QRS Morphology Is Equally Important!

We read with great interest the TARGET (Targeted Left Ventricular Lead Placement to Guide Cardiac Resynchronization Therapy) study by Khan et al. (1), a randomized controlled trial with targeted left ventricular (LV) lead placement to guide cardiac resynchronization therapy. The results of the study are promising and do emphasize the importance of the location of the LV lead in relation to the latest segment of contraction. However, many conventional variables have not been identified in the study, and more data are needed to support the conclusions of the study.

Morphology of the QRS complex (left bundle branch block vs. right bundle branch block vs. nonspecific intraventricular conduc- tion delay) has not been reported in the study. Many previous studies have consistently shown that QRS morphology is one of the most important predictors of response (2). The distribution of left bundle branch block between both groups should be identified as it can potentially influence the results.

It will be interesting to see if there is a correlation between the QRS morphology and axis with the latest segment of contraction in this study. It is postulated that QRS morphology and frontal axis can predict the latest segment of activation; whether it would predict the latest segment of mechanical contraction is unknown (3). Khan et al. (1) do have the unique opportunity to evaluate this concept in their study population. Nearly one-half (47%) of the patients in the control group ended up having a concordant LV lead (more remote or adjacent location), thereby significantly influencing the results. The mean total scar burden in both groups should be reported in the study to support the conclusions.

We are grateful for the comments and interest shown by Drs. Reddy and Lakireddy with respect to our recent publication of the TARGET (Targeted Left Ventricular Lead Placement to Guide Cardiac Resynchronization Therapy) study (1) regarding targeted left ventricular (LV) lead placement to guide cardiac resynchronization therapy (CRT). We do not believe that there are robust data to justify the title of their letter and have addressed the specific points below.

First, the morphology of the QRS complex is not, as of yet, part of the guidelines for patients who should be recommended CRT even though, as pointed out by the authors, a number of studies have shown that it is an important determinant of response (2).

The centers recruiting for the study routinely implant patients with only baseline left bundle branch block (LBBB) morphology. Reflecting this, there were only 2 patients who had non-LBBB morphology, distributed equally in each group. In both patients, the electrocardiogram showed right bundle branch block morphol- ogy, distributed equally in each group. In both patients, the electrocardiogram showed right bundle branch block morphology, the latest segment of activation was in the inferoseptum, the final lead position was remote, and both patients were CRT.
nonresponders. The equal distribution of both cases across the groups did not influence the primary endpoint of the study.

Second, the concept of using the baseline electrocardiogram to identify the optimal segment for LV lead pacing is interesting. The most important conclusion from the TARGET study is that the latest site of mechanical activation and distribution of scar are related to long-term outcomes. The electrocardiogram can inform regarding the latest site of electrical activation and scar, but as yet there is no evidence that it offers sufficient sensitivity to predict the response to CRT. We have not had the opportunity yet to explore this with the TARGET dataset, and we are grateful to the authors for bringing this to our attention as a focus for future study.

Third, total scar burden is indeed a key determinant of outcome after CRT (3), and its role in the TARGET population is the focus of continuing study by our group. Speckle-tracking echocardiography is the main modality used in the study, and its utility in assessing total scar burden in a CRT population is not well reported. We have recently reported, in abstract form, the correlation of speckle-tracking echocardiography to total scar burden as defined by magnetic resonance imaging. We are continuing analysis of our data to assess the use of speckle-tracking echocardiography to delineate LV scar, but considered it premature to report these data pending further validation.

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