

# Unexplained Extremely High Creatine Kinase-MB Levels in a Cancer Patient with No Chest Pain

Anurag Yadav<sup>1</sup>, Malathi Mala<sup>2</sup>

## ABSTRACT

Creatine kinase-MB (CK-MB) is a widely evaluated testing enzyme in diseases related to cardiac or injury. Here we relate a clinical scenario of a patient presenting with no chest pain or symptom related to the cardiac disease whose CK-MB levels were remained inordinately elevated despite normal total CK levels. Clinically and subsequent pathological examination showed no evidence of infarction, inflammation or cardiac ischemia. Further evaluation of the patient reveals the presence of the primary prostate carcinoma with the secondary metastatic lesions in the hepatic lobe.

**Keywords:** Creatine kinase, CK-MB, Myocardial infarction.

*Indian Journal of Medical Biochemistry* (2019); 10.5005/jp-journals-10054-0092

## INTRODUCTION

With the advances in the laboratory testing and measurement of the creatine-kinase and its isoenzymes (CK-MB) play a pivotal role in diagnosing acute myocardial infarction helping in early management of the patients. However, there are many instances, some conditions are known with the lower sensitivity and specificity for the assay of CK-MB activity. A false positive increase in levels are profoundly appreciated in the skeletal muscle and other non-cardiac conditions like trauma, malignancies, pulmonary embolism, etc., High CK-MB activity in the absence of the chest pain and myocardial infarction/injury is due to the presence of a macro enzyme in the serum of patients is a surprise. Elevated serum levels of CK accompanied by an MB fraction in excess of 2–4% have generally been accepted as an indication of myocardial damage or infarction.

## CASE PRESENTATION

A 65-year-old male with carcinoma prostate was admitted for weakness and anorexia. The patient was apparently alright 3 months back, following which he notices to have decreased appetite and lack of sleep during the night. There was a significant loss in weight for the last 2 months, with abdominal bloating and dyspepsia. Past history was medically not significant. Vitals were within the normal limit for age and sex. Abdomino-pelvic sonography showed mild enlarge liver with the metastatic lesion on both lobes of the liver with innumerable hyperechoic nodules and mass lesion varying in size with a hyperechoic halo. Prostate vol–102cc grossly enlarges in size and is replaced by the heterogenous lobulated mass lesion, with anterior infiltration into the bladder with loss of fat planes and extended into the right vesicoureteric junction.

However, as part of the emergency workup, the cardiac markers were analysed, with the troponin I <0.01 (reference range up to 0.05 ng/mL), CK-MB was markedly elevated 845 IU/L (reference range: up to 24 IU/L) exceeding that of the total CK which was only 121 IU/L (reference range: 20–200IU/L) and yielding a CK-MB: total CK ratio of 6.98 (Table 1).

## DISCUSSION

Creatine kinase is a muscle enzyme consisting of the two subunits, M&B. There are three distinctly identified isoenzymes: CK-MM (skeletal muscle), CK-BB (brain) and CK-MB (heart) each of these is 80kDa dimmers. Certain higher than the normal molecular weight

<sup>1</sup>Assistant Professor, <sup>2</sup>Professor and Head

<sup>1-2</sup>Department of Biochemistry, FMMC-Mangaluru, Karnataka, India

**Corresponding Author:** Anurag Yadav, Assistant Professor, Department of Biochemistry, FMMC-Mangaluru, Karnataka, India, Mobile: +91 9972456525, e-mail: yadav.anurag52@gmail.com

**How to cite this article:** Yadav A, Mala M. Unexplained Extremely High Creatine Kinase-MB Levels in a Cancer Patient with No Chest Pain. *Indian J Med Biochem* 2019;23(1):200-231.

**Source of support:** Nil

**Conflict of interest:** None

forms of these have been described known as macro-enzymes and carry molecular weight of greater than 200kDa. Macromolecular forms of not only creatine kinase have been described but also that of the amylase, AST, lactate dehydrogenase (LDH).<sup>1</sup>

The macro-molecular forms of creatine kinase are termed macro-CK type 1 and macro-CK type 2. Macro-CK type 1 is a complex formed by one of the CK isoenzymes and immunoglobulin in an antigen–(auto) antibody reaction. Most often, its components entail CK-BB and monoclonal IgG.<sup>2,3</sup> All except macro CK type 2 consist of a normal enzyme complexed with an immunoglobulin, most commonly IgG or IgA. The complexed enzyme has reduced blood clearance, resulting in increased circulating amounts of the higher-than-normal molecular weight form of the relevant enzyme. Thus, this amalgamated molecule may interfere with commonly used biochemical assays by adding to the estimation of CK-MB but not to the total CK.<sup>7</sup> Conversely, high levels of total CK with a normal CK-MB have also been described in the literature.<sup>2,4</sup>

Irrespective of the macro-CK subtype, a retrospective study by the Change et al., concluded that approximately 40% of the patients with the CK-MB: total CK ratio greater than the 1 had the underlying malignancy.

Clinically when considering the presence of macro-CK a thorough investigation for Myocardial infarction should be done. Once cardiac pathology is excluded, the presence of macro-CK in serum may be estimated and diagnosis can be made using the special methods such as electrophoresis, immune-inhibition, and chromatography.

## CONCLUSION

It is important as a clinician to not to underestimate the presence of the cardiac markers elevation in the patients with the history of

**Table 1:** Few of the biochemical investigation of the patient

<i>Test parameter</i>	<i>Measured levels</i>	<i>Normal reference range</i>
Hemoglobin	11.4 g/dL	14–18 g/dL
Leukocyte count total	7500/cumm	4000–11000/cumm
Platelet count	144000/cumm	150000–500000/cumm
ESR	55 mm/1 <sup>st</sup> hour	Up to 10 mm/1st hour
Serum creatinine	1.39 mg/dL	0.7–1.3 mg/dL
Serum urea	40 mg/dL	10–50 mg/dL
Serum total protein	6.98 g/dL	6.4–8.3 g/dL
Serum albumin	3.73 g/dL	3.5–5.2 g/dL
Serum globulin	3.3 g/dL	2.3–3.5 g/dL
Serum total bilirubin	3.55 mg/dL	0.1–1.2 mg/dL
Serum AST	369 IU/L	Up to 35 IU/L
Serum ALT	79 IU/L	Up to 45 IU/L
Serum alkaline phosphatase	433 IU/L	40–129 IU/L
Serum GGTP	529 IU/L	Up to 55 IU/L
Serum PSA, total	>500 ng/mL	Up to 4 ng/mL
Serum testosterone	0.076 ng/mL	2.8–8 ng/mL
Whole blood troponin I	<0.01 ng/mL	Up to 0.05 ng/mL
Serum CK, total	121 IU/L	20–200 IU/L
Serum CK-MB activity	845 IU/L	Up to 24 IU/L
Serum CK-MB: Total CK	6.98	<1.0

the chest pain. On the other hand, the clinician must be aware of the macro-molecule enzyme variants in patients with no chest pain and clinical feature suggesting the carcinoma when interpreting the abnormal biochemical test.

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