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A rare form of imported infectious heart block

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Abstract

Background: Chagas disease is endemic in the southern cone of Latin America and is becoming more prevalent in the United States with more than 300,000 people infected. It is an important cause of heart block worldwide, but is thought to be rare in the United States, and therefore easily overlooked. Heart block from Chagas disease often occurs in the young, and is permanent; therefore, early diagnosis and treatment is crucial. **Case report**: A 37-year-old woman from Bolivia presented with decreased exercise capacity and generalized fatigue. Her electrocardiogram revealed right bundle branch block escape rhythm. Her enzyme-linked immunosorbent assay for *Trypanosoma cruzi* was negative, but given the high level of suspicion, an immunofluorescent antibody assay was performed, which was diagnostic. She was treated with benznidazole and permanent pacemaker placement. **Conclusion**: Chagas disease is becoming more prevalent in the United States and other regions of the developed world. Patients presenting from an endemic area with suggestive symptoms require investigation to detect this diagnosis because therapy restores patients to full functional capacity in the short term; in the long term, the prognosis is uncertain but cardiac surveillance for progressive ventricular dysfunction, thrombosis, and tachyarrhythmia is indicated. Treatment with anti-trypanosomal agents should be offered to patients with chronic Chagas disease and a permanent pacemaker should be considered in symptomatic patients with bradycardia.

Keywords

Chagas disease; heart block; heart failure; *Trypanosoma cruzi*; infectious heart block; pacemaker.

Introduction

Chagas disease (CD) is a rare but important cause of heart block and heart failure in populations migrating from endemic areas. CD is endemic in South America and is becoming more prevalent in the United States. According to the Centers for Disease Control and Prevention (CDC), more than 300,000 people in United States are infected with *Trypanosoma cruzi*[1]. Heart block from CD is permanent and requires pacemaker placement. Serologic tests are available for diagnosing

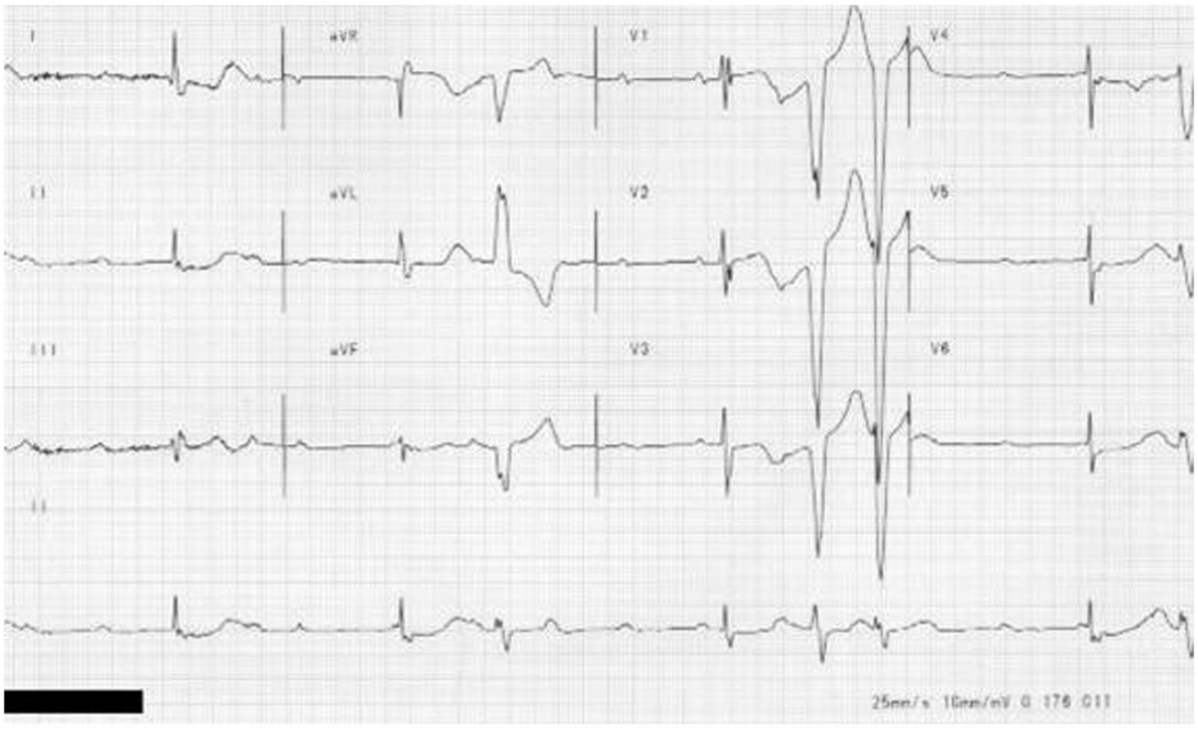

Fig. 1. Electrocardiogram: third degree atrioventricular block with right bundle branch block escape rhythm.

chronic CD but are not routinely considered given the low prevalence of the disease in the United States and they can give false-positive and false-negative results.

