Title

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Case Report: Rapidly Progressing Chagas Cardiomyopathy

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Abstract. Chagas disease, caused by the parasite *Trypanosoma cruzi*, can cause a potentially life-threatening cardiomyopathy in approximately 10–40% of afflicted individuals. The decline in cardiac function characteristically progresses over the course of many years. We report a case of Chagas disease in which the patient experienced an atypical rapid deterioration to severe cardiomyopathy over the course of 16 months. This case argues the need for increased routine surveillance for patients with confirmed *T. cruzi* infection, who are determined to be at high-risk for worsening cardiomyopathy.

INTRODUCTION

Chagas disease, caused by the parasite *Trypanosoma cruzi*, can cause excessive morbidity and mortality through gastrointestinal involvement and potentially life-threatening cardiomyopathy.[1–3] The World Health Organization has placed the disease burden of Chagas as first among parasitic diseases in the Americas.[2] Although this disorder is predominantly seen in rural areas of Central and South America, the constantly expanding global community has brought Chagas disease to the forefront of non-endemic areas, particularly the United States and Europe.[3–5] Although the pathophysiology of the disease is not completely understood, the expected time course of the disease is well described.[5,6] The "acute" phase of Chagas disease typically lasts 8–12 weeks and is characterized by a nonspecific inflammatory reaction with spontaneous recovery in 90% of patients.[2,7] The subsequent latent, or "indeterminate," phase is defined as the lack of any clinical, radiographic, or electrocardiographic abnormalities and is only detectable by serologic testing.[7,8] Of these patients, approximately 10–40% will enter the "determinant" phase characterized by gastrointestinal involvement and/or myocardial dysfunction, typically occurring over a period of years or decades after the initial infection.[5,7] In this case report, we describe a patient with confirmed *T. cruzi* infection and a rapid decline of cardiac function as seen on serial echocardiograms over a course of 16 months.

CASE PRESENTATION

A 63-year-old El Salvadorian female with chronic kidney disease, hypertension, and hypothyroidism presented to our institution with shortness of breath and dyspnea on exertion. She was found to have an otherwise unexplained left anterior fascicular block on electrocardiogram and was diagnosed with Chagas disease via positive enzyme-linked immunosorbent assay and indirect fluorescent antibody tests. Transthoracic echocardiogram was obtained, which revealed mild diastolic dysfunction, mild apical dyskinesis, an estimated left ventricular ejection fraction of 55%, and an apical left ventricular aneurysm (Figure 1). The patient's electrocardiogram showed evidence of a left anterior fascicular block (Figure 2). The patient was consented for initiation of antiprotozoal therapy with nifurtimox, however she wished to delay treatment because of social reasons and was subsequently lost to follow-up.

Sixteen months after her initial presentation to our hospital, the patient was admitted with shortness of breath and dyspnea on exertion. She had not taken the provided nifurtimox because of concerns regarding side effects of the medication. Physical exam at the time of admission was largely unremarkable including no evidence of jugular venous distension, pulmonary rales, or lower extremity edema. Chest X-ray at the time of admission showed cardiomegaly and pulmonary vascular congestion. Initial laboratory data showed a b-type natriuretic peptide of 428.7 mg/dL (normal < 100 mg/dL), troponin of 0.031 mg/L (normal < 0.010, indeterminate = 0.029–0.299 mg/L), and creatinine at baseline of 1.45 mg/dL (< 1.3 mg/dL). Most notably, repeat transthoracic echocardiogram revealed severe global hypokinesis of the left ventricle with an estimated ejection fraction of 25%. Doppler measurements indicated moderate diastolic dysfunction. There was moderate dilation of the left atrium and left ventricle, and moderate tricuspid and mitral regurgitation. Estimated pulmonary arterial systolic pressure was 49 mmHg. Subsequent coronary angiography showed no flow-limiting coronary artery disease.

