

Case Report

Brucellar spondylodiscitis: a rare cause of back pain – a case report

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ABSTRACT

Human brucellosis is one of the most common bacterial zoonotic infections worldwide and is caused by brucella species, which are facultative intracellular gram-negative coccobacilli. The disease can involve multiple organ systems, with osteoarticular manifestations being the most frequent focal complication. Among these, spinal involvement is clinically important because it often presents with nonspecific symptoms and can mimic other infectious or neoplastic disorders, leading to delayed diagnosis. We report the case of a 50-year-old man who presented with intermittent fever and persistent low back pain and was subsequently diagnosed with spinal brucellosis. Although the mortality associated with brucellosis is low, delayed recognition may result in significant morbidity, prolonged disability, and neurological complications. In regions where tuberculosis is highly prevalent, brucellar spondylitis is frequently overlooked because of its close clinical and radiological resemblance to tuberculous spondylitis. Therefore, spinal brucellosis should be considered in the differential diagnosis of patients presenting with fever and back pain, particularly in endemic areas, to facilitate timely diagnosis and appropriate treatment.

Keywords: Brucellosis, Spine, Back pain, Spondylodiscitis

INTRODUCTION

Brucellosis is an important zoonotic infection caused by bacteria of the genus *Brucella*. These are Gram-negative, facultative intracellular coccobacilli that can affect different organs and tissues in humans. Infection commonly occurs through the consumption of unpasteurized milk and dairy products obtained from infected animals. It can also be transmitted through direct contact with infected animals, tissues, or body fluids, especially when the bacteria enter through damaged skin or mucous membranes. Inhalation of contaminated aerosols and accidental exposure through the eyes are other possible routes of infection. The continued occurrence of brucellosis in endemic areas is associated with limited animal disease-control programs and traditional livestock-handling practices. Although death due to brucellosis is uncommon, delayed diagnosis and treatment can lead to considerable health problems because the infection may involve the musculoskeletal,

cardiovascular, nervous, genitourinary, and hepatobiliary systems.¹

Musculoskeletal involvement is the most common focal complication of brucellosis. Among these complications, spinal infection or spondylodiscitis is considered one of the more serious forms. The lumbar spine is affected most frequently, with the L4-L5 region being one of the commonly involved levels. The reported frequency of spinal involvement varies considerably among studies, ranging from approximately 2% to 54% of patients with brucellosis.²

The clinical features of spinal brucellosis can differ depending on the location and severity of infection. It may present as spondylitis, discitis, or spondylodiscitis, while an epidural abscess may occur in some patients. Persistent back pain is the most common complaint. Patients may also experience fever, weakness, fatigue, and other general symptoms. In severe cases, compression of the spinal cord

or nerves may produce neurological problems, including weakness of the lower limbs and difficulties with bladder or bowel control.³

Diagnosing spinal brucellosis can be difficult because its clinical symptoms and imaging findings may be similar to those seen in spinal tuberculosis, pyogenic vertebral osteomyelitis, and spinal tumors. If diagnosis is delayed, the infection may progress and cause permanent neurological damage or long-term disability. Therefore, spinal brucellosis should be included in the differential diagnosis of patients with persistent back pain and prolonged fever, especially in areas where brucellosis is common. Early serological investigations combined with appropriate imaging techniques can help establish the diagnosis and allow treatment to be started at an early stage.⁴

CASE REPORT

A 50-year-old male from Neemuch, Madhya Pradesh, India, presented with complaints of intermittent high-grade fever, low back pain, and difficulty in walking due to pain for the preceding 15-20 days. He had no significant past medical or surgical history, and his family history was unremarkable. There were no sensory deficits or bowel and bladder disturbances on neurological examination.

Initial laboratory investigations revealed an erythrocyte sedimentation rate (ESR) of 120 mm/hour, hemoglobin of 9.5 g/dl, total leukocyte count of 6,100/ μ l, platelet count of 409,000/ μ l, serum creatinine of 0.79 mg/dl, serum glutamic-pyruvic transaminase (SGPT/ALT) of 36 U/l, and thyroid-stimulating hormone (TSH) of 6.11 μ IU/ml. Peripheral smear for malarial parasites was negative.

The patient initially received symptomatic treatment and was further evaluated for tropical febrile illnesses. Brucella IgM was found to be positive by enzyme-linked immunosorbent assay (ELISA). Based on this result, treatment with doxycycline was initiated, along with analgesics for symptomatic relief. However, despite therapy, the patient continued to experience persistent low back pain.

