Value of left ventricular longitudinal strain in predicting overt heart failure in patients with Chagas disease and preserved left ventricular ejection fraction


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Introduction: Speckle-tracking echocardiography (STE) is an established tool to detect early myocardial contractile impairment. In Chagas disease patients, STE may be helpful to identify subtle myocardial damage with the potential of progression to heart failure.

Purpose: This study aimed to assess the value of STE in predicting heart failure in Chagas disease patients with preserved left ventricular ejection fraction (LVEF).

Methods: Patients with Chagas disease living in endemic area who had preserved LVEF (>50%) were selected for the study. Clinical evaluation, B-type natriuretic peptide (NT-ProBNP), electrocardiogram (ECG), and echocardiogram were performed at enrollment in 2015 to 2016 and in the follow-up visit between 2018 and 2019. Global longitudinal strain (GLS) derived from STE was analyzed offline. Peak GLS was calculated as the mean value from 18 segments of the left ventricle (Figure 1). The outcome was development of heart failure defined by elevation of NT-ProBNP levels, categorized according to age-specific cut-points for heart failure at the second evaluation. Patients with abnormal NT-ProBNP at baseline or those who died between the 2 visits were not included.

Results: A total of 692 were enrolled, mean age was 58 ± 12 years and 495 (72%) were women. Mean LVEF at baseline and follow-up visits were 63.4 ± 4.6% and 59.8 ± 11.2% (p<0.001). The median [IQR] time between visit 1 and visit 2 was 5.4 [4.5 - 5.8] years. Among patients alive and attending the second visit, 48 patients (7%) developed overt heart failure with overall incidence rate of 14.1 events per 1000 patient-years (95% CI 10.4-18.6). On multivariable analysis, independent predictors of new-onset heart failure were male sex (OR 2.30, 95% CI 1.02-5.18), age (OR 1.04, 95% CI 1.01-1.07), QRS duration (OR 1.03, 95% CI 1.01-1.04), left atrial (LA) volume indexed (OR 1.05, 95% CI 1.01-1.09), and GLS (OR 0.90, 95% CI 0.81-0.98). LVEF did not remain in the model. The C-statistic of the final model was 0.80 (95% CI 71-88) showing a good discrimination.

Conclusions: In a cohort of patients with Chagas disease from remote areas with preserved ejection fraction, GLS was an important predictor of progression to overt heart failure, after adjustment for sex, age, QRS duration and LA volume. GLS was associated with further increased NT-ProBNP levels, which is useful to guide heart failure management, irrespective of systolic dysfunction.