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CARDIOVASCULAR SURGERY AND INTERVENTIONS

Comparative evaluation of clinical, hematological, and echocardiographic parameters in NSTE-MI patients undergoing CABG versus PCI

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ABSTRACT

Objectives: Non-ST segment elevation myocardial infarction (NSTE-MI) patients may be managed with either percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG). This study compares clinical, hematological, and echocardiographic characteristics between these two groups.

Patients and methods: We conducted a retrospective analysis of 120 NSTE-MI patients, with 60 undergoing CABG and 60 undergoing PCI. Demographic features, laboratory values, echocardiographic measurements, and angiographic SYNTAX scores were collected. Correlation analyses were performed using Spearman's method.

Results: The mean age was higher in the CABG group (64.9±11.1 *vs.* 62.2±11.5 years, p=0.254). Mean platelet volume (MPV), was 8.90±1.75 in the CABG group and 8.57±1.23 in the PCI group (p=0.347). Platelet count was slightly higher in the CABG group (232,583±74.3 *vs.* 225,816±54.5, p=0.927). Baseline ejection fraction (EF) was significantly higher in PCI patients (60.3±5.4 *vs.* 55.3±8.8, p=0.002), and the change in EF during hospitalization (ΔEF) was more pronounced in the CABG group (5.0 [3.0-9.5] *vs.* 1.0 [0.0-4.0], p<0.001). Peak troponin levels were higher in the CABG group (6418.8±11103.3 *vs.* 6135.3±9647.2, p=0.983). SYNTAX score was significantly greater in the CABG group (39.7±7.0 *vs.* 30.1±3.9, p<0.001). C-reactive protein levels were higher in CABG patients (19.5±3.9 *vs.* 16.5±2.4, p=0.937). Median neutrophil-to-lymphocyte (N/L) ratio was 2.5 *vs.* 2.2 (p=0.675). WBC counts were similar between groups (9.0×10^3 *vs.* 9.02×10^3, p=0.971). According to Spearman correlation analysis, MPV was positively correlated with ΔEF (r=0.259, p=0.005), while SYNTAX score was negatively correlated with baseline EF (r=-0.288, p=0.002). A positive correlation was observed between peak troponin and ΔEF (r=0.553, p<0.001), as well as between SYNTAX score and ΔEF (r=0.542, p<0.001). Additionally, N/L ratio was positively correlated with ΔEF (r=0.228, p=0.013).

Conclusion: CABG-treated NSTE-MI patients showed higher anatomical complexity and greater EF decline. Several correlations between hematological and functional parameters were identified.

Keywords: NSTE-MI, CABG, PCI, SYNTAX score, ejection fraction.

Non-ST-segment elevation myocardial infarction (NSTE-MI) represents a clinically significant form of acute coronary syndrome (ACS), encompassing a heterogeneous group of patients with varying degrees of myocardial ischemia and injury.[1] Unlike ST-segment elevation myocardial infarction (STEMI), NSTE-MI is not characterized by persistent ST-segment elevation on the electrocardiogram, but is nonetheless associated with elevated cardiac biomarkers indicative of myocardial necrosis.[2] It often reflects subtotal coronary artery obstruction or severe stenosis, and carries a considerable risk of short- and long-term adverse cardiovascular outcomes, especially in patients with extensive atherosclerosis, diabetes, or left ventricular dysfunction.[3]

Optimal management of NSTE-MI hinges on timely risk stratification and appropriate selection of a revascularization strategy. Both the European Society of Cardiology (ESC) and American College of Cardiology/American Heart Association (ACC/AHA) guidelines recommend an early invasive approach for high-risk patients.[2,3] The choice between percutaneous coronary intervention (PCI) and coronary artery bypass

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grafting (CABG), however, must be tailored to individual anatomical and clinical characteristics. PCI is typically favored due to its minimally invasive nature, faster recovery, and lower immediate procedural risk. Conversely, CABG is generally preferred in cases involving multivessel disease, left main involvement, or high SYNTAX scores, as it offers more comprehensive and durable revascularization.[4]