A plain radiograph of the lumbosacral spine demonstrated an old compression fracture of the L4 vertebral body. Magnetic resonance imaging (MRI) of the lumbosacral spine revealed heterogeneously enhancing hypointense marrow signal intensity lesions involving the L4 and L5 vertebral bodies, with an associated anterior epidural soft-tissue component at the L4 level causing spinal canal narrowing and compression of the traversing and exiting bilateral nerve roots. Associated end-plate erosions raised the possibility of a neoplastic lesion.

An oncology consultation was sought, and a positron emission tomography-computed tomography (PET-CT) scan was performed to identify the primary lesion and assess disease extent. PET-CT demonstrated metabolically

active irregular lytic lesions with marrow infiltration involving the L4 and L5 vertebrae, raising the possibility of malignancy, including lymphoma or multiple myeloma.

Subsequently, a CT-guided biopsy of the L4 vertebral body was performed. Histopathological examination revealed a few ill-formed to well-formed epithelioid granulomas without caseous necrosis, suggestive of granulomatous spondylitis. Correlation with the positive microbiological findings supported the diagnosis of spinal brucellosis.

The patient was treated with intravenous amikacin for 15 days, oral doxycycline for one month, and oral rifampicin for six months. At the end of six months of therapy, he showed marked clinical improvement with complete resolution of fever and significant relief of back pain. He was able to walk comfortably without pain and had resumed his routine daily activities.

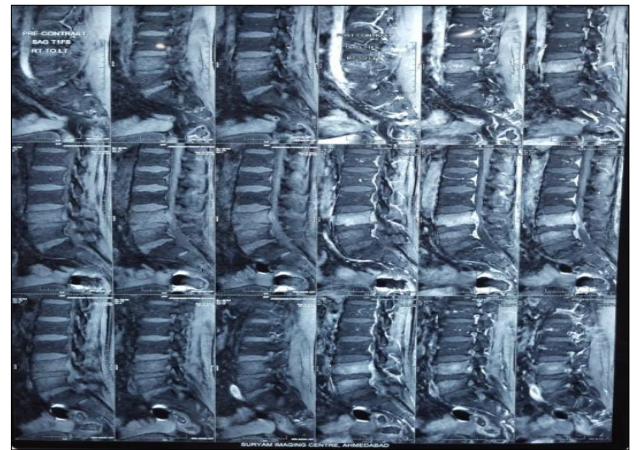


Figure 1: On T1W images abnormal hypointense marrow signal intensity lesions are seen involving L4 and L5 vertebral bodies, which appears hyperintense on FS images.

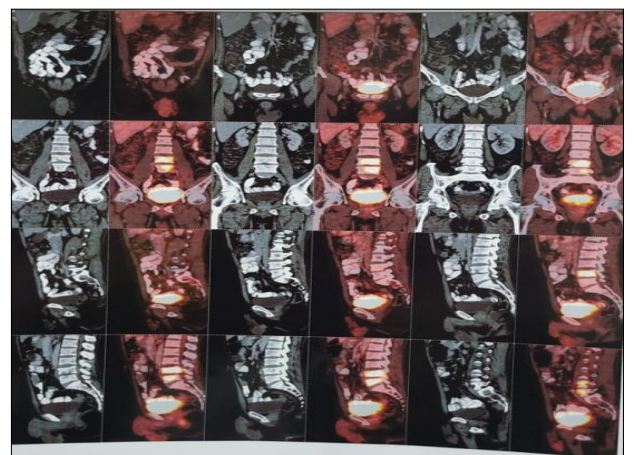


Figure 2: Irregular lytic and marrow infiltrating lesion seen in L4-L5 vertebra with minimal enhancing soft tissue component.

DISCUSSION

Human brucellosis, also known as Malta fever, is a zoonotic infection caused by *Brucella* species, which are gram-negative coccobacilli. Although the infection occurs worldwide, it is particularly common in regions such as the mediterranean basin, West Asia, the Middle East, Central and South America, and sub-Saharan Africa.⁵ Humans may acquire the infection through direct exposure to infected animals or through the consumption of unpasteurized milk and dairy products. After entering the body, *Brucella* organisms can pass through the lymphatic system and subsequently enter the bloodstream, allowing the infection to disseminate to different organs and tissues.⁶

The clinical presentation of brucellosis is diverse and may vary from an acute illness to a gradually progressive disease. Patients commonly experience fever, sweating, loss of appetite, weakness, headache, muscle pain, and joint pain, which may resemble a flu-like illness. Osteoarticular complications are among the most common focal manifestations of brucellosis and include arthritis, spondylitis, and sacroiliitis.² Spinal involvement occurs most frequently in the lumbar region, followed by the thoracic spine, whereas cervical involvement is relatively uncommon.⁷

Spinal brucellosis commonly presents with persistent back pain, particularly in the lower back, and the pain may occasionally extend to the legs. Other clinical features may include low-grade fever, excessive sweating, and weight loss. Neurological manifestations depend on the severity of inflammation involving the vertebral bodies and intervertebral discs and on the extent of spinal canal compression. The disease may progress gradually over several weeks or months.⁸ Because the clinical and radiological features can overlap with other spinal conditions, diagnosis may be difficult. Important differential diagnoses include tuberculous spondylitis, pyogenic spondylitis, intervertebral disc herniation, metastatic spinal lesions, and degenerative spondylosis.⁹ Although pyogenic infection is a common cause of vertebral osteomyelitis, brucellosis should also be considered in patients living in or coming from endemic regions.

