CASE REPORT

Acquired *Brucella* bacteraemia in a young infantAmbar Bhatnagar,¹ Daisy Khera,¹ Kuldeep Singh,¹ Anuradha Sharma²¹Department of Paediatrics, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India²Department of Microbiology, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India

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SUMMARY

An infant aged 6 weeks presented with failure to thrive since birth, fever and lethargy for 4 days. The child was fed on unpasteurised diluted goat's milk after birth. She was diagnosed to have brucellosis both by blood culture and serology. Her mother's *Brucella* serology was negative. She was successfully treated with injection amikacin and tablet rifampicin and had satisfactory weight gain thereafter. Acquired brucellosis should be considered in the differential diagnosis of failure to thrive in young infants.

BACKGROUND

Congenital brucellosis in infants is well described but occurs rarely and very few cases have been reported until now. Acquired brucellosis in young infants has rarely been reported.

CASE PRESENTATION

A female child aged 6 weeks was admitted with a history of not gaining weight since birth, fever for 4 days, lethargy and poor feeding for 4 days. Antenatal period was uneventful. The child was delivered in hospital by vaginal route, birth weight was 2 kg and there was no history of adverse perinatal events. The child was fed on unpasteurised diluted goat's milk after birth. Breast feeding was stopped due to lactation failure as stated by the mother. Goat milk was started due to cultural myth that it is very safe and easily digestible by newborns. Past history: the infant was a term delivery and had low birth weight of 2 kg at birth.

At the time of admission, the child was lethargic, febrile with temperature of 101.8°F, heart rate of 160/min, respiratory rate of 58/min and normal peripheral perfusion. The child was having severe visible wasting, skin turgor was delayed, oral mucosa was wet and eyes were not sunken. Weight at the time of admission was 1.55 kg (< -3 z score), length was 51 cm (at -2 z score) and occipitofrontal circumference was 35 cm (between -1 and -2 z score). Rest of the systemic examination including musculoskeletal system was normal. Clinical diagnosis of failure to thrive with some dehydration with faulty feeding with probable sepsis was considered.

INVESTIGATIONS

Table 1 shows all the haematological, biochemical, microbiological and imaging investigations of the child.

Investigations revealed normal blood glucose, blood counts, C reactive protein, blood gases, electrolytes, mineral profile and liver function tests. Prerenal

azotaemia was present at the time of admission (urea/creatinine=157/0.71 mg/dL), which improved by day 4 of admission. Cerebrospinal fluid (CSF) studies and urine routine and microscopy examination was normal and urine culture was sterile after 24 hours of incubation. Blood culture sent at admission was positive for *Brucella melitensis* on day 5 of admission. After receiving blood culture report, serum agglutination test for *Brucella* was sent and it was positive in 1:320 agglutination titre for both *Brucella melitensis* and *Brucella abortus*. History was reviewed and it was found that the child was breast fed only for a week after birth and was receiving unboiled goat's milk since birth. She was fed on lukewarm goat's milk mixed with water in 1:1 dilution with spoon. A *Brucella* serum agglutination test on mother's blood was done to rule out congenital brucellosis and it was negative.

DIFFERENTIAL DIAGNOSIS

1. Faulty feeding with septicaemia
2. Inborn error of metabolism
3. Brucellosis

TREATMENT

The child was managed with intravenous fluids, orogastric feeding and intravenous antibiotics. After confirmation of *Brucella*, we treated our patient based on sensitivity report with injection amikacin (15 mg/kg) for 2 weeks and tablet rifampicin (15 mg/kg) for 6 weeks.

OUTCOME AND FOLLOW-UP

Repeat blood culture of the patient after 8 days of starting treatment was sterile. The child improved clinically and started gaining weight satisfactorily. Convalescent serology was not sent due to cost constraint. The child was followed-up every weekly for first month and then every monthly for 6 months. Her growth parameters normalised by 5 months after discharge.

DISCUSSION

Brucellosis is a zoonosis caused by ingestion of unpasteurised milk or other dairy products, from infected animals or through close contact with their secretions. Human-to-human transmission, which is rare, has been reported in association with blood transfusion, bone marrow transplantation, transplacental or perinatal exposure and breastfeeding.^{1 2} Cases in the first year of life are very uncommon and ingestion of breast milk from an infected mother and vertical transmission are usually responsible at this age.³ *Brucella* are small aerobic intracellular coccobacilli, localised

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Table 1 Haematological, biochemical, microbiological and imaging investigations of the child

