



ORIGINAL ARTICLE

Predictors of response to cardiac resynchronization therapy: A prospective cohort study



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KEYWORDS

Chronic heart failure;
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Predictors

Abstract

Introduction: Cardiac resynchronization therapy (CRT) has modified the prognosis of chronic heart failure (HF) with left ventricular systolic dysfunction. However, 30% of patients do not have a favorable response. The big question is how to determine predictors of response.

Aims: To identify baseline characteristics that might influence echocardiographic response to CRT.

Methods and Results: We performed a prospective single-center hospital-based cohort study of consecutive HF patients selected to CRT (NYHA class II-IV, left ventricular ejection fraction (LVEF) <35% and QRS complex ≥ 120 ms). Responders were defined as those with a $\geq 5\%$ absolute increase in LVEF at six months. Clinical, electrocardiographic, laboratory, echocardiographic, autonomic, endothelial and cardiopulmonary function parameters were assessed before CRT device implantation. Logistic regression models were used. Seventy-nine patients were included, 54 male (68.4%), age 68.1 years (standard deviation 10.2), 19 with ischemic etiology (24%).

At six months, 51 patients (64.6%) were considered responders. Although by univariate analysis baseline tricuspid annular plane systolic excursion (TAPSE) and serum creatinine were significantly different in responders, on multivariate analysis only TAPSE was independently associated with response, with higher values predicting a positive response to CRT (OR=1.13; 95% CI: 1.02-1.26; $p=0.020$). TAPSE ≥ 15 mm was strongly associated with response, and TAPSE <15 mm with non-response ($p=0.005$). Responders had no TAPSE values below 10 mm.

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PALAVRAS-CHAVE

Insuficiência cardíaca crónica;
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Respondedor;
Fatores preditivos

Conclusion: From a range of clinical and technical baseline characteristics, multivariate analysis only identified TAPSE as an independent predictor of CRT response, with TAPSE <15 mm associated with non-response. This study highlights the importance of right ventricular dysfunction in CRT response.

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Preditores de resposta à terapêutica de ressincronização cardíaca: estudo *cohort* prospetivo
Resumo

Introdução: A terapêutica de ressincronização cardíaca (CRT) modificou o prognóstico da insuficiência cardíaca (HF) com disfunção ventricular esquerda. Contudo, 30% dos doentes não são respondedores. A grande questão está em identificar preditores de resposta.

Objetivos: Identificar características basais que podem influenciar a resposta ecocardiográfica à CRT.

Metodologia e resultados: Estudo *cohort* prospetivo, unicêntrico, hospitalar, de doentes consecutivos com HF selecionados para CRT (classes II-IV NYHA, fração de ejeção ventricular esquerda <35% e QRS ≥120 msec).

Os respondedores foram definidos por aumento absoluto de fração de ejeção ventricular esquerda ≥5% aos 6 meses.

Antes da implantação do ressincronizador, foram avaliados parâmetros clínicos, eletrocardiográficos, laboratoriais, ecocardiográficos, autonómicos, endoteliais e funcionais cardiorrespiratórios. Utilizaram-se modelos de regressão logística.

Incluíram-se 79 doentes, 54 masculinos (68,4%), idade 68,1 (SD=10,2) anos, 19 isquémicos (24%). Aos 6 meses, consideraram-se respondedores 51 doentes (64,6%). Apesar de, por análise univariável, a excursão sistólica do plano do anel tricúspide (TAPSE) e a creatinina sérica serem significativamente diferentes nos respondedores, em análise multivariável, apenas TAPSE foi independentemente associada a resposta, sendo valores superiores preditivos de resposta positiva à CRT (OR=1,13; 95% CI: 1,02-1,26; p=0,020). A TAPSE ≥15 mm teve forte associação com resposta, enquanto TAPSE <15 mm a não resposta (p=0,005). Respondedores não tiveram valores de TAPSE inferiores a 10 mm.

Conclusão: De um conjunto de características basais clínicas e técnicas, a análise multivariável apenas identificou TAPSE como preditor independente de resposta a CRT, associando TAPSE <15 mm a não resposta. Este estudo destaca a importância da disfunção ventricular direita na resposta à CRT.

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Introduction

Cardiac resynchronization therapy (CRT) was developed as a treatment for heart failure (HF), and is effective in improving left ventricular (LV) function, with significant impact on the prognosis of symptomatic patients with advanced LV dysfunction and wide QRS.¹

Since 2001, the benefits of CRT in terms of reverse remodeling and improvements in symptom severity, quality of life, hospitalization and survival have been clearly demonstrated in randomized controlled clinical trials, as shown in reviews.² However, despite well-defined selection criteria, the CRT non-response rate, which reaches 30-40% in major trials, still represents a major concern.

Different variables have been studied to determine markers that might predict CRT response.³⁻¹² Echocardiographic measures of ventricular dyssynchrony, for example, cannot identify responders.¹²

Identifying genuine predictors of CRT non-response remains a challenge.

Aim

The study's main purpose was to assess the baseline variables that might significantly influence an echocardiographic response to CRT in HF.

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