Case report

A 37-year-old Bolivian woman without any significant past medical history presented with 2 months of generalized fatigue and decreased exercise capacity. She described her symptoms as mild shortness of breath and fatigue. She had not experienced chest pain, palpitation, lightheadedness, fever or myalgia.

On examination, she appeared fatigued and had a heart rate of 36 beats per minute. Her cardiovascular examination was unremarkable except for the bradycardia. Chest, abdominal and neurologic examinations were normal. Her complete blood count, electrolytes and thyroid profile were unremarkable. Her electrocardiogram revealed right bundle branch block escape rhythm (Fig. 1). Lyme titer was negative. Given that the patient was from Bolivia, enzyme-linked immunosorbent assay (ELISA) for *T. cruzi* antibodies was checked, which returned negative, but as suspicion was very high, an immunofluorescent antibody assay (IFA) was performed, which returned positive. A transthoracic echocardiogram was obtained, which showed normal left ventricular function without any wall motion abnormality or valvular pathology. She was started on benznidazole and received a permanent dual chamber pacemaker. She remained symptom-free at follow up.

Discussion

This patient presented with third degree atrioventricular block secondary to chronic CD. CD is thought to be rare in the United States so not suspected enough and could be easily missed. Unlike other infectious causes, heart block due to CD is permanent.

CD is a protozoan infection due to *T. cruzi*, the most common vector being *Rhodnius prolixus*. About 10 million people carry the disease, and although most are living in the southern cone of south America, the CDC reports that 300,167 individuals with *T. cruzi* infection live in the United States and 30,000–45,000 of these have cardiomyopathy[1]. This estimate is based on the Pan American Health Organization (PAHO) data on country-specific estimates of the prevalence and

burden of *T. cruzi* infection and estimated number of immigrants from each country in the United States[1]. However, this may underestimate the real prevalence because American travelers who become infected during their visit to an endemic region are not included. Widespread blood bank screening for *T. cruzi* in donors confirmed infection in 37 states and Puerto Rico[2]. The PAHO estimates that approximately 60,000 new *T. cruzi* infections occur each year[3].

There are three different phases of CD: acute, intermediate and chronic. In the acute phase, the patient may be asymptomatic or may present with non-specific febrile illness, myocarditis or heart failure. Cardiac conduction abnormalities in the form of heart block and bundle branch blocks are seen in the chronic phase. It may also manifest in the form of tachyarrhythmia, bradyarrhythmia, heart failure, thromboembolism or sudden death. Heart failure in chronic CD is usually biventricular, but manifestation of right heart failure is more predominant. CD is associated with mural thrombi formation in (usually left) ventricular aneurysms, dislodging of which may result in a systemic or pulmonary embolic event. Sudden cardiac death due to ventricular tachycardia or third degree atrioventricular block is not uncommon in young populations in endemic countries.

In patients presenting from endemic areas with suggestive symptoms, investigations to detect underlying CD should be done. The acute phase is diagnosed by parasitemia or polymerase chain reaction. Serology tests remain negative for up to 2 weeks after the initial infection. A diagnosis of chronic infection requires serological methods to detect IgG antibodies to *T. cruzi*, most commonly ELISA and IFA. No available assay has sufficient sensitivity and specificity to be used alone. Two serological tests based on different antigens and/or techniques are used in parallel to increase the accuracy of the diagnosis. In our patient, the ELISA was negative initially, but given high suspicion, an IFA was performed, which returned positive. Further cardiac evaluation in the form of echocardiography, ambulatory monitoring, exercise testing or invasive electrophysiologic assessment may also be indicated depending on individual patient circumstances.

Treatment with benznidazole or nifurtimox should generally be offered to patients with acute *T. cruzi* infection, women in the reproductive age group and patients in the intermediate phase with mild to moderate cardiomyopathy. In addition, recent studies have shown some benefit of treating underlying infection in patients with chronic disease without heart failure[4]. Conduction abnormalities in CD are permanent and treatment of high grade arteriovenous block or bundle branch block(s) in symptomatic patients requires placement of a permanent pacemaker. An implantable cardioverter defibrillator should be considered in patients at high risk of sudden cardiac arrest. Treatment of heart failure in CD is similar to the general approach in left ventricular dysfunction from other causes but early consideration to the use of oral anticoagulation is warranted due to the high thromboembolic risk in patients with left ventricular aneurysm.

This case illustrates the importance of suspecting CD in patients presenting from an endemic area with suggestive symptoms. As the conduction abnormalities (heart block) secondary to CD are irreversible and a permanent pacemaker is required, early diagnosis is crucial. Furthermore, the diagnosis can be missed by false-negative serologic test results. It is vital to perform two or more serologic tests for confirmation in patients with high suspicion of disease. Antiparasitic treatment should be offered to patients even in the chronic phase of the disease without heart failure.

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