

Brucella Infection Associated with Complete Atrioventricular Block

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Background: The clinical spectrum of *Brucella* infection is quite diverse and characterized by multi-system involvement. Patients present with myocarditis, endocarditis, or pericarditis. Infective endocarditis is the most common cardiovascular complication in patients with brucellosis. Although conduction abnormalities are seen in cases with endocarditis, they are reported very rarely in the setting of cardiac *Brucella* infection.

Case Report: An eight and a half-year-old male patient was referred to our clinic due to inadequate response to cotrimaxazole plus streptomycin treatment at the 15th day of admission. Although local hospital records on the patient showed a heart rate of 80 bpm, we determined a heart rate of 46 bpm. The electrocardiogram showed complete atrioventricular (AV) block. The average heart rate was determined as 48 bpm with 24-hour Holter electrocardiogram (ECG) monitoring. The echocardiographic

examination showed normal-sized heart chambers and the absence of valvular involvement. An agglutination test for brucellosis was found to be positive with a titer of 1/320. High fever, arthralgia, and splenomegaly regressed following doxycycline plus rifampicin therapy, but there was no improvement in the AV block. A permanent pacemaker was implanted because of the detection of an average heart rate of 48 bpm.

Conclusion: Because cardiac failure and rhythm abnormalities are reported in the course of *Brucella* infection and may be associated with significant outcomes, cases with brucellosis should be evaluated carefully in terms of cardiac involvement. This report aims to draw attention to complete AV block as an extremely rare complication of *Brucella* infection.

Keywords: *Brucella* infection, atrioventricular block, myocarditis, child

Brucella infection is the most common zoonotic disease in the world and is particularly endemic in low socioeconomic populations around the Mediterranean Sea, India, and Central and South America (1). The clinical spectrum of *Brucella* infection is quite diverse and it is characterized by multi-system involvement. This infection can also involve the pericardium, myocardium, and endocardium. Infective endocarditis is the most common cardiovascular complication in the patients with brucellosis (1). Although conduction abnormalities are seen in cases with endocarditis, they are reported very rarely in the setting of cardiac *Brucella* infection (2,3). Here, we present a child diagnosed with complete atrioventricular (AV) block during the course of a *Brucella* infection.

CASE PRESENTATION

An eight and a half-year-old male patient was admitted to the pediatric outpatient clinic of a local hospital with complaints of high fever, arthralgia of the left ankle joint, and abdominal pain. He was diagnosed with brucellosis following determination of positive agglutination test. The patient was referred to our clinic due to inadequate response to cotrimaxazole plus streptomycin treatment at 15th day of admission. Although there was no accompanying electrocardiogram (ECG) recording, consignment note of the local hospital showed a heart rate of 80 bpm. But we determined a heart rate of 46 bpm on admission. His body temperature was 37.9°C and blood pressure was 100/70 mmHg. His liver was palpated 2 cm below the costal margin, and he

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had dullness in Traube's area. He had arthralgia but no evidence of arthritis. Of the inflammatory markers, C-Reactive protein (CRP) was 5.7 mg/dL; the erythrocyte sedimentation rate was 14 mm/h. His liver function tests and troponin I level were normal. Standard 12-lead-ECG (Del Mar Reynolds Medical Pathfinder ECG system; Hertford, United Kingdom) showed complete AV block (Figure 1) and the average heart rate was 48 bpm during 24-hour Holter ECG monitoring (Del Mar Reynolds Pathfinder Holter ECG apparatus; Hertford, United Kingdom). No sinus pause was detected. Echocardiographic (General Electric; Wauke-sha, WI, USA) examination showed normal sized heart chambers with normal systolic functions and the absence of valvular involvement. Abdominal ultrasonography (Acuson S2000TM scanner Siemens Medical Solutions; Mountain View, CA, USA) revealed splenomegaly. Agglutination test for brucellosis was found to be positive with a titer of 1/320, while serologic tests for Epstein -Barr virus, cytomegalovirus, hepatitis B virus, rubella virus, salmonella, and *Borrelia burgdorferi* were all negative. Repeated blood cultures were positive for

Brucella melitensis. High fever, arthralgia, and splenomegaly regressed following doxycycline plus rifampicin therapy, but there was no improvement in AV block. A permanent pacemaker was implanted because of ongoing complete AV block and average heart rate of 48 bpm 30 day after determination of AV block. Antibiotic therapy was stopped at the end of six weeks. Complete AV block persisted throughout the follow-up duration of two years.

Written informed consent was obtained from the parents of the patient presented in this report.

DISCUSSION

Brucella infection is the most common zoonosis all around the world, but especially in the Mediterranean countries. The wide clinical spectrum of the disease can lead to a delayed diagnosis (4). Although the most frequent mode of transmission of the disease is the consumption of unpasteurized milk and

