

Prediction of Super-Response to Cardiac Resynchronisation Therapy

Authors : Vadim A. Kuznetsov, Anna M. Soldatova, Tatyana N. Enina, Elena A. Gorbatenko, Dmitrii V. Krinochkin

Abstract : The aim of the study was to evaluate potential parameters related with super-response to CRT. Methods: 60 CRT patients (mean age 54.3 ± 9.8 years; 80% men) with congestive heart failure (CHF) II-IV NYHA functional class, left ventricular ejection fraction $< 35\%$ were enrolled. At baseline, 1 month, 3 months and each 6 months after implantation clinical, electrocardiographic and echocardiographic parameters, NT-proBNP level were evaluated. According to the best decrease of left ventricular end-systolic volume (LVESV) (mean follow-up period 33.7 ± 15.1 months) patients were classified as super-responders (SR) (n=28; reduction in LVESV $\geq 30\%$) and non-SR (n=32; reduction in LVESV $< 30\%$). Results: At baseline groups differed in age (58.1 ± 5.8 years in SR vs 50.8 ± 11.4 years in non-SR; $p=0.003$), gender (female gender 32.1% vs 9.4% respectively; $p=0.028$), width of QRS complex (157.6 ± 40.6 ms in SR vs 137.6 ± 33.9 ms in non-SR; $p=0.044$). Percentage of LBBB was equal between groups (75% in SR vs 59.4% in non-SR; $p=0.274$). All parameters of mechanical dyssynchrony were higher in SR, but only difference in left ventricular pre-ejection period (LVPEP) was statistically significant (153.0 ± 35.9 ms vs. 129.3 ± 28.7 ms $p=0.032$). NT-proBNP level was lower in SR (1581 ± 1369 pg/ml vs 3024 ± 2431 pg/ml; $p=0.006$). The survival rates were 100% in SR and 90.6% in non-SR (log-rank test $P=0.002$). Multiple logistic regression analysis showed that LVPEP (HR 1.024; 95% CI 1.004-1.044; $P = 0.017$), baseline NT-proBNP level (HR 0.628; 95% CI 0.414-0.953; $P=0.029$) and age at baseline (HR 1.094; 95% CI 1.009-1.168; $P=0.30$) were independent predictors for CRT super-response. ROC curve analysis demonstrated sensitivity 71.9% and specificity 82.1% (AUC=0.827; $p < 0.001$) of this model in prediction of super-response to CRT. Conclusion: Super-response to CRT is associated with better survival in long-term period. Presence of LBBB was not associated with super-response. LVPEP, NT-proBNP level, and age at baseline can be used as independent predictors of CRT super-response.

Keywords : cardiac resynchronisation therapy, superresponse, congestive heart failure, left bundle branch block

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