

Tuberculous Subdeltoid Bursitis with Rice Bodies

Ryuh-Sup Kim, Joung-Yoon Lee, Sae-Rom Jung, and Kang-Yun Lee

Department of Orthopedic Surgery, In Ha University Hospital, Incheon, Korea.

A 41-year-old woman with a 2-month history of diffused swelling and persistent dull pain in her right shoulder was examined. Magnetic resonance imaging (MRI) findings revealed subdeltoid bursitis and rice bodies with normal surrounding tissue and shoulder joint. Arthroscopic debridement and biopsy of the subdeltoid bursa were performed. Histologic examination of the bursal tissue showed granulomatous tissue with typical caseous necrosis. A positive culture of *Mycobacterium tuberculosis* confirmed the diagnosis of tuberculosis. We report on the clinical, radiological and athological findings in a patient with tuberculous subdeltoid bursitis accompanied by multiple rice body formation without coexisting active bone and joint tuberculosis, and conduct a literature review.

Key Words: Subdeltoid bursa, bursitis, tuberculosis, rice bodies, mycobacterium infections

INTRODUCTION

The incidence of tuberculosis has declined persistently since the introduction of antituberculous chemotherapy. However, there are many reports in the recent literature indicating that the rate of tuberculosis, both in the United States and throughout the world, especially in Africa and Asia, has been increasing.^{1,2} This increase is due to increasing numbers of people traveling globally and immigrating, especially the elderly, chronically immunosuppressed patients and patients with acquired immunodeficiency syndrome.³ The authors encountered a rare case of tuberculous subdeltoid bursitis, which was accompanied by multiple rice body formation without coexisting

active bone and joint tuberculosis.

CASE REPORT

A 41-year-old woman was referred to our clinic due to persistent dull pain in her right shoulder (dominant side) for 2 months. The pain was not aggravated with movement but occasionally disturbed sleeping at night. On physical examination, she was afebrile, and the presence of a diffuse swelling from the anterior to posterior portion of the deltoid area was revealed. The swelling was elastic and soft with a sign of fluctuation. There was no tenderness over the acromion or acromioclavicular joint, and no sign of acute inflammation such as local heating or redness. There was no limitation of motion in the right shoulder. The axillary nerve was intact. She had no pulmonary symptoms, such as a productive cough, and no history of trauma or receiving acupuncture around the shoulder. Family history revealed no previous tuberculosis.

The white blood cell count was 6,400/ μ l (normal range, 4,000-10,800) without a left shift. Rheumatoid factor (RF) was negative. The erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) concentration level, and urinalysis results were normal. Chest radiography revealed a single granuloma without evidence of active disease. Plain radiographs of her right shoulder revealed no abnormalities except soft tissue swelling (Fig. 1). T1-weighted sagittal MRI of the right shoulder demonstrated a homogenous, intermediate-intensity mass in the subdeltoid space (Fig. 2A). T2-weighted sagittal MRI showed a delineated, intermediate-intensity, honeycomb-like appearance in the subdeltoid region surrounded by high

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Reprint address: requests to Dr. Ryuh-Sup Kim, Department of Orthopedic Surgery, In Ha University Hospital, 7-206, 3-Ga, Shinheung-Dong, Jung-Gu, Incheon 400-103, Korea. Tel: 82-32-890-3043, Fax: 82-32-890-3047, E-mail: keelim@inha.ac.kr

signal intensity (Fig. 2B). Aspiration of synovial fluid was performed from the subdeltoid bursa



Fig. 1. Plain shoulder anteroposterior radiography of the involved shoulder showing soft tissue swelling without soft tissue calcification or bony lesion.

and the sample was cultured in bacterial and acid-fast bacilli (AFB) culture.

