# Don't Just Fit and Forget: Incremental Benefit of Optimisation of Medical Therapy Post Cardiac Resynchronization Therapy

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## Introduction

Cardiac resynchronization therapy (CRT) is recommended for suitable patients with heart failure (HF) who continue to be symptomatic despite optimal medical therapy (OMT).[1] In reality, only a minority of patients are able to tolerate target dosages of guideline directed medical therapy (GDMT) prior to receiving CRT.[2] Common reasons for the same include low blood pressure, bradycardia, pauses, kidney injury or a combination of these factors.[2] The aim was to assess whether a review by the heart failure team (HFT) post CRT resulted in further optimisation of medical therapy. The effect of this intervention on hospitalisation for HF, incidence of ventricular arrhythmias and mortality was also assessed.

## Materials and methods

A retrospective analysis of records of consecutive patients undergoing CRT implantation [n=83, CRT - Defibrillator 70/83 (84.3%), CRT - pacemaker 13/83 (15.7%)] between March 2017 and February 2019. Follow-up duration was 12 months. Baseline medical therapy prior to CRT was assessed. Patients reviewed by the HFT within six months of receiving CRT were compared with those who were not. Optimisation was defined as upward adjustment of dosages of GDMT or introduction of a new disease-modifying drug that patient was not initially suitable for pre-CRT. Statistical analyses were performed using IBM SPSS statistics 20.0 (SPSS Inc.). Continuous variables were expressed as mean ± standard deviation (SD) while categorical variables were expressed as proportions. Chi-squared test and Mann–Whitney U test were used for comparing categorical and continuous variables respectively.

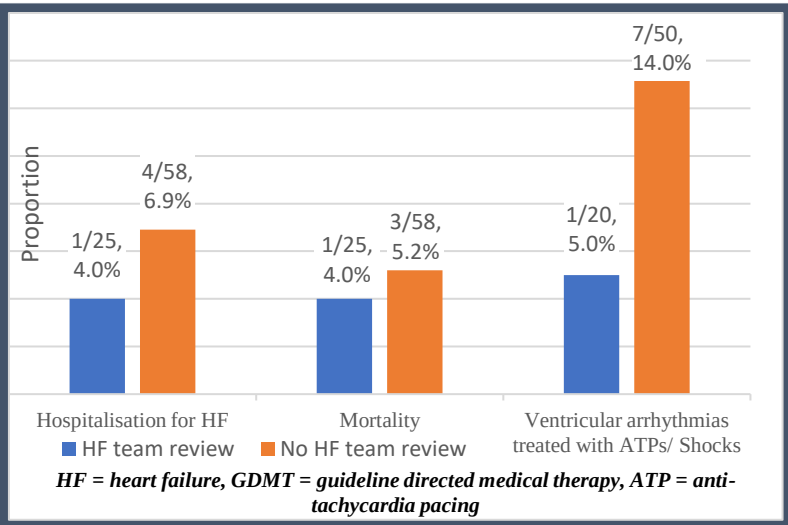
## Results

Mean age: 71.1 ± 11.1 years; males (58/83, 70%). Prior to CRT, the proportion of those on target dosages of angiotensin inhibitors, betablockers, mineralocorticoid receptor antagonist and sacubitril-valsartan were 27.7% (23/83), 24.0% (20/83), 8.4% (7/83) and 6.0% (5/83) respectively. The baseline characteristics including response to CRT were similar between those reviewed by the HFT within 6-months and those not reviewed by the HFT. Almost a third of those reviewed by the HFT had their medication optimised unlike the comparator group with only 7% having their medications optimised (Table 1). Beta-blocker was the most optimised medication. The proportion of patients experiencing ventricular arrhythmias (VTs) treated by the device, hospitalisation for HF and mortality was higher amongst those not reviewed by the HFT (figure 1).

**Table 1. Baseline Characteristics and OMT between those reviewed and those not reviewed by the HFT within 6-months post CRT.**

| Parameters | HFT-R N = 25 | No HFT-R N = 58 | *p*-value |
|---|---|---|---|
| ***Baseline characteristics/ response to CRT*** | | | |
| **Age, years (SD)** | 69.2 (14.5) | 71.9 (9.2) | 0.619 |
| **Male sex, n, (%)** | 19 (76.0) | 39 (67.2) | 0.425 |
| **HTN, n, (%)** | 10 (40.0) | 17 (29.3) | 0.340 |
| **DM, n, (%)** | 10 (40.0) | 12 (20.7) | 0.067 |
| **AF, n, (%)** | 7 (28.0) | 13 (22.8) | 0.614 |
| **eGFR, ml/min/m² (SD)** | 61.2 (23.1) | 62.1 (17.9) | 0.929 |
| **Cardiomyopathy** | | | |
| **Ischaemic, n, (%)** | 14 (56.0) | 29 (50.0) | 0.604 |
| **Dilated, n, (%)** | 11 (44.0) | 25 (43.1) | |
| **Others, n, (%)** | 0 (0.0) | 4 (6.8) | |
| **CRT type** | | | |
| **CRT-D** | 20 (80.0) | 50 (86.2) | 0.475 |
| **CRT-P** | 5 (20.0) | 8 (13.8) | |
| **EF pre-CRT, n, (%)** | 25.4 (5.7) | 26.1 (7.4) | 0.598 |
| **EF post-CRT, n, (%)** | 34.3 (6.9) | 33.3 (9.6) | 0.667 |
| **CRT-responder, n, (%)** | 19 (76.0) | 44 (75.9) | 0.989 |
| ***Optimisation of medical therapy (OMT) within 6-months post CRT*** | | | |
| **OMT done, n, (%)** | 18 (72.0) | 4 (6.9) | <0.0001 |
| **No OMT, n, (%)** | 7 (28.0) | 54 (93.1) | |

HFT-R within 6-months post CRT, HTN = hypertension, DM = diabetes mellitus, AF = atrial fibrillation, eGFR = estimated glomerular filtration rate, CRT-D = cardiac resynchronization therapy – defibrillation, CRT-P = cardiac resynchronization therapy – pacemaker




***HF = heart failure, GDMT = guideline directed medical therapy, ATP = anti-tachycardia pacing***

**Figure 1. A 12-month outcome measures between those reviewed and those not reviewed by the heart failure team.**

## Discussion

The low proportion of patients on target dosages of GDMT is a reflection of the difficulty attaining the optimal recommended dosages prior to CRT.[3] Our findings show that in a vast majority of patients there is room for optimisation of GDMT post CRT. This may be because of an improvement in BP following CRT as found in the COMPANION and CARE-HF trials.[4,5] It may also be from protection against bradycardia, sinoatrial nodal pauses and slowing of atrio-ventricular conduction offered by CRT.[2] The difference in VTs between the two study groups may have resulted from the higher proportion of beta blocker optimisation amongst those reviewed by the HFT. Background severity of HF, response to CRT, short duration of follow-up and other comorbid conditions may have contributed to the attenuation of differences in other clinical outcomes observed between the study groups.

## Conclusion

We strongly recommend that all patients receiving CRT should have their medications optimised post implant. In view of their expertise, this is best done by the HFT as attaining target dosages of GDMT remains a cornerstone of heart failure treatment, favourably influencing symptoms as well as possible prognosis.

## References

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