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ORIGINAL ARTICLE

Incidence of ventricular arrhythmias in patients with severe left ventricular systolic dysfunction: is there a benefit after cardiac resynchronization therapy?☆

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KEYWORDS
Cardiac resynchronization therapy;
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Abstract
Introduction: Cardiac resynchronization therapy (CRT) has significant benefits in selected patients, but its impact on the incidence of ventricular tachyarrhythmias remains the subject of debate. We analyzed the occurrence of appropriate therapies in patients undergoing CRT combined with an implantable cardioverter-defibrillator (ICD).
Methods: We studied 123 patients with left ventricular ejection fraction (LVEF) <35%, who underwent successful implantation of CRT-ICD or ICD alone (primary prevention).
Results: Mean age was 63±12 years, LVEF 25±6%, and median follow-up 372 days. CRT-ICD devices were implanted in 63 patients (group A) and ICD alone in 60 (group B). In Group A 86% were clinical responders, with a lower prevalence of ischemic cardiomyopathy (30% vs. 72%), and more patients in NYHA class III before device implantation (90% vs. 7%) compared to those with ICD alone. There were no differences in the incidence of appropriate therapies (19% vs. 12%) or in the time to first therapy (305 days vs. 293 days). Overall mortality was 11% in group A and 12% in group B. Kaplan-Meier curves for arrhythmic events in patients with CRT showed no significant differences (HR 1.71, 95% CI 0.67-4.36, p=NS) compared to those without CRT.
Conclusions: Despite a higher rate of responders in patients with CRT-ICD for primary prevention, the incidence of appropriate therapies was similar to those with an ICD alone.

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PALAVRAS-CHAVE
Terapêutica de ressincronização cardíaca;
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Incidência de arritmias ventriculares em doentes com disfunção sistólica ventricular esquerda grave: existe benefício após terapêutica de ressincronização cardíaca?

Resumo
Introdução: A terapêutica de ressincronização cardíaca (TRC) tem benefícios significativos em doentes seleccionados. O impacto desta modalidade na incidência de taquidisritmias ventriculares permanece controverso. Analisámos a ocorrência de terapêuticas apropriadas em doentes submetidos a TRC combinada com cardioversor-desfibrilhador (CDI).
Métodos: Estudo de 123 doentes com fracção de ejecção ventricular esquerda (FEVE) <35%, submetidos a implantação com sucesso de TRC-CDI ou CDI isoladamente (prevenção primária).
Resultados: Idade média foi 63±12 anos, FEVE de 25±6%, seguimento mediano de 372 dias. Implantou-se TRC-CDI em 63 doentes (grupo A) e CDI isoladamente em 60 doentes (grupo B). No grupo A tivemos 86% de respondedores clínicos, menor prevalência de cardiomiopatia isquémica (30% *versus* 72%), e mais doentes em classe III da NYHA antes da implantação do dispositivo (90% *versus* 7%) comparativamente com o grupo com CDI isoladamente. Não se identificaram diferenças relativamente à incidência de terapêuticas apropriadas (19% *versus* 12%) ou no tempo para a primeira terapêutica (305 dias *versus* 293 dias). A mortalidade total foi de 11% no grupo A e de 12% no grupo B. As curvas de Kaplan-Meier para eventos arrítmicos em doentes com TRC, não mostraram diferenças significativas (HR 3,02, IC 95% 0,82 – 11,09, p=NS) comparativamente com doentes sem TRC.
Conclusões: Em doente submetidos a TRC-CDI por prevenção primária, apesar da elevada taxa de respondedores, a incidência de terapêuticas apropriadas não foi diferente do obtido em doentes com CDI isoladamente.

Introduction

The benefits of implantable cardioverter-defibrillators (ICDs) for prevention of sudden cardiac death (SCD) have been demonstrated in various clinical trials.[1–4] The prevalence of heart failure (HF) ranges between 5 and 10% in Europe, with high long-term mortality due to worsening left ventricular (LV) function, as well as SCD.[5] ICDs have been shown to be effective in terminating malignant ventricular arrhythmias and preventing SCD in patients with impaired LV function, improving the survival of high-risk patients but not their quality of life or HF symptoms.[3,4] Cardiac resynchronization therapy (CRT) can improve hemodynamic parameters and HF symptoms, reduce hospitalizations for decompensated HF, promote LV reverse remodeling and decrease mortality.[6,7] It is, however, less clear whether CRT has an impact on the prevalence of ventricular arrhythmias. Although in theory LV reverse remodeling after CRT may help reduce their incidence, the rate of SCD remains high in patients treated by CRT alone. In the first report from the Cardiac Resynchronization-Heart Failure (CARE-HF) study, CRT did not reduce the rate of SCD in the first 29 months of follow-up (CRT: 35% vs. medical therapy alone: 32%),[7,8] while in the Comparison of Medical Therapy, Pacing, and Defibrillator in Heart Failure (COMPANION) trial, CRT with defibrillator back-up (CRT-ICD) led to lower overall mortality and SCD, which suggests that ventricular arrhythmias may be the cause of death in some patients undergoing CRT.[9]

Many patients who receive CRT are also candidates for an ICD, and it is therefore common to implant a combined CRT-ICD device. The present study aimed to analyze the clinical outcomes and incidence of ventricular tachycardia or fibrillation (VT/VF) in HF patients treated with CRT-ICD.

Methods

We retrospectively studied 123 consecutive patients, with no previously documented VT/VF, who underwent implantation of CRT-ICD or ICD alone in our institution. All patients met Class I criteria according to the AHA/ACC/NASPE/ESC guidelines at the time of implantation. Only patients with LV ejection fraction (LVEF) <35% and indication for primary prevention were included. Sixty patients with ICD alone were compared with 63 with CRT-ICD. All gave their informed consent for implantation of an ICD or CRT-ICD. Prescription of beta-blockers and amiodarone was based on the clinical judgement of the attending physician. Non-ischemic dilated cardiomyopathy was diagnosed after exclusion of significant stenosis of one or more coronary arteries.

The patients were routinely followed in the ICD clinic every 3-4 months, or earlier in cases of spontaneous ICD therapy or syncope, to interrogate the device and download the stored electrograms. Follow-up was at least 6 months in all patients. The incidence of appropriate therapies was assessed by two experienced electrophysiologists on the basis of the stored electrograms. Appropriate therapies were defined as antitachycardia pacing (ATP) or shocks due to sustained VT/VF. All data were entered in a database from the time of implantation. Patients with CRT-ICD were considered clinical responders if they presented sustained improvement of at least one NYHA functional class. Reverse