
CORRELATION OF TIMI RISK SCORE WITH ANGIOGRAPHIC SEVERITY IN PREDICING THE EXTENT OF CORONARY ARTERY DISEASE IN PATIENTS WITH NON ST ELEVATION ACUTE CORONARY SYNDROMEN. Senthil¹, S. R. Ramakrishnan², J. Damodharan³**HOW TO CITE THIS ARTICLE:**

N. Senthil, S. R. Ramakrishnan, J. Damodharan. "Correlation of TIMI Risk Score with Angiographic Severity in Predicting the Extent of Coronary Artery Disease in Patients with Non St Elevation Acute Coronary Syndrome". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 41, October 12, 2015; Page: 6981-6991, DOI: 10.18410/jebmh/2015/953

ABSTRACT: BACKGROUND: Individuals admitted with non ST elevation MI have a wide variation in their disease severity, which ranges according to clinical and laboratory characteristics¹. Thus risk stratification is essential for adequate clinical decision and identifying individuals who benefit from more aggressive therapy. TIMI risk score is the most widely used scoring system for risk stratification because of ease of using this system over others and is much more powerful comparing to other systems.² **OBJECTIVE:** To prognostically correlate TIMI risk score with angiographic severity and extent of coronary artery disease in 100 Patients with non ST elevation acute coronary syndrome. **MATERIALS AND METHODS:** Individuals meeting the objective criteria for NSTEMI who are undergoing coronary angiography were assessed by TIMI score for risk stratification and quantification of severity of coronary artery disease. **RESULTS AND DISCUSSION:** Out of 100 NSTEMI patients assessed, significant three vessel disease was found in patients with TIMI score of 5-7 (p value < 0.01) and significant two vessel disease was found with p value of < 0.05 for the same TIMI score of 5-7. **CONCLUSION:** There is a positive correlation between TIMI score and extent of coronary artery disease. TIMI risk stratification is safe and easy method for rapid assessment of mortality and MI risk.

KEYWORDS: Non ST Elevation MI (NSTEMI), Coronary Angiography, TIMI Score.

INTRODUCTION: Patients with non ST elevation ACS is a heterogenous group of population with varying morbidity and mortality risks.³ Risk stratification is very important for making appropriate decisions regarding treatment of these patients.⁴ Patients with highest risk will receive greatest benefit from rapid use of more effective treatment (coronary interventions and medications)^{1,5,6,7} In addition to prognostic assessment, predicting anatomical extension of CAD is useful for making clinical decision. The aim of this study is therefore prognostically assessing the TIMI risk score and its extent of predicting the anatomical severity of CAD.

MATERIALS AND METHODS: Individuals admitted to emergency department in SRMC who was diagnosed with non ST segment elevation MI were included in the study. Patients with typical chest discomfort with either positive troponin T values or ECG changes showing ST segment depression > 0.05mV, T wave inversion > 0.1mV were included in the study. Exclusion criteria were ST elevation MI, new onset LBBB or previous history of CABG/angioplasty.

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A total of 100 patients fulfilling the above criteria were included in the study. The TIMI risk score was calculated for all patients. TIMI risk score is a sum of seven dichotomous variables with 1 point for each variable; 1) Age ≥ 65 yrs 2) ≥ 3 risk factors for CAD 3) known CAD (stenosis $\geq 50\%$) 4) Use of aspirin within last 7 days 5) \geq two episodes of rest angina within 24 hours 6) ST segment deviation $\geq 0.5\text{mm}$ 7) Elevated cardiac biomarkers. According to TIMI risk score, all patients were categorized into 3 groups. Category 1- TIMI score 0-2, Category 2- TIMI score 3-4, Category 3- TIMI score 5-7.

The degree of coronary artery disease was determined by coronary angiography and was classified as 1) normal coronary angiogram 2) Non significant CAD($<70\%$ stenosis in epicardial vessels & $<50\%$ in left main vessel 3) Significant 1 vessel disease (one vessel $\geq 70\%$ stenosis) 4) Significant 2 vessel disease (two vessels showing $\geq 70\%$ stenosis) 5) Significant 3 vessel disease(all three vessels showing $\geq 70\%$ stenosis) 6) Significant left main CAD ($\geq 50\%$ stenosis).

