The study of TIMI Risk Score analysis and its correlation with ST segment Elevation Myocardial Infarction (STEMI).

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ABSTRACT

Background: Analysis of TIMI risk score & correlation with ST elevation myocardial infarction (STEMI). **Methods:** This is a 12 months Observational Cross- sectional study conducted at NIMS Medical College and Hospital- a tertiary hospital in rural areas close to Jaipur. In this study we included 60 patients with acute myocardial infarction who were admitted to the coronary care unit of NIMS HOSPITAL JAIPUR during the year JAN 2015 –DEC 2015. The data obtained were analysed using Excel sheet/SPSS software. Tests of significance were done using the Chi - square test at 95% confidence interval. **Results:** According to our study myocardial infarction was more common in male compared to female (male:female ratio 4:1) Complications rate is significantly higher in male patients(p=0.0010) compared to female patients(p=0.0114). Mortality is increased with the increase in TIMI risk score. **Conclusion:** TIMI Risk score for ST segment Elevation Myocardial Infarction (STEMI) may be readily applied at the bedside at the time of hospital presentation and captures the majority of prognostic information offered by a full logistic regression model. The mortality increased proportionally with TIMI score. This risk assessment tool is likely to be clinically useful in the triage and management of patients eligible for fibrinolytic therapy and may also serve as a valuable aid in clinical research. Sufficiently simple to be practical at the bedside and effective for risk assessment across a heterogeneous spectrum of patients, the TIMI risk score may be clinically useful in the triage and treatment of patients with STEMI who undergo acute reperfusion therapy.

Keywords: TIMI Score, Acute STEMI, Complications, Mortality.

INTRODUCTION

Ischaemic heart disease is a condition in which there is an inadequate supply of blood and oxygen to a portion of the myocardium; it typically occurs when there is an imbalance between myocardial oxygen supply and demand[1].

CAD occurs in Indians 5–10 years earlier than in other populations around the world and the major effect of this peculiar phenomenon is on the productive workforce of the country aged 35–65 years. The prevalence of CAD and the incidence of ACS also are very high among Indians.[2]

The rising incidence of ACS in Indians may be related to the changes in the lifestyle, the westernization of the food practices, the increasing prevalence of diabetes mellitus and probably genetic factors.

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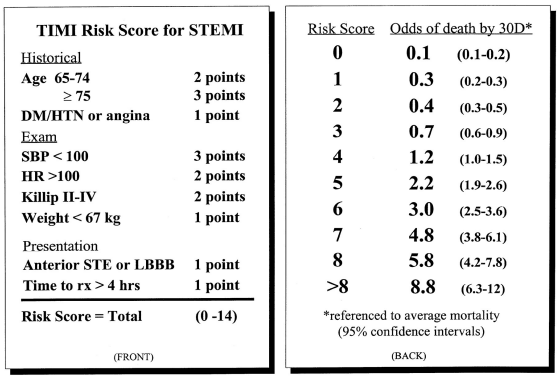
TIMI Risk Score for STEMI[3]



TIMI Risk Score for STEMI	
Historical	
Age 65-74	2 points
≥ 75	3 points
DM/HTN or angina	1 point
Exam	
SBP < 100	3 points
HR >100	2 points
Killip II-IV	2 points
Weight < 67 kg	1 point
Presentation	
Anterior STE or LBBB	1 point
Time to rx > 4 hrs	1 point
Risk Score = Total	(0 -14)

(FRONT)

Risk Score	Odds of death by 30D*
0	0.1 (0.1-0.2)
1	0.3 (0.2-0.3)
2	0.4 (0.3-0.5)
3	0.7 (0.6-0.9)
4	1.2 (1.0-1.5)
5	2.2 (1.9-2.6)
6	3.0 (2.5-3.6)
7	4.8 (3.8-6.1)
8	5.8 (4.2-7.8)
>8	8.8 (6.3-12)

*referenced to average mortality (95% confidence intervals)

(BACK)

Importance of Risk Stratification

For many years it was felt that approximately 50% of coronary events occurred in patients with no risk factors. However, in reality, the presence of one or more risk factors in younger (18-59) is highly sensitive for future coronary events[4].

