

# *Brucella melitensis* is an agent in pediatric arthritis.

## Case series

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### ABSTRACT

Brucellosis is a significant health problem and is endemic in some regions. Osteoarticular involvement is seen most frequently in brucellosis (20-60%). In regions where brucellosis is endemic, it should be considered in the etiology of arthritis. We report the 12 cases, were 11 males with a mean age of 12 years (range, 2-17 years). Involvement was determined in the hip in 9 cases, the sacroiliac joint in 2 and the knee in 1. All the cases had arthralgia, fever was determined in 8 cases and leukocytosis in one case. Surgical treatment was applied to one case because of septic arthritis. Serious complications of the infection may be encountered and particularly in musculoskeletal system involvement, it should be kept in mind that complications can be prevented by early diagnosis and treatment.

**Key words:** arthritis, brucella, infectious disease, child, therapy.

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### INTRODUCTION

Brucellosis is a zoonosis caused by small, gram negative, immobile cocobacilli.<sup>1</sup> Throughout the world in general, brucellosis is a significant health problem and is endemic in some regions, Turkey has been reported as a country where brucellosis is endemic. According to World Health Organisation data, 500,000 new cases per year are recorded. It is primarily an animal disease, which spreads through direct contact with infected animals or the consumption of infected animal products.<sup>2</sup>

After contamination by the agent microorganism, they proliferate in the regional lymph nodes, pass into the blood and cause systemic infection with the involvement of several organs and tissues, primarily the reticuloendothelial system. The disease is characterised by non-specific symptoms. Together with fever, the second most significant symptom is muscle and joint pain. In Turkey, while researching the etiology of fever of unknown origin, brucellosis should be considered first and attention should be given to the necessary investigation of the disease.<sup>2</sup>

Osteoarticular involvement is seen in brucellosis.<sup>2</sup> This may be seen as arthritis, spondylitis, sacroiliitis, osteomyelitis, tenosynovitis and bursitis, monoarticular arthritis of the knee or hip is seen more often in children and sacroiliac joint involvement in adolescents and adults.<sup>3</sup> Septic arthritis is rarely seen.<sup>4</sup> The most common disease agent species is *Brucella melitensis*.<sup>2,4</sup> In this study, arthritis cases caused by *Brucella melitensis* in childhood were examined.

### CASE SERIES

The 12 patients were 11 males with a mean age of 12 years (range, 2-17 years). There was a history of animal husbandry contact and consumption of unpasteurised milk and dairy products in 10 cases. 7 cases were classified as acute and 5 as subacute. Arthralgia was present in all cases, fever in 8 cases, hepatomegaly and splenomegaly in 4 cases, leukocytosis in one case and leukopenia with thrombocytopenia in one case. Involvement was determined most commonly in the hip (n= 9), then the sacroiliac joint (n= 2) and knee (n= 1). The cases were evaluated by direct radiograph and MRI, oedema was observed at sacroiliac joint (*Figure 1. A-C*). Diagnosis was made based on a clinical picture compatible with brucellosis, together with standard tube agglutination test (SAT) positive (1/160 or higher titer) in 11 cases, *Brucella* spp. isolation in a sterile body fluid with automated culture system (BACTEC 9120) in 3 cases, both serology and isolation in 2 cases.

Surgical treatment was applied to one case because of septic arthritis. Medical treatment of

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streptomycin, doxycyclin, rifampicin and TMP/SMZ was applied to all cases for 6 weeks. In 2 cases with sacroiliac joint involvement, the treatment was continued for 10 weeks. In one case, surgery consisting of drainage and washing procedures was applied because of septic arthritis, and in this case treatment was extended to 6 months. No recurrence was observed in any case. In one case, skin rash was observed resulting from TMP/SMZ medication allergy and so the medication was changed.

## DISCUSSION

Brucellosis affects approximately 500,000 people per year worldwide.<sup>2,5</sup> Turkey is seen as an endemic country and regional differences are shown. Depending on the geographic region, incidence varies between 1% and 26.7%.<sup>6</sup> The disease occurs more in the regions of East and South-east Anatolia where animal husbandry is

more widespread.<sup>7</sup> The most common route of contagion is through the consumption of raw milk and unpasteurised dairy products.<sup>8</sup> The cases of the current study lived in an area where animal husbandry is widely practised.

The disease can affect all age groups. In a study of children in Iran, the mean age was 8.02 years and 60% of cases were male, while a similar study in Saudi Arabia found the mean age to be 7.4 years and 58.3% of cases were male.<sup>9,10</sup> In studies in Turkey by Çatakli et al, Öncel et al and Çelebi et al, the mean age was similarly found to be 10.5, 11.2 and 10 years respectively and the rates of male gender were determined as 75%, 54% and 63%.<sup>5,6,11</sup> In the current study, the mean age was 12 years and male gender was 91%.

