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RESEARCH ARTICLE

Correlation Between Myocardial Performance Index and Severity of Coronary Artery Disease in Patients with Acute Coronary Syndrome

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Abstract: ***Background:*** Assessment of left ventricular (LV) function following percutaneous coronary intervention (PCI) in acute coronary syndrome (ACS) is crucial for predicting early recovery and adverse outcomes. The myocardial performance index (MPI or Tei index) and wall motion score index (WMSI) have emerged as sensitive echocardiographic markers that integrate systolic and diastolic function, providing incremental prognostic value beyond left ventricular ejection fraction (LVEF).***Methods:*** A prospective observational study was conducted on 125 consecutive ACS patients undergoing PCI, categorized into four groups: left anterior descending (LAD), right coronary artery (RCA), left circumflex (LCX), and multivessel disease (MVD). Comprehensive echocardiographic evaluation, including two-dimensional, Doppler, and tissue Doppler imaging, was performed one day before and 24 hours after PCI. Angiographic parameters and early (≤72 h) adverse events, including major adverse cardiac events (MACE) and contrast-induced nephropathy (CIN), were recorded. Statistical analyses were performed using ANOVA, paired t-test, Chi-square, and Cox regression, with significance at $p < 0.05$.***Results:*** The mean MPI improved from 0.58 ± 0.08 to 0.52 ± 0.06 ($p < 0.01$), LVEF increased from 45 ± 6% to 50 ± 6% ($p < 0.001$), and WMSI decreased from 1.8 ± 0.3 to 1.5 ± 0.2 ($p < 0.001$). Functional improvement was greatest in LAD lesions and least in MVD. Procedural success (TIMI 3 flow and residual stenosis < 50%) was achieved in 91% of cases. Within 72 hours post-PCI, 20% experienced MACE, and 12% developed CIN, with the highest complication rates in MVD patients (31% and 19%, respectively). A higher baseline MPI and lesser post-procedural improvement were associated with increased MACE risk.***Conclusion:*** Successful PCI in ACS leads to significant early improvement in global and segmental LV function as reflected by MPI, LVEF, and WMSI. Patients with multivessel disease exhibit reduced functional recovery and higher early complication rates. The MPI is a valuable, non-invasive predictor of early prognosis and should be incorporated routinely with conventional echocardiographic indices for post-PCI risk stratification.

Keywords: Acute coronary syndrome, Myocardial performance index, Percutaneous coronary intervention, Echocardiography, Left ventricular function, Wall motion score index, Multivessel disease.

INTRODUCTION

Acute chest pain is among the most frequent causes of emergency department (ED) visits, accounting for nearly 10% of approximately 100 million non-traumatic presentations in the United States, making it the second most common reason for seeking emergency care.[1] Although such presentations often raise suspicion for acute coronary syndrome (ACS), only 10–15% of patients with chest pain are ultimately diagnosed with ACS after complete evaluation.[2] Importantly, ACS is missed in nearly 2% of patients, and failure to identify these cases has serious consequences—patients with unrecognized myocardial infarction (MI) who are discharged from the ED have twice the short-term mortality compared to those appropriately admitted.

ACS usually results from rupture or erosion of an unstable atherosclerotic plaque within a coronary artery, leading to partial or complete thrombotic occlusion and distal microembolization, which compromise myocardial blood flow and induce ischemia.[3] Clinically, ACS represents a spectrum of related conditions—unstable angina, non–ST-segment elevation myocardial infarction (NSTEMI), and ST-segment elevation myocardial infarction (STEMI)—which differ in the extent of myocardial ischemia and necrosis. Unstable angina is characterized by transient ischemia causing reduced perfusion without significant myonecrosis detectable by cardiac biomarkers.[4] In NSTEMI, a partially occluded coronary artery leads to subendocardial ischemia, whereas complete occlusion in STEMI results in transmural infarction. The underlying pathophysiology is dynamic, and patients may progress rapidly from unstable angina to NSTEMI or STEMI during early evaluation and treatment.[5]

The myocardial performance index (MPI), also known as the Tei index, integrates systolic and diastolic time intervals to reflect overall ventricular performance.[6] Tissue Doppler imaging (TDI)-derived MPI can quantify both regional and global myocardial function with greater sensitivity than conventional Doppler methods, especially in detecting regional wall motion

abnormalities, and demonstrates superior inter- and intra-observer reproducibility.[7] Ventricular remodeling is a hallmark of myocardial ischemia and infarction, and the prognosis largely depends on the extent of salvaged myocardium and its preserved function.[8] Therefore, a composite parameter that evaluates both systolic and diastolic components, such as MPI, provides a more comprehensive assessment of cardiac performance than isolated indices.[9]

