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Role of CK-MB and Troponin-I in Diagnosing Non-ST-Elevation Myocardial Infarction

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Abstract: ***It is now well known that, as compared to all other cardiac markers the cardiac Troponin-I and CK-MB are found to be more reliable for the diagnosis of myocardial infarction (MI). The aim of our study was to assess the comparative role of CK-MB and Troponin-I in the diagnosis of non-ST elevation MI (NSTEMI) where there is minimal cardiac damage. Design: The study comprised of 50 patients presenting with history of chest pain and no ST segment elevation on electrocardiogram. Troponin-I was estimated on admission and CK-MB was measured 12 hrs after admission by commercially available kit. The patients were divided into two groups i.e. Troponin-I positive and Troponin-I negative. Results: The Troponin-I was positive in 17 (34%) patients but CK-MB was elevated in 12 (24%) patients. The 5 (30%) patients were Troponin-I positive but CK-MB within normal limit. Conclusion: Therefore it can be concluded that Troponin-I can identify the minimal cardiac damage which will be useful for the physician to start immediate intervention.***

Keywords: Troponin-I, CK-MB, Non-ST-elevation MI, Unstable angina

1. Introduction

Coronary artery disease is a major health risk in most of the western population and is now becoming major cause of death in many developing countries like India with one in ten patients dying of myocardial infarction. As per projections of the Global Burden of Disease study, the burden of cardiovascular disease in India by the year 2020 will be the highest in world [1].

Ischemia refers to lack of oxygen due to inadequate perfusion of the myocardium, which causes an imbalance between oxygen supply and demand. The most common cause of myocardial ischemia is obstructive atherosclerosis of epicardial coronary arteries. Patients with ischemic heart disease fall into two large groups i.e. patients with stable angina secondary to chronic coronary artery disease and patients with acute coronary syndrome. Acute coronary syndrome encompasses patients with ST elevation myocardial infarction on their presenting ECG & those with unstable angina and non-ST elevation myocardial infarction.

Unstable angina is defined as angina pectoris (or equivalent type of discomfort) with at least one of the following features

1. Occurring at rest or at minimal exertion usually lasting for more than 20 min (if not interrupted by nitroglycerin administration).
2. Being severe & described as frank pain or of new onset (within one month).
3. Occurring with crescendo pattern (more severe, prolonged and frequent than the previous one).

The diagnosis of NSTEMI is established if patient with clinical features of unstable angina develop evidence of myocardial necrosis. Unstable angina and non-ST elevation myocardial infarction if not detected as well as not treated on time then it may lead to infarction [2].

Previously the enzymes like aspartate transaminase & lactate dehydrogenase have been of much supporting value but the gold standard in detection of myocardial infarction was an elevated level of creatine kinase [3]. The use of creatine kinase was superseded by the use of myocardium specific enzyme CK-MB which is a myocardium specific isoenzyme of creatine kinase enzyme. This marker satisfies the criteria for diagnosing myocardial infarction (MI) as proposed by WHO, European Cardiac Society [ECS], and American College Of Cardiology [ACC] for defining acute myocardial infarction there should be elevated levels of troponin in presence of appropriate clinical features [4].

Recently it has been documented that there is increase incidence of non-ST-elevation myocardial infarction with fewer patients presenting with classical acute myocardial infarction. So as per the suggestions of National Academy of Clinical Biochemists (NACB), while defining non-ST elevation myocardial infarction, ECG changes plus elevated troponin levels should be considered [5].

Certain markers like lactate dehydrogenase [LDH], aspartate transaminase [AST] and creatine phosphokinase [CPK] are already been replaced by Troponin-T and CK-MB. In some studies it has been noted that the Troponin-I has a potential to replace CK-MB as a cardiac marker. So the elevated levels of which can be useful to distinguish non-ST-elevation myocardial infarction from unstable angina [6].

Therefore the purpose of present study is to compare the role of CK-MB and Troponin-I for the diagnosis of Non ST elevation myocardial infarction.

the patient with minor myocardial damage has entered in the phase of myocardial necrosis or not.

5. Conclusion

Troponin-I is found to be more useful cardiac marker for the diagnosis of non-ST-elevation myocardial infarction as compared to CK-MB. So it will useful for the early diagnosis and treatment of the patient.

6. Future Scope

As the present work is limited the larger studies are required in future, proving the specificity and sensitivity of Troponin-I to support our findings.

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