Brucella melitensis in blood cultures of two newborns due to exchange transfusion

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SUMMARY: Akcakuş M, Esel D, Çetin N, Paç-Kısaarslan A, Kurtoğlu S. Brucella melitensis in blood cultures of two newborns due to exchange transfusion. Turk J Pediatr 2005; 47: 272-274.

Brucellosis is a zoonotic infection, transmitted to humans primarily by consumption of unpasteurized milk and milk products. Transmission by blood transfusion is possible but very unusual. Herewith we present two newborns with positive blood cultures for Brucella melitensis after exchange transfusions. However, the standard tube agglutination titers against Brucella were not elevated and the newborns did not develop brucellosis. It is suggested that, in areas endemic for brucellosis, blood donors should be questioned about symptoms of brucellosis, and if suspected, serological tests for brucellosis should be indicated before blood transfusion. At the same time, the prevalence of the disease among animals should be reduced with effective animal disease control programs.

Key words: brucellosis, exchange transfusion, newborn.

Brucellosis is a worldwide zoonosis, the incidence of which has decreased in developed countries. It is more common in countries that do not have good standardized and effective public health and domestic animal health programs. Areas currently listed as high risk are the Mediterranean basin (Portugal, Spain, Southern France, Italy, Greece, Turkey, and North Africa), South and Central America, Eastern Europe, Asia, Africa, the Caribbean, and the Middle East[1-5]. There are some reports about endemic and sporadic forms of this infection in Turkey[6].

Primarily, it is a disease of animals, affecting sheep, goats, cattle, swine, dogs, and several other animals, and the major sites of infection include the genital organs, mammary glands, and placenta. Humans acquire the disease by the ingestion of raw milk or dairy products made from unpasteurized milk, by direct contact through the broken skin or conjunctiva, or by inhalation of contaminated dust[5]. The disease typically attacks young and middle-aged adults, with a low incidence among infants and elderly patients[1-3].

Human-to-human transmission is rare but has been reported in association with blood transfusion, bone marrow transplantation, and transplacental or perinatal exposure[7-17]. We present here two newborns with positive blood cultures for Brucella melitensis after exchange transfusion. However, the standard tube agglutination titers were not elevated and the disease did not develop.

Case Reports

Case 1

A five-day-old male infant having jaundice was referred to our University Hospital. The boy was born to non-consanguineous healthy parents at term by normal delivery after an uneventful pregnancy. He was the fourth child of the family. Two siblings are healthy. The second child died because of hyperbilirubinemia in the neonatal period. In our patient, his parents recognized jaundice on the 3rd day of life.

On physical examination, the child appeared icteric. His weight was 3230 g, length 51 cm, head circumference 34 cm, temperature 36.7°C, heart rate 140 beats/min, and blood pressure 65/40 mmHg. Other physical findings were within normal limits.

Laboratory findings included: hemoglobin 11.2 g/dl, hematocrit 35%, and white blood cell count 10,600/mm^3 (55% neutrophils,

45% lymphocytes). The reticulocyte count was 8% and the platelet count 294,000/mm^3. The peripheral smear showed marked spherocytosis. Blood groups of mother and baby were 0 Rh (+) and A Rh (+), respectively. Total bilirubin was 38 mg/dl with a direct component of 1.3 mg/dl. The result of direct Coombs test was negative. Levels of electrolytes, blood urea nitrogen, creatinine, glucose, calcium, phosphorus, alkaline phosphatase, results of liver function tests and urinalysis were normal.

Two double volume exchange transfusions were needed to reduce bilirubin to acceptable levels. After the first exchange transfusion, ampicillin (100 mg/kg/day) and netilmicin sulfate (5 mg/kg/day) were started. The baby was discharged after four days in good condition. *Brucella melitensis* was isolated in blood culture (BACTEC Peds Plus/F Medium) which was taken at the end of the second exchange transfusion procedure. The standard tube agglutination titer and blood culture were found negative in the mother.

On the follow-up of the baby, blood cultures were negative and the standard tube agglutination titers were 1/40, 1/60 and negative at two weeks, two months and sixth months, respectively. At one year of age, physical examination and growth of the baby were normal; blood culture and the brucella agglutination titer were negative. The donor was a 33-year-old male. The patient informed us he had consumed fresh cheese. He had complaints of weakness, arthralgia, and backache. With these complaints, the standard tube agglutination titer was performed and the titer was 1/320. He had been prescribed tetracycline and streptomycin.

