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Pediatric Brucellosis: A Challenging Diagnosis—Case Report

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Abstract

Background: Brucellosis is the second most widely spread zoonotic disease. There is less literature on this disease in Pakistan, leading to delayed diagnosis, or the patient remains undiagnosed. This study aims to contribute to Pediatric brucellosis literature, epidemiological, clinical features, laboratory findings, and treatment. **Case Presentation:** We present an 11-year-old child who was admitted to the hospital due to abdominal pain for one month and a fever for 15 days. On abdominal ultrasound, she had hepato-splenomegaly with minimal pleural effusion. A comprehensive diagnostic workup for infectious and immunologic disorders confirmed brucellosis with the antibody tests report. She received doxycycline, rifampin, and trimethoprim-sulfamethoxazole for three months. The treatment was continued with Syrup Doxycycline (50 mg/5 ml), and Syrup Rifampicin (2 g/100 ml) was prescribed for five weeks. Her symptoms were improved by the end of the treatment. **Conclusion:** *Brucella* is an intracellular pathogen affecting multi-systems of the human body; thus, the treatment is started with antimicrobials that have penetrative effects on a cell. The treatment can be adjusted based on the age group and the complication of the symptoms.

Keywords

Brucellosis, zoonotic disease, pediatrics, infectious disease, case report

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Introduction

Background

Brucellosis is the second most widespread zoonotic disease discovered in the 19th century.[1] Human brucellosis is caused by 4 *Brucella* species: *B. melitensis, B. abortus, B. suis*, and *B. canis*. This infection can have variable manifestations, including osteoarticular, sacroiliitis, hepatitis, or neurological symptoms.[2]

Brucella species are bacteria that infect humans as incidental hosts. Brucellosis results from contact with fluids from infected farm animals or consuming contaminated animal products such as unpasteurized milk and cheese.[3] This disease is primarily endemic in developing and tropical countries.[4] The first brucellosis study in Pakistan was reported in 1979.[5] Among all provinces, Punjab has the highest number of reported cases. However, it is still highly underreported and misdiagnosed.[6] Delays in the onset of appropriate treatment often cause severe symptoms with cardiac, intestinal, nervous, and pulmonary complications.

Antimicrobials most frequently used to treat Brucellosis are tetracyclines, aminoglycosides, and fluoroquinolones.[2,7] To prevent relapses, combination regimens, Doxycycline with Rifampicin or Gentamycin or Trimethoprim-Sulfamethoxazole and Rifampin are used. Moreover, massive livestock vaccination, hygiene practices, and the pasteurization of milk products ensure prevention.[2]

We are reporting a case of a child diagnosed with Brucellosis after two weeks of initial presentation due to a lack of data regarding this disease in Pakistan to analyze clinical symptoms. This study aims to contribute to Pediatric brucellosis literature, epidemiological, clinical features, laboratory findings, and treatment.

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Case Presentation

A previously healthy 11-year-old female presented with abdominal pain for one month and a fever for 15 days. Her medical history was significant for unexplained weight loss over the past month. She was referred from a tertiary care hospital with reported hepatomegaly (13 cm liver span), moderate splenomegaly (16.6 cm), and right-sided minimal pleural effusion on ultrasonography.

