Original Article

Nepalese Heart Journal 2026; Vol 23(1), 27-31

Angiographic Profile among Patients with Acute Coronary Syndrome in Tertiary Care Centre: A descriptive cross-sectional study

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Cite this article as: Regmi SR, Hussain A, Dhital BM, Kurmi RN, Shah DK. Angiographic Profile among Patients with Acute Coronary Syndrome in Tertiary Care Centre: A descriptive cross-sectional study. Nepalese Heart Journal. 2026;23(1):27–31.

Submission Date: February 25, 2026

Acceptance Date: May 18, 2026

Submitted using Strobe checklist

Abstract

Background: The number of coronary arteries involved, the degree of stenosis, and the type of vessel involvement in patients with acute coronary syndrome determine presentation, morbidity and mortality. We aimed to determine angiographic findings in patients with acute coronary syndrome outside Kathmandu Valley. The data regarding angiographic profiles of patients undergoing coronary angiograms outside the valley is limited. This study aims to narrow the gap.

Methods: A Descriptive cross-sectional study was conducted in the Unit of Cardiology, Department of Internal Medicine from January 1, 2022, to December 30, 2022, after ethical approval from the Institutional Review Committee (reference number:079/080-161). Convenience sampling was used. Point estimates and 95% confidence intervals were calculated.

Results: Among 192 patients, majority of the patients were male with a mean age of 61.29 ± 12.50 years. Triple vessel disease (TVD) was present in 77 (40.10%) patients. Left anterior descending artery (LAD) was most involved which was present in 157 (81.77%) patients. ST-elevated myocardial infarction (STEMI) was present in 134 (69.79%) patients. Diabetes mellitus was present in 122 (63.54%) patients, and it was the most common risk factor.

Conclusions: In our study, triple vessel disease and involvement of the left anterior descending artery were the most common angiographic findings. Diabetes mellitus was the most common modifiable risk factor, which could be the reason for multiple vessel involvement.

Keywords: Acute Coronary Syndrome, Coronary Angiography, Non-ST segment Elevated Myocardial Infarction, ST segment Elevated Myocardial Infarction, Unstable Angina

DOI: https://doi.org/10.3126/nhj.v23i1.94828

Introduction

Coronary artery disease (CAD) is a global health problem and is the leading cause of mortality and morbidity worldwide both in developed and developing countries.[1,2] Globally, South Asian countries have the highest incidence of coronary artery disease.[3] In Nepal Coronary Heart Disease related death reached 30559(18.7%) of total deaths with an Age-adjusted Death Rate of 158.35 per 100,000 of the population which ranks Nepal 41st in the world according to WHO in 2017.[4]

In Nepal, the prevalence of CAD was 5.7%.[5] Percutaneous Coronary Intervention (PCI) is performed in limited hospitals outside the capital city. Data regarding angiographic findings is scarce outside Kathmandu. Our study attempts to fortify this aspect. Chitwan Medical College is one of the main referral tertiary care hospitals

with a facility of percutaneous coronary intervention and expertise in the related field. PCI was performed in patients with Acute Coronary Syndrome (ACS) confirmed by electrocardiographic (ECG) findings and cardiac biomarkers (cTnI).

The study aimed to determine the angiographic profile of patients with Acute Coronary Syndrome admitted to a tertiary care center outside Kathmandu Valley. This study will add insights on the acute coronary syndrome presentation and angiographic profiles and of this subset of patients.

Methods

This descriptive cross-sectional study was conducted in the Unit of Cardiology, Department of Internal Medicine, at Chitwan Medical College Teaching Hospital (CMCTH), from January 1, 2022, to December 30, 2022. The study was approved by the Institutional Review Committee (IRC) of CMCTH (Reference No- 079/080-161). All patients of acute coronary syndrome above 18 years of age who underwent coronary angiography and got admitted to the Coronary Care Unit (CCU) were included in the study. Patients of coronary artery disease other than acute coronary syndrome and those who denied consent were excluded from the study. Convenience sampling was used in this study. The sample size was calculated using following formula:

$n = Z2 \times p \times q / e2$

$= 1.962 \times 0.057 \times 0.943 / (0.05)2$

$= 83$

Where,

n= minimum require sample size

Z= 1.96 at 95% Confidence Interval (CI)

p= prevalence of 5.7%5

q= 1-p

e= margin of error, 5%

The calculated sample size was 83. Taking 10% as the non-response rate, the required sample size was 91. However, a total of 192 samples were taken for the study.