Case 2

A five-day-old male infant having jaundice was referred to our hospital. The boy was born to non-consanguineous healthy parents at 37 weeks of gestation by cesarean section because of fetal distress. He was the first child of the family. His parents recognized jaundice on the 4th day of life.

On physical examination, the child appeared icteric. His weight was 2865 g, length 48 cm, head circumference 32.5 cm, temperature 36.7°C, heart rate 152 beats/min, and blood pressure 60/30 mmHg. Other physical findings were within normal limits.

Laboratory findings included: hemoglobin 16.4 g/dl, hematocrit 45%, and white blood cell count 10,200/mm^3 (10% neutrophils, 90% lymphocytes). The reticulocyte count was 3% and the platelet count 497,000/mm^3. The peripheral smear revealed normochromic-macrocytic erythrocyte morphology. Blood groups of mother and baby were the same, 0 Rh (+). Total bilirubin was 26.7 mg/dl with a direct component of 1.6 mg/dl. The result of direct Coombs test was negative. Serum electrolytes, blood urea nitrogen, creatinine, glucose, calcium, phosphorus, alkaline phosphatase, and results of liver function tests and urinalysis were normal.

We could not find the cause of hyperbilirubinemia. A two-volume exchange transfusion was performed. After the exchange transfusion, we started ampicillin (100 mg/kg/day) and amikacin sulfate (20 mg/kg/day). *Brucella melitensis* was isolated in blood culture (BACTEC Peds Plus/F Medium) which was taken after the exchange transfusion. After positive blood culture of the baby, the standard tube agglutination titer and blood culture were found negative in the mother. The baby was discharged on the 15th day of life. On follow-up of the baby, blood cultures were negative and the standard tube agglutination titers were 1/60, 1/40 and negative at two weeks, two months and sixth months, respectively. At one year of age, physical examination and growth of the baby were normal; blood culture and the standard tube agglutination titers were negative. We could not reach the donor because he was out of the city.

Discussion

Brucellosis is a major zoonotic disease, widely distributed in both humans and animals, especially in the developing world. The disease is endemic in our country[6-10].

Human-to-human transmission is rare but has been reported in association with blood transfusions, bone marrow transplantation, transplacental or perinatal exposure and possibly postnatally, through breast milk[7-17].

Neonatal brucellosis is rare, and it has been suggested that the possible modes of transmission are horizontal (via the placenta) when maternal infection occurs during pregnancy and vertical when the baby ingests contaminated maternal secretions during birth and through breast milk[7-14].

Blood transfusions frequently are life-saving, and modern intensive care of premature neonates, children with cancer, and transplant recipients would be impossible without this. The transfusion of blood and blood products exposes recipient patients to both non-infectious and infectious adverse events. Approximately 11 to 12 million units of blood are transfused annually with an average of 3.5 units per patient. There is 1% or greater risk of ill effects associated with transfusion. From 1976 through 1985, 355 deaths were reported to the U.S. Food and Drug Administration (FDA) as a result of transfusion, for a mortality risk of 0.001% or 1 in 100,000 patients transfused. Infections accounted for 27.3% of these deaths[18].

In our two cases presented here, exchange transfusion was performed because of hyperbilirubinemia. In both newborns, *Brucella melitensis* was isolated in blood cultures which were final specimens after the exchange transfusions. The blood cultures which were taken before the exchange transfusions were negative. The mothers were healthy; their blood cultures were reported negative for *Brucella melitensis* and their standard tube agglutination titers were negative. Most probably, we performed exchange transfusion with blood infected with *Brucella melitensis*. We were able to reach one of the donors possibly infected. We followed these two babies with physical examinations, blood cultures (held for four weeks) and the standard tube agglutination titers. Neither of the babies developed brucellosis. We thought that infection did not develop because of the use after the exchange transfusions of ampicillin and aminoglycoside, to which the organism was susceptible in vitro. The duration of antibiotic therapy was very short, but it might have been effective in the bacteriemic phase of the disease.

Brucellosis is endemic in many parts of the world. However, in the literature, blood transfusion-related transmission is very rare. In countries like Turkey, blood donors are generally not screened for brucellosis. Since the occurrence of transfusion-related transmission is rare, whether or not there is a protective mechanism for prevention of the disease after transfusion is not known.

In conclusion, it was only by chance that our patients did not develop brucellosis. It is suggested that, in areas endemic for brucellosis, blood donors should be questioned about symptoms of brucellosis, and if suspected, serological tests for brucellosis should be indicated before blood transfusion. At the same time, the prevalence of the disease among animals should be reduced with effective animal disease control programs.

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