HEART Score as a Predictor of Angiographic Severity of Coronary Artery Disease in Patients Diagnosed with Acute Coronary Syndrome

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ABSTRACT

Background: Acute coronary syndrome (ACS) is a major cause of morbidity and mortality worldwide. Rapid risk stratification of patients presenting with chest pain is essential for early diagnosis and appropriate management. The HEART score, which incorporates History, Electrocardiogram, Age, Risk factors, and Troponin levels, has emerged as a simple and effective clinical tool for predicting major adverse cardiac events. However, limited studies have evaluated its relationship with the angiographic severity of coronary artery disease (CAD), particularly in the Indian population.

Objective: To assess the HEART score in patients with acute coronary syndrome and to evaluate its correlation with the angiographic severity of coronary artery disease.

Methods: This prospective observational study was conducted in the Department of General Medicine at a tertiary care teaching hospital. A total of 50 adult patients diagnosed with acute coronary syndrome were included. Clinical history, cardiovascular risk factors, electrocardiographic findings, and troponin levels were recorded, and the HEART score was calculated for each patient. Patients were categorized into low-risk (0–3), moderate-risk (4–6), and high-risk (7–10) groups. All patients underwent coronary angiography to determine the severity of coronary artery disease. Statistical analysis was performed using SPSS software, and the association between HEART score categories and angiographic findings was analyzed using the Chi-square test, with $p < 0.05$ considered statistically significant.

Results: The mean age of the study population was 56.8 ± 11.4 years, and 68% of the patients were male. Hypertension (60%) and diabetes mellitus (52%) were the most common cardiovascular risk factors. Based on the HEART score classification, 18% of patients were categorized as low risk, 52% as moderate risk, and 30% as high risk. Coronary angiography revealed single vessel disease in 36% of patients, double vessel disease in 26%, triple vessel disease in 20%, and normal coronary arteries in 18%. A significant association was observed between increasing HEART score categories and the severity of coronary artery disease ($\chi^2 = 12.84$, $p = 0.002$), with multi-vessel disease predominantly observed in patients with higher HEART scores.

Conclusion: The HEART score is a simple and effective bedside risk stratification tool that correlates significantly with the angiographic severity of coronary artery disease in patients with acute coronary syndrome. Its routine use in clinical practice may help identify high-risk patients early and facilitate timely diagnostic and therapeutic interventions.

Keywords: Acute coronary syndrome; HEART score; coronary angiography; coronary artery disease; risk stratification; chest pain.

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INTRODUCTION

Chest pain is one of the most frequent presenting complaints in emergency departments worldwide and represents a major diagnostic challenge for clinicians. It accounts for a substantial proportion of hospital visits and can be caused by a wide spectrum of conditions ranging from benign musculoskeletal disorders to life-threatening cardiovascular emergencies such as acute coronary syndrome (ACS), pulmonary embolism, or aortic dissection. Among these, ACS remains a leading cause of morbidity and mortality globally, making early identification and prompt management crucial to improving patient outcomes. Rapid and accurate risk stratification is therefore essential to distinguish patients who require urgent intervention from those who can be safely discharged from the emergency department (1).

Acute coronary syndrome encompasses a spectrum of clinical conditions resulting from acute myocardial ischemia due to sudden reduction in coronary blood flow. This spectrum includes unstable angina, non-ST elevation myocardial infarction (NSTEMI), and ST-elevation myocardial infarction (STEMI). The underlying pathophysiology usually involves rupture or erosion of an atherosclerotic plaque followed by platelet aggregation and thrombus formation, leading to partial or complete occlusion of the coronary artery. Early recognition and risk stratification are essential to prevent myocardial damage and reduce mortality in patients with suspected ACS (2).

Patients with chest discomfort are often evaluated initially with a clinical history, physical examination, electrocardiography (ECG), and detection of cardiac biomarkers such as troponin. However, neither the severity of underlying coronary artery disease (CAD) nor the identification of patients at risk of major adverse cardiac events (MACE) may be accurately predicted by these individual indicators. As a result, a number of clinical risk assessment instruments have been created to help doctors make decisions early. The Global Registry of Acute Coronary Events (GRACE) score, the Emergency Department Assessment of Chest Pain Score (EDACS), and the Thrombolysis in Myocardial Infarction (TIMI) score are popular scoring systems that are used to categorize patients according to their risk of unfavorable outcomes (3).

