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THE NEW VANCOUVER CHEST PAIN RULE USING TROPONIN AS THE ONLY BIOMARKER

Emergency Medicine

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ABSTRACT

The purpose of this study was to perform the external validation of the new Vancouver Chest Pain Rule in the patients presenting to ED with possible risk for ACS. Those with clear symptoms of ACS were admitted to cardiac intensive unit and rest were subjected to detailed history and baseline ECG and troponin levels were sent along with remaining history for VCPS. The troponin levels and ECG were repeated after 2 hours along. The results were recorded in their designated proforma and were statistically analyzed at the end of the study. Total 118 patients were included in our study, out of which only 27.1% patients (32) were admitted under the critical care and majority of the patients i.e., 86 (72.89%) were discharged early on the basis of new VCPR, using serum troponin level as the biomarker. The chi square test using P value was <0.00001 in patients admitted with increased troponin level at 24 hours, thus proving troponin as the significant biomarker in patients with ACS. Only 3.39% (4) patients succumbed to death, all of them died with almost same cause. The Vancouver Chest Pain Rule with troponin as the only biomarker identified sizable low-risk cohort.

KEYWORDS

New Vancouver Chest Pain Rule, Troponin, Scoring system for ACS, Emergency, Chest pain

INTRODUCTION

Patients presenting in emergency department (ED) with chest pain represent large group of adults. The most common underlying causes for these symptoms are acute coronary syndromes (ACS), acute myocardial infarction (AMI) and unstable angina pectoris (UAP). For all the ED physicians, there is focus on achieving very low rate of adverse cardiac event after discharge. This seriousness has resulted in the development of protocols to achieve negative predictive value (NPV) and high sensitivity for short-term serious adverse events. The purpose of this study was to perform the external validation of the new Vancouver Chest Pain Rule in the patients presenting to ED with possible risk for ACS. In addition, we sought to identify if differences in the diagnostic accuracy of this rule existed with the use of highly sensitive versus sensitive troponin assays.

REVIEW OF LITERATURE

ACS is term that encompasses disease entities of the unstable angina pectoris (UAP), a non-ST-segment elevation myocardial infarction (NSTEMI) and a ST-segment elevation myocardial infarction (STEMI). Chest pain is the most common symptom described by patients for Emergency Department (ED) presentations with possible ACS. Establishing diagnosis of the acute coronary syndrome (ACS) is vital in treating all those patients. In order to treat physiological or pathological pain, an understanding of the pain mechanisms is important.

REMS:

It is abbreviated version of acute physiology and chronic health evaluation II (APACHE II) and is based on the physiological parameters like pulse rate, the mean arterial pressure (MAP), the respiratory rate, the Glasgow coma scale (GCS) score, the oxygen saturation, and age of the patient, which is very simple and can be applied in emergency setting [2]. Moreover, it is more frequently used in Emergency Department for the risk stratification and is been validated as excellent predictor of the mortality in the non-surgical patients [2].

SACS:

The objective of SACS scoring system is to identify the patients who are at the high risk for Obstructive Coronary Artery disease (OCAD), with intent that patients will receive the diagnostic and the interventional measures prior to occurrence of Acute MI or other Major Adverse Coronary Event (MACE). The SACS formula observes correlations between symptoms, ECG, CAD risk factors and troponin value.

VCPR:

New VCP Rule was developed by Scheuer Meyer and team [3], where rule stated that for the early discharge of the chest pain patient, patient needed to have:

1. A normal initial electrocardiogram (ECG) Troponin ≤99% at 2 hours No previous known history of acute coronary syndrome (ACS) or nitrate use and chest pain increasing with palpation OR
2. A normal initial ECG Troponin ≤99% at 2 hours No previous known history of ACS or nitrate use Chest pain not increasing with palpation Age <50 years old, and non-radiating pain (neck, jaw, or arm).

Cullen et al [4] further validated this study and found that sensitivity is 99.1% and 16.3% is the specificity.

