Case Report
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MRI Findings of Brucellar Spondylitis: A Case Report
부루셀라 척추 감염증의 자기공명영상 소견: 1예 보고

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Brucellosis is a systemic infectious disease, and musculoskeletal involvement is a frequent complication. Particularly, spondylitis is a common involvement. However, early diagnosis of brucellar spondylitis is often difficult due to non-specific clinical symptoms and long latent period. Especially in Korea, where tuberculosis is an endemic disease, differentiation between tuberculous and brucellar spondylitis is clinically and radiologically more challenging. A 59-year-old male cattle farmer, who presented with non-specific back pain, had spondylitis on magnetic resonance imaging (MRI), and serologic test finally confirmed brucellar spondylitis. Therefore, we report a case of a rather rare disease in Korea, brucellar spondylitis with a review of MRI findings.

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Index terms
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INTRODUCTION

Brucella species are facultative intracellular, non-encapsulated, non-motile, and gram-negative coccobacilli, which are transmitted by the consumption of unpasteurized milk and dairy products or by direct contact with infected animals (1). Brucellosis still remains as a major health problem causing a high degree of morbidity and economic loss in many regions, particularly in the Mediterranean, Middle East, and Latin America, but it is rare in Korea (2). However, recently, the incidence rate of Brucellosis is on the rise in Korea (3). Although brucellosis affects any organs, including the musculoskeletal and reticuloendothelial systems, osteoarticular diseases, including sacroiliitis, peripheral arthritis, spondylitis, osteomyelitis, and bursitis are the most common complication (4). We describe a case of brucellar spondylitis as the cause of non-specific back pain, with a review of MRI findings.

CASE REPORT

A 59-year-old male cattle farmer was presented with increasing lower back pain, which steadily developed over 2 months. His pain was unresponsive to rest and pain killers and it was worse at night. Additionally, he complained of fever and night sweating. He had no medical history of any diseases, including hypertension, diabetes, tuberculosis or hepatitis.

On physical examination, his body temperature was 37.8°C. His lower back movement was significantly painful in all directions, and tenderness was present on the lumbar vertebral region. No neurologic abnormality was detected. Laboratory findings on the peripheral blood test showed a raised erythrocyte sedimentation rate (ESR) and C-reactive protein to 80 mm/h and 2.64 mg/dL, respectively. However, no abnormality was reported in other peripheral blood and biochemical tests, and blood culture was negative. On detailed questioning, he had a history of contact with a Brucella-infected cow. Brucellar standard tube-agglutination test, which measures serum immunoglobulin G levels against Brucellar antigen, was measured at 1 : 320, and the patients was diagnosed with brucellar infection.

The lumbar spine MRI was performed with a 1.5-T Gyroscan ACS-NT system (Philips Medical Systems, Best, the Nether-

lands) using a spine coil. Axial and sagittal T1 and T2 weighted images and short-tau inversion recovery were obtained via MRI scanners. Also, T1 axial and sagittal contrast enhanced images were obtained. Lumbosacral spine MRI showed low signal intensity in L2 and L3 vertebral bodies on T1 weighted image and heterogeneous high signal intensity on T2 weighted image (Fig. 1A, B). In contrast, patchy heterogeneous irregular enhancement was detected in the affected L2 and L3 vertebral bodies. Disc space narrowing was not definitely detected, but minimal endplate involvement was seen in the anterior portion of L2 and L3 vertebral bodies. Also, irregular heterogeneous enhancement of paraspinal soft tissue was seen (Fig. 1C, D). All MR images are compatible with spondylitis in L2 and L3 vertebral bodies.

The patient was started on combination of oral rifampin, streptomycin, and doxycycline. The patient's back pain subsided during the course of medical treatment.

DISCUSSION

Brucella species are small gram-negative and aerobic coccobacilli that are transmitted most commonly through the ingestion of unpasteurized milk products or by direct contact with infected animals (1-3). Species that cause human brucellosis are Brucella melitensis, *B. abortus*, *B. suis*, and *B. canis*. *B. abortus* is detected mostly in Korea (3). The symptoms of brucellosis are non-specific, including fever, headache, back pain, myalgia, fatigue, sweating, anxiety or depression, and hepatobiliary or gastrointestinal abnormalities (5). The non-specific and commonly subtle nature of the symptoms results in difficulty of establishing an early diagnosis. In a patient suspected of having brucellosis, a detailed history taking of direct contact with infected animals or consumption of their products is important for early diagnosis and treatment (1, 3). In our case, confirming the patient's vocation and history on recent contract of brucellosis infected cow enabled us to make early diagnosis and to initiate the treatment. Brucellosis may affect various body organs, and spondylitis is the most prevalent and important complication of brucellosis in adults with frequency ranging from 2% to 50% (6). The lumbar region is the most frequent site of occurrence, whereas the cervical region is the least affected site of brucellar spondylitis (5).

