# Shorter PR Intervals Lead To Greater Improvement In Right Ventricular Function After CRT With Left Ventricular Pacing

Xu Gao, MD, MS, Abdishektaei Mohammad, MSc, Pamela K.. Mason, MD, FHRS, Andrew E.. Darby, MD, Rohit Malhotra, Nishaki Mehta, MD, Oliver J. Monfredi, MBChB, PhD, Mike Mangrum, MD, Michael Salerno, MD, PHD, Frederick Epstein, PhD, Christopher Kramer, MD and Kenneth C. Bilchick, MD, MS, FHRS.
University of Virginia Health System, Charlottesville, VA

## Background

- Tailoring cardiac resynchronization therapy (CRT) pacing strategies, such as synchronized left ventricular pacing (SLVP) or biventricular pacing, for individual patients could facilitate a more personalized approach to CRT pacing and improve outcomes
- In this study, we evaluate whether differences in PR interval influences the optimal pacing strategy in each patient based on cardiac magnetic resonance (CMR) assessments of LV and RV function.
- We hypothesize that a shorter PR interval may be associated with a better improvement in RV function with SLVP as this would avoid RV pacing and allow for more effective fusion of LV pacing with intrinsic conduction from the right bundle branch.

## Methods

- Patients with chronic systolic HF, LVEF ≤ 35% and with a class I or IIA indication underwent CRT implantation.
- CMR was obtained before CRT and 6 months after CRT
- PR and QRS durations were measured on 12 lead ECGs obtained prior to CRT.
- During the post-CRT scan, CMR parameters were assessed in multiple pacing modes.

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Email for corresondence: xg6nc@virginia.edu

## Results

- In 40 patients, 24 (60%) had an improvement in LV function and 17 (42%) had an improvement in RV function 6 months after CRT as assessed by CMR.
- In the LV pacing mode, patients with shorter PR intervals had greater improvements in the RVEF post-CRT (r=0.36, p=0.04; Figure), as well as in the LVEF (p=0.067 after adjustment) (Figure 1).
- In contrast, during biventricular pacing, the PR interval was not significantly associated with CMR-derived improvements in the RVEF or LVEF (Figure 2).
- A shorter PR interval was still associated with RVEF improvement after adjustment for the baseline RVEF (p=0.017).

**Table 1. Demographic and Clinical Characteristics, n = 40**

| | |
|---|---|
| Age (years), mean ± SD | 68.2 ± 10 |
| Gender female, no. (%) | 21 (53%) |
| Ischemic Cardiomyopathy, no. (%) | 19 (48%) |
| Diabetes Mellitus, no. (%) | 13 (33%) |
| Hypertension, no. (%) | 16 (40%) |
| PR Interval (ms), mean ± SD | 170 ± 29 |
| QRS Duration (ms), mean ± SD | 153 ± 18 |
| Bundle Branch Block Morphology | |
| LBBB, no. (%) | 28 (70%) |
| RBBB, no. (%) | 7 (18%) |
| IVCD, no. (%) | 5 (2%) |
| LVEDV (mL), mean ± SD | 112.6 ± 37 |
| LVESV (mL) , mean ± SD | 84.8 ± 35 |
| LVEF (%), median (IQR) | 28 (21-32) |

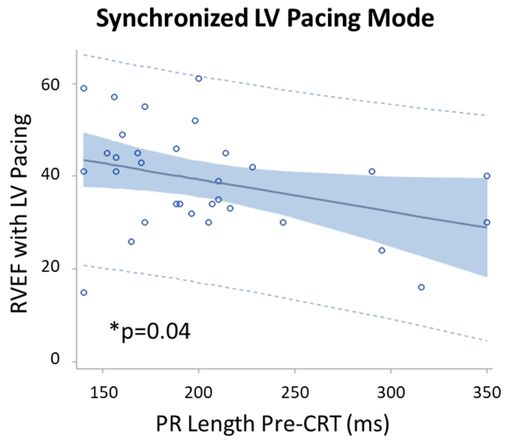
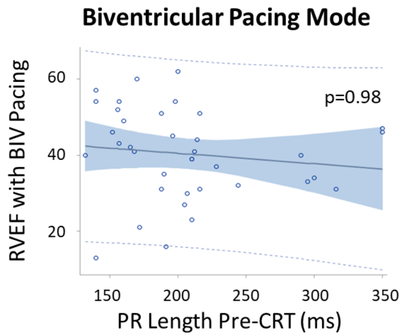



**Figure 1.** Shorter PR intervals pre-CRT were associated with greater improvement in RVEF in synchronic LV pacing mode. r=0.36; p=0.04



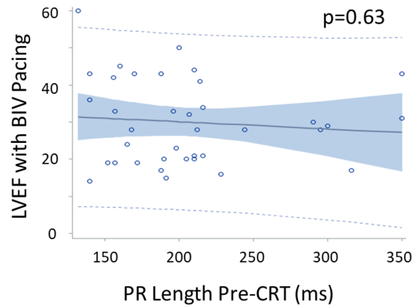




**Figure 2.** As opposed to SLVP, PR interval was not associated with improvement in RVEF or LVEF with biventricular pacing.

## Conclusions

- In addition to the association with LV functional improvement, a shorter PR interval has an even more prominent effect on RV functional improvement after CRT based on high-resolution CMR assessment of ventricular function.
- RVEF in patients with shorter PR only improved with SLVP but not BIVP. This finding is consistent with our hypothesis that SLVP allows for more effective fusion of LV pacing and intrinsic right bundle conduction.