High serum levels of T troponin (TnT) have been described in patients with nonischemic myocardiopathies as markers of myocardial damage. We aimed to determine whether a highly sensitive TnT assay could identify patients with early stage chronic Chagas disease cardiopathy. We studied 39 outpatients with a serologic diagnosis of Chagas disease by clinical examination, electrocardiogram and echocardiogram. Among all patients, 15 had no cardiac lesions, 15 showed only typical electrocardiographic changes, and nine had echocardiographic alterations. All TnT determinations were negative except in one patient in the latter group (1 out of 9; 11.11%). This patient had the lowest ejection fraction (29%) and had a left ventricular diastolic diameter of 77 mm. Thus, in the present study troponin T levels were not associated with early signs of myocardial damage in Chagas disease.

Key words: Chagas disease. Troponin. Myocardiopathy.
TnT values have been found in patients with heart failure of various etiologies, and its persistence seems to be associated with decreased survival in patients with idiopathic dilated cardiomyopathy.

The clinical value of serum TnT concentrations has not been assessed in chronic Chagas disease. The aim of this study was to determine whether elevated serum TnT values are associated with the presence of characteristic lesions of chagasic cardiomyopathy.

PATIENTS AND METHOD

Population

We studied 39 consecutive patients with positive serology for Chagas disease attended in the Cardiology Service of the Hospital de Privado de Córdoba in Argentina. All patients were clinically stable, none had been hospitalized for heart failure in the three months prior to inclusion in the study, and all were assessed on an outpatient basis. Diagnosis of Chagas disease was established according to the results of the following serological tests: enzyme-linked immunosorbent assay, indirect hemagglutination test (positive ≥1/28) and indirect immunofluorescence test (positive ≥1/32).

The following exclusion criteria were applied: history of ischemic heart disease, primary valve disease, use of cardiotoxic drugs, chronic renal insufficiency and surgery of any type in the previous 30 days. All patients underwent a clinical examination, 12-lead electrocardiography and bidimensional Doppler echocardiography. Patients were divided into three groups: indeterminate (IND) group, with no cardiac lesions; CCC-A group, with electrocardiographic alterations alone (sinus bradycardia <50 bpm, first-degree atrioventricular [AV] block, left anterior hemiblock, incomplete or complete right bundle branch block, permanent pacemaker, or combinations of these factors), and CCC-B group, with echocardiographic alterations, defined as left ventricular ejection fraction <50% and/or left ventricular diameter at end diastole equal to or greater than 56 mm. All patients gave informed consent for participation in the study.

RESULTS

Among the 39 patients studied, 15 showed no abnormality in the various studies performed (IND group). Of the remaining patients, 15 presented only characteristic electrocardiography alterations (CCC-A), and 9 showed alterations in left ventricular dimensions or contractility (CCC-B). Patient characteristics are summarized in Table 1. The most frequent electrocardiographic alterations in the CCC-A and CCC-B groups were complete right bundle branch block alone (40% and 11.11%, respectively) or combined with left anterior hemiblock (20% and 22.22%, respectively). The remaining patients presented sinus bradycardia (n=5), sinus bradycardia plus first-degree AV block (n=2), sinus bradycardia plus first-degree AV block and complete right bundle branch block (n=2), incomplete right bundle branch block (n=4) and permanent pacemaker (n=3).

Only one patient (from the CCC-B group) in the series presented an abnormal troponin T value consi-

| Table 1: Characteristics of the 39 patients with chronic Chagas disease |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| **Variable**                | **IND (n=15)**              | **CCC-A (n=15)**            | **CCC-B (n=9)**             |  
| Age, years                  | 56.27±7.35                  | 60.93±11.28                 | 61.22±17.95                 | .4833  
| Sex, men/women              | 2/13                       | 8/7                        | 6/3                        | .0171  
| Abnormal electrocardiograms, % | 0                          | 100                        | 88.89                      | <.0001  
| Left ventricular diameter at diastole, mm | 41.2±7.19                   | 44.16±6.39                 | 56.2±11.19                 | .0003  
| Left ventricular ejection fraction, % | 67±8.23                    | 62.4±8.23                  | 49.67±17.1                 | .0021  
| Troponin T, positive, %     | 0                          | 0                          | 11.11                      | .1808  

*IND significant differences as compared to CCC-A and CCC-B. **CCC-B significant differences as compared to IND and CCC-A.  
IND indicates indeterminate; CCC, chronic chagasic cardiomyopathy.  
Values are expressed as mean±SD.
ordered to be positive (0.029 ng/mL). All the other determinations were negative. The patient with the abnormal TnT value, classified as New York Heart Association functional class III, had the lowest left ventricular ejection fraction value (29%) and the largest left ventricular diameter at diastole (77 mm) of all the patients studied. Because of the low percentage of positive determinations, test results could not be expressed in terms of sensitivity and specificity.

**DISCUSSION**

In various studies carried out in patients with chronic heart failure using second generation assays for TnT determination, increased values were found in patients with acute left-ventricular dysfunction (mean ejection fraction 19%; range 14%-28%) and in patients hospitalized for non-chagasic heart failure. For both TnT and troponin I, correlations were found with severity of heart failure and decreased ejection fraction.

As in other types of heart disease, the slow progression of chagasic cardiomyopathy involves a process of myocardial remodeling. Histologically, however, it differs from other cardiomyopathies in certain aspects. In chagasic heart disease, there is a higher, denser accumulation of extracellular collagen surrounding the muscle fiber groups, and moderate to severe chronic inflammatory infiltrate is more frequent and follows a multifocal pattern. The presence of microvascular alterations, such as capillary and arteriolar dilation, can lead to local ischemia and fibrosis. Moreover, apoptosis of the cardiac muscle fibers does not occur as frequently as in other cardiomyopathies, and it has been suggested that the main mechanism of cell death may be necrosis. All these histologic markers are present, though at different levels of intensity, in all phases of the chronic stage of Chagas disease, even in the indeterminate. Since TnT is a cytosolic enzyme that is released with cell membrane damage, its serum values would be expected to be increased at any phase of the chronic period. Nevertheless, in our study using a highly sensitive test, only one patient with advanced chagasic cardiomyopathy presented elevated TnT concentrations.

In conclusion, serum TnT concentration appears to have little value as an early marker of myocardial lesion in patients with positive serology for Chagas disease.

**REFERENCES**


