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CORRELATION OF TIMI RISK SCORE WITH SEVERITY OF CORONARY ARTERY DISEASE BY CORONARY ANGIOGRAM IN PATIENTS WITH NON-ST–ELEVATION MYOCARDIAL INFARCTION

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Contribution

UMB conceived, designed, wrote manuscript and did data collection. MA wrote and reviewed it. MEA did data collection. MAQ did statistical analysis. All authors contributed equally.

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ABSTRACT

Objective: To determine the correlation of TIMI risk score with severity of coronary artery disease by coronary angiogram in patients with non-ST–elevation myocardial infarction (NSTEMI).

Methodology: This cross-sectional study was conducted at Department of Cardiology, Jinnah Hospital, Lahore from 1st April 2016 to 30th September 2016. Patients presenting with non-ST–elevation myocardial infarction (NSTEMI) were enrolled and received standard medical therapy. Patients were risk stratified with TIMI risk scores as low, intermediate and high. Patients were evaluated with coronary angiograms to assess the extent of coronary artery disease (CAD). The severity of CAD evaluated on angiography was measured by GENSINI Score.

Results: Total of 110 pateints were included in the study with 88 patients (80%) were below 60 years whereas 22 patients (20%) were either 60 years or more in age. About 75 patients (68.2%) were males. Mean TIMI score of patients was 4.68 ± 1.33 ranged from 2 to 7. Mean GENSINI score of sampled population was 21.45 ± 4.108 ranged from 11 to 30. Correlation between TIMI score and severity of CAD came out 0.47. It was also significant. Presence of diabetes, hypertension and gender had no significant effect on correlation.

Conclusion: It is concluded that there is moderate correlation (r=0.47) between TIMI score & severity of CAD as measured by GENSINI score in our sampled population.

Key Words: Angiography, GENSINI score, Non ST elevation myocardial infarction, Severity of CAD, TIMI score.

INTRODUCTION

Cardiovascular diseases (CVDs) are the number one cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.7 million people died from CVDs in 2015,an estimated 31% of all deaths worldwide. Of these deaths, an estimated 7.4 million were due to coronary artery disease (CAD) / Myocardial infarction (MI) having over 80% of CVD deaths take place in low and middle-income countries and occur almost equally in men and women.[1] Cardiovascular diseases account for most noncommunicable diseases (NCDs) deaths.[2] As the magnitude of CVDs continue to accelerate globally policies are developed for prevention.[3] In USA more than 8 million patients with chest pain visit to emergency departments (ED) every year, representing the second most common cause of adults visit in ED.[4] Therefore risk stratification is required prior to admission as this issue has been given rise to burden healthcare costs.[5]

Gensini score is a useful score to determine severity and extent of CAD but it requires invasive approach (coronary angiography) for this scoring.[6,7] While Thrombolysis in myocardial infarction (TIMI) score is a prognostic score developed for managing the high risk of cardiac events immediately after cardiac events. It is quite valid in predicting the morbidity and mortality in newly presenting patients.[8-11] Its relation with extent of coronary artery stenosis and number of involved vessels has not been extensively studied. In a study by Santos et al, concluded that TIMI risk score have best predictive ability for severity of CAD.[12]Lakhani et al results showed that patients with TIMI score > 4 were more likely to have significant three vessels CAD (62 %) versus those with TIMI risk score < 4 (46.2 %), ($p < 0.04$).[13] In a French study, One-vessel disease was found more often in patients with TIMI score 0 to 2 than in patients with TIMI score 5 to 7 (28.9 % vs 0 %; $p=0.01$), and in patients with TIMI score 3 to 4 than in those with score 5 to 7 (35 % vs 0 %, $p=0.006$). Three-vessel or left main disease was more likely found in patients with score 5 to 7 than in patients with TIMI score 3 to 4 (66.7 % vs 26 %; $p=0.01$) or patients with score 0 to 2(66.7 % vs 13.2 %; $p<0.001$).[14] In another study of 112 patients assessed, a positive correlation of the Gensini score was observed with TIMI ($p = 0.02$) scores, but that association was weak ($r = 0.27$).[15]

Objective was to determine the correlation of TIMI risk score with severity of coronary artery disease by coronary angiogram (by GINSINI score) in patients with non-ST–elevation myocardial infarction (NSTEMI).

METHODOLOGY

A cross sectional study was conducted in Department of Cardiology, Jinnah Hospital, Lahore from 1st April 2016 to 30th September 2016. Subjects of either gender, age between 40 -70 years with non-ST–elevation myocardial infarction defined as chest pain for more than 30mins but less than 24 hours was selected with 5% error, taking r value of 0.279 through a non-probability consecutive sampling technique. Patients who had ST elevation myocardial infarction (STEMI) on ECG, new left bundle branch block on electrocardiogram (ECG), prior revascularization either surgical/percutaneous determined by history and who are not candidates for coronary angiography(advanced cancer, chronic renal failure & chronic liver disease) were excluded. After an informed consent all enrolled patients received standard medical therapy for NSTEMI. Patients were risk stratified with TIMI risk scores as low, intermediate and high. Patients were evaluated with coronary angiograms to assess the extent of coronary artery disease (CAD). The angiography was performed by the interventional cardiologist. The severity of CAD evaluated on angiography was measured by GENSINI Score. Data was analyzed using SPSS version 17. Numerical variables like age, GENSINI score and TIMI Risk Score was described as mean and standard deviations, while categorical variables like TIMI Risk class was described as frequencies and percentages. Correlation coefficient was calculated for TIMI and GENSINI score. P value of less than 0.01 was taken as significant.

