A Case Report


**ABSTRACT** • A 63-year-old female patient presented for infected total knee prosthesis by *Brucella* spp. several years after undergoing knee replacement arthroplasty. She underwent a two-stage revision surgery and was treated with gentamicin, rifampicin and doxycycline for a total duration of four months.

Keywords: total knee replacement; knee prosthesis infection; *Brucella*

**CASE REPORT**

A 63-year-old female, obese, presented to our hospital for pain in her left knee of one-year duration. She underwent left total knee arthroplasty on November 2011 for knee osteoarthritis. After two years she developed tenderness, swelling and redness of her left knee (Fig. 1), treated by painkillers without any further investigations.

She presented in February 2015 with worsening of her symptoms, so she became unable to bear weight. Her pain was continuous in type, waking her at night and interfering with her daily activities; she also reported night sweats and chills. Laboratory studies showed the following: an elevated C-reactive protein of 27.4 mg/L and normal white blood cell count. X-rays and leucoscan of her left knee revealed loosening of the tibial prosthesis (Fig. 1), and evidence of osteomyelitis, respectively.

The patient underwent a two-stage revision total knee arthroplasty. In the first stage her left knee prosthesis was removed with gentamicin spacer insertion (Fig. 1). During this surgical procedure, synovitis with granulation tissue were removed, cultures were taken and returned to be negative after 3 days. On the 4th day, subculture of test was positive at a titer > 1/5120. There was a pure tissue were removed, cultures were taken and returned to be negative after 3 days. On the 4th day, subculture of test was positive at a titer > 1/5120.

While reviewing her history, the patient reported eating homemade cheese prepared from unpasteurized fresh milk. After the first surgical procedure antibiotic therapy was given for four months (gentamicin 240 mg for 15 days, rifampicin 300 mg three times daily and doxycycline 100 mg twice daily) and was followed by a second stage revision left total knee arthroplasty (Fig. 1).

During the second procedure the surgical field was macroscopically clean, without pus, or any other sign of inflammation or infection. Several cultures specimen from the femur and the tibia were taken and returned to be negative. At two years follow-up, the patient was pain free with excellent functional result and reported a high level of satisfaction.

**DISCUSSION**

Brucellosis, which is primarily an animal disease, is transmitted to humans from infected animals’ meat, milk, urine and body fluids. It is a common zoonosis seen all over the world, especially in the Mediterranean countries, the Arabian Peninsula, India, Mexico, and Central and North America. In developed countries, the infection has been eradicated from animals, but developing countries still have significant morbidity.

The disease is generally transmitted to humans eating cheese, made from raw milk, and milk products such as cream and butter as well as eating animals’ reticuloendothelial organs, such as the spleen and liver, without proper cooking. In addition, it may be transmitted by way of infected secretions coming into contact with skin cracks, conjunctiva, or inhalation of dust in stable. It manifests as a systemic infection with nonspecific symptoms as fever, sweats, anorexia, fatigue or weight loss. It can affect any organ or organ system of the body.

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On physical examination, the most notable findings are fever, lymphadenopathy, and hepato-splenomegaly. Osteoarticular complications of brucellosis include: arthritis, spondylitis, osteomyelitis, tenosynovitis, and bursitis, the most commonly reported complication is the sacroiliac joint infection as described in many studies [1-3].

The incidences of infection of primary total hip and knee arthroplasty sites lie between 1% and 5.6%. Aerobic Gram-positive cocci (S. aureus, coagulase negative staphylococci and enterococci) account for 65% of these infections [4]. Less frequent causes of infection (6%) are aerobic Gram-negative bacilli (Escherichia coli, Proteus mirabilis and Pseudomonas aeruginosa). Fungal or mycobacterial infections are extremely unusual [5].

First described in 1991 [6], Brucella infection of total knee prosthesis was then reported in many cases [7-12]. In 2011 in Germany, Wünschel et al. described a case of a 64-year-old female who presented with loosening of her knee prosthesis following total knee replacement, five years earlier. About two weeks after replacement of the prosthesis, bacterial growth was detected by chance in the preoperative culture and Brucella melitensis was diagnosed. The authors focused on the considerable risk for laboratory-acquired infections [13]. Tassinari et al. reported a case of Brucella infection in a total knee arthroplasty without radiological signs of prosthetic loosening. They were able to manage the infection only with antibiotic therapy using rifampicin and doxycycline for eight weeks [14]. Sazegari et al. described a 78-year-old man whose total knee arthroplasty showed the symptoms of infection with Brucella with radiographic signs of loosening five years after the surgery. The patient was treated successfully with a two-stage revision arthroplasty surgery along with rifampicin and doxycycline for eight weeks [15].

Infection caused by Brucella following total hip arthroplasty was also reported in the literature by other authors [10,16]. Ruiz-Iban et al. and Rozado et al. reported two cases of total hip arthroplasty infected by Brucella pathogens; one had evidence of component loosening and was managed with a two-stage reimplantation along with oral antibiotics, and the other case showed no evidence of component loosening and was therefore treated with a course of oral antibiotics alone [10].

Treatment strategy depends on the implants fixation status. When component loosening is present, the treatment of choice is a two-stage management comprising removal of the implants in the first stage followed by 3 to 4 months of antibiotic treatment with or without gentamicin cement spacer [10,9,15]. In the second stage, the spacer is removed and the final revision prosthesis is implanted. Conservation of the implants and the use of suppressive antibiotic therapy are rarely indicated and are reserved for patients with well-fixed implants or those who are unfit for surgery [12,14]. In all cases, revision surgery was performed only when evidence of loosening was seen on imaging studies.

Figure 1.  Left: AP and lateral X-rays of the left knee showing the loosened prosthesis (postero-lateral tibial plateau)  
Center: AP and lateral X-rays of the left knee after replacement with a spacer.  
Right: AP and lateral X-rays of the left knee after the second stage revision surgery.
CONCLUSION

Our patient suffered from chronic brucellosis, which was misdiagnosed and was not appropriately managed for almost three years. She presented with evidence of component loosening and was therefore treated with a two-stage procedure as described in the literature. Brucellosis should be considered in endemic areas and should be listed in the differential diagnosis in the management of loosened or painful knee prosthesis, especially in endemic regions.

CONFLICT OF INTEREST
The authors have no conflict of interest in this study.

REFERENCES