



# Brucella spondylodiscitis that affected both cervical and lumbar spines: a rare case report from Syria

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**Introduction and importance:** Brucellosis, the most common microbial zoonotic disease in the world, is endemic in both industrialized and underdeveloped countries. Between 2 and 53% of patients with brucellosis, patients develop spondylitis, and people between the ages of 50 and 60 are the most commonly affected. It mostly affects the lumbar vertebrae (L4 and L5 in particular) and the thoracic vertebrae.

**Case presentation:** A 52-year-old patient was brought to the neurological clinic after complaining of lower back discomfort, reduced mobility, and lower extremity weakness for 6 weeks. Both the cervical and lumbar columns were the sites of the specific discomfort. MRI showed cervical and lumbar discitis.

**Clinical discussion:** A high titre of anti-brucella antibodies was found by serology testing. He was treated with oral doxycycline (100 mg, two times daily), rifampicin (900 mg) orally once daily, and gentamicin (400 mg) once daily. The patient had massive improvement after 3 months of treatment.

**Conclusions:** This case should serve as a reminder to healthcare providers to keep a high index of suspicion for uncommon infections, including Brucella species, in patients exhibiting discitis symptoms, especially when traditional microbiological gram stain and culture are negative.

**Keywords:** brucella, brucellosis, neurobrucellosis, spondylodiscitis

## Introduction

Brucellosis, also known as Malta fever or undulant fever, is a frequent zoonotic sickness with a high fatality rate that is a major concern for public health. It is one of the most prevalent zoonoses worldwide<sup>[1]</sup>. While seldom fatal, brucellosis in humans can have severe effects. Approximately 500 000 individuals worldwide have brucellosis each year, and 2.4 billion people are estimated to be at risk<sup>[2]</sup>. The spinal vertebra is one of the musculoskeletal forms most frequently affected by brucellosis<sup>[3]</sup>. Studies show that 2–54% of Brucella infections cause spinal infections, with the lumbar spine being most frequently affected<sup>[4]</sup>.

Several different spinal brucellosis symptoms can result in spondylitis, discitis, spondylodiscitis, or an epidural abscess. Depending on the disease, back pain from chronic Brucellosis may be accompanied by other progressive neurologic signs such as

## HIGHLIGHTS

- A 52-year-old patient was brought to the neurological clinic after complaining of lower back discomfort, reduced mobility, and lower extremities weakness for one and a half months. Both hips and the cervical and lumbar vertebrae were the site of the specific discomfort.
- Between 2 and 53% of brucellosis patients develop spondylitis, and people between the ages of 50 and 60 are the most commonly affected. Rather than the cervical spine, it mostly affects the lumbar vertebrae (L4 and L5 in particular) and the thoracic vertebrae.
- This case should serve as a reminder to healthcare providers to keep a high index of suspicion for uncommon infections, including Brucella species, in patients exhibiting discitis symptoms, even when traditional microbiological investigations are negative.

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lower limb weakness and sphincter dysfunction<sup>[5]</sup>. Treatment of brucellosis should focus on efficiently managing the condition and preventing complications. Treatment for acute infections with antibiotics reduces symptoms, prevents recurrence, and treats infections<sup>[6]</sup>. We report a rare and difficult clinical case of Brucella spondylodiscitis that affected both the cervical and lumbar spines.

## Case presentation

A 52-year-old patient arrived with a fever, exhaustion, and low back and cervical discomfort that had been steadily becoming worse over the previous six weeks. The pain was also

accompanied by weakness in the lower limbs and problems with walking. Type 2 diabetes mellitus and hypertension were detected in the prior medical history. His vital signs were 38.3°C, 150/90 mmHg blood pressure, 105 bpm heart rate, and a 24 bpm respiration rate. Physical examination results included cervical and lumbar vertebral tenderness, lower extremity strength of 3/5 proximally and 4/5 distally, reduced tone, and no deep tendon reflexes; upper extremity strength and tone were normal, with increased triceps tendon reflexes, normal sensory function, and no sphincter dysfunction; cardiologic, respiratory, and abdominal examination results were within normal limits.