Although CABG is often reserved for patients with greater coronary complexity and worse baseline clinical status, several studies suggest that it may provide superior improvement in myocardial perfusion and left ventricular function compared to PCI, particularly in the presence of viable but ischemic myocardium. However, data comparing early changes in cardiac function following CABG versus PCI in NSTE-MI patients remain limited.[5]

Ejection fraction (EF) is a central measure of left ventricular systolic performance and a key prognostic marker in myocardial infarction. It is not a static parameter, and may improve after effective revascularization, especially in patients with hibernating or stunned myocardium. Therefore, evaluating not only the baseline EF but also its change during hospitalization (ΔEF) may provide valuable insights into myocardial recovery and the impact of the chosen revascularization strategy.[6]

In addition to imaging-based assessments, several hematological and inflammatory markers have emerged as potential indicators of disease severity and prognosis in ACSs. Parameters such as mean platelet volume (MPV), neutrophil-to-lymphocyte (N/L) ratio, white blood cell count (WBC), and high-sensitive C-reactive protein (CRP) are easily accessible through routine blood tests and may reflect both the thrombotic and inflammatory burden. These markers could offer supplementary prognostic value, particularly when interpreted alongside anatomical and functional data.[7-9]

In this context, the present study aimed to provide a comparative evaluation of NSTE-MI patients undergoing CABG or PCI by analyzing their clinical characteristics, hematological parameters, echocardiographic measurements, and angiographic complexity as assessed by the SYNTAX score. Particular attention was given to changes in EF during hospitalization and the potential relationships between laboratory markers and functional recovery. This integrated approach may contribute to a more nuanced understanding of how different revascularization strategies influence short-term cardiac outcomes in this diverse and high-risk patient population.

PATIENTS AND METHODS

Study Design and Setting

This was a retrospective, observational, single-center study conducted at a tertiary care academic hospital specializing in cardiovascular care. The study was designed to compare clinical, hematological, and echocardiographic outcomes in patients diagnosed with NSTE-MI who underwent either PCI or CABG during the same hospitalization period. Ethical approval for the study protocol was obtained from the Institutional Review Board of Bakırçay University Çiğli Training and Research Hospital (date: 23.09.2025, document number: KU.FR.09 no:1/1) and the research was conducted in accordance with the Declaration of Helsinki principles.

Study Population

A total of 120 patients with a confirmed diagnosis of NSTE-MI were included in the analysis. Patients were consecutively selected from electronic hospital records between January 2022 and December 2024. The diagnosis of NSTE-MI was established based on clinical symptoms (typically chest pain lasting >20 minutes), electrocardiographic findings (absence of persistent ST-segment elevation), and elevated cardiac biomarkers (specifically high-sensitivity troponin I levels exceeding the 99th percentile upper reference limit).

Patients were divided into two equal groups based on the revascularization strategy applied. The PCI group included those who underwent coronary angiography followed by PCI with stent implantation. In contrast, the CABG group consisted of patients who were evaluated by the heart team and referred for surgical revascularization due to anatomical complexity, multivessel disease, or other clinical considerations.

Inclusion and Exclusion Criteria

Patients aged 18 years or older with a confirmed diagnosis of NSTE-MI who underwent revascularization via either PCI or CABG during the index hospitalization were included in the study. Eligibility also required the availability of complete laboratory, echocardiographic, and angiographic data.

Patients were excluded if they had ST-segment elevation myocardial infarction (STEMI), presented with cardiogenic shock, had a history of prior CABG surgery, or were affected by active infection, systemic inflammatory disease, known hematologic disorders, or malignancy. Incomplete clinical records or missing echocardiographic data also constituted exclusion criteria.

Data Collection and Variables

All data were retrospectively collected from institutional digital medical records. The recorded and analyzed variables included demographic and clinical parameters such as age, sex, cardiovascular risk factors (including hypertension, diabetes mellitus, hyperlipidemia, and smoking), past medical history (prior myocardial infarction, heart failure, atrial fibrillation, and stroke), as well as presenting symptoms and the time interval from symptom onset to hospital admission.