On arrival at our hospital, her temperature was 98 F. She was tachycardic with pulse being 140 bpm, and her arterial blood pressure was 108/66 mmHg. Our physical examination referred to epigastric tenderness, abdominal distension, and hepatosplenomegaly with decreased breath sounds on the right side of the chest. Our laboratory results reported pancytopenia (Hemoglobin 7.9 mg/dl, Platelets 79 × 10E9/L, and WBC 5.5 × 10E9/L). Her peripheral smear showed mild microcytic, hypochromic, anisocytosis, elliptocytes, polychromasia, and dimorphic picture of RBCs and few macrophages. Laboratory testing was otherwise significant for Direct Bilirubin (0.4 mg/dl) and Hypoalbuminemia (2.34 g/dl). Upper GI Endoscopy was completely normal. Anti-tissue transglutaminase Ig A levels, ANA levels, serum ceruloplasmin levels, and 24-h urinary copper levels were all within range. CT scan of the abdomen with contrast showed hepatosplenomegaly, mild ascites, multiple enlarged lymph nodes, and a focal area of narrowing in the sigmoid colon. The right middle lung lobe showed patchy ground-glass haziness with few fibrotic nodules, and mild to moderate right-sided pleural effusion was noted (Figure 1). Due to her abdominal pain, we started her course for IV analgesics, but her condition did not improve. Initial infectious workup was unrevealing, with negative malaria, human deficiency virus, Tuberculin skin test, and negative dengue serology. Thoracentesis showed exudative pleural effusion with inflammatory cells rich in lymphocytes, few mesothelial cells, and foamy macrophages; no malignant cells were seen in the fluid. Pleural fluid direct microscopic examination revealed no presence of tuberculosis bacilli. She became very irritable during the hospital stay and had an episode of fit/delirium/psychosis. In addition to the attack, brain magnetic resonance imaging was done, which reported no abnormality except for minimal meningeal enhancement along the right parietal lobe (Figure 2). Lumbar Puncture was advised, which was refused by the attendant. Systemic lupus erythematosus was suspected due to the occurrence of acute psychotic events, but the anti-ds antibody came out negative. However, Brucella antibody titers, Abortus antibody, and Melitensis antibody were >1:320; this explained the presence of *Brucella melitensis*. Initially, she was started on Injection Meropenem 1 g for six days. After positive titers, Syrup Doxycycline (50 mg/5 ml) and Syrup Rifampicin (2 g/100 ml) were prescribed for six weeks. The patient was followed up in OPD, and symptoms were improved. Rifampicin 8 ml was further continued for 15 days.

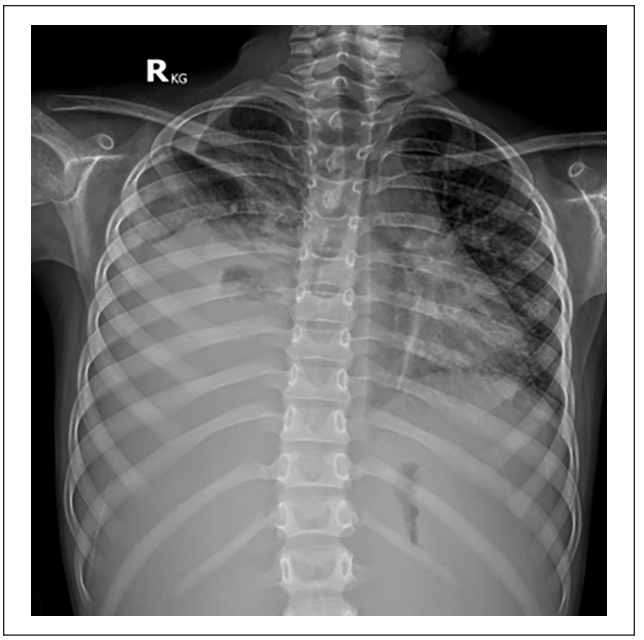

Figure 1. (Rt lung) Blunting of costophrenic angles with lower zone opacity with obstruction of hemi-diaphragm.

Discussion and Conclusion

Brucellosis infection is caused by species in the *Brucella* genus, remains endemic in the South Asian regions, and is commonly neglected in developing countries, including Pakistan.[8,9] This zoonotic disease mainly affects cattle, sheep, horses, camels, buffaloes, and dogs, which can be transmitted to humans through ingestion of unpasteurized milk and raw meat or in contact with the secretions of the infected animals.[8-10] *Brucella melitensis* is the commonly implicated pathogen in the pediatric age group, accounting for 20% to 25% of the cases in the endemic areas.[8,10,11] As the clinical presentation of *Brucellosis* is non-specific, therefore, the diagnosis is tedious. Patients present with fever, anorexia, abdominal pain, night sweats, chills, and joint pain.[8,9,12] The pattern of fever in *Brucellosis* has frequent remissions for which it is characterized as "undulant fever." Fever and arthralgia are the most common signs and symptoms.[7] Hepatomegaly, splenomegaly, and lymphadenopathy are observed during physical examinations.[3] In pediatrics, Osteoarticular manifestations, Neurobrucellosis, and Cardiac complications are usually described.[5,12]

The diagnosis of this disease is through a sample from the sterile site. A sample collected from blood or bone marrow has definitive results.[3,8] The sensitivity of the blood sample is 53%−90%. However, a bone marrow sample is the gold standard with a sensitivity as high as 97%. Serum agglutination test can be helpful in narrowing down the diagnosis; titers 1:>160 are considered positive.[3] Conversely, titers alone are unfavorable for diagnosis in endemic areas