The HEART score, among these techniques, has grown in popularity due to its simplicity, use, and good predictive capacity in emergency department settings. The five clinical components that make up the HEART score are age, risk factors, electrocardiogram results, history, and troponin levels. Each of these components has a score between 0 and 2, and the total score ranges from 0 to 10. Patients are divided into low-risk (0–3), moderate-risk (4–6), and high-risk (7–10) groups for significant adverse cardiac events based on this score. Clinicians can quickly evaluate patients with suspected ACS using this structured scoring system and make well-informed judgments on invasive therapy, observation, or discharge (2).

Multiple studies have demonstrated the diagnostic and prognostic utility of the HEART score in patients presenting with chest pain. A large meta-analysis including over 41,000 patients showed that individuals with a HEART score of 0–3 had a very low incidence of major adverse cardiac events, supporting the use of the HEART score as a reliable risk stratification tool in emergency settings (2). Similarly, clinical studies have shown that higher HEART scores are significantly associated with increased risk of major adverse cardiac events and significant coronary artery disease detected on imaging or angiography (4).

Recent studies have investigated the connection between the HEART score and the angiographic severity of coronary artery disease in addition to forecasting unfavorable clinical outcomes. The gold standard for assessing the degree and complexity of CAD is still coronary angiography, which is frequently measured using scoring systems like the SYNTAX score. Higher HEART scores may be linked to more severe coronary artery involvement, according to studies that show a substantial positive association between HEART score and SYNTAX score. For instance, a multicenter study found a statistically significant association ($r = 0.493$, $p < 0.001$) between the SYNTAX score and HEART score, suggesting that individuals with higher HEART scores were more likely to have severe coronary artery disease (5).

Additionally, studies evaluating imaging modalities such as coronary computed tomography angiography have shown that the HEART score can effectively predict the presence of significant coronary artery stenosis and short-term major adverse cardiac events. In one study involving patients presenting with suspected ACS, the incidence of major adverse cardiac events increased markedly with higher HEART score categories, demonstrating the score's ability to stratify patients according to clinical risk (6).

Due to variations in patient demographics, the frequency of cardiovascular risk factors, and healthcare practices, the HEART score's predictive ability may fluctuate between populations despite thorough worldwide validation. Assessing the HEART score's suitability in regional clinical contexts is especially crucial in developing nations like India, where the prevalence of diabetes mellitus, hypertension, smoking, and dyslipidemia is comparatively high. Additionally, few studies have looked at the connection between the HEART score and the angiographic severity of coronary artery disease in Indian patients with acute coronary syndrome.

Therefore, the present study aims to assess the usefulness of the HEART score in patients diagnosed with acute coronary syndrome and to evaluate its association with the angiographic severity of coronary artery disease. Establishing such a relationship may enhance early risk stratification, guide timely therapeutic interventions, and improve clinical decision-making in emergency and cardiology practice.

MATERIALS AND METHODS

Study Design

This study was conducted as a prospective observational study in the Department of General Medicine at a tertiary care teaching hospital in Puducherry that provides emergency and cardiology services. Prospective observational designs are widely used to evaluate the effectiveness of clinical risk stratification tools because they allow systematic documentation of clinical variables and patient outcomes without altering routine clinical management. Risk scores such as the HEART score are commonly applied in emergency department settings to support rapid assessment of patients presenting with chest pain and suspected acute coronary syndrome (ACS) (7). The study was carried out over a period of three months, during which all eligible patients presenting with chest pain were screened and evaluated.

Study Population

The study population consisted of adult patients presenting with chest pain or chest discomfort suggestive of acute coronary syndrome. Patients presenting with chest pain represent a heterogeneous clinical group, and structured clinical tools such as the HEART score are specifically designed to stratify these patients according to their risk of adverse cardiac events (8). All patients meeting the eligibility criteria during the study period were consecutively enrolled to minimize selection bias.

Inclusion Criteria

Patients aged greater than or equal to 18 years, presentation with chest pain or chest discomfort suggestive of cardiac origin, diagnosis of acute coronary syndrome based on clinical evaluation, electrocardiographic findings, and cardiac biomarkers, and patients who subsequently underwent coronary angiography for assessment of coronary artery disease.