DATA ANALYSIS: Patient characteristics were summarized using proportion and chi –square test for dichotomous variables and means. Anova T test was done and Pearson correlation was done. All reported probability values are 2 tailed and p values < 0.05 were accepted as statistically significant All analysis were performed with SPSS for Windows version 10.

RESULTS: After exclusion, 100 patients were included in this study group. All patients underwent risk stratification and coronary angiography and were divided into three groups. Category 1- TIMI score 0 to 2, Category 2 – TIMI score 3 to 4, Category 3 – TIMI score 5 to 7.

On analysis, chest pain followed by dyspnoea was the commonest symptom among all three groups. (Table 1 and Figures 1, 2, 3)

Symptoms	Category 1 (0-2) n=38	Category 2 (3-4) n=33	Category 3 (5-7) n=29	P value
Chest pain	29 (36.7%)	24 (30.4%)	26 (32.9%)	0.231
Dyspnea	21 (41.2%)	16 (31.4%)	14 (27.5%)	0.8
Oedema	2 (22.2%)	5 (55.6%)	2 (22.2%)	0.312
Cough/wheeze	0 (0%)	2 (100%)	0 (0%)	0.126
Orthopnea	0 (0%)	0 (0%)	2 (100%)	0.082
PND	2 (40%)	1 (20%)	2 (40%)	0.781
Palpitation	7 (58.3%)	4 (33.3%)	1 (8.3%)	0.174
Syncope	0 (0%)	3 (100%)	0 (0%)	0.43

Table 1

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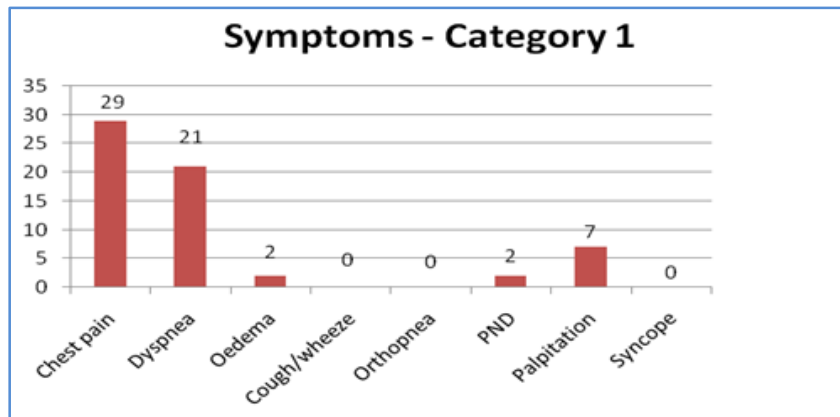