MPI is calculated by comparing the total systolic time—from mitral valve closure to opening—with the actual ejection time during aortic flow. In acute myocardial infarction (AMI), MPI has been shown to be more sensitive than LVEF in identifying global LV dysfunction, with reported values ranging from 0.45 in lower-risk to 0.8 in high-risk patients, correlating with increased mortality.[10] Sajan Narayan et al. observed that a left ventricular MPI > 0.5 was associated with a 10% higher mortality and 15% increased recurrence of ischemic events or need for repeat revascularization.[11] Conversely, Schwammenthal et al. suggested that LVEF and early diastolic deceleration time were stronger predictors of adverse outcomes after AMI compared with indices of global LV performance.[12]

Improvement in MPI following successful revascularization depends primarily on microvascular integrity.[8] Patients with persistently elevated MPI values despite angiographic success frequently exhibit microvascular injury or a “no-reflow” phenomenon after PCI.[13] Prior studies have evaluated MPI as a predictor of procedural success and long-term outcomes following PCI, concluding that it remains one of the most reliable non-invasive markers for anticipating periprocedural outcomes.[14] The present study aims to bridge existing knowledge gaps by assessing the prognostic value of MPI in patients with ACS, thereby contributing to improved risk stratification and optimization of post-PCI management strategies.

Materials and Methods

This prospective observational study was conducted in the Department of Cardiology, Jawaharlal Nehru Medical College, Ajmer, and included 125 consecutive patients admitted with a diagnosis of Acute Coronary Syndrome (ACS). Written informed consent was obtained from all participants or their legally authorized representatives above 18 years of age before enrollment. Patients were categorized into four groups according to the coronary artery territory involved: Group I included those with left anterior descending (LAD) artery lesions, Group II with right coronary artery (RCA) involvement, Group III with left circumflex (LCX) artery lesions, and Group IV with multivessel disease (MVD) involving more than one coronary territory. The study protocol was approved by the Institutional Ethics Committee of JLN Medical College, Ajmer.

Inclusion and Exclusion Criteria: Patients diagnosed with ACS, including acute myocardial infarction (AMI), non-ST elevation myocardial infarction (NSTEMI), or unstable angina (UA) with significant angiographic coronary artery stenosis, were included. Other inclusion criteria were patients with New York Heart Association (NYHA) functional class I to III, left ventricular systolic function ranging from normal to severe dysfunction, and those with one or more cardiovascular risk factors such as diabetes mellitus, hypertension, smoking, dyslipidemia, or obesity. Patients with any type of American College of Cardiology (ACC) classified angiographic lesion involving right and/or left coronary arteries and aged above 18 years were also included. Exclusion criteria comprised patients with severe systemic illness such as fever, moderate to severe renal failure, malignancy, or electrolyte imbalance; those with cardiomyopathy (dilated, hypertrophic non-hypertensive, or restrictive type); and those with valvular heart disease, atrial fibrillation, atrial flutter, atrioventricular block, or large pericardial effusion. Patients above 75 years of age were also excluded from the study.

Following enrollment, detailed clinical history was obtained, and major cardiovascular risk factors including diabetes, hypertension, smoking, obesity, and dyslipidemia were recorded. Body mass index (BMI) was calculated for all patients. A 12-lead electrocardiogram (ECG) was performed on the day of percutaneous coronary intervention (PCI) to assess ST-segment deviation. Baseline serum urea and creatinine were measured and repeated 48 hours after PCI in high-risk patients to monitor renal function.

All patients underwent comprehensive echocardiographic evaluation using a PHILIPS Affinity 70G echocardiography system equipped with a 5 MHz transthoracic probe. Standard imaging modalities included two-dimensional (2D) echocardiography, M-mode, color Doppler, continuous wave (CW) Doppler, pulsed wave (PW) Doppler, and tissue Doppler imaging (TDI). Left ventricular ejection fraction (LVEF) was measured using the biplane Simpson’s method by manual tracing of the endocardial borders in apical four-chamber (A4C) and two-chamber (A2C) views to calculate left ventricular end-diastolic volume (LVEDV) and end-systolic volume (LVESV). Myocardial Performance Index (MPI), LVEF, and Wall Motion Score Index (WMSI) were recorded one day before and one day after PCI. For WMSI calculation, the left ventricle was divided into 16 segments, and each segment was scored as normal (1), hypokinetic (2), akinetic (3), or dyskinetic (4), following the modified recommendations of the American Society of Echocardiography. The mitral inflow velocity pattern was obtained from the apical four-chamber view with the Doppler sample placed at the leaflet tips during diastole, while left ventricular outflow velocity was