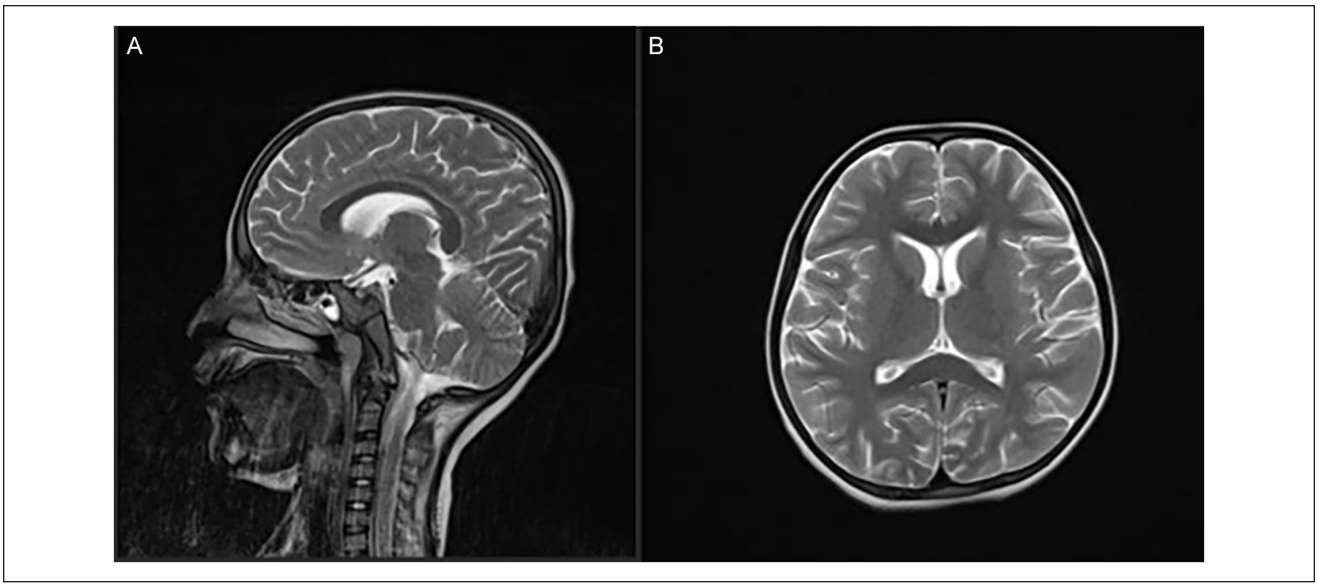

Figure 2. (A) Shows no abnormality. (B) Minimal meningeal enhancement along the right parietal lobe.

due to the increased prevalence of antibodies.[9,10] Serologic testing should be considered for titers that reveal the active infection.[8] Further supportive diagnostic tests include raised inflammatory markers, increased liver enzymes, and hematologic findings, including anemia, leukopenia, thrombocytopenia, and pancytopenia.[3,7] In order to rule out Neurobrucellosis, an MRI brain is a helpful tool that demonstrates inflammatory changes and increased intracranial pressures with ventricular dilatation, infrequently as a space-occupying lesion.

Brucella species are intracellular pathogens affecting multi-systems of the human body; thus, the treatment is started with antimicrobials that have penetrative effects on a cell.[8,10] In literature, endemic areas are noted, with approximately 4.4% of relapses.[10] It is worth noting that combined drug therapy has a greater chance of avoiding relapses. In uncomplicated cases of age group >8 years, two combination regimens can be used: Doxycycline with Rifampicin or Gentamycin or Trimethoprim-Sulfamethoxazole and Rifampin. As for the age group <8 years Septran with Rifampicin or Gentamycin is often used for 4 to 6 weeks.[1,2,8] In complicated cases, triple therapy with Aminoglycoside, Gentamicin or Streptomycin, is added to the dual combination regime, recommended for a minimum of 6 weeks 1.

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Author Contributions

AS and MS have written the manuscript and interpreted patient's information and lab reports. SE and AK have critically reviewed the work. All authors have read and approved the final manuscript.

Availability of Data and Materials

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Consent for Publication

The consent was taken from the patient's guardians as she was underage at the time of publication.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval and Consent to Participate

The ZHC ethical review committee has approved us to collect data and use patients' data anonymously. The patient's guardians were explained and informed about the data that is used in this study.

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