Original Article

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Safety and Outcomes of Overnight Discharge Following Elective Percutaneous Coronary Intervention at a Tertiary Cardiac Centre in Nepal

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Abstract

Background and aims: Advances in percutaneous coronary intervention (PCI) have improved procedural safety, enabling consideration of shorter hospital stays after uncomplicated procedures. However, evidence supporting early discharge strategies in low- and middle-income countries remains scarce. This study evaluated the safety and feasibility of overnight discharge following elective PCI in a tertiary cardiac center in Nepal.

Methods: In this prospective observational study, 375 consecutive patients undergoing uncomplicated elective PCI were enrolled. All patients were monitored overnight and discharged the following day if clinically stable. The primary outcome was the incidence of major adverse cardiovascular events (MACE) within 30 days.

Results: The mean age of the study population was 59.4 ± 9.6 years, with males comprising 75.7% (n = 284). Transradial access was utilized in 85.6% (n = 321) of procedures. At 30-day follow-up, no major adverse cardiovascular events (MACE) or hospital readmissions were observed. Minor bleeding events (BARC 1–2) occurred in 62 patients (16.5%), while no major bleeding complications were recorded.

Conclusions: Overnight discharge following uncomplicated elective PCI appears feasible with low observed event rates in carefully selected low-risk patients in a resource-limited setting.

Keywords: percutaneous coronary intervention; early discharge; transradial access; resource utilization

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Introduction

Percutaneous coronary intervention (PCI) has advanced substantially in recent years due to improvements in device technology, adjunctive pharmacotherapy, and procedural techniques. These developments, particularly the widespread use of newer-generation drug-eluting stents and transradial access, have contributed to a significant reduction in procedural complications, especially bleeding and vascular events. As a result, recovery following PCI has become more predictable, allowing shorter durations of hospitalization in selected patients.

Evidence from high-income countries indicates that early discharge either on the same day or after overnight observation, following uncomplicated elective PCI is safe, cost-effective, and well tolerated by patients.[1–5] Reduced access-site complications with radial approaches have been a key driver of this transition, enabling earlier mobilization and discharge.[6] In parallel, increasing pressure on healthcare systems to optimize resource utilization has further supported the adoption of early discharge strategies.

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However, the generalizability of these findings to low- and middle-income countries remains uncertain. Variations in healthcare infrastructure, patient characteristics, and follow-up systems may influence outcomes. In Nepal, where the burden of cardiovascular disease is increasing and healthcare resources are limited, strategies that safely reduce hospital stay could provide significant clinical and economic benefits. Nevertheless, locally generated evidence on this topic remains scarce.

The primary objective of this study was to evaluate the safety of overnight discharge following uncomplicated elective PCI, as assessed by 30-day major adverse cardiovascular events (MACE). Secondary objectives included assessment of bleeding complications, access-site complications, and hospital readmissions. This study was therefore conducted to evaluate the safety and feasibility of overnight discharge following uncomplicated elective PCI in a tertiary cardiac center in Nepal.

Methods

Study Design and Population

This prospective observational study was conducted at a single tertiary cardiac center in Nepal over a 12-month period (January–December 2023). Adult patients undergoing elective percutaneous coronary intervention (PCI) for coronary artery disease were consecutively enrolled.

Patients with a history of acute coronary syndrome (ACS), including ST-elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI), or unstable angina, were eligible only if they had achieved clinical stability and were scheduled for delayed or staged elective PCI. Cases requiring primary or urgent PCI were not included.

All patients received guideline-directed dual antiplatelet therapy before discharge and were counseled regarding medication adherence and warning symptoms requiring urgent medical evaluation.

Inclusion and Exclusion Criteria

Inclusion criteria

- Patients undergoing elective PCI for chronic coronary syndrome or stable angina, irrespective of non-invasive ischemia testing
- Patients with previously documented ACS who underwent elective or staged PCI after stabilization
- Absence of post-procedural ischemic symptoms or coronary complications
- No evidence of vascular or access-site complications.