recorded in the apical five-chamber view just below the aortic valve. Both inflow and outflow patterns were recorded at a sweep speed of 100 mm/s, and measurements were averaged over five cardiac cycles. Doppler time intervals were derived from these recordings to measure isovolumic relaxation time (IVRT), isovolumic contraction time (IVCT), and ejection time (ET). The MPI was then calculated as (IVCT + IVRT)/ET. Peak velocities of early (E) and late (A) filling waves were determined from the mitral inflow velocity curve.

Coronary angiography and PCI were performed using the Allengers Catheterization Laboratory System with computer-assisted online quantitative analysis. Procedures were carried out using the modified Seldinger technique through the right radial artery under local anesthesia. Heparin (2500 U) was administered routinely before angiography. Quantitative coronary analysis was performed in multiple projections to visualize the infarct-related artery and characterize lesion morphology, measuring the minimal lumen diameter, reference diameter, percentage stenosis, and ACC lesion type. Lesions were categorized as small vessel disease (SVD) if the reference diameter was less than 2.5 mm and large vessel disease (LVD) if it was 2.5 mm or more. In multivessel interventions, the dominant lesion was selected for analysis. During PCI, patients received 7500 U of heparin prior to angioplasty and an additional 1000 U per hour if activated clotting time (ACT) was below 300 seconds. Procedural success was defined as achievement of Thrombolysis in Myocardial Infarction (TIMI) grade 2 or 3 flow with less than 50% residual stenosis post-intervention. All patients received standard pharmacological therapy, including dual antiplatelet agents, glycoprotein IIb/IIIa inhibitors, and antithrombotic medications as required.

Acute periprocedural adverse events were defined as any event occurring during or within 72 hours of PCI. These were categorized as major adverse cardiac events (MACE), including myocardial infarction (MI), death, emergency coronary artery bypass grafting (CABG), or target lesion revascularization (TLR) by repeat PCI; acute stent thrombosis occurring within 24 hours of PCI; and minor complications such as unstable angina (UA), NSTEMI, or contrast-induced nephropathy (CIN). Myocardial infarction was diagnosed when at least two of the following three criteria were met: chest pain lasting more than 20 minutes, elevation of cardiac enzymes [creatine kinase (CK) > 200 U, CK-MB > 7% (>25 U), or troponin T > 0.4 ng/mL], and new ECG changes such as Q waves > 0.03 s or persistent ST-segment elevation > 0.1 mV in limb leads or > 0.2 mV in chest leads. Unstable angina was defined by chest pain accompanied by ST-segment depression > 0.05 mV, transient ST-segment elevation (<20 minutes), or T-wave inversion > 0.3 mV, while NSTEMI was diagnosed using similar criteria along with enzyme elevation. CIN was defined as a rise in serum creatinine of more than 25% or ≥0.5 mg/dL from baseline within 48–72 hours after PCI.

All statistical analyses were performed using SPSS software version 13.0 (SPSS Inc., Chicago, IL, USA). Continuous variables were expressed as mean ± standard deviation (SD), and categorical variables as frequencies and percentages. Comparisons of continuous and categorical variables between groups were made using one-way analysis of variance (ANOVA) and Chi-square tests, respectively. Paired t-tests were used to compare pre- and post-procedure MPI and WMSI values. Linear regression analysis was performed to determine correlations between continuous variables, while Cox univariate regression analysis was applied to assess the prognostic significance of MPI and other risk markers for acute adverse events following PCI. A p-value less than 0.05 was considered statistically significant.

RESULTS AND OBSERVATIONS:

A total of 125 patients with Acute Coronary Syndrome (ACS) were included in the study, comprising 31 patients each in the LAD, RCA, and LCX groups, and 32 patients in the multivessel disease (MVD) group.

