

Original article

Study of assessment of severity in acute coronary syndrome with unstable angina

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Abstract:

Prevalence of Acute coronary syndrome (ACS) is less in rural areas while more in urban areas. The patient with ACS requires aggressive and time-bound treatment. Reperfusion of myocardium is to be achieved at the earliest. The analysis of the patients with chest pain is done by ECG, Cardiac markers, and various cardiac scores. In the present study we tried to assess the severity of ACS with TIMI score & Heart score. Thus, the main purpose of conducting such scores is that we can prognosticate and assess the risk. 70 cases of chest pain coming to EMD between Sep 2020 to Dec 2020 were screened for risk stratification & prognostication. The clinical data was collected as guided by TIMI & Heart scores. The risk thus calculated, was explained to the patient, his relatives, & the accompanying persons. This study facilitates the emergency physicians to triage the patients and send them to optimum location of medical delivery. In our study, the cases which were found as high risk as per the score guide-lines, were counseled and advised for aggressive investigative & therapeutic management. The cases which were found as Intermediate risk, were counseled for hospitalization & to undergo further investigations. Cases with Low risk were admitted for 24-48 hrs, because of the insistence on part of the patient or his relatives and also treating physicians. Hence we can conclude that TIMI & Heart score can guide us in triaging the patient of ACS in EMD, so that they can be directed to appropriate investigative & treatment pathway.

Keywords: Acute coronary syndrome, unstable angina, Emergency department

Introduction:

When the patient comes to emergency medicine department (EMD) with complaints of chest pain, the main worry to him & his relatives is whether this chest pain is due to cardiac origin or due to some other cause. Next doubt is whether he requires immediate intervention such as percutaneous angioplasty in myocardial infarction (PAMI), Thrombolysis, or Coronary artery bypass graft (CABG).

It is a dictum in medicine that Chest pain has to be considered as due to cardiac cause unless proved otherwise. The incidence of Myocardial infarction in India is 25% in pts <40 yrs, 50% in pts >50 yrs. Prevalence of Acute coronary syndrome (ACS) in rural areas is 3-4 % while in urban area is 8-10%. [1, 2, 3, 4] The patient with ACS requires aggressive and time-bound treatment. Reperfusion of myocardium is to be achieved at earliest. As per the American heart association guidelines, time required between door to definitive treatment is 90 min, wherein PAMI is the first treatment of choice. If the delay is more than that, then PAMI has very minimal role, other treatment options are to be tried such as Thrombolysis, & in such cases the residual deficit always persists.

The analysis of the patients with chest pain is done by ECG, Cardiac markers, and various cardiac scores. These

scores assess the severity of ACS with ECG findings & Trop I test. In the present study we tried to assess the severity of ACS with TIMI score & Heart score. Thrombolysis in Myocardial infarction (TIMI) is a 7 item diagnostic tool, which can quantify the risk in the potential or actual cases of ACS. There are multiple variables which can predict the risk of mortality in ACS cases. This is one of such multi-variable models to identify the predictability and to quantify their contribution to the mortality risk. TIMI can act as bedside diagnostic tool to assess the risk stratification, regarding the prognosis & aggressive management [8]

Heart score is another score which is being used apart from TIMI score. The parameters to record the score are different but it also predicts the probability of MACE in ACS within 6-8 weeks [9]. Heart score is calculated as soon as the ECG and lab reports are available. In this case the primary end point is MACE within 6weeks. As per the score the risk % is assessed and accordingly the definitive management is started.

The risk assessment is calculated as Low, Intermediate & High risk. And accordingly patient can be analyzed as to how aggressively he needs the treatment.

Material & Methods:

70 cases of chest pain coming to EMD between Sep 2020 to Dec 2020 were screened for risk stratification & prognostication. The duration of the study was for the period of 4 months. Along with vital parameters, the data was collected as guided by TIMI & HEART score. In TIMI score it was risk prognostication for individual number

reflected in the score. While in HEART score, the cases were categorized as Low, Intermediate, High risk. Accordingly, the risk stratification & the prognostication of mortality / MACE were evaluated. The risk thus calculated, was explained to the patient, his relatives, & the accompanying persons.