FIGURE 1

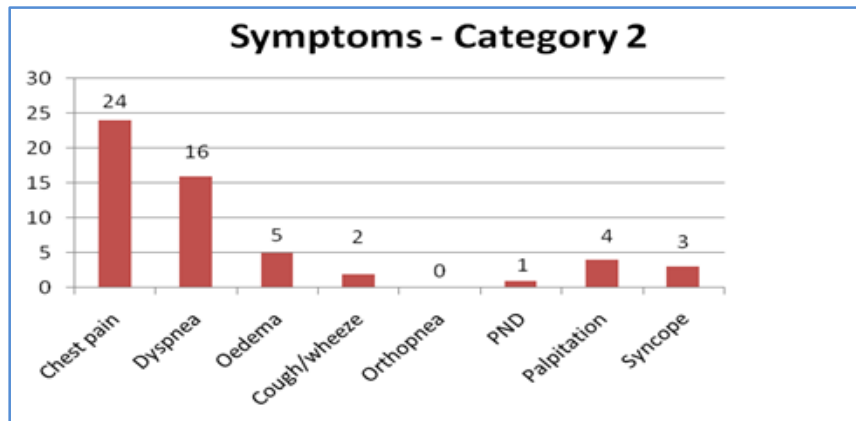


FIGURE 2

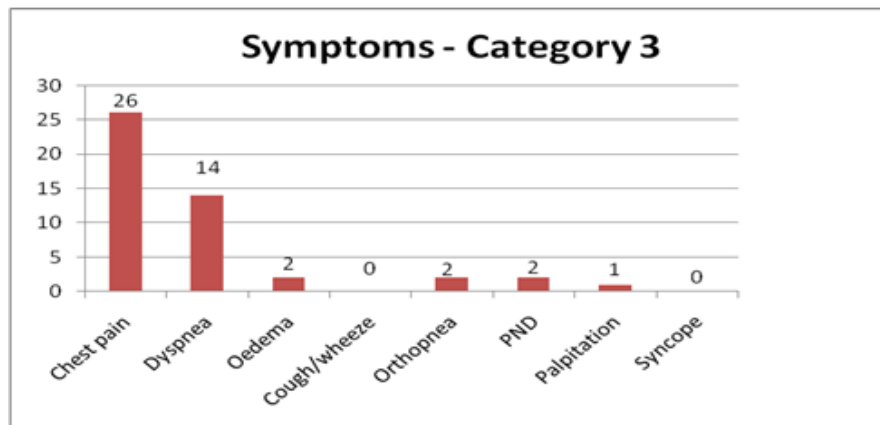


FIGURE 3

Mean age was 51.8 yrs. \pm 10.8 in Category 1, 59.6 \pm 10.6 yrs. in Category 2 and 63.6 \pm 9.3 yrs. in Category 3. Incidence of CAD increases with age. So age is considered a most important risk factor.⁸ Age over 45 yrs. in male and 55 yrs. in female is considered a strong risk factor for

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CAD.⁹ Our study also revealed that as age advances, the TIMI score increases which were concurrent with older studies. (Table 2 Figure 4)

	Category 1 (0-2) n=38	Category 2 (3-5) n=33	Category 3 (6-7) n=29	P value
Age	51.8 + 10.8	59.6 + 10.6	63.6 + 9.3	0.003
Male	14 (25%)	25 (44.6%)	17 (30.4%)	0.004

Table 2

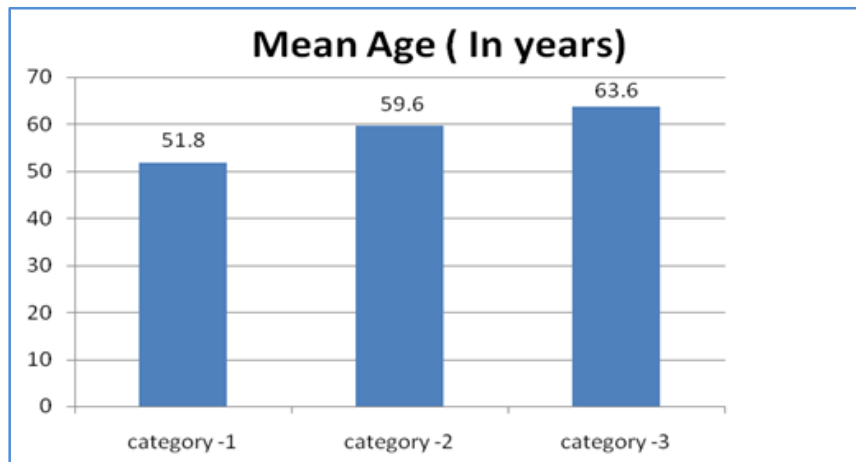


FIGURE 4

Male preponderance was seen in category 2 and category 3 groups of patients whereas females were more in category 1 group. (Figure 5). CAD incidence in male is equal to that in females who are on average older by 10 years. In a study conducted by Karounos et al, TIMI scores and sex were evaluated but no statistical difference was identified.¹⁰