Definite diagnosis of brucellosis is established by clinical manifestations and the isolation of brucella species from blood or bone marrow cultures (1, 2). In the absence of bacteriologic confirmation, a positive serology for brucella (titer over 1 : 160 in a standard tube agglutinin test or a 4-fold rise in brucella-antibody titer in the interval of 2 weeks) is considered definite diagnosis (2). Particularly in Korea, because tuberculosis is an endemic disease, tuberculous or brucella infections of the spine can be confusing. Both are caused by intracellular pathogens, which are difficult to isolate or identify in a short period (4). Although ESR is not a useful indicator for the diagnosis of brucellar spondylitis, elevated ESR has been observed in a majority of

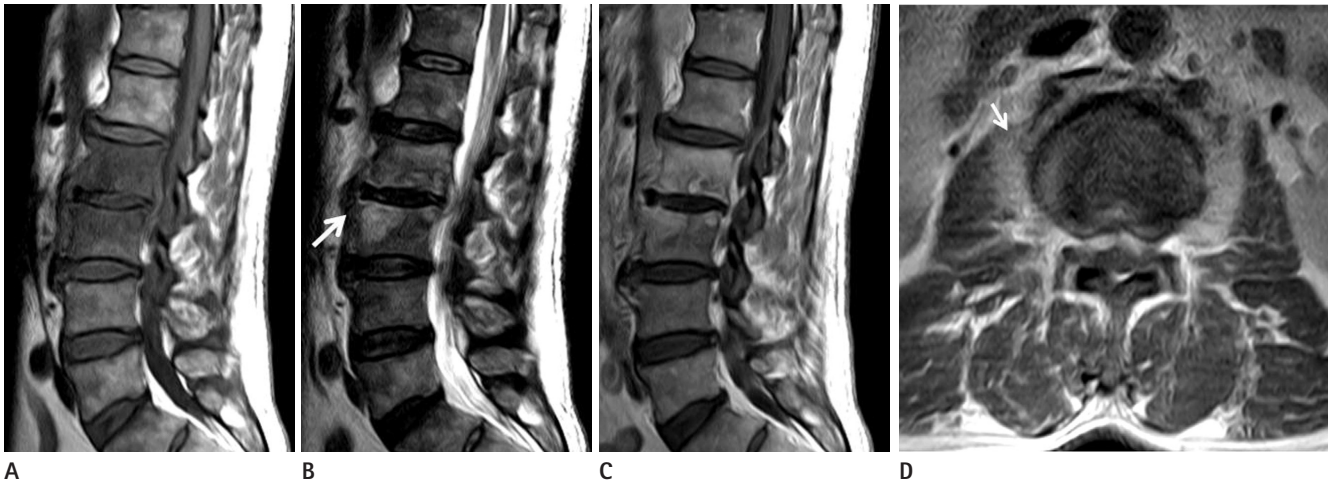

Fig. 1. Images of the lumbar spine from an MRI show brucellar spondylitis in a 59-year-old cattle farmer.
A, B. Sagittal T1 **(A)** and T2 **(B)** weighted images show low and high signal intensity in L2 and L3 vertebral bodies, respectively, and minimal endplate involvement (arrow) is seen in the anterior portion of L2 and L3 vertebral bodies.
C, D. Irregular heterogeneous enhancement (arrow) of paraspinal soft tissue is seen in sagittal **(C)** and axial **(D)** contrast enhanced T1-weighted image.

case reports, which may be used as valuable parameter for monitoring response to therapy (1).

MRI is the most preferred method of choice for the diagnosis of brucellar spondylitis, because it provides better demonstration of marrow change and paravertebral soft tissue spreading than other imaging techniques (7). MRI is very useful in differentiating brucellar spondylitis from tumor or degeneration, but radiographically, differentiation between tuberculous and brucellar spondylitis is complicated (8). There are only few reports on differential MRI findings between tuberculous and pyogenic spondylitis (5, 7, 8).

Lumbar spine, especially lower, is common site for pyogenic spondylitis. Brucellar spondylitis has more intact vertebral structure, more frequent disc association, diffuse vertebral osteomyelitis, less soft tissue involvement around the paraspinal area and absent gibbus deformity than other pyogenic or tuberculous spondylitis (9). In contrast, tuberculous spondylitis usually manifests on MRI with thinly and smoothly enhanced abscess wall and abnormal paraspinal signal with good demarcation (8). Also, tuberculous spondylitis has more frequent findings of subligamentous spread that spans 3 or more vertebrae and more narrowing of disc space than spondylitis due to brucella or other pyogenic causes. Paraspinal mass in tuberculous spondylitis is usually larger than that of brucellar spondylitis (7, 10). Another reported characteristic of tuberculous spondylitis includes frequent involvement of the posterior vertebral bodies and arches (8).

Yet, there has been a standard treatment regimen for the brucellosis, and it is treated with mixed combinations of antibiotics. The most effective treatment is known to be SDR combination (Streptomycin, Doxycycline, and Rifampin), and this combination is found to reduce failure and relapse (10).

In conclusion, due to rarity of the disease and non-specific nature of its symptoms and signs, brucellar spondylitis requires more attention from physicians to make early diagnosis. For patients with unknown fever, consumption of unpasteurized milk, and occupations that have a risk of contracting the infection, a physician must question possibility of brucellosis, and it must be included for differential diagnosis. It is also considered that MRI is an imaging modality that offers higher possibility of making the diagnosis. Thus, its use and careful interpretation of MRI is essential in making early diagnosis of brucellar spondylitis to initiate treatment.

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부루셀라 척추 감염증의 자기공명영상 소견: 1예 보고

김진우 · 김명순 · 김영주

부루셀라증은 전신적 감염증으로 근골격계 이환이 가장 흔하며, 특히 척추 감염증이 가장 흔하다. 비특이적 증상과 긴 잠복기로 인하여 부루셀라 척추 감염증의 조기 진단은 어렵다. 특히 국내는 결핵성 척추 감염증의 빈도가 높기 때문에 임상적 그리고 영상의학적으로 부루셀라 척추 감염증과 결핵성 척추 감염증의 감별이 필요하다. 비특이적 허리 통증을 호소하는 59세 목축업자는 자기공명영상 촬영을 시행하여 척추 감염증을 확인하였고, 최종적으로 혈청학적 검사에서 부루셀라 척추 감염증으로 진단되었다. 저자들은 국내에서 흔하게 발견되지 않는 부루셀라 척추 감염증의 자기공명영상 소견을 보고하고자 한다.

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