

Safety and Cost Implications of General Ward versus Coronary Care Unit Admission After PCI for Stable STEMI: A Propensity-Matched Analysis

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Background: Routine coronary care unit (CCU) admission after primary percutaneous coronary intervention (PCI) for ST-segment elevation myocardial infarction (STEMI) was affected during the COVID-19 pandemic. Infection control requirements require clinical assessment-based triaging to identify low-risk patients suitable for general ward admission. This study evaluated whether triaging clinically stable patients with STEMI (P-STEMI) to general wards is safe and cost-effective compared with CCU admission.

Methods: This single-centre retrospective study included 486 P-STEMI who underwent PCI between January 2020 and December 2022; 82 were triaged to general wards and 404 to the CCU. A triage protocol based on COVID-19 testing status and clinical stability was implemented. Covariates were preselected using a directed acyclic graph (DAG) and balanced between groups via 1:1 propensity score matching. The primary outcome was total hospitalisation costs; secondary outcomes included in-hospital major adverse cardiovascular events (MACE) and length of stay.

Results: In the original cohort, the general ward group had significantly lower costs (median \$3515.59 vs \$4057.86, $p < 0.001$) and MACE rates (2.44% vs 16.83%; $p < 0.001$). After PSM (76 patients each), general ward admission remained significantly associated with reduced hospitalisation costs (median \$3515.15 vs \$3798.86, $p = 0.049$). However, the difference in MACE was no longer significant (2.63% vs 3.95%, $p = 0.649$). No significant difference in LOS was observed. The Zwolle risk score demonstrated good predictive ability for in-hospital MACE (AUC=0.867).

Conclusion: For clinically stable P-STEMI post-PCI, triage to general wards was associated with significantly lower hospitalisation costs, and no statistically significant difference in MACE was observed.

Keywords: triage, ST-elevation myocardial infarction, percutaneous coronary intervention, coronary care unit, propensity score analysis

Introduction

ST-segment elevation myocardial infarction (STEMI) is a life-threatening cardiovascular emergency requiring timely reperfusion therapy.¹ Following successful primary percutaneous coronary intervention (PCI), patients are routinely admitted to the coronary care unit (CCU) for close monitoring to enable the early detection and management of potentially life-threatening complications.^{1,2} This approach has long been considered standard practice. However, the ACCF/AHA STEMI guidelines do not provide explicit recommendations on whether patients with STEMI should be admitted to the CCU after PCI.³ Initially established for the monitoring and treatment of peri-infarction ventricular arrhythmias, the CCU has evolved into a highly specialised cardiac intensive care unit (CICU).⁴ Modern CICU populations are characterised by advancing age and a substantially higher burden of cardiovascular and non-cardiovascular comorbidities,^{5,6} which have contributed to the ongoing scarcity of CICU bed capacity. This challenging circumstance has further highlighted the importance of a risk-based triage strategy for STEMI patients.

Advances in reperfusion strategies have substantially improved STEMI outcomes.^{7,8} Shavadia et al⁹ reported that although > 80% of patients with clinically stable STEMI were admitted to the intensive care unit (ICU) after primary PCI, only 16% developed complications requiring intensive care. Several studies have demonstrated the safety of managing low-risk patients with STEMI in non-ICU settings.^{10–12} More recently, Amon et al¹³ reported that among 1770 patients with initially stable STEMI, only 5.3% developed in-hospital adverse events requiring intensive care. Collectively, these studies support the feasibility of risk-based triage in patients with stable STEMI. Nevertheless, post-PCI deterioration in P-STEMI may still occur, mainly due to failed reperfusion, malignant arrhythmias, hemodynamic instability, or mechanical complications.¹⁴ Identifying low-risk patients for general ward care faces barriers, including variability in institutional resources, clinician acceptance, patient expectations, and the capacity for surveillance systems to detect delayed deterioration.

In early 2020, the coronavirus disease (COVID-19) pandemic imposed an unprecedented strain on healthcare systems,^{15,16} leading to severe CCU bed shortages.¹⁷ While the pandemic created an acute crisis, optimising CCU resource allocation while maintaining patient safety is a persistent challenge that extends beyond pandemic contexts. In response, our institution implemented a clinical assessment-based triage protocol in January 2020, allowing selected patients with stable STEMI to be admitted to general wards equipped with telemetry monitoring. This study aimed to compare in-hospital outcomes between patients with STEMI triaged to general wards and those triaged to the CCU following PCI, and to evaluate the impact of this triage approach on resource utilisation.

Methods

Study Design and Setting

This single-centre retrospective study was conducted at Changde Hospital, Xiangya School of Medicine, Central South University (The First People's Hospital of Changde City), a regional medical centre in northwestern Hunan Province, China. The Department of Cardiology is equipped with a 16-bed CCU and three general wards (each with 47 beds, of which 12 have telemetry monitoring capabilities). The CCU has a nurse-to-bed ratio of 1.5:1 and is equipped with advanced life support devices, including ventilators, intra-aortic balloon pumps, and continuous renal replacement therapy. General wards have a nurse-to-bed ratio of 0.42:1, with physicians conducting daily rounds once or twice daily but without a dedicated intensive care team stationed in the unit.

Study Population

Data were retrospectively collected from the STEMI database for all patients who presented between 1 January 2020 and 31 December 2022 (n=908).

The inclusion criteria were as follows: (1) diagnosis of STEMI according to the Fourth Universal Definition of Myocardial Infarction,¹⁸ (2) presentation within 24 hours of symptom onset, and (3) primary PCI or rescue PCI following failed thrombolysis.

