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CASE REPORT

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Pulmonary involvement in brucellosis: A case report and literature review

Maryam Abdollahi | **Vadood Javadi** | **Reza Shiari** | **Khosro Rahmani**

Department of Pediatric Rheumatology, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Correspondence
Vadood Javadi, Pediatric Rheumatologist, Mofid Children's hospital, Shariati Ave, Hosseinieh Ershad, Tehran, Iran.
Email: vadoodj@gmail.com

Abstract

Although pulmonary involvement is rare in brucellosis it should be considered as a causative agent in patients with prolonged fever and arthritis. Also, it should be presented with manifestations resembling systemic juvenile idiopathic arthritis.

KEYWORDS

arthritis, brucellosis, infectious disease, pediatrics, pulmonary nodule

1 | INTRODUCTION

We report a young boy suffering from prolonged fever and knee arthritis. The spiral chest chest computed (CT) scan revealed ground glass parenchymal nodules bilaterally. The standard tube agglutination (STA) test for brucella was positive. Brucellosis should be in mind as a causative agent in patients with fever and arthritis in endemic area.

Brucellosis is a zoonotic disease caused by the gram-negative bacteria.[1] It is an important worldwide disease in both humans and animals.[2] The transmission most often occurs as a result of the contact with animals or their products (through the consumption of unpasteurized milk and dairy product) and via occupational contact (eg, farmers).[3]

Human brucellosis is a multisystem disease that may present with a broad spectrum of clinical manifestations, such as fever, Arthralgia, sweating, encephalitis, meningitis, spondylitis, orchitis, arthritis, and endocarditis.[4,5] Respiratory system involvement is a rare complication of brucellosis. Interstitial pneumonia, lobar pneumonia, bronchitis, pleural effusion, granuloma formation, solitary nodules, empyema, and abscesses have been reported.[6]

Epidemiological data, clinical picture compatible with brucellosis, and detection of specific antibodies are the main criteria for diagnosing brucellosis.[7] Herein, we presented a boy with fever, arthritis, and pulmonary nodule and with a final diagnosis of brucellosis along with a review of the current literature.

2 | CASE REPORT

A previously healthy 2.5-year-old boy presented with a 2-week history of fever and left knee pain and mild cough. He had history of unpasteurized milk consumption. Physical examination showed swelling, limitation of range of motion, pain on motion, and warmness of left knee (Figure 1).

Due to mild pain in the flexion of the hip, ultrasonography was done and revealed mild effusion of bilateral hip joints. Laboratory data revealed white blood cells (WBC):15 300/mm^3 (neutrophil: 65%, lymphocyte: 31%), hemoglobin: 11.7 g/dL, platelets: 456 000/mm^3, erythrocyte sedimentation rate: 25 mm/1 hour and C-reactive protein: 40 mg/dL. On the basis of prolonged fever and multiple joint involvements and cough, an essential workup was done to exclude systemic juvenile idiopathic arthritis (JIA), infections, and malignancy. A diagnostic arthrocentesis of the knee was performed to exclude septic arthritis. Fluid analysis showed WBC: 15 000/mm^3 (neutrophil: 85%, lymphocyte: 15%), red blood cell: 2000/mm^3, glucose: 62 mg/dL, protein: 4 g/dL. Gram stain of synovial fluid was negative. Furthermore, synovial fluid was cultured

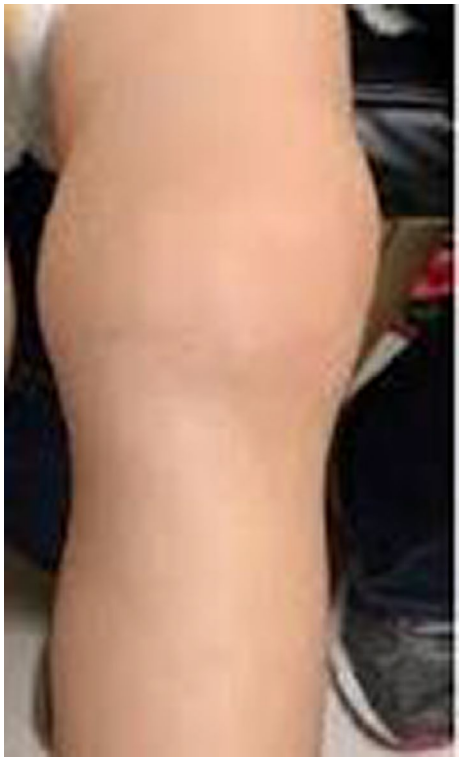

FIGURE 1 Left knee arthritis in the boy with prolonged fever and pulmonary nodules

under aerobic and anaerobic conditions with incubation for at least 7 days. Result of culture was negative.

Tuberculin skin test and blood culture were negative. Bone marrow aspiration and biopsy were normal. Chest X-ray and total abdominopelvic ultrasonography were normal, but a spiral chest CT scan revealed a few parenchymal nodules up to 4 mm in bilateral lungs (Figure 2).

