

Studium of the clinical impact of different forms of cardiac resynchronization therapy by patients with chronic heart failure

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ABSTRACT:

Introduction: Biventricular (BiV) pacing decreases mortality and improves quality of life of patients with severe heart failure. Haemodynamic and short time clinical studies suggest that isolated leftventricular pacing could have the same effect.

Aims: Compare the effect of BiV and leftventricular pacing by subjects with dilated cardiomyopathy and severe heart failure with the attention to signs of dyssynchrony and remodeling of the left chamber. In methodical substudy compare the results of left chamber volumes and ejection fraction (EF LK) measured by CT angiography and 2-dimensional echocardiography with use of contrast agent (K-ECHO).

Methods: Patients indicated for cardiac resynchronization therapy were randomized for either BiV or leftventricular pacing. After implantation of the device they were examined clinically and by echocardiography every 3 months in the period of one year. Four years from the onset of the study the major adverse events in both groups were evaluated. The results of left chamber volumes and EF LK measured by K-ECHO and CT angiography were compared.

Results: We enrolled 33 patients. We found clinical improvement in both groups but more in the group with BiV pacing. Reverse remodeling was also more pronounced in BiV group- EF LK improved in BiV group for $12,5 \pm 2,6\%$ vs. $5,1 \pm 2,0\%$ in the group with leftventricular pacing ($p < 0,01$), main difference of left ventricular enddiastolic diameter in BiV group was $8,7 \pm 1,8\text{mm}$ versus $5,1 \pm 1,8\text{mm}$ in the group with leftventricular pacing ($p < 0,05$). During 3 year follow-up 4 patients died- 3 cardiovascular deaths occurred in the group with leftventricular pacing, 1 non-cardiovascular death in BiV group. In comparison with CT angiography K-ECHO overestimates the EF LK ($23 \pm 7\%$ versus $17 \pm 8\%$, $p < 0.001$) and underestimates volumes of the left chamber (LVEDV $286 \pm 90\text{ml}$ versus $374 \pm 137\text{ml}$, LVESV $223 \pm 83\text{ml}$ versus $316 \pm 127\text{ml}$, $p < 0.001$)

Conclusion: Clinical improvement and reverse remodeling was more pronounced in the group with BiV pacing. Long time follow-up suggests higher risk of cardiovascular death in the group with leftventricular pacing. In comparison with CT angiography echocardiography overestimates the EF and underestimates volumes of the left chamber.

KEYWORDS: cardiac resynchronization therapy, leftventricular pacing, left ventricular function, left ventricular volume, echocardiography, CT angiography