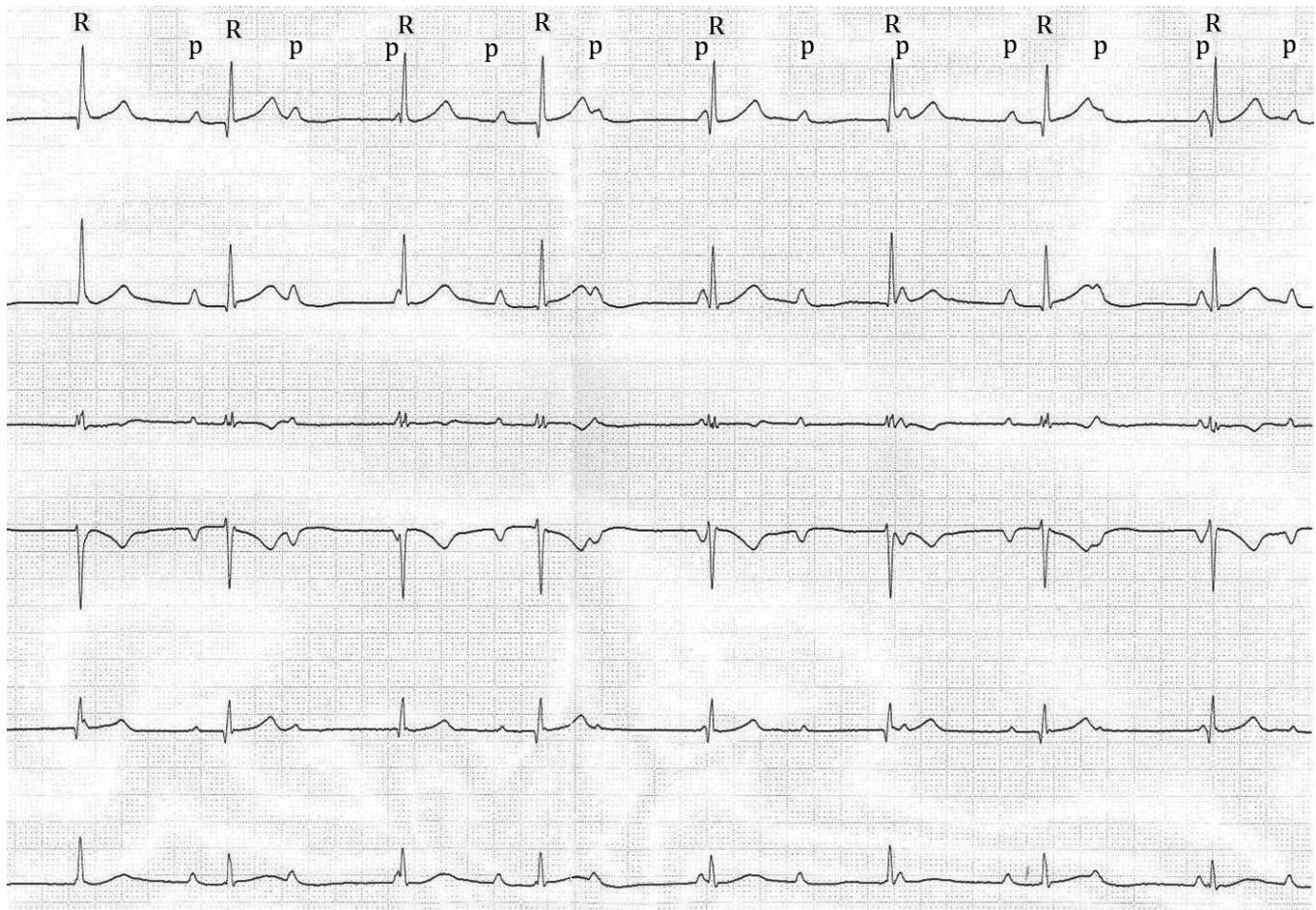


FIG. 1. Electrocardiogram showing complete atrioventricular block
P: P wave; R: R wave

milk products, it can also be transmitted through droplet infection or direct contact with infected animals (5). Cardiovascular involvement following from *Brucella* infection presents most frequently as endocarditis or myocarditis (1,4). It generally affects aortic valve, while mitral valve may be involved less frequently. Myocardial involvement and pericardial effusion are more frequent, especially in the setting of valvular involvement and these cases may require valvular replacement despite the long-term medical treatment (1). In a study from Spain, cardiac involvement has been identified in only 1.5% of 530 patients, whereas myocarditis and pericarditis were detected in only one case (6). Lulu et al. (7), in their study conducted in Kuwait, have detected cardiovascular involvement in 6 of 400 patients with brucellosis. However, *Brucella* infection rarely affects the conduction system of the heart. Electrocardiographic changes usually reflect involvement of the cardiac conduction system. Nonspecific ST-segment changes, T wave inversion, atrial fibrillation and complete right bundle branch block have been reported in the patients with *Brucella* infection (8,9). Only one adult case with complete AV block following *Brucella* infection was reported so far (3). As the medical records of local hospital showed a normal heart rate at the beginning of the disease and no cardiac dysfunction was determined with echocardiography, we thought that complete AV block detected in our case was probably not long-standing and may be associated with recent *Brucella* infection. Although we had started the treatment of infection in early phase of disease, the heart block did not resolve and required permanent pacemaker. This may indicate that *Brucella* infection may affect the conduction system with a different mechanism, such as an antigen–antibody interaction. To the best of our knowledge, our patient was the only pediatric case with complete AV block related to brucellosis.

Because cardiac failure and rhythm abnormalities are reported in the course of *Brucella* infection and may be associated with significant outcomes, cases with brucellosis should be evaluated carefully in terms of cardiac involvement. This report aimed to draw attention to complete AV block as an extremely rare complication of *Brucella* infection.

Ethics Committee Approval: N/A.

Informed Consent: Written informed consent was obtained from the parents of the patient presented in this report.

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