A Case of Idiopathic Massive Rice Bodies in the Knee Joint without Rheumatoid Arthritis or Tuberculosis and a Literature Review

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Rice bodies are materials with an amorphous nucleus and a fibrin layer found floating in the synovial space and bursa. These bodies have often been detected in patients with rheumatoid arthritis, tuberculous arthritis, and bursitis. Although the etiology and pathogenesis of rice bodies are not yet fully understood, it has been hypothesized that they might be caused by chronic inflammation originating from the synovium. However, we report on a case of idiopathic massive rice bodies in the knee joint without evidence of inflammatory articular disease or infection including rheumatoid arthritis, seronegative spondyloarthritis, tuberculosis, or bacterial or fungal infection. (J Rheum Dis 2016;23:316-320)

Key Words. Rice body, Knee, Rheumatoid arthritis, Tuberculosis

INTRODUCTION

Floating rice-like particles in the synovial space could be found in the inflammatory joint diseases. These particles are known as rice bodies and were first reported by Reise in 1895 in tuberculous arthritis [1]. Rice bodies have been found in the synovial space in patients with rheumatoid arthritis or seronegative spondyloarthritis [2] and in the bursa [3] and around tendon sheaths [4] in association with inflammation. However, we experienced a case with massive rice bodies in the knee joint without any inflammatory or infective evidence and report these idiopathic rice bodies with an associated literature review.

CASE REPORT

A 46-year-old male had developed discomfort in the right knee one year ago, and aggravated swelling and pain two month ago. For these symptoms, he visited to the outpatient clinic of orthopedics department. He did not have any medical history and previous joint problems. He worked in an office and had not experienced any traumatic events involving the right knee joint. He felt discomfort when climbing stairs but no definite tenderness and warmth in the right knee. He did not have any symptoms in the other joints and had not experienced inflammatory back pain, uveitis, psoriasis, or inflammatory bowel disease. At admission, his white blood cell count was 3,870/µL, hemoglobin was 14.9 g/dL, and platelet count was 224,000/µL. Erythrocyte sediment rate was 6 mm/hr, and C-reactive protein was 3.18 mg/L (normal range, 0∼5 mg/L). Antinuclear antibody, rheumatoid factor, anti-cyclic citrullinated protein antibody, and human histocompatibility leukocyte antigen (HLA) B27 were all negative. Magnetic resonance imaging (MRI) of the knee showed a large amount of joint effusion with numerous low-signal foci in the suprapatellar bursa against a background of fluid signal intensity on T2-weighted image and intact anterior and posterior cruciate ligaments and collateral ligaments, as shown in Figure 1. Arthroscopic syno-
vectomy of the right knee joint was conducted for diagnosis and revealed numerous rice bodies in the synovial space, but no definite synovial proliferation, as shown in Figure 2. Microscopic pathology of these materials revealed multiple nodular fibrocartilaginous tissues consistent with rice bodies and clean synovium without any synovial hyperplasia and inflammatory cells as shown in Figure 3. The results of bacterial, fungal, and acid-fast bacilli (AFB) culture studies from the synovium and washing synovial fluid were all negative, and real-time polymerase chain reaction (PCR) for non-tuberculous mycobacterium (NTM) of synovium was also negative. His symptoms improved after synovectomy without any medications and continue to be stable 6 months later.

Figure 1. Magnetic resonance images of the right knee. (A) T1-weighted image (T1WI) and (B ∼ D) T2-weighted images (T2WI) showed a large amount of joint effusion with numerous low-signal foci against a background of fluid signal intensity on T2WI. Anterior and posterior cruciate ligaments and collateral ligaments were intact.