Hematological and Inflammatory Parameters

Laboratory data were obtained from blood samples drawn within the first 6 hours of hospital admission, prior to revascularization, and included measurements of (MPV, fL), platelet count ($\times 10^9$/L), WBC count ($\times 10^3$/μL), N/L ratio, high-sensitivity C-reactive protein (hsCRP, mg/L), and peak high-sensitivity cardiac troponin I (ng/L).

Echocardiographic Evaluation

Transthoracic echocardiography (TTE) was performed for all patients upon admission and repeated prior to discharge using standard parasternal and apical views in accordance with American Society of Echocardiography guidelines. Left ventricular EF was calculated using the biplane Simpson's method.[10] The following variables were extracted: Baseline EF (%), EF at discharge (%), change in EF (ΔEF = discharge EF - baseline EF). All transthoracic echocardiographic examinations were performed using a GE Vivid E9 echocardiography system (GE Healthcare, Horten, Norway) by experienced cardiologists.

Coronary Angiography and SYNTAX Score

Selective coronary angiography was performed via the femoral approach using the Judkins technique and a General Electric Innova 3100 angiographic system (Buc Cedex, France). Multiple angiographic views were obtained to ensure optimal visualization of the coronary anatomy, including at least four projections for the left anterior descending and left circumflex arteries, and at least two projections for the right coronary artery. All angiographic recordings were stored in DICOM format on compact discs. Coronary angiograms and SYNTAX scores were independently assessed by two experienced interventional cardiologists who were blinded to the patients' clinical data; any discrepancies in scoring were resolved by consensus. In patients assigned to the PCI group, PCIs were performed by experienced operators. In the CABG group, surgical strategy and graft selection were determined based on the detailed angiographic findings. Coronary lesion complexity was evaluated using the SYNTAX scoring algorithm, which incorporates factors such as lesion location, bifurcation involvement, thrombus burden, calcification, and total occlusions. Treatment allocation was influenced by the SYNTAX score, with patients having a score of 33 or higher generally being directed toward CABG due to the greater anatomical complexity.[4]

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were tested for normality using the Kolmogorov-Smirnov test. Normally distributed continuous variables were presented as mean ± standard deviation (SD), while non-normally distributed variables were presented as median (interquartile range). Categorical variables were expressed as frequencies and percentages. Between-group comparisons were performed using appropriate statistical tests based on data distribution and type. The independent samples t-test was used for normally distributed continuous variables, while the Mann-Whitney U test was applied for non-normally distributed continuous variables. Categorical variables were compared using either the chi-square test or Fisher's exact test, as appropriate. To assess the relationships between selected hematological, echocardiographic, and angiographic parameters, Spearman's rank correlation coefficient (r) was employed. A two-tailed p-value of less than 0.05 was considered indicative of statistical significance in all analyses.

RESULTS

A total of 120 patients diagnosed with NSTE-MI were included in the study, comprising two equal groups: 60 patients underwent PCI, while the remaining 60 patients underwent CABG operation. The mean age of the entire cohort was 63.6±11.3 years, with the CABG group being slightly older (64.9±11.1 years) than the PCI group (62.2±11.5 years), although this difference did not reach statistical significance (p=0.254). Both groups were comparable in terms of sex distribution and cardiovascular risk factors such as hypertension, diabetes mellitus, dyslipidemia, smoking status, and history of prior myocardial infarction, indicating that the baseline clinical profiles were relatively balanced.