The exclusion criteria were: (1) prior history of acute myocardial infarction; (2) type 2–5 myocardial infarction;¹⁸ (3) death before or during PCI; (4) severe hepatic or renal dysfunction (alanine transaminase >5× upper limit of normal, serum creatinine >200 µmol/L); (5) active bleeding; (6) malignancy; (7) concomitant new-onset stroke; (8) electrocardiographic findings of complete left bundle branch block; and (9) positive COVID-19 nucleic acid test.

Triage Protocol

In January 2020, a triage protocol was implemented based on COVID-19 infection control requirements. The triage decision was made by the interventional cardiology team based on a patient's COVID-19 testing status at admission as well as their clinical stability.

Patients with a negative COVID-19 nucleic acid test result within 48 hours prior to admission were triaged to the CCU for post-PCI care.

Patients without a negative COVID-19 nucleic acid test result within 48 hours prior to admission were managed as follows: (1) for patients without a negative COVID-19 test who were clinically unstable (eg, Killip class ≥II, cardiogenic shock, or malignant arrhythmias), the team performed rapid nucleic acid testing. If a negative result was confirmed and CCU beds were available, the patient was prioritised for CCU admission.

(2) Patients without a negative COVID-19 test result who were clinically stable (Killip class I, no signs of haemodynamic instability, or malignant arrhythmias) were triaged to the general wards (isolation buffer zones) for post-PCI care. The patients underwent immediate nucleic acid sampling after admission and remained in the isolation buffer zone until a negative result was obtained. Following the confirmation of a negative result, patients were transferred to non-isolation general wards.

General Ward Configuration for COVID-19 Isolation

General ward rooms designated for COVID-19 isolation (isolation buffer zones) were equipped with telemetric ECG monitoring and central surveillance at the nursing station. Emergency carts containing defibrillators and resuscitation drugs were located at both ends of each corridor. An emergency response protocol ensured that the on-call physician could arrive within 5 minutes and that patients requiring advanced life support could be transferred to the CCU within 15 minutes.

Outcomes

Primary Outcome

Total hospitalisation costs: extracted from the front sheet of medical records.

Secondary Outcomes

Length of hospital stay: defined as days from admission to discharge or death.

In-hospital major adverse cardiovascular event (MACE): defined as a composite endpoint including all-cause mortality, sudden cardiac arrest, new-onset stroke, acute heart failure, cardiogenic shock, acute kidney injury, acute respiratory failure, BARC type 3 or 5 bleeding, and acute stent thrombosis. Detailed definitions of each component are provided in [Supplementary Table S1](#).

Data Collection

Data were extracted by two trained researchers using a standardised data collection form, followed by cross-verification, which a third senior researcher adjudicated.

Data sources included:

- Electronic medical records for demographics, clinical characteristics, costs, and outcomes
- Laboratory information system for laboratory values
- Cardiac catheterisation database for angiographic and procedural details
- COVID-19 testing records for nucleic acid test results and timing
- Isolation ward admission and transfer records

Statistical Analysis

The normality of continuous variables was assessed using the Shapiro–Wilk test. Non-normally distributed variables are expressed as medians and interquartile ranges. Categorical variables are reported as frequencies and percentages. The Mann–Whitney *U*-test was used for non-normally distributed continuous variables, and the chi-square test was used for categorical variables. The missing rate for serum creatinine, troponin I, and left ventricular ejection fraction (LVEF) was less than 10%; therefore, missing values were imputed using the median. Prior to further analysis, we constructed a directed acyclic graph (DAG) using the DAGitty tool (<https://www.dagitty.net/>) to identify potential confounding factors for adjustment.¹⁹

We assessed the predictive performance of the Zwolle risk score (ZRS) for in-hospital MACE in patients with STEMI by calculating the area under the curve (AUC) using the method described by DeLong et al.²⁰ Propensity score matching (PSM) was employed to balance baseline risk factors between the general ward and CCU groups, creating a matched cohort with comparable risk profiles. Propensity scores were calculated using a non-parsimonious multivariate logistic regression model, with ward assignment (general ward) as the independent variable and confounders selected via DAG as covariates. A 1:1 PSM protocol without replacement was implemented using a greedy matching algorithm with a caliper width of 0.01. Standardised differences (SD) were calculated to evaluate the covariate balance between matched groups.^{21,22} The differences in in-hospital outcomes between the general ward and CCU groups were compared. In the PSM cohort, the association between general ward admission

and in-hospital outcomes in clinically stable patients with STEMI was evaluated using logistic regression models. To assess the robustness of our results, we also performed a sensitivity analysis using overlap weighting based on the estimated propensity scores. Specifically, participants in the general ward group were weighted by PS, and participants in the CCU group were weighted by 1-PS.

This study adhered to the STROBE guidelines for reporting and analysis.²³ All statistical analyses were performed using SPSS (version 29.0) and R (version 4.2.0) software, and statistical graphs were generated using GraphPad Prism (version 10). Statistical significance was defined as a two-sided *p*-value of < 0.05.