TIMI score & Heart scores tables are given below.

Table 1: TIMI score for NSTEMI

Sr No		Score	Risk %
1	Age > 65 yrs	1	4.7%
2	>3 risk factors for CAD	1	8.3
3	Use of ASA in last 7 days	1	13.2
4	Known CAD > 50%	1	19.9
5	>1 episode of Rest Angina in 24 hrs	1	26.2
6	ST segment deviation	1	40.9
7	Elevated cardiac markers	1	40.9
	Total	7	

Table 2: TIMI Score fore STEMI

History	Score	Risk score	Odds of death/ 30 days
Age 65-74 yrs	2	0	0.1
Age >75 yrs	3	1	0.3
Diabetes/ HTN / Angina	1	2	0.4
Examination		3	0.7
SBP < 100mm	3	4	1.2
HR > 100/ min	2	5	2.2
Killip II – IV	2	6	3
Weight < 67 kg	1	7	4.8
Presentation		8	5.8
Ant STE / LBBB	1	>8	8.8
Time to start t/t > 4 hrs	1		
Total risk score	0-14		

Table 3: Heart Score

History	Highly suspicious	2
	Moderately suspicious	1
	Slightly – non suspicious	0
ECG	Significant ST depression	2
	Non specific repolarisation	1
	Normal	0
Age	>65 yrs	2
	>45-<65 yrs	1
	<45 yrs	0
Risk	>3 risk factors	2
Factors	1-2 risk factors	1

	No risk factors	0
Troponin	>3	2
	>1- <3	1
	Normal	0

Risk factors are DM, HTN, Hypercholesterolemia, Family h/o CAD, obesity.

Score 0-3 Low risk
Score 4-6 Intermediate risk
Score 7-10 High risk

Results:

There were 49 males & 21 females in this group. Age group – youngest patient was 24 years & the eldest of the group was 90 yrs. Chest pain, sweating & breathing difficulty was the most common presentation. Out of 70 cases 5 had bradycardia, 13 had tachycardia, rest were within normal range of 60-100/min. Oxygen saturation SpO2 was <90% in 2 cases only. Majority of the patients in this study showed STEMI changes on ECG. Of the predisposing factors, 41 patients were hypertensive, 37 patients had diabetes

mellitus, 12 had pre-existing coronary artery disease (CAD), 31 patients were overweight as per their height weight chart. The severity of the ACS was assessed by TIMI & HEART score. The risk assessment was calculated with these scores. This was especially essential when the ECG showed NSTEMI changes. When there are STEMI changes, the diagnosis of ACS is crystal clear. It is only in those with NSTEMI or no positive findings on ECG, these scores are found to be of paramount importance.

Table 4: Percentage Risk as per TIMI Score

TIMI Score	No of Pts	Risk %
1	5	4.7%
2	7	8.3
3	8	13.2
4	12	19.9
5	13	26.2
6	14	40.9
7 or >7	11	40.9
Total	70 Pts.	

Table 5: Percentage Risk as per HEART Score

Heart Score	No of Pts	Risk %
0-3	4	2.5%
4-6	24	20.3%
7-10	42	72.7%
Total	70	

Study outcome –

This study facilitates the emergency physicians to triage the patients to optimum location of medical delivery like ICU/ Hospital ward/ OPD but also identifying the patients who can be treated best with newer but expensive modalities like PAMI &/or Thrombolysis. (TIMI 1)

- 24 cases had thrombolysis
- 17 cases had been sent to cath lab for PAMI immediately
- 8 patients had gone against medical advice. (Choice of hospital / Cardiologist)

- 20 patients were counseled for CAG & further investigations in consultation with cardiologist. Most of them had subsequently undergone CAG further definitive management.
- 1 patient died in ICU.