METHODS

This was a prospective, observational study conducted in the Department of Emergency Medicine at Dr. D.Y. Patil University, School of Medicine, Nerul, Navi Mumbai on patients coming to ED with acute chest pain over a period of 1 year from October 2018 to October 2019. 118 patients were enrolled in this study.

INCLUSION CRITERIA: All the patients presenting with sign and symptom of ACS.

EXCLUSION CRITERIA: Patients diagnosed with ACS on admission, Patients diagnosed with any other cause of chest pain, terminally ill patient, Pregnant females.

Those with clear symptoms of ACS were admitted to cardiac intensive unit and rest were subjected to detailed history and baseline ECG and troponin levels were sent along with remaining history for VCPS. The troponin levels and ECG were repeated after 2 hours along. The results were recorded in their designated proforma and were statistically analyzed at the end of the study.

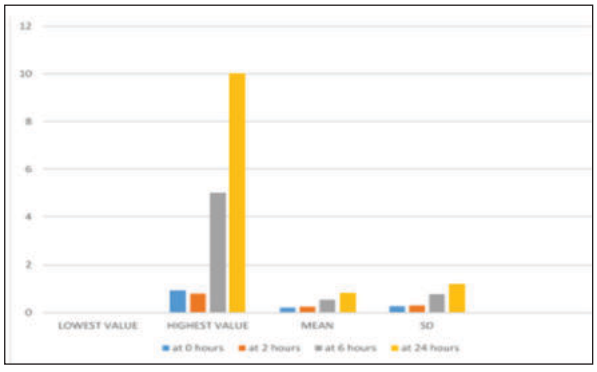
RESULTS

A total of 118 patients were included in our study with 21 patients (18%) under age of 40 and rest 82% being above 40 years. The mean ±SD for patients below 40 years being 34.28± 5.62 and the mean ±SD for patients above 40 years was 60.82 ± 12.78. In patients <40 years of age, the male: female ratio is 4:1 i.e., 17(80.95%) were males and 4 i.e., only 19.05% were females. While, in patients >40 years of age, the male; female ratio decreases to 3:2 i.e., 58 (59.79%) were males and 39 (40.21%) were females. Out of 21 patients <40 years of age, 10 patients (42.85%) had palpitations. Out of 97 pts >40 years of age, 39 patients (40.2%) had palpitations as presenting complain. Out of 21 patients <40 years of age, only 1 male patients (4.76%%) had diaphoresis, while out of 97 patients >40 years of age, 15 patients (15.46%) had diaphoresis as presenting complain. History of ACS was seen only in 18 patients i.e., 15.25%, while 100 patients (84.75%) in our study had

no H/O previous ACS. In our study, lowest troponin level at 0, 2, 6, 24 hours was <0.01 and highest was 0.9, 0.8, 5, >10, respectively. The mean ± SD at 0, 2, 6, 24 hours was 0.21 ± 0.27, 0.25 ± 0.3, 0.54 ± 0.77 and 0.83 ± 1.2, respectively. A total of only 27.1% patients (32) were admitted under the critical care and majority of the patients i.e., 86 (72.89%) were discharged early on the basis of new VCPR, using serum troponin level as the biomarker. The chi square test using P value was significant i.e., <0.00001 in patients admitted with increased troponin level at 24 hours, thus proving troponin as the significant biomarker in patients with ACS. Only 3.39% (4) patients succumbed to death, all of them died with almost same cause.

Troponin level	Lowest value	Highest value	Mean	SD
0 hours	<0.01	0.9	0.21	0.27
2 hours	<0.01	0.8	0.25	0.3
6 hours	<0.01	5	0.54	0.77
24 hours	<0.01	>10	0.83	1.2

Troponin level at 0, 2, 6, 24 hours



CONCLUSION

The Vancouver Chest Pain Rule with troponin as the only biomarker identified sizable low-risk cohort. However, sensitivity was lower than that identified in the original derivation study and was considered insufficient to enable safe early discharge. Modifications to the tool would be required if troponin was incorporated as the only biomarker.

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