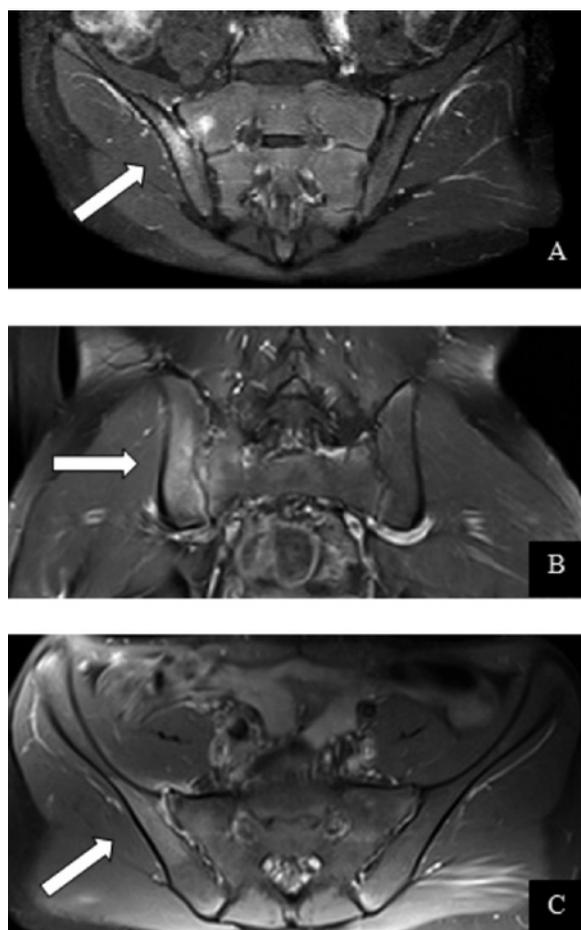
The most significant risk factors in brucellosis, are the habitual consumption of raw milk and its products and the extent of animal husbandry.<sup>6</sup> Rates of unpasteurised milk consumption and animal husbandry were determined as 51.6% and 22.6% by Çelebi et al and as 53.3% and 26.6% by Öncel et al.<sup>5,6</sup> In 10 of the cases in the current study, there was a history of contact with animal husbandry, raw milk and unpasteurised dairy products.

Brucellosis can be seen in acute, subacute and chronic forms.<sup>1</sup> In the current study, 7 cases were classified as acute and 5 as subacute.

Although the disease symptoms are non-specific, fever and arthralgia are the most commonly encountered. In the Öncel et al study, the symptoms of patients on presentation were found to be 93.3% fever and 53.3% arthralgia.<sup>5</sup> Çelebi et al reported rates of fever at 88.7% and arthralgia at 64% while Buzgan et al determined the rate of arthralgia at 73.7% and fever at 72.2%.<sup>6,7</sup> In the current study, all the cases had arthralgia and fever was observed in 8 cases. Although brucellosis is an infectious disease, leukocytosis was only present in one case.

Osteoarticular involvement is the most frequently seen form of involvement in brucellosis.<sup>12</sup> Joint involvement seen in brucellosis may be septic or reactive; septic arthritis, which is the more severe form, is less frequently seen and involvement is generally monoarticular. Often, sacroiliac joint involvement is seen as the second most common peripheral joint involvement. Monoarticular arthritis of the knee and hip are more often seen in children and sacroiliac joint involvement in adolescents and adults. Peripheral arthritis generally involves large, weight-bearing joints, with the hip and knee joints being the most

FIGURE 1. Oedema of sacroiliac joint at different sections of magnetic rezonans imaging (arrows shown in A-C)



commonly involved areas. In the current study, there were 9 cases of the hip, 2 of the sacroiliac joint and one of the knee joint.

In all pediatric age groups, *Staphylococcus aureus* is the leading cause of septic arthritis and brucellosis is a significant cause of septic arthritis in endemic regions.<sup>2</sup> Wong et al reported brucella septic arthritis in the hip and Kalkan et al in the knee.<sup>12,13</sup> In the case of the current study where septic arthritis was observed.

Diagnosis is based on a positive culture. However, because of delayed or difficult proliferation, positive culture results may not always be obtained and in this case, diagnosis made with the tube agglutination test is accepted for individuals with an appropriate clinical table.<sup>2</sup> In the current study, diagnosis was made 11 cases by serology, 3 cases by isolation, 2 cases by both serology and isolation.

In cases where the regions of involvement are the peripheral joints or the sacroiliac joint, radiological abnormalities are rare, with the majority seen as normal or showing non-specific changes.<sup>12</sup> Direct radiographs and ultrasonography can be helpful in diagnosis. Computed tomography, MRI and bone scintigraphy are the best methods for diagnosis.<sup>14</sup> In the current study, the cases were evaluated by direct radiograph and MRI.

The choice of the most appropriate antibiotic to be used in treatment, the duration of treatment and how to evaluate the response to treatment are subjects which have as yet not been fully elucidated.<sup>3</sup> The preferred antibiotics in treatment are doxycyclin, streptomycin, rifampicin, TMP/SMZ, tetracyclin, ceftriaxone and chloramphenicol.<sup>15</sup> Treatment was defined as for 6 weeks, but in 2 cases with sacroiliac joint involvement, the treatment was continued for 10 weeks and in the case where surgery was applied because of septic arthritis, treatment was continued for 6 months.

Brucellosis is known to be a disease where relapse is seen.<sup>2</sup> Çelebi et al observed relapse at the rate of 4.8%, Öncel et al. at 6.6%, while Abuhandan et al did not observe any relapse.<sup>5,6,8</sup> In the current study, no relapse was observed which can be attributed to the long duration of the treatment and the use of multiple antibiotics.

In conclusion, brucellosis continues to be a significant health problem in endemic areas such as in Turkey and should be considered in clinically consistent cases of monoarthritis. As this disease can lead to serious complications, appropriate treatment following early diagnosis is necessary. ■

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