Discussion:

The clinicians involved in treating acute emergencies are often worried about one fact that the patient may have some complication or the other soon after discharge from EMD. Hence to discharge the case from emergency ward is always the most challenging decision. The decision to treat the patient of chest pain on domiciliary level due to lack of positive findings of ACS is really very difficult. Around 25% of the hospital admissions & 5-10% of EMD admissions are diagnosed to be the actual cases of ACS. While screening these things considerable time & energy is wasted and there is unwarranted burden on the hospital infra-structure. Hence there was need to have some sort of scoring system which can guide us in stratification of risk & the prognostication. [7]

The primary goal of the analysis of chest pain is to rule out the cause as ACS. It has been found that 80% of the patients of chest pain did not have signs of actual ACS. Hence there are high chances of either over-diagnosis or false positive cases. Hence the need to evaluate risk stratification & prognostication in such cases of chest pain was essential. Thrombolysis in Myocardial infarction (TIMI) score was developed by Elliot Antman et al in 2000. It reflects the probability of the 30 days mortality, in patients of chest-pain coming to Emergency department. Separate scoring system exists for STEMI & NSTEMI patients. There are some modifications done in this score by some workers where time to start treatment was taken in account. The sensitivity reported was around 90% with TIMI & GRACE score.

Another score was developed later on as HEART score. It was also used as point of diagnostic tool, and was found to be more user-friendly. With both TIMI & HEART score, one can assess the severity & risk stratification by clinical observation, logic, & individual clinical acumen. One does not require additional gadgets such computer which is a must in GRACE score. The heart score had an advantage over others in the sense that it could cover the grey areas, which were found to be ignored in TIMI score [9]. The main difference in the two scoring systems was that, TIMI analyses the 30- day mortality, while HEART score analyses the risk of stratification of MACE in 6 weeks. Hence there is bound to be some difference in the 2 scores. Further it was noticed that the HEART score is better than others in broad analysis of the chest-pain culminating in ACS, while TIMI & GRACE score are better in prognostication of patients in CCU.

There is wide variation in development of risk stratification tools. Some are based on statistical weighting of variables collected in observational study. While some are based on clinical judgment, logic, & common sense. The initial model is mathematical, more complicated while the latter one is clinical based, more simplistic and user friendly. The development of scoring system is continuous phenomenon. Some new other scores such as GRACE score, ACI-TIPI, North American Chest Pain rule, Vancouver chest pain rule are being used. Out of these scores, it is the Vancouver score which is specially developed, which can facilitate early discharge of the patients. However, the study is limited to TIMI & HEART score; we would not go in the details of the advantages / disadvantages of the various scoring systems.

In our study, the cases which were found as high risk as per the score guide-lines, were counseled and advised for aggressive investigative & therapeutic management. The cases which were found as Intermediate risk were counseled for hospitalization & to undergo further investigations. Rest of the cases which were Low risk, which could have been treated on domiciliary level. However, these patients were admitted for 24-48 hrs, because of the insistence on part of the patient or his relatives and also treating physicians. This was non adherent with the score guideline protocol.

Conclusion:

The cases presenting with STEMI changes are straight forward, and hence they present no dilemma in treatment decisions. But the cases presenting with NSTEMI are more difficult to analyse and such cases demand critical evaluation and Specialist's opinion. It is in this group of patients, one needs to have high index of suspicion. In such cases the risk stratification, risk % is of paramount importance. TIMI score & HEART score can guide us in prognostication & risk prediction in this grey area. Main difference in the two scores was, TIMI score predicts mortality in 30 days, while HEART score predicts the risk % of MACE in 6 weeks. Both scores are used as bed-side diagnostic tool, the HEART score provides better analysis of patients presenting with chest pain, while TIMI score is better diagnostic tool for predicting risk in the patients in CCU. Hence, we can conclude that TIMI & Heart score can guide us in triaging the patient of ACS in EMD, so that they can be directed to appropriate investigative & treatment pathway.

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