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ORIGINAL RESEARCH

Evaluation of the HEART Score for Chest Pain Patients at the Emergency Department: An Institutional Based Study

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ABSTRACT

Background: Chest pain representing acute coronary syndrome (ACS) is the most common reason patients presenting to the emergency department (ED) are admitted to the hospital. This study was a prospective validation of the HEART score for chest pain patients at the emergency department.

Materials & Methods: Patients admitted to the cardiac emergency department due to chest pain irrespective of age were included in the study. Complete patient history was taken. Only the troponin value of the first blood sample was used for the HEART score calculation. The primary endpoint in this study was the occurrence of a major adverse cardiac event (MACE), within six weeks of initial presentation. Statistical analysis was performed with R (Version 2.9; The R foundation for Statistical Computing, Vienna, Austria).

Results: In the present study total patients included were 400 in which total males were 72.5%. 15% patients had a history of AMI, 10.5% had history of CABG, 21.25% patients had history of PCI, 4.25% patients had history of stroke and 4% patients had history of peripheral arterial disease. 90 patients had MACE<6 weeks and 310 patients had no MACE<6 weeks. In the present study 90 patients had MACE<6 weeks and 310 patients had no MACE<6 weeks. The five elements of the HEART score differed significantly between the groups with and without MACE.

Conclusion: The present study concluded that HEART score differed significantly between the groups with and without MACE.

Keywords: Chest Pain, Heart Score, MACE.

INTRODUCTION

Chest pain is the second leading reason for emergency department (ED) visits.[1] While up to 20% of patients may have a cardiac cause of their chest pain, few have life- threatening conditions and the majority are ultimately diagnosed with noncardiac pain.[2] The first challenge in these patients is to identify those with acute coronary syndrome (ACS). This diagnostic process should be quick and efficient, since the prognosis improves dramatically when ACS patients receive targeted treatment as early as possible.[3] In a busy ED, we need an objective method to risk stratify patients quickly, using minimum resources. There are various scoring methods used for this, but none exclusively for ED patients except the

HEART score.[4]HEART was not developed from a database as modern scores often are. The HEART score was based on clinical experience and medical literature and designed to be as easy to use as the Apgar score for newborns.[5]HEART score stands for History, ECG, Age, Risk factors, and Troponin I where each component is scored from 0 to 2.[4] This study was a prospective validation of the HEART score for chest pain patients at the emergency department.

MATERIALS& METHODS

Patients admitted to the emergency department, L. N. Medical College & Research Centre, Bhopal, Madhya Pradesh (India) due to chest pain irrespective of age were included in the study. Patients with ST-elevation acute myocardial infarction (STEMI) were also included in the study. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and informed consent was taken from the guardian of the patient. Complete patient history was taken including cardiovascular risk factors, medication, physical examination and past medical history. Laboratory values, including troponin I or T levels, were collected throughout the study period, starting with the moment of admission and typically repeated with 6 h intervals. Only the troponin value of the first blood sample was used for the HEART score calculation. The ECG was blindly reviewed and classified. The primary endpoint in this study was the occurrence of a major adverse cardiac event (MACE), within six weeks of initial presentation. MACE consists of: AMI, PCI, CABG, coronary angiography revealing procedurally correctable stenosis managed conservatively, and death due to any cause. Statistical analysis was performed with R (Version 2.9; The R foundation for Statistical Computing, Vienna, Austria). p value <0.005 was considered significant.

RESULTS

In the present study total patients included were 400 in which total males were 72.5%. 15% patients had history of AMI, 10.5% had history of CABG, 21.25% patients had history of PCI, 4.25% patients had history of stroke and 4.5% patients had history of peripheral arterial disease. 90 patients had MACE<6 weeks and 310 patients had no MACE<6 weeks.

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Table 1: Patient characteristics

Patient characteristics	N	%
Total patients	400	100
Males	290	72.5
History of AMI	60	15
History of CABG	42	10.5
History of PCI	85	21.25
History of stroke	17	4.25
History of peripheral arterial disease	18	4.5

Table 2: Number of patients in each element of the HEART score.

	No MACE<6w n=310			MACE<6w n=90			P value
Points	**0**	**1**	**2**	**0**	**1**	**2**	**0.000**
History	140(45.16 %)	100(32.25 %)	70(32.58%)	9(10%)	25(27.77 %)	56(63.33%)	0.000
ECG	202(65.16 %)	60(19.35%)	48(15.48%)	31(34.44%)	20(22.22 %)	39(43.33%)	
Age	58(18.70	134(43.22	118(38.06	3(3.33%)	38(42.22	49(54.44%	0.000

	%)	%)	%)		%)	)	
Risk Factors	28(9.03%)	114(36.77 %)	168(54.19 %)	5(5.55%)	25(27.77 %)	60(66.66%)	0.000
Troponin	284(91.61 %)	14(4.5%)	12(3.87%)	47(52.22%)	15(16.66 %)	28(31.11%)	0.000

MACE=Major Adverse Cardiac Events

DISCUSSION

The HEART score was developed in the Netherlands in 2008 by Six, Backus and Kelder as a rapid risk stratification tool for patients with chest pain according to their short-term risk MACE (defined as acute myocardial infarction [AMI], need for percutaneous coronary intervention [PCI] or coronary artery bypass graft [CABG], and death within 6 weeks**)** to help identify low-risk patients, suitable for earlier ED discharge within 30 days of index ED visit.[6]

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In a retrospective study in low-risk chest pain patients from North Carolina (USA) they found a 0.6% risk of MACE in 904 patients with HEART scores≤3. The authors state "… the HEART score could substantially reduce cardiac testing in a population with low pretest probability of ACS". These conclusions were further supported by their other recent article in this journal, where HEART with 0 and 3 h serial troponin after presentation "identified 20% (95% CI 18–23%) for early discharge with 99% (95% CI 97–100%) sensitivity for ACS. The HEART score had a net reclassification improvement of 10% (95% CI 8–12%) versus unstructured assessment and 19% (95% CI 17–21%) versus the North American Chest Pain Rule".[7,8]

Backus B et al concluded that the HEART score provides the clinician with a quick and reliable predictor of outcome, without computer-required calculating. Low HEART scores (0–3), exclude short-term MACE with >98% certainty. In these patients one might consider reserved policies. In patients with high HEART scores (7–10) the high risk of MACE may indicate more aggressive policies.[9]

Mark DG et al concluded that RISTRA- ACS and HEART pathway had the lowest negative likelihood ratios (0.06, 95% CI, 0.03–0.10 and 0.07, 95% CI, 0.04–0.11, respectively) and the greatest net benefit across a range of low- risk thresholds. RISTRA- ACS demonstrated the highest discrimination for 60- day major adverse cardiac event (area under the receiver operating characteristic curve 0.92, 95% CI, 0.91–0.94, P<0.0001).[10]

CONCLUSION

The present study concluded that HEART score differed significantly between the groups with and without MACE.

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