P539

Comparative analysis of patients with cardiac resynchronization therapy depending on septal flash

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Background: Mechanical dyssynchrony (MD) and superresponse (SR) to cardiac resynchronisation therapy (CRT) relationship is still debated.

Aim: To assess clinical and morpho-functional features of the heart in patients with congestive heart failure (CHF) after cardiac resynchronization therapy (CRT) depending on septal flash (SF).

Materials and methods: The study enrolled 60 patients (92.0% men, 8.0% women; mean age 54.5 ± 10.4 years; 70.0% had left bundle branch block (LBBB) with II-IV NYHA functional class CHF. SF (mechanical anomaly of interventricular septum (IVS) movement) is determined according to speckle tracking echocardiography (STE) and tissue Doppler imaging (TDI). Patients were divided into two groups: with SF (I group, n = 10) and without SF (II group, n = 50).

Results: At baseline the groups did not differ in main clinical characteristics including QRS width and LBBB. Mechanical interventricular delay was higher in group I (65.5 ms [53.5;95.5] vs 31.0 ms [15.0;64.5]; p=0.026). Basal segment of IVS longitudinal strain (LS) delay by STE (257.5 ms [156.3;293.8] vs 323.5 ms [262.5;377.8]; p=0.024) and LS delay by TDI (204.0 ms [170.8;260.3] vs 434.0 ms [370.0;489.0]; p<0.001) were significantly lower in group with SF. According to logistic regression a combination of LS apical segment of IVS by STE (HR 0.607; 95% CI 0.369 – 0.989; p=0,048) and LS delay basal segment of IVS by TDI (HR 0.969; 95% CI 0.0945 – 0.993; p=0.011) had a relationship with SF. According to ROC analysis sensitivity and specificity of this model in SF definition in patients with CRT were 87.5% and 86.5% (AUC = 0.939; p < 0.01). Mean changes in LV ESV (52.0 ml [32.5;72.8] vs 19,0 ml [1.3;40.0]; p=0.002) and LV ejection fraction (EF) (13.0% [5.5;18.8] vs 4.0% [2.0;9.0]; p=0.002) were significantly higher in patients with SF. All patients in group I had a super-response to CRT (ESV LV decrease ≥30%); 42.0% patients in group II were superresponders (p<0.001).

Conclusion: SF could be determined by STE and TDI. SF is associated with severe mechanical interventricular dyssynchrony and superresponse to CRT. Patients with SF have significantly better LV EF dynamics after CRT.

Abstract Figure. Septal Flash in patient with SR to CRT