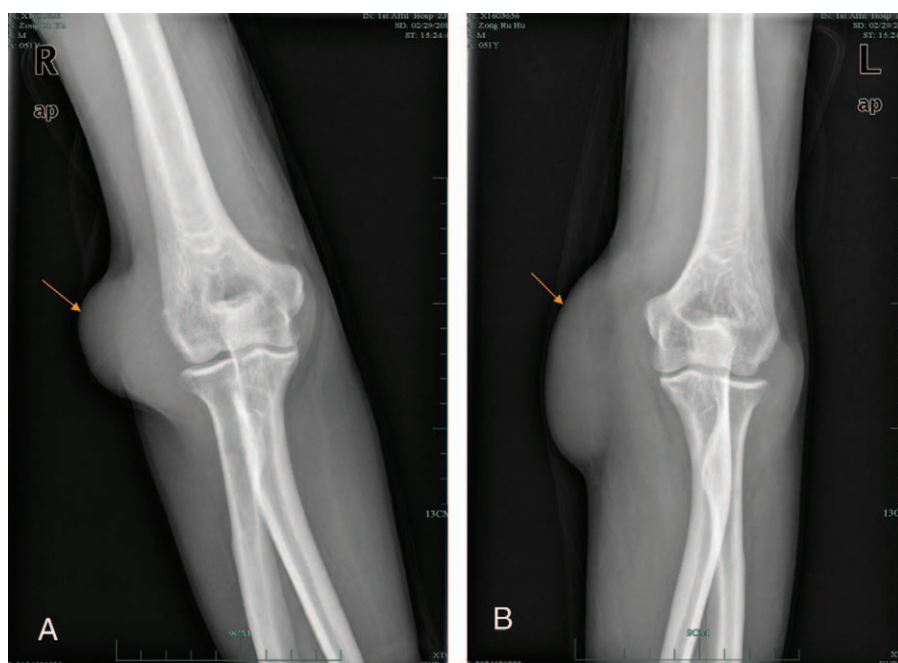


Figure 2. Frontal radiographs of bilateral elbow joints (A, B) showed multiple soft tissue masses around the elbows (arrows), and the bones were not involved.

resulting in synovial effusion, and synovial proliferation due to chronic inflammation.^[6] With the increasing of intra-articular pressure, the synovial fluid distends to the articular capsule or weaker areas, and finally forms the synovial cysts.^[7,8] The cysts are usually associated with adjacent capsule, bursa, or tendon sheaths. In this case, the bilateral cystic lesions of elbows gradually increased in 7 months; therefore, it is logical to assume that they were related to the excessive synovial fluid in the capsule, which distended to the bursa or tendon sheaths.

Except for the basic clinical manifestations from RA, MESC may produce lots of local symptoms and complaints, which may result from the pressure, acute rupture, or dissection, or may present initially as an unrelated clinical condition.^[2,9] Cystic lesions of RA arising from the elbow joint may present peripheral neuropathy (such as posterior interosseous, median, and ulnar nerves) because of nerve compression.^[10] If cystic lesions ruptured, they could present pain and swelling associated with disappearance of sheath effusion, and simulate vascular lesions (such as deep vein thrombosis, aneurysm, fistula, or varix),

abscess, or invade other soft tissues.^[9,11] However, typical symptoms of RA such as joint tenderness and morning stiffness, as in our case, may be absent in some patients. Some cases may have no bone changes such as erosion or edema. Presumably, typical symptoms of RA may be related with the pathological features such as bone destruction.^[3]

MESC was rarely reported in RA, so sometimes it is very difficult to make the accurate diagnosis without related clinical history. Although some laboratory indexes such as ESR and CRP are very important for the evaluation of inflammatory, imaging examination can estimate the changes in synovium, cartilage, and bone as a result of the disease activity or in response to the therapy.^[12–14] X-ray and CT are more advantageous than MRI for detecting the bone damage such as osteoporosis and bone erosions, while MR will be more sensitive and specific in demonstrating inflammation of joints, bursa, tendon sheath, and bone marrow.^[15–17] In general, the synovitis is defined as a thickness area with intermediate to low signal on T1-weighted images, but high signal on T2-weighted images. After intravenous

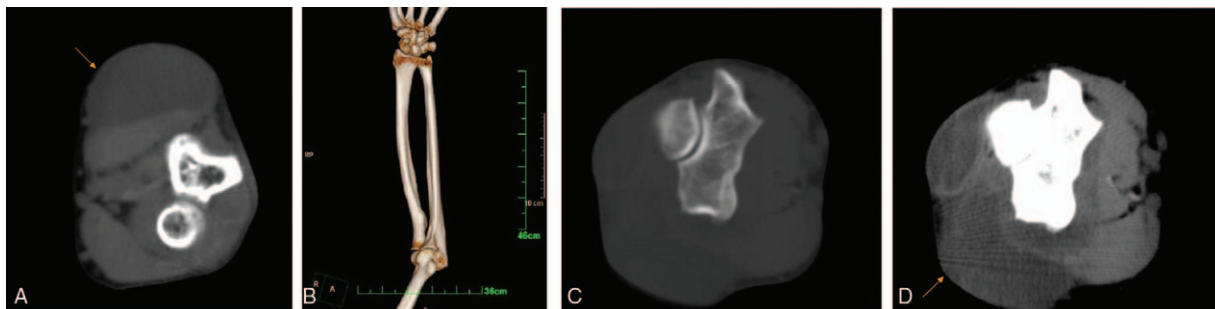


Figure 3. Axial CT (A, C, D) and 3D reconstruction (B) images displayed multiple cystic lesions around the elbows (arrows), with homogeneous low attenuation, smooth, and sharp contour, and without bone destruction.

