



ORIGINAL ARTICLE

Triple-site pacing for cardiac resynchronization in permanent atrial fibrillation – Acute phase results from a prospective observational study



Pedro Marques*, Miguel Nobre Menezes, Gustavo Lima da Silva, Ana Bernardes, Andreia Magalhães, Nuno Cortez-Dias, Luís Carpinteiro, João de Sousa, Fausto J. Pinto

Cardiology Department, University Hospital Santa Maria, Centro Hospitalar de Lisboa Norte, CCUL, University of Lisbon, Portugal

Received 28 October 2015; accepted 20 December 2015
Available online 30 May 2016

KEYWORDS

Cardiac resynchronization therapy;
Multi-site pacing;
Triple-site pacing;
Heart failure;
Atrial fibrillation;
Cardiac output;
QRS duration;
Ejection fraction

Abstract

Introduction and Aim: Multi-site pacing is emerging as a new method for improving response to cardiac resynchronization therapy (CRT), but has been little studied, especially in patients with atrial fibrillation. We aimed to assess the effects of triple-site (Tri-V) vs. biventricular (Bi-V) pacing on hemodynamics and QRS duration.

Methods: This was a prospective observational study of patients with permanent atrial fibrillation and ejection fraction <40% undergoing CRT implantation (n=40). One right ventricular (RV) lead was implanted in the apex and another in the right ventricular outflow tract (RVOT) septal wall. A left ventricular (LV) lead was implanted in a conventional venous epicardial position. Cardiac output (using the FloTrac™ Vigileo™ system), mean QRS and ejection fraction were calculated.

Results: Mean cardiac output was 4.81 ± 0.97 l/min with Tri-V, 4.68 ± 0.94 l/min with RVOT septal and LV pacing, and 4.68 ± 0.94 l/min with RV apical and LV pacing ($p < 0.001$ for Tri-V vs. both BiV). Mean pre-implantation QRS was 170 ± 25 ms, 123 ± 18 ms with Tri-V, 141 ± 25 ms with RVOT septal pacing and LV pacing and 145 ± 19 ms with RV apical and LV pacing ($p < 0.001$ for Tri-V vs. both BiV and pre-implantation). Mean ejection fraction was significantly higher with Tri-V ($30 \pm 11\%$) vs. Bi-V pacing ($28 \pm 12\%$ with RVOT septal and LV pacing and 28 ± 11 with RV apical and LV pacing) and pre-implantation ($25 \pm 8\%$).

Conclusion: Tri-V pacing produced higher cardiac output and shorter QRS duration than Bi-V pacing. This may have a significant impact on the future of CRT.

© 2016 Sociedade Portuguesa de Cardiologia. Published by Elsevier España, S.L.U. All rights reserved.

* Corresponding author.

E-mail address: pedronmarques@gmail.com (P. Marques).

PALAVRAS-CHAVE

Terapêutica de resincronização cardíaca;
Pacing multi-site;
Pacing triple-site;
 Insuficiência cardíaca;
 Fibrilhação auricular;
 Débito cardíaco;
 Duração QRS;
 Fração de ejeção

***Pacing triple-site* para resincronização cardíaca na fibrilhação auricular permanente – resultados da fase aguda de um estudo prospetivo observacional**
Resumo

Introdução e objetivo: O *pacing multi-site* está a emergir como um novo método de resincronização cardíaca. Todavia, foi pouco estudado, sobretudo em fibrilhação auricular. Este estudo visa aferir o efeito hemodinâmico e na duração do QRS de *pacing* Tri-V versus Bi-V. **Métodos:** Estudo prospetivo observacional de doentes com fibrilhação auricular permanente e fração de ejeção < 40% submetidos a implantação de CRT (n=40). Implantou-se um eletrocaterter direito no ápex, outro na parede septal do trato de saída direito e outro em posição venosa epicárdica esquerda convencional. Calcularam-se o débito cardíaco (usando o sistema Vigileo Flotrac®), o QRS médio e a fração de ejeção.