Exclusion Criteria

Patients were excluded from the study if they had traumatic chest pain, were younger than 18 years of age, had a clearly identifiable non-cardiac cause of chest pain at presentation, or had incomplete clinical or laboratory data necessary for HEART score calculation or outcome assessment.

Sample Size

The study comprised a total of 50 patients with acute coronary syndrome. Based on previously published research assessing the HEART score in patients presenting with chest pain, the minimum necessary sample size was calculated. The formula $N = (Z\alpha/2 \times \sigma / E)^2$ was used to determine the sample size. $Z\alpha/2$ is the standard normal variable that corresponds to the required confidence level, σ is the standard deviation, and E is the acceptable error. A minimum sample size of roughly ten individuals was determined using a standard deviation of 1.56, an acceptable error of 1, and a confidence level of 95% ($Z = 1.96$). However, the sample size was expanded to 50 patients in order to improve the study's reliability and statistical validity. Comparable sample sizes have been utilized in similar observational studies assessing risk stratification scores in emergency rooms in order to evaluate prediction accuracy (9).

Data Collection

All eligible patients were enrolled after obtaining informed consent. A structured data collection proforma was used to record demographic details, clinical history, cardiovascular risk factors, electrocardiographic findings, and laboratory investigations. Demographic variables included age and gender. Clinical history included characteristics of chest pain

such as type of pain (typical or atypical), radiation, duration of symptoms, and associated symptoms including dyspnea, sweating, nausea, vomiting, or syncope. Cardiovascular risk factors including diabetes mellitus, hypertension, smoking status, dyslipidemia, and family history of coronary artery disease were also documented. Collection of these variables is essential in cardiovascular risk stratification because these factors are known contributors to the development and progression of coronary artery disease (10).

HEART Score Assessment

The HEART score was calculated for each patient using five clinical components: history, electrocardiogram findings, age, cardiovascular risk factors, and troponin levels. Each component was assigned a score ranging from 0 to 2, resulting in a total score ranging from 0 to 10. Based on the total score, patients were classified into three risk categories: low risk (0–3), moderate risk (4–6), and high risk (7–10). The HEART score has been validated as a simple and reliable clinical tool for early risk stratification of patients presenting with chest pain and suspected ACS, enabling clinicians to rapidly identify patients at low or high risk of major adverse cardiac events (8).

Coronary Angiography and Assessment of Coronary Artery Disease Severity : ll patients diagnosed with acute coronary syndrome underwent coronary angiography as part of their standard clinical management. Coronary angiography was performed using standard techniques via radial or femoral arterial access. The angiographic findings were evaluated to determine the presence and severity of coronary artery disease, including the number of affected vessels and the degree of luminal stenosis. Coronary angiography remains the gold standard diagnostic modality for evaluating the anatomical severity of coronary artery disease and guiding therapeutic decisions in patients with acute coronary syndrome (11).

Outcome Measures

The primary outcome of the study was to evaluate the relationship between the HEART score and the angiographic severity of coronary artery disease in patients diagnosed with acute coronary syndrome. Secondary outcomes included determining the distribution of patients across HEART score risk categories and identifying any association between HEART score classification and clinical outcomes such as need for intensive care, intervention, or adverse events.

Statistical Analysis

All collected data were entered into Microsoft Excel and subsequently analyzed using the Statistical Package for the Social Sciences (SPSS) software version 23.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were expressed as frequency and percentage. The association between HEART score categories and angiographic severity of coronary artery disease was assessed using the Chi-square test. A p-value less than 0.05 was considered statistically significant. Similar statistical approaches are commonly used in observational studies evaluating cardiovascular risk stratification tools in emergency department populations (9).

Ethical Considerations

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki (12). Ethical approval was obtained from the Institutional Ethics Committee prior to the commencement of the study. Written informed consent was obtained from all participants before enrolment, and confidentiality of patient information was strictly maintained throughout the study.

RESULTS

The study findings are presented in Tables 1–8 and Figures 1–3.

Baseline Characteristics of the Study Population

A total of 50 patients diagnosed with acute coronary syndrome were included in the present study. The mean age of the study population was 56.8 ± 11.4 years, with ages ranging from 34 to 78 years. The majority of patients were males (34 patients, 68%), while females constituted 16 patients (32%). Most patients belonged to the age group of 51–60 years (36%), followed by 61–70 years (28%), indicating that acute coronary syndrome was more prevalent among middle-aged and elderly individuals in this study population.