Results

Baseline Characteristics

A total of 486 patients with STEMI, who met the inclusion criteria, were enrolled in the study (Figure 1). In the original cohort, the median age of the patients was 62 years. Among them, 104 (21.4%) were female, and 428 (88.1%) underwent

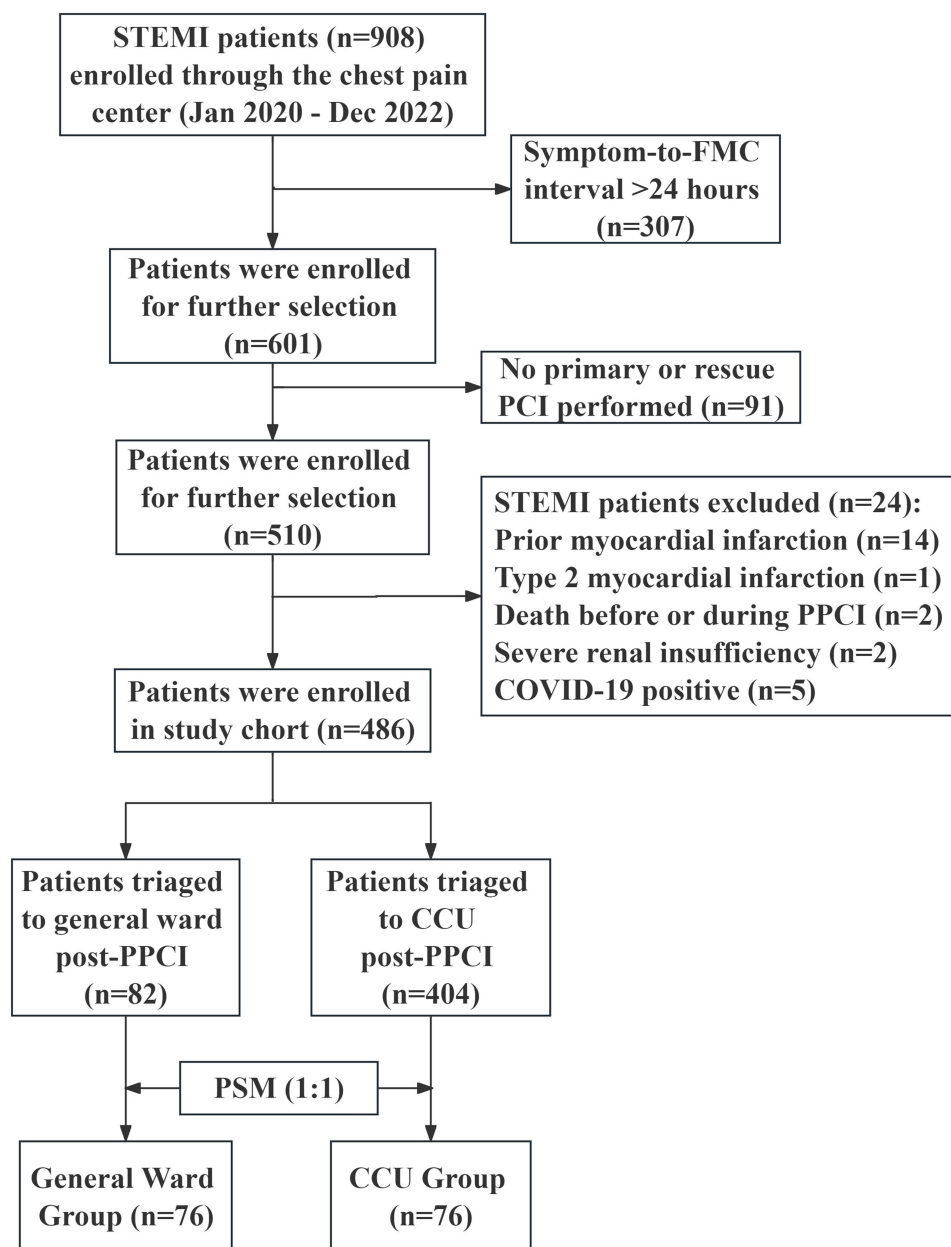


Figure 1 Flowchart of the selection of study participants.

primary PCI. Eighty-two (16.8%) were triaged to the general ward for subsequent care. During hospitalisation, 70 patients (14.4%) experienced study-defined MACE.

We used a DAG to identify potential confounding factors and relationships among triage, general wards, and in-hospital MACE, and to establish a minimal set of covariates. As shown in Figure 2, age, diabetes, hypertension, smoking, anterior wall myocardial infarction, syncope, total ischaemic time, systolic blood pressure, Killip classification, pre- and post-PCI thrombolysis in myocardial infarction (TIMI) flow grades, slow flow/no-reflow, triple-vessel disease, branch vessel occlusion, serum creatinine, troponin I, and LVEF were recommended by DAGitty.

Table 1 presents the intergroup comparisons of risk factors among the study participants. In the original cohort, patients with STEMI in the general ward group had shorter total ischaemic time, lower troponin I levels, higher systolic blood pressure and LVEF levels, as well as higher proportions of normal cardiac function and TIMI grade 3 flow in the culprit vessel ($p<0.05$). Conversely, the general ward group demonstrated lower rates of syncope, slow flow/no-reflow, and triple-vessel disease ($p<0.05$). After 1:1 PSM in the original cohort, the differences in the aforementioned confounding factors between the general ward and CCU groups were not statistically significant ($p>0.05$). Following 1:1 PSM in the original cohort, the SDs for most covariates were $<10\%$, indicating a significant improvement in the variable imbalance between the two groups (Supplementary Figure 1).