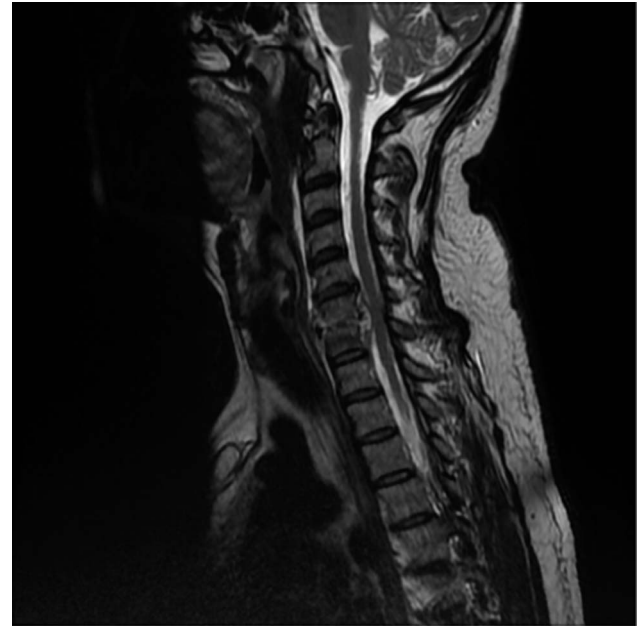
The results of laboratory tests showed that the patient's erythrocyte sedimentation rate (ESR) was 40 mm/h, 82 mg/l of C-reactive protein (CRP),  $7.62 \times 10^3/l$  of white blood cells (WBC), 33/57 of lymphocytes/neutrophils (L/N), 13.2 mg/dl of haemoglobin (Hb),  $188 \times 10^3/l$  of platelet count test (PLT), 40 mg/dl of urea, 1.1 mg/dl of creatinine, 145 mg/dl of glucose, alanine aminotransferase (ALT) of 13 U/l, and 18 U/l of aspartate aminotransferase (AST) of 18 U/l.

We ordered an MRI of the cervical and lumbar spine with and without contrast based on the clinical and laboratory images (Figs. 1–4). The results indicated cervical (C6–C7) and lumbar (L3–L4) discitis with a paravertebral abscess at the C6–C7 level.

After taking a biopsy from the lumbar disc that was impacted, we ordered a culture and sensitivity test as well as brucella and Mycobacterium tuberculosis polymerase chain reactions (PCRs) on the sample.

The test for brucellosis came back positive. The patient was found to be ingesting unpasteurized milk after more interrogation.

Gentamicin (400 mg) was given orally once daily (during the first 14 days), along with 100 mg of doxycycline twice daily and 900 mg of rifampicin orally once daily for a duration of 12 weeks. Following a few days of antibiotic therapy, the patient's fever returned to normal. The patient saw a dramatic improvement in



**Figure 2.** MRI .T1 C+ (Gd). enhancement of vertebral endplates of c6–c7. enhancement of paravertebral soft tissues.

his pain and laboratory findings. Three months after being discharged, he underwent another evaluation and was totally ambulatory with no issues.

## Discussion

Both developed and developing countries are endemic to brucellosis, the most common microbial zoonotic disease worldwide.



**Figure 1.** MRI. T2 high signal in disc space, high signal in adjacent endplates (bone marrow oedema) and paravertebral soft tissue at the level of C6–C7.



**Figure 3.** MRI .T1. low signal in adjacent endplates (bone marrow oedema) L4–L5. low signal in disc space.



**Figure 4.** MRI. T2 (stir) High signal in adjacent endplates of L4–L5 vertebrae.

*Brucella* *militans* spp., an intracellular bacterium that causes brucellosis<sup>[7]</sup>, is the most common species of brucella. Clinical signs of brucellosis vary widely, ranging from mild cases that show no symptoms to severe cases that may be lethal. Osteoarticular disorders account for 67% of all focal forms, the most common type. The most frequent site of involvement is the axial skeleton, which makes sense given bone closure and bone marrow migration from long to axial bones. Spondylitis develops in 2–53% of brucellosis individuals, and adults in the 50–60 age range are usually the most affected<sup>[8]</sup>.

There are two ways that brucellosis can spread: directly through skin or conjunctival sores coming into contact with infected tissues, or indirectly through eating unpasteurized dairy products<sup>[9,10]</sup>. Animal fetuses, placentas, and aborted wombs are extremely infectious to people, and there is no evidence of illness spreading from person to person. It has not been determined whether one sex is more likely than the other to get infected, and if males are more likely to contract the disease, it may be due to their employment in endemic areas. *Brucella* incubation lasts anywhere from one to four weeks<sup>[9]</sup>. Fever, chills, joint discomfort, night sweats, headache, muscular soreness, and enlarged liver, spleen, or lymph nodes are examples of nonspecific brucellosis symptoms<sup>[9,10]</sup>.