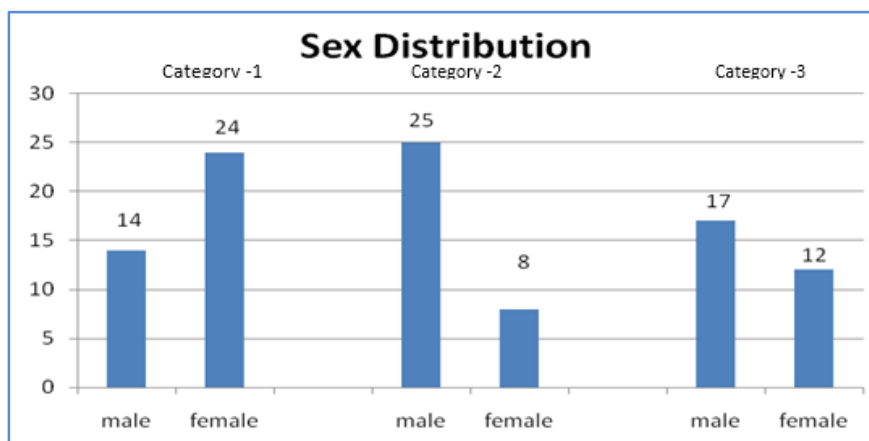


FIGURE 5

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More number of patients belonging to category 2 and category 3 were on aspirin, ACE inhibitors, statins and OHA's compared to category 1 with significant p value of < 0.005. (Table 3, Figure 6, 7, 8).

	Category - 1	Category - 2	Category - 3	P - value
ASA	18(25.4%)	28(34.4%)	25(35.2%)	<0.005
Beta-blocker	6(24.0%)	7(28.0%)	12(48.0%)	0.047
Calcium channel blocker	17(39.5%)	17(39.5%)	9(20.9%)	0.257
ACE inhibitors	6(14.0%)	18(41.9%)	19(44.2%)	< 0.005
Statins	8(16.7%)	21(43.8%)	19(39.6%)	< 0.005
OHA	11(20.0%)	25(45.5%)	19(34.5%)	< 0.005
Insulin	1(6.3%)	6(56.3%)	9(100.0%)	0.007
Clopidogrel	2(15.4%)	7(53.8)	4(30.8%)	0.136
Diuretic	1(25.0%)	0(.0%)	3(75.0%)	0.001

