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Original research article

Analysis of biochemical cardiac markers in MI patients in Udaipur (Rajasthan)

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Abstract
There is a lot of scope in research as far as the biomarkers of cardiac profile are concerned. In the upcoming research areas the physiology and pathology in this area holds an enormous importance. Various markers of the cardiac profile will sort out various problems of the physicians when it comes to a prompt diagnosis. The proper management and quick diagnosis of CVD needs the help of proper and developed biomarkers. This holds the importance of the study in an area where it becomes evident that a biomarker cardiac origin that is Total CPK, CPK-MB, SGOT, cTn-T, cTn-I becomes very important in field of diagnosing MI.
Keywords: Myocardial infarction, total CPK, CPK-MB

Introduction

Today is a world where the investigations are not limited. There are probably a large number of multiplex investigations by which the diagnosis becomes easy and comfortable. We are able to find the reports within few hours and this has made management easy for the doctors.We have found many personal marker techniques which have led to the fast track reporting and above all the strategies are cost effective also.

With upcoming new strategies of multi bio maker assays we must look forward to minimizing the mortality related to different cardiac disorders. We need to work on priority basis for the development of a technique in a way that we don't overlook the other strategies which focus on not so good and average reporting. The nutshell is that whatever good comes up in the field of accurate diagnosis willproperly entertained in the field of upcoming research. We must therefore try to bring forward though the assay research that might do good and serve the mankind as far as clinical aspects are there. Serving in the area of accurate diagnosis for the physicians, the outcomes can be actually better and also solve many complications as far as managing the patients is concerned in connection to ischemia and cardiac disorders. There are however various key markers which will let us give proper management to the patients, and in this aspect, the doctors should be thoroughly sound with what are the assays and what are the implications for their smooth practices. If we want to improve the management and learn about how the patients are responding to a specific therapy we need to consider many techniques and interventional methods which will effectively evaluate the derangements and disorders. We can improve our conventional system by replacing older methods by newer techniques. For this to happen we need to implement proper bioassays and biomarkers along with accuracy and precision. This kind of facilitated system will definitely improve the quality control measures and helpto strengthen the whole system.If we take into consideration the usage of hundred percent accurate markers which can also provide us with assay methods we can always provide enormous information to getparameters biological parameters of different disorders along with getting an idea of response of the treatments. There is also a need to keep few points in mind related to significant and key advantages related to endpoint assay which will definitely expiate various important techniques and treatment strategies that needs to focus on connecting key markers of cardiac profile with endpoints clinically. This also notifies the fact of bringing up new scientifically developed assay strategies. We are already aware of the fact that in the world, there are many reasons behind morbidity and mortality. One such reason behind a vast range of mortality is coronary syndrome or ACS. There is no doubt that the sufferers can easily be distinguished for the specific derangement according to the clinical signs and symptoms but the fact is also that this stratification becomes even more simpler and convenient if we consider the risk causing factors along with ECG interpretations. The reporting becomes even best when we consider the results in connection

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with the cardiac profile key markers. This helps the physician both ways that is in the accurate diagnosis as well as prognosis [4] The exact confirmation about the disease and damage caused in the syndrome is very important and holds on priority. All these needs use of trusted as well as convenient assay of markers for detecting the extent of damage and necrotic episodes.The listed biomarker assays is of troponin which is undoubtedly a gold standard test in order to test the necrosis of the myocardium. It is very common assay and is done along with creatinine kinase-MB.
Myoglobin is yet another assay for quick and effective management and diagnosis [5] Necrosis of the tissue or inflammation of the tissue of cardiac origin holds importance in this aspect. Diagnosis and proper prognosis requires accuracy in investigation of all the cardiac parameters.The assay of troponin is a reliable assay in the cardiac profile [6].

Aims and Objectives
Foremost an easy clinical management of the diseased along with multi complicated risk factors in a sufferer should be the priority of any physician. We should be segregating the patients accordingly and try to identify them clinically with a positive and easy approach for attaining and ruling out these fatal risk causing factors. If we need to calculate the worldwide occurrence of ACS and try to obtain an estimate of the disorder the clinical testing along with a proper finding of complication is extremely significant. However, sometimes and rarely it may happen that an adequate prediction of the disorder might get erroneous. Sometimes, we cannot accurately provide the list of releasing episodes and more risk of the damage done in coronary artery diseases.
We aim to study that the increased range of biomarker enzymes of cardiac profile could also be connected with damage done and caused during the progression of the MI.

Methodology
Area of study
This study has been performed in the diagnostic laboratory of Pacific Medical College and Hospital (PMCH) Udaipur, Rajasthan.

Design of the study
Cross sectional study.
Period of study
Three years

Sample population
Patients admitted with MI in PMCH, Udaipur. The inclusion criterion was taken into consideration and sample size was achieved

Size of samples
Fifty samples were divided in two groups
Group 1: 25 cases of CHD.
Group 2: Served as controls (25) in form of control group.