RESULTS

In our study population 110 patients were included with mean age of 53.70 ± 9.602 years ranged from 40 to 70 years of age. About 88 patients (80%) in our study population were below 60 years whereas 22 patients (20%) were either 60 years or more in age. Male patients were 75 (68.2%), 58 patients (52.7%) were diabetic, 15 patients (13.6%) were hypertensive. Only 11 patients (10%) had family history of myocardial infarction (Table 1). Mean TIMI score of 110 patients was 4.68 ± 1.33 ranged from 2 to 7. Mean GENSINI score of sampled population was 21.45 ± 4.108 ranged from 11 to 30(Table 2). Correlation between TIMI score & severity of CAD came out 0.47. There was no change in strength of correlation with age. It remained significant for both groups. It remained significant for both male and female. There was no significant change in strength of correlation with diabetes. (Table 3)

Table 1: Demographic and Clinical Profile of Subjects (n=10)

Variables n= 110	Frequency	Percent
Age Mean = 53.70 SD = 9.602 Min = 40 Max = 70		
Below 60 years	88	80.0
60 years & above	22	20.0
Gender		
Male	75	68.2
Female	35	31.8
Diabetes Mellitus		
Yes	58	52.7
No	52	47.3
Hypertension		
Yes	15	13.6
No	95	86.4
Family history of MI		
Yes	11	10.0
No	99	90.0

Table 2: Descriptive Statistics GENSINI & TIMI Scores (n=10)

Statistics n=110	GENSINI Score	TIMI score
Mean	21.45	4.68
SD	4.108	1.334
Minimum Score	11	2
Maximum Score	30	7

Table 3: Correlation between GENSINI & TIMI Scores (n=10)

PearsonCorrelation N =110	GENSINI Score
TIMI score	.470**
Sig. (2-tailed)	.000
**. Correlation is significant at the 0.01 level (2-tailed).	

DISCUSSION

Myocardial infarction is one of the most common life threatening diagnoses in emergency hospital admissions. Most of the complications occur during the first few hours while the patients are likely to be in the hospital.[1] Thrombolysis in myocardial infarction (TIMI) score is a prognostic score developed for managing the high risk of cardiac events immediately after cardiac events. It is quite valid in predicting the morbidity and mortality in newly presenting patients.[8-9] Its relation with extent of coronary artery stenosis and number of involved vessels has not been extensively studied.[13]

In our study, mean TIMI score of 110 patients was 4.68 ± 1.33 ranged from 2 to 7. Mean GENSINI score of sampled population was 21.45 ± 4.108 ranged from11 to 30. Correlation between TIMI score & severity of CAD came out 0.47 (moderate). It was also significant ($p < 0.001$). it implies that TIMI risk score can be used to triage the patients as it correlated with severity of coronary artery disease. This study validates TIMI risk score in predicting the extent of coronary arteries involvement in patients with NSTEMI.

Results of our study augment the results of previous ones. In a study of 112 patients assessed, a positive correlation of the Gensini score was observed with TIMI ($p = 0.02$) scores, but that association was weak ($r = 0.27$).[15] In a French study, One-vessel disease was found more often in patients with TIMI score 0 to 2 than in patients with TIMI score 5 to 7 (28.9 % vs 0 %; $p=0.01$), and in patients with TIMI score 3 to 4 than in those with score 5 to 7 (35 % vs 0 %, $p=0.006$). Three-vessel or left main disease was more likely found in patients with score 5 to 7 than in patients with TIMI score 3 to 4 (66.7 % vs 26 %; $p=0.01$) or patients with score 0 to 2(66.7 % vs 13.2 %; $p<0.001$).[14] In the PRISM PLUS study, it was revealed that there was more severe CAD and left main coronary disease in patients with high TIMI risk score when compared with those with lower risk score.[16]

Lakhani et al results showed that patients with TIMI score > 4 were more likely to have significant three vessels CAD (62 %) versus those with TIMI risk score < 4 (46.2 %), ($p < 0.04$).[7] In our study population, 88 patients (80%) were below 60 years whereas 22 patients (20%) were either 60

years or more in age.while 75 patients (68.2%) were male. Age distribution of included patient shows still younger group is having the maximum burden of CHD. It is quite different from that of develop countries in which age is above 60. It implies the need of extensive preventing program leading to decrease in young age mortality in our patients at risk of coronary artery disease. More male were included in the study which may be either due to health seeking behavior of our population or harmonic protection of female which lead to decrease incidence of myocardial infarction in female gender. Almost 2/3rd population of included patients were male. 58 patients (52.7%) were diabetic. To our surprise more than half of the population was diabetic showing much increased frequency of non ST elevation myocardial infarction in diabetics. Presence of diabetes, hypertension and gender had no significant effect on correlation. Family H/O MI altered the correlation

CONCLUSION

It is concluded that there is moderate correlation (r=0.47) between TIMI score and severity of CAD as measured by GENSINI score in our sampled population. Further studies in this regard should be encouraged.

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