Exclusion criteria

- Ongoing ACS presenting as rest angina or myocardial infarction within 72 hours
- Renal dysfunction with serum creatinine >1.5 mg/dL
- Severe left ventricular dysfunction (LVEF <30%) or decompensated heart failure
- Requirement for continued hospitalization due to non-clinical factors

Patient Selection

Only patients meeting criteria for uncomplicated PCI which was defined by all of the following: restoration of TIMI grade 3 flow, absence of periprocedural myocardial infarction, absence of significant coronary dissection impairing flow, no vascular complications requiring intervention, stable hemodynamics, and no requirement for prolonged intravenous therapy.[1,4,5] Those patients meeting criteria of uncomplicated PCI were considered eligible for early discharge. Individuals who did not fulfill these criteria were excluded from the early discharge pathway and analysis.

Follow-up and Outcomes

Patients were monitored overnight and discharged the following day if clinically stable. Follow-up at 30 days was completed using structured telephone interviews in combination with institutional medical record review.

The primary outcome was the occurrence of major adverse cardiovascular events (MACE) defined as a composite of all-cause mortality, myocardial infarction, and target vessel revascularization within 30 days. Secondary outcomes included bleeding events classified according to BARC criteria, access-site complications, and hospital readmission defined as any unplanned hospitalization within 30 days.

Statistical Analysis powered"

Continuous variables are presented as mean ± standard deviation, while categorical variables are summarized as frequencies and percentages. Given the observational single-arm design and absence of primary outcome events, analyses were primarily descriptive.

Formal comparative statistical testing and subgroup analyses were considered exploratory only and interpreted cautiously because of the very low event rate and limited statistical power. No priori sample size calculation was performed, as this study was designed primarily to evaluate feasibility and generate preliminary safety data in a real-world setting. The study was not designed to establish non-inferiority or equivalence regarding early discharge safety.

Exact 95% confidence intervals were calculated for observed event rates where appropriate.

Results

Baseline Characteristics

A total of 375 patients were included in the analysis as summarized in Table 1. The mean age was 59.4 ± 9.6 years, and the majority were male (284, 75.7%). Common cardiovascular risk factors included hypertension (51.7%), diabetes mellitus (38.7%), dyslipidemia (27.7%), and active smoking (56%).

Clinical Presentation and Procedural Characteristics

Clinical presentations prior to PCI and procedural details are summarized in Table 2.

A substantial proportion of patients had a history of ACS, including STEMI (27.2%), NSTEMI (18.7%), and unstable angina (14.7%); however, all underwent PCI in an elective setting following stabilization. Chronic coronary syndrome was present in 39.5% of cases.

Regarding coronary anatomy, single-vessel disease was observed in 40.3% of patients, double-vessel disease in 30.9%, and triple-vessel disease in 28.8%. Multivessel PCI was performed at 41.3%.

Transradial access was the most frequently utilized approach (85.6%), with femoral and ulnar access used less commonly.

Table 1. Baseline Demographic and Clinical Characteristics of the Study Population

Variable	Value
Total cases (n)	375
Mean age (years)	59.4 ± 9.6 (38–84)
Male	284 (75.7%)
Female	91 (24.3%)
Dyslipidemia	104 (27.7%)
Hypertension	194 (51.7%)
Diabetes mellitus	145 (38.7%)
Overweight	150 (40%)
Smoking	210 (56%)

Table 2. Clinical Presentation and Procedural Characteristics

Variable	Value
STEMI*	102 (27.2%)
NSTEMI*	70 (18.7%)
UA*	55 (14.7%)
CCS	148 (39.5%)
SVD	151 (40.3%)
DVD	116 (30.9%)
TVD	108 (28.8%)
Multivessel PCI	155 (41.3%)
Radial access	321 (85.6%)
Ulnar access	24 (6.4%)
Femoral access	30 (8.0%)

*Represents prior clinical presentation; all procedures were elective PCI after stabilization.

STEMI = ST-elevation myocardial infarction; NSTEMI = non-ST elevation myocardial infarction; UA = unstable angina; CCS = chronic coronary syndrome; SVD = single-vessel disease; DVD = double-vessel disease; TVD = triple-vessel disease; PCI = percutaneous coronary intervention.