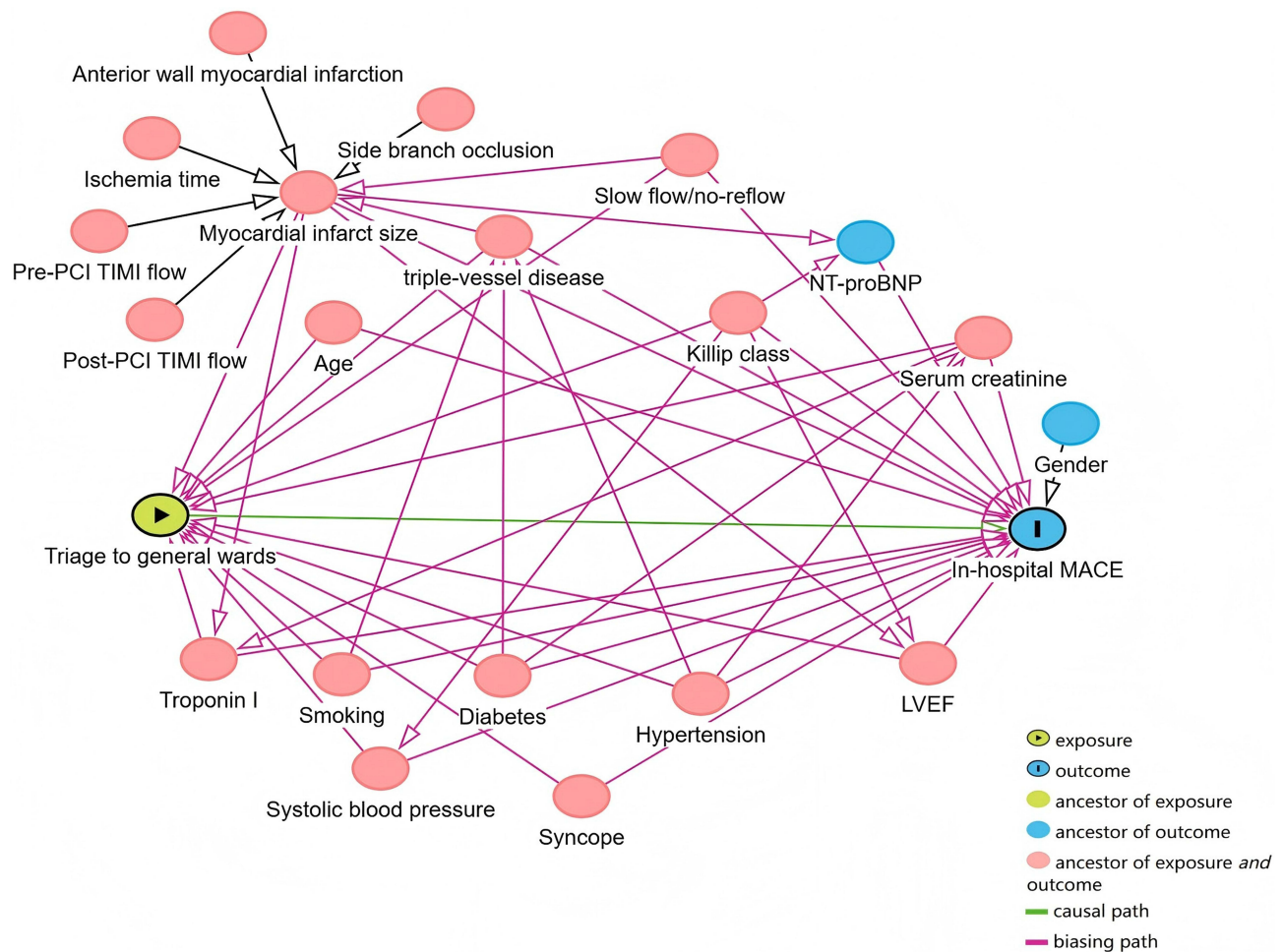


Figure 2 Directed acyclic graph of potential confounding factors.

Table 1 Baseline Characteristics Before and After Propensity Score Matching

Characteristic	Before Matching				After Matching			
	General Ward	CCU	SD (100%)	p	General Ward	CCU	SD (100%)	p
Participants	82	404			76	76		
Age (years), median (IQR)	63.00 (54.00–69.75)	62.50 (54.00–72.00)	16.8	0.293	63.00 (53.50–69.25)	59.00 (52.75–65.50)	10.6	0.514
Diabetes, n (%)	13 (15.85%)	65 (16.09%)	0.6	0.958	10 (13.16%)	12 (15.79%)	7.5	0.645
Hypertension, n (%)	46 (56.10%)	229 (56.68%)	1.2	0.922	44 (57.89%)	42 (55.26%)	5.3	0.743
Smoking, n (%)	50 (60.98%)	245 (60.64%)	0.7	0.955	47 (61.84%)	46 (60.53%)	2.7	0.868
AWMI, n (%)	43 (52.44%)	213 (52.72%)	0.6	0.963	39 (51.32%)	40 (52.63%)	2.6	0.871
Syncope, n (%)	3 (3.66%)	44 (10.89%)	28.1	0.043	3 (3.95%)	6 (7.89%)	16.8	0.303
Ischemia time (hours)	5.70 (3.87–8.40)	6.50 (4.50–10.00)	27.6	0.011	5.80 (3.70–8.43)	6.35 (4.00–9.30)	12.4	0.447
SBP (mmHg), median (IQR)	135.00 (114.25–155.25)	130.00 (110.00–146.00)	28.1	0.031	132.50 (112.75–152.00)	133.00 (118.75–149.25)	1.0	0.951
Killip I, n (%)	81 (98.78%)	348 (86.14%)	49.3	0.001	75 (98.68%)	76 (100.00%)	16.3	0.316
Pre-PCI TIMI 3, n (%)	13 (15.85%)	31 (7.67%)	25.6	0.019	12 (15.79%)	7 (9.21%)	20.0	0.220
Post-PCI TIMI 3, n (%)	76 (92.68%)	354 (87.62%)	17.0	0.191	71 (93.42%)	70 (92.11%)	5.1	0.754
Slow flow/no-reflow, n (%)	4 (4.88%)	104 (25.74%)	60.5	<0.001	4 (5.26%)	3 (3.95%)	6.3	0.699
TVD, n (%)	16 (19.51%)	167 (41.34%)	48.8	<0.001	16 (21.05%)	17 (22.37%)	3.2	0.844
BRANCH, n (%)	1 (1.22%)	27 (6.68%)	28.3	0.053	1 (1.32%)	0 (0.00%)	16.3	0.316
Creatinine (umol/L), median (IQR)	82.00 (67.00–92.75)	82.50 (69.00–101.00)	13.1	0.446	82.00 (65.75–93.00)	79.50 (65.50–89.00)	13.4	0.409
Troponin I (ng/mL), median (IQR)	4.80 (2.28–8.97)	12.00 (3.27–25.00)	63.4	<0.001	4.95 (2.50–10.05)	5.35 (1.37–13.00)	0.0	0.999
LVEF (%), median (IQR)	60.00 (54.00–62.00)	59.50 (50.00–62.00)	29.7	0.037	60.00 (54.00–62.25)	60.00 (56.75–62.00)	3.9	0.809

