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ANALYSIS OF COMPARISON OF THE GRACE, HEART AND TIMI SCORE TO PREDICT MAJOR ADVERSE CARDIAC EVENTS IN CHEST PAIN PATIENTS IN PAKISTAN

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Abstract:
Introduction: Chest pain is a common presenting symptom in the emergency department (ED). Numerous chest pain patients are admitted to the medical clinic because of the likelihood of dangerous conditions, for example, intense myocardial dead tissue (AMI).
Aims and objectives: The basic aim of the study is to compare the GRACE, HEART and TIMI score to predict major adverse cardiac events in chest pain patients in Pakistan.
Methodology of the study: This study was conducted in Benazir Bhutto Hospital, Rawalpindi during September to November 2018. The data was collected from the emergency department of the hospital. We collected the data of those patients who visit the emergency department of hospital for the chest pain. Any patient with chest pain presenting to the ED was eligible for inclusion. Patients specifically perceived as having ST-rise myocardial localized necrosis (STEMI) were rejected, as a result of the absence of indicative vulnerability. Every single included patient gave composed educated assent. The GRACE score and TIMI score were determined naturally from the tentatively gathered information, without translation by the agents.
Results: The data were collected from 100 patients of both genders. The mean age of selected population is 62 years. Comparison of performance of GRACE, HEART and TIMI score in terms of safety and efficiency. This is an absolute level of safety of missing no > 5% of all patients with MACE to define a "low-risk" group. At this absolute safety level, the GRACE score classified 334 patients as "low risk" of whom 12/334 (3.6%) patients developed MACE. Using the same absolute safety level, the HEART score classified 708 patients as "low risk" with 14/708 (2.0%) patients developing MACE. Conclusion: It is concluded that chest pain, as a common yet potentially life-threatening condition, deserves much attention in risk stratification and management, particularly in the ED where quick decisions are required for efficient patient care. The HEART score performed best in discriminating between those with and without MACE.
Key words: *Cardiac, Chest, Pain, GRACE, TIMI, Score.*

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INTRODUCTION:
Chest pain is a common presenting symptom in the emergency department (ED). Numerous chest pain patients are admitted to the medical clinic because of the likelihood of dangerous conditions, for example, intense myocardial dead tissue (AMI). It is be that as it may, not possible to concede all chest pain patients because of restricted healthcare assets [1]. Consequently, recognizing intense coronary disorder (ACS) from other cardiovascular and non-heart diseases is essential [2]. It is fundamental to rapidly and precisely distinguish patients who are at high and low risk of creating major unfriendly cardiovascular occasions (MACE) so as to ideally allot ED and emergency clinic assets [3].

Risk stratification of ED chest pain patients has been widely contemplated lately. In any case, there is right now no broadly acknowledged risk stratification strategy for ED chest pain patients [4]. Introductory ED risk scores were received from those made for post-ACS risk stratification, for example, the Thrombolysis in Myocardial Infarction (TIMI) score and the Global Registry of Acute Coronary Events (GRACE) score, among others [5]. Nonetheless, in light of the fact that these risk scoring apparatuses were not explicitly intended for ED chest pain patients, their execution in the ED has been peripheral [6].

Up to 6.3% of emergency office (ED) visits are identified with chest pain. A critical inquiry in these patients is whether they have an intense coronary disorder (ACS), as any postponement in diagnosis and treatment can negatively affect their guess [7]. Ordinary values of troponin and a typical electrocardiogram (ECG) still don't prohibit ACS totally. Accordingly, numerous patients giving chest pain are at present hospitalized and widely assessed with non-obtrusive pressure testing or imaging, or with an intrusive coronary angiography [8]. Be that as it may, of all chest pain patients < 25% will have an ACS. On the off chance that patients at low risk for ACS could be perceived right off the bat in the demonstrative procedure, it can possibly lessen patient weight, length of remain at the ED, recurrence of hospitalization and expenses [9-10]. To analyze ACS, doctors utilize patient history, ECG variations from the norm, cardiovascular markers (notably troponin) and a few other potential factors. Universal heart rules express that chest torment patients introducing to the ED ought to be evaluated with a hazard stratification apparatus or hazard score and throughout the years, various instruments have been created.

Aims and objectives
The basic aim of the study is to compare the GRACE, HEART and TIMI score to predict major adverse cardiac events in chest pain patients in Pakistan.

METHODOLOGY OF THE STUDY:
This study was conducted in Benazir Bhutto Hospital, Rawalpindi during September to November 2018. The data was collected from the emergency department of the hospital. We collected the data of those patients who visit the emergency department of hospital for the chest pain.

Data collection
Any patient with chest pain presenting to the ED was eligible for inclusion. Patients specifically perceived as having ST-rise myocardial localized necrosis (STEMI) were rejected, as a result of the absence of indicative vulnerability. Every single included patient gave composed educated assent. The fundamental endpoint in our investigation was major antagonistic cardiovascular occasions (MACE) inside about a month and a half after the underlying ED introduction (counting the file occasion). MACE comprised of shaky angina (UA), non-ST rise myocardial dead tissue (NSTEMI), STEMI, percutaneous coronary intervention (PCI), coronary blood vessel sidestep joining (CABG), stenosis oversaw moderately, cardiovascular demise, non-cardiovascular passing and passing with obscure reason. The potential occurrence of MACE was distinguished by methods for a telephone call with every patient at 3 months after introduction.
In all patients with a conceivable MACE or obscure status, the electronic emergency clinic records were explored. All data conceivably showing MACE was additionally researched by analyzing restorative records from the clinic. The GRACE score and TIMI score were determined naturally from the tentatively gathered information, without translation by the agents. Cut-off values of troponin were given by medical clinic to evaluate whether the dimension of this heart marker was hoisted.

