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Research Article

THE PATTERN OF RISING AND FALLING OF SERUM CK-MB IN PATIENTS SUFFERING FROM MYOCARDIAL INFARCTION

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ABSTRACT

Objectives: Isoenzymes in the blood are important diagnostic and prognostic biomarkers in medical sciences for various cardiac diseases, that is, myocardial infarctions. Creatine kinase (CK)-MB is an important Isoenzyme secret when the destruction of cardiac muscle cells takes place.

Methods: A total of 196 myocardial infarction patients and 104 controls were studied in the cardiology department of Hamidia Hospital, Bhopal. Initial elevation of CK-MB occurs after 6 h mean time to peak elevation was 8–24 h and the time to return to the baseline was >48 h in male controls the mean CK-MB level was 19.34±2.83 IU/L and in female the means CK-MB level was 19.32±3.65 IU/L.

Result: The mean value of CK-MB at different time intervals in MI patients where 245.12±64.56 at 8–16 h, 230.50±44.88 IU/L at 17–24 h, 88.33±3.84 IU/L at 25–32 h, 74.50±38.19 IU/L at 33–40 h, and 50.88±2.32 IU/L at 41–48 h.

Conclusion: The pattern of rising and falling of CK-MB provided most valuable about the MI and its timely management. In conditions where reinfarction is suspected, CK-MB may be useful to classify a new event due to its shorter duration of elevation at detectable levels in plasma.

Keywords: Myocardial infarction, Isoenzymes, Creatine kinase MB, CK-MM.

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INTRODUCTION

Serum enzyme markers are used for the detection and management planning of myocardial infarction (MI). The dimeric enzyme, consisting of two subunits, M and B, has three isoenzymes: Creatine kinase (CK)-BB (CK1), CK-MB (CK2), and CK-MM (CK3). CK-MM is the dominant form found in all tissues [1]. CK-MB reaches its highest point within 24 h, starting to increase 4–9 h after myocardial injury and decreasing to the normal range after 48–72 h [2]. Determination of the CK-MB relative index (CK-MB/total CK×100) by measuring CK-MB and total CK is also frequently used for the diagnosis of MI [3-5]. If this index is 2.5% or above, CK-MB is probably of myocardial origin [6]. Ideal cardiovascular biomarkers help in early and late diagnosis and should be easy to measure, fast, cheap, and quantitative [7-9].

In the present investigation, the measurement of CK-MB level was performed. CK-MB of MI patients was compared with controls. The relation between the level of CK-MB (in IU/L) and different time intervals is a useful tool to detect MI in ICU patients and for their rapid treatment between 2004 and 2006.

METHODS

Overall, 196 MI patients and 104 normal subjects were studied in the Department of Cardiology, Hamidia Hospital, Bhopal. Proper consent was taken before the study, Patients were further divided and compared with their CK-MB value into both sexes (male and female). The blood sample was collected. CK-MB level was estimated in IU/L by the enzymatic method in an auto-analyzer at different time intervals (hours) to know the peak and baseline level of CK-MB in the sample. CK-MB activity is not significantly reduced when the separated serum is stored for up to 48 h at 4°C or 1 month at −20°C. Since the mass measurement is not subject to the loss of enzyme activity, CK-MB protein concentration in serum is stable for weeks, whether the specimen is stored under refrigeration and for several years if stored at −20°C [10,11].

ECG was also performed.

RESULTS

The mean CK-MB level in both male and female controls was 19.33±3.65 IU/L. It ranges from 10.32 IU/L to 28.12 IU/L. In normal male, the level was 19.34±2.83 IU/L, whereas in female the level was 19.32±3.65 IU/L.

The study found that the mean value of CK-MB at different time intervals in MI patients were 245.12±64.56 at 8–16 h, 230.50±44.88 IU/L at 17–24 h, 88.33±3.84 IU/L at 25–30 h, 74.50±38.19 IU/L at 33–40 h, and 50.66±2.32 IU/L at 41–48 h. The difference in CK-MB levels among male and female controls was statistically insignificant. Table 1 shows, the maximum level (245.12±64.56 IU/L) of CK-MB was at the time interval between 8 and 16 h after MI.

DISCUSSION

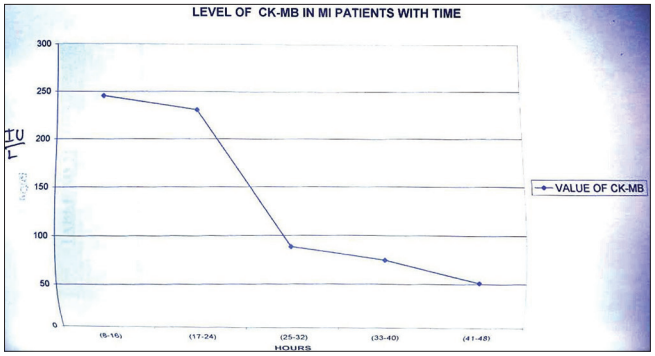
The dimeric enzyme, consisting of two subunits, M and B, has three isoenzymes: CK-BB (CK1), CK-MB (CK2), and CK-MM (CK3). CK-MM is the dominant form found in all tissues [1]. CK-MB reaches its highest point within 24 h, starting to increase 4–9 h after myocardial injury and decreasing to the normal range after 48–72 h [2]. Determination of the CK-MB relative index (CK-MB/total CK×100) by measuring CK-MB and total CK is also frequently used for diagnosis of MI. If this index is 2.5% or above, CK-MB is probably of myocardial origin.

CK-MB is an ideal cardiovascular biomarker that should help in early and late diagnosis. It is easy to measure, fast, cheap, and quantitative,

Table 1: Level of CK-MB with respect to time

S. No.	Testing time (hours)	Mean (CK-MB)	Standard Error
1	8–16	245.12	64.56
2	17–24	230.50	44.88
3	25–32	88.33	3.84
4	33–40	74.50	38.19
5	41–48	50.66	2.325

CK-MB: Creatine kinase MB



Graph 1: Level of creatine kinase in myocardial infarction patients with time

and finally it should have long-term storage conditions and be stable under them [12].

CONCLUSION

CK-MB may be used to estimate infarct size. Furthermore, other candidate biomarkers, such as hFABP, GPBB, S100, PAPP-A, CRP, TNF, IL6, IL18, CD40 ligand, MPO, MMP9, cell-adhesion molecules, oxidized LDL, glutathione, homocysteine, fibrinogen, and D-dimer procalcitonin may play a role in the diagnosis of AMI.

The pattern of rising and falling of CK-MB provided most valuable about the MI and its timely management. In conditions where reinfarction is suspected, CK-MB may be useful to classify a new event due to its shorter duration of elevation at detectable levels in plasma [13]. Graph 1 shows the level of CK-MB in MI patients with time.

This not only saves money for patients but also provides relief from hospitalization among economically deprived private populations of states such as Madhya Pradesh, India.

AUTHORS CONTRIBUTION

The author was the principal investigator of the study and was involved in the design conduct, report writing, review of manuscript, and analysis.

CONFLICTS OF INTEREST

The authors declare that they have no conflict of interest.

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