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Correlation between scores and outcome in Acute Coronary Syndrome patients

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Abstract

A proper analysis for the connection between baseline characteristics and the incidence of death and death-plus-myocardial (re)infarction at 30 days was done by [1]. The most important baseline features associated with death in analysis were age, heart rate, systolic blood pressure, ST-segment depression, signs of pump failure, and elevated levels of biomarkers. A risk estimation score was developed from this analysis [1].Over the last 10 years, multiple methods of risk stratification for ACS patients have been developed. Different scores are now available based on initial clinical history, ECG, and laboratory tests that enable early risk stratification on admission. Even among patients with ST-elevation myocardial infarction (STEMI), for whom initial therapeutic options are well defined, patient risk characteristics impact short and long term medical decision making [2].The TIMI risk score [3] is validated predictor of short term mortality.so we aimed to Correlate between TIMI score and in hospital outcomes in Acute Coronary Syndrome patients and concluded that the higher the TIMI score the higher adverse in hospital clinical cardiovascular outcomes.

Keywords: Scores, Adverse in-hospital outcomes, Acute Coronary Syndrome.

1. Introduction

Coronary artery disease (CAD) is the single most frequent cause of death worldwide. More than seven million people die from CAD every year, accounting for 12.8% of all deaths [4].Acute coronary syndrome (ACS) is a potentially life-threatening manifestation of CAD, where time is crucial in the initial management. A mainstay of the initial management is based on ischemic and bleeding risk stratification, as recommended in current international clinical guidelines [5].Quick and accurate risk stratification of chest pain patients in the emergency department is essential to evidence-based initiation of early, aggressive medical and interventional management of ACD patients [6].

2. Material and methods

- **Study Design**

It is single center; observational study that was conducted at coronary care unit at "Benha University hospital".

- **Patients**

Five hundred patients with first attack of acute coronary syndrome were enrolled in the study.

- **Inclusion criteria**

Consecutive adult male and female patients admitted to hospital within 12 hours of symptom onset and presenting with acute coronary syndrome (ST elevation myocardial infarction and Non ST acute coronary syndrome)

ST-segment elevation myocardial infarction: defined as presence of ST-segment elevation of ≥1 mm in ≥1 location or presumed recent left bundle branch block on presenting electrocardiogram in patients with ischemic symptoms [7]**.**

- **Exclusion criteria**

Patients meeting the following criteria did not participate in the study:

- Prior MI
- Prior PCI or CABG.
- Rheumatic heart disease.
- End stage renal disease.
- End stage liver disease.

- **Methods**

The following data were collected:

A) Ethical considerations

Informed consents were obtained from all participants. The study was approved by the ethics committee on research involving human subjects of Faculty of Medicine – Benha University.

B) Patients Characteristics:

- Demographics: Age, weight.
- Admission details: Type of ACS, Killip class (both on admission and in hospital course), Risk factors (Smoking, DM, hypertension, dyslipidemia & positive family history), TIMI risk score as shown in table (1).

- **B) Investigations:**

- ECG: Presence or absence of ST segment deviation (elevation or depression), The rhythm, whether sinus or non-sinus rhythm (as atrial fibrillation, ventricular tachycardia, junctional rhythm or AV block), QRS complex, whether normal or abnormal (as LBBB).
- Laboratory investigations:

Including: serum lipid profile (cholesterol, triglycerides, LDL & HDL) and cardiac enzymes (troponin).

- 2D echocardiography:

Assessment of LV systolic function by modified Simpson method (((LVEDV – LVESV) / LVEDV) * 100), wall motion score index, 17 segment model.

In hospital outcome: Heart failure, Arrhythmia (AF, VT, HB)**,** Bleeding (major, minor)**,** Stroke, Death.

2.1Statistical analysis

All results were statistically analyzed and tabulated using the suitable program.

Table (1) TIMI risk score.

	Age	65-74	2
		≥ 75	3
	Systolic Blood Pressure <100		3
	Heart Rate >100		2
TIMI in STEMI (0 14)	**Killip class II-IV**		1
	Anterior STE or LBBB		1
	Diabetes, HTN, or history of angina		1
	Weight < 67 kg		1
	Time to treatment > 4 hours		1
	TIMI risk score in STEMI [3]		
	Age ≥ 65		1
	≥ 3 risk factors for CAD		1
	Use of ASA (last 7 days)		1
TIMI in UA/NSTEMI	**Known CAD (prior stenosis $50%)**		1
	>1 episode rest angina in < 24 h		1
	ST-segment deviation		1
	Elevated cardiac markers		1
TIMI score in UA / NSTEMI [9]			

Table (2) correlation between TIMI score and in hospital outcomes.

