

Long Term Assessment of the Biological Profile in Patients with Acute Myocardial Infarction and Left Bundle Branch Block

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In order to study the impact of an acute coronary syndrome on the lifestyle changes of the patients, we prospectively studied the long term biological parameters of patients with myocardial infarction. After a median follow-up of 17 months, we noticed a significant improvement in the lipid profile of patients, both due to lifestyle changes and therapeutic compliance. Certainly, the occurrence of an acute coronary event has altered patients' attitudes about cardiovascular risk, motivating changing lifestyle and choosing the right therapy.

Keywords: biological profile, acute myocardial infarction, prognostic, prospective study

Myocardial infarction (MI) has become a pandemic pathology of this century, with an increased incidence and prevalence in all countries, and Romania is currently on the ascending trend in the incidence of coronary artery disease [1-3].

Worldwide, each year more than 7 million people experience myocardial infarction, and one-year mortality rates are now in the range of 10%, but vary with patient characteristics. The consequences are even more dramatic because among patients who survive, 20% suffer a second cardiovascular event in the first year [4]. Prevention after myocardial infarction is crucial to reduce risk and suffering. Evidence-based interventions include optimal medical treatment with anti-platelets and statins [5], achievement of blood pressure, lipid and blood glucose targets, and appropriate lifestyle changes [6].

The left bundle branch block (LBBB) is traditionally regarded as the equivalent of an acute myocardial infarction with ST segment elevation and may be associated with a poor prognosis compared to normal intraventricular conduction [7-9]. Dyslipidemia is still a major risk factor for coronary artery disease. Epidemiological studies have demonstrated that abnormal lipid profile is associated with a high risk of coronary artery disease [6].

Experimental part

In order to study the impact of an acute coronary syndrome on the lifestyle changes of the patients, we prospectively studied the long term biological parameters in patients with myocardial infarction and new left bundle branch block. From the total of 387 patients with acute myocardial infarction and one coronary lesion hospitalized from January 2011 to December 2013 in Georgescu Institute of Cardiovascular Disease Iași, a sum-total of 82 patients were included in the study. According to the presence of new left bundle branch block, patients were divided into two groups:

- 42 patients with acute myocardial infarction and new left bundle branch block;
- 42 patients with acute myocardial infarction without left bundle branch block.

We prospectively studied all these patients included in the study after a mean follow-up of 16.51 ± 2.41 months, assessing their biological parameters, in order to evaluate

the impact of an acute coronary event on the lifestyle changes, especially in those with a severe prognosis, such as those with new LBBB.

Biological parameters included laboratory parameters usually evaluated at the hospitalization, respectively: blood count, cholesterol, LDL cholesterol, HDL cholesterol, triglycerides, myocardial cytolysis markers (myocardial creatine kinase and troponin T), transaminases TGO and TGP), LDH, lipid profile, creatinine and uric acid.

The glycemic status was assessed according to the criteria of the European Diabetes Society, as follows: normal glycemic control was defined as fasting blood glucose (FPG) < 5.6 mmol / L (100 mg / dL), diabetes diagnosis being established with 2 FPG values ≥ 7.0 mmol / L (126 mg / dL) (venous plasma glucose) [10].

Patients were considered diabetic if they had a history of diabetes, blood glucose values ≥ 126 mg / dL, or were treated with oral antidiabetics or insulin.

In this article we focused on lipid and glucidic profile of these patients.

Statistical analyses were performed using the Statistical Program for Social Sciences (version 17.0 SPSS Inc.). Data were labeled as nominal or quantitative variables. Nominal variables were described using frequencies. Quantitative variables were tested for normality of distribution by means of Kolmogorov-Smirnov test and were described by median and percentiles or by mean and standard deviation, whenever the case. The frequencies of nominal variables were compared with a chi-square test. Differences in the means and medians or between groups were analyzed using t-test or Mann-Whitney test when appropriate. A p value of < 0.05 was considered statistically significant.

Patients were informed about the study and their written, informed consent was obtained. The trial protocol was approved by the Medical Ethics Committee of the University of Medicine and Pharmacy Grigore T. Popa Iasi and was conducted according to the modified Declaration of Helsinki (Somerset West Amendment, 1996).

Results and discussions

Lipid profile

We dynamically analyzed the lipid profile of patients in both study groups, knowing that patients with a history of acute myocardial infarction have a therapeutic target of

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LDL cholesterol ≤ 70 mg / dL or a reduction of more than 50% of baseline. Analyzing the lipid profile of patients for each of the lipid, total cholesterol, HDL cholesterol, LDL cholesterol and triglyceride fractions, we noticed a significant reduction in their values in both patient groups.