Clinical Outcomes

Complete 30-days follow-up was achieved in all patients. No major adverse cardiovascular events or readmissions were observed during the follow-up period (0%; 95% confidence interval: 0–0.8%).

Minor bleeding events (BARC type 1–2) occurred in 16.5% of patients. These events were predominantly minor access-site ecchymosis or self-limited nuisance bleeding related to transradial access and did not require blood transfusion, vascular intervention, or escalation of care. No patients required prolonged hospitalization or additional monitoring because of bleeding complications, and no bleeding events were reported after discharge. No major bleeding complications were observed.

Subgroup Analysis

Pre-specified subgroup analyses were performed based on clinical presentation (stable angina vs prior ACS), vascular access sites, and extent of coronary artery disease.

Given the absence of primary outcome events, subgroup analyses were descriptive only and not suitable for inferential statistical interpretation.

Discussion

This prospective observational study represents a real-world implementation experience of overnight discharge following uncomplicated elective PCI in a low- and middle-income country (LMIC) tertiary cardiac center. The absence of major adverse cardiovascular events and readmissions at 30 days suggest that overnight discharge does not compromise short-term clinical outcomes when appropriate selection criteria and post-procedural monitoring are applied.

These findings are consistent with previously published data from high-income settings, where early discharge protocols have been associated with low complication rates and favorable patient outcomes.[1–5] Collectively, such evidence supports the concept that prolonged hospitalization after uncomplicated PCI may not provide additional clinical benefits in stable patients.

A key factor contributing to the favorable outcomes in this study is the high utilization of transradial access. This approach has been consistently associated with lower rates of bleeding and vascular complications compared with femoral access, thereby facilitating early ambulation and enabling safe discharge.[6]

An additional consideration is whether same-day discharge (SDD) may be feasible in selected patients undergoing uncomplicated PCI. Studies from high-income settings have demonstrated that SDD after elective transradial PCI can be safe and associated with reduced healthcare utilization when appropriate patient selection and follow-up systems are available.[7–9] However, compared with SDD pathways, overnight observation may provide an additional safety margin in LMIC settings where transportation barriers, limited emergency access, and variability in post-discharge support systems remain in important concerns. In the present study, an overnight observation strategy was considered more practical and adaptable within the existing healthcare infrastructure while still allowing reduction in hospital stay and resource utilization.

Despite the absence of observed adverse events, this should not be interpreted as evidence of zero risk. The upper limit of the 95% confidence interval (0.8%) indicates that a small but clinically relevant residual risk cannot be excluded. This underscores the importance of strict patient selection, optimal procedural outcomes, and structured follow-up when implementing early discharge pathways.

From a healthcare systems perspective, the implications are particularly relevant in resource-constrained settings such as Nepal. Early discharge protocols may help reduce hospital occupancy, improve bed availability, and lower treatment costs and healthcare financial burden without adversely affecting patient safety.

Limitations

This study has several limitations including its single-center observational design and inclusion of only carefully selected low-risk patients undergoing uncomplicated PCI were included, so our findings should not be generalized and interpreted broadly. Additionally, follow-up was limited to 30 days, and longer-term outcomes were not assessed which may also have resulted in under-detection of silent myocardial infarction, minor adverse events, or admissions to other healthcare facilities. Besides; lesion complexity (SYNTAX, bifurcation, calcification), stent length/number, number of stents implanted per patient, contrast volume, fluoroscopy/procedure duration, use of intravascular imaging or adjunctive devices were not studied. Larger multicenter studies with extended follow-up are needed to validate these findings.

Conclusion

Overnight discharge following uncomplicated elective PCI appears to be feasible and safe in carefully selected low-risk patients. While no adverse events were observed in this cohort, these findings should be interpreted in the context of strict selection criteria and short-term follow-up. Broader validation through multicenter studies with longer follow-up is warranted.

Ethical Statements

Ethical Approval:

Approved by Shahid Gangalal National Heart Centre (Approval No. 1-2023).

Informed Consent:

Written informed consent was obtained from all participants.

Funding:

No funding was received.

Conflict of Interest:

The authors declare no conflict of interest.

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