

ORIGINAL ARTICLE

Severity of Coronary Artery Disease in Patients of NSTEMI Associated With Elevated Troponin Levels

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ABSTRACT

Non-ST-segment elevation myocardial infarction (NSTEMI) is more communal than ST-segment elevation myocardial infarction (STEMI), and statistics on the coexistence of severe coronary disease among these individuals is consistent across the populace results in fatal postponement in appropriate treatment.

So, in this study, we tried to assess the incidence of severe coronary artery disease in NSTEMI where serum levels of troponin I are significantly elevated. This will benefit to recognize people who must be categorized as high-risk and refer them to priority centers for coronary revascularization so that the clinical outcomes in these patients can be improved.

Study Design: A cross-sectional study.

Methods: A total of 118 patients with a history of chest complaints for the last 48-hours or symptoms equivalent to angina. After 72 hours of admission; Coronary angiography was performed in the same hospital. The result variable; severe coronary artery disease was labeled.

Results: Of 118 patients, 106 (89.8%) were females, 12 (10.2%) were males, and the M:F ratio was 8.8: 1. 56.05 ± 4.21 years was the mean age of the patients and 30 to 60 years was the age range. Most of the subjects were 51 and 60 years of age (98=83.1%). In this analysis, 16 (13.6%) patients had severe CAD, while 102 (86.4%) patients did not have. The mean Troponin-I level was 7.65±3.07. One vessel was involved in 35(29.7%) of patients, two vessels were involved in 63(53.4%) of patients and three vessels were involved in 20(16.9%) of patients.

Conclusions: We institute severe coronary artery disease among significant number of NSTEMI patients. High troponin I levels are key to detecting the occurrence of severe coronary artery disease among these patients. Therefore, we concluded that cardiac catheterization should be performed to detect its presence in all patients with trop-T elevation, even without ST elevation so that the patients may get advantage from prompt revascularization, counting coronary artery bypass graft (CABG) surgery. The severity of coronary artery disease was found in 13.6% of patients with raised cardiac troponin levels.

Keywords: ST-segment elevation myocardial infarction (STEMI), non-ST segment elevation acute coronary syndrome (ACS).

INTRODUCTION

The myocardial infarction is one of the related incidences in the acute coronary syndrome (ACS), which comprises non-ST-segment elevation myocardial infarction (NSTEMI), unstable angina, and ST-segment elevation myocardial infarction (STEMI)¹⁻². CAD is the foremost cause of death for people universally, killing more than 60 billion people every year. Over time, NSTEMI has become additional communal as compared to STEMI. The annual incidence is 73 per 1,000 population, but average hospital mortality varies from 3% to 5% depending on the country³⁻⁴. Though more dangerous is STEMI because it reflected an infarction of the full-thickness wall of the myometrial, there is now substantial insignia that a serious primary disease noticed in a vast number of patients is NSTEMI. Recently, the National Cardiovascular Database Registry (NCDR) and American College of Cardiology (ACC) reported that 41% of the patients with NSTEMI had severe coronary artery disease that required prompt treatment modality⁵⁻⁶. Severe coronary artery disease is definite as the occurrence of 90% and more with gensini score > 25 stenosis in the diameter of coronary arteries. The existence of severe coronary artery disease specifies higher mortality and a

worse prognosis⁷⁻⁸. The arteries which are affected can be resurrected with coronary bypass surgery or angioplasty. In addition, thrombolysis may result in less rate of thrombus formation in the left ventricle. The underlying events of ACS, namely plaque rupture or disruption, are believed to be the result of process of inflammation. Troponin I is a constituent of the cardiomyocytes contractile apparatuses and is the ideal ischemic and myocardial infarction events recognizing biochemical marker in NSTEMI patients⁹. The troponin test is expected to be an important indicator of initial stratification of risk conferring to the American Heart Association (AHA)/ ACC guiding principle as it improves clinical consequences in patients with NSTEMI. In ACS patients, the result is proportional to the concentration of serum troponin¹⁰. Though troponin-T is measured as an indicator of damage to the wall of myocardium, statistics on its capability to forecast the presence of severe coronary artery disease are different in the regional populace, and some studies report CAD with marginal raise of troponin also showed a high frequency of severe CAD¹¹⁻¹². So, in this study, we tried to assess the incidence of severe coronary artery disease in NSTEMI where serum levels of troponin T are significantly elevated. This will benefit to

recognise people who must be categorised as high-risk and refer them to priority centers for coronary revascularization so that the clinical outcomes in these patients can be improved.

MATERIALS AND METHODS

This cross-sectional study was conducted at the Cardiology department of Hospital for one-year duration from July 2020 to July 2021. A total of 118 patients (106 females and 12 males) of 30-60 years of age with a history of chest complaints for the last 48-hours or symptoms equivalent to angina and cardiac troponin level above 500 ng/l were enrolled in the analysis. After 72 hours of admission; Coronary angiography was performed in the same hospital. The result variable; severe coronary artery disease was labeled.

A thorough examination and full medical history were performed. The samples of blood were taken for cardiac T troponin after eight and forty-eight hours of admission to hospital. Troponin I above 500 ng / L was clearly marked as increased. Coronary angiography videos were reviewed by a consultant cardiologist with experience of five years after post-d-graduation, and conferring to standard protocols; the lesions were evaluated. The result variable, namely severe coronary artery disease along with demographic profile, was entered into the pre-designed form and documented. Data were analysed using the Social Science Statistical Package (SPSS) version 21. The standard deviation and mean were estimated for quantitative variables, and the calculation of percentage and frequency for qualitative variables. A qualitative classification was made using a chi-square test to see the impact of these transformers on severe coronary disease. $p \leq 0.05$ was considered significant.

