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Observational study of clinical risk scores for triaging undifferentiated chest pain in emergency department in Indian setting

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Abstract
Background: this study was conducted to evaluate clinical risk scores for triaging undifferentiated chest pain in emergency department in Indian setting.
Material and methods: Overall 150 subjects were involved in this study. Patients presenting to emergency department with chest pain >18years of age were involved in the study. Traumatic chest pain. Subjects with Traumatic chest pain and pregnant females were excluded from the study. Patient presenting to casualty were assessed and details like Age, Sex, Past medical, history, Risk factors, Medication use, CSS/Killip class, Signs & symptoms, Patient history, Cardiac arrest upon admission, Vital signs, ECG findings, Cardiac enzymes were taken and applied to risk scores. The four risk scores 1) HEART 2) TIMI 3)GRACE 4)PURSUIT were applied to each of the patient. The reference outcome for assessing score performance was the final diagnosis made by the treating clinician.
Results: A total of 150 patients were included in our study. The mean Age was about 51 years.6(4.0%) of the participants had Age: 20-29 Years. 28 (18.7%) of the participants had Age: 30-39 Years. 32(21.3%) of the participants had Age:40-49Years. 40(26.7%) of the participants had Age: 50-59 Years. 29 (19.3%) of the participants had Age: 60-69Years. 12(8.0%) of the participants had Age:70-79Years. 2(1.3%) of the participants had Age: 80-89Years. 1(0.7%) of the participants had Age:≥90 Years.
Conclusion: We come to the conclusion that HEART score had the best diagnostic accuracy compared to TIMI score, GRACE score and PURSUIT score.
Keywords: clinical risk scores, chest pain, triaging.

Introduction

Chest pain is among the most common complaint presenting to the emergency departments (Eds) worldwide. The etiology of chest pain can range from benign to life threatening causes. Most common underlying causes for this symptoms are acute coronary syndromes (ACS), acute myocardial infarction (AMI) and unstable angina pectoris (UAP).[1]
With the turn of the century, cardiovascular diseases (CVDs) have become the leading cause of mortality in India.In comparison with the people of European ancestry, CVD affects Indians at least a decade earlier and in their most productive midlife years.For example, in Western populations only 23% of CVD deaths occur before the age of 70 years; in India, this

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number is 52%. Prevalence of IHD in 1960 in urban India was 2%, and increased 7-fold to almost 14% by 2013. Similarly, it more than quadrupled in rural areas, from 1.7% to 7.4% between 1970 and 2013.[2]

Many conditions cause chest pain, yet discriminating ACS from alternate and generally less serious aetiologies, such as gastro-esophageal reflux is a challenge. Therefore, it is crucial to develop a effective way to stratify chest pain patients based on risk for development of major adverse cardiac events (MACE) in order to provide effective care and prevent overutilization of resources. Normal values of troponin and a normal electrocardiogram (ECG) still do not exclude adverse cardiac events completely.As a result many patients are hospitalized and undergo a barrage of non invasive and invasive testing including coronary angiography (CAG).[3] To Effectively diagnose ACS, we should use the combination of Patient history ,ECG abnormalities ,Cardiac markers and several other potential variables. In this study we want to assess the performance of four such risk scores to stratify patient with high risk of MACE from those with low risks for MACE in patients presenting to the emergency department with undifferentiated chest pain . The four risk scores being 1) HEART 2)TIMI 3)GRACE 4)PURSUIT.

Hence the present study was conducted to assess the clinical risk scores for triaging undifferentiated chest pain in emergency department in Indian setting.

Material and methods

Overall 150 subjects were involved in this study. Patients presenting to emergency department with chest pain >18years of age were involved in the study. Traumatic chest pain Subjects with Traumatic chest pain and pregnant females were excluded from the study.

Patient presenting to casualty were assessed and details like Age, Sex, Past medical, history, Risk factors, Medication use, CSS/Killip class, Signs & symptoms, Patient history, Cardiac arrest upon admission, Vital signs, ECG findings, Cardiac enzymes were taken and applied to risk scores .The four risk scores 1) HEART 2)TIMI 3)GRACE 4)PURSUIT were applied to each of the patient. The reference outcome for assessing score performance was the final diagnosis made by the treating clinician.