The patient underwent gentle diuresis with intravenous furosemide with improvement of her symptoms and a decrease of b-type natriuretic peptide to 79.8 mg/dL. The patient was discharged on maximally tolerated guideline-directed medical therapy including benazepril and carvedilol, in addition to furosemide and amiodarone. Indication for amiodarone is somewhat unclear from documentation, though likely initiated due to exhibited ectopy on continuous cardiac monitoring Given her marked decline in ejection fraction and observed ventricular ectopy, the patient underwent uncomplicated placement of a dual-chamber implantable cardioverter defibrillator (ICD) for primary prevention.

One year after initiation and adherence to guideline-directed medical therapy, her subsequent echocardiogram showed some improvement in left ventricular function with an estimated ejection fraction of 45%. Subsequently, the patient was readmitted once to our hospital for a congestive heart failure exacerbation secondary to medication noncompliance. Once optimized, she was discharged, and despite extensive counseling and outreach she was lost to follow-up. Four years after initial presentation the patient died in her home. Her death certificate listed ischemic coronary artery disease as the probable cause of death; however, the ICD could not be retrieved to establish whether a fatal arrhythmia had occurred, and the autopsy was not performed.

DISCUSSION

Tremendous efforts have been implemented to fight Chagas disease, as this has become the most significant parasitic illness

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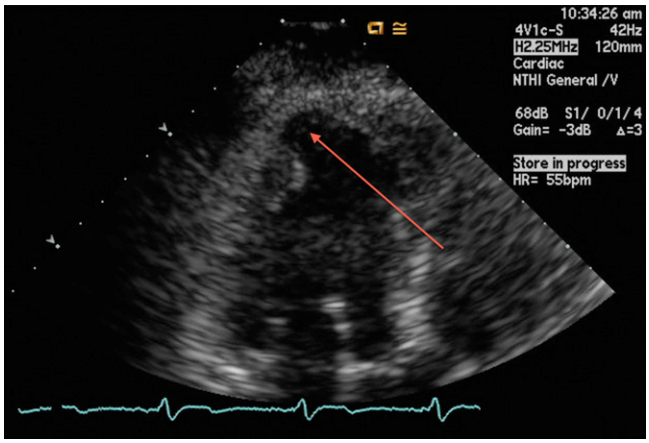

FIGURE 1. Transthoracic echocardiogram, apical long-axis view, demonstrating the apical aneurysm (arrow) characteristic of Chagas cardiomyopathy.

in the Americas, accounting for nearly five times as many disability-adjusted life years as malaria.[2] With an estimated 8 million individuals infected in the Americas alone and up to 40% of these patients advancing to the determinant phase of disease, Chagas disease has become a significant cause of potentially life-threatening cardiomyopathy.[1,2,7] With increasing globalization, there has been a growing presence of chronic Chagas cardiomyopathy in the developed world.[3] It is becoming increasingly important for clinicians in regions where immigration from endemic areas is prevalent to be familiar with the disease.

Chronic cardiomyopathy is the most prominent manifestation of Chagas disease, and it can contribute to sudden cardiac death through numerous mechanisms including thromboembolism, arrhythmias, heart failure, and stroke.[5,9] Although the expected time course of Chagas disease of years to decades is well described, the above case demonstrates that an accelerated course may be observed and can lead to increased morbidity and mortality, particularly among patients receiving limited surveillance.

With no formal guidelines for follow-up screening directed specifically at Chagas cardiomyopathy, it is left to the clinician to decide when each patient should undergo surveillance. As with the patient presented above, individuals may have no abnormal physical exam findings in the presence of significantly worsening cardiac function. It has been shown that several independent prognostic factors for mortality may be seen on echocardiogram, particularly left ventricular systolic dimension and ejection fraction, likely making this the most appropriate means for assessing cardiac function in Chagas patients.[3,10] Although it may not be feasible to provide regular, serial echocardiograms to all patients found to be seropositive for *T. cruzi*, it is important to identify those at increased risk for rapid progression of cardiomyopathy so that regular surveillance, more aggressive medical therapy, and/or ICD placement may be considered.[11–13]