Inclusion criteria
A sum of 25 patients with myocardial infarction and 25 age, sex matched control group was taken into the study of Udaipur, Rajasthan.

Exclusion criteria
Patients suffering from given disorders/histories:
Diabetic Mellitus
Alcoholism
Acute or chronic renal disease
Liver disorders
Smokers
Acute complications like severe infections or trauma

Statistical analysis
Data was taken and was entered in Microsoft excel 2007 Worksheet. A master chart was prepared. These data was distinguished according to the aim.

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Results

Age

Distribution as per the age of the patients suffering from MI:

Table1: Age wise category of MI patients and control

S. No	Age(Years)	N. = number ofsubjects	%
1.	21-40	04	06%
2.	41-61	25	52%
3.	62-81	21	40%
4.	82 and more	1	2%

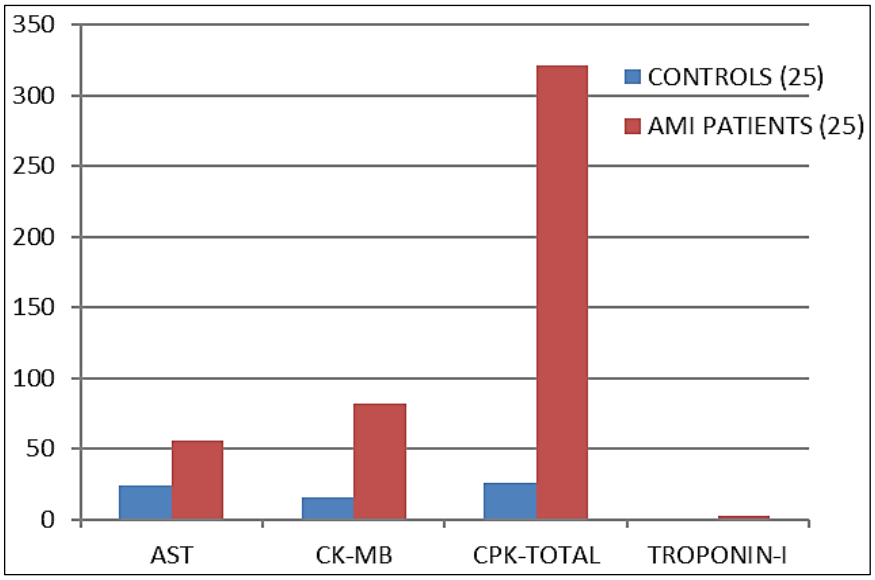
Table2: Gender wise category of MI and control group of patients

S.No.	Gender	Number ofPatients	Percentage(%)
1.	Males	35	71%
2.	Females	15	29%

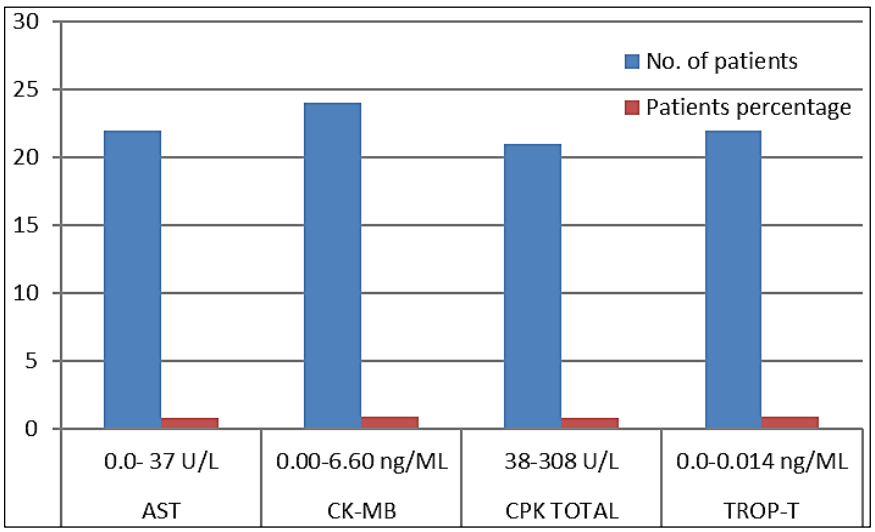
Table 3: Enzymes levels in serum for acute myocardial infarction patients and control category

Subjects	AST	CK-MB	CPK-Total	Troponin-I
Controls (25)	24.21±6.10 U/L	15.79±4.12nG/ML	26.21±4.76 U/L	0.06±0.01nG/ML
AMI Patients (25)	56.03±15.99U/L	82.0±33.54nG/ML	320.995±25.21U/L	1.41±0.61nG/ML

Mean ± SD.P<0.001 during comparison with normal controls, unit in international units per liter.