The patient underwent arthroscopic debridement and biopsy of the right subdeltoid bursa. Arthroscopic findings revealed many rice bodies, some of which were loosely attached to the synovium (Fig. 3A). The rice bodies macroscopically resembled shiny rice grains. The size, consistency and shape varied with more than half of these bodies being between 2 and 10 mm in length (Fig. 3B). Microscopically, they consisted of an inner amorphous core made up of eosinophilic material, surrounded by collagen and fibrin. Light microscopic examination of the bursa revealed granulomatous tissue with typical caseous necrosis (Fig. 4A and B). The Ziehl-Neelsen stain did not reveal AFB. However, *Mycobacterium tuberculosis* was



Fig. 2. (A) T1-weighted sagittal MRI showing a distension of the subdeltoid bursa without clear definition of individual nodules. (B) A fat-suppressed T2-weighted sagittal MRI showing an intermediate-intensity, honeycomb-like appearance as multiple tiny nodules by high signal intensity within the distended bursa.

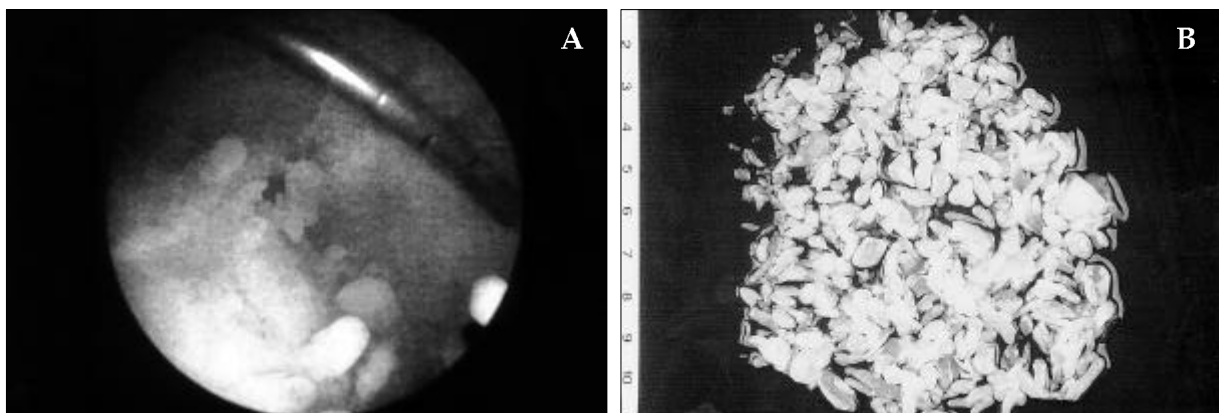


Fig. 3. (A) Arthroscopic photograph showing rice bodies attached to the synovial wall. (B) Photograph showing numerous rice bodies.

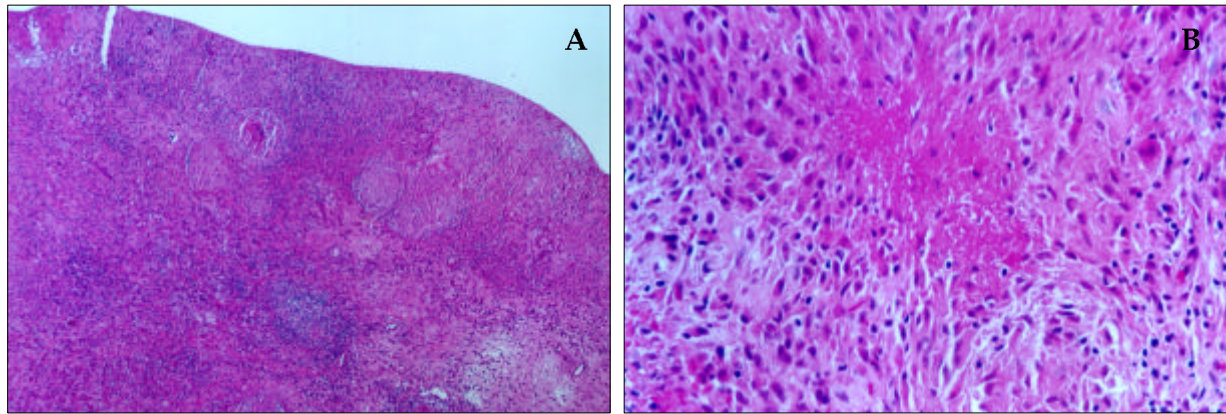


Fig. 4. Photomicrograph showing, (A) chronic granulomatous inflammation (H&E, $\times 40$), and (B) typical caseous necrosis (H&E, $\times 200$).

isolated from the serous fluid in the bursa, allowing the definitive diagnosis of tuberculous bursitis to be made. The patient underwent anti-tuberculous chemotherapy for 6 months. At 18 months after surgery, the patient has no sign of recurrent disease.