	30/09/2015	02/10/2015	13/10/2015
Hb* (10.5–14 gm/dL)	18.1		
TLC† (6000–14 000/cumm)	14 800		
N‡ (22%–48%)	41%		
PLT§ (1.5–4.0 lakhs)	1.85		
ALT¶ (13–45 U/L)	20		
AST** (9–80 U/L)	24		
Urea (5–18 mg/dL)	157	40	13
Creatinine (0.2–0.4 mg/dL)	0.71	0.4	0.2
Sodium (130–145 mEq/L)	130	133	140
Potassium (4.1–5.3 mEq/L)	5.86	4.15	3.96
Calcium (9–11 mg/dL)	9.28		
Phosphorus (4–6.5 mg/dL)	5.45		
ALP†† (150–420 U/L)	123		
CRP (hs)‡‡ (<1 mg/dL)	0.25		
CSF§§ cytology (0–6 cells/μL)	No cells seen		
CSF§§ culture	Sterile		
CSF§§ biochemistry			
Sugar (40–80 mg/dL)	Sugar=62 mg/dL		
Protein (41–75 mg/dL)	Protein=50 mg/dL		
Brucella antibody SAT¶¶ (patient)	Positive for both <i>Brucella melitensis</i> and <i>Brucella abortus</i> with >1:320 agglutination titre		
Brucella antibody SAT¶¶ (mother)	Negative		
USG*** cranium	Normal study		
Blood culture (30/9/15)	Growth of <i>Brucella melitensis</i> sensitive to piperacillin, piperacillin tazobactam, ceftazidime, amikacin, ciprofloxacin		
Repeat blood culture (8/10/15)	Sterile		

Hb*, haemoglobin; TLC†, total leucocyte count; N‡, neutrophils; PLT§, platelet count; ALT¶, alanine transaminase; AST**, aspartate transaminase; ALP††, alkaline phosphatase; CRP (hs)‡‡, C reactive protein (highly sensitive); CSF§§, cerebrospinal fluid; SAT¶¶, serum agglutination test; USG***, ultrasonography.

in the reproductive organs of host animals. They are shed in large numbers in the animal's urine, milk, placental fluid and other fluids. To date, eight species have been identified out of which the following four have moderate-to-significant human pathogenicity: *Brucella melitensis* (from goat and sheep; highest pathogenicity), *Brucella suis* (from pigs), *Brucella abortus* (from cattle) and *Brucella canis* (from dogs).⁴

Few publications are available regarding congenital brucellosis in infants. In the neonatal period, congenital brucellosis, which is an extremely rare condition, can lead to serious clinical consequences with a high morbidity and mortality rate. It is known that brucellosis can be transmitted to neonates through breast milk.^{5–6} As per Glocwicz *et al*,⁷ only 20 neonatal cases with congenital brucellosis caused by transplacental exposure have been reported in the literature so far. Acquired brucellosis in young infants has rarely been reported. Makis *et al*⁸ reported a girl aged 2.5 months who became infected either by inhaling infected aerosolised particles or by direct transmission of the pathogen through minor skin abrasions or mucosal surfaces. Most of the young infants with brucellosis presented with low birth weight, failure to thrive, jaundice, hepatomegaly, splenomegaly, respiratory difficulty and general signs of sepsis (fever, vomiting). Some cases are asymptomatic. In our case, failure to gain weight was the primary symptom.

Because the clinical picture of brucellosis is not distinctive, the diagnosis must be based on a history of potential exposure,

a presentation consistent with the disease and supporting laboratory findings. Isolation of *Brucella* from blood, CSF, bone marrow, joint fluid or from a tissue aspirate or biopsy sample is definitive and attempts at isolation are usually successful in 50%–70% of cases. In recent years, matrix-assisted laser desorption ionisation time-of-flight spectrometry has emerged as a powerful tool in bacterial identification. Nucleic acid amplification techniques are now quite widely used. Serological examination often provides the only positive laboratory findings in brucellosis. In acute infection, IgM antibodies appear early, usually within 3–7 days following infection. IgG antibodies appear in the blood 2–3 weeks following infection. In endemic areas or in settings of potential occupational exposure, agglutinin titres of 1:320–1:640 or higher are considered diagnostic; in non-endemic areas, a titre of $\geq 1:160$ is considered significant.⁹ The sensitivity and specificity of *Brucella* serum agglutination test (SAT) for the bacteraemic patients is 95.6% and 100.0% respectively, while that of the ELISA IgG is 45.6% and 97.1%, and that of the ELISA IgM is 79.1% and 100.0% respectively. In patients with *Brucella* bacteraemia, the sensitivity of either ELISA IgM or IgG is lower than SAT, however, combining IgM and IgG has similar sensitivity and specificity to SAT.¹⁰

Initial care for brucellosis is supportive. Multidrug antimicrobial regimens are the mainstay of therapy because of high relapse rates reported with monotherapeutic approaches.¹¹ For brucellosis in children younger than 8 years, administration of rifampicin (15 mg/kg) and trimethoprim-sulfamethoxazole (TMP-SMZ) for 6 weeks is the therapy of choice.¹² We preferred rifampicin and amikacin in our case based on culture and sensitivity report and because TMP-SMZ should be avoided in infants <2 months of age.

To summarise, brucellosis should be thought of as a cause of failure to thrive in young infants if dietary history is suggestive and it should be investigated and managed appropriately.

Learning points

- Acquired brucellosis should be thought of as a cause for failure to thrive in young infants.
- History of unpasteurised milk consumption should be enquired in such infants.
- Timely detection and treatment of brucellosis has good outcome.

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