TABLE 3

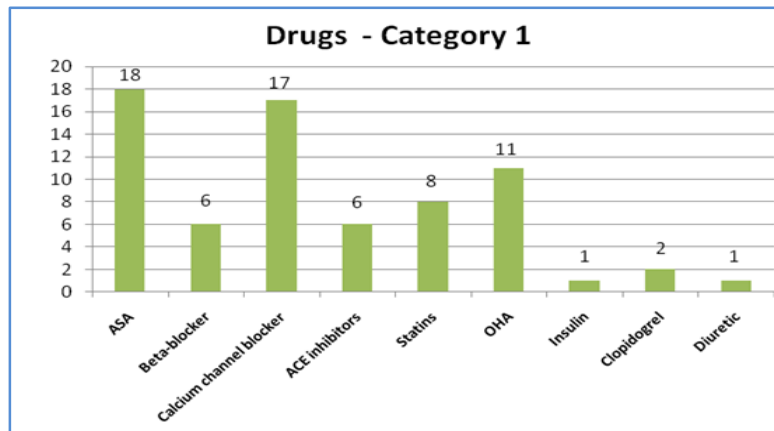


FIGURE 6

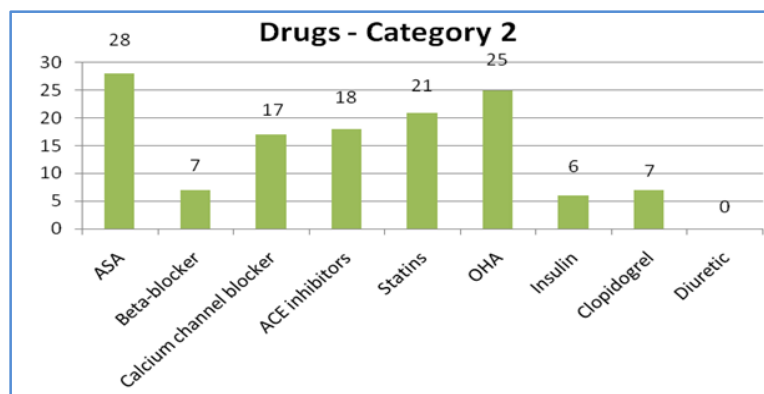


FIGURE 7

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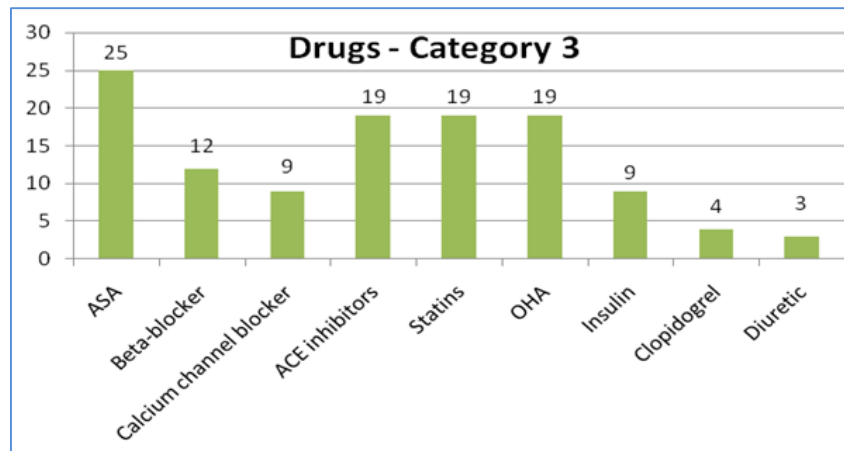


FIGURE 8

Patients belonging to categories 2 and 3 had higher incidence of the following risk factors- dyslipidemia, diabetes mellitus, heart failure and cardiac intervention comparing to category 1. Though other risk factors were still common in categories 2 and 3, and p values were not statistically significant. (Table 4, Figures 9, 10, 11)

Risk Factors	Category 1 (0-2) n=38	Category 2 (3-4) n=33	Category 3 (5-7) n=29	P value
Diabetes Mellitus	11(19.30%)	25(43.90%)	21(36.80%)	0.005
Hypertension	21(33.3%)	24(38.1%)	18(28.6%)	0.313
Heart failure	1(9.1%)	2(18.2%)	8(72.7%)	0.003
Dyslipidemia	9(17.3%)	25(48.1%)	18(34.6%)	< 0.005
Myocardial Infarction	25(38.5%)	21(32.3%)	19(29.2%)	0.98
Cardiac Intervention	0(0%)	7(26.9%)	19(73.1%)	< 0.005
Smoker	13(24.1%)	25(46.3%)	16(29.6%)	0.002
Tobacco Chewing	2(9.5%)	12(57.10%)	7(33.30%)	0.005
Alcohol	7(20.6%)	18(52.9%)	9(26.5%)	0.005

Table 4

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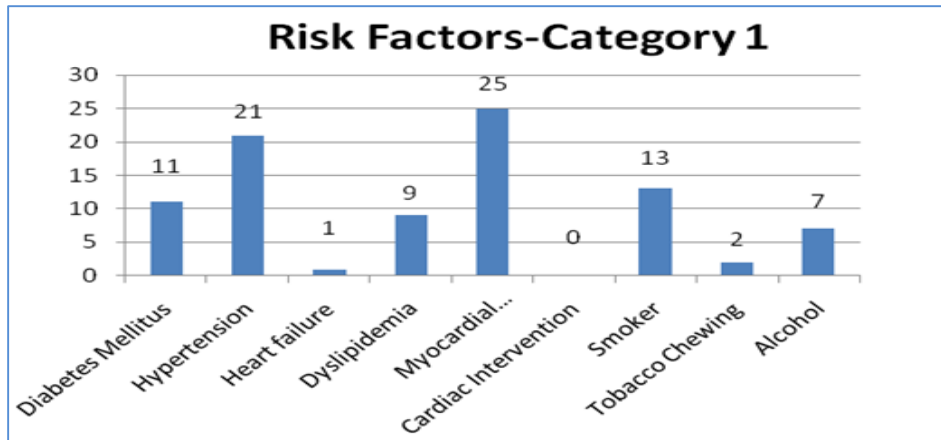