Data was analysed by preparing the master chart in microsoft excel. The data will be analysed by using the software SPSS 16.0 version /SAS 9.0 version. Descriptive statistics will be prepared. Chi Square test was applied.

Results

Table 1: age-wise distribution of subjects

Age (in years)	Number of subjects
20-29	06
30-39	28
40-49	32
50-59	40
60-69	29
70-79	12
80-89	02
≥90	01

Table 2: gender wise distribution of subjects

Gender	Number of subjects
Males	98
Females	52

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Total	150

Table 3: summary of presentation

Presentation	Yes	No
Chest pain (classical)	76	74
Chest pain (non classical)	74	76
Breathlessness	42	108
Diaphorsesis	41	109
HTN	62	88
Hypercholesterolemia	26	124
Diabetes melllitus	37	113
Obesity	28	122
Smoking	07	143
Prior Cardiac H/O	09	141
Significant Family H/O	37	113
Medication (Aspirin Use)	15	135

Discussion

A total of 150 patients were included in our study.The mean Age was about 51years.6(4.0%) of the participants had Age: 20-29 Years. 28 (18.7%) of the participants had Age:30-39Years. 32(21.3%) of the participants had Age: 40-49Years. 40(26.7%) of the participants had Age: 50-59 Years. 29 (19.3%) of the participants had Age: 60-69Years. 12(8.0%) of the participants had Age:70-79Years. 2(1.3%) of the participants had Age: 80-89Years. 1(0.7%) of the participants had Age:≥90 Years.

98(65.3%) of the participants were Male. 52 (34.7%) of the participants were Female. 76(50.7%) of the participants presented with classical chest pain and 74(49.3%) of the participants had Non-Classical chest pain. 42(28.0%) of the participants had associated history of Breathlessness. 41 (27.3%) of the participants had associated history of Diaphoresis.

62(41.3%) of the participants had history of hypertension. 26(17.3%) of the participants had history of Hypercholesterolemia. 37 (24.7%) of the participants had history of Diabetes Mellitus. 28 (18.7%) of the participants had obesity.7 (4.7%) of the participants were smokers 9 (6.0%) of the participants had Prior Cardiac history. 37(24.7%) of the participants had Significant Family history of cardiac illness in the family 15(10.0%) of the participants had history of Medication(Aspirin)Use.

Few studies previously compared the prognostic value of different risk scores for predicting MACE in unselected chest pain populations. These studies consistently favored HEART score over other clinical risk scores. For instance, Poldervaart and colleagues recently compared three risk scores for predicting 6-week MACE (19%) in nine Dutch hospitals (n=1,748).[4] They found that HEART had the highest discrimination index (AUC=0.86), followed by TIMI (AUC=0.80) and GRACE (AUC=0.73). Sakamoto and colleagues also recently compared the same three risk scores for predicting 30-day MACE (36%) in a single hospital in Singapore (n=604).[5] They also found that HEART had the highest discrimination index (AUC=0.78), followed by TIMI (AUC=0.65) and GRACE (AUC=0.62). In a third prospective validation study by the authors of the HEART score,[6] the HEART score (AUC=0.83) outperformed TIMI (AUC=0.75) and GRACE (AUC=0.70) in predicting 6-week MACE (17%) in a large cohort of patients (n=2440). In a fourth study, Sun and colleagues compared TIMI and HEART risk scores for predicting MACE (6.2%) in nine U.S. hospitals (n=8,255).[7] They similarly found that HEART score had a higher discrimination

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index (AUC=0.75) compared to TIMI (AUC=0.67).

Conclusion

A Total of 150 patients were included in our study out of which 47.3% of the patients had significant CAD and 52.7% had Non-significant CAD. When the performance of the different scores were compared to assess chest pain:HEART score was the most sensitive in detecting patients with high risk of significant CAD.PURSUIT score was the most specific in detecting patients with high risk of significant CAD.PURSUIT score had the best positive predictive value. HEART score had the best negative predictive value It was concluded that HEART score had the best diagnostic accuracy compared to TIMI score, GRACE score and PURSUIT score.

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