Regarding hematological parameters, the MPV, a marker often associated with platelet reactivity and inflammation, was marginally higher in the CABG group (8.90±1.75 fL) compared to the PCI group (8.57±1.23 fL), but this difference was not statistically significant (p=0.347). Platelet counts were also slightly elevated in the CABG group (232.5±74.3×10^3/µL *vs.* 225.8±54.5×10^3/µL), yet without statistical significance (p=0.927). Similarly, CRP levels, a non-specific indicator of systemic inflammation, were higher in the CABG group (19.5±3.9 mg/L) than in the PCI group (16.5±2.4 mg/L), but this difference too was not significant (p=0.937). WBC counts were nearly identical in both groups (9.0×10^3/µL *vs.* 9.02×10^3/µL; p=0.971). Median neutrophil-to-lymphocyte (N/L) ratio, another emerging inflammatory marker, was slightly higher in the CABG group (2.5 *vs.* 2.2), although this did not differ significantly between interventions (p=0.675). These findings suggest that the systemic inflammatory and hematologic profiles at baseline were largely similar between patients selected for either revascularization strategy.

In contrast, significant differences emerged when angiographic complexity and echocardiographic findings were evaluated. The SYNTAX score, which quantifies the anatomical complexity and severity of coronary artery disease (CAD), was substantially higher in the CABG group (39.7±7.0) compared to the PCI group (30.1±3.9), with the difference being highly statistically significant (p<0.001). This confirms that patients selected for CABG had more diffuse, multivessel, and anatomically challenging disease. Interestingly, this anatomical severity translated into functional impairment: baseline left ventricular EF was significantly lower in the CABG group (55.3±8.8%) than in the PCI group (60.3±5.4%) (p=0.002), suggesting a greater degree of myocardial dysfunction at presentation among patients undergoing surgical revascularization. ROC curve analysis was performed to evaluate the predictive value of the SYNTAX score for guiding treatment strategy in patients with non-ST-elevation myocardial infarction (NSTEMI). As demonstrated in Figure 1, the SYNTAX score showed a significant ability to discriminate patients who underwent CABG operation. The optimal cut-off value was identified at 32.75, yielding a sensitivity of 88.3% and a specificity of 83.3%.

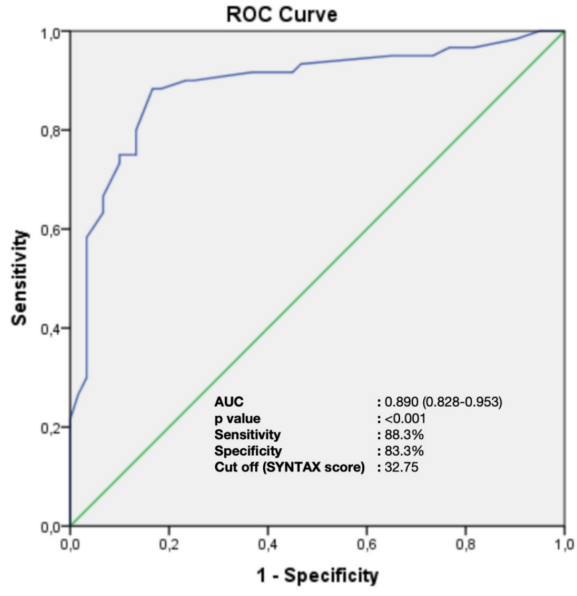

Figure 1. ROC curve analysis of SYNTAX score for predicting CABG selection in NSTEMI patients.
ROC: Receiver operating characteristic; CABG: Coronary artery bypass grafting; NSTEMI: Non–ST-elevation myocardial infarction; AUC: Area under the curve.

Despite this initial disadvantage in baseline EF, the CABG group demonstrated a notably greater improvement in EF during the course of hospitalization. The median (25^{th}-75^{th}) change in EF (ΔEF) was significantly higher in the CABG group (5.0 [3.0-9.5]) than in the PCI group (1.0 [0.0-4.0]) (p<0.001) (Figure 2). This finding indicates that patients who underwent CABG experienced a more robust functional recovery, likely attributable to more complete and anatomically comprehensive revascularization achieved via surgical grafting. These observations support the hypothesis that even in patients with lower baseline systolic function, surgical intervention may yield substantial gains in myocardial performance when the anatomical burden of disease is high. Table 1 presents the clinical and laboratory findings of patients with NSTEMI according to the applied treatment management.

