IMPACT OF REVASCULARIZATION VIA PERCUTANEOUS CORONARY INTERVENTION IN ISCHEMIC CARDIOMYOPATHY ON LEFT VENTRICULAR FUNCTION AND REGIONAL WALL MOTION

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Introduction

Ischemic cardiomyopathy (ICM),the most frequent cause of heart failure (HF) and systolic dysfunction of the left ventricle (LV), refers to significant left ventricular systolic dysfunction, characterized by an LV ejection fraction (EF) of less than 40%, which is associated with and results from extensive coronary artery disease or as a consequence of an acute myocardial infarction. The primary rationale for coronary revascularization in ischemic cardiomyopathy is based on reducing chronic ischemia and restoring function in hibernating myocardium. There is a **knowledge gap** regarding the functional and clinical benefits of PCI in patients with ICM, particularly in relation to myocardial viability assessment.

Aim of the Work

The aim of the study was to identify the Impact of revascularization by Percutaneous coronary intervention in patients with ischemic cardiomyopathy on left ventricular function and regional wall motion.

Subjects and Methods

This prospective cohort study was done at the cardiology department of Alexandria Main University Hospitals. The study enrolled 60 patients with stable ICM (LVEF <40% and significant coronary artery disease). Dobutamine stress echocardiography (DSE) was used to assess myocardial viability, and PCI was performed according to standard guidelines. Patients were followed at three and six months post-procedure. Primary outcome was LVEF changes. Secondary outcomes were NYHA and CCS classifications, six-minute walk test (6MWT) performance, hospitalisation and mortality rates. Statistical analyses assessed the correlation between myocardial viability and post-PCI recovery.

Results

The mean age was 58.88±9.920 years, and 76.7% were males. 70.0% were smokers, 48.3% had diabetes mellitus and 48.3% had hypertension. 81.7%, had previous acute coronary syndrome (ACS) and 35.0% had a history of previous PCI or CABG.23.3% had chronic kidney disease (CKD), 41.7% had chronic total occlusion (CTO), and 81.7% had multi-vessel disease.

Only 5% of patients had left main (LM) disease, while 41.7% had chronic total occlusion (CTO), with the mean number of diseased vessels 2.13 ± 0.72 and a median of 2.0. Most patients (71.7%) had stenosis over 90%, while 28.3% had stenosis between 70% and 90%. The LAD artery was the most frequently treated (71.7%)The mean SYNTAX Score was 15.78±7.533, while the mean Residual SYNTAX was 4.92 ± 7.426.

The primary outcome: We found significant increase in the ejection fraction (EF) over six months, with values ranging from 25.0% to 40.0% at baseline, 25.0% to 50.0% at 3 months, and 25.0% to 55.0% at 6 months. The mean EF improved from 36.10% to 37.53% at 3 months and 38.64% at 6 months, with statistically significant changes (p = 0.001).

The secondary outcomes: Statistically Significant improvements in **NYHA classification** were observed, with Class I patients increasing from 16.7% at 3 months to 27.6% at 6 months, Class II patients rising from 71.7% to 62.1%, and Class III decreasing from 11.7% to 8.6%(p < 0.001). **CCS classification** showed 80.0% in Stage 1 at 3 months, rising to 82.8% at 6 months, also showing significant improvement (p < 0.001). **The 6-minute walk test (6MWT)** showed improvement in scores, with a mean score of 351.50 at baseline, 368.17 at 3 months, and 399.2 at 6 months, with statistical significance (p = 0.001 at 3 months, p < 0.001 at 6 months).

31.7% of the patients were hospitalized, all for cardiac causes. There was only 5% mortality.

Table: D Follow up of EF at 3 months and 6 months

	Baseline (n = 60)		3months (n = 60)		6months (n = 58)		Test of Sig.	p
	No.	%	No.	%	No.	%		
EF								
≤40	60	100.0	48	80.0	36	62.1		
41 – 49	0	0.0	9	15.0	17	29.3	Fr=340*	<0.001*
≥50	0	0.0	3	5.0	5	8.6		
Min. – Max.	25.0 – 40.0		25.0 – 50.0		25.0 – 55.0			
Mean ± SD.	36.10 ± 4.11		37.53 ± 5.59		38.64 ± 6.95		Fr=8.453*	0.003*
Median (IQR)	35.50(35.0 – 40.0)		38.0(33.0 – 40.0)		39.0(35.0 – 43.0)			
Sig. bet. periods	p_1=.044*, p_2=0.007*, p_3=0.021*							

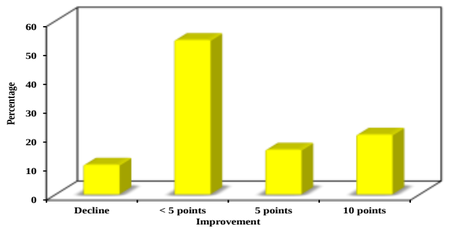

Figure 1: Distribution of studied sample according to EF change.

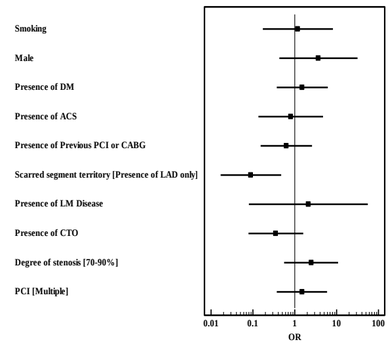

Figure 2: Multivariate logistic regression analysis for the parameters affecting improvement in EF≥5 points (no. of improved = 21 vs. 37)

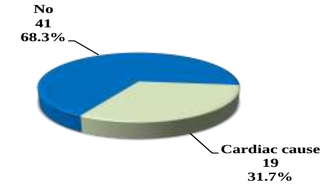

Figure 3: Distribution of the studied cases according to hospitalization (n=60).

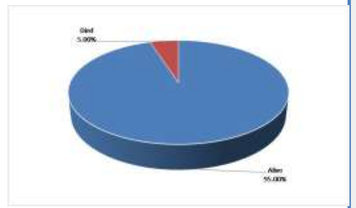

Figure 4: Distribution of studied sample according to mortality.

Conclusion

This study highlights the significant benefits of Percutaneous Coronary Intervention (PCI) in patients with ischemic cardiomyopathy, particularly in improving ejection fraction (EF), functional status, and quality of life. Notably, the study observed a positive correlation between EF recovery and improved clinical outcomes, such as reduced angina, better exercise capacity, and enhanced overall quality of life. The improvements in EF were most notable in patients with fewer scarred myocardial segments and lower SYNTAX scores, suggesting that PCI is particularly effective when targeted at viable myocardium.