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Case Report

Brucellar spondylodiscitis in a case with spondylolisthesis

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Abstract. Spondylodiscitis with epidural abscess complication in Brucella infection is quite rare. Spondylolisthesis with spondylolysis at two levels is very unusual. Herein a case of spondylodiscitis with epidural and anterior paravertebral abscess due to Brucella with spondylolytic spondylolisthesis altogether in 54-years old female, is reported. Clinical, laboratory and radiological findings of brucellar spondylodiscitis with differential diagnosis are discussed. Brucellar spondylodiscitis diagnosis was based on clinical history supported by serology and blood culture and MRI. Spondylolisthesis was demonstrated by plain radiograph and MRI. This is a unique case of brucellar spondylodiscitis along with two level spondylolytic spondylolisthesis.

Key words: Brucella, spondylodiscitis, spondylolysis, spondylolisthesis, magnetic resonance imaging

1. Introduction

Brucellosis is a systemic zoonosis caused by facultative intracellular bacteria of the genus Brucella. Although spondylitis is the most prevalent and important osteoarticular involvement in Brucella infection, the spinal epidural abscess complication is quite rare (1-12). Spondylolisthesis with spondylolysis is commonly seen at L4-5 and L5-S1 levels but both level involvements in the same case, is very unusual (13). Herein a case of spondylodiscitis with epidural and anterior paravertebral abscess due to Brucella at L2-3 and true spondylolisthesis at L4-5 and L5-S1 due to spondylolysis altogether in a fifty four years old female is reported.

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The interesting point in our case is that although brucella microorganisms prefer the weakest points to attach and survive, two level listhesis were not involved, and also due to this infectious disease, spondylolisthesis may be seen due to laxation of the ligaments but also this was not encountered in our case.

2. Case report

This 54-year-old female was admitted to our hospital with a six-month history of back pain that had worsened during the past two weeks. She was a housewife and for the past month her complaints were; generalized fatigue, myalgia, mild sweating and intermittent febrile sensations. Her medical history was unremarkable; she had no history of hypertension, diabetes mellitus, pulmonary tuberculosis, or any other systemic disease. On physical examination, her body temperature was 37.1 C. Tenderness was present on the upper lumbar vertebrae. Neurological physical examination was within normal limits. Laboratory values were unremarkable except for the erythrocyte sedimentation rate (ESR): 51 mm/h, C-reactive protein (CRP): 42 mg/L.

Chest X-ray revealed no pathology. Plain film of the lumbosacral spine showed degenerative changes with the joint space narrowing at L2-3 and spondylolisthesis at L4-5 and L5-S1 levels with pars interarticularis defects (Figure 1).

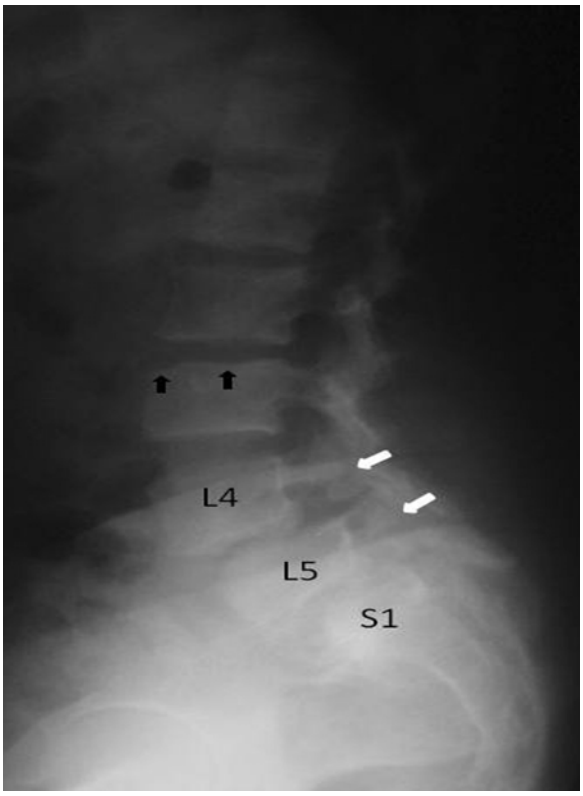

Fig. 1. Lateral radiograph of the lumbar spine shows focal erosions at the superior end plate of L3 vertebra with disc space narrowing of L2-3 (black arrows). There is also spondylolisthesis at L4-5 and L5-S1 levels and associated pars defects, spondylolysis (white arrows). Prominent end plate degenerations, narrowing of central canal and neural foramina are seen at L4-5 and L5-S1.

Magnetic resonance imaging (MRI) was performed via 1.5T magnet (Gyroscan Intera, Phillips, Netherlands) with spine coil. MRI findings were compatible with spondylodiscitis at L2-L3 with accompanying epidural and paraspinal abscess and soft tissue edema (Figure 2a, 2b).

Brucella standard tube agglutination test was positive at a titter of 1 : 320. Blood culture was performed using BACTEC 9240 Blood Culture System (Becton Dickinson, Diagnostic Instrument system, Ireland). Brucella melitensis was identified. Treatment included aminoglycoside (streptomycin 1 g/day for 15 days), doxycycline (200 mg/day for 45 days), and rifampicin (15 mg/kg/day for 45 days). On the follow-up decline of acute-phase reactants was observed.