Considerable variability in short-term mortality risk exists among patients with ST-elevation myocardial infarction (STEMI) who receive fibrinolytic therapy. The careful risk assessment for each patient informs decisions regarding therapeutic interventions, triage among alternative levels of hospital care, and allocation of clinical resources[5].

ST-Elevation MI:[6]

Acute – must satisfy criteria (1 and 2) and (3 or 4) below:

(1) Presence of new or presumably new ST-elevation> 0.1 mV in 2 or more contiguous ECG leads felt to be ischemic and without other explanation of ST-elevation, such as acute pericarditis.
(2) Clinical scenario consistent with myocardial infarction;
(3) Elevated enzymes (CK-MB > ULN or, in the absence of CK-MB, a total CK >2x ULN or elevation of troponin-T within 24 hours of the onset of ischemic discomfort;
(4) New Q-waves distinct from time of presentation.

MATERIALS AND METHODS

This study consisted of 60 patients with acute myocardial infarction who were admitted to the coronary care unit of the NIMS Medical College & Hospital, Jaipur between Jan 2015- December 2015. The presence of acute myocardial infarction was documented by detailed history, Physical examination, Laboratory investigations {cardiac enzymes}, 14 leads ECG including RV leads. All these patients with acute myocardial infarction were treated by Intravenous streptokinase (thrombolytic therapy) after excluding its contraindications.

Laboratory investigations on admission included x-ray chest, CBC with ESR, CK–MB, trop-T, Random blood sugar, Serum Lipids, LFT, RFT, Serum Electrolytes.

ECG was taken on admission and then at 90 min after admission, after 6 hours of admission; after 12 hours of admission and after 24 hours of admission. Patients were kept on continuous cardiac monitoring for at least 48 hours after admission.

We calculated and evaluated a convenient bedside clinical risk score for predicting 7 days mortality in fibrinolytic-eligible patients with STEMI. The Thrombolysis in Myocardial Infarction **(**TIMI) risk score for STEMI was calculated from logistic regression analysis.

RESULTS

Table 1: Comparison of TIMI Score[3,4] in male and female patients on admission

Category	TIMI 2 Score ≥ 8	TIMI 2 Score < 8	$\sum X^2$	P value
No. of Male patients	38	10	16.33	0.0001
No. of Female patients	11	1	8.33	0.0039

This table shows that among 60 cases of acute myocardial infarction in this study, 48 (80%) cases were male and 12 (20%) cases were female. This suggests that myocardial infarction was more common in male. (male**:** female ratio 4**:** 1) This table shows that 79.16% of male patients had risk score ≥ 8 and 20.83% had risk score < 8. The table also shows that 91.66% of female patients had risk score ≥ 8 and 8.33% had risk score < 8. In this study risk score ≥ 8 was present in maximum no. of the patients.

Table 2: Complications in male and female patients with respect to TIMI-2 Score

Category	Complications with TIMI 2 Score ≥ 8	Complications with TIMI 2 Score < 8	$\sum X^2$	P value
No. of Male patients	16	2	10.88	0.0010
No. of Female patients	9	1	6.40	0.0114

Complications like cardiogenic shock, congestive cardiac failure and arrhythmias are common in both sexes in which TIMI 2 score ≥ 8 but Complications rate are significantly higher in male patients(p=0.0010) compared to female patients(p=0.0114)

Table 3: Mortality in male and female patients with respect to TIMI-2 Score

Category	Mortality with TIMI 2 Score ≥ 8	Mortality with TIMI 2 Score < 8	$\sum X^2$	P value
No. of Male patients	9	2	0.80	0.3657
No. of Female patients	5	2	0.1428	0.7055

From above table it is clear that mortality increase with increase TIMI risk score. Mortality is maximum with TIMI risk score ≥ 8 and lowest with TIMI risk score of < 8. In present study male patients with risk score ≥ 8 had 81.81% mortality, male patients with risk score <8 had 18.18% mortality, female patients with risk score ≥ 8 had 71.42% mortality and female patients with risk score <8 had 28.57% mortality [Figure 1].

