

Septal scar predicts non-response to cardiac resynchronization therapy

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Background: Scar in the left ventricular (LV) posterolateral wall is associated with poor response to cardiac resynchronization therapy (CRT). The impact of septal scar, however, has been less thoroughly investigated. As recovery of septal function seems to be an important effect of CRT, we hypothesized that CRT response depends on septal viability.

Aim: The aim of the present study was to investigate the association between septal scar and volumetric response to CRT, and to compare the impact of scar located in septum to scar located in the posterolateral wall.

Methods: 128 patients with symptomatic heart failure undergoing CRT implantation based on current guidelines (ejection fraction $30 \pm 8\%$, QRS-width 164 ± 17 ms) were included in the study. Volumes and ejection fraction were measured by echocardiography using the biplane Simpson's method at baseline and six months follow up. Non-response was defined as less than 15% reduction in end-systolic volume. Scar was assessed by late gadolinium enhancement cardiac magnetic resonance, and reported as percentage scar per regional myocardial volume. Numbers are given in [median ;10-90% percentile].

Results: Scar was present in 62 patients (48%). Scar burden was equal in septum [0% ;0-34%] and the posterolateral wall [0% ;0-36%], $p = 0.10$. 31 patients (24%) did not respond to CRT. The non-responders had higher scar burden than the responders in both septum [16% ;0-57% vs 0% ;0-23%, $p < 0.001$] and the posterolateral wall [6% ;0-74% vs 0% ;0-22%, $p < 0.001$].

In univariate regression analysis both septal and posterolateral scars correlated with non-response to CRT ($r = 0.51$ and $r = 0.33$, respectively). However, combined in a multivariate model only septal scar remained a significant marker of non-response ($p < 0.001$), while posterolateral scar did not ($p = 0.23$).

Septal scar $\geq 7.1\%$ predicted non-response with a specificity of 81% and a sensitivity of 70% by receiver operating characteristic curve analyses. The area under the curve was 0.79 (95% confidence interval 0.70 – 0.89) (Figure).

Conclusions: Septal scar is more closely associated with volumetric non-response to CRT than posterolateral scar. Future studies should explore the correlation between regional scar burden and different functional parameters, and how they relate to CRT response.

Abstract Figure. Septal scar predicts non-response to CRT