FIGURE 9

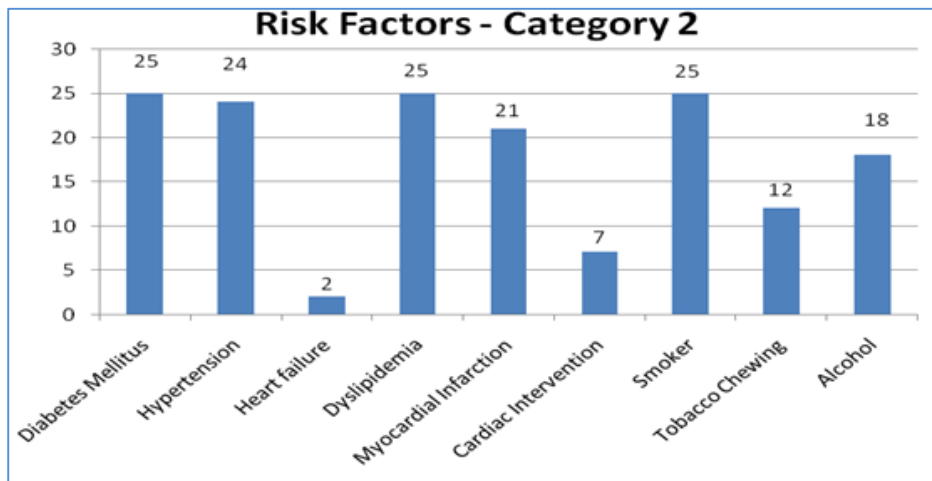


FIGURE 10

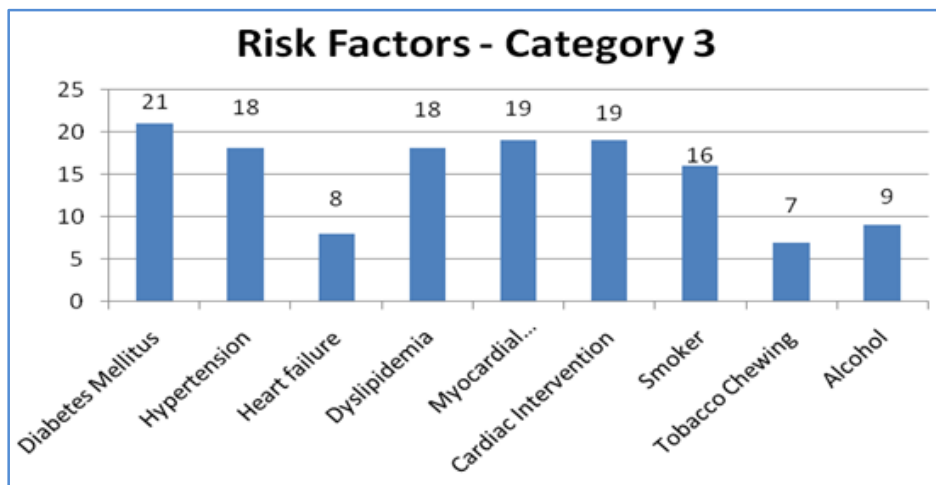


FIGURE 11

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There were higher incidence of ECG changes (ST depression > 1mm) and elevated cardiac enzymes (Troponin T) in category 3 compared to other categories with significant p values of < 0.005. (Table 5, Figures 12, 13, 14)