Figure 2. Gross morphology of rice bodies in the washing synovial fluid and arthroscopic findings. (A) Many white amorphous materials were found in the washing synovial fluid collected through arthroscopic irrigation. Arthroscopic findings were consistent with rice bodies in the suprapatellar space (B) and revealed a normal synovium (C).
DISCUSSION

Rice bodies were most commonly detected in rheumatoid arthritis [2], tuberculous arthritis, and bursitis [5,6]. Rice bodies had been found in 72% of joints affected by rheumatoid arthritis after aspiration and lavage of synovial fluid [2]. These materials could occur adjunctive to inflamed synovium, in the bursa [3], and around tendon sheaths [4], as well as in the pleural fluid of patients with rheumatoid arthritis [7]. They have also been reported in patients with juvenile arthritis [8], seronegative spondyloarthritis [2], and osteoarthritis [2]. In the tuberculous
arthritis and bursitis, it had been also often combined with rice bodies [5,6]. Rice bodies have been found in various joints including shoulder, knee, wrist, and elbow [2].

MRI is a helpful diagnostic tool for rice bodies in the synovial space and bursa ahead to operation. The MRI features of rice bodies are described as iso- or hypo-intense on T1-weighted and T2-weighted images. They are difficult to distinguish from bursal and synovial fluid on T1-weighted images, and a honeycomb-like pattern could be seen from the border of each body that is distinguished from the surrounding fluid on T2-weighted images, as shown in our report [9]. These appearances are not specific findings of rice bodies, and they have to be differentiated from various benign synovial proliferative disorders, including chronic synovial proliferation, pigmented villonodular synovitis, and synovial osteochondromatosis [9,10].

The etiology of rice bodies is not fully understood, but they might originate from microinfarction of the synovium due to chronic inflammation [10]. Microscopic findings of rice bodies had shown an amorphous core surrounded by thin fibrin, and the core compositions were similar to those of inflamed synovium including types I, II, and V collagen and microvasculature [10]. Thus, floating materials might originate from proliferative synovium due to chronic inflammation.

However, rice bodies had been rarely reported in the joint with nonspecific synovitis as shown in Table 1. Several cases with rice bodies of the wrist joints and flexor tendon sheath in the absence of rheumatic disease or tuberculosis have been reported, and these might be caused by overuse because they usually occurred on the patient’s dominant side [11]. And two cases of rice bodies in the knee joint with nonspecific synovitis had been reported, and both patients had no signs or laboratory findings of rheumatoid arthritis or infection [12,13]. And pediatrics also had rice bodies in knee and shoulder joints without definite inflammatory articular diseases [13,14]. All cases with idiopathic rice bodies had been accompanied with synovitis or tenosynovitis and any symptoms had not been recurred after only tenosynovectomy. Rice bodies without any inflammatory signs in the joint have not been previously reported. In our report, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were within normal range, and no definite clinical features reflecting inflammation such as tenderness or joint warmth were noted. Results of culture and PCR for tuberculosis and NTM were negative, and all ligaments and menisci were intact. Furthermore, arthroscopic finding and pathology of the synovium showed clean synovium without definite inflammatory cells infiltrates.

Based on our case and literature reviews, we have to check immunologic markers including rheumatoid factor (RF), anti-citrullinated protein antibody (ACPA), anti-nuclear antibodies (ANA) and HLA B27 and culture studies when rice bodies in the joint space are suspected in ultrasonography and MRI. Idiopathic rice bodies with nonspecific tenosynovitis could be clearly cured by tenosynovectomy. And idiopathic rice bodies without any inflammatory reaction also could be cured by surgical removal for relieving symptoms without additional medical treatments.

**SUMMARY**

Rice bodies were commonly detected in the synovial space in patients with rheumatoid arthritis or tuberculosis and could often be found in the bursa and around tendon sheaths. The etiology of rice bodies had not been clearly understood, but they might be formed from chronic inflammation. However, we reported that massive rice bodies in the suprapatellar space were founded without any evidence of synovitis in the knee joint. Therefore, the pathogenesis of rice bodies must be studied in addition to inflammation in the future.

**CONFLICT OF INTEREST**

No potential conflict of interest relevant to this article was reported.

**REFERENCES**