Graph 01: Graphical representation of serum enzymes of cardiac profile in control group and patients



Graph 02: Graphical representation of number of patients and % of patients for serum enzymes

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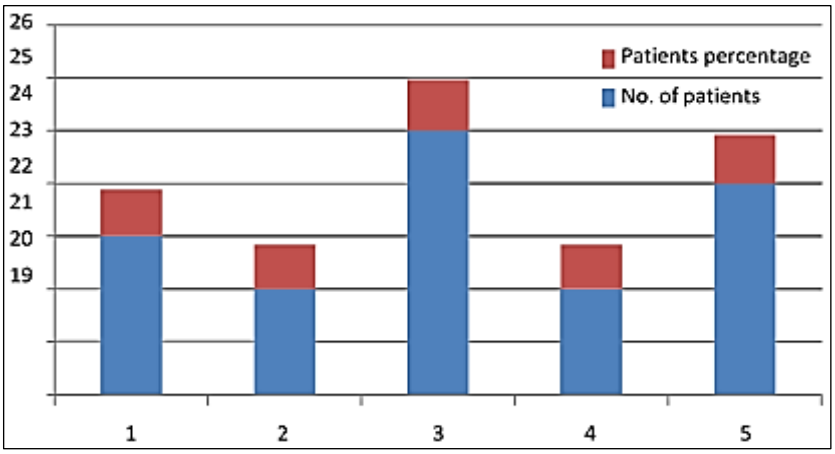
Table 4: N = number of subjects of acute myocardial infarction having raised enzyme levels

	AST	CK-MB	CPK Total	TROP-T
Normal range	0.0-37 U/L	0.00-6.60 ng/ML	38-308 U/L	0.0-0.014 ng/ML
No. of patients	22	24	21	22
Patients percentage	86%	95%	83%	91%

95% patients of AMI had high value of CK-MB, 86% patients had elevated value of AST than normal range, 91% patients had higher value of Troponin-I than normal range CPK total also have higher value in 83% of AMI patients.



Graph 03: Graph showing raised levels of enzymes in AMI patients and % of occurrence in 25 acute myocardial patients

Discussion

For an accurate and quick diagnosis of myocardial infarction (acute) the main and very important base is the sign and symptom. ECG alterations are important for the diagnosis. Another important base for the diagnosis of AMI is the alteration in the range or level of serum enzymes. We have known the fact that the reliability of signs and symptoms is not that accurate for a proper treatment or therapy, however electrocardiogram can be authentically be relied on and is very common in practice also. We have also seen cases where there may be an inclusive type of pattern given for ECG. Whenever we come across such cases or situations where there is inaccuracy in the pattern or there is doubt in the clinician mind then comes the significance of measuring the serum level of cardiac profile markers of myocardium necrosis and then only we can give an accurate diagnosis. Thus we need to focus on the investigation process including the assay of serum enzymes for proper diagnosis and treatment provided to the patients and also to exclude the inaccurate parameters as practiced in some professional laboratories where they overlook the assay portions[2].

About two third cases of AMI might not be diagnosed only on the base of clinical signs and symptoms. Irony is many of the clinicians depend entirely on electrocardiogram alterations for therapies which are sometimes fatal. There are many factors to be taken into consideration while giving proper therapies and the causes play an important role in such cases[3].

In the present scenario we can fully rely on the cardiac biomarker profile of the serum enzymes and they are most reliable factors in diagnosing and ruling out cardiac heart disorders and acute myocardial infarction cases if the serum enzyme ranges mainly aspartatetransferase, lactate dehydrogenase, Troponin-I type, creatine kinase MB type and creatine phosphokinase comes to be in normal range in simultaneous runs. Increased range of cardiac enzymes biomarkers may be present but rare[8]. Elevated serum enzyme activities in collaboration with AMI mostly are due to coming out of the enzymes from the myocardium. There are various reasons and causes which effect the decrease of bio-enzymes in the myocardium and falling in the serum as also influenced by a disrupted myocardial supply and demand of O_2[9].

The factors that contribute to the level of serum enzymes depends on the rate of decrease in the myocardium, the rate of appearing of those in serum and release of enzymes from the heart along with release of enzymes through areas which are not from myocardium. However, there was pseudo positive reporting in early times because of non-availability of iso-forms of the enzymes but since their discovery there were accurate reporting. Creatine kinase enzyme gets released in skeleton muscles, so the connection between quantity of appearance and depletion is to be focused to rule out some falsely positive increased range of enzymes given earlier due to non-availability of proper and advanced isoforms study of the serum enzymes [7].

There are many research studies that tell us about the correlation between highest peak enzyme

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concentrations and activity after MI and have been controversial about the impact of metabolism which can result in flux elevation that can either be completely reversed sometimes or might partly reversed. Thus, increased range of CK-MB can sometimes tell us about the opposite impact on myocardium arising from another reason or cause and not damage done to the tissue or any kind of ischemic episode [7].

Summary

We summarize our results that cardiac marker profile of Total creatine phosphokinase, CPK-MB, serum glutamate oxaloacetate, cTn-T and cTn-I is significant for the evaluating MI. Males come as high risk groups in comparison to other gender group. It is found that cTn-T is very good and trusted markers[16].Troponin-T becomes the reliable cardiac biomarker enzyme for detecting MI.

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