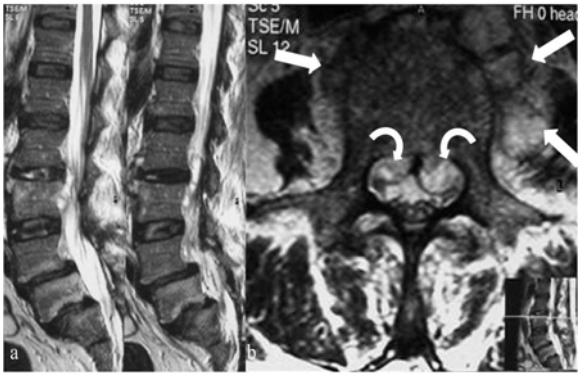

Fig. 2a. Sagittal T2 weighted image demonstrates brucellar spondylodiscitis at L2-3; increased signal intensity involving L2-3 disc and confluent increased signal intensity involving subchondral parts of L2 and especially L3 vertebrae with paravertebral and epidural abscess. There are also seen severe end plate degenerations and disc degenerations along with grade 1 spondylolystesis at L4-5 and L5-S1 levels.
2b. T2-weighted axial image reveals central canal narrowing with mild indentation of dural sac and L3 nerve roots by hyperintense bilobulated epidural abscesses (curved arrows). There is a paravertebral abscess especially on the left anterolateral side of the vertebral body (straight arrows).

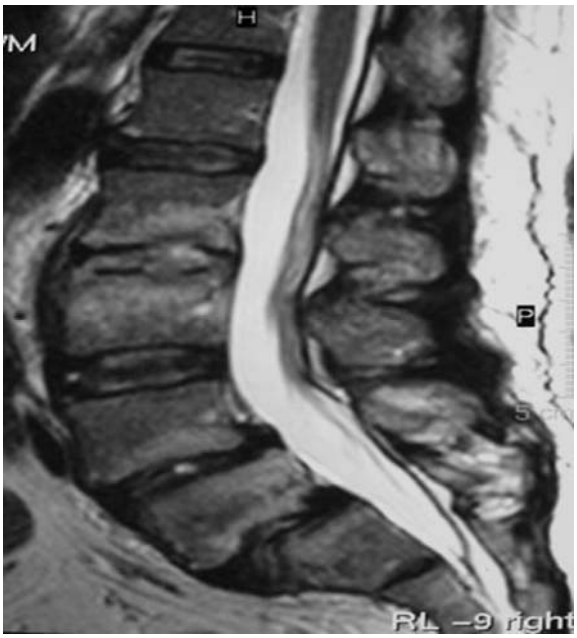

Fig. 3. Control MRI in the sagittal plane after six-week treatment with antibiotics reveals regression of paravertebral and epidural abscess formations. Increased signal intensity of L2-3 disc and adjacent vertebral bodies continues.

MRI after six weeks of medical treatment demonstrated regression of paravertebral and epidural abscesses (Figure 3). Surgical treatment was suggested for two level spondylolytic spondylolisthesis but the patient refused. She wanted to continue her treatment in another center due to her social problems. Therefore we were unable to follow-up her progress.

3. Discussion

Brucellosis, a systemic zoonosis that can involve many organs and tissues, is caused by facultative intracellular bacteria of the genus *Brucella* which is small, gram-negative coccobacilli transmitted to humans either by the consumption of unpasteurized milk or dairy products from infected animals or by direct contact with the infected animals (1).

The spine is affected in the elderly, while the sacroiliac joints and knee arthritis predominate in children and young adults (2). Spondylitis is the most widespread and important clinical form of osteoarticular involvement, typically in endemic areas (3-5). However, spinal epidural abscess development and neurological involvement are rare. Lumbar vertebra is the most common site for epidural abscesses (4). Spondylodiscitis at L2-L3 level with accompanying epidural and paraspinal abscess and soft tissue edema were encountered in our case.

Clinically, usually non-specific symptoms and signs such as fever, malaise, night sweating, polyarthralgia, myalgia, and headache are seen (6,7). Back pain, generalized fatigue, myalgia, mild sweating and intermittent febrile sensations were the symptoms in our patient. Physical examination usually demonstrates a "spinal syndrome", with a segmental spinal rigidity and paravertebral muscle contracture. Pain was observed following pressure application on the spinous process of the involved vertebrae. Spinal cord or nerve root compression findings are uncommon for brucellar spondylitis (4). Although neurological examination in our case was within normal limits, tenderness was present on the upper lumbar spine.

The finding of *Brucella* organisms in blood, bone marrow, or involved tissue culture is the gold standard for diagnosis of Brucellosis. However, culturing *Brucella* species is not easy since the bacteria grow slowly and bacteraemia is intermittent (7,8). Also positive blood culture depends on proper use of culture techniques, preparation of several specimens, disease duration progresses and administration of antibiotic treatment (6,9). Therefore, serologic testing stands as an important presumptive diagnostic tool for brucellar spondylitis. The serum tube agglutination test (Wright test) is considered positive if antibrucella titres $\geq$1/160 are obtained in standard tube agglutination tests or a four-fold rise in Brucella antibody titter from baseline is considered definitive (6,8,9). Brucella standard tube agglutination test was positive at a titter of 1:320 and Brucella melitensis was identified in blood culture in our case.

