Original Article

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Prevalence of Short-Term Mortality and Assessment of Risk Factors of Unstable Angina and Non St-Elevation MI in Patients Admitted at CCU of PMCH Nawabshah

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Author`s Contribution

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ABSTRACT

Objective: To determine the short term mortality (30 days) and risk factors in patients with unstable Angina (UA) and non-ST elevation Myocardial Infarction (NSTEMI) at Cardiology department PUMHS Nawabshah (SBA).

Methodology: This cross-sectional study was conducted at the Cardiology Department, PUMHS Nawabshah form March 2023 to August 2023. Patients diagnosed with UA and NSTEMI, irrespective of age and gender, were included. Short-term mortality was assessed through direct patient follow-up, hospital records, or telephonic contact with family members. Additionally, risk factors such as hypertension, diabetes mellitus, smoking, and dyslipidemia were evaluated. Data were entered and analyzed using SPSS version 25, and associations were assessed using the Chi-square test at a 95% confidence interval.

Results: The overall mean age of the patients was 58.39 ± 13.68 years. Males constituted 70%, while females made up 30% of the study population. The overall short-term mortality rate was 9.7%, with left ventricular failure (40.3%) being the most common complication, followed by arrhythmia (3.3%). Mortality rates were similar among patients with hypertension (4.3%), smoking (3.7%), diabetes (3.0%), and dyslipidemia (5.0%) compared to non-affected groups. Additionally, a family history of cardiovascular disease (2.3%) and other risk factors (2.3%) showed no significant correlation with mortality.

Conclusion: The overall short-term mortality rate was 9.7%. While risk factors contribute to overall cardiovascular risk, while did not independently affect short-term mortality. Therefore, comprehensive risk assessment models are essential for better prediction and management of short-term outcomes in UA and NSTEMI patients.

Keywords: ACS, 30 days mortality, Non-STEMI, Smoking, Hypertension, Dyslipidemia.

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Introduction

Acute Coronary Syndrome (ACS) is the term denoting three specific diseases that includes unstable angina, NSTEMI and ST elevation MI.[1,2] The key difference between them lies in the severity of ischemia, specifically whether it is significant enough to cause myocardial damage and lead to the release of cardiac biomarkers.[3] Before the introduction of high-sensitivity troponin assays, hospital admissions for unstable angina were more frequent than those for STEMI, accounting for approximately 25%–50% of all ACS cases.[3,4]

Ischemic heart disease remains a leading cause of mortality, with ACS and sudden cardiac death being responsible for the majority of fatalities, accounting for

approximately 1.8 million deaths annually.[5] The occurrence of IHD and ACS rises with advancing age; however, these conditions tend to manifest 7 to 10 years earlier in men than in women on averag.[5] NSTEMI have angina symptoms at rest which later on result in myocardial necrosis as is seen in elevated cardiac biomarkers with no ST elevation on 12-lead ECG. Troponin and CK-MB are the gold standard for identifying Myocardial Infarction. These biomarkers lack sensitivity in detecting transient myocardial ischemia, commonly observed in ACS patients with UA, and may take several hours to become positive in NSTEMI after symptom onset. Therefore, the primary goal in UA/NSTEMI management is the early identification of myocardial ischemia or pre-infarction, allowing for immediate interventions to restore optimal blood flow to the myocardium and prevent further cardiac damage.[6,7]

Patients diagnosed with UA or NSTEMI exhibit a wide range of risk for mortality and cardiac ischemic events due to the heterogeneous nature of these conditions. Various efforts have been made to stratify risk levels in these patients, often focusing on single variables, such as the presence or absence of ECG changes or elevated serum cardiac biomarkers, to establish a risk gradient for adverse outcomes.[8,9]

The in-hospital mortality rate for UA is very low, with previous studies reporting a rate of approximately 0.27%, while MI patients have a significantly higher in-hospital mortality rate of 11.1%.[10] Over the years, the mortality rate for UA has remained comparable to that of chronic stable angina, at around 1.6% annually. In contrast, STEMI patients exhibit a notably high in-hospital mortality rate of 42%, despite a reported 9% in-hospital mortality, compared to 7% among NSTEMI patients.

