



# OPTIMAL PERCENTAGE OF BIVENTRICULAR PACING TO OBTAIN CRT RESPONSE: HOW HIGH IS HIGH ENOUGH?

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## Background

The greatest benefit with cardiac resynchronization therapy (CRT) is achieved when biventricular pacing (BivP) percentage (%) is close to 100%. However, in some patients that goal can be challenging to obtain.

## Purpose

Determine whether a lower BivP% could lead to similar outcomes in terms of CRT response and events, as compared with patients with BivP% more than 98%.

## Methods

- Patients with CRT followed up in a remote-monitoring network were retrospectively analyzed. BivP% was assessed and response to CRT was defined as an absolute increase in left ventricle (LV) ejection fraction (EF) >5% or a relative increase in LVEF >15%.
- Low BivP% was defined as <98%.
- Clinical, echocardiographic data and all-cause death at follow-up were evaluated.
- ROC curve and AUC were obtained to determine the discriminative power of BivP% as predictor of CRT response. Optimal cut-point value was obtained and patients were divided according to this value. Kaplan-Meier survival function was used to compare survival in the different groups and the Log-rank test was used for comparison.

## Results

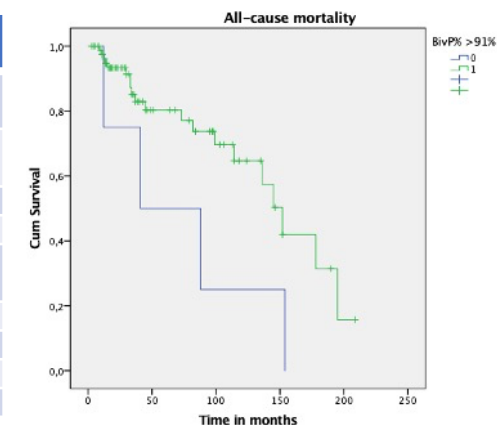
- **88 patients, 76% male, median age 73.5** (IQR 65.75-79.25) years had an implanted CRT device, with defibrillator capacity in 69%. Etiology was **ischemic in 44%** and idiopathic in 38% patients.
- **Median LVEF before CRT was 27%** (IQR 20.25-32) and median LVEDV was 201 mL (IQR 160-236.5).

## Results

- **44 patients (50%) had low BivP% (median 91%, IQR 96-99)** during follow-up, 55% due to AF and 52% due to frequent PVC's.
- AV node ablation was performed in 11 patients and AF ablation in 2 patients.
- **After optimization** of medical therapy, device programming and/or interventional procedures, we obtained a **BivP >98% in 26 out of the 44 patients (59%)**. However, in **18 patients (20%) BivP% was <98% (median 95, IQR 92.25-96)**. **66% patients were CRT responders**.
- Median follow-up was 36 (IQR 23.75-84) months. During follow-up, **11 (13%) patients were hospitalized for HF and mortality was 27% (24 patients)**.

**Optimal cut-point value for predicting CRT response was 91% BivP% (AUC 0.644, p-value 0.047, 95% CI 0.496-0.792).** The characteristics of the two groups **didn't differ significantly** (Table). **Survival was significantly higher in patients with BivP%>91%** (Log-rank 3.667, p-value 0.050).

|                               | BivP <91%<br>(n=4)  | BivP >91%<br>(n=84) | p-value |
|-------------------------------|---------------------|---------------------|---------|
| BivP%, median (IQR)           | 85 (62.5-88.75)     | 99 (98-100)         | 0.001   |
| Age in years, median (IQR)    | 72.50 (70.50-73.75) | 74.00 (65.00-80.00) | 0.666   |
| CRT-D, n (%)                  | 3 (75.0)            | 58 (69.0)           | 0.999   |
| Ischemic cardiopathy, n (%)   | 3 (75.0)            | 35 (41.7)           | 0.311   |
| LVEF before CRT, median (IQR) | 27 (19-39)          | 27 (20-32)          | 0.795   |
| Beta-blockers, n (%)          | 4 (100.0)           | 78 (95.1)           | 0.999   |
| Antiarrhythmic drugs, n (%)   | 2 (50.0)            | 34 (41.5)           | 0.999   |
| AV-node ablation, n (%)       | 0 (0.0)             | 11 (13.1)           | 0.999   |
| AF history, n (%)             | 2 (50.0)            | 59 (70.2%)          | 0.583   |



## Conclusion

In this population, a **biventricular pacing >91% was sufficient to achieve CRT-response and was associated with a better survival.**