ECG changes and enzymes	Category – 1	Category – 2	Category - 3	P - value
ST depression >1mm	6(14.6%)	17(41.5%)	18(43.9%)	< 0.005
T inversion >2mm	22(33.3%)	21(31.8%)	23(34.9%)	0.175
Troponin T	2(9.1%)	5(22.7%)	15(68.2%)	< 0.005

Table 5

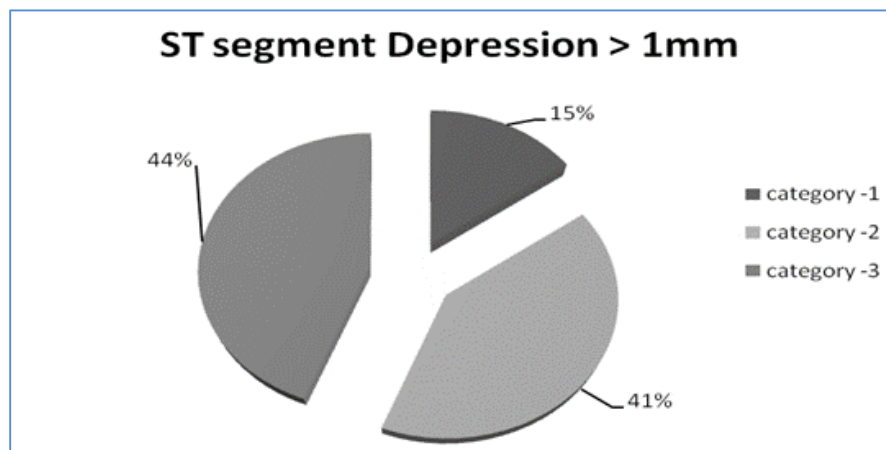


FIGURE 12

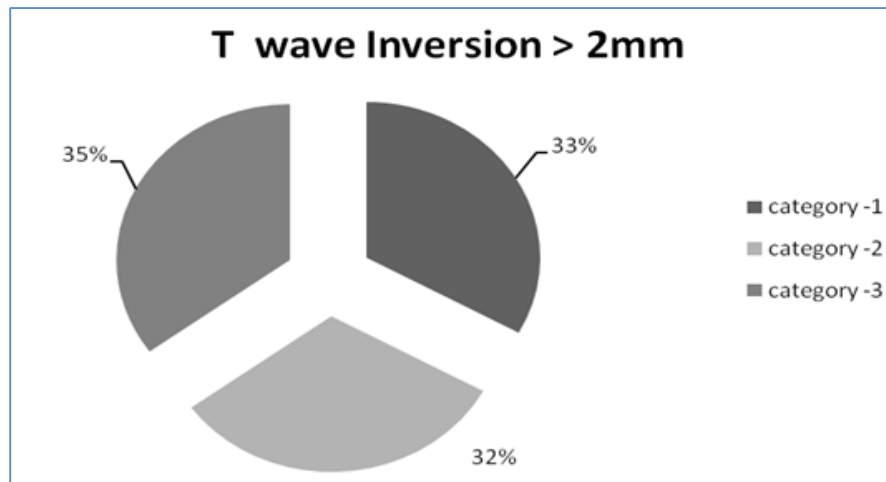


FIGURE 13

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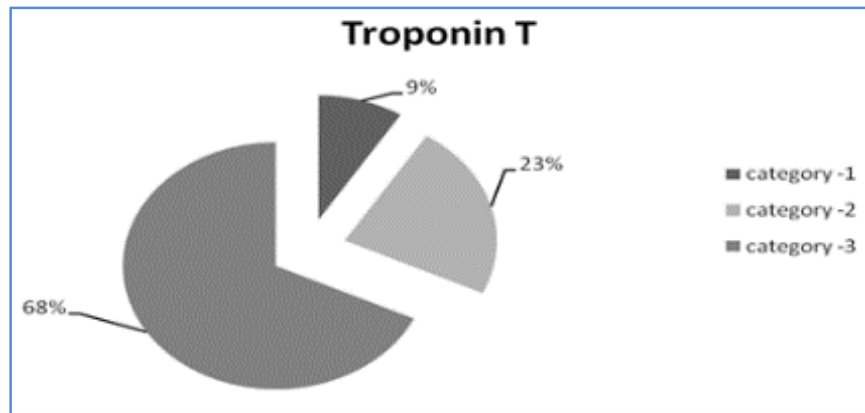


