

CASE REPORT

Family transmitted brucellosis: a case series and literature review

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ABSTRACT

Background: Brucellosis, caused by *Brucella* spp. It is a common zoonotic bacterial infection worldwide, with significant concern in Saudi Arabia. Despite a range of symptoms, including fever, fatigue, sweating, and muscular and joint pain, the diagnosis of brucellosis is typically confirmed using blood tests. Rifampin, doxycycline, or streptomycin are basic treatment drugs.

Case Presentation: We report a family cluster of three people with brucellosis: a 16-year-old boy who drank unpasteurized milk, his 53-year-old mother with no chronic illnesses, and his 56-year-old father with pre-diabetes. All had fever and joint pain. All were diagnosed by blood test. The son's *Brucella* titer was highest (1:5,621), the mother's was 1:1,280, and the father's was 1:320. The son had the most severe case and received doxycycline (100 mg twice daily) and rifampicin (900 mg once daily) for 12 weeks. The mother and father had milder cases and were treated with rifampicin (600 mg daily) and doxycycline (100 mg twice daily) for 6 weeks.

Conclusion: Our report shows likely spread of *Brucella* from child to mother, possibly by direct contact with the son's body fluids, and possible sexual spread from mother to father. Although rare, this report stresses the need for more clinical awareness. Brucellosis should be suspected in people with fever, tiredness, and muscle or bone pain not explained by other infections. Early treatment is important.

Keywords: Familial cluster, brucellosis, transmission, combination therapy.

Introduction

Brucellosis, caused by *Brucella* spp. It is a common zoonotic bacterial infection worldwide [1]. The animal reservoirs for each *Brucella* spp. are linked to a specific animal, with *Brucella melitensis* predominantly being a disease of sheep and goats, *Brucella abortus* infecting cattle, *Brucella suis* biovars 1-3 infecting swine, and *Brucella canis* primarily infecting dogs and canids [1].

It is a health issue in many parts of the world, including the Middle East and Asia, especially in areas where livestock farming is commonplace, and dairy products may not always be pasteurized. The disease has been of significant concern in Saudi Arabia, where the annual incidence from 2003 to 2018 was reported to be 15.34 per 100,000 population [2].

Brucellosis causes symptoms such as fever, fatigue, sweating, and muscle and joint pain. It is usually diagnosed by blood tests [3]. The serum (tube) agglutination test (SAT) checks for *Brucella* antibodies.

Suspect cases with serum titers of 1:100 or higher are considered confirmed [4]. People with suspected or confirmed Brucellosis are treated with rifampin, doxycycline, or streptomycin for 21 days [4]. If treatment is inappropriate, poorly followed, or delayed, chronic infection can occur. Chronic infections require complex treatment and can persist for several years [4].

Infection can be transmitted to humans through direct contact with infected animals or their secretions, consumption of unpasteurized milk and dairy products, and inhalation of aerosols [5]. Other rare routes of transmission are vertical (mother to child), through

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Family transmitted brucellosis

breastfeeding, consumption of uncooked meat, and sexual contact [6]. Only a few reports have highlighted a high incidence of brucellosis among family members of an index case, due to sharing the same source of infection and similar risk factors, such as consumption of unpasteurized dairy products. Herein, we report a family cluster of three people with brucellosis.

Cases Presentation

Case 1

A 16-year-old male presented in July 2025 with 3 weeks of left hip and lower back pain made worse by movement and causing difficulty walking. For 2 months, he had occasional nosebleeds that lowered his hemoglobin from 15 to 11 g/dl. One week before the presentation, he developed a high fever (40°C), lost his appetite, and lost 4 kg over 1 to 2 months. He also noticed swelling in his left buttock without trauma or skin changes. He had no symptoms of bowel disease, psoriasis, joint inflammation, eye problems, or finger or tendon swelling. He drank unpasteurized milk and knew that relatives who were exposed to the same animals or milk had brucellosis.