CONCLUSION

Patients infected with *T. cruzi* should be monitored for the development of cardiac manifestations of Chagas disease. Although Chagas disease is typically a slowly progressing disease, this case demonstrates that rapid cardiovascular deterioration may occur. Among patients with initial echocardiographic evidence of a dilated cardiomyopathy, it may be prudent to screen those with risk factors for worsening cardiac function with more regular echocardiograms because abnormal findings may have prognostic value for adverse events and mortality. Those patients with coronary artery disease, poorly controlled hypertension, history of receiving

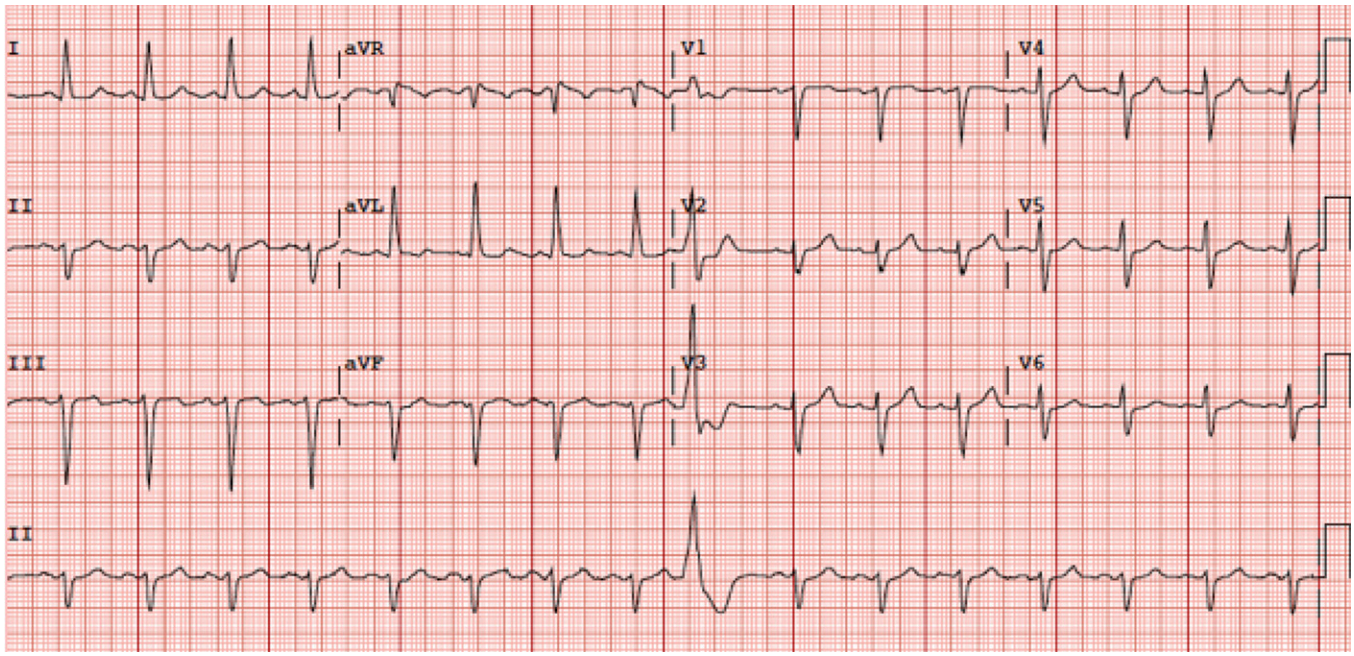

FIGURE 2. Twelve lead electrocardiogram demonstrating normal sinus rhythm and left axis deviation consistent with left anterior fascicular block.

specific chemotherapies (e.g., doxorubicin), or delayed initiation of antiprotozoal therapy may fall into this category.

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