Regarding cardiovascular risk factors, hypertension was the most common risk factor observed in 30 patients (60%), followed by diabetes mellitus in 26 patients (52%). Smoking was present in 18 patients (36%), dyslipidemia in 14 patients (28%), and a positive family history of coronary artery disease in 10 patients (20%). Multiple risk factors were present in several patients, reflecting the multifactorial etiology of coronary artery disease.

Associated clinical symptoms included dyspnea in 21 patients (42%), sweating in 28 patients (56%), nausea or vomiting in 12 patients (24%), and syncope in 4 patients (8%). Typical anginal chest pain was reported in 31 patients (62%), whereas atypical chest pain was observed in 19 patients (38%).

Electrocardiographic Findings and Troponin Levels

Electrocardiographic evaluation showed that significant ST-segment deviation suggestive of myocardial ischemia was present in 22 patients (44%), while nonspecific ST-T changes were observed in 17 patients (34%). The remaining 11 patients (22%) had a normal electrocardiogram at presentation.

Cardiac troponin levels were elevated in the majority of patients. Mild elevation (1–3 times the normal value) was noted in 19 patients (38%), whereas markedly elevated troponin levels (>3 times the normal value) were detected in 21 patients (42%). The remaining 10 patients (20%) had normal troponin values during initial assessment.

Distribution of HEART Score

The mean HEART score among the study participants was 5.3 ± 1.9. Based on the HEART score classification, patients were stratified into three risk categories. Low-risk patients (HEART score 0–3) constituted 9 patients (18%). Moderate-risk patients (HEART score 4–6) represented the largest group with 26 patients (52%). High-risk patients (HEART score 7–10) comprised 15 patients (30%).

These findings demonstrate that the majority of patients presenting with acute coronary syndrome fell into the moderate-risk category according to the HEART score.

Coronary Angiographic Findings

Coronary angiography was performed in all 50 patients to determine the extent and severity of coronary artery disease. Significant coronary artery disease was detected in 41 patients (82%), while normal coronary arteries or non-significant stenosis were observed in 9 patients (18%).

Among patients with significant coronary artery disease, single vessel disease (SVD) was observed in 18 patients (36%), double vessel disease (DVD) in 13 patients (26%),

and triple vessel disease (TVD) in 10 patients (20%). Multi-vessel disease was therefore present in a substantial proportion of patients in the study population.

Association between HEART Score and Angiographic Severity

A clear trend was observed between increasing HEART score categories and greater angiographic severity of coronary artery disease.

Among patients in the low-risk group (HEART score 0–3), most had normal coronary arteries or single vessel disease. Only one patient in this group demonstrated double vessel disease, and none had triple vessel involvement.

In the moderate-risk group (HEART score 4–6), single vessel disease was the most common angiographic finding, followed by double vessel disease. A smaller proportion of patients in this category demonstrated triple vessel disease.

In contrast, patients classified as high risk (HEART score 7–10) showed significantly higher rates of multi-vessel coronary artery disease. Triple vessel disease was predominantly observed in this group, indicating a greater angiographic severity of coronary artery disease.

Statistical analysis using the Chi-square test demonstrated a significant association between HEART score risk categories and angiographic severity of coronary artery disease ($\chi^2 = 12.84$, $p = 0.002$). This finding suggests that higher HEART scores are strongly associated with more extensive coronary artery involvement.

Correlation Between Individual HEART Score Components and Coronary Artery Disease Severity

Further analysis of individual components of the HEART score revealed that electrocardiographic changes and elevated troponin levels showed the strongest association with severe coronary artery disease. Patients with significant ST-segment deviation and markedly elevated troponin levels were more likely to have double or triple vessel disease on coronary angiography. Additionally, increasing age and the presence of multiple cardiovascular risk factors were also associated with greater angiographic severity.

Clinical Outcomes Based on HEART Score Categories

Clinical outcomes during hospitalization also varied according to HEART score categories. Patients with low HEART scores were more likely to be managed conservatively and discharged after observation. Moderate-risk patients required further diagnostic evaluation and monitoring, while high-risk patients frequently required intensive care management and invasive interventions such as percutaneous coronary intervention.

Overall, adverse outcomes were more frequently observed among patients with higher HEART scores, further supporting the predictive value of the HEART score in identifying patients at increased risk of severe coronary artery disease and adverse clinical outcomes.