If initially from the total of 84 patients enrolled in the study, nearly two thirds, respectively 55 patients (65.47%), had an elevated total cholesterol of ≥ 200 mg / dL, we noticed that after a medium follow-up period of 16.51 ± 2.41 months, under an adequate lifestyle regimen and hypolipemic treatment, only 21 patients in both groups had an increased total cholesterol (28.57% vs 21.42% in the control group, $p = 0.307$). Analyzing the total cholesterol values in the two groups of patients, we noticed an average total cholesterol level of 173.52 ± 42.29 mg / dL vs. 164.28 ± 36.76 mg / dL in the control group patients.

HDL cholesterol values were initially higher in a small number of patients, 4 patients in each group, at subsequent assessment, more than half of the patients had normal HDL cholesterol levels. Thus, 19 patients vs. 28 patients in the control group had protective values of HDLc, with statistically significant differences, $p = 0.039$.

As mentioned, LDL cholesterol is the therapeutic target for lipid profile. Initially, almost 40% of patients had elevated LDLc, but the evaluation of this parameter after a follow-up period of 17 months, showed a significant reduction in this percentage, 26.19% of patients with elevated LDLc, respectively 14 patients with left bundle branch block and 10 in the control group, $p = 0.250$. The mean value of LDL cholesterol was 91.85 ± 4.91 mg/dL in the control group and 83.30 ± 4.88 mg/dL, only 20 patients with the left bundle branch block and 15 from the control group achieved the target LDLc of ≤ 70 mg/dL or a reduction of more than 50% over baseline (fig.1).

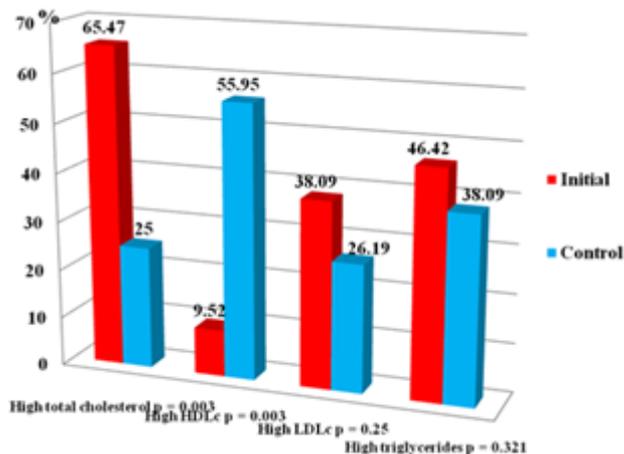


Fig.1. Lipid profile of patients with acute MI and LBBB: initial vs. control

If initially nearly half (46.42%) of the patients enrolled in the study had elevated triglycerides, over the 150 mg/dL limit for both sexes, only 38.09% of patients had elevated triglyceride levels in the subsequent evaluation. Note that only 2 patients initially received fibrate therapy, which has a triglyceride lowering effect in particular. Also, after the follow-up period, only three patients compared to a triple percent at baseline, had triglyceride values above 200 mg/dL.

Glucidic profile

The evaluation of fasting blood glucose values during initial hospitalization revealed increased values especially in patients with left bundle branch block (35.41% vs 9.52% in patients in the control group), with statistically significant differences ($p = 0.004$). This can also be interpreted in the

context of the acute coronary event which, as we know, may be associated with a transient increase of these values. However, by analyzing the blood glucose values at a distance from the acute coronary event, we noticed a significant improvement in the patients' glucose profile, only 13.09% with elevated glucose levels, 8 patients with the left bundle branch block and 3 from the control group, with statistically significant differences, $p = 0.05$.

Smoking status

If, at the onset of the acute coronary event, nearly half (46.42%) of the patients included in the study were smokers, after the follow up period, 82.15% of the patients no longer smoked. Trying to find out why patients have quit smoking, we found that they were aware that smoking was one of the main cardiovascular risk factors, so most of them did not smoke at all after the diagnosis of acute myocardial infarction. Only 6 patients with the left bundle branch block and 9 of the control group said they still smoked, but they also considerably reduced the number of cigarettes smoked daily. It should be noted that, there were no statistically significant differences between the two groups, $p = 0.285$ (fig.2).