He looked thin and limped from pain. His back could not move well, and pain tests were positive on the left. Hip magnetic resonance imaging (MRI) showed left sacroiliitis and swelling in the left piriformis muscle.

Blood tests showed elevated inflammation (ESR 69 mm/hr, normal 0-15; CRP 6.9 mg/l, normal <6.0) and anemia (hemoglobin 11 g/dl, normal 13.5-17.5). The *Brucella* blood titer was very high (1:5,621), and liver enzymes were raised. These findings fit brucellar sacroiliitis.

He started treatment with doxycycline (100 mg twice a day) and rifampicin (900 mg once daily) for 12 weeks. He tolerated the medicine well and improved over time, with his fever resolving and his walking improving. His liver tests were checked during treatment.

After 12 weeks of treatment, he came back for a checkup. He felt better. New blood tests, including liver and *Brucella* tests, were done. Another hip MRI was planned to check recovery.

Case 2

A 53-year-old woman with no chronic illnesses came in August 2025 after 2 months of off-and-on fever and feeling tired. Her son and husband had brucellosis. She did not drink unpasteurized milk. Tests showed positive *Brucella* IgM and a titer of 1:1,280. She started rifampicin (600 mg once daily) and doxycycline (100 mg twice daily).

At first, her fever and back pain continued. She had lumbar disc disease with left leg weakness and numbness. Doctors were worried about spinal infection, so an MRI was ordered to check.

She finished 6 weeks of antibiotics. At follow-up, her symptoms improved and went away. Routine blood tests, including liver and *Brucella* tests, were done.

Months later, she had back pain and belly discomfort. She was diagnosed with acid reflux and got dexlansoprazole. She also used pain cream and had blood tests, including for vitamin D.

Case 3

A 56-year-old man with prediabetes came in September 2025 with fever, chills, about 10 kg weight loss, and back pain. His wife and son had brucellosis. Blood tests outside the hospital showed a *Brucella* titer of 1:320. Laboratory tests, including liver tests, were performed before treatment. Later testing showed positive *Brucella* IgG, confirming brucellosis.

The patient was started on combination therapy with rifampicin (600 mg daily) and doxycycline (100 mg twice daily) for 6 weeks, with celecoxib prescribed temporarily for pain control. At a follow-up visit 4 weeks after starting treatment, he reported marked clinical improvement.

After finishing treatment, he came for a checkup. Most symptoms improved, but he still felt tired and achy, with joint pain. He also had numbness and low vitamin D. Blood tests found low vitamin B12 and still low vitamin D. The *Brucella* blood test was now negative. He would be checked for his vitamin levels, diabetes risk, and ongoing pain.

Discussion

The livelihoods of many people in Saudi Arabia depend on livestock, and the spread of this disease poses a danger to both humans and animals and to the overall output of infected livestock [7]. Family history and household members have a significant association with *Brucella* seropositivity due to the shared environment and dairy products [8]. Brucellosis is transmitted to humans through the consumption of infected, unpasteurized animal milk or direct contact with infected animals [9]. Human-to-human transmission (HHT) has been described, including vertical and sexual. Other forms of HHT have been anecdotal, including blood transfusion, and rarely transmitted through direct contact with infected fluids (e.g., during caretaking) [10]. However, it should be noted that genetic factors may affect susceptibility to brucellosis and contribute to a high attack rate among household members exposed to the pathogen [11]. Our study details a family cluster of brucellosis that began when a son was hospitalized in July 2025 after consuming unpasteurized milk. He was diagnosed with *Brucella* through a serology agglutination test. A month later, his mother presented with intermittent fever and fatigue, yielding a positive SAT for brucellosis, indicating possible transmission from the son. Subsequently, his father experienced fever, chills, weight loss, and back pain, with positive



Family transmitted brucellosis

SAT, suggesting potential transmission through contact with the son or sexually from his wife.