Distinguishing brucellar spondylitis from tuberculous spondylitis is particularly important because both conditions may produce similar clinical and imaging findings. Tuberculous spinal infection may involve the thoracic vertebrae and is often associated with marked vertebral destruction and spinal kyphosis, while the intervertebral disc may remain relatively preserved. In contrast, brucellar infection frequently involves the lower lumbar vertebrae, particularly the L4-L5 region. These differences, together with the patient's clinical history and laboratory findings, may assist in establishing the correct diagnosis.

Laboratory investigations in brucellosis may demonstrate an elevated erythrocyte sedimentation rate, lymphocytosis, and anemia. Other hematological abnormalities, including thrombocytopenia, leukopenia, or leukocytosis, may also be present. However, blood cultures have limited sensitivity and may be positive in only approximately 45% of patients.¹⁰ Therefore, vertebral involvement due to brucellosis should be considered when evaluating patients with persistent spinal pain, particularly in endemic areas and in older individuals.

MRI is an important imaging method for evaluating spinal brucellosis because of its high sensitivity and its ability to demonstrate vertebral, disc, and soft-tissue abnormalities. MRI findings may include spondylitis, spondylodiscitis, epidural abscess, and narrowing of the spinal canal.¹¹ The lumbar spine is reported to be involved in approximately 68% of cases, with the L4 and L5 vertebral levels being commonly affected. Brucellar spinal infection generally produces localized destruction around the vertebral end plates, while granulation tissue and soft-tissue edema may occur more frequently than large abscess formation. During the acute stage, the affected vertebral bodies and discs may show low signal intensity on T1-weighted images and high signal intensity on T2-weighted images. End-plate involvement may be present without significant abscess formation. In chronic disease, the MRI appearance may become heterogeneous on T1-weighted images.

Serological investigations are valuable in the diagnosis of brucellosis and frequently provide positive results. The brucella agglutination test has traditionally been used as an important diagnostic serological method. It may become positive during the early stage of infection, although its sensitivity may decrease in subacute and chronic disease. The antibody titre generally declines over several months.¹² The Rose Bengal test is another rapid serological method used for the detection of brucella antibodies. It is performed using a Rose Bengal-stained bacterial antigen suspension in an acidic buffered medium and is considered a useful screening test because of its rapidity and diagnostic performance.¹³

The treatment of spinal brucellosis primarily relies on prolonged antimicrobial therapy. The major objectives of treatment are to eradicate the infection, control symptoms, prevent complications, and reduce the risk of relapse. Since *Brucella* organisms can survive within host cells, antibiotics with good intracellular penetration are particularly important. Commonly used antimicrobial agents include doxycycline, rifampicin, streptomycin, gentamicin, trimethoprim-sulfamethoxazole, and ciprofloxacin.¹⁴ Combination antibiotic therapy is generally preferred because it provides better treatment effectiveness and helps reduce relapse. Rifampicin and doxycycline are among the commonly recommended treatment options.¹⁵

The duration of treatment should be individualized according to the severity and location of infection, the

clinical condition of the patient, and the presence of complications. Spinal involvement generally requires a longer course of therapy than uncomplicated brucellosis. Published reports have described treatment durations ranging from approximately six weeks to several months, with prolonged treatment being considered in patients with focal spinal disease or other complications.^{6,9}

CONCLUSION

Spinal brucellosis is an uncommon but important manifestation of human brucellosis that often presents with nonspecific clinical features, resulting in delayed diagnosis. In regions where brucellosis is endemic or in patients with relevant occupational or animal exposure, clinicians should maintain a high index of suspicion when evaluating individuals presenting with persistent back pain, fever, or features of spondylodiscitis. A combination of detailed clinical assessment, serological testing, and magnetic resonance imaging plays a crucial role in establishing an early diagnosis. Prompt initiation of appropriate antimicrobial therapy is associated with excellent clinical recovery and helps prevent neurological complications, relapse, and long-term disability. This case highlights the importance of including spinal brucellosis in the differential diagnosis of infective spondylodiscitis to facilitate timely diagnosis and improve patient outcomes.

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