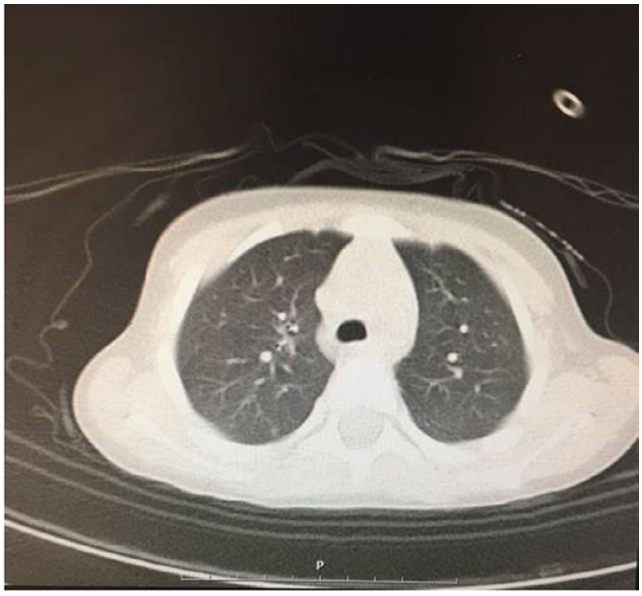

FIGURE 2 The Spiral chest CT scan revealed some pulmonary nodules

Furthermore, the STA test for brucella was positive with a titer Wright: 1/160 and 2-mercaptoethanol (2ME): 1/80. The patient was treated with impression of brucellosis with a combination of trimethoprim-sulfamethoxazole (TMP: 10 mg/kg/d and SMX: 50 mg/kg/d for 6 weeks), rifampin (15 mg/kg/d for 6 weeks), and gentamycin (6 mg/kg/d for 2 weeks). He was evaluated again at the end of treatment. The Wright and 2ME titer decreased. Also, repeated chest CT scan was done for him that revealed normal parenchyma without nodules.

3 | DISCUSSION AND CONCLUSION

Brucellosis is a public health concern, especially in an endemic area like Iran.[5] The transmission of brucella often occurs as a result of contact with animals or their products.[8]

The disease can involve any tissue in the body, so it should be considered in the differential diagnosis in any systemic disease presenting as prolonged fever.[9]

Brucellosis may cause serious clinical complications with the involvement of the internal organs, including lungs, joints, brain, and heart.[8] Although pulmonary involvement is a rare manifestation in the course of brucellosis, but it should be considered in a patient with prolonged fever and arthritis and pulmonary symptoms in an endemic area.[10]

There are a few reports in the literature about pulmonary involvement in brucellosis in children. In the literature, the following pulmonary manifestations of brucellosis have been reported: lung abscess, empyema, pneumonia, pleural effusion, nodules, and hilar and parenchymal lymphadenopathy.[4,7,11-13] Infectious disease with various organ manifestation (eg, osteoarticular) should be regarded as suspicious for brucellosis, especially when there is a potential exposure.[14] Even in areas where brucellosis is endemic, there are rare cases of brucellosis in which the focal form of brucellosis invaded the respiratory tract.[15] A variety of presentations, affected organs and complications have been reported in the course of brucellosis. Brucellosis can be initially present with symptoms of prolonged fever, arthritis, and rarely pulmonary involvement.[13,16] This is possibly due to the nature of the disease, which is subject to consistent under reporting and misdiagnosis. Furthermore, there are other bedside clues to help the clinician to differentiate brucellosis from other differential diagnosis. History of living in an endemic area and history of consuming unpasteurized milk products and possibly having a past history of brucellosis help to these differentiations.

There are a few case reports of pulmonary nodules in brucellosis in children. Piampiano et al reported a 14-year-old boy had a 1-month history of weakness, dry cough, and

TABLE 1 Case reports of pulmonary involvement in brucellosis

Authors	Clinical manifestations	Age at onset	Radiological abnormalities
Piampiano et al	Intermittent fever Weakness Dry cough	14	Multiple nodules Pleural effusion
Singh et al	Fever Cough Chest pain	8	Consolidation
Kerem et al	Fever Dry cough Pleuritic pain	12	Pleural effusion Consolidation

intermittent fever. CT scan demonstrated multiple bilateral peripheral pulmonary nodules and pleural effusion.[17] Singh et al[18] reported an 8-year-old child with fever, cough, and chest pain. In workup, he had right side pulmonary consolidation. Kerem et al[4] reported two cases of brucellosis of the lung with pleural effusion. (Table 1) Pulmonary complications are rarely serious and readily respond to the usual regimens used for the treatment of uncomplicated brucellosis as happened in our case.[11]

In approach to the patient with prolong fever, arthritis, and lymphadenopathy, several causes including systemic JIA, malignancy, and infectious diseases such as brucellosis (in an endemic area) should be excluded. In endemic regions, childhood brucellosis is characterized by a wide spectrum of clinical manifestations. Thus, it should be considered in unusual presentations such as pulmonary involvement with accompanying symptoms like fever and arthritis. Pulmonary involvement of brucellosis has a good prognosis with combined antimicrobial therapy.

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We thank the patient and her parents for consent to publish this case study.

CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTION

MA: served as the main physician and contributed to study concepts, study design, definition of intellectual content, literature research, clinical studies. **VJ**: served as guarantor of integrity of the entire study and edited the manuscript. **RS**: contributed to provision of patient information, acquisition of clinical data, and literature research. **KR**: contributed to provision of patient information, acquisition of clinical data, and literature research.

CONSENT TO PUBLISH

We confirm that the written informed consent form has been provided by the parents to have the case details published. Also, we restate that institutional approval is not required to publish the case details.

DATA AVAILABILITY STATEMENT

If requested (please contact vadoodj@gmail.com).

ORCID

Vadood Javadi https://orcid.org/0000-0002-4159-2052

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