

Childhood pneumonia due to brucellosis

A case report

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Abstract

Rationale: Childhood brucellosis is a significant community health problem. It may imitate other conditions and may be misdiagnosed. Pulmonary involvement is a rare complication of childhood brucellosis.

Patient concerns: A 23-month-old child was referred to our hospital with a 3-week history of fevers and cough. He was initially diagnosed with pneumonia.

Diagnoses and Interventions: Conventional antibiotic treatment was ineffectual. Total leukocyte count was 10,300/mm³, hemoglobin was 8.5 g/dL, and platelet count was 250,000/mm³. The erythrocyte sedimentation rate and procalcitonin were 25 mm/h and 0.12 ng/mL, respectively. Chest radiography showed pneumonic infiltrate in both lungs.

The initial bacteriologic test results were negative. Ten days after admission, *Brucella melitensis* were isolated from the second blood culture. This child was cured with the 2-drug regimen (rifampin+trimethoprim-sulfamethoxazole) for 6 weeks.

Outcomes: The child recovered well with no occurrence of complications. The child remained asymptomatic without any signs or symptoms at a follow-up of 1 year.

Lessons: Non-specific findings of pulmonary brucellosis in children often make diagnosis difficult. The second blood culture is essential. In endemic areas, children with fevers and cough should be included in the diagnosis in cases of pulmonary brucellosis.

Abbreviations: ALT = alanine aminotransferase, AST = aspartate aminotransferase, *B melitensis* = *Brucella melitensis*, ESR = erythrocyte sedimentation rate, HBDH = hydroxybutyric dehydrogenase, LDH = lactic dehydrogenase, PCT = procalcitonin, SAT = standard tube agglutination test, TMP-SMZ = trimethoprim-sulfamethoxazole.

Keywords: childhood pneumonia, cough, fever, pulmonary brucellosis

1. Introduction

Human brucellosis represents one of the most widespread zoonotic diseases in the world, and is caused by intracellular gram-negative coccobacilli, namely, *Brucella* species. It affects all age groups. Brucellosis in children accounts for 3% to 10% of reported cases.^[1] However, in endemic regions, almost one-fourth of the patients are younger than 14 years.^[2] Recently, more attention has been directed towards childhood brucellosis.

Editor: N/A.

Consent to publish: The parents of the patient have provided informed consent for publication of the case. A copy of the written consent is available for review by the Editor of this journal.

The authors report no conflicts of interest.

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Medicine (2019) 98:27(e16247)

Received: 11 January 2019 / Received in final form: 1 May 2019 / Accepted: 7 June 2019

<http://dx.doi.org/10.1097/MD.00000000000016247>

Many children with brucellosis in endemic areas are initially misdiagnosed and treated for other infectious diseases. It is a systemic disease that can involve in any organ or organ system in the human body.^[1] However, involvement of the respiratory system in brucellosis is rare and its non-specific findings often make diagnosis difficult.^[3] Still, even in studies from countries where brucellosis is almost epidemic, the percentage of reported cases with respiratory involvement is extremely low. The purpose of this paper is to describe a case of childhood brucellosis with pneumonia and to present the relevant literature review.

2. Case presentation

A boy of 23 months had a dry cough and hyperpyrexia for 3 weeks. His father reported that his complaints suddenly began and gradually worsened. On admission his temperature was 39.5°C, respiratory rate was 26 per minute, and pulse was 106 beats per minute. Total leukocyte count was 10,300/mm³, hemoglobin was 8.5 g/dL, and platelet count was 250,000/mm³. Biochemical analysis revealed alanine aminotransferase (ALT) of 54 U/L, aspartate aminotransferase (AST) of 54 U/L, hydroxybutyric dehydrogenase (HBDH) of 385 U/L, and lactic dehydrogenase (LDH) of 453 U/L. The erythrocyte sedimentation rate (ESR) and procalcitonin (PCT) were 25 mm/h and 0.12 ng/mL, respectively. Chest radiography showed pneumonic infiltrate in both lungs (Fig. 1). He was initially diagnosed with pneumonia. Conventional antibiotic treatment (ceftriaxone) was ineffectual. On the fifth day of treatment, the child continued to show feverish and bechic. The initial bacteriologic test results were negative. Ten