Abbreviations: SD, standardized difference; AWMI, anterior wall myocardial infarction; SBP, systolic blood pressure; TVD, triple-vessel disease; BRANCH, side branch occlusion; LVEF, left ventricular ejection fraction.

Relationship of Zwolle Risk Score with in-Hospital MACE

Receiver operating characteristic (ROC) curve analysis was used to evaluate the ability of ZRS to predict in-hospital MACE in patients with STEMI after PCI. The AUC for ZRS was 0.867 (95% CI: 0.833–0.895, $Z=12.102$, $p<0.001$) (Figure 3), with sensitivity, specificity, and optimal thresholds of 0.771, 0.880, and 4.5, respectively.

Association Between General Ward Admission and in-Hospital Outcomes

In the original cohort, the median total hospitalisation cost was significantly lower in the general ward group than in the CCU group (\$3515.59 vs \$4057.86, $p<0.001$) (Figure 4A). A similar trend was observed in the PSM cohort (\$3515.15 vs \$3798.86, $p=0.049$) (Figure 4B).

In the original cohort, patients with STEMI admitted to the general ward after PCI demonstrated a significantly lower incidence of in-hospital MACE than those in the CCU (2.44% vs 16.83%, $p<0.001$) (Figure 5A). However, in the PSM cohort, the difference in MACE incidence between the two groups was not statistically significant (2.63% vs 3.95%, $p=0.649$) (Figure 5B).

In both the original and PSM cohorts, no significant difference in the median total length of stay was observed between the general ward and CCU groups ($p>0.05$) (Figure 6).

Table 2 further evaluates the association between general ward admission after PCI and in-hospital outcomes in the PSM cohort of patients with STEMI. After adjusting for the propensity score, among clinically similar and stable patients with STEMI who had no significant difference in length of stay, CCU admission was associated with an approximately \$650 increase in total hospitalisation costs compared to general ward admission ($p<0.05$). Admission to the general ward was not associated with an increase in in-hospital MACE rates ($p>0.05$), but was correlated with reduced hospitalisation costs.

Sensitivity Analysis

A weighted cohort was generated using an overlap weighting model based on the estimated propensity scores (Table 3). In this weighted cohort, findings were consistent with those observed in the PSM cohort. CCU admission was associated with significantly higher total hospitalisation costs compared with general ward admission ($\beta = 678.82$, 95% CI: 341.55–1016.08, $p<0.001$), whereas no statistically significant difference in in-hospital MACE was detected between the two groups (OR = 1.80, 95% CI: 0.29–11.22, $p = 0.527$).

