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MECHANICAL DYSSYNCHRONY AS A PREDICTOR OF SUPERRESPONSE IN PATIENTS WITH CARDIAC RESYNCHRONISATION THERAPY

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• Background:

Data from multicenter studies suggest that the left bundle brunch block (LBBB) and wide QRS complex are associated with good response to cardiac resynchronisation therapy (CRT). Other studies evaluated echocardiographic parameters of mechanical dyssynchrony (MD) for patient selection to CRT. However, in real clinical practice the usage of these criteria is still debated.

• Aim:

To evaluate clinical and morpho-functional features in patients with congestive heart failure (CHF) and superresponse (SR) to CRT, to find predictors of SR.

• Materials and methods:

79 patients (88.9% men, mean age 53.7±9.1 years, 55.3% with ischemic cardiomyopathy) with II-IV NYHA functional class

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At baseline and in dynamics (mean follow-up period was 10.6±3.7 months)

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According to dynamics of left ventricular (LV) end-systolic volume (ESV) patients were divided into two groups

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I gr. (n=19) with decrease of LV ESV ≥30% (superresponders)

II gr. (n=60) with decrease of LV ESV <30% (non-superresponders)

• Results:

At baseline groups did not differ in main clinical characteristics, including the presence of LBBB. The width of QRS complex was higher in superresponders (162.3±42.8 ms in the I group vs 139.8±35.0 ms in the II group; p=0.046). Parameters of MD were higher in superresponders: LV pre-ejection period (PEP) (159.2±34.9 ms vs 135.9±35.6 ms; p=0.020), interventricular mechanical delay (IVMD) (73.0 [46; 108] ms vs 42.5 [18; 70] ms; p=0.005) and intraventriclular delay (IVD) assessed by tissue Doppler imaging (TDI) (110.0 [35; 153] ms vs 60.0 [29; 100] ms, p=0.034). In dynamics patients with SR had significantly lower LV ESV (103.0±32.8 ml vs 155.4±51.5 ml; p<0.001), LV end-diastolic volume (184.2±38.3 ml vs 233.8±60.5 ml; p=0.002) and higher LV ejection fraction (45.4±7.2% vs 34.8±6.2%; p<0.001). According to the logistic regression IVMD (OR 1.019, 95% CI 1.004-1.035; p=0.014) had an independent association with SR. According to the ROC analysis the sensitivity and specificity of this model in the prediction of SR in patients with CRT were 68.4% and 63.3% respectively with the cut- off value of IVMD 58.5 ms (AUC=0.716; p=0.005).

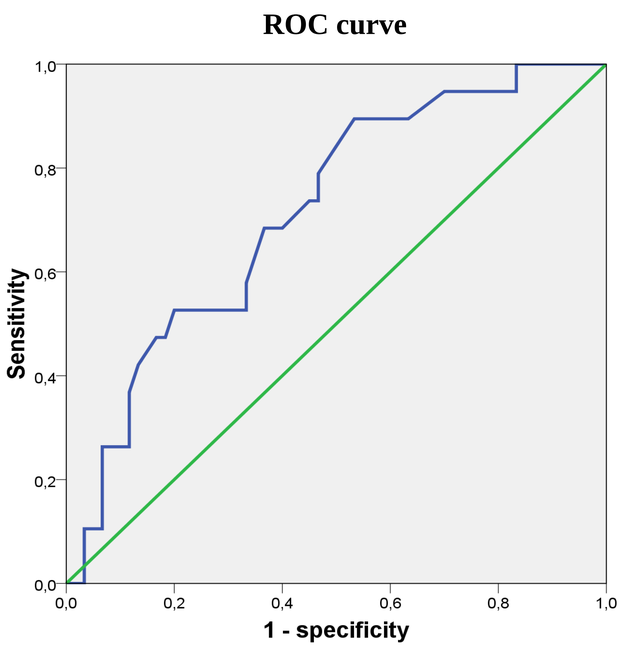

Figure 1. ROC curve for prediction of SR in patients with CRT

• Discussion:

SR to CRT was first described in 2005 but still there is no single unified criteria of SR. The proportion of superresponders in different studies is reported to be in the range of 12-47 %. The lack of a universal definition of SR to CRT is one of the main reasons of such a wide range. Despite different response criteria in most studies patients with LBBB and wide QRS derive better benefit from CRT. In 2013 an individual patient meta-analysis of five randomized trials by Cleland J.G. et al. demonstrated that only QRS width was an independent predictor of CRT response while LBBB was not. Some data suggest that non-ischemic cardiomyopathy, absence of myocardial infarction, body-mass index <30kg/m2, female gender were associated with SR. In our study SR was defined as a relative reduction in LVESV >30% after CRT according to several large sample studies. The percentage of SR found in our study was 24%. LBBB, QRS width and most parameters mentioned above were not found as predictive factors of greater response to CRT. In recent studies mechanical dyssynchrony parameters demonstrated good sensitivity in prediction of CRT SR. In our study presence of all parameters of mechanical dyssynchrony was higher in SR but in multivariate analysis only IVMD was identified as independent factor associated with CRT SR.

• Conclusion:

In patients with CHF more severe MD is associated with SR to CRT. LBBB was not associated with CRT SR. Probably the value of IVMD can be used as an independent predictor of SR to CRT in patients with CHF.

The authors have nothing to disclose.