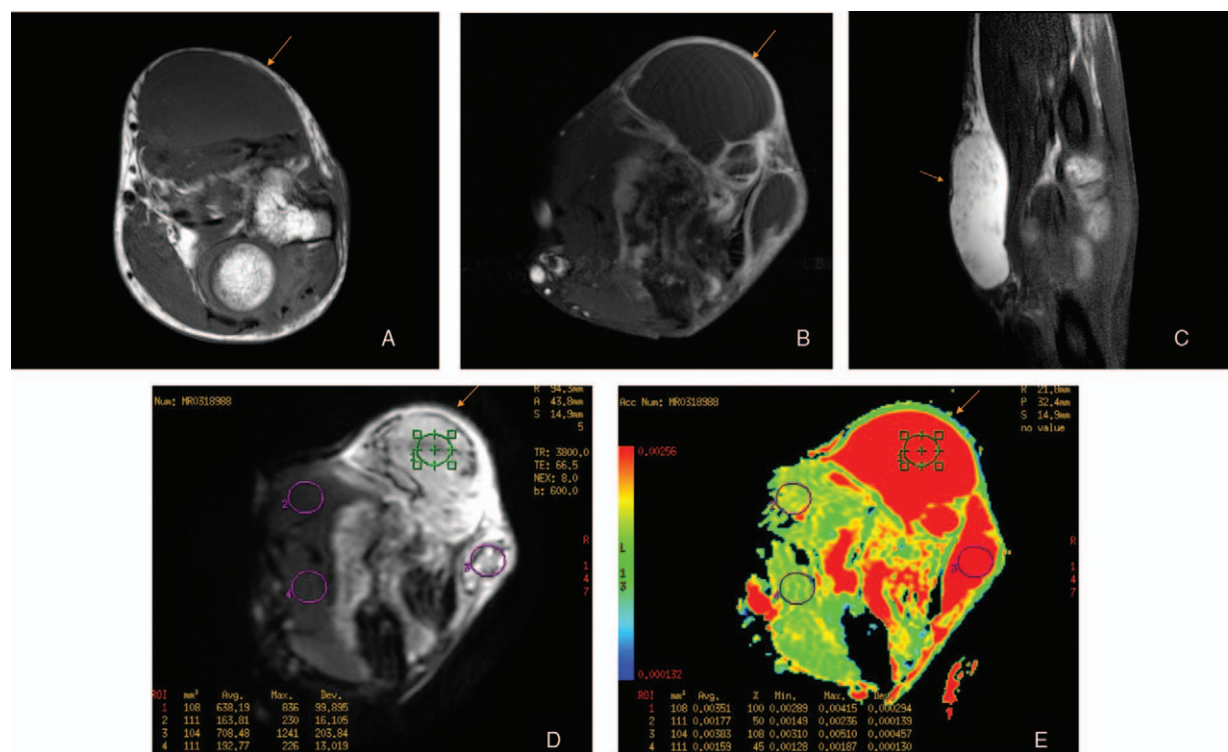


Figure 4. MR images of the elbow joints (A–E). Multiple cystic lumps around the elbows were demonstrated, the signal intensity of which were similar to muscles on T1-weighted images (A), and mainly high signal with internal spots of slightly lower signal on T2-weighted images (C). Pseudocolor map of ADC parameter showed red area in the lump without diffusion restriction (E). After intravenous administration of contrast agent, the lumps were demonstrated multilocular cystic lesions with enhanced capsules or septa obviously (B) (arrows).

administration of contrast agent, the synovitis with abnormal enhancement can be more helpful for the diagnosis from effusion.^[13–15] At the early stage of RA, fat-suppression sequences such as short time inversion recovery can display the bone edema, which manifests as high signal, and contrast enhancement on T1-weighted images with fat suppression. The bone destruction can be seen on T1-weighted images without fat suppression in patients with early RA, and may be observed a median of 2 years earlier than conventional X-ray or CT.^[18] For the patients with MESC, MRI is more sensitive and more specific

in the assessment of cystic lesions than X-ray and CT, as it helps distinguishing fluid from solid tumors.

For this case, the diagnosis of RA would be difficult because the patient had no relative histories, and cystic lesions involving multiple joints simultaneously are very rare. However, imaging examinations can provide more detailed information for this kind of disease, such as synovial inflammation, multiple cystic lesions around the joint, bone erosion, etc., which is helpful to make a definite diagnosis of RA combining with the results of autoantibodies.

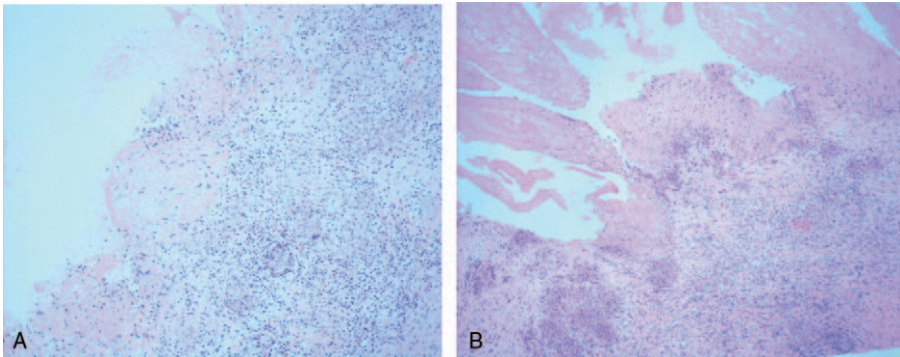


Figure 5. Pathological examination (H&E, ×100) of the submitted synovial tissue revealed the central part was caseous necrosis, with epithelioid cells and Langerhans' giant cells around, and fibrous tissue hyperplasia and lymphocytes infiltration. But the acid-fast staining was negative.

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