Acute STEMI was defined as chest pain of >20 min duration and ST elevation of ≥1 mm in at least two contiguous limb leads or ≥2 mm in V2-V3 for men (or ≥1.5 mm for women) and ≥1 mm in other chest leads presenting within 7 days of symptoms with positive cardiac biomarkers.

Dyslipidemia was defined as the presence of any of the following: lipid-lowering drugs or total cholesterol >240 mg/dL, triglycerides (TG) >150 mg/dL, low-density lipoprotein >130 mg/dL, and high-density lipoproteins (HDL) <50 mg/dL for female and <40 mg/dL for male. Diabetes Mellitus was defined as symptoms of diabetes, fasting blood sugar >126 mg/ dL or HbA1C level > 6.5 or if a patient was on oral hypoglycemic agents. Hypertension was defined as systolic blood pressure >140 mmHg and/or diastolic blood pressure >90 mmHg and/or use of anti-hypertensive treatment.[6,7]

Significant CAD was defined as a diameter stenosis >30% in Left main coronary artery and >50% in other major epicardial artery. Normal vessels were defined as the complete absence of any disease in the left main coronary artery (LMCA), left anterior descending (LAD), right coronary artery (RCA), and left circumflex (LCX) as well as in their main branches (diagonal, obtuse marginal, ramus intermedius, posterior descending artery, and posterolateral branch). The patients were classified as having Left main coronary artery disease, single-vessel disease (SVD), double-vessel disease (DVD), or triple vessel disease (TVD).

Data were collected retrospectively from January 1, 2022 to December 30, 2022 regarding demographic variables, clinical presentation, duration of symptoms, risk factors (age, smoking, hypertension, diabetes mellitus, alcohol consumption, dyslipidemia, and family history), left ventricular ejection fraction, renal function test, cardiac biomarker and angiographic profile.

The data obtained were entered into Microsoft Excel 2013 and analyzed using IBM SPSS Statistics version 21.

Results:

Among 192 patients, 129(67.18%) were male with male to female ratio of 2.04. The mean age of the patients was 61.29 ± 12.50 years. (Table 1)

Table 1. Age-wise distribution of patients with ACS (n= 192)

Age (Years)	n (%)
Up to 30	3 (1.56)
31-40	8 (4.16)
41-50	28 (14.58)
51-60	51 (26.56)
61-70	59 (30.72)
71-80	32 (16.66)
81-90	11 (5.72)

Among total of 192 patients, 77 (40.10%) had TVD and the most involved vessel was left anterior descending artery (LAD) which was present in 157 (81.77%) patients.

ST-elevation myocardial infarction (STEMI) was the most common type of ACS (Fig. 1). Single-vessel disease was common in unstable angina; however, triple-vessel disease was more common in patients with STEMI and NSTEMI (Fig. 1)

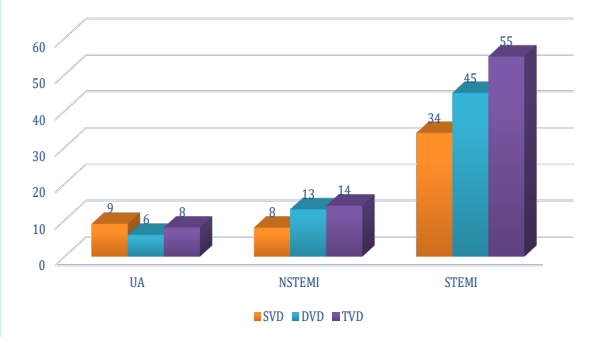

Fig. 1 *Distribution of coronary vessel involvement in patients with ACS (n=192)*

In our study, there were 16 (8.33%) young patients (< 45 years).

Chest pain was the most common presentation which was followed by shortness of breath. (Table 2)

Table 2. Distribution of patients according to clinical presentation (n= 192)

Clinical presentation	n (%)
Chest pain	163 (84.89)
Shortness of breath	15 (7.81)
Chest discomfort	8 (4.16)
Dizziness	4 (2.08)
Syncope	2 (1.04)

Among 192 patients, diabetes mellitus and hypertension were present in 122 (63.54%) and 97 (50.52%) patients respectively followed by dyslipidemia 68 (35.41%).