DISCUSSION

Musculoskeletal tuberculosis occurs in approximately 1-3% of tuberculosis patients.^{4,5} In musculoskeletal tuberculosis, tuberculous spondylitis is a common manifestation, while tuberculosis of soft tissue such as the tenosynovial sheath or bursa is rare.¹ Secondary tuberculous involvement of soft tissue from bone and joint disease is well recognized. Thus, it is important to determine the extent of involvement, to detect any communication between an infected bursa and joint, and to treat tuberculous bursitis.

Tuberculous bursitis without coexisting active bone and joint tuberculosis may affect any site but is a rare condition, having been seldom described in the literature. The common sites of involvement are the bursae, including the greater trochanteric, prepatellar and olecranon bursae,⁶⁻¹⁰ which are the areas subjected to frequent trauma. Since the introduction of antituberculous chemotherapy, only two studies on tuberculous subdeltoid bursitis without coexisting active bone and joint tuberculosis have been published. In their study of 21 cases of tuberculous tenosynovitis and bursitis,

Jaovisidha et al.¹⁰ reported 3 cases of tuberculous subdeltoid bursitis. Alkalay¹¹ also reported on a patient who had a 30-year history of tuberculous subdeltoid bursitis.

There are two theories as to the etiopathogenesis of tuberculous bursitis, i.e., direct inoculation⁸ and hematogenous dissemination from a primary focus, usually the lung.¹ The subdeltoid bursa covered by the deltoid muscle is less likely to be exposed to trauma, of which our patient had no past history. Therefore, we could exclude the possibility due to direct inoculation. Even if a primary tuberculous infection healed without clinical evidence of the disease, the secondary focus may become active years later.¹² Consequently, the absence of active pulmonary tuberculosis, or even signs of healed disease, does not eliminate the possibility of tuberculous subdeltoid bursitis as a secondary tuberculous infection.

The formation of intra-articular rice bodies was first described in tuberculous arthritis. However, while these nodules appear to be a common finding in rheumatoid arthritis and bursitis, they are conversely uncommon in other arthropathies.¹³ Their etiology remains obscure. Some authors proposed a synovial origin with microinfarction leading to synovial sloughing and subsequent encasement by fibrin derived from synovial fluid.¹⁴ Others thought that the earliest rice bodies are formed *de novo* in synovial fluid independently of synovial elements and that their presence is due to progressive enlargement of fibronectin/fibrin aggregates.¹⁵

Arthroscopic findings of our patient revealed rice bodies attached to the synovial wall. We speculate that these rice bodies were formed due to synovial microinfarction as described by Cheung.¹⁴ The appearance and composition of the rice bodies in our patient, both macroscopically and microscopically, were similar to those reported from rheumatoid arthritis.¹³ Rice bodies composed of fibrous tissue in this patient were shown as intermediate-intensity on T1- and T2-weighted images. Thus, although these nodules were homogenous and could not be distinguished from bursal fluid on T1-weighted images, they showed honeycomb-like appearance on T2-weighted images, with the outline of each nodule delineated from the surrounding bursal fluid.¹⁶ No enhancement in rice bodies was seen on intravenous gadolinium-enhanced images.¹⁶

In conclusion, within the English literature since the introduction of antituberculous chemotherapy, we report the first case of tuberculous subdeltoid bursitis accompanied by rice bodies without coexisting active bone and joint tuberculosis. We presumed that this infection was of hematogenous origin. Our case supports the hypothesis that rice bodies are formed due to microinfarction of synovial tissue.

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