The radiologic diagnosis of brucellar spondylitis is especially based on the MRI findings even though spine radiographs, bone scan and CT may provide some information. There is approximately 2-8 weeks duration between the onset of symptoms and the appearance of the radiologic changes on roentgenograms (4). The focal erosions of the superior or inferior vertebral body angle are characteristic of brucellosis but sensitivity is low and findings may mimic degenerative diseases (4). CT may be performed for better marking out the bone erosions but MRI has a higher sensitivity for detecting the disease in the early stages and provides an excellent definition of paravertebral and epidural extension (10,11).

Brucellar spondylitis may be unifocal or multifocal. Within the spine, most affected is the lumbar region particularly at the L4–L5 level, followed by thoracic and cervical spine. Involvement of more than one level can also be seen (5,6,8,10). Paravertebral abscesses are observed in approximately 30% of cases and are typically characterized by well-defined margins (5). Radiological differential diagnoses of brucellar spondylitis include tuberculosis spondylitis, pyogenic spondylitis, intervertebral disc herniation, metastatic lesion, and spondylosis. Distinctive MR features of brucellar spondylitis include a preference for the lower part of the lumbar spine, diffuse but exclusively anterior part involvement, intact vertebral architecture despite evidence of diffuse vertebral osteomyelitis, disc space involvement, minimal or moderately abnormal paraspinal soft tissue involvement usually without abscess formation, and a lack of gibbus deformity (4,5,7,8,10). A lumbar spondylodiscitis that involved mostly the anterior part of the vertebral body at L2-3 with epidural and paravertebral abscess formation and lack of vertebral architecture deformity were present in our case.

Management of brucellosis involving the spine has not been standardized and drug selection, duration of antibiotics, and the role of surgery still remains controversial (7,8). Since brucellosis

usually responds to antibiotics, surgery is considered as the last choice. Medical treatment stands as an alternative to surgery in benign soft-tissue lesions in the absence of neurological deterioration (3,9,12). Urgent surgical decompression can decrease or eliminate morbidity in cases with spinal epidural abscess but should be performed in cases with moderate to severe neurological deficits, particularly if progressive and in cases with a severe mass effect on the neural structures on MRI study (9,12). Surgery is reserved for those exceptional cases of arachnoidal abscesses and progressive signs of spinal cord and nerve root compression (3,5,9,12). In their report of brucellar spondylitis, Solera et al (3) reported that only one of the 35 patients underwent surgical treatment of a spinal epidural abscess. When there is response to medical management, the changes of the signal intensity tend to regress in 6 weeks to many months (5). However the optimal duration of therapy is unknown, but at least 3 to 6 months of treatment would reported to be beneficial in osteoarticular brucellosis (3). MRI after six weeks of medical treatment in our case demonstrated regression of paravertebral and epidural abscesses. Following 45 days of medical treatment, surgery was recommended but since she wanted to continue her treatment protocol in another center due to her social problems thus we were unable to follow-up her progress.

Spondylolysis is a defect in the pars interarticularis. Spondylolisthesis is defined as ventral slipping or gliding of all or part of one vertebra on a stationary vertebra beneath it. These abnormalities are seen primarily in approximately 90% in the lumbar spine and most commonly at the L4-5 and L5-S1 levels (13). It is important to distinguish spondylolisthesis associated with spondylolysis, which is called true or isthmic spondylolisthesis from degenerative spondylolisthesis or in other words, pseudospondylolisthesis that is spondylolisthesis occurring without spondylolysis. Correct diagnosis is made on a single lateral film by demonstration of the defect in pars interarticularis or by spinous process sign (13). In true spondylolisthesis a bilateral defect in pars interarticularis leads to a forward slippage of the vertebral body, pedicle and superior articular process of the involved vertebra while the spinous process, lamina and inferior articular process remain in the normal position. Therefore, the study of the most dorsal aspects of the spinous process reveals a step-off at the interspace above the level of the slip (13). Pars interarticularis defects were clearly seen with grade I spondylolistesis at L4-5 and L5-S1 levels on lateral lumbar film in our case.

Microorganisms prefer the weakest points to attach and survive however; two level listhesis were not involved in our case of brucellar spondylitis. Also due to infectious disease, spondylolisthesis may be seen due to laxation of the ligaments but also this was not encountered in our case.

There was no neurologic deficit in our patient and back pain was controlled by resting and analgesics; therefore, antimicrobial therapy was preferentially considered over surgical decompression. Following response to antibiotherapy, surgery was recommended for spondylolytic spondylolisthesis of two levels. However, the patient refused it.

To conclude two level spondylolytic spondylolisthesis, in other words true spondylolisthesis and accompanying brucellar spondylodiscitis at different levels have not previously been reported to our knowledge.

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