In our study, inferior wall was the most involved, followed by anterior wall (Fig. 2)

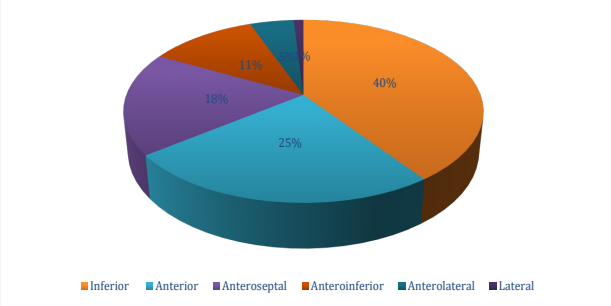

***Fig. 2** Distribution of study population according to the wall involvement (n=192)*

Discussion

Ischemic heart disease followed by stroke is the leading cause of death worldwide of which 80% of deaths and 85% of disabilities occur from cardiovascular disease in developing countries.[8-10]

In our study, the mean age of presentation was 61.29 years which was comparable to studies done in Nepal, India, and USA.[11-16] The incidence of ACS in young (<45 years) ranges from 5-10%.[17-19] Among 192 patients, young patients (<45 years) comprise 16 (8.33%) which was similar to another study done in Nepal.[20]

Angiographic findings in our study revealed more involvement of triple vessel than double vessel disease which was comparable to studies done in Pakistan and Bangladesh.[21,22] However, other studies done had a high prevalence of single vessel disease.[23-26] The high incidence of triple vessel disease in our study might be due to high frequency of diabetes mellitus as a risk factor. Prevalence of TVD in majority of patients adds grievances to our already financially weak patient population. Government subsidies need to be spread to cardiac centers outside Kathmandu to support these groups of patients.

In this study, TVD was more common in patients with STEMI and NSTEMI whereas SVD was more common in patients with UA. The left anterior descending artery (LAD) was most the commonly involved followed by the right coronary artery (RCA) which was comparable to a study conducted in India.[25]

In our study STEMI was most common presentation among the patients with ACS followed by NSTEMI [35] (18.22%), which was concordant with the study conducted in Nepal[26] and India[25]. However, studies conducted in European countries typically present NSTEMI.[27-29] This difference may be attributed to more severe presentation in case of STEMI, which warrants immediate seeking of medical attention. STEMI patients require emergency revascularization. For this reason, more PCI and CABG capable centers need to be established outside the Kathmandu Valley.

ECG finding revealed inferior wall MI 77 (40.10%) was most common followed by anterior wall 47 (24.47%) which was comparable, with the study conducted in Pakistan.[30]

Diabetes mellitus, smoking, hypertension, and dyslipidemia are established as risk factors for coronary artery disease. In our study, diabetes mellitus was the most common risk factor which was prevalent in more than half of our patients which was much higher than other studies conducted in Nepal[26,31], INTERHEART, GRACE, ACTION, EHS, and PACIFIC registries[32-36]. Diabetes mellitus was followed by hypertension which was present in 97 (50.52%) patients which was comparable to studies done in Nepal[26], India[37], Pakistan[38], and GRACE[33] registry but lower than ACTION[34] and PACIFIC[36] registry. Awareness regarding early diagnosis and adequate treatment of diabetes and hypertension can help to decrease complications of these diseases that include coronary artery disease. Focused plans and policies are warranted to tackle all these risk factors from all three levels of government.

Limitations of the Study

This was a single-center, descriptive cross-sectional study within a limited time frame. The convenience sampling method was used. Above constraints limits the wider representation of ACS population in Nepal. We could not calculate the magnitude of the disease and correlate the different risk factors with angiographic findings. Lack of awareness among the patients and referral bias among the care providers causes loss of a significant proportion of patients reaching cardiac centers. A nationwide multicenter prospective study should be conducted to determine the magnitude of the disease.

Conclusion

Data regarding patients with acute coronary syndrome outside the Kathmandu valley are scarce. This study is an attempt to fortify this aspect. In our study, triple vessel disease was the most common angiographic finding among patients with acute coronary syndrome. Diabetes mellitus was the most common modifiable risk factor, which could be the reason for multiple vessel involvement. Health policy makers must emphasize primary preventive measures, while clinicians/physicians should focus on primary and secondary preventive measures to decrease morbidity and mortality related to coronary artery disease.

Conflict of Interest:

None

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