

Effect Myocardial Scar Characteristics Assessed by Cardiac Magnetic Resonance on Cardiac Resynchronization Therapy Response

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OBJECTIVE:

To evaluate the effect of myocardial scar characteristics such as scar size, localization, and transmurality using cardiac magnetic resonance (CMR) imaging on cardiac resynchronization therapy (CRT) response.

METHODS AND RESULTS:

This prospective observational study included 22 patients (males 63.6%, mean age 58.6 ± 10.5 years) who were eligible for CRT implantation. They underwent complete CMR study and echocardiography before CRT implantation. Short term clinical and echocardiographic followed up at 3 months after implantation for CRT response. CRT response was defined as a $\geq 15\%$ reduction in left ventricular end-systolic volume (LVESV).

CRT response was achieved in 12 (54.5%) patients. There was no significant difference between CRT responders and non-responders regarding baseline clinical, electrocardiographic and echocardiographic characteristics. CRT responders showed significant improvement in NYHA class, mitral regurgitation

severity, left ventricular ejection fraction and reduction in left ventricular end-diastolic volume and LVESV then CRT non-responders. Myocardial scar size was significantly larger in CRT non-responders than CRT responders (15.41 ± 9.02 versus 10.77 ± 3.78 mm², $P = 0.01$). In addition, responders found to have a significantly lower percentage of fibrosis at segments related to the left ventricular lead position. Transmural myocardial scar was significantly lower in CRT responders than CRT non-responders ($P = 0.03$).

CONCLUSIONS:

CRT gives a better response in patients who have non-transmural small-sized myocardial scar and implantation of left ventricular lead in a segment with a low percentage of fibrosis. Therefore, CMR derived scar size, localization and transmurality assessment prior to CRT implantation may allow better identification of patients who would respond to CRT.