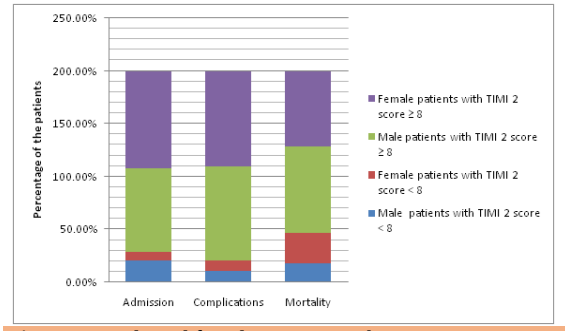


Figure 1: Male and female patients with TIMI 2 score.

DISCUSSION

According to our study myocardial infarction was more common in male compared to female, with male**:** female ratio 4**:** 1 [Table-1]. The overall incidence of acute myocardial infarction in men was 80 %, which was higher than women (20%) in our study and quite comparable to that in In a TIMI.

Table 4: Sex distribution in acute myocardial infarction

Sex	Present Study n=60	In TIMI II Study n=15,060
MEN	80%	75.30%
WOMEN	20%	24.70%

II study with an incidence of 75.30% in men and 24.70% in women [Table 4]. Incidence in women were lower in both studies, which could be due to premenopausal protection in females from coronary artery diseases. Complication rate is significantly higher in male patients (p=0. 0010) compared to female patients (p=0. 0114) [Table-2].

Table 5: TIMI risk score with mortality in Acute Myocardial Infarction

Risk score	Present Study n=60	In TIMI II[3] n=15,060	David A et al[5] n=84902	Jaqueline et al[7] n=103
0	0%	0.80%	0.70%	0.70%
1	0%	1.60%	0.90%	1.30%
2	8.33%	2.20%	2.20%	1.90%
3	9.09%	4.40%	3.70%	3.90%
4	10.42%	7.30%	5.70%	6.50%
5	11.11%	12.40%	10.00%	11.60%
6	10%	16.10%	15.00%	14.70%
7	26.66%	23.40%	18.00%	21.50%
8	37.5%	26.80%	23.00%	24.40%
>8	80%	35.90%	35%	31.70%

In the present study mortality increase with increase TIMI risk score [Table 3]. Mortality is minimum in risk score 0 and maximum in risk score greater than 8. The risk of death for patients with a score greater than or equal to 8 was 60 times higher when compare to the score 0. Risk score and associated mortality in the present study quite compared to In the TIMI II study, David A et al and Jaqueline et al [Table 5].[5,7] In this sense, the TIMI risk score was strongly associated with mortality and as the TIMI risk score increase, mortality is also increasing.

CONCLUSION

Incidence of acute myocardial infarction increases with age. Incidence of acute myocardial infarction was higher in male (80%) as compared to female (20%).

The time elapsed between the onset of symptom and initiation of treatment is greater (>4 hrs) in our setup. It may be because of lack of awareness of situation, lack of education and time spent in the referral of patients form primary to tertiary care is higher.

The hemodynamic status of patients on admission was quite different (severe) compared to that described in Time II study.

According to TIMI Risk score, mortality was maximum in TIMI score ≥ 8. As TIMI risk score increases, mortality of the patients also increases.

Limitations:-

(1)As the sample size of the present study was very small compared to original study, it's difficult to conclude & generalize the results to a large group of patients.

(2) Because of small sample size & lesser female patients were enrolled, sex-wise interpretation of

data has very limited value as it can't be applied to a large group.

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How to cite this article: Sharma DK, Patel VKN, Devpura G, Rishi JP, Pandey M. The study of TIMI Risk Score analysis and its correlation with ST segment Elevation Myocardial Infarction (STEMI). Ann. Int. Med. Den. Res. 2016;2(2):139-42.

Source of Support: Nil, **Conflict of Interest:** None declared