CASE REPORT

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THE CASE

A 49-year-old Mexican immigrant woman was admitted to the hospital with a 5-month history of fatigue and a 30-pound unintentional weight loss. She was also experiencing arthralgia, swelling, and stiffness in her hands and feet that was worse in the morning. The patient, who was obese and suffered from type 2 diabetes and hypertension, said that at the onset of her illness 5 months earlier, she’d experienced approximately 2 weeks of night sweats and a few days of fever.

A month before being admitted to the hospital, she’d been seen in our southern New Mexico family medicine office. Her recent history of fever, joint symptoms, and weight loss raised concerns of an insidious infection, a new-onset rheumatologic condition, or an occult malignancy.

Initial lab tests revealed leukopenia (white blood cell count, 3200/mcL), microcytic anemia (hemoglobin, 9.4 g/dL), and an elevated erythrocyte sedimentation rate of 30 mm/hr (normal range, 0-20 mm/hr). A rheumatoid factor test was negative, and her thyroid, kidney, and liver function tests were all normal.

More testing... The patient frequently traveled between New Mexico and her hometown of Chihuahua, Mexico, but there had been no recent changes in her diet or environmental exposures. She denied drinking any unpasteurized milk in Chihuahua. But based on her travel history, we ordered enzyme-linked immunosorbent assay (ELISA) antibody titers for Brucella, immunoglobulin G, and immunoglobulin M, which all came back negative. Additionally, we ordered an abdominal and pelvic ultrasound and a chest x-ray that were nondiagnostic. Given the patient’s weight loss and anemia, we referred her to a gastroenterologist for upper and lower gastrointestinal endoscopic evaluations. Unfortunately, the patient was uninsured and did not go to see the gastroenterologist.

A month after seeing us, our patient’s fatigue, lack of appetite, and joint pain became debilitating and she was admitted to the hospital for further evaluation, including a consultation with an oncologist.

THE DIAGNOSIS

During our patient’s 6-day hospital stay, a bone scintigraphy showed a focus of uptake in her left parietal bone and computed tomography scans of her chest, abdomen, and pelvis revealed a left thyroid nodule, as well as multiple noncalcified pulmonary nodules. Blood cultures were also obtained.

Despite the initial negative antibody tests, the blood cultures drawn in the hospital revealed the presence of Brucella melitensis, and we diagnosed brucellosis in this patient.

DISCUSSION

Brucella melitensis is one of the 4 recognized, land-based species of the Brucella genus that can cause disease in humans. Goats, sheep, and camels are natural hosts of B...
Brucellosis can also result from inhaling infected, aerosolized material; therefore, individuals whose occupations involve close work with host animals or work in laboratories with the bacteria have an increased risk of infection. Due to the risk of acquiring the infection via inhalation, brucellosis is considered a bioterrorism threat. Additionally, there have been reports of human-to-human transmission via sexual intercourse, transplacental infection, blood and bone marrow transfusion, and breastfeeding. 

*B. melitensis* is the cause of the majority of *Brucella*-related illnesses in the world, though symptoms of infection are similar among the different *Brucella* species. The pathogen can affect almost all organ systems after the initial 2- to 4-week incubation period. Symptoms of brucellosis can be highly variable, although fever is consistently present. Other red flags include arthritis (usually affecting the peripheral joints, the sacroiliac joints, and the lower spine), epididymo-orchitis, and hepatitis resulting in transaminase elevation. Abscess formation can be seen in the liver, spleen, and other organs.

Less common but more ominous complications include central nervous system infections and abscesses, endocarditis, and pulmonary infections. Endocarditis and the resulting aortic valve involvement is the major cause of mortality. *Brucella*-related uveitis, thyroiditis, nephritis, vasculitis, and acalculous cholecystitis have also been reported. 

**Rare in the United States.** Pasteurization of dairy products and mass vaccination of livestock make *Brucella* infection rare in the United States. While there have only been 80 to 139 cases of brucellosis reported per year in the United States since 1993, it remains a persistent threat. International travel is common from the United States to the Middle East and other parts of the world where brucellosis is endemic.

Additionally, infection of livestock with *Brucella* remains widespread in Mexico and the consumption of unpasteurized Mexican dairy products from goats and sheep remains a high-risk activity for acquiring the disease. Consequently, Texas and California account for more than half of the brucellosis diagnoses in the United States. However, in 2010, cases were reported in 25 other states and the District of Columbia.

**Repeat serology tests are preferred for confirming the Dx**

It is interesting that our patient’s initial *Brucella* serology by ELISA was negative, because it was ordered months after her initial symptoms. Antibodies should be seen within a month of symptom onset. The Centers for Disease Control and Prevention (CDC) recommends taking 2 serum samples to establish a serologic diagnosis of brucellosis. The first should be drawn within 7 days of symptom onset and the second should be taken 2 to 4 weeks later. A greater than 4-fold rise in the antibody titer confirms the diagnosis. While ELISA is an acceptable serologic test, the CDC recommends using a serum tube agglutination test called the *Brucella* microagglutination test (BMAT). Repeat serology was not performed on our patient because the diagnosis had been confirmed by blood culture.

**A combination of antibiotics is the recommended treatment**

Treatment of brucellosis should include a tetracycline for at least 6 weeks in combination with an aminoglycoside or rifampin 600 mg/d for an all-oral regimen. Doxycycline 100 mg twice a day is preferred due to fewer gastrointestinal adverse effects than tetracycline. Relapse is not uncommon (10%) and usually occurs within one year of completing the antibiotics. However, there is a case report of a patient having reactivated brucellosis manifested as acalculous cholecystitis 28 years after completing antibiotics. Our patient was started on oral doxycycline 100 mg twice a day and oral rifampin.
600 mg/d for 6 weeks. Within days of starting the antibiotics, her joint symptoms and fatigue rapidly abated and her appetite returned. Follow-up radiological testing was not performed after her initial hospital studies due to her lack of financial resources.

The patient’s daughter had also been experiencing night sweats, chills, malaise, anorexia, joint pains, weight loss, and alopecia over the previous 2 months. Her blood cultures were positive for *B. melitensis* as well, and she was started on the same antibiotic regimen as her mother. The daughter was also seen in our clinic by another physician and improved quickly within a week of starting treatment.

Both our patient and her daughter remained symptom-free 6 years after treatment.

**THE TAKEAWAY**

Brucellosis is rare in the United States, but international travel to endemic areas is commonplace and consumption of unpasteurized Mexican dairy products from goats and sheep is widespread. Brucellosis has a wide range of symptoms, but a prompt diagnosis by an ELISA or BMAT serologic test and appropriate treatment can avoid morbidity and mortality. Treatment includes a tetracycline for at least 6 weeks in combination with an aminoglycoside or rifampin.

**References**