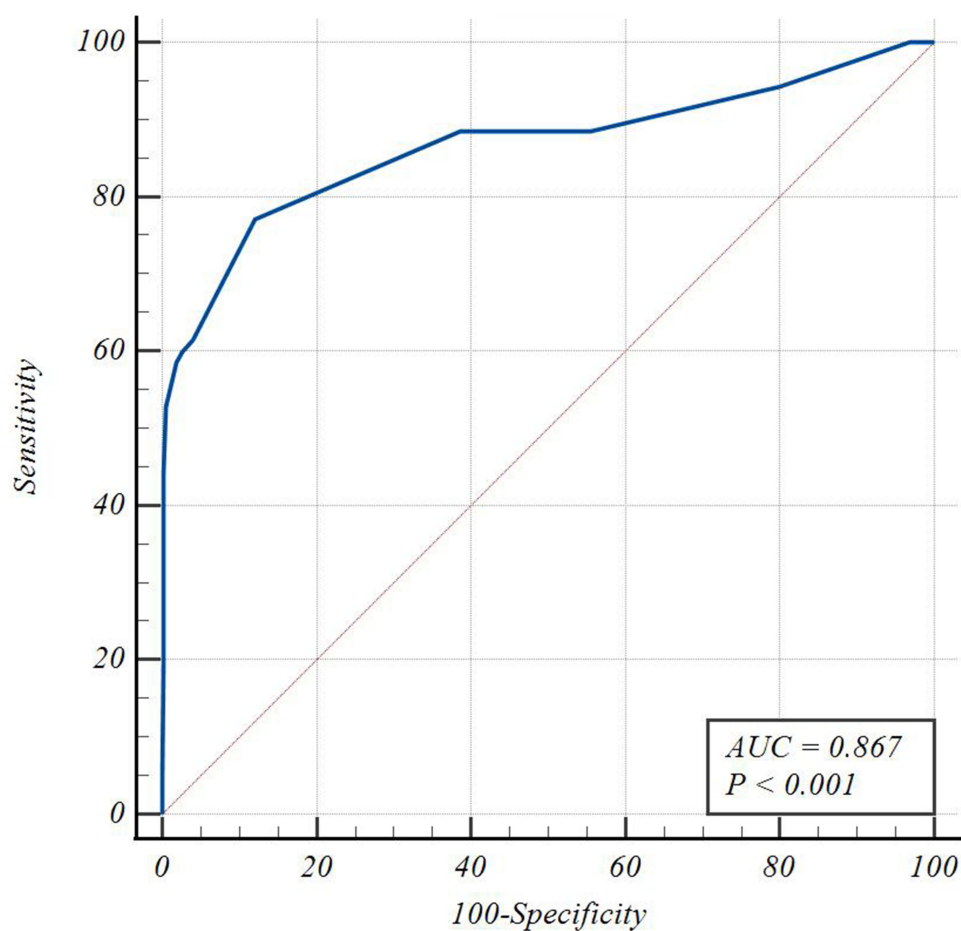


Figure 3 Receiver operating characteristic curve of the ZRS for predicting in-hospital MACE in patients with STEMI.

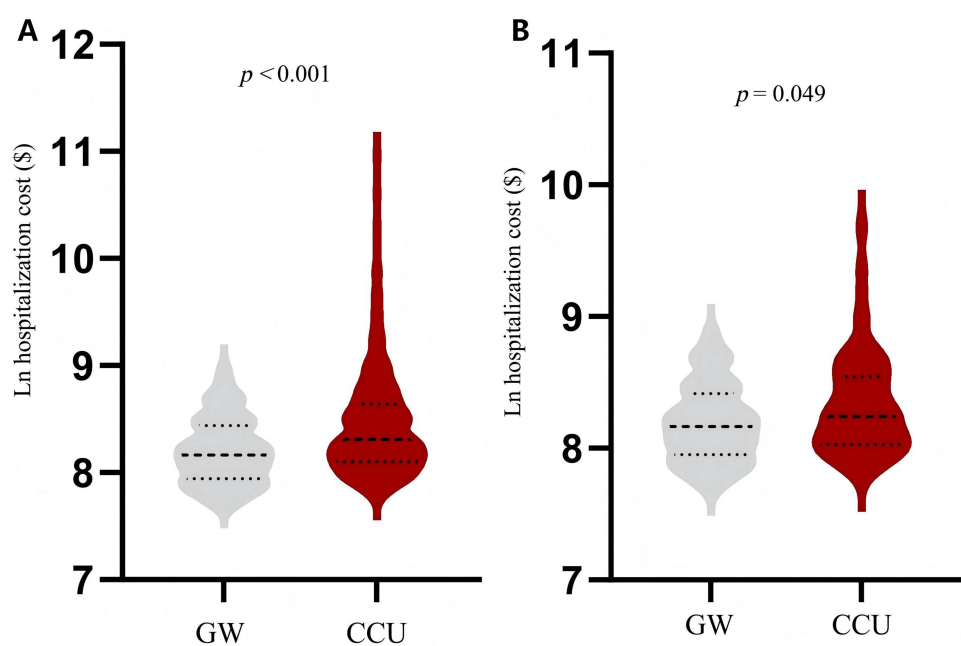


Figure 4 Differences in total hospitalisation costs between patients with STEMI triaged to general wards v. CCU (natural logarithm transformation applied to hospitalisation costs). (A) before propensity score matching; (B) after propensity score matching.

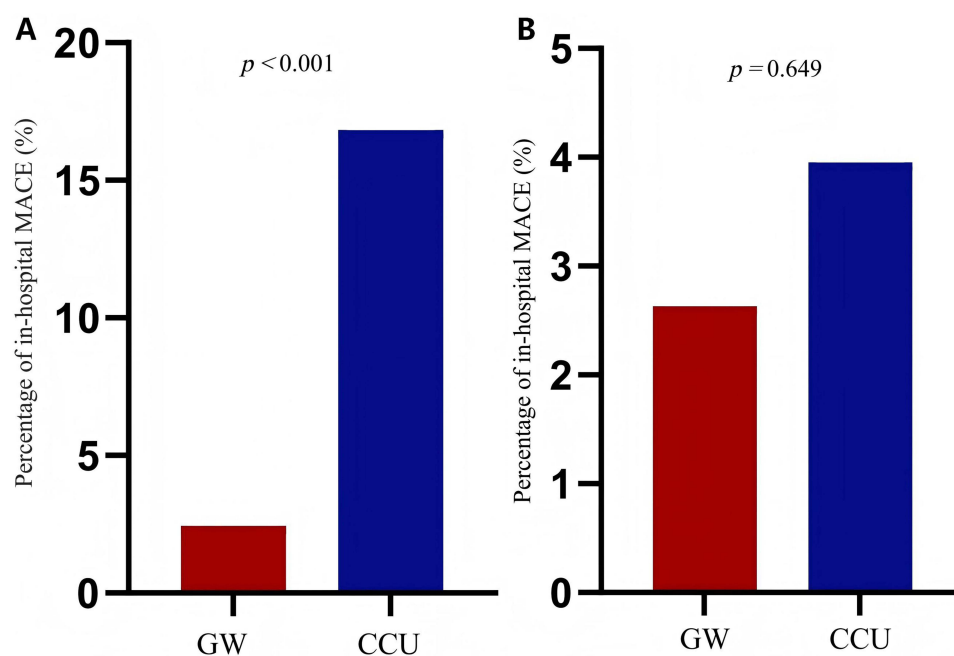


Figure 5 Differences in in-hospital MACE incidence between patients with STEMI triaged to general wards vs CCU. (A) before propensity score matching; (B) after propensity score matching.