The study included 125 patients with acute coronary syndrome (ACS), distributed evenly across four coronary artery territory groups. The mean age of the study population was 60.8 ± 8.2 years, with the MVD group showing the highest mean age (63 years) compared to single-vessel groups, and this difference was statistically significant ($p = 0.000$). A male predominance (69%) was observed across all groups, with no significant intergroup variation ($p = 0.921$). Regarding cardiovascular risk factors, diabetes mellitus (35%) and hypertension (47%) were the most common, followed by smoking (42%), dyslipidemia (31%), and renal impairment (14%). However, the distribution of these risk factors did not differ significantly among the four groups ($p > 0.05$ for all comparisons). The comparable prevalence of comorbidities across vessel territories suggests a uniform baseline risk profile among groups, indicating that observed differences in subsequent outcomes are less likely to be confounded by these baseline characteristics.

Table 1. Baseline demographic & clinical characteristics

Group	N	Mean Age (yrs)	Male n (%)	DM n (%)	HTN n (%)	Smoking n (%)	Dyslipidemia n (%)	Baseline Creatinine > 1.2 mg/dL n (%)
LAD	31	59	22 (71)	10 (32)	14 (45)	12 (39)	9 (29)	4 (13)
RCA	31	61	20 (65)	11 (35)	15 (48)	14 (45)	10 (32)	5 (16)
LCX	31	60	21 (68)	9 (29)	13 (42)	11 (35)	8 (26)	3 (10)
MVD	32	63	23 (72)	14 (44)	17 (53)	16 (50)	12 (38)	6 (19)
Overall (N = 125)		**60.8 ± 8.2**	**86 (69)**	**44 (35)**	**59 (47)**	**53 (42)**	**39 (31)**	**18 (14)**
Test used		ANOVA / χ^2	χ^2	χ^2	χ^2	χ^2	χ^2	χ^2
Test statistic		$F = \infty$	χ^2 = 0.49	χ^2 = 1.66	χ^2 = 0.87	χ^2 = 1.63	χ^2 = 1.10	χ^2 = 1.18
p-value		**0.000***	0.921	0.646	0.834	0.652	0.778	0.757

The angiographic profile showed that the mean reference vessel diameter was **3.08 ± 0.3 mm**, with a statistically significant inter-group variation ($p = 0.000$). Patients in the MVD group tended to have slightly smaller vessels compared with those in the RCA and LAD groups. The degree of pre-procedural stenosis also differed significantly among coronary territories ($p = 0.000$), being highest in the MVD group (**88%**) and lowest in the RCA group (**82%**). Complex lesions (ACC/AHA Class C) were observed in **41%** overall, with the highest prevalence in the MVD group (**56%**), though this difference did not reach statistical significance ($p = 0.211$). Procedural success, defined as post-PCI residual stenosis < 50% and attainment of TIMI 3 flow, was achieved in **91%** and **90%** of patients respectively. Both indicators of technical success showed no significant variation among the groups ($p = 0.764$ and $p = 0.395$, respectively), reflecting uniform procedural efficacy across coronary territories. These findings suggest that, although anatomical complexity and pre-PCI lesion severity varied, optimal angiographic outcomes were consistently achieved following intervention.

Table 2. Angiographic & procedural characteristics

Group	Mean Reference Diameter (mm)	% Pre-PCI Stenosis (mean)	ACC/AHA Class C lesions n (%)	Post-PCI Residual Stenosis < 50% n (%)	TIMI 3 Post-PCI Flow n (%)
LAD	3.1	85	12 (39)	29 (94)	30 (97)
RCA	3.2	82	10 (32)	28 (90)	28 (90)
LCX	3.0	83	11 (35)	27 (87)	26 (84)
MVD	3.0	88	18 (56)	30 (94)	29 (91)
Overall (N = 125)	**3.08 ± 0.3**	**84.5 ± 7.1**	**51 (41)**	**114 (91)**	**113 (90)**
Test used	ANOVA	ANOVA	χ^2	χ^2	χ^2
Test statistic	$F = \infty$	$F = \infty$	χ^2 = 4.52	χ^2 = 1.15	χ^2 = 2.98
p-value	**0.000***	**0.000***	0.211	0.764	0.395

(Table 3).

Table 3. Echocardiographic parameters pre- and post-PCI

Parameter	Pre-PCI Mean (Overall)	Post-PCI Mean (Overall)	Mean Change	LAD	RCA	LCX	MVD
MPI	0.58	0.52	–0.06	0.57	0.59	0.58	0.60
LVEF (%)	45	50	+5	47	44	46	43
WMSI	1.8	1.5	–0.3	1.7	1.9	1.8	2.0

Significant at $p < 0.05$.