Additionally, the one-year mortality rate for NSTEMI patients may be equivalent to or even higher than that of STEMI patients.[10] Patients admitted with NSTEMI or UA in lower-income or Asian countries are generally younger, with a high prevalence of diabetes and active smoking habits.[11] They also tend to have less chronic comorbidity compared to patients in higher-income regions. Notably, a large proportion of these patients meet the criteria for early invasive intervention, highlighting their elevated risk profile. These individuals are more susceptible to adverse outcomes, including mortality, recurrent myocardial infarction, symptomatic ischemia, severe arrhythmias, heart failure, and stroke.[11] Although there are no recent studies directly addressing the pathophysiological link between short-term mortality and UA or NSTEMI in the available literature. Advance age, male gender and other conditions like hypertension, diabetes, chronic kidney disease, and the ischemic heart disease significantly elevate mortality risk. Despite the advances made in the treatment of ACS, NSTEMI and UA continue to be associated with elevated short-term mortality. A better understanding about the dynamic epidemiology of short-term mortality and the identification of particular high-risk subgroups within the UA/NSTEMI spectrum are pivotal to facilitate risk stratification and to optimize early treatment strategies.

The significance of this study is to fill in gaps in existing literature by presenting updated short-term mortality prevalence estimates and evaluating exploration of traditional risk factors. By assessing the risk factors, this study can be useful in the intention of creating targeted interventions to decrease early mortality in this patient cohort.

Methodology

This cross-sectional study was conducted in the Coronary Care Unit of the Cardiology Department at Peoples Medical College Hospital, Nawabshah from March 2023 to August 2023. The study included patients aged over 18 of both genders who were admitted to the Coronary Care Unit with a diagnosis of Acute Coronary Syndrome, specifically Unstable Angina and Non-ST-Elevation Myocardial Infarction (NSTEMI).

Patients with ST-Elevation Myocardial Infarction (STEMI), those with significant comorbidities such as malignancy or severe chronic kidney disease, and individuals unwilling to participate were excluded from the study. A non-probability convenience sampling technique was used for patient selection.

Unstable angina was defined as chest pain lasting more than 20 minutes at rest, increasing in frequency with exertion, and/or lasting longer, with or without ECG changes and normal cardiac biomarkers. NSTEMI was defined as chest pain with or without ECG changes but with elevated cardiac biomarkers.

Patient data was collected, and all participants were monitored for mortality within 30 days of hospital admission. Mortality data was obtained through direct patient follow-up, hospital records, or telephone contact with family members. Additionally, key risk factors for short-term mortality—including hypertension, diabetes mellitus, smoking, and dyslipidemia—were assessed. A statistical analysis was performed to evaluate the

significance of these risk factors in relation to 30-day mortality, with a p-value of <0.05 considered statistically significant.

Results

The study included 300 patients, with overall mean age of 58.39±13.68 years with a male predominance (69.7%). The most common occupation was housewives (30.3%), followed by laborers, government employees, farmers, and private employees. Chest pain (94.0%) was the most frequent symptom, with shortness of breath (58.3%) and palpitations (20.7%). Unstable angina was present in 34.0% of patients, while 66.0% had NSTEMI. ECG changes included ST-segment depression (33.0%), deep T-wave inversion (18.3%), and transient ST elevation (19.3%). Recurrent angina within 24 hours occurred in 28.0% of cases. Elevated cardiac troponin was observed in 53.0%, while CKMB elevation was rare (4.0%). Table I

Table.1: Demographic and clinical characteristics of the patients. (n=300)

Variables	N	%
Gender		
Male	209	69.7
Female	91	30.3
Occupational status		
House wife	91	30.3
Farmer	50	16.7
Laborer	57	19.0
Gov. Employee	61	20.3
Private Employee	41	13.7
Symptoms		
Chest pain	282	94.0
Shortness of breath	175	58.3
Palpitation	62	20.7
Other symptoms	201	67.0
Unstable angina		
Yes	141	34.0
No	159	66.0
ECG changes		
ST segment depression	99	33.0
Deep T wave inversion	55	18.3
Transient ST elevation	58	19.3
Recurrent Angina symptoms in 24 hrs		
Yes	84	28.0
No	216	72.0
Elevated cardiac troponin		
Yes	159	53.0
No	141	47.0
CKMB		
Yes	12	4.0
No	288	96.0

Regarding risk factors, hypertension (46.0%), smoking (41.0%), and hyperlipidemia (49.0%) were the most prevalent, followed by diabetes (34.0%), family history of cardiovascular disease (24.7%), and other factors (20.0%). Figure 1

