Abstract: P1161

Possibilities of gadolinium-enhanced cardiac magnetic resonance in selection of candidates for cardiac resynchronization therapy

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Background. Cardiac resynchronization therapy (CRT) has been of great benefit to many heart failure (HF) patients with reduced ejection fraction (EF) and widened QRS complexes. Nonetheless, approximately one third of candidates may not derive symptomatic benefit from CRT. Several reasons have been proposed to explain lack of response to CRT in such patients. Underlying myocardial substrate, the total amount of scar and its location appears to be important in determining response and outcome.

Purchase. To determine the impact of the amount and distribution of myocardial structural damage on response to CRT in patients with ischemic (ICM) and non-ischemic cardiomyopathy (NICM).

Methods. 43 patients with HF (age 62.3±9.1 yrs (mean±SD), 44.2% females and 55.8% males) due to ICM (41.8%) or NICM (58.2%), LV ejection fraction <35%, QRS>130 ms, LBBB, sinus rhythm were enrolled. Late-gadolinium enhancement-cardiovascular magnetic resonance (LGE-CMR) was undertaken to evaluate myocardial scar prior to CRT devices implantation. All CMR analysis was performed on CVI42 software. According to signal intensity fibrosis zone (signal intensities of 5-SD above the mean normal remote myocardium) and «grey zone» (signal intensities of 2-SD above the mean normal remote myocardium) were defined. Scar zone included fibrosis zone and «grey zone». Percentage and mass of fibrosis zone, «grey zone» and scar were accessed. Scar location was assessed using a 16 segment model (AHA). Response was defined as a reduction in LV ESV of >15% at 6 months follow-up.

Results. In nonresponse group was significantly higher percent and mass of total scar (median 4% [3; 19] vs 24% [7; 44], p=0.017, 6 g [4; 32.5] vs 41 g [8; 86], p = 0.017), fibrosis zone (median 0% [0; 3.5] vs 8% [0; 19], p=0.01, 0 g [0; 6] vs 14 g [0; 34], p = 0.014) and "grey zone" (4% [3; 15] vs 15% [7; 23], p=0.027, 6 g [4; 27.5] vs 23 g [8; 39], p = 0.04). Among patients with NICM and ICM, percentage of response was higher in group of NICM (44.19% vs 11.63%, p<0.01). Response to CRT was less in patients with posterolateral scar (9.3% vs 25.58%, p<0.01), more specifically in segments 5, 10, 11, 16 (p<0.05). CRT response in patients with ICM didn’t depend on amount of myocardial structural damage, but depend on scar localization – presence of lateral scar was associated with poor response (p=0.294). In NICM group amount (percentage and mass) of fibrosis zone was less in responder group (median 0% [0; 3] vs 8.5% [0; 11], p<0.05, 0 g [0; 3] vs 14.5 g [0; 22], p < 0.05.

Conclusion. Response to CRT is significantly higher in patients with NICM in comparison with ICM. Nonresponse to CRT is associated with posterolateral scar regardless of the etiology of heart failure. In patients with NICM amount of fibrosis zone is higher in the group of patients with ineffective CRT. In case of ICM, amount of LV structural damage does not affect the effectiveness of CRT, but in patients with lateral scar the effect of CRT is worse.