



Brucella-Associated Lumbar Compression Fracture: A Case Report and Literature Review

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Abstract

Vertebral Compression Fracture (VCF) is a significant clinical condition that can cause serious morbidity in both young and older populations. While osteoporosis is the most common cause of VCF, trauma, falls, metastatic cancers, and infections are among other major etiological factors. Among infections, brucella and tuberculosis are the most common causes of spondylodiscitis and compression fractures. We present a case of VCF developing after Brucella spondylodiscitis in a 74-year-old male patient who presented with long-term back pain and aimed to review similar cases in the English literature.

Keywords: Vertebral compression fracture; Brucella; Spondylodiscitis

Introduction

Vertebral Compression Fracture (VCF) is a significant clinical condition that can cause serious morbidity in both young and older populations. While osteoporosis is the most common cause of VCF, trauma, falls, metastatic cancers, and infections are among other major etiological factors. Especially in older individuals, VCF can occur without a history of trauma. Infections are among the rare causes of VCF. VCF due to infections can result in the invasion of vertebral tissue by pathogens and local bone destruction. While osteoporosis is the most common cause of VCF, trauma, falls, metastatic cancers, and infections are among other major etiological factors. In endemic areas, the incidence of severe spondylodiscitis cases due to these pathogens varies between 2% and 60% [1].

Brucella is a zoonotic infection. In addition to various other findings, it can cause musculoskeletal involvement and is included in the differential diagnosis of inflammatory arthritis. It can present with arthralgia, arthritis, as well as sacroiliitis and spondylodiscitis. In cases developing spondylodiscitis, subsequent compression fractures have been reported very rarely.

We present a case of VCF developing after Brucella spondylodiscitis in a 74-year-old male patient who presented with long-term back pain and aimed to review similar cases in the English literature.

Case Presentation

A 76-year-old male patient presented to the rheumatology clinic with a complaint of back pain lasting more than a year. The patient stated that the back pain worsened with movement and coughing, and sometimes the pain was unbearable, leading him to visit the emergency room several times. He also described symptoms such as tingling, numbness, weakness, and fatigue in the lower extremities. The patient's past medical history revealed that he had consulted a neurosurgery clinic for back pain and had undergone surgery for a lumbar disc herniation at a specific date. Lumbar MRI (June 2023) performed at that time revealed a herniation between L4-L5 and spondylodiscitis at T12 (Figures 1 and 2). The patient was operated on for a disc herniation in November 2023. After the operation, due to persistent pain complaints, he applied to the rheumatology clinic in December 2023.

In the rheumatological inquiry, there were no features other than inflammatory back pain. The systemic physical examination revealed localized tenderness in the back area and pain with back movements. No deformity or swelling was detected in the peripheral joints. FABER and FADIR tests were negative. No pathology was found in the neurological examination, and deep tendon reflexes were normoactive. Complete blood count and biochemical tests were normal in laboratory

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Figure 1: A) 2023 June B) 2023 Nov C) 2024 June. On the initial MRI T1 without contrast, performed due to back pain, bone marrow edema and paravertebral soft tissue involvement were observed at the T12-L1 vertebrae. In subsequent MRI scans, an increase in bone marrow edema was noted, along with loss of height in the disc and vertebral body.



Figure 2: A) 2023 June B) 2023 Nov C) 2024 June. In the T2 MRI images of the same patient, a progressive worsening of the height loss in the vertebrae is more clearly visible over time.

examinations. However, the Rose-Bengal slide agglutination test performed in serum was positive, and the Brucella Coombs test was positive at a titer of 1/640. Lumbar T-score was found to be -1.5 in bone mineral density measurement (DEXA).

Lumbar Magnetic Resonance (MR) imaging (Figure 1 and 2) revealed bone marrow edema in the T12-L1 vertebrae, paravertebral soft tissue involvement, and a compression fracture in the T12 vertebra. The patient was diagnosed with Brucella-induced spondylodiscitis and started on doxycycline 200 mg/day and rifampicin 600 mg/day. Treatment was completed up to 12 weeks. In the following days of treatment, significant improvement was observed in the patient's pain and physical examination findings.

Discussion

Brucellosis is a zoonotic infection affecting many systems. It can cause arthritis, arthralgia, sacroiliitis, and spondylodiscitis in the musculoskeletal system. Here, we present a case of brucellosis-induced spondylodiscitis that resulted in a compression fracture.

While Brucella exhibits systemic involvement, it can also cause musculoskeletal manifestations. The frequency of musculoskeletal involvement varies depending on the clinic evaluated. In the series by Buzgan et al. [2], 260 out of 1028 patients had musculoskeletal findings, with 32 (3.1%) having spondylodiscitis, 64 (6.2%) having sacroiliitis, and 147 (14.3%) having peripheral arthritis. In a study by Basilkovski et al. [3], musculoskeletal involvement was found in 169 (51%) of 331 brucellosis patients. In these cases, peripheral

arthritis was most common in 119 patients (60.7%), followed by sacroiliitis in 60 patients (30.6%), and spondylodiscitis in 56 patients (28.6%), in decreasing order of frequency. In the series by Kısacık et al. [4], musculoskeletal involvement was found in 93 of 113 patients. Peripheral arthritis was observed in 74 (65.4%) of these patients, and sacroiliitis in 19 (16.8%). In the series by Geyik et al. [5], spondylodiscitis was detected in 60 (31%) of 195 brucellosis patients with musculoskeletal involvement. In this series, the most common musculoskeletal system involvement was sacroiliitis in 108 patients (55%) and peripheral arthritis in 106 patients (54%). Our case presented with prominent spondylodiscitis, without sacroiliitis or peripheral arthritis. Spondylodiscitis developed, followed by a compression fracture 4 months later. Compression fractures following Brucella-induced spondylodiscitis are rarely reported in the literature. Katonis et al. [6], reported one case of compression fracture among 10 spondylodiscitis cases in their series of 6 patients, and Cebesoy et al. [7], reported a compression fracture in a pregnant patient with Brucella spondylodiscitis.

Vertebral compression fractures occur when one or more vertebrae in the spine lose height and collapse, usually due to trauma or weakening of the bone structure. They are most commonly seen in conditions that reduce bone density, such as osteoporosis, in traumatic injuries, or with the spread of metastatic bone tumors to the spine. Brucella-associated vertebral compression fractures are a rare but clinically significant complication of brucellosis in the spine. These complications pose a significant clinical challenge due

to their potential to compromise spinal stability and increase the risk of neurological damage. Brucella's impact on the vertebral column often targets the lumbar region, but the thoracic and cervical spine can also be involved. The pathophysiological mechanisms caused by this infection include the development of osteomyelitis in the vertebral bodies and inflammation in the disc space. The disruption of vertebral blood flow and increased localized inflammatory response led to ischemia and increased osteoclastic activity in the bone tissue activation. Pro-inflammatory cytokines (e.g., TNF- α and IL-1) triggered by the infection accelerate both osteolysis in the vertebral body and degenerative changes in the intervertebral disc. These processes weaken vertebral stability, leading to a critical reduction in mechanical load-bearing capacity. In advanced stages of infection, vertebral instability and collapse can occur, potentially resulting in complications such as epidural abscesses, spinal cord compression, and psoas abscess.

Conclusion

In conclusion, the management of Brucella-induced vertebral compression fractures requires a multidisciplinary approach. Brucella should be considered as a potential cause of spondylodiscitis, and it should be kept in mind that this condition, although rarely, can cause compression fractures.

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