IMPACT OF CARDIAC RESYNCHRONIZATION THERAPY (CRT) ON THE SEVERITY OF MITRAL REGURGITATION IN DILATED CARDIOMYOPATHY PATIENTS

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INTRODUCTION

Functional Mitral regurge in advanced Heart failure dilated cardiomyopathy patients is a strong predictor to mortality this arouses to study the impact of Cardiac resynchronization therapy on functional MR in DCM.

AIM OF THE WORK

The aim of our study was to assess the effect of cardiac resynchronization therapy on the severity of mitral valve regurgitation among patients with DCM.

PATIENTS AND METHODS

This is a prospective observational study of Twenty-five patients with advanced heart failure DCM with sinus rhythm LBBB wide QRS≥ 130 ms with at least moderate MR, subjected to CRT implantation at Alexandria main university Hospital and followed up by Echocardiography after CRT by 1 week and 10 weeks and comparing between improved MR (Group I) and stable MR group patients (Group II).

RESULTS

Evidence of early response to CRT was observered in 9 patients (36%), MR improvement among responders to CRT was observed in 7 patients (77.8%) and was higher among early echocardiographic responders (48%) than among early clinical responders (40%), and is significantly association with percent of reduction in QRS width in surface ECG. (*P* value: 0.026). FMR improvement observed in 15 patients (60%) 'Group I' (p value <0.001) vs 10 patients (40%) show stable MR 'Group II'.

Table 1: Comparison between the three studied periods according to different parameters (n = 25)

	Pre	1 week	10 weeks	Test of sig.	Pairwise
QRSduration (m sec)	160 (140 – 160)	120 (80 – 120)	120 (80 – 120)	Fr=49.368* <0.001*	p_1<0.001*, p_2<0.001*,p_3=0.888
NYHA					
Class II	0 (0%)	11 (44%)	14 (56%)	Fr=31.857* (<0.001*)	p_1=0.001*, p_2<0.001*, p_3=0.480
Class II-III	0 (0%)	3 (12%)	2 (8%)		
Class III	21 (84%)	9 (36%)	8 (32%)		
Class III-IV	3 (12%)	2 (8%)	1 (4%)		
Class IV	1 (4%)	0 (0%)	0 (0%)		
EDD (mm)	78.55 ± 9.07	76.20 ± 9.61	72.85 ± 12.15	F=7.482* (0.004*)	p_1=0.427, p_2=0.011*, p_3=0.009*
ESD (mm)	67.57 ± 9.52	64.28 ± 11.29	59.91 ± 12.04	F=25.295* (<0.001*)	p_1=0.021*, p_2<0.001*,p_3<0.001*
EDV (ml)	284(194 – 594)	267(113 – 483)	275(113 – 487)	Fr=14.638* (0.001*)	p_1=0.021*, p_2=0.024*,p_3=0.157
ESV (ml)	203.5(128 – 459)	189(68.4 – 394)	151(68.4 – 450)	Fr=25.441* (<0.001*)	p_1=0.001*, p_2<0.001*,p_3=0.157
LAD (mm)	51.94 ± 4.26	47.68 ± 4.39	45.91 ± 6.64	F=26.692* (<0.001*)	p_1<0.001*, p_2<0.001*,p_3=0.132
LAVI (ml/m²)	42.3(30.7 – 77.1)	34 (22.7 – 89.1)	29.3(24.8 – 101.2)	Fr=18.083* (<0.001*)	p_1<0.001*, p_2<0.001*,p_3=0.888
EF %	29.11 ± 6.61	34.86 ± 8.35	37.48 ± 4.31	F=38.394* (<0.001*)	p_1<0.001*, p_2<0.001*,p_3=0.888
E wave (cm/s)	96 (40 – 150)	50.8 (38.4 – 90.3)	64(26.7 – 179)	Fr=14.333* (0.001*)	p_1<0.001*, p_2=0.024*,p_3=0.157
A (cm/s)	64.7(27.6 – 124)	96.43(29.8 – 124)	74.5(43 – 131)	Fr=6.244* (0.044*)	p_1=0.238, p_2=0.238, p_3=0.018*
E/A	1.76(0.46 – 3.33)	0.66(0.35 – 3.03)	1.43(0.35 – 2.29)	Fr=12.427* (0.002*)	p_1=0.001*, p_2=0.065, p_3=0.105
Mean E` (cm/s)	7.30 (4.25 – 14.0)	5.20 (3.43 – 12.0)	8.93(3.80 – 12.15)	Fr=3.237 (0.198)	p_1>0.05, p_2>0.05, p_3>0.05
E/E`	12.07(6.66–26.82)	9.03(5.33–26.36)	7.39(5.33–21.41)	Fr=4.144 (0.126)	p_1>0.05, p_2>0.05, p_3>0.05
MR					
Mild	0 (0%)	10 (40%)	10 (40%)	Fr=30.0* (<0.001*)	p_1=0.001*, p_2=0.001*, p_3=1.000
Moderate	13 (52%)	8 (32%)	8 (32%)		
Severe	12 (48%)	7 (28%)	7 (28%)		