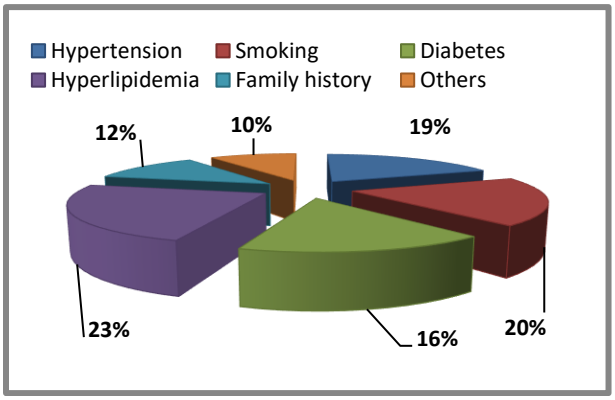

Figure 1: Estimated risk factors. (n=300)

According to the outcomes, left ventricular failure was observed in 40.3% of cases, while arrhythmia was noted in 3.3% of patients. The mortality rate was recorded at 9.7% of the total cases. Figure 2

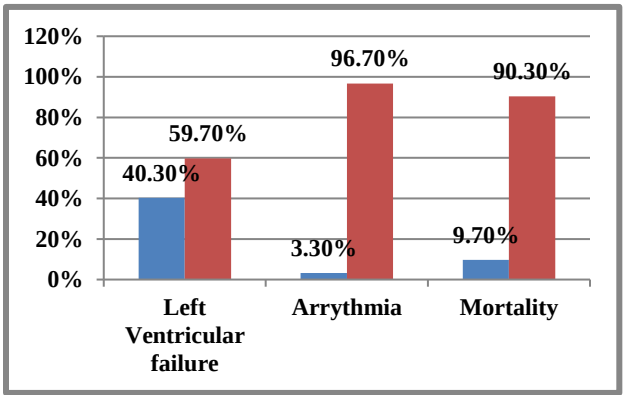

Figure 2. Patients distribution according to their outcomes (n=300)

Short-term mortality showed insignificant association with individual risk factors (p>0.05). Hypertension (4.3%), smoking (3.7%), diabetes (3.0%), and dyslipidemia (5.0%) had similar mortality rates compared to non-affected groups. A family history of cardiovascular disease (2.3%) and other risk factors (2.3%) also showed no strong correlation with mortality. The findings suggest that while these risk factors contribute to overall cardiovascular risk, and did not independently impact short-term mortality. Table II

Table II: Short term mortality according to risk factors. (n=300)

Risk factors	Short term mortality		p-value
	Yes	No	
Hypertension			
Yes	13	125	0.894
	4.3%	41.7%	
No	16	146	
	5.3%	48.7%	
Smoking			
Yes	11	112	0.724
	3.7%	37.3%	
No	18	159	
	6.0%	53.0%	
Diabetes			
Yes	9	93	0.723
	3.0%	31.0%	
No	20	178	
	6.7%	59.3%	
Dyslipidemia			
Yes	15	132	0.758
	5.0%	44.0%	
No	14	139	
	4.7%	46.3%	
Family history			
Yes	7	67	0.945
	2.3%	22.3%	
No	22	204	
	7.3%	68.0%	
Others			
Yes	7	67	0.922
	2.3%	22.3%	
No	22	204	
	7.3%	68.0%	

Discussion

The risk factors for short-term mortality in patients with Unstable Angina (UA) and Non-ST-Elevation Myocardial Infarction (NSTEMI) are complex and multifactorial, involving demographic characteristics, clinical conditions, and procedural factors that collectively influence patient outcomes. In this study, 300 cases were analyzed, with a mean age of 58.39 ± 13.68 years, and males comprising the majority (69.7%). These findings align with the study by Taneja AK et al.[12], which reported a mean age of 65.8 ± 11.9 years in patients with NSTEMI. Similarly, Adam AM et al[13] reported a mean age of 53.17 ± 12.65 years for males and 57.85 ± 12.73 years for females, with males comprising 65.2% of the study population and females 34.8%. Additionally, a study by Mustafa J et al[14] found a mean age of 49 ± 10 years, with 66% males and 34% females, while Memon AG et al[15] reported a mean age of 37.63 ± 6.26 years, where males (80.7%) outnumbered females (19.3%). The higher proportion of males in these studies may be attributed to smoking habits, which are more prevalent among men.