Statistical analysis
Continuous variables were presented as means with standard deviations, categorical variables were presented as absolute number of patients with corresponding percentages.

RESULTS:
The data were collected from 100 patients of both genders. The mean age of selected population is 62 years. All the basic characteristics of patients are represented in table 01.

Table 01: Baseline characteristics of selected patients

	All patients	Patients with MACE	Patients without MACE
Mean age (SD)	62 (14)	67 (11)	60 (15)
Mean systolic blood pressure in mm Hg (SD)	144 (23)	147 (23)	143 (23)
Mean diastolic blood pressure in mm Hg (SD)	81 (13)	82 (13)	81 (13)
Mean heart frequency per minute (SD)	73 (15)	75 (17)	73 (15)
Diabetes Mellitus	271 (16%)	68 (21%)	203 (14%)
Obesity (BMI > 30 kg/m^2)	319 (18%)	58 (18%)	261 (18%)
Hypercholesterolemia	559 (32%)	117 (36%)	442 (31%)
Hypertension	846 (48%)	209 (64%)	637 (48%)
Positive family history	629 (36%)	117 (36%)	512 (36%)
Current smoking	441 (25%)	81 (25%)	360 (25%)
History of cardiovascular disease	576 (33%)	154 (47%)	422 (30%)
History of AMI	277 (16%)	65 (20%)	212 (15%)
History of PCI	331 (19%)	91 (28%)	240 (17%)
History of peripheral artery disease	69 (4%)	25 (8%)	44 (3%)
Mean creatinin in µmol/l (SD)	80 (33)	85 (22)	78 (35)

SD: standard deviation, mm Hg: millimetres of mercury, BMI: Body Mass Index, AMI: acute myocardial infarction, PCI: percutaneous coronary intervention, CABG: coronary arterial bypass grafting, CVA: cerebrovascular attack, TIA: transient ischemic attack, DOAC: direct oral anticoagulant.

Table 02 demonstrates the examination of execution of GRACE, HEART and TIMI score as far as security and productivity. This is a flat-out dimension of wellbeing of missing no > 5% of all patients with MACE to characterize an "okay" gathering. At this supreme security level, the GRACE score grouped 334 patients as "generally safe" of whom 12/334 (3.6%) patients created MACE. Utilizing a similar supreme security level, the HEART score arranged 708 patients as "generally safe" with 14/708 (2.0%) patients creating MACE. Ultimately, the TIMI score recognized 439 patients as "generally safe" with 14/439 (3.2%) having a MACE.

Table 02: Comparison of performance of GRACE score, HEART score and TIMI score in terms of safety and efficiency.

95% sensitivity	GRACE score	HEART score	TIMI score
Corresponding cut-off for "low risk"	≤ 72 points	≤ 3 points	0 points
Number of patients classified "low risk" / total number of patients	334/1748 (19.1%)	708/1748 (40.5%)	439/1748 (25.1%)
Percentage of MACE in "low risk" group	3.6% (12/334)	2.0% (14/708)	3.2% (14/439)
MACE, of which AMI	5	3	0
MACE, of which death	0	1	0
Negative predictive value (NPV)	96% (94%–98%)	98% (97–99%)	97% (95–98%)

DISCUSSION:

As a standout amongst the most well-known explanations behind crisis medical clinic confirmation, chest torment gets much consideration as it is now and again hard to observe the etiology rapidly and accurately [11]. For effective and precise patient care, it is fundamental to create strategies for fast guideline out or rule-in of MACE. Most chest torment scores use troponin or other research facility tests which require time [12]. The pathway utilizing high affectability cardiovascular troponin might be done in 60 minutes yet requires two blood tests [13]. In spite of the fact that purpose of-care (POC) cardiovascular biomarker testing have been picking

up enthusiasm for late years and have been created to conquer the long turnaround time of research center testing, POC testing is still generally inaccessible in generally countries [14]. In this manner, there appears to in any case be requirements for quicker devices to precisely hazard stratify chest torment patients showing to the ED. Throughout the years, numerous surveys have been distributed, extending from general themes identified with finding of ACS to precise audits on explicit hazard scores [15].

One important job for heart chance scores is to distinguish patients as generally safe so as to maintain a strategic distance from further testing and emergency clinic confirmation in these patients [16]. A perfect triage instrument would distinguish the biggest number of patients at generally safe (for example productivity) without trading off security, implying that the quantity of patients named generally safe yet creating MACE (for example false negatives) ought to be low [17]. When setting a flat out wellbeing level for missed MACE of 5% of all out patients, the HEART score distinguishes the most patients as "okay", to be specific 708 patients, with 14 patients missed of the complete 325 patients with MACE [18-19]. This compares to an extent of MACE in the generally safe gathering of 2.0% [20]. In spite of the fact that the meaning of a worthy false-pessimistic rate is powerless to closely-held convictions, and may differ between nations, Than et al. also, Kline et al. gauge that the most clinicians would acknowledge a false-negative rate of 1 to 2% [21].

CONCLUSION:

It is concluded that chest pain, as a common yet potentially life threatening condition, deserves much attention in risk stratification and management, particularly in the ED where quick decisions are required for efficient patient care. The HEART score performed best in discriminating between those with and without MACE. The HEART score identified the largest number of patients (40.5%) as low risk without compromising safety. We recommend the use of the HEART score in the work-up of patients with chest pain at the ED.

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