Combined Assessment of Left Ventricular Dyssynchrony and Contractility by Speckled Tracking Strain Imaging: A Novel Index for Predicting Responders to Cardiac Resynchronization Therapy

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Background: Mechanical dyssynchrony is an important factor in the response to cardiac resynchronization therapy (CRT). However, no echocardiographic measure can improve prediction of case selection for CRT.

Objective: The purpose of this study was to assess the efficacy of a newly combined echocardiographic index for ventricular dyssynchrony and contractility using speckled tracking strain analysis to predict responders to CRT.

Methods: Forty-seven patients with severe heart failure in New York Heart Association functional class III/IV, left ventricular ejection fraction ≤ 35%, and QRS duration ≥ 130 ms were included in the study. Echocardiography was performed, and a novel index (i-Index), the product of radial dyssynchrony and radial strain, was calculated. Responder to CRT was defined as a patient with a ≥ 15% decrease in left ventricular end-systolic volume at 6-month follow-up.

Results: Thirty-two patients (68%) were classified as responders. The i-Index was significantly higher in responders than in nonresponders (3,450 ± 118 vs 1,481 ± 84, P < .001). The area under receiver operator characteristic curve was 0.92 for the i-Index, which was better than the index of radial dyssynchrony only (0.74). A cutoff value of i-Index >2,000 predicted responders with 94% sensitivity and 80% specificity. The index using only radial dyssynchrony had 81% sensitivity and 53% specificity. Furthermore, i-Index decreased in responders (1,985 ± 126, P < .001) but not in nonresponders (1,684 ± 86, P = .48).

Conclusion: Our findings suggest that a novel combined index by radial strain echocardiography might be a predictor of response to CRT. The value of this novel echocardiographic index requires further assessment in larger studies.

Keyword: CRT