

Techniques with Biomarkers for Secondary Prevention in Heart Patients

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Abstract

Advances have been increasing as to new techniques that can help with the prognosis of secondary prevention in post revascularization or angioplasty patients. Sequentially, according to the strength of clinical evidences there are assays being improved for specificity and sensibility: Creatine Kinase MB, Glycated Hemoglobin, High Sensitivity C Reactive Protein, N Terminal Cerebral Natriuretic Peptide so far. Biomarkers can not only help the orientation to the doctor in charge but can also be a very strong motivational factor for lifestyle modifications. This is the fact with Ultra Sensitive C Reactive Protein that presents decreasing and protective effects in patients that start and maintain guided exercises. Smoke quitting, healthy and well balanced diet, weight control and stress reduction have their protective effects proved and can be checked by negative results in all markers that have been technically developed and point to lack or presence of cardiac muscle integrity.

Keywords

Creatine Kinase MB, Glycated Hemoglobin, High Sensitivity C-Reactive Protein, N-Terminal Cerebral Natriuretic Peptide, Periprocedure Myocardial Infarction.

Abbreviations

CK MB: Creatine Kinase MB

Hb Glic: Glycated hemoglobin

hsPCR: High sensitivity C-reactive protein

N-pBNP: N-Terminal Cerebral Natriuretic Peptide

PMI: Periprocedure Myocardial Infarction

Among the biomarkers used in the scenario of treatment by myocardial revascularization in chronic coronary insufficiency we will study here: creatine kinase MB (CK MB), troponins, glycated hemoglobin (Hb Glic), high sensitivity C-reactive protein (hsPCR), myeloperoxidase and N-terminal cerebral natriuretic peptide (N-pBNP).

CK MB mass and troponins: myocardial infarction is defined as elevation of CK MB and troponin 3 times above the 99th percentile of the maximum reference limit. In a multicenter study involving 4,930 patients, acute myocardial infarction was detected in 7.2% of patients by CK MB criterion and in 24.3% by troponin criterion¹ after treatment by percutaneous angioplasty.

Both enzymes at continuous values were also associated with mortality at 1 year. It was also observed that a 20-fold increase in troponin above 99 was similar to a 3-fold increase in CK MB in relation to the incidence of myocardial infarction and 1-year mortality. This difference occurs due to the greater sensitivity of troponin, which can differentiate minor infarctions².

However, troponin may be elevated in situations other than acute myocardial ischemia, such as cardiac contusion, coronary heart failure, renal failure, aortic dissection, hypertrophic cardiomyopathy, tachycardia or bradiarrhythmia, heart block, rhabdomyolysis with cardiac injury, pulmonary embolism, severe pulmonary hypertension, acute neurological disease, including stroke, subarachnoid hemorrhage, infiltrative diseases: amyloidosis, sarcoidosis, scleroderma, myocardial inflammatory diseases, drug toxicity or circulating toxins, a severely ill patient, respiratory failure, sepsis, extreme exertion (e.g. maratonists). The use of these markers becomes even more useful when associated with the use of magnetic resonance imaging for the diagnosis of periprocedural infarction. (Recommendation: 1; Level of Evidence B)

Hb Glic: it is known that diabetic patients and patients without a history of diabetes but with high Hb Glyc have a high cardiovascular risk. In the TWENTE³ study, 629 patients were divided into 3 groups: diabetics, diabetics not previously detected and non-diabetic, and the incidence of periprocedural myocardial infarction (PMI) was verified. This incidence was 13.6% in undetected diabetics, 6.1% in non-diabetics and 3.7% in diabetics. At 1 year the PMI in the treated artery was higher in undetected diabetics. It was concluded that undetected diabetics with HbGlyc > 6.5% have a higher risk of PMI. Other studies have confirmed these findings⁴. (Recommendation: 1A; Level of Evidence B)

hsPCR: some studies have evaluated the relationship between the level of hsPCR before the procedure and the incidence of reesthesis. Some studies have found a relationship between

hsPCR elevation and reesthesis^{5,6,7} while other studies have not confirmed it⁸. (Recommendation: 3; Level of evidence C)

Myeloperoxidase: in a study evaluating the value of oxidative stress biomarkers in predicting cardiovascular mortality in patients undergoing selective coronary angiography, 1117 patients were retrospectively evaluated. It was found that patients with increased myeloperoxidase or hsPCR had a 5.3 times higher mortality risk and patients with both altered parameters had a 4.3 times higher risk than those with only one altered factor⁶. (Recommendation: 3; Level of evidence: C)

N-pBNP: this is an excellent marker for ventricular dysfunction and its value as a predictor of revascularization outcome was evaluated in some studies^{7,9}. In 86 patients undergoing percutaneous coronary angioplasty, in-hospital mortality was 0% in patients with N-pBNP < 1,000ng/L and 17% when > 1,000 ng/L¹⁰. Coronary angioplasty has also been shown to lead to decreased N-pBNP¹¹.

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Conflicts of interest

No conflict of interest.

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