Additional analysis revealed important correlations among the study parameters. A negative correlation was found between SYNTAX score and baseline EF (Spearman's r=-0.288, p=0.002), implying that patients with more complex coronary lesions tend to have more impaired ventricular function at the time of presentation. In contrast, SYNTAX score was strongly and positively correlated with ΔEF (r=0.542, p<0.001),

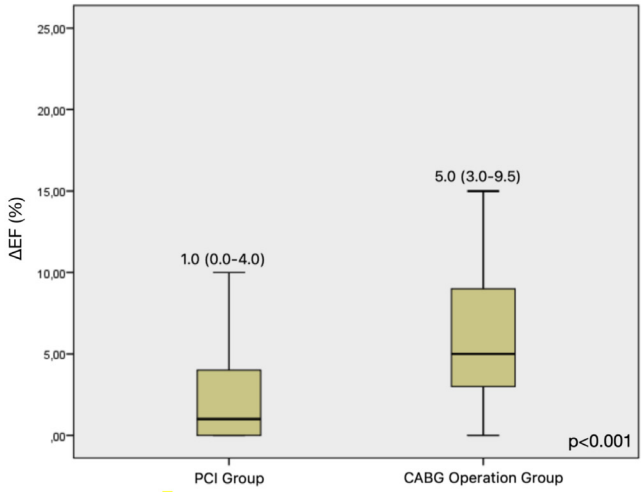

Figure 2. Comparison of ΔEF between PCI and CABG groups.
ΔEF: Change in ejection fraction; PCI: Percutaneous coronary intervention; CABG: Coronary artery bypass grafting; Statistical data were presented as median (25^{th}-75^{th}), and a p-value <0.05 was considered statistically significant.

suggesting that patients with greater anatomical disease burden derived greater benefit in terms of left ventricular function improvement after revascularization - an effect particularly pronounced in the CABG group.

Furthermore, peak troponin levels, while not significantly different between the groups (CABG: 6418.8±11,103.3 ng/L *vs.* PCI: 6135.3±9647.2 ng/L; p=0.983), demonstrated a robust positive correlation with ΔEF (r=0.553, p<0.001). This indicates that higher troponin release-typically associated with greater myocardial injury-was paradoxically linked to greater improvement in EF, possibly reflecting the recovery of stunned or hibernating myocardium after successful reperfusion.

Among hematological markers, MPV showed a significant positive correlation with ΔEF (r=0.259, p=0.005), suggesting a potential role for platelet activity in modulating myocardial recovery. Although high MPV values have been traditionally linked to worse cardiovascular outcomes, in this study, higher MPV may represent a physiological response to myocardial injury and repair processes rather than an exclusively prothrombotic state. Likewise, the N/L ratio, despite not differing significantly between groups, exhibited a statistically significant positive correlation with ΔEF (r=0.228, p=0.013), reinforcing the notion that systemic inflammatory activation during acute coronary events might be related to post-revascularization myocardial remodeling and recovery.

Collectively, these findings emphasize that patients selected for CABG, although presenting with more severe coronary disease and reduced baseline systolic function, benefited from more pronounced improvement in left ventricular performance following intervention. The data also suggest that beyond anatomical complexity, simple laboratory markers such as MPV and N/L ratio may carry independent prognostic information related to myocardial recovery. The consistent and significant correlations between SYNTAX score, troponin, MPV, and ΔEF strengthen the potential utility of combining clinical, anatomical, biochemical, and hematological data to guide therapeutic decision-making in NSTE-MI.

In the multivariate logistic regression analysis performed to identify independent predictors of undergoing CABG surgery, ΔEF (%) and SYNTAX score were found to be significant determinants. An increase in ΔEF was independently associated with higher odds of CABG (odds ratio [OR]: 1.908, 95% confidence interval [CI]: 1.354-2.689, p<0.001). Similarly, a higher SYNTAX score significantly predicted CABG referral (OR: 1.388, 95% CI: 1.197-1.610, p<0.001) (Table 2).