DISCUSSION

Acute coronary syndrome (ACS) remains a major cause of morbidity and mortality worldwide, and early risk stratification plays a crucial role in guiding clinical decision-making in patients presenting with chest pain. The HEART score has emerged as a simple and practical tool for evaluating patients with suspected ACS in emergency settings. The present study aimed to assess the relationship between the HEART score and the angiographic severity of coronary artery disease (CAD) in patients diagnosed with ACS. Our findings demonstrate a significant association between higher HEART score categories and greater angiographic severity of CAD.

The majority of patients in this study were male (68%), with a mean age of 56.8 ± 11.4 years. This finding is in line with a number of earlier studies that assessed ACS populations. For example, middle-aged guys made up the bulk of patients who presented with chest pain in the prospective validation research by, which is consistent with the known higher prevalence of coronary artery disease in men (8). In a similar vein, research on populations in emergency rooms has demonstrated that older age and male gender are significant predictors of elevated cardiovascular risk.

The proportion of cardiovascular risk factors in the present study sample was likewise similar to earlier studies. The most prevalent risk factors found in our study were diabetes mellitus (52%) and hypertension (60%). These results are consistent with research showing that among the most common risk factors in patients presenting with suspected ACS in emergency rooms are hypertension, smoking, and metabolic disorders (10). The rising incidence of cardiovascular disease, especially in emerging nations where lifestyle-related risk factors are more prevalent, is reflected in the high prevalence of these risk factors.

In the present study, the mean HEART score was 5.3 ± 1.9, with the majority of patients categorized as moderate risk (52%), followed by high risk (30%) and low risk (18%). These findings are consistent with previous studies evaluating the distribution of HEART score categories in ACS patients. A large prospective validation study reported that approximately one-third of patients fall into the low-risk category, while a substantial proportion are classified as moderate or high risk (8). Similarly, another prospective study evaluating risk stratification tools in emergency department patients demonstrated that the HEART score effectively stratifies patients into distinct risk groups for major adverse cardiac events (9).

The substantial association between the angiographic severity of coronary artery disease and the HEART score categories was one of the study's main conclusions. On angiography, patients with higher HEART scores were more likely to have multi-vessel coronary artery disease. In particular, patients in the high-risk group were more likely to have triple vascular disease, whereas those in the low-risk group were more likely to have single vessel disease or normal coronary arteries. This correlation implies that the HEART score may represent the underlying structural severity of coronary artery disease in addition to predicting clinical outcomes.

Previous research has found a link between HEART score and angiographic findings, supporting these results. The HEART score and the SYNTAX score, which is frequently used to gauge the complexity of coronary artery disease, showed a strong positive connection in a multicenter study by Salimi et al. (5). The HEART score may be a useful predictor of angiographic severity, according to the authors, who found that patients with higher HEART scores were more likely to have substantial coronary artery involvement.

Similarly, another study evaluating the predictive value of the HEART score for coronary artery disease reported that higher HEART scores were significantly associated with the presence of ischemic heart disease and major adverse cardiac events (4). These findings support the hypothesis that the

HEART score reflects both clinical risk and underlying coronary artery pathology.

Furthermore, the present study findings are consistent with research demonstrating that the HEART score is a reliable predictor of adverse clinical outcomes in patients with suspected ACS. A systematic review and meta-analysis involving more than 40,000 patients showed that patients with low HEART scores have a very low risk of major adverse cardiac events, while higher scores are associated with significantly increased risk. These findings reinforce the clinical utility of the HEART score as a reliable bedside risk stratification tool (2).

The substantial correlation between specific HEART score components and angiographic severity was another significant finding in this study. Multi-vessel coronary artery disease was most strongly correlated with significant ECG abnormalities and high troponin levels. This finding is in line with other research showing that elevated cardiac biomarkers and irregular electrocardiograms are significant indicators of coronary artery blockage and myocardial ischemia. It has long been known that electrocardiographic abnormalities like ST-segment deviation are indicators of significant myocardial ischemia and an elevated risk of unfavorable cardiac outcomes.

In addition to predicting angiographic severity, the HEART score also demonstrated utility in guiding clinical management decisions in our study. Patients classified as low risk were more likely to be discharged after observation, whereas high-risk patients required intensive monitoring and invasive interventions such as percutaneous coronary intervention. These findings highlight the practical value of the HEART score in optimizing resource utilization and improving patient triage in emergency settings.

