Possible False Positive Heart Fatty Acid Binding Protein in Patient Who Has a High Level of Creatinine Kinase

Kreatin Kinaz Düzeyi Yüksek Olan Hastalarda Heart Fatty Acid Binding Protein Hatalı Olarak Pozitif Olabilir

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Abstract

Serum heart fatty acid binding protein (H-FABP) is a novel sensitive marker for early diagnosis of acute myocardial infarction. However, H-FABP is less specific than troponins, because it is also found in skeletal muscle. Recently, we have observed 3 patients who had high CK levels due to destruction of skeletal muscle and they had false positive high H-FABP levels. (JAEM 2012; 11: 241-2)

Key words: Heart fatty acid binding protein, creatinine kinase, acute myocardial infarction

Introduction

Heart fatty acid binding protein (H-FABP) is a new marker with a low molecular weight which indicates early myocardial tissue injury (1, 2). Various studies have shown that H-FABP becomes positive earlier than troponins and is more sensitive than myoglobin (3-5). Besides, the H-FABP found in skeletal muscle is approximately 10-20% of the concentration of H-FABP in heart muscle (6). Recently, we have observed 3 patients who had high creatinine kinase (CK) and H-FABP levels for various reasons.

Case Reports

Case 1

A 26-year-old male patient was admitted to the emergency room of our institution with atypical chest pain. The peak creatinine phosphokinase-MB isoenzyme (CKMB) was 34 IU/L, the troponin I concentration was <0.2 ng/mL and the H-FABP was 38 ng/mL. No risk factors associated with coronary artery disease (CAD) were reported in his personal history. His blood pressure (BP) was 130/80 mmHg and pulse rate was 92/min. The electrocardiography (ECG), chest X ray and echocardiography examinations were all within normal limits. In the second measurement of his cardiac enzymes performed on the same day, the levels of H-FABP, CKMB and troponin I were found as 29 ng/mL, 90 IU/L and <0.2 ng/mL respectively. On follow-up, the serum CK value of the patient was found to be 3217 IU/L and troponin I was negative. His current high H-FABP and CK levels were estimated to be associated with his skeletal muscle destruction. The patient was discharged and directed to the rheumatology clinic.

Case 2

A 75 year-old male patient was admitted to the emergency room with a scorpion bite. After the initial intervention, the biochemical cardiac markers were measured as 27 ng/mL for H-FABP, 28 IU/L for CKMB and 0.26 ng/mL for troponin I levels. The patient was hospitalized with the diagnosis of acute coronary syndrome following scorpion sting poisoning. His BP was 140/90 mmHg and pulse rate was 82/min. The ECG and chest X ray examinations were within normal limits. Diastolic dysfunction was detected with echocardiography. In his second measurement of cardiac enzymes performed the next day, the levels of H-FABP, CK, CKMB and troponin I were measured as 47 ng/mL, 870 IU/L, 27 IU/L and <0.2 ng/mL respectively. However, in a test performed within 6 hours, the results of the analyses revealed H-FABP 38 ng/mL, CK 817 IU/L, CKMB 31 IU/L and troponin I <0.2 ng/mL. It was concluded that the high levels of H-FABP and CK in this patient occurred secondary to the muscle injury following the scorpion bite.

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Case 3

A 64 year-old female patient applied to the emergency room with complaints of atypical chest pain and extensive body pain. The values measured for the levels of H-FABP, CKMB and troponin I were 32 ng/mL, 36 IU/L and 1 <0.2 ng/mL respectively. The patient was diagnosed with acute coronary syndrome and admitted to the coronary care unit. She was reported to have had a coronary bypass surgery in her history. She had been treated with atorvastatin for hyperlipidemia for the last 3 months. Her BP was 130/80 mmHg and pulse rate was 80/min. No pathological features were observed in her physical examination. The results of her ECG were within normal limits; her chest x-ray films revealed an increased heart shadow; and no localized wall motion abnormalities were observed with echocardiography. In her second measurement of cardiac enzymes performed on the same day, her CK was found as 1342 IU/L and troponin I as <0.2 ng/mL. It was concluded that with extensive body pain, the patient had high CK levels due to atorvastatin and this drug was withdrawn. Her current high H-FABP and CK levels were estimated to be associated with atorvastatin myopathy constructive effect. The patient was discharged and called for a follow-up visit after 2 weeks when it was observed that her high CK was back to normal and her H-FABP levels were negative. These results confirmed the idea that CK increased due to atorvastatin use, which, in turn, led to an increase in H-FABP levels.

Laboratory: CK and CKMB activity in serum was measured by the Olympus Chemistry Analyzer AU640. The dynamic range of this multiple-point rate test was calculated as 8.1% at 43 U/L. Point of Care Testing (POCT) systems were used for Troponin I assessments. Serum CK-MB ≥25 IU/L and Troponin I >0.2 ng/mL were considered as positive. The principle of the newly developed whole-blood rapid H-FABP test was based on a dual monoclonal antibody sandwich method using 2 distinct monoclonal antibodies and a gold label method. The rapid H-FABP test was calibrated to detect a serum H-FABP concentration of >6.2 ng/mL as a positive line, because other clinical investigations of this quantitative assay using the same monoclonal antibodies showed a cut-off level for diagnosing acute myocardial infarction (AMI) of 6.2 ng/mL (2, 5, 7-9).

Discussion

Cardiac troponins are highly sensitive and specific markers of myocardial damage (10, 11). They are mainly found as structural proteins but they become detectable in the serum by 4 to 6 hours after myocardial injury (12). In particular, early diagnosis is known to be extremely important in AMI. Thus, H-FABP has started to be used recently as a new cardiac marker which may increase at an earlier stage in AMI (1, 2).

H-FABP is a new cardiac marker with a low molecular weight (15-20 kDa) that sensitively reveals myocardial injury (1-5, 13). Its concentration in blood starts to increase in 1.5 hours and remains positive for nearly 24 hours. As a cytoplasmic protein, H-FABP plays a significant role in the intracellular transport of fatty acids for oxidation in mitochondria (14). Being tissue-specific, it is named after the tissue of origin (Liver; L-FABP, Heart; H-FABP, Intestinal; I-FABP). It is most commonly found in the heart and liver. It is also known that the concentration of H-FABP in skeletal muscle is approximately 10-20% of its concentration in heart muscle (6).

As a new marker, known to be more sensitive than troponins and myoglobin in diagnosing AMI in the first 2 hours, it has been recently started to be used. However, except for cardiac injury, what leads to high levels of H-FABP and what decreases its specificity are not clear. In our clinic, we detected high levels of H-FABP along with high levels of CK due to muscle destruction in the 3 cases reported above. The troponin I levels did not show any increase in these patients. We suggest that this protein, known to be present in muscle tissue, might increase as a result of muscle injury.

Conclusion

Consequently, physicians should be well aware that in patients who apply to emergency room with complaints of chest pain and had a diagnosis of high level of CK due to skeletal muscle destruction, as was the case with our patients, the H-FABP level might lead to false positive results and therefore, the level of troponin I should also be taken into consideration.

Conflict of Interest

No conflict of interest was declared by the authors.

References