Table 1. Baseline characteristics according to treatment management in patients with non–ST-elevation myocardial infarction

Treatment group	PCI group, n=60	CABG group, n=60	p-value
Age	62.17±11.50	64.87±11.11	0.254
Gender (male,%)	70.0	71.7	0.841
SYNTAX score	30.17±3.88	39.72±7.03	**p<0.001***
Δ-EF (%)	2.27±2.39	6.58±4.88	**p<0.001***
CRP (mg/dL)	16.52±24.88	19.46±38.93	0.937
MPV (fL)	8.57±1.24	8.91±1.76	0.347
Neu/L ratio	4.27±5.83	3.68±3.15	0.675
Platelet count (×10^3/μL)	225.82±54.48	232.58±74.34	0.927
Troponin level (ng/L)	6135.32±9647.26	6418.77±11103.32	0.983

PCI: Percutaneous coronary intervention; CABG: Coronary artery bypass grafting; CRP: C-reactive protein; MPV: Mean platelet volume; Neu/L: Neutrophil-to-lymphocyte ratio.

Table 2. Multivariate logistic regression analysis for predictors of CABG operation

	p-value	OR	95% CI
Gender (male)	0.408	1.865	0.426-8.166
Troponin level	0.001	1.000	1.000-1.000
Baseline EF (%)	0.258	1.075	0.948-1.219
ΔEF (%)	<0.001	1.908	1.354-2.689
Age	0.113	1.051	0.988-1.119
SYNTAX score	<0.001	1.388	1.197-1.610

ΔEF: Change in ejection fraction; CABG: Coronary artery bypass grafting; CI: Confidence interval; OR: Odds ratio.

DISCUSSION

This study provides a comparative analysis of NSTE-MI patients who underwent either PCI or CABG operation, focusing on hematological markers, angiographic complexity, and echocardiographic outcomes. Our findings reveal that although patients treated with CABG had a significantly higher anatomical disease burden and lower baseline EF, they exhibited greater improvement in EF (ΔEF) during hospitalization. These results underscore the functional benefits of surgical revascularization in patients with more extensive CAD, and highlight the prognostic value of integrating hematological and anatomical indices into clinical decision-making.

Our data showed that the SYNTAX score, a validated index of coronary complexity was significantly higher in the CABG group, suggesting that patients selected for surgery had more anatomically diffuse or multivessel disease. This finding aligns with the current ESC and ACC/AHA guidelines, which recommend CABG in patients with high SYNTAX scores and diabetes, or in those with complex multivessel disease, as it is associated with lower long-term mortality and major adverse cardiovascular events compared to PCI.[2-4]

Despite having significantly lower baseline EF, CABG patients demonstrated a more pronounced improvement in EF during hospitalization. This observation may partly reflect the selection of patients with viable or hibernating myocardium who are more likely to recover function once adequate perfusion is restored, rather than the surgical technique itself. The more complete revascularization typically achieved with CABG - especially in cases involving chronic total occlusions or diffuse atherosclerosis-could also contribute to this finding. Similar trends have been noted in previous studies, where postoperative EF gains were associated with myocardial viability and restoration of blood flow rather than a direct effect of the revascularization modality itself.[11-13] One of the key innovations of our study is the assessment of hematological markers specifically MPV and N/L ratio in relation to functional cardiac recovery. MPV, a well-established surrogate marker for platelet activation and systemic inflammation, was found to be positively associated with changes in ΔEF. This finding appears to contrast with the majority of existing literature, in which elevated MPV levels have been consistently associated with adverse cardiovascular outcomes, including increased risk of myocardial infarction, heart failure, and mortality.[14-16] However, emerging evidence suggests that, particularly in the setting of ACSs, transient elevations in MPV may not solely reflect a prothrombotic state but could also indicate dynamic hematological changes secondary to reperfusion, inflammatory resolution, or hemodilution post-CABG.[17] Therefore, rather than implying a causal relationship, our observation may reflect a context-dependent response associated with perioperative physiological adaptation and recovery. Similarly, the N/L ratio—an easily obtainable marker of systemic inflammation and stress—was also found to correlate with ΔEF in our study. This association should be interpreted cautiously, as fluctuations in N/L ratio may represent not only inflammatory activation but also subsequent resolution or normalization of immune balance after revascularization.[18] These observations align with reports suggesting that temporal changes in N/L ratio can provide insight into both the extent of injury and the trajectory of recovery in ACSs.[19] In contrast to previous studies where elevated MPV and N/L ratio were linked to adverse outcomes, our findings suggest a context-dependent association between these hematological markers and functional cardiac recovery (ΔEF) after revascularization. While Khan et al.[11] demonstrated that CABG offers superior long-term outcomes compared to PCI in patients with left ventricular systolic dysfunction, their analysis did not specifically address short-term improvements in EF. Conversely, Soetisna et al.[12] reported a significant postoperative increase in EF among patients with baseline EF <35%, attributing this improvement to recovery of hibernating myocardium following complete revascularization. Taken together, our study complements these findings by introducing an additional dimension suggesting that perioperative hematological and inflammatory dynamics may serve as surrogate indicators of myocardial repair and adaptive recovery after CABG.