The clinical implications of these findings are particularly important in resource-limited healthcare settings. Early identification of high-risk patients can facilitate timely referral for coronary angiography and revascularization, while low-risk patients can be safely managed with conservative strategies. This approach may help reduce unnecessary hospital admissions, decrease healthcare costs, and improve patient outcomes.

However, several limitations should be considered when interpreting the results of this study. First, the study was conducted in a single tertiary care centre with a relatively small sample size of 50 patients, which may limit the generalizability of the findings. Second, the study focused primarily on the relationship between HEART score and angiographic severity without long-term follow-up for major adverse cardiac events. Future studies with larger sample sizes and longer follow-up periods are necessary to further validate the predictive value of the HEART score in different populations.

Despite these limitations, the present study provides valuable evidence supporting the usefulness of the HEART score in predicting the angiographic severity of coronary artery disease in patients with acute coronary syndrome. The findings highlight the potential role of the HEART score as a simple and effective tool for early risk stratification and clinical decision-making in emergency department settings.

CONCLUSION

In conclusion, the present study demonstrates that the HEART score is a useful and practical clinical tool for risk stratification in patients presenting with acute coronary syndrome. A significant association was observed between higher HEART score categories and greater angiographic severity of coronary artery disease, with patients in the high-risk group showing a higher prevalence of multi-vessel coronary artery involvement. Additionally, important clinical components of the HEART score, including electrocardiographic changes, elevated troponin levels, advanced age, and multiple cardiovascular risk factors, were found to correlate with severe coronary artery disease. These findings support the clinical utility of the HEART score as a simple bedside assessment tool that can aid in early identification of high-risk patients, facilitate timely diagnostic and therapeutic interventions, and optimize decision-making in emergency and cardiology settings.

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Table 1: Baseline Demographic Characteristics of Study Population (n = 50)

Variable	Number of Patients (n)	Percentage (%)
Age Group (years)		
31–40	4	8
41–50	9	18
51–60	18	36
61–70	14	28
>70	5	10
Gender		
Male	34	68
Female	16	32
Mean Age ± SD	56.8 ± 11.4	—

Table 2: Distribution of Cardiovascular Risk Factors among Study Participants

Risk Factor	Number of Patients (n)	Percentage (%)
Hypertension	30	60
Diabetes Mellitus	26	52
Smoking	18	36
Dyslipidemia	14	28
Family History of CAD	10	20
No Risk Factors	6	12

Table 3: Clinical and Diagnostic Findings of Patients

Clinical Variable	Number of Patients (n)	Percentage (%)
Type of Chest Pain		
Typical Angina	31	62
Atypical Chest Pain	19	38
Associated Symptoms		
Dyspnea	21	42
Sweating	28	56
Nausea/Vomiting	12	24
Syncope	4	8
ECG Findings		
Normal ECG	11	22
Non-specific ST–T changes	17	34
Significant ST deviation	22	44
Troponin Levels		
Normal	10	20
1–3 × normal	19	38

>3 × normal	21	42

Table 4: Distribution of HEART Score Risk Categories

HEART Score Category	Score Range	Number of Patients (n)	Percentage (%)
Low Risk	0–3	9	18
Moderate Risk	4–6	26	52
High Risk	7–10	15	30
Mean HEART Score ± SD	—	5.3 ± 1.9	—

Table 5: Association Between HEART Score and Angiographic Severity of Coronary Artery Disease

HEART Score Category	Normal Coronaries	Single Vessel Disease	Double Vessel Disease	Triple Vessel Disease	Total
Low Risk (0–3)	6	3	0	0	9
Moderate Risk (4–6)	3	12	8	3	26
High Risk (7–10)	0	3	5	7	15
Total	9	18	13	10	50

Table 6: Multivariate Logistic Regression Analysis for Predictors of Severe Coronary Artery Disease (Double/Triple Vessel Disease)

Variable	Odds Ratio (OR)	95% Confidence Interval	P-value
Age >60 years	2.18	1.02 – 4.67	0.041
Male Gender	1.54	0.71 – 3.34	0.267
Diabetes Mellitus	2.36	1.08 – 5.17	0.031
Hypertension	1.89	0.88 – 4.02	0.097
Smoking	2.71	1.19 – 6.18	0.017
Significant ECG changes	3.45	1.52 – 7.82	0.003
Elevated Troponin (>3× normal)	4.12	1.83 – 9.27	<0.001
HEART Score ≥7	5.38	2.11 – 13.69	<0.001