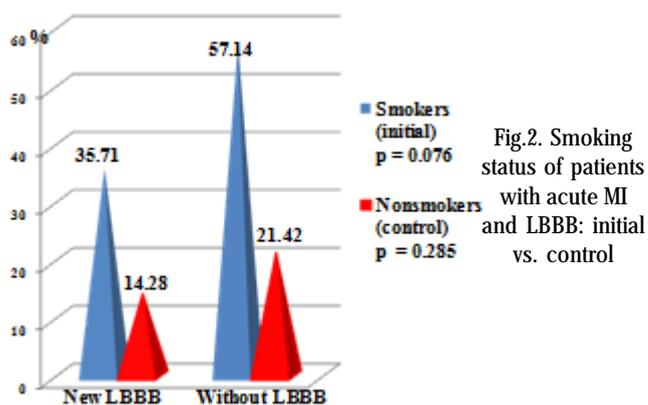


Fig.2. Smoking status of patients with acute MI and LBBB: initial vs. control

Obesity

Another extremely important cardiovascular risk factor, is the obesity, and we found a reduction in the body mass index in patients in both study groups, with no statistically significant differences between patients with and without the left bundle branch block ($p = 0.782$). Analyzing the patient's distribution by body mass index, we noticed that at the follow up visit, most patients were normoponderal (36 vs. 25 patients in the control group), only three patients in both groups with obesity grade 1, and no patients with obesity grade 2 or 3 (fig.3).

Our study, is among the few who has evaluated the impact of a myocardial infarction on the lifestyle changes of the patients and demonstrated that patients with myocardial infarction and new LBBB are more motivated

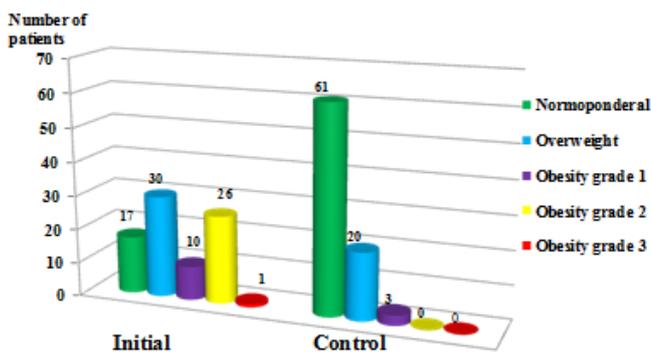


Fig.3. Distribution of patients with acute myocardial infarction and left bundle branch block according to the ponderal status

in reducing the cardiovascular risk by lifestyle changes and right therapy.

If initially nearly half (46.42%) of the patients enrolled in the study had elevated levels of lipids, analyzing the lipid profile of patients for each of the lipid, total cholesterol, HDL cholesterol, LDL cholesterol and triglyceride fractions, we noticed a significant reduction in their values in both patient groups.

Dyslipidemia is still a major risk factor for CHD. Epidemiological studies have conclusively linked high levels of total cholesterol and low-density lipoprotein cholesterol and low levels of high-density lipoprotein cholesterol with CHD incidence and mortality [6]. A series of changes in lipid metabolism occur during acute phase response. As a result, plasma TG level increases, while HDL, LDL and TC levels decrease, demonstrated by many studies [11]. There is no consensus with respect to timing of lipid and lipoprotein measurements in terms of proximity to the baseline values, the magnitude of the changes and when these changes reach maximum and basal values. A reduction in the magnitude of these changes is seen over time. First time Biorck et al. [12] reported that serum cholesterol levels decreased during MI. Since then, a wide range of changes in the serum lipid and lipoproteins following acute coronary events have been reported. Taking into the count that phasic changes in serum lipid and lipoprotein levels occur after 24 h of myocardial infarction, the findings of a recent study emphasize the need for assessment of the lipid profile of these patients to be made at admission, so as to identify patients at a higher potential risk [13].

Diabetes mellitus is widely recognized as a significant risk factor for the development of cardiovascular disease and is an independent risk factor for accelerated atherosclerosis with more severe and extensive lesions compared with those without diabetes [14,15]. Recent reports have suggested that the presence of LBBB in patients with type 2 diabetes mellitus may indicate worse left ventricular systolic dysfunction compared with those without LBBB and compared with those without diabetes but with LBBB [15,16].

In a cross-sectional analysis, we demonstrated that the presence of new LBBB in diabetic patients is unequivocally associated and could be the first manifestation of an extensive coronary artery disease, even in asymptomatic patients [17].

It is well known that early treatment of hyperlipidemia following acute myocardial infarction provides potential benefits and reduces the morbidity and mortality of CHD. Exact knowledge regarding baseline serum lipids and lipoprotein levels as well as their varying characteristics can be used to guide selection of lipid lowering medication.

Conclusions

We noticed a significant improvement in the lipid profile of patients with acute myocardial infarction in the control assessment, both due to lifestyle changes and therapeutic compliance. Certainly, the occurrence of an acute coronary event has altered patients' attitudes about cardiovascular risk, motivating changing lifestyle and choosing the right therapy.

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