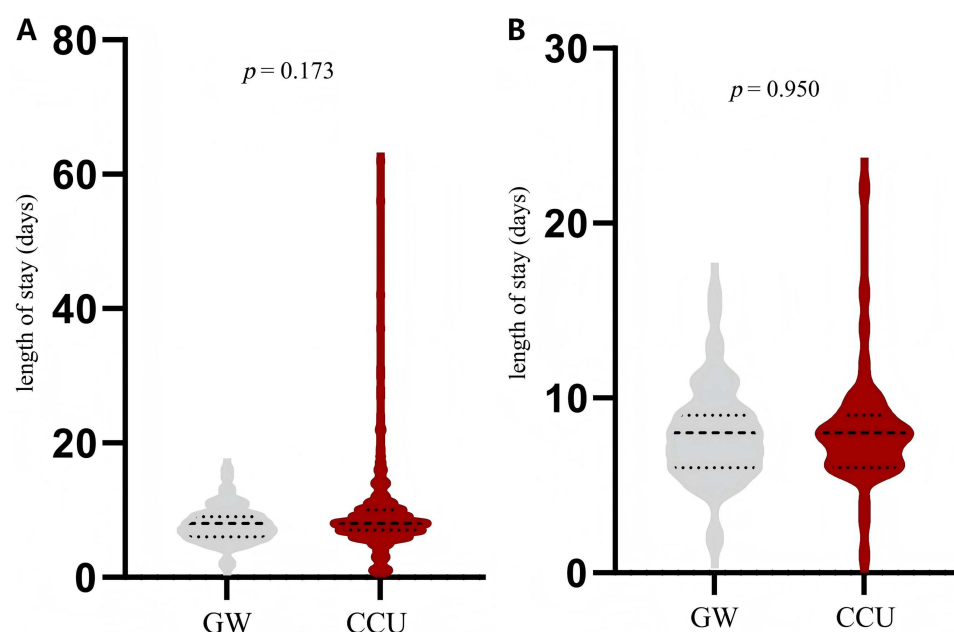


Figure 6 Differences in total length of hospital stay between patients with STEMI triaged to general wards vs CCU. (A) before propensity score matching; (B) after propensity score matching.

Discussion

In this retrospective study, no statistically significant difference in in-hospital MACE was observed between clinically stable STEMI patients admitted to general wards and those admitted to the CCU. However, general ward admission was associated with significantly lower hospitalisation costs. The Zwolle score showed good predictive performance for in-hospital MACE, supporting its potential role in guiding triage decisions.

Table 2 Multivariable Logistic Regression of Outcomes Associated with General Ward Admission

Exposure	Non-Adjusted			Adjust I		
	OR/ β	95% CI	<i>p</i>	OR/ β	95% CI	<i>p</i>
Total hospitalisation costs						
GW	Ref			Ref		
CCU	648.15	(103.90, 1192.39)	0.021	649.89	(104.35, 1195.43)	0.021
In-hospital MACE						
GW	Ref			Ref		
CCU	1.52	(0.25, 9.37)	0.6514	1.64	(0.25, 10.69)	0.6045

Notes: Non-adjusted model adjusted for: none. Model I adjusted for: propensity score.

Abbreviations: GW, general ward; CCU, coronary care unit.

Table 3 Association Between General Ward Admission and Outcomes in the Weighted Cohort

Exposure	OR/ β	95% CI	<i>p</i>
Total hospitalisation costs			
GW	Ref		
CCU	678.82	(341.55, 1016.08)	<0.001
In-hospital MACE			
GW	Ref		
CCU	1.80	(0.29, 11.22)	0.527

Abbreviations: GW, general ward; CCU, coronary care unit.

Prehospital catheterisation laboratory activation, rapid interfacility transfer, and primary PCI have significantly reduced mortality and complication rates in patients with STEMI.^{7,24} However, a guideline-recommended approach for routing all patients with STEMI to the CCU has not been adequately evaluated.^{25,26} During the study period, a sustained reduction in CCU utilisation (from nearly 100% to 83%) was observed, and the overall MACE rate (14.4%) remained consistent with that of contemporary STEMI cohorts,^{8,9} indicating that selective triage may not compromise safety. The lower unadjusted MACE rate in the general ward group reflected appropriate risk stratification (more favourable baseline characteristics), whereas the higher rate in the CCU group reflected a sicker case mix. After PSM, the difference in MACE was no longer statistically significant (2.63% vs 3.95%, $p = 0.649$), suggesting that care unit choice was not associated with a significant difference in outcome after accounting for measured confounders. However, given the small sample size and low event rate, this finding should be interpreted with caution and does not imply equivalence. Cost savings favoured general ward admission, with an approximately \$650 reduction per patient after matching ($p=0.021$), which was attributable to lower bed and monitoring charges rather than patient differences. Based on the observed cost savings of approximately \$650 per patient and applying a Zwolle score threshold of <4 to identify low-risk patients, we estimated that approximately 65% of clinically stable STEMI patients after PCI—representing about 110 patients annually at our institution—could be triaged to general wards. This approach would result in annual institutional savings of approximately \$71,500 in hospitalisation costs.