In this study the frequency of unstable angina was found among 53.0%. However, Nguyen Tet al[168] found lower rate of unstable angina as 19.4% and this frequency was lower from our findings may of because of they found unstable angina in both ST and Non- ST elevation MI. In another study of Mihajlović Det al[169] reported that the frequency of unstable angina was 20.79, which was lower as compared to our findings. In this study ST segmental depression was seen in 33.0% of the cases, deep T wave inversion was observed in 18.3% cases and Transient ST elevation was noted in 19.3% cases. Task FM et al[16] reported that ECG findings in elderly patients with MI are often non-diagnostic, with up to 43% lacking ST-elevation or ST-depression. ST-segment changes and T-wave abnormalities serve as key indicators of unstable CAD, with the extent and severity of ischemia correlating to the degree and number of leads showing ST-depression. The degree of ST-segment depression is closely linked to short-term mortality in patients with (NSTE-ACS). One study reported that 60.13% of patients exhibiting ST-segment depression had a significant correlation with early mortality, highlighting its prognostic importance in risk assessment.[17] Although some studies have questioned the prognostic significance of isolated T-wave inversion, deep symmetrical T-wave inversion in anterior chest leads is frequently associated with significant stenosis of the proximal LAD artery or the left main coronary artery.

In this study the elevated cardiac troponin was seen in 53.0% of the cases and CK MB was positive among 4.0% of the cases. In the agreement of our findings Muhammad F et al[18] reported that among 250 patients with NSTEMI, troponin positive were 198 (79.2%) and 185 patients (74%) were CK-MB positive. The prognosis of NSTEMI patients varies based on cardiac troponin levels, with a direct correlation between the degree of troponin elevation and the risk of mortality. Higher troponin levels serve as a negative prognostic marker, even after accounting for clinical predictors and electrocardiographic abnormalities.[19]

In this study according to the outcome left ventricular failure was observed in 40.3% of the cases, arrythmia was in 3.3% cases and mortality rate was observed 9.7% of the cases. Comparatively Kasim S et al[11] found an AUC of 0.88 for predicting short-term mortality in a cohort of 9,518 patients with NSTEMI/UA. We identified age, Killip class, heart rate, and administration

of Low-Molecular-Weight Heparin as key features associated with mortality, highlighting a high mortality risk in this population. In contrast Wong WT et al[20] showed that the 1-year all-cause mortality also significantly increased across UA, NSTEMI and STEMI (1-year all-cause mortality: UA 2.5%, NSTEMI 4.5%, and STEMI 8.7; $P < 0.01$ at 1 year), indicating that NSTEMI had a higher short-term mortality compared with UA.[20] Additionally in this study, short-term mortality showed no significant association with individual risk factors ($p > 0.05$), as hypertension, smoking, diabetes, dyslipidemia, and family history of cardiovascular disease had similar mortality rates to non-affected groups, indicating that while these factors contribute to overall cardiovascular risk, they did not independently influence short-term mortality. This study has several limitations like a single-center and limited sample size study, therefore the findings may not be generalizable to a broader population, as the results are specific to the patient demographics and healthcare practices of the study setting, with also have limited the statistical power to detect significant associations between individual risk factors and short-term mortality.

Additionally, this study did not follow a specific validated risk model, such as the GRACE or TIMI risk scores, which are widely used to predict mortality and adverse cardiac events in patients with acute coronary syndrome. As a result, the findings cannot be considered fully conclusive. Future large-scale, multicenter studies with larger populations are recommended to improve the generalizability of the results and extend the follow-up period beyond 30 days to assess long-term mortality and outcomes in patients with UA/NSTEMI. Incorporating standardized risk assessment models like GRACE or TIMI scores would enhance prognostic accuracy and support clinical decision-making. Furthermore, multivariate analysis should be conducted to account for confounding factors and provide a more precise understanding of the risk factors influencing short-term mortality.

Conclusion

As per the study conclusion the short-term mortality rate was 9.7%, with left ventricular failure (40.3%) being the most common adverse outcome, followed by arrhythmia (3.3%). However, none of the individual risk factors showed a statistically significant association with short-term mortality, suggesting that mortality in UA and NSTEMI patients may be influenced by a combination of factors, including clinical presentation, hemodynamic instability, troponin elevation, ECG abnormalities, and management strategies, rather than traditional risk factors alone. Given the lack of strong correlation between mortality and individual risk factors, comprehensive risk assessment models are recommended to better predict short-term outcomes in these patients.

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