The inverse correlation between SYNTAX score and baseline EF suggests that more complex coronary disease is associated with reduced left ventricular function at presentation.[20] This is biologically plausible, as greater atherosclerotic burden leads to more ischemic myocardium and impaired systolic performance. However, the strong positive correlation between SYNTAX score and ΔEF may seem contradictory. A potential explanation is that patients with low baseline EF and extensive disease may have more viable myocardium that can recover once complete revascularization is achieved, particularly through CABG. The correlation between peak troponin levels and ΔEF further supports this interpretation in our study. Higher troponin levels, while typically associated with more severe myocardial necrosis, may also indicate a larger area of reversible ischemia, particularly in non-transmural infarctions. In such scenarios, prompt and complete revascularization could salvage myocardium and improve contractile function.[21]

Our results suggest that CABG may offer superior short-term functional outcomes in selected NSTE-MI patients, especially those with high SYNTAX scores and impaired baseline EF. Moreover, simple hematological markers such as MPV and N/L ratio may help identify patients who are more likely to experience meaningful improvement in myocardial function after revascularization. These parameters are inexpensive, routinely available, and could be incorporated into clinical risk models.

This study has several limitations. First, it was conducted in a single-center with a retrospective design, which may introduce selection bias and precludes causal inferences. Second, the study was non-randomized, and potential confounding factors could not be fully controlled. Third, long-term follow-up data were not available; therefore, we could not evaluate outcomes such as survival, rehospitalization, or recurrent ischemia. In particular, the absence of extended follow-up limits our ability to determine whether the observed improvement in ΔEF is independently associated with mortality or hospital readmission.

Fourth, ΔEF was measured only during hospitalization and may not accurately represent sustained functional recovery. Fifth, advanced imaging modalities such as myocardial strain analysis or viability studies were not performed, which could have provided additional mechanistic insights into myocardial recovery. Despite these limitations, our study offers a multidimensional perspective on the interplay between anatomical complexity, hematological markers, and cardiac function, thereby contributing to the growing body of evidence supporting individualized revascularization strategies in NSTE-MI.

In NSTE-MI, CABG patients exhibit greater angiographic disease burden but benefit from significant improvement in cardiac function. Integration of MPV, N/L ratio, and SYNTAX score into clinical practice may refine risk stratification and inform revascularization decisions. Further prospective studies are warranted to validate these associations.

Ethics

Ethics Committee Approval: Ethical approval for the study protocol was obtained from the Institutional Review Board of Bakırçay University Çiğli Training and Research Hospital (date: 23.09.2025, document number: KU.FR.09 no:1/1) and the research was conducted in accordance with the Declaration of Helsinki principles.

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Concept: S.A.; Design: S.A.; Data Collection or Processing: S.A., M.Z.; Analysis or Interpretation: S.A., M.Z.; Literature Search: S.A.; Writing: S.A., M.Z.

Conflict of Interest: No conflict of interest was declared by the authors.

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