Osteoarticular infections are complications unique to brucellosis and include the following: Sacroiliitis: it can occur unilaterally or bilaterally and has an incidence of 2–45%. Spondylitis is the most prevalent clinical type, with an incidence rate ranging from 2 to 60%. It affects elderly people often, with the lumbar vertebrae accounting for 60% of cases, the thoracic region for 19%, and the coccyx for 12%. Spondylodiscitis: More often affecting the thoracic and lumbar vertebrae than the cervical spine, it particularly affects the L4 and L5 vertebrae. 14–26% of people have peripheral arthritis, which affects the big joints in the knees, hips, and ankles<sup>[9,11]</sup>. Ana Lebre *et al.*<sup>[12]</sup>

conducted a retrospective analysis of 54 patients with brucellar spondylodiscitis. Prior to the diagnosis, the symptoms had been present for 5.5 months.

But it took us one and a half months. When compared to our circumstances, neurological deficits (25.9%), fever (46.3%), and pain (98.1%) were the most common signs and symptoms. The lumbar area accounted for 77.7% of the total<sup>[12]</sup>. Therefore, cervical placement in our patient is considered unusual. It is important to scan the whole spine since 3–14% of people with spinal brucellosis have multifocal bone involvement. Noncontiguous multifocal involvement impacted the cervical and lumbar regions of the spine in the instance under description. A history of contact with the infection source, clinical signs of inflammation in the affected joints, blood culture, synovial fluid culture, serological tests (the most common), PCR, computed tomography (CT), and MRI are among the methods used to diagnose brucellosis<sup>[9,10]</sup>.

A CT scan can identify the disease's distinctive characteristics, such as sclerosis and vertebral destruction<sup>9</sup>. The best modality for assessing patients with infectious spondylitis and for those patients' follow-up exams is MRI. The range of results for blood cultures for brucella is 35–92%, and laboratory results (leucopenia with relative lymphocytosis, elevated liver enzymes, and an ESR value frequently exceeding 40 mm/h) are nonspecific<sup>[13]</sup>.

Brucellosis has a wide range of differential diagnoses, including autoimmune disorders, infectious mononucleosis, malignant neoplasms, TB, and secondary spondylitis complications<sup>[9,14]</sup>.

In our instance, MRI revealed an infection process (Figs. 1–4). Both a positive PCR result for brucella in the sample and a high titre of anti-brucella antibodies were discovered during serological testing. Treating acute infections, providing symptom relief, and preventing recurrence are the objectives of therapy. We recommend a combination of doxycycline (for at least 12 weeks) and rifampin (for at least 12 weeks) as a therapy for spondylitis in adults and children older than or equal to 8 years. The first 14–21 days of treatment should be spent with streptomycin or gentamicin.

For children under the age of eight, we use TMP-SMX instead of doxycycline. In our instance, the patient received therapy with doxycycline (100 mg, twice daily), rifampicin (900 mg, once daily), and gentamicin (400 mg, once daily). Following three months of treatment, the patient's condition had greatly improved. As of yet, there is no vaccination against brucellosis. We combine doxycycline (200 mg) and rifampicin (600 mg) for prevention<sup>[9]</sup>.

## Conclusion

Healthcare professionals should be reminded by this case to maintain a high level of suspicion for rare infections, such as those caused by *Brucella* species, in patients presenting with symptoms of spondylodiscitis, particularly in cases where conventional microbiological tests provide negative results. Further research is required to completely understand the aetiology and best course of treatment for brucellosis-induced spondylodiscitis.

## Methods

The work has been reported in line with the SCARE criteria<sup>[15]</sup>.

### Ethical approval

It is not applicable because all data belong to the authors of this article.

### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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### Author contribution

A.A. performed the histological examination and was a major contributor in writing the manuscript. S.H. was a major contributor in writing the manuscript. M.S. was a major contributor in writing the manuscript and prepared all figures. A.F., H.A., Y.A. wrote a part of the manuscript. All authors read and approved the final manuscript.

### Conflicts of interest disclosure

None.

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### Guarantor

The guarantor author is Mouhammed Sleia.

### Data availability statement

Not applicable to this article.

### Provenance and peer review

Not commissioned, externally peer-reviewed.

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