Brucellosis has several clinical presentations, including a systemic syndrome with fever, sweats, chills, and fatigue, as well as localized presentations such as epididymo-orchitis and spondylodiscitis. Neurobrucellosis and endocarditis are severe presentations of the disease [12]. Our cases suffered from fever and different skeletal pains.

If treatment is not taken in the acute phase, various complications will occur, resulting in disability, skeletal deformity, and even death. Besides, brucellosis may lead to complications in the locomotor-osteoarticular, digestive, respiratory, genitourinary, cardiovascular, nervous, and blood systems, posing a major threat to human health and to the entire social and economic development [13]. In our study, the index case (Case 1) was the worst and required the longest treatment. He had a limited left-sided range of motion, with positive bilateral straight leg raises and positive FABER and Gaenslen tests on the left. The MRI showed findings suggestive of left sacroiliitis with associated edema in the left piriformis muscle. He also reported elevated liver enzymes. Such complications highlight the need for a careful history and physical examination with directed investigations. Treatment regimens and durations differ between uncomplicated and complicated disease; accordingly, it is imperative to investigate the disease type [11].

Bacterial culture is the gold standard for diagnosing human brucellosis; however, serology can be used when culture is negative [14]. Interpretation of *Brucella* serology can be difficult; bacterial culture is the gold standard for diagnosing human brucellosis; however, serology can be used when culture is negative [14]. Interpretation of *Brucella* serology can be difficult, especially in individuals from endemic countries and those with previous infection [14]. Brief resolved unexplained event uses BrucellaCapt, IgG, IgM, and MAG. The BrucellaCapt® immunocapture assay detects all total anti-*Brucella* antibodies, including non-agglutinating IgA and IgG, and is sensitive and specific. Agglutination assays can exhibit prozone effects; therefore, it is essential that serial dilutions do not yield false-negative results [14]. The prozone phenomenon occurs when there is excess antibody, which inhibits the antigen-antibody lattice required for a visible reaction, leading to a false-negative result. Repeated serology is essential to confirm the initial serological results [14]. Regarding our cases, all were diagnosed serologically by agglutination assays; the son reported the highest *Brucella* titer (1:5,621), the mother was 1:1,280, and the father was 1:320. Treating with a single antibiotic should be avoided, as there is a high rate of relapse when a combination regimen is not used. For uncomplicated infections, doxycycline (100 mg PO twice daily for 6 weeks) may be the most appropriate monotherapy; however, relapse rates with this approach are

40%; hence, rifampin (600-900 mg/day) is usually added. In children, a regimen of trimethoprim-sulfamethoxazole and rifampin for 4 to 6 weeks may be used, as doxycycline should not be used in children. In spondylitis or sacroiliitis, doxycycline and rifampin combined with an aminoglycoside (gentamicin) for the initial 2-3 weeks, followed by 6 weeks of rifampin and doxycycline, is usually recommended [15]. Our first case is the most aggressive; he was started on a combination of doxycycline (100 mg twice daily) and rifampicin (900 mg once daily) for 12 weeks. The mother and father were less severe; they were started on combination therapy with rifampicin (600 mg daily) and doxycycline (100 mg twice daily) for 6 weeks.

Conclusion

Our report describes that the likely transmission of *Brucella* from child to mother may be by direct contact with body fluids of her son during health care, and probable sexual transmission from mother to father. This hypothesis is based on the parents' admission that they have not dealt with any of the infection vectors, which may include unsterilized milk and infected livestock. Although these events are rare, this report highlights the importance of improving clinical awareness. Brucellosis should be considered for persons presenting with fever, fatigue, and bone-muscle pain not associated with other infections. Early and appropriate treatment is essential.

List of Abbreviations

HHT	Human-to-human transmission
SAT	serum (tube) agglutination test

Conflicts of interest

The authors declare that they have no conflict of interest regarding the publication of this case report.

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Informed consent

The patients have signed informed consent and approve the publication.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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Family transmitted brucellosis

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