

Total isovolumic time, a marker of global left ventricular dyssynchrony, predicts response to cardiac resynchronization therapy in heart failure patients with atrial fibrillation

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Background and Aim: Cardiac resynchronization therapy (CRT), based on broad QRS duration has proved successful for patients in late stage heart failure (HF), however almost 30% do not respond. Standard segmental Doppler echocardiographic measures of ventricular dyssynchrony are controversial in predicting response, particularly in atrial fibrillation (AF) patients. The aim of this study was to assess echo and clinical predictors of CRT response in AF patients.

Methods: We studied the response of 27 HF patients in AF (mean age 74 ± 7 years, 78% male) who fulfilled the guideli-

nes for CRT treatment; NYHA class III-IV, despite full medical therapy, QRS duration >120 ms and left ventricular (LV) ejection fraction (EF) <35%, using clinical assessment, NT-proBNP and Doppler echocardiographic examination. Global LV dyssynchrony was assessed by total isovolumic time - t-IVT in s/min [calculated as: 60 - (total ejection time + total filling time)], and Tei index (t-IVT/ejection time). Based on a reduction in the NYHA class and NT-proBNP after CRT, patients were divided into responders (R) and non-responders (NR).

Results: Thirteen (48%) of 27 patients were responders, who proved to have lower LVEF (p=0.02), longer t-IVT (p=0.000) and higher Tei index (p=0.03), before CRT compared with NR. All other clinical and echo parameters were not different between groups. Only prolonged t-IVT [0.690 (0.509-0.937), p = 0.02] independently predicted response to CRT. A t-IVT 11 s/min was 69% sensitive and 79% specific (AUC 0.78, p=0.015) in predicting CRT response.

Conclusion: Prolonged total isovolumic time, a marker of global LV dyssynchrony, is an independent predictor of CRT response in heart failure patients with atrial fibrillation who fulfill the guidelines criteria for CRT.

KEYWORDS: cardiac resynchronization therapy, heart failure, atrial fibrillation, echocardiography, total isovolumic time.

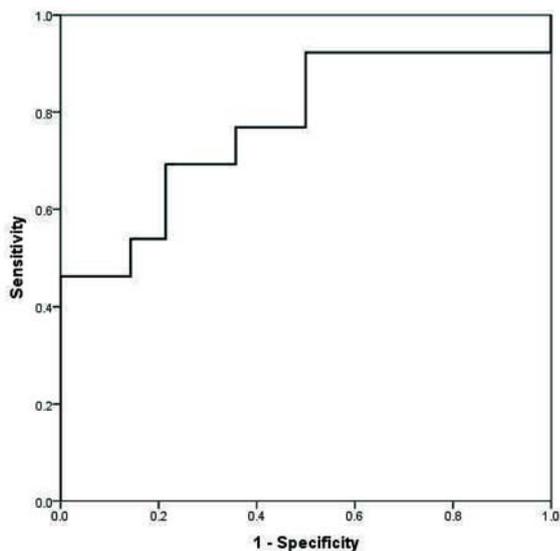


Figure 1. ROC-curve of t-IVT in predicting CRT response in patients with atrial fibrillation.

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