

## APPLICATION OF THROMBOLYSIS IN MYOCARDIAL INFARCTION (TIMI) RISK SCORE IN PATIENTS WITH ST ELEVATION MYOCARDIAL INFARCTION UNDERGOING PRIMARY PERCUTANEOUS CORONARY INTERVENTION

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### ABSTRACT

**Objective:** The purpose of study was to determine whether thrombolysis in myocardial infarction (TIMI) risk score applied to patients undergoing primary percutaneous coronary intervention identifies a group of patients at high risk for adverse outcome.

**Study Design:** Descriptive cross sectional study.

**Place and Duration of Study:** Study was conducted at AFIC/NIHD Rawalpindi from June 2014 to Dec 2014.

**Methods:** We studied patients with STEMI who were treated with primary PCI. The TIMI risk score was calculated to determine its predictive value for in hospital mortality. Patients were divided into two groups according to their TIMI risk score. Low risk being 0-4 points and high risk  $>5$  and the frequency of adverse events was analyzed.

**Results:** we analyzed 102 patients. Thirty (29.4%) patients classified as high risk (TIMI  $>5$ ) had higher incidence of adverse events than the low risk group: mortality 13.3% vs. 0, ( $p=.002$ ), heart failure 16.6% vs. 4.1 (.032), cardiogenic shock 13.3% vs. 1.3% ( $p=.011$ ), ventricular arrhythmias 23.3% vs. 5.5% ( $p=.008$ )

**Conclusion:** TIMI risk score for STEMI can predict in hospital mortality and identifies a group of high risk patients who might develop adverse events.

**Keywords:** Myocardial infarction, Risk care.

### INTRODUCTION

Pharmacological or mechanical reperfusion strategy is indicated in patients with ST elevation myocardial infarction within 12 hours of the onset of symptoms<sup>1,2</sup>. Primary percutaneous coronary intervention has demonstrated superiority over thrombolysis in several studies. Primary PCI has better results if the procedure can be done within 120 min of the patient arriving at the hospital. The benefit of primary PCI is different in various groups of patients. Hence risk stratification to identify such group of individuals prior to intervention is crucial to optimize their therapeutic management.

A number of risk scores have been developed and applied to patients treated exclusively with primary PCI and have reported favorable results. Thrombolysis in myocardial infarction (TIMI) risk score for STEMI is a simple assessment based on clinical data at the time of patient's arrival in the

hospital. We studied TIMI risk score applied to patients with STEMI who underwent primary PCI.

### MATERIALS AND METHODS

The study was conducted at Armed forces Institute of cardiology Rawalpindi National institute of heart diseases covering the period from June 2014 to December 2014. The information included demographic data, risk factors, in hospital course. We analyzed all patients who met the criteria for acute myocardial infarction with an ST elevation  $>1$  mm in  $>2$  contiguous leads or left bundle branch block and who were destined for primary PCI. The TIMI risk score was calculated using the variables obtained at admission according to published criteria for each patient as outlined in Table-2. We analyzed the frequency of adverse events during hospital care including mortality, re-infarction, heart failure, cardiogenic shock, ventricular arrhythmias.

### Statistical analysis

Data were obtained from a total of 102 patients with STEMI who were taken to

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catheterization laboratory for primary PCI. Analysis was performed with the statistical package SPSS version 21. The continuous and discrete variables were expressed as mean and standard deviation. The categorical variables were expressed as frequencies and percentages and compared with chi-square (X<sup>2</sup>) or Fischer's exact test. Results are reported as the two tailed P value and difference were considered significant at a P value of less than 0.05.

**RESULTS**

The average age of the population was 58.29 ± 12.26 years and 93.1% were males and 6.9% females. Twenty seven patients (26.5%) had previous history of diabetes and 42 (41.2%) had history of hypertension. With respect to cardiac function, 85.5% were in Killip class 1, 10.7% class 2-3 and 3.92% in class 4. The mean ejection fraction measured by echocardiography was 43% ± 10.3. The distribution of patients according to TIMI score was as follows. 0 point, 4 patients (3.9%); 1 point 26 patients (25.5%); 2 points 10 patients (9.8%); 3 points, 17 patients (16.7%); 4 points 15 patients (14.7%); 5 points 12 patients (11.8%); 6 points 5 patients (4.9%); 7 points 5 patients (4.9%); 8 points 4 patients (3.9%); 10 points 1 patient (0.98%) and 12 points 3 patients (2.9%).