Table 7: Correlation of Individual HEART Score Components with Angiographic Severity of Coronary Artery Disease

HEART Score Component	Single Vessel Disease (n=18)	Double Vessel Disease (n=13)	Triple Vessel Disease (n=10)	P-value
Suspicious Clinical History	11	9	8	0.041
Significant ECG Changes	6	8	8	0.009
Age ≥65 years	5	6	6	0.032
≥3 Risk Factors	8	7	6	0.048
Elevated Troponin (>3× normal)	7	9	8	0.002

Table 8: Clinical Outcomes According to HEART Score Risk Categories

HEART Score Category	Discharged	Observation Ward	ICU Admission	Coronary Intervention	Mortality	Total
Low Risk (0–3)	7	2	0	0	0	9
Moderate Risk (4–6)	8	9	6	3	0	26
High Risk (7–10)	1	2	7	4	1	15

Total	16	13	13	7	1	50

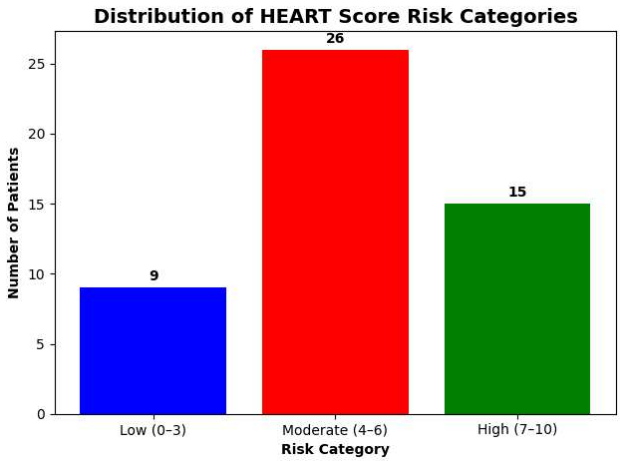

Figure 1: Distribution of HEART Score Risk Categories among Patients with Acute Coronary Syndrome

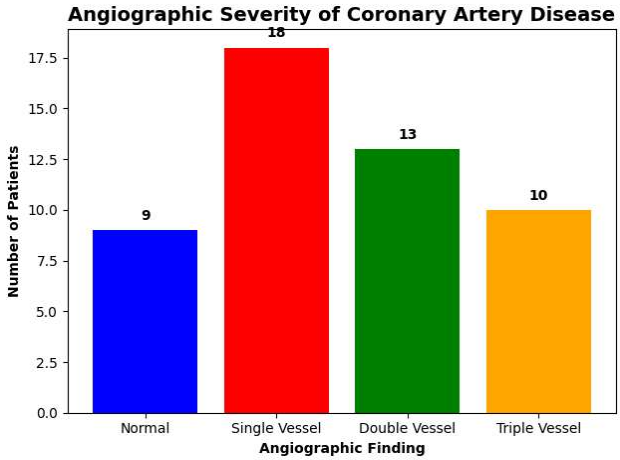

Figure 2: Angiographic Severity of Coronary Artery Disease in the Study Population

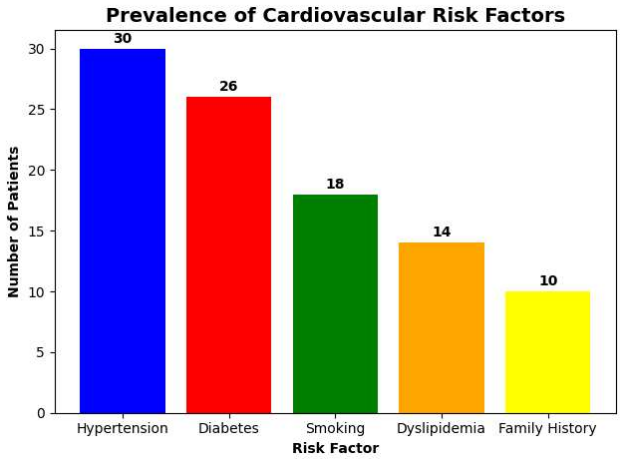

Figure 3: Prevalence of Cardiovascular Risk Factors among Patients with Acute Coronary Syndrome