Resultados: O débito cardíaco médio foi $4,81 \pm 0,97$ L/min em Tri-V, $4,68 \pm 0,94$ L/min com *pacing* septal e esquerdo e $4,68 \pm 0,94$ L/min com *pacing* apical e esquerdo ($p < 0,001$ para Tri-V versus ambos BiV). O QRS pré-implantação médio foi 170 ± 25 ms, 123 ± 18 ms em Tri-V, 141 ± 25 ms em *pacing* septal e esquerdo e 145 ± 19 em *pacing* apical e esquerdo ($p < 0,001$ para Tri-V versus ambos BiV e pré-implantação). A fração de ejeção média foi estatisticamente superior em Tri-V ($30 \pm 11\%$) versus Bi-V ($28 \pm 12\%$ em *pacing* septal e esquerdo e $28 \pm 11\%$ em *pacing* apical e esquerdo), e versus pré-implantação ($25 \pm 8\%$).

Conclusão: O *pacing* em Tri-V produziu um débito cardíaco superior e QRS mais estreito do que em Bi-V. Estes resultados poderão modificar o futuro da terapêutica de resincronização.

© 2016 Sociedade Portuguesa de Cardiologia. Publicado por Elsevier España, S.L.U. Todos os direitos reservados.

List of abbreviations

AF	atrial fibrillation
AV	atrioventricular
Bi-V	biventricular pacing
CRT	cardiac resynchronization therapy
ECG	electrocardiographic
EF	ejection fraction
LV	left ventricular
NYHA	New York Heart Association
RV	right ventricular
RVOT	right ventricular outflow tract
Tri-V	triple-site ventricular pacing

Introduction

Cardiac resynchronization therapy (CRT) is an established therapy for patients with drug-refractory heart failure and electrical evidence of dyssynchrony. Several large clinical trials have demonstrated that biventricular (Bi-V) pacing significantly reduces all-cause mortality and heart failure-related hospitalizations and symptoms, and improves quality of life, exercise tolerance and left ventricular (LV) systolic performance.¹ However, even when appropriately selected, 20-30% of patients do not respond to CRT. This may be due to incomplete resynchronization, as intraventricular and inter-ventricular dyssynchrony can persist in 25-30% of patients despite CRT.² For such non-responders, multi-site and multi-point pacing are emerging as new methods of CRT. The

few previously published studies regarding these novel pacing modalities have shown improved LV hemodynamics and synchrony.³⁻⁶ However, doubts remain concerning their indications and short-term and long-term efficacy and safety, and thus the optimal method of resynchronization remains unknown.

In the subgroup of patients with atrial fibrillation (AF), no fewer than 23% of all those with implanted CRT devices,⁷ studies are still scarce, and these patients are particularly challenging. However, currently available evidence suggests CRT may be of benefit. A meta-analysis⁸ of prospective cohort studies comparing response to CRT in patients with sinus rhythm vs. AF showed not only that CRT was beneficial in both groups, but also that the AF group performed better in terms of reverse remodeling (assessed as improvement in ejection fraction [EF]), albeit with worse functional outcomes. Because achieving high levels of pacing is harder in patients with AF, there is evidence that atrioventricular (AV) junction ablation may further enhance CRT response and improve not only remodeling response but also functional outcomes.⁹ Interestingly, there is evidence that even AF patients without severely depressed EF, prolonged QRS or severe heart failure (i.e. in New York Heart Association [NYHA] class \leq II) may benefit from CRT. A randomized trial¹⁰ assessing patients who underwent AV junction ablation due to severely symptomatic permanent AF showed that CRT was more beneficial than conventional right ventricular (RV) apical pacing both in patients who met the current recommendations for CRT implantation regarding EF, QRS duration and functional class and in those who did not. Finally, only one trial of multi-site pacing has been undertaken in the subgroup of AF patients,¹¹ with good results.

Download English Version:

<https://daneshyari.com/en/article/1125561>

Download Persian Version:

<https://daneshyari.com/article/1125561>

[Daneshyari.com](https://daneshyari.com)