The overall in hospital mortality was 3.9% and its frequency relative to the TIMI risk score is shown in Fig-1. Adverse events that occurred during hospitalization are shown in table 3. It was observed that mortality was higher in higher risk score (13.3% vs 0). Other adverse events also occurred more frequently in higher score group: heart failure (16.6% vs 4.1%), development of cardiogenic shock (13.3% vs 1.3%), ventricular arrhythmias (23.3% vs 5.5%).

**DISCUSSION**

TIMI risk score was developed using data from patients treated with thrombolysis in a randomized trial and predicts mortality at 30 days. About 20% of patients according to this score are at higher risk of death. The score was also validated in National Registry of Myocardial Infarction and showed a robust predictive value for mortality in patients treated with thrombolytic therapy. In our study 33

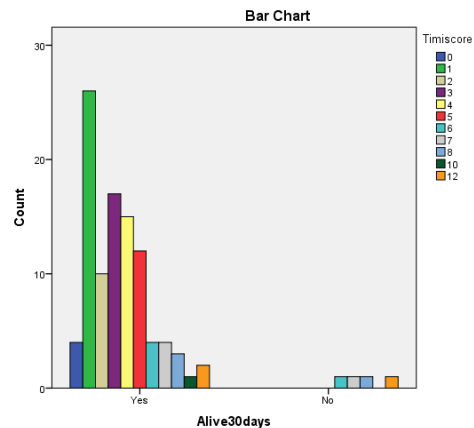
(23%) patients were stratified as high risk (TIMI risk score />5) before the procedure. Lev et al

**Table-1: Demographics and baseline characters.**

Base Line Characteristics		Frequency (%)
Age	75 or above	13 (13.9%)
	65 - 74	17 (15.9%)
Male gender		95(93.1%)
Hypertension		42 (41.2%)
Diabetes Mellitus		27 (26.5%)
Previous angina		16 (15.8)
Systolic BP<100		9 (9.8%)
Heart rate>100		16 (16%)
Killip class 1		87 (85.5%)
Killip 2-3		11 (10.7%)
Killip 4		4 (3.92%)
Weight < 67 kg		15 (15.1%)
Anterior STE or LBBB		33 (32.3%)
Time to treatment > 4 hour		49 (48.3%)
LVEF<40%		17 (16.8%)

**Table-2: TIMI risk score for STEMI.**

Criteria		Points
Age	/>75 years	3
	65-74	2
DM or HTN or Angina		1
Systolic BP <100		3
Heart rate >100		2
Killip class 2-4		2
Weight <67 Kg		1
Anterior STE or LBBB		1
Time to treatment >4 hrs		1
Total points		0-14



**Figure-1: The distribution of patient's mortality according to TIMI score.**

identified that stratification with TIMI risk score in patients undergoing primary PCI predicts mortality and major adverse cardiac events (death, myocardial infarction, target vessel

## CONCLUSION

TIMI risk score for STEMI applied to patients undergoing primary PCI identifies a group of patients at high risk not only for

**Table-3: In hospital mortality and adverse outcome.**

	Overall (102)	TIMI 0-4	TIMI >5	p-value
Death	4 (3.9%)	0	4 (13.3%)	.002
Heart failure	8 (7.8%)	3 (4.1%)	5 (16.6%)	.032
Cardiogenic shock	5 (4.9%)	1 (1.3%)	4 (13.3%)	.011
Ventricular arrhythmias	11 (10.7%)	4 (5.5%)	7 (23.3%)	.008

revascularization). We applied the TIMI risk score in a group of patients undergoing primary PCI and showed that an increase in TIMI risk score is associated with increased frequency of in hospital mortality and has a high predictive value for this parameter<sup>3-5</sup>.

The progress achieved in reducing in hospital mortality in STEMI patients increases the importance of predicting other post-procedural complications that may influence on patient's outcome. We also divided the patients in low and high risk groups based upon scoring whereby score  $\geq 5$  indicating high risk group. An important clinical implication of the study was identification of high risk group which showed higher mortality as compared to low risk group (TIMI score  $< 4$ ) as well as higher in hospital adverse events such as heart failure, cardiogenic shock and ventricular arrhythmia which may have bearing on poor outcome in this group of patient. Cardiogenic shock developed in 5 patients (4.9%) and 4 of these were categorized as high risk patients with TIMI score  $> 5$ . It would be pertinent to identify such patients so that preventive measures could be implemented in order to avoid the development of cardiogenic shock<sup>6,7</sup>.

higher in hospital mortality but also for other adverse events such as heart failure, development of cardiogenic shock and ventricular arrhythmias.

## Conflict of Interest

This study has no conflict of interest to declare by any author.

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