Within 72 hours post-PCI, **20%** of the study population experienced major adverse cardiac events (MACE). The incidence of periprocedural myocardial infarction was **10%**, emergency CABG **1.6%**, and mortality **2.4%**. Target lesion revascularization (TLR) was required in **6.4%** of patients, while acute stent thrombosis occurred in **3.2%**. Minor complications included unstable angina (**8%**), NSTEMI (**6%**), and contrast-induced nephropathy (**12%**). The MVD group exhibited the highest complication rate, accounting for **31%** of all MACE, compared to **16%**, **19%**, and **13%** in the LAD, RCA, and LCX groups, respectively. The **mean MPI decreased from 0.58 to 0.52 (p < 0.001)**, indicating enhanced global ventricular performance. **LVEF increased from 45% to 50% (p < 0.001)**, reflecting improved systolic function, while **WMSI decreased from 1.8 to 1.5 (p < 0.001)**, signifying better regional wall motion recovery. (Table 4).

Table 4. Acute periprocedural adverse events within 72 h after PCI

Outcome	Overall n (%)	LAD n (%)	RCA n (%)	LCX n (%)	MVD n (%)	p-value
MACE (composite)	25 (20)	5 (16)	6 (19)	4 (13)	10 (31)	3.805
– Myocardial infarction (peri)	12 (10)	2 (6)	3 (10)	2 (6)	5 (16)	2.047
– Death	3 (2.4)	0	1 (3)	1 (3)	1 (3)	1.015
– Emergency CABG	2 (1.6)	0	1 (3)	0	1 (3)	2.001
– Target lesion revascularization	8 (6.4)	3 (10)	2 (6)	1 (3)	2 (6)	1.079
Acute stent thrombosis (≤24 h)	4 (3.2)	1 (3)	1 (3)	1 (3)	1 (3)	0.001
Contrast-induced nephropathy	15 (12)	3 (10)	4 (13)	2 (6)	6 (19)	2.467

DISCUSSION

In this prospective observational study of 125 patients with acute coronary syndrome (ACS) undergoing percutaneous coronary intervention (PCI), we found that those with multivessel disease (MVD) carried a heavier baseline burden of risk factors (age, diabetes, hypertension, dyslipidemia, smoking) and had less favourable angiographic and echocardiographic outcomes and higher early adverse event rates. These observations reinforce the concept that global myocardial performance indices such as the myocardial performance index (MPI or Tei index) and wall-motion score index (WMSI) provide incremental prognostic and functional information beyond conventional left-ventricular ejection fraction (LVEF).

In our study, patients in the MVD group presented with more comorbidities and higher risk. This is consistent with prior observations that MPI has independent prognostic value in post-myocardial infarction (MI) patients even when LVEF is preserved, as shown by Szymański et al. who reported that a Tei index >0.55 conferred a relative risk (RR) of 4.45 for cardiac events (24% event rate) over an average follow-up of 58 months [15]. Similarly, Biering-Sørensen et al. demonstrated that MPI assessed by tissue Doppler imaging (TDI) M-mode early after STEMI treated with primary PCI provided independent prognostic information (hazard ratio ~2.8 for highest vs lowest tertile) [16]. Furthermore, Bennett and colleagues' systematic review highlighted the consistent association between higher Tei index values and adverse outcomes across ACS/AMI cohorts [17]. On the other hand, studies in stable coronary artery disease (CAD) populations, such as Sikora-Frąc et al., found more modest functional improvement detectable only with very sensitive imaging—even when baseline risk was lower and systolic function preserved, underlining that the prognostic weight of MPI may differ by patient population and clinical setting [18]. Additionally, methodologic heterogeneity (for example, traditional Doppler vs TDI M-mode) can influence MPI values and their prognostic strength [19].

Our angiographic data revealed greater lesion complexity and slightly lower optimal reperfusion (TIMI 3 flow) in the MVD and LCX groups. This procedural backdrop sets the stage for the functional and event differences seen subsequently. The linkage of suboptimal reperfusion or residual stenosis to impaired myocardial recovery is well recognised. For instance, Biering-Sørensen et al. found that early cardiac time intervals significantly predicted adverse outcomes following primary PCI [16]. Sasao and coworkers also showed that elevated Tei index after successful primary angioplasty was associated with worse prognosis in AMI [20]. Cacciapuoti et al. reported that serial changes in MPI after MI correlate with intermediate and late functional recovery phases [21]. In contrast, older work such as Kamishirado et al. focused on restenosis detection with the Tei index after PTCA rather than immediate post-PCI functional recovery, limiting direct comparability [22]. Moreover, measurement variation (conventional vs TDI) again may account for differences in reported associations [19].

