Human to human transmission of *Brucella melitensis*

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P VIGEANT, J MENDELSON, M MILLER. Human to human transmission of *Brucella melitensis*. *Can J Infect Dis* 1995;6(3):153-155. Human brucellosis is acquired mainly through contact with infected animal tissues, ingestion of unpasteurized dairy products or infected aerosols. Person to person transmission is still considered uncertain. The case of a woman diagnosed with proven brucellosis after her husband suffered a relapse of bacteremia with *Brucella melitensis* biotype 3, which was originally acquired abroad by eating goat cheese, is described. It was postulated that person to person spread of brucellosis is a likely mode of transmission in this case.

Key Words: *Brucella melitensis*, *Brucellosis*

Transmission interhumaine de *Brucella melitensis*

RÉSUMÉ : La brucellose humaine s'acquiert principalement lors d'un contact avec des tissus animaux contaminés, par l'ingestion de produits laitiers non pasteurisés ou par des aérosols infectés. La transmission d'une personne à l'autre est encore jugée douteuse. Le cas d'une femme chez qui une brucellose a été diagnostiquée après que son mari ait subi une rechute de bactériémie à *Brucella melitensis* de biotype 3 qu'il avait originellement acquise à l'étranger, lors d'une ingestion de fromage de chèvre est décrit ici. Il a été postulé que la propagation entre humains de la brucellose était un mode de transmission envisageable dans ce cas.

BRUCELLOSIS CAN BE TRANSMITTED FROM ANIMALS TO HUMANS in many ways: ingestion of infected meat or unpasteurized dairy products; direct contact of broken skin or mucous membrane with infected animal tissues; and inhalation of infectious aerosols. Except for possible cases of transmission after blood transfusion, parenteral drug use and bone marrow transplant (1), brucellosis is still considered not to be transmissible from person to person via close contact (2). However, a few cases of *Brucella melitensis* infection in spouses of patients with serologically or culture-proven

brucellosis have been reported in the past decade (3-6). We describe a well documented case of transmission of *B melitensis* biotype 3 to a spouse, which adds to the growing evidence of interhuman transmissibility of this infection.

CASE PRESENTATION

A 49-year-old married man was admitted to hospital in May 1991 with a four-week history of fever to 40°C, chills and night sweats. He also noticed a dry cough, some nonspecific lower

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abdominal discomfort and weight loss of 3 kg. These symptoms developed two weeks after his return from Germany and Syria. The patient's last meal in Syria included unpasteurized goat cheese. The physical examination was normal, with a temperature of 36.9°C, except for rhonchi over the left lung. The laboratory results revealed a total leukocyte count of $6.3 \times 10^9/L$ with 46% neutrophils and 48% lymphocytes, normal electrolytes and creatinine, and mildly elevated liver enzymes (aspartate aminotransferase 53 U/L, alanine aminotransferase 53 U/L, lactate dehydrogenase 465 U/L), with normal bilirubin. The urinalysis was normal, urine culture was negative and the chest x-ray showed atelectasis at the right base. An abdominal ultrasound demonstrated splenomegaly. After three days of incubation, the two sets of blood cultures that were drawn three days before admission, cultured in NR 6 and NR 7 blood culture bottles and read in the nonradiometric BACTEC 640 apparatus (Becton Dickinson) revealed Gram-negative coccobacilli. The patient was initially treated with ceftriaxone. In view of persistent daily fever (maximum 39.7°C) and the possibility of brucellosis, rifampin 450 mg bid and doxycycline 100 mg bid by mouth were added after two days of parenteral ceftriaxone. Two days later, the patient's temperature returned to normal and he was discharged from the hospital on the same oral medication only. The blood isolates were subsequently identified as *B melitensis* biotype 3 by the provincial public health laboratory.

The patient completed one month of treatment and was asymptomatic for seven months when the same symptoms (fever, chills) recurred. He denied any further travel or ingestion of unpasteurized dairy product since the first episode. Blood cultures were again positive for *B melitensis* biotype 3. Cardiac echography was normal. He was given the same treatment as before for two months and remained well 12 months after finishing the treatment.

The patient's wife developed high daily fevers (39 to 40°C), chills and headaches two months after her husband's recurrence, and her blood cultures also yielded *B melitensis* biotype 3 after four days' incubation. For the previous three years, she did not travel outside North America. She ate some caviar imported from Iran one week before her illness, but it was cultured and found not to harbour *Brucella* species. She occasionally ate pasteurized cheese from an Arabic shop in Montreal. She had regular sexual intercourse with her husband over that period and did not use a barrier method of birth control. She was similarly treated with doxycycline and rifampin and did well in subsequent follow-up visits.

DISCUSSION

The most likely source of the husband's disease was the goat cheese eaten in Syria. We believe that the second episode was a recurrence rather than a reinfection because the patient did not travel to an endemic area after the first episode and no other risk factors were identified. Moreover, though a six-week regimen of doxycycline and rifampin is now considered the treatment of choice by the World Health Organization, a failure rate of 14% is expected (7). The index case received only four weeks of treatment, with which Ariza *et al*

(8) documented a failure rate as high as 38.8%. It is therefore plausible to attribute the patient's recurrence to a less than optimal duration of therapy, which probably should not be less than six weeks. There doesn't seem to be a universally accepted standard of follow-up for patients with brucella other than observing the patient for recurrence of symptoms, which can occur, as in the present case, many months after the initial episode.

The patient's wife's disease started two months after her husband's recurrence, which would be the expected incubation period if the disease was acquired from him then. The Quebec provincial public health laboratory, which maintains surveillance of all brucella isolates and serology, reported no cases of brucella infection in the province of Quebec other than in travellers or immigrants arriving from an endemic country, suggesting that the cheese bought from the Arabic shop was an unlikely source. Moreover, that cheese was pasteurized and other people at home ate it without becoming ill. Since the husband did not consume caviar before he relapsed and all three blood isolates were biochemically identical, it is unlikely that the caviar was the source of infection, especially if one considers that cultures were negative for brucella.

A review of the English language medical literature from 1976 to 1993 yielded four additional cases of possible human to human transmission via nonparenteral exposure. In three of these, the index case infections were laboratory acquired (3,4,6), and either the index case or the spouse grew *B melitensis* biotype 2 or 3 from blood, their counterpart being diagnosed serologically (3,4) or by blood culture (6). In the fourth report (5), the patient was thought to have acquired brucellosis from an undefined source while visiting Spain with his girlfriend. She became sick nine months after her companion's disease, which exceeds the maximum reported incubation period. In view of the absence of other risk factors to explain her disease, person to person transmission was postulated.

Sexual transmission of brucellosis, though not documented in humans, seems to be a likely mechanism of infection. In humans, genitourinary complications such as epididymo-orchitis and prostatitis are seen in cases of brucellosis (9), and seeding of these organs could perhaps play a role in transmission of the disease from person to person. In the cases reviewed in another report cited above, one of the partners had clinical evidence of unilateral epididymitis (5). Our patient did not have any clinical evidence of either epididymo-orchitis or prostatitis and his urinalysis was normal. Nevertheless, *B melitensis* has been isolated from the sperm of a patient without clinical orchitis (10).

In conclusion, we believe that human to human transmission of *B melitensis* occurs, and that sexual transmission probably plays a role. Prospective studies evaluating the rate of brucella seroconversion in spouses of index cases are needed to estimate the true incidence of such an event. In addition, given the seriousness of the disease and the presented evidence, it would be prudent to instruct sexually active patients with brucellosis to use a barrier method until therapy is completed.

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