

Importance of cardio markers in the diagnosis of myocardial infarction

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Abstract: In recent times, the death rate due to myocardial infarction is increasing. Early diagnosis of the disease is of great importance in preventing the death rate of this disease. Cardiomarkers are important in the diagnosis of myocardial infarction. Current myocardial infarction cardiomarkers can be divided into several groups: cardio markers of cardiomyocyte necrosis and ischemia, neuroendocrine cardio markers, inflammatory cardiomarkers, as well as a number of new cardiomarkers whose diagnostic value is still not well studied. Cardiac Fatty Acid Binding Protein, Myoglobin, Troponin T, Creatine Kinase – MB, etc.

Key words: Cardio marker, Myocardial Infarction, Neuroendocrine cardiomarker, myoglobin, Troponin T

Introduction: In medicine, there is a term biomarker, which is used to refer to proteins detected in the blood. Depending on the concentration of these proteins, the severity or presence of any disease can be assessed. Biomarkers are indicators that allow you to identify the wrong organ or tissue. There are specific proteins in the body that are specific to certain organs or tissues. When a person begins to get sick, such a protein can enter the bloodstream as a result of breaking the integrity of the cells of the organ. For example, with liver cirrhosis or myocardial infarction. Determining such indicators during the examination allows doctors to make a diagnosis. There is another group of biomarkers introduced into the human body to check the functions of any organ. An example of such an indicator is rubidium chloride, which allows assessing the blood supply of the heart muscle. Biomarkers are often used to measure the progression of a disease or the effect of a treatment. They are used in early diagnosis and prevention of diseases. Tumor markers are also markers for diseases that often begin asymptotically, such as Alzheimer's disease and rheumatoid arthritis. Cardiology also has its indicators, which are called cardiomarkers. Cardiomarkers are used to diagnose people with chest pain and suspected acute coronary syndrome. Cardiac biomarker testing is now used as an adjunct to basic tests such as EKG and measurement of the activity of aspartate aminotransferase, lactate dehydrogenase and creatine kinase enzymes.

Introduction: Currently, the following cardiac indicators are widely used: creatine kinase-MB, myoglobin, C-reactive protein, troponin T, brain natriuretic peptide, fatty acid-binding protein 3. Cardiomarkers allow doctors to identify disorders related to the functioning of the cardiovascular system, as well as monitor the course of the disease will give. The advantage of using cardiomarkers is rapid analysis, which allows you to get the result quickly.

Results and their analysis: Creatine kinase is an enzyme that performs energy functions in muscle cells. There are three isoforms of the enzyme. Each of them is specific to a certain muscle group. The creatine kinase MB isoenzyme is located in the heart muscle and enters the blood when heart muscle cells are damaged. A sharp increase in the concentration of creatine kinase MB in the blood is observed in the third or fourth hours after myocardial infarction, the peak is from 10 to 24 hours after the event. The concentration of the marker in the blood returns to normal within 72 hours. At the same time, an increase in creatine kinase in the blood can indicate other serious damage to muscle tissue, as well as kidney failure. Measurement of creatine kinase is performed by two main methods: electrophoretic or immunological. The second method is more accurate. Creatine kinase MB isoenzyme can also be used to detect blood clots. Creatine kinase is one of the oldest cardiac markers, and its disadvantage is low specificity. Increased activity of creatine kinase-MB - CK-MB is most characteristic for myocardial infarction. An increase in its level is observed 4-8 hours after an acute attack and reaches a maximum level after 12-24 hours. The size of the increase corresponds to the size of the affected area of the myocardium.

Myoglobin is a protein found in skeletal muscle. In its structure, it is similar to hemoglobin, which is involved in the transport of oxygen. Myoglobin enters the bloodstream shortly after muscle tissue damage and is detected in the blood one hour after myocardial damage. In addition, the appearance of this cardiac biomarker in the bloodstream may be associated with skeletal muscle damage. This is the shortest-term sign of myocardial infarction, because its concentration in the blood normalizes within 24 hours. It is used in diagnostics, because myoglobin is detected in the blood much longer with an enlarged infarct zone. Determination of myoglobin plays an important role in repeated myocardial infarction, the probability of which is very high. Today, for the prevention of repeated myocardial infarction, Cardiovisor is used, which allows timely detection of deviations in the state of the heart, leading to repeated infarction and timely consultation with a doctor. There are several methods for determining myoglobin, such as the fluorometric method and the immunochromatographic method. They allow determination of protein concentration with high accuracy. Myoglobin is an oxygen-carrying protein in skeletal muscle and myocardium. An increase in its level in the blood is observed 2-3 hours after the onset of pain in myocardial infarction and lasts for 2-3 days.

In myocardial infarction, myoglobin levels can increase 4-10 times or more, depending on the area of myocardial damage. Also, determining its concentration is of great importance in patients with long-term compression syndrome, extensive muscle damage. Myoglobin is a protein similar to hemoglobin in structure found in skeletal and cardiac muscles. Its function is to deliver oxygen to tissues. Its high concentration in the blood is detected one hour after myocardial infarction, but this condition does not last long, and its level is normal after 24 hours. However, it all depends on the area of the lesion, sometimes the high rate lasts for two or three days. The norm of myoglobin in women is 12-76 $\mu\text{g} / \text{l}$, in men it is 19-92 $\mu\text{g} / \text{l}$, but after a heart attack, this indicator can increase by 4-10 times or even more.

Troponin proteins are structural proteins that form the thin filaments of muscle fibers and regulate the movement of contractile proteins. Different forms of troponin T and I proteins predominate in skeletal and cardiac muscle. Cardiac troponin T and cardiac troponin I have recently been used in diagnostics, but they have proven themselves well. These forms of troponin are highly specific proteins of the heart muscle. They make it possible to diagnose and identify heart disorders with great accuracy. Currently, they are used for early diagnosis of heart muscle diseases. These cardiomarkers are also used for prognostic purposes. Troponin T is a cardiospecific protein, the increase occurs with myocardial infarction, microinfarcts, unstable angina, myocarditis. Its content in the blood increases 2-6 hours after the development of a myocardial infarction and can be elevated for at least 6 days.

C-reactive protein is found in serum or plasma in high concentrations during inflammatory processes. This cardiac marker is useful in predicting the risk of thrombotic events, as well as in the diagnosis of myocardial infarction. This protein is essential for the effective functioning of white blood cells that fight infection. Its concentration in the blood begins to rise 14 hours after the start of the inflammatory process and 18 hours after myocardial infarction. The concentration of c-reactive protein returns to normal within 30-40 days. Cardiomarkers are substances whose concentration in the blood increases sharply in case of heart failure. In addition to other diagnostic methods, a blood test for cardiac markers is prescribed for suspected acute coronary syndrome (chest pains and palpitations). They are also indicated before surgical operations under anesthesia to assess the endurance of the heart

Conclusions: Cardiomarkers should be sensitive and specific in the diagnosis of myocardial infarction. Through this, early detection of the disease can reduce the prognosis of the factors that arise after the disease. Cardiomarkers are important in early detection of any heart disease.

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