Impact of chronic sequential LV-RV pacing with cardiac resynchronization therapy for patients with narrower (<130 ms) QRS complexes following evaluation of acute myocardial strain characteristics

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Background: Prior studies have shown acute improvement in myocardial strain patterns (SP) and strain rates (SR), left ventricular ejection fraction (LVEF), and long-term clinical improvement by Cardiac Resynchronization Therapy (CRT) preferential LV pacing. This relationship has not been studied in patients (pts) with narrower QRS.

Objectives: We aimed to evaluate myocardial speckle tracking SP and SR at different VV intervals in pts with narrow (<130 ms) and wide (>130 ms) QRS.

Methods: We assessed LVEF and speckle tracking myocardial SP and SR as per the American Society of Echocardiography (ASE) Dyssynchrony Writing Group methods in pts with CRT in acute settings at VV0, VV60 and LV-only pacing. For SP assessment, we used Bull's eye format display of the LV segments, and scores for SR, 2 = early stretch, late peak, 1= early stretch, early peak, and 0 = single peak at aortic closure.

Results: Total cohort of 271 pts; age 69.2±10.3 yrs (mean ± SD), male - 60%, divided into 2 groups; Gp A (QRS <130 ms, n=69) and Gp B (QRS >130 ms, n=202). QRS width and LVEF in Gp A and B were 120.1±12.3 ms and 152.1±12.9 ms, and 22.3±9.4% and 23.3±10.2% respectively. With VV0 increase in LVEF, 67±6.0% from baseline 22.3±9.4% was seen in Gp A compared to 43±6.5% from 23.3±10.2% in Gp B ($p<0.01$). With VV60 and LV-only pacing further rise in LVEF to 100.0±7.1% and 112.0±7.2% in Gp A and 80.2±8.0% and 93±8.1% in Gp B was seen. (Figure 1). Strain scores at different VV timings in both groups are shown in Table 1.

Conclusions: In pts with CRT, different VV timings show differences in acute myocardial speckle tracking SP and SR, and LVEF. These changes are markedly favorable with LV-only and sequential LV-RV pacing even in pts with narrower QRS. Our findings support chronic sequential LV-RV pacing programming in CRT pts with narrow QRS.

Table 1. Strain scores at different VV timings at different LV segments

	Group A (QRS <130 ms)	Group B (QRS >130 ms)	P value
VV0 – septum	2.23/2.34	2.23/2.34	NS
VV0 – anterior wall	2.06/1.73	2.06/1.73	
VV0 – lateral wall	2.23/1.73	2.23/1.73	
VV0 – posterior wall	2.41/2.25	2.41/2.25	
VV0 – inferior wall	2.37/2.24	2.37/2.24	
VV60 – septum	0.91/0.87	0.91/0.87	NS
VV60 – anterior wall	1.51/1.33	1.51/1.33	
VV60 – lateral wall	1.57/1.33	1.57/1.33	
VV60 – posterior wall	1.57/1.45	1.57/1.45	
VV60 – inferior wall	1.56/1.45	1.56/1.45	
LV only – septum	0.7/0.61	0.7/0.61	NS
LV only – anterior wall	1.41/1.22	1.41/1.22	
LV only – lateral wall	1.39/1.17	1.39/1.17	
LV only – posterior wall	1.49/1.31	1.49/1.31	
LV only – inferior wall	1.44/1.32	1.44/1.32	

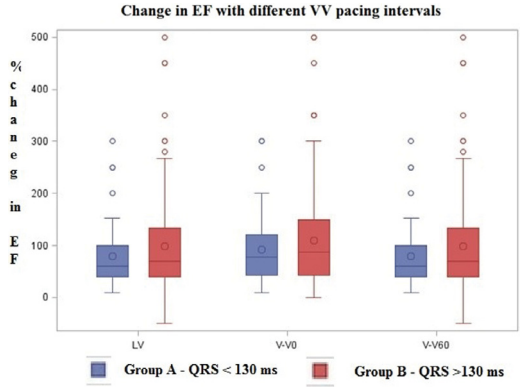

Figure 1