		TIMI		P value
		Mean	**Standard Deviation**	
Heart Failure	**No**	2.1	1.3	<0.0001
	Yes	5.2	2.2	
Arrythmia	**No**	2.6	1.7	0.22
	Yes	3.2	2.6	
Bleeding	**No**	2.9	1.8	0.25
	Yes	1.7	1.2	
Death	**No**	2.8	1.8	0.012
	Yes	3.7	.6	

3. Results

A total of 500 patients were included in the final analysis, all patients were admitted to CCU unit after diagnosis of cardiac ischemic attack in the form of myocardial infarction or unstable angina. Patients had a mean age of 55.3 ± SD 12.9 years old.

TIMI score was significantly associated with in hospital heart failure with higher mean when compared to non-heart failure patients with p value <0.0001 as shown in table (2). Along with incidence of mortality during hospital stay was significantly associated with TIMI score as patients who expired had a higher mean score compared to surviving ones with p value 0.011.

4. Discussion

Risk is defined as the probability and severity of loss from exposure to a hazard, and can be assessed in different ways. The application of quantitative or qualitative measures to determine the level of risk associated with a specific hazard defines the process of risk assessment. Qualitative risk assessments (ie, high, intermediate or low risk) are based on the presence or absence of certain characteristics (risk markers or factors). These are easy to use but not accurate as there may be wide variations in individual risk within risk subgroups. Quantitative risk assessments, based on algorithms or mathematical formulae, are more precise but more complicated to use. Risk scores are formula generated numbers used for quantitative risk assessment that rank-order individuals according to the likelihood of developing a specific outcome (or combination of outcomes) during a defined time interval [9].

Acute coronary syndromes (ACS) are clinical entities characterized by acute symptomatic myocardial ischemia that has not been triggered by stimuli causing a significant increase of the demand for oxygen by the heart. ACS is usually caused by acute thrombosis of a coronary artery, most frequently associated with lesions caused by chronic coronary atherosclerosis. According to the initial ECG, ACS is classified as presenting with ST segment elevation or non-ST segment elevation. This article will focus on non-ST segment elevation ACS [8].

The clinical consequences of ACS range from none or minimal sequelae to early death. Patients with ACS have a relatively high incidence of cardiac events in the short term, particularly myocardial ischemic recurrences—recurrent angina or myocardial infarction (MI)—but also heart failure, arrhythmias and other events, which may also lead to future

further complications. For this reason, ACS requires an early pharmacological treatment—based on antithrombotic therapies [9].

Acute coronary syndrome (ACS) is characterized by a spectrum of distinct clinical entities with a common etiology that ranges from unstable angina (UA) to non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction depending on the severity [10].

Despite advances in treatment, acute coronary syndrome (ACS) is still associated with significant mortality [11]. Identifying high-risk patients, and hence selecting those who would benefit from more aggressive treatment, is essential for the management of ACS. Furthermore, stratification of the risk of ACS using tools such as risk scores (RSs) is recommended by practice guidelines [10]

The most widely used RS is the thrombolysis in myocardial infarction (TIMI) algorithm [3], which is simple to calculate and is derived from selected clinical-trial cohorts. For ST-segment elevation myocardial infarction (STEMI), the TIMI score is based on eight clinical indicators available on admission with scores ranging from 0 to 14. For non-ST-segment elevation myocardial infarction (NSTEMI), the TIMI score is based on seven clinical indicators with scores ranging from 0 to 7.

In our study, the results approved that higher TIMI score was associated with higher incidence of in hospital complications and this is matched with the result obtained by [12] that revealed the TIMI risk score is a useful and simple score for the stratification of patients with high risk of 14-day mortality with reasonably acceptable discriminating ability in patients with NSTEMI-ACS. Therefore, its use among clinicians is suggested to apply strategic and precise interventions in monitoring these patients. If used appropriately, this tool may prove to be a life-saving and cost-effective risk stratification tool in cardiac care settings. However, in our study cut off value was >2.5 & in this study cut off value was 4.

And also our results were concordant with the result obtained by [13] revealed that High TIMI risk score correlates significantly with death and complications like cardiogenic shock and arrhythmias in early post-infarction period and frequency of complication increases with the increasing score & this is matched with our results.

5. Conclusion

The higher the TIMI score the higher adverse in hospital clinical cardiovascular outcomes.

6. Limitations

Although adequate number of study population was used in this study, it is still limited in number to generalize the results.

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