

Quantitative analysis of dyssynchrony assessed by multidetector computed tomography can predict clinical outcome after cardiac resynchronization therapy

T. Onishi, Y. Koyama, K. Inoue, A. Okamura, M. Iwamoto, K. Tanaka, H. Nagai, Y. Hirao, T. Oka, N. Tanaka, S. Watanabe, A. Sumiyoshi, M. Okada, K. Iwakura, K. Fujii

Sakurabashi-Watanabe Hospital, Osaka, Japan
Funding Acknowledgement: Type of funding source: None

Background: The degree of mechanical dyssynchrony has been suggested as a predictor for long-term survival after cardiac resynchronization therapy (CRT). There have been little reports of dyssynchrony assessment with the use of cardiac computed tomography (CCT).
Methods: We studied 35 heart failure (HF) patients (average age 67±10 years) referred for CRT with NYHA III-IV heart failure, left ventricular (LV) ejection fraction (EF) 20±10% (all ≤35%), and QRS duration 156±22 ms (all ≥120ms). Electrocardiogram-gated contrast-enhanced 256-slice multi-detector CT was performed before CRT. Based on CCT, the LV endocardial boundaries from short-axis images reconstructed at 5% increments of cardiac cycle were automatically detected, and the time from R-wave to maximal wall motion was calculated for each of the 16 standardized segments

for all slices using software “Myocardial Contraction Map”. The standard deviation modified by mean heart rate (%SD) was respectively calculated as the global parameter of dyssynchrony. LVEF was also measured using MDCT. The predefined primary end-point was the first HF hospitalization or death over 2 years.
Results: %SD was feasible in all patients, respectively. There were 16 events over 2 years; 11 HF hospitalizations and 5 deaths. Patients with %SD ≥22% (optimal cutoff for outcome by ROC curve analysis) had a better clinical outcome than patients with %SD <22% (p=0.01, Figure).
Conclusion: Patients who had %SD ≥22% assessed by MDCT had a particularly favorable event-free survival following CRT, and this appears to be an important prognostic marker.