RESULTS

Of 118 patients, 106 (89.8%) were females, 12 (10.2%) were males, and the M:F ratio was 8.8: 1. 56.05 ± 4.21 years was the mean age of the patients and 30 to 60 years was the age range. Most of the subjects were 51 and 60 years of age (98=83.1%).

Table 1: Demographic Features of studied patients

Characteristic	n (%)
Gender	
Male	12 (10.2)
Female	106 (89.8)
Age (years) ^o	56.05 ± 4.21
Age Group	
30-40 years	8 (6.7)
41-50 years	12(10.2)
51-60 years	98 (83.1)
Smoker	
Yes	84 (71.2)
No	34 (28.8)
ECG Changes	
Yes	68(57.6)
No	50 (42.4)
Severe coronary artery disease	
Present	16 (13.6)
Absent	102 (86.4)

In the studied population, a total of 84 (71.2%) patients smoked cigarettes, and changes in ECG were detected in 68 (57.6%) patients. In this analysis, 16 (13.6%) patients had severe CAD, while 102 (86.4%) patients did not have. The comprehensive features of the studied people are given in Table-I.

After classifying severe CAD in the other age groups, there was significant variance in severe CAD between the various age groups ($p = 0.99$), and classification by sex showed no statistically significant difference ($p = 0.62$). Likewise, there was no significant relation between smoking and severity of CAD ($p = 0.48$) and changes in ECG ($p = 0.81$). Detailed outcomes of the relationship are given in Table-II.

Table 2: Relationship of Severe coronary artery disease with characteristics of studied patients

	Severe coronary artery disease existence		P-value
	Present (n = 16)	Absent (n = 102)	
Gender			
Male	2 (16.7)	10 (83.3)	0.62
Female	14 (13.2)	92 (86.8)	
Age Group			
30-40 years	1 (12.5)	7 (87.5)	0.99
41-50 years	3 (25)	9 (75)	
51-60 years	12 (12.2)	86 (87.8)	
Smoker			
Yes	12 (14.3)	72(85.7)	0.48
No	4 (11.8)	30 (88.2)	
ECG Changes			
Yes	10 (14.8)	58 (85.2)	0.81
No	6 (12)	42 (88)	

The mean Troponin-I level was 7.65 ± 3.07 . One vessel was involved in 35(29.7%) of patients, two vessels were involved in 63(53.4%) of patients and three vessels were involved in 20(16.9%) of patients.

DISCUSSION

In this study, we instituted that a significant quantity of NSTEMI individuals with significantly raised levels of troponin T had severe CAD requiring immediate revascularization, counting coronary artery bypass graft (CABG) surgery¹³. There was also no vast relation between severity of CAD and age or smoking. MI can be divided into 2 types depending on its severity; NSTEMI is the least invasive type. The blood clot partially blocks the artery in NSTEMI, and as an outcome, solitary that part of the heart muscle that receives blood from the artery involved causes ischemia¹⁴. Unlike most severe myocardial infarctions (STEMI), NSTEMI does not explain an imputable increase in the ST segment on an ECG. This shows that the artery is not completely occluded in NSTEMI. In recent years, significant progress has been made in distinguishing between myocardial damage and necrosis¹⁵⁻¹⁶. As a result, the description of MI has changed over the ages.

One study found that the majority of patients (54%) with acute MI hospitalized were NSTEMI patients. This study similarly exhibited that NSTEMI patients had an advanced one-year mortality (18%) than individuals with MI

with ST-segment elevation (12%). NSTEMI patients supposed to be elder, history of multivessel disease, poorer LV function, and acute coronary events history. 56.05 ± 4.21 years was the mean age of the patients and 30 to 60 years was the age range, with the majority of patients 98 (83.1%), 51 to 60 years¹⁷⁻¹⁸. In comparison to other local studies, our slightly lower average age may be associated with greater susceptibility to cardiovascular disease in the younger age groups. It is imperative to establish whether this is a real trend or simply because of the potential for better research. In this analysis, 16 (13.6%) patients had severe CAD, while 102 (86.4%) patients did not have. Altman et al. showed an incidence of severe CAD in 54% of NSTEMI patients in their study. Qadira et al. Study shows 230 NSTEMI patients, 25 (22.52%) single-vessel and 40 (36%) two-vessel patients, 110 patients have cardiac troponin T levels ≤ 10 times the upper normal limit¹⁹⁻²⁰. Of the 119 patients with cardiac troponin T more than 10 times the upper normal limit, 23 (19.3%) had one vessel and 37 (31.1%) had two vessels disease and 55 (46.2%) had CAD of more than three vessels²¹⁻²². While other studies found an incidence of severe CAD ranging from 40% to 65% in NSTEMI, a large report from the National Cardiovascular Database that included over 100,000 patients found that 41.8% of NSTEMI patients had severe CAD²³. In comparison to this analysis, the incidence of severe CAD in our study populace was somewhat lower.

This study has some limitations. First, no long-term follow-up has been performed to determine the mortality rates with the passage of time. The second is data from one institution that may not be demonstrative of the whole population.

CONCLUSION

We institute severe coronary artery disease among significant number of NSTEMI patients. High troponin T levels are key to detecting the occurrence of severe coronary artery disease among these patients. Therefore, we concluded that cardiac catheterization should be performed to detect its presence in all patients with trop-T elevation, even without ST elevation so that the patients may get advantage from prompt revascularization, counting coronary artery bypass graft (CABG) surgery. The severity of coronary artery disease was found in 13.6% of patients with raised cardiac troponin levels.

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