Figure 1. Chest radiography showed pneumonic infiltrate in both lungs.

days after admission, *Brucella melitensis* (*B melitensis*) were isolated from the second blood culture. The standard tube agglutination test (SAT) for *Brucella* antigens yielded to 1:320. His father recalled that the boy had a history of consumption of unpasteurized goat milk for 2 months. Then he was started on oral rifampin and trimethoprim-sulfamethoxazole (TMP-SMZ) for 6 weeks. His clinical condition gradually improved and biochemical findings were within normal ranges. *B melitensis* was not available from the blood culture after 6 weeks treatment. The child remained asymptomatic without any signs or symptoms at a follow-up of 1 year. Written informed consent was obtained from the parents of the patient for the publication of this case report and accompanying images.

3. Discussion

In recent years, brucellosis shows high morbidity, severe economic losses, and public health problems.^[1] The disease usually starts after consumption of unpasteurized milk and dairy products, and through direct contact with infected animals.^[1,4] Vertical transmission of brucellosis is rare. Breast milk is a potential source of infection, though it is frequently overlooked.^[5] Clinical manifestations of childhood brucellosis are varied and range from minimal symptoms to extreme morbidity and occasional fatality.^[6] Also, its clinical features are protean and simulate those of other febrile illnesses.

In humans, brucellosis presents as a multisystem disease involving in many organs and tissues.^[1] Among the most complications, the respiratory system is rarely reported. Interestingly, respiratory complications are more frequently observed in children than in adults.^[7] In the study of Pappas et al,^[8] of the 450 patients in whom brucellosis was diagnosed, the median age of patients was 53 years (range, 16–85 years), 37 (8.2%) presented with a form of respiratory involvement, cough was reported by 25 patients (5.6%). All patients with respiratory damage were cured after 6 weeks of treatment. In another study of Ahmetagić, 41 (16.7%) of the 246 children brucellosis had

cough.^[9] There are few reports of respiratory involvement in brucellosis, many of which are case reports. Still, the exact pathologic characteristics of the process are unclear.

Non-specific clinical and radiological manifestations were the main reason for the delay in proper treatment. Difficulty in distinguishing brucellosis from other pulmonary infections, such as tuberculosis, sometimes posed an additional diagnostic challenge.^[10] Unfortunately, brucellosis and tuberculosis are prevalent in most regions, especially in developing countries.^[11] The patient in this study was presenting with fever and cough. Leukocytosis, anemia, elevated ESR, and increased PCT reflected inflammation and a wide spectrum of clinical presentations. However, increased HBDH and LDH levels were ignored. In the recent study by Faruqi et al,^[6] serum LDH levels are elevated in a substantial proportion of patients with chronic cough. It is likely to be a potential marker of airway inflammation in chronic cough. Similar to the aforementioned studies, serum levels of HBDH and LDH were increased in our patient with cough. Then, the correlation of HBDH and LDH levels and childhood brucellosis with pneumonia should be further researched.

The respiratory route of entry of *Brucella* organisms through inhalation of aerosol is well documented.^[8] In present study, the child with obviously pulmonary manifestations, however, was infected via consumption of unpasteurized goat milk. As far as *Brucella* isolation from blood samples is concerned, young patients have more often positive result than older ones, which frequently lead to bacteraemia.^[12] Because of wide distribution of the microorganism through the bloodstream to various organs, including the lungs, bacteraemic spread may be the most probable route for acquiring pulmonary brucellosis.^[13] Strains of low virulence (e.g., *Brucella abortus* S19) are almost always cleared from the blood stream within a week, whereas virulent strains (e.g., *B melitensis*) produce a bacteraemia that regularly persists for 4 weeks and even longer.^[14] These studies may partially explain why *B melitensis* was isolated from our patient with typical pneumonia after the consumption of goat milk.

In conclusion, childhood brucellosis remains a serious public health problem. Non-specific findings of pulmonary brucellosis in children often make diagnosis difficult. The second blood culture is essential. In a brucellosis-endemic area, screening of childhood brucellosis is crucial to decrease the misdiagnosis, to initiate early treatment, and to reduce complications.

Acknowledgments

The authors thank Professor Yuexin Zhang and our colleagues who provide insight and expertise that greatly assist the research. They also thank the child involved in this case.

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