FIGURE 14

Significant CAD was observed in 49 patients (49%). Out of which 10 had single vessel disease (20.42%), 12 (24.48 %) had two vessel disease, 23 (46.94 %) had three vessel disease, 4 (8.16 %) had left main vessel disease. (Table 6, Figure 15)

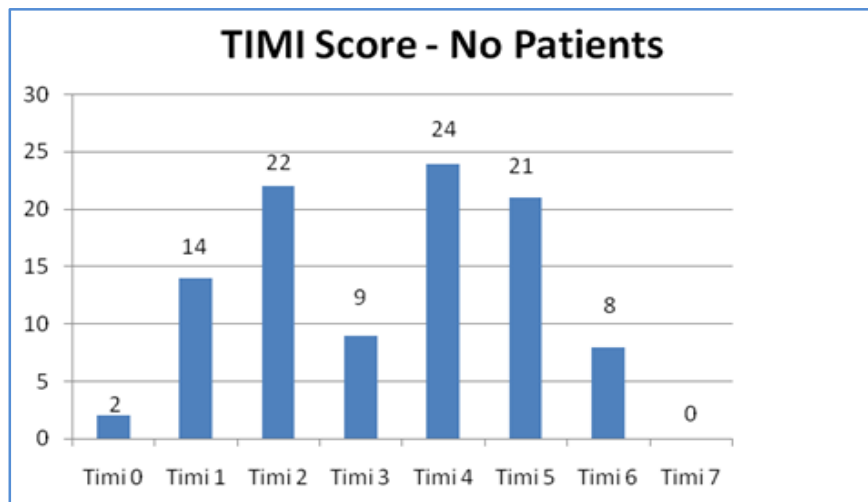


FIGURE 15

Coronary Angiogram	CAT-1 (0-2) (n = 38)	CAT-2 (3-4) (n = 33)	CAT-3 (5-7) (n = 29)	P value
Normal angiogram	32(84.21%)	6(18.18%)	0(0%)	<0.01
Non-significant CAD	5(13.15%)	8(24.24%)	0(0%)	<0.05
Significant 1 vessel CAD	0(0%)	9(27.27%)	1(3.44%)	<0.01
Significant 2 vessel CAD	1(2.63%)	3(9.09%)	8(27.58%)	<0.05

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Significant 3 vessel CAD	0(0%)	4(12.12%)	19(65.55%)	<0.01
Significant left main CAD	0(0%)	3(9.09%)	1(3.44%)	>0.05
Total No Patients	38	33	29	

Table 6

Patients with TIMI score of 0 to 2 had greater likelihood of having normal angiogram comparing with other groups (p values <0.01) which was comparable to French study.¹¹ There was higher incidence of non-significant CAD in categories 1 and 2 comparing with category 3 (p value <0.05).

Single vessel disease was more common in categories 2 and 3 (10 patients) comparing with category 1. Two vessel disease was more common with category 3 (8 patients) comparing with other categories (p value <0.05). Patients with higher TIMI scores had significant three vessel disease (19 patients in category 3) with p values of <0.01. Significant left main CAD was seen in categories 2 and 3 (4 patients) comparing category 1.

Overall our study revealed that only 2.63% of patients with TIMI score of 0 to 2 had significant CAD as compared to 57.57% of patients with TIMI score of 3 to 4. TIMI scores of 5 to 7 had 100% significant CAD. Thus this study shows increasing incidence of significant CAD with higher TIMI scores which was revealed by all other previous studies which reported positive correlation between TIMI score values and severity of coronary artery disease.^{8,11}

CONCLUSION: In NSTEMI –ACS evaluated by coronary angiogram, TIMI risk score has good discriminatory value in predicting the extent of CAD. Its ease of use renders it a good scoring system for mortality and MI risk prediction.

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