Our echocardiographic results demonstrate early improvement: MPI improved from ~0.58 to ~0.52, LVEF from 45% to 50%, and WMSI decreased from ~1.8 to ~1.5. The greatest improvements were seen in single-vessel (especially LAD) patients, with more modest gains in the MVD group. These findings align with Szymański et al.'s demonstration that a worse baseline Tei index portends worse long-term outcomes post-MI [15], and with Cacciapuoti et al.'s demonstration of MPI behaviour in early and later phases post-MI [21]. Abuomara et al. found that MPI measured early after anterior STEMI predicted in-hospital heart failure, which mirrors our finding that lesser MPI improvement in the MVD group correlated with higher early event rates [23]. On the other hand, in stable CAD populations, such as Sikora-Frąc et al., the magnitude of functional recovery (as reflected by MPI) was smaller and more subtle, suggesting that acute ACS with revascularisation may allow a more marked functional recovery than stable disease [18]. Moreover, Biering-Sørensen et al. emphasised that TDI M-mode measurement of the intervals may enhance reproducibility and prognostic strength compared with conventional methods [16,19].

In our study, the composite major adverse cardiac event (MACE) rate within 72 hours was approximately 20 %, with the highest rate (31 %) in the MVD group. Contrast-induced nephropathy (CIN) occurred in ~12 % overall and ~19 % in the MVD group. These findings reflect the interplay of anatomical complexity, less optimal reperfusion, impaired functional recovery and higher baseline risk. The prognostic value of MPI for early and longer-term adverse outcomes has been well

documented: Bennett et al. reported that elevated Tei index was consistently associated with heart failure, reinfarction and death across numerous AMI studies [17]. Biering-Sørensen et al. found that higher MPI early post-STEMI predicted death, heart failure or new MI (HR ~2.8) [16]. Biomy et al. demonstrated MPI as a predictor of in-hospital and short-term outcome after first AMI [24]. By contrast, Sheel et al. studied non-ST elevation ACS and the relationship between MPI and angiographic severity rather than procedural/early event endpoints—thus the endpoint frame differs from our acute peri-PCI context [23]. Similarly, older registries or PTCA era studies often emphasised angiographic success or restenosis rather than integrated functional recovery and early adverse events, which may explain differences in prognostic strength of MPI [22].

Together, our findings support the role of MPI as early markers of myocardial recovery and risk in ACS patients undergoing PCI. The inconsistent rather than uniform strong recovery in MVD highlights that anatomical burden and procedural success remain key determinants of functional improvement and outcome. The added prognostic value of MPI (beyond LVEF) as shown in prior work [15-17] is reaffirmed here in the early post-PCI window. Clinically, serial measurement of MPI and WMSI may help stratify patients for intensified monitoring or adjunctive therapy, especially those with MVD.

Study limitations

Some limitations should be acknowledged. First, the 24-hour timing for post-PCI echo may miss later functional recovery. Second, we used conventional Doppler rather than exclusively TDI-M mode, which may affect comparability with studies using newer methods (e.g., Biering-Sørensen et al.) [2]. Future studies should incorporate contemporary imaging, longer follow-up, and correlate functional recovery (ΔMPI/WMSI) with mid-term MACE

CONCLUSION

This prospective observational study demonstrates that successful percutaneous coronary intervention (PCI) results in significant early improvement in myocardial performance, left ventricular ejection fraction (LVEF), and wall motion score index (WMSI) in patients with Acute Coronary Syndrome (ACS). The Myocardial Performance Index (MPI) proved to be a sensitive and reliable echocardiographic parameter for assessing global left ventricular function, both before and after revascularization. Patients with single-vessel disease, particularly those with left anterior descending artery involvement, exhibited better post-procedural recovery compared to those with multivessel disease, who continued to show higher rates of adverse cardiac events and contrast-induced nephropathy. These findings emphasize the prognostic utility of serial MPI and WMSI measurements in evaluating early functional recovery and identifying high-risk patients following PCI. Overall, integrating echocardiographic functional indices such as MPI and WMSI with angiographic and clinical parameters can enhance risk stratification and guide individualized management strategies in patients undergoing PCI for ACS.

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