Several risk stratification tools have been developed to predict prognosis in STEMI patients, though their utility for post-PCI triage varies. The Zwolle score,²⁷ originally validated in primary PCI-treated STEMI patients, incorporates

readily available clinical and angiographic variables to predict 30-day mortality. Its simplicity makes it particularly suitable for rapid triage decisions. By contrast, the CADILLAC score accurately predicts short- and long-term mortality,²⁸ but studies validating it excluded high-risk patients with cardiogenic shock or cardiac arrest,²⁹ limiting its generalizability, and its role in post-PCI triage remains unvalidated. The APACHE III score³⁰ captures broader physiological derangements but is less practical for rapid bedside triage due to its complexity. Overall, the Zwolle score offers the best balance of simplicity, accessibility, and predictive performance for guiding post-PCI triage decisions.

Our findings align with a growing body of evidence supporting the safety of managing low-risk patients with STEMI in non-ICU settings. In a prospective study of 549 patients with STEMI, Ebinger et al¹² used a modified ZRS for post-PPCI triage. The low-risk group showed significantly lower complication rates (8.3% vs 38.7%) and in-hospital mortality rates (0.4% vs 12.5%) than the high-risk group (both, $p < 0.001$), with substantially lower overall medical costs (\$6720 vs \$11,783; $p < 0.001$). In another prospective study that applied the ZRS for STEMI triage, high-risk patients ($ZRS \geq 4$) were admitted to the CICU, whereas low-risk patients ($ZRS < 4$) were transferred to a telemetry unit.³¹ Among the cohorts (low-risk: 57%; high-risk: 43%), the low-risk group had significantly lower in-hospital mortality and complication rates ($p < 0.001$), along with a reduction in the average hospitalisation cost of \$1419. A retrospective study validated the APACHE III score for triaging patients with STEMI, showing that among 253 cases, the low-risk group (70.75%) had significantly lower APACHE III scores (28.3 vs 58.8) and post-STEMI complication rates (5.6% vs 39.2%) than the high-risk group.³² Collectively, these studies have consistently demonstrated that low-risk patients with STEMI can be managed in non-ICU settings using risk-scoring tools. However, our study suggests that clinical assessment alone, in the absence of traditional risk scores, may be effective for identifying low-risk patients for general ward triage.

The COVID-19 pandemic revealed the fragility of critical care capacity. While the pandemic created an acute crisis, the underlying challenge of optimising CCU resource allocation while maintaining patient safety is a persistent issue that extends beyond the pandemic context. CCU beds remain a limited and expensive resource, and the rising incidence of cardiovascular disease continues to place increasing demands on critical care capacity.³³ Our experience suggests that a clinical gestalt-based triage protocol may safely reduce CCU utilisation during periods of resource constraint.

Notably, in our study, this triage strategy, driven by pandemic control requirements and incorporating clinical assessment and CCU bed availability, resulted in the admission of some high-risk and clinically less stable patients to general wards. The specific case composition included three cases of pre-PCI syncope, one case of Killip class 2 after PCI, six cases of TIMI flow grade 2 after PCI, four cases of slow/no-reflow during PCI, and three cases requiring temporary pacemaker implantation during PCI. Within the general ward group, two patients experienced MACE: one case of sudden in-hospital ventricular fibrillation that was successfully resuscitated with timely electrical defibrillation, and one case of upper gastrointestinal bleeding that improved after endoscopic haemostasis. These findings suggest that during special pandemic periods, a triage strategy based primarily on isolation needs, alongside brief clinical assessments, may increase the medical risks for patients with STEMI in general wards, highlighting the need for developing more comprehensive risk evaluation systems.

This study had several limitations. First, although triage was primarily driven by COVID-19 testing status, some confounding by indication may remain, and residual confounding from unmeasured factors cannot be excluded despite PSM and sensitivity analyses. Second, the matched cohort was small, with only 5 MACE events in total, which limited the interpretability of the observed “no significant difference” and precluded claims of equivalence or safety. Third, as a single-centre study, our findings may not be generalizable to institutions without telemetry-equipped wards or rapid CCU transfer capabilities. Finally, other pandemic-related factors may have affected outcomes and are difficult to quantify. Our findings should therefore be considered hypothesis-generating and require prospective validation in larger, ideally multicentre cohorts.

Conclusions

For clinically stable P-STEMI, triage to general wards equipped with telemetry monitoring and rapid-response protocols was associated with significantly reduced hospitalisation costs. No statistically significant difference in MACE was observed, although larger prospective studies are needed to confirm safety.

Data Sharing Statement

The datasets generated and analysed in this study are not publicly available but can be reasonably requested from the corresponding author.

Ethics Approval and Informed Consent

This retrospective study was approved by the academic ethics committee of Changde Hospital, Xiangya School of Medicine, Central South University (The first people's hospital of Changde city) (approval number: YX-2023-216-04). The requirement for informed consent was waived by the committee because this study involved no more than minimal risk to patients and the analysis of anonymised/de-identified data collected during routine clinical practice, and it was impracticable to obtain consent from all patients given the retrospective nature of the data.

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Disclosure

The authors declare that they have no conflicts of interest to declare for this work.

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