Echocardiographic optimization favors greater reduction in left ventricular end-diastolic volume compared to electrocardiographic optimization in patients with cardiac resynchronization therapy

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Introduction: Cardiac resynchronization therapy (CRT) is a widely used method in the treatment of symptomatic patients with advanced heart failure and LBBB. Its beneficial impact on the reduction of left ventricular (LV) volumes has already been shown.[1,2] The aim of this study was to determine if echocardiographic optimization of CRT pacing intervals (ECHO) after CRT device implantation has a favorable impact on LV volume change compared to electrocardiographic optimization (ECG).

Patients and Methods: An overall of 147 patients with implanted CRT according to guidelines were included in this study and divided into two groups according to the CRT optimization method (N=70 in ECG arm an N=77 in ECHO arm). ECG optimization was performed using 12-lead electrocardiogram, fusion-optimized intervals, intracardiac electrogram-based algorithms and electrocardiographic imaging. ECHO optimization implied correction of atrioventricular, inter- and intraventricular dyssynchrony using echocardiographic imaging. The change in LV end-diastolic (EDV), end-systolic (ESV) and stroke volume (SV) as well as LV ejection fraction (EF) was compared between groups, before and 6 months after CRT implantation.

Results: EDV and ESV significantly decreased and EF increased in both groups. In the ECHO a statistically significant reduction in EDV compared to ECG was present (p=0.028). According to greater EDV reduction, SV significantly decreased in ECHO (p=0.026). No significance was observed in ESV change between groups (p=0.063) (**Table 1**).

Conclusion: ECHO optimization of CRT leads to a more significant reduction of EDV compared to ECG optimization after 6 months of follow up.

TABLE 1. Left ventricle volumes and ejection fraction change before and 6 months after cardiac resynchronization therapy between the analyzed groups.

	ECG (N=70)			ECHO (N=77)			
	Before CRT	6 months after CRT	Mean change, SD	Before CRT	6 months after CRT	Δ	
EDV (ml)	218.81	167.48	51.32 (±64.25)	231.81	157.53	74.28 (±80.25)	**p= 0.028**
ESV (ml)	162.27	112.25	50.01 (±59.38)	169.67	102.57	67.1 (±75.02)	p= 0.063
SV (ml)	56.54	55.23	1.31 (±16.46)	62.14	54.96	7.18 (±19.66)	**p= 0.026**
EF (%)	26.67	36.79	10.11 (±8.39)	26.97	39.13	12.16 (±10.80)	p= 0.1

EDV - left ventricular end-diastolic volume, ESV - left ventricular end-systolic volume, SV - left ventricular stroke volume, EF - left ventricular ejection fraction, SD - standard deviation.

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LITERATURE

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