Qualitative data were described using number and percent, normally quantitative data was expressed in mean ± SD and abnormally distributed data was expressed in median (Min. - Max.) **F: F test (ANOVA) with repeated measures,** Sig. bet. Periods was done using **Post Hoc Test (adjusted Bonferroni)** **Fr: Friedman test,** Sig. bet. Periods was done using Post Hoc Test (Dunn's)

p: p value for comparing between the studied periods $-p_1$: p value for comparing between Pre and 1 week

p_2: p value for comparing between Pre and 10 week $-p_3$: p value for comparing between 1 week and 10 week *: Statistically significant at p≤0.05

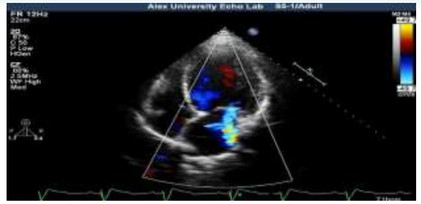

Table 2: Comparison between the two studied groups according to different parameters

		Group I (n = 15)	Group II (n = 10)	Test of Sig.	p
QRS duration (m sec)	Pre	160(140 – 160)	150(140 – 160)	U=47.50	0.129
	1 week	120(80 – 120)	120(120 – 120)	U=70.0	0.807
	10 weeks	120(80 – 120)	120(120 – 120)	U=65.0	0.605
	% of reduction	25(20 – 46.67)	19.65(14.29 – 25)	U=35.0*	0.026*
EDD (mm)	Pre	75.71 ± 7.92	82.81 ± 9.39	t=2.039	0.053
	1 week	72.98 ± 9.04	81.03 ± 8.70	t=2.213*	0.037*
	10 weeks	68.33 ± 9.21	79.64 ± 13.29	t=2.343*	0.034*
	% of reduction	3.70(-5.69 – 25.32)	1.89(-5.87 – 23.17)	U=53.0	0.238
ESD (mm)	Pre	64.23 ± 7.64	72.58 ± 10.22	t=2.339	0.028*
	1 week	60.27 ± 10.53	70.30 ± 10.03	t=2.376*	0.026*
	10 weeks	55.17 ± 9.67	67.01 ± 12.15	t=2.707*	0.013*
	% of reduction	11.75(0.24 – 29.39)	4.68(0.24 – 25.27)	U=45.0	0.103
ESV (ml)	Pre	203.5 (128 – 220)	268.3 (149 – 459)	U= 50.50	0.177
	1 week	136 (68.4 – 210)	249 (120 – 394)	U= 33.0*	0.019*
	10 weeks	131 (68.4 – 210)	249 (109 – 450)	U= 34.0*	0.023*
	% of reduction	31.88 (-3.28 – 46.56)	4.58 (-3.28 – 26.85)	U= 36.0*	0.031*
Early Clinical Response					
	Responder	10 (66.7%)	7 (70.0%)	χ^2= 0.031	FEp= 1.000
	Not responder	5 (33.3%)	3 (30.0%)		
Early Echocardiographic response					
	Responder	12 (80.0%)	4 (40.0%)	χ^2= 4.167	FEp= 0.087
	Not responder	3 (20.0%)	6 (60.0%)		
Responder (both clinical and Echo) (n=9)		7 (77.8%)	2 (22.2%)		

CONCLUSION

CRT improves degree of functional MR among DCM patients and improvement in degree of MR is significantly associated with baseline QRS and percent of reduction in QRS width.