Inflammatory Markers in Patients with Hypothyroidism and Diabetes Mellitus Type 1

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INTRODUCTION: The accumulation of macrophages what happens in atherosclerotic process is associated with increased concentration of fibrinogen and CRP (C-reactive protein), and these two markers of inflammation are considered early signs of atherosclerosis. Aim: The aim of the study was to compare levels of inflammatory markers (CRP and fibrinogen) and HbAlc as a parameter of quarterly blood glucose control in patients with both diabetes mellitus type 1 and hypothyroidism who have ischemic heart disease with the patients with same autoimmune diseases, but without ischemic heart disease. Patients and methods: This prospective study included 30 patients who were all diagnosed with both hypothyroidism and diabetes mellitus type 1. Patients were divided into two groups according to the persistence of ischemic heart disease. The first group (I) included patients with previously diagnosed ischemic heart disease (N=12), and second group (II) was without ischemic heart disease (N=18). CRP, fibrinogen and HbAlc were measured in all patients. Results: CRP level in group I was higher than in group II, and the difference between groups is statistically significant (t = -4.125, p = 0.0001). Fibrinogen was also significantly higher in first group (t = -4.7; p = 0.0001). Both, CRP and fibrinogen levels were in two groups above the upper reference values. The average value of HbAlc as a parameter of quarterly glycemic control in both groups showed bad controlled diabetes mellitus, 8.77% (± 1.89) vs. 8.16% (± 1.71), but among the groups there were not statistically significant differences (t = -0.921 p = 0.365). Conclusion: Patients with both type 1 diabetes mellitus and hypothyroidism who have ischemic heart disease have significantly higher levels of inflammatory markers: CRP and fibrinogen, than patients with the same diseases who did not have coronary heart disease, while HbAlc as a parameter of quarterly blood glucose control did not differ between groups, but in both groups showed values that corresponded to poor disease control. While future medical research has not reached full answers to the atherosclerotic process, seems reasonable to consider an effect of all identified biochemical markers associated with this process. Key words: inflammatory markers, ischemic heart disease, hypothyroidism, diabetes mellitus type 1.

1. INTRODUCTION

Atherosclerosis is a process that begins with endothelial dysfunction and moving towards emerging atherosclerotic plaque. It includes a number of specific molecular cascades and cellular responses that can be best described as an inflammatory disease. The process is characterized by the accumulation of extracellular and intracellular lipids, monocyte - macrophage infiltration, formation of foam cells, smooth muscle cell proliferation and accumulation of connective-tissue proteins. If the inflammatory response is not effective in neutralizing and removing the causative agents, it continues without limitation, leading to thickening of the arterial wall. Most recent basic research found that inflammation plays a crucial role in all stages of the disease: the initial, further progression to thrombotic complications (1). The accumulation of macrophages is associated with increased concentration of fibrinogen and CRP, and these two markers of inflammation are considered early signs of atherosclerosis (2). Atherosclerosis is usually revealed with one of the clinical events that indicate a critical reduction of blood flow through affected artery: coronary artery disease, cerebrovascular disease and peripheral arterial disease. Coronary heart disease is the most serious indicator of atherosclerosis (3).

2. AIM

The aim of our study was to compare levels of inflammatory markers (CRP and fibrinogen) and HbAlc as a parameter of quarterly blood glucose control in patients with both diabetes mellitus type 1 and hypothyroidism who have ischemic heart disease with the patients with the same autoimmune diseases, but without ischemic heart disease.

3. PATIENTS AND METHODS

This prospective study included 30 patients, both males and females. All were diagnosed with both hypothyroidism and diabetes mellitus type 1. Inclusion criteria were: age 30-60 years, minimum five years duration of diabetes, and hypothyroidism with the previously included substitution therapy. The research was conducted based on
the usual approach to the patient: anamnesis, clinical examination and analysis of laboratory tests. CRP, fibrinogen and HbA1c as a parameter of quarterly glycemic control were measured in all patients. Patients were divided into two groups according to the persistence of ischemic heart disease. The first group included patients with previously diagnosed ischemic heart disease (IHD) (N=12), and second group was without IHD (N=18).

4. RESULTS

In the first group of patients with ischemic heart disease, 66.7% were women, 33.3% were men, and in the second group, without ischemic heart disease, 61.1% were women and 38.9% men. There was no significant difference in gender between the groups. (χ²=0.096, df=1, p=0.757). Two groups of patients did not differ by age (t =-1.195, p=0.242), nor by the duration of diabetes (t=0.475, p=0.641), and duration of hypothyroidism ( t =-0.895; p=0.378). CRP level in group I was 8.49 (± 1.19), in group II 5.5 (± 2.31). Both values are above the upper reference values (0-5 mg/L), and the difference between groups is statistically significant, significantly higher in group I ( t =-4.125, p =0.0001).

Fibrinogen level was also in both groups above the upper reference values, in group I 7.55 (±1.09), in group II 4.66 (±1.93) and its value in the group I was significantly higher than the value in group II (t=-4.7; p=0.0001). The average value of HbA1c as a parameter of quarterly glycemic control in both groups showed values that corresponded to poor disease control, in group I and 8.77% (±1.89) in group II 8.16% (±1.71), but among the groups

| Ischemic heart disease | N  | M    | SD   | Me   | t     | df | p
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<tr>
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<tr>
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<tr>
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<td>8.767</td>
<td>1.8850</td>
<td>.5442</td>
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Table 1. HbA1c in two groups of patients

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5. DISCUSSION

Many earlier studies revealed the connection of inflammatory markers with the atherosclerotic process. So the PROCAM study showed that fibrinogen is an independent risk factor for cardiovascular disease. In this study, unexpectedly, those with low fibrinogen had a low incidence of coronary events, even when serum LDL cholesterol was high (4). Some studies were dealt with inflammatory markers in various endocrinopathies. Eurodiab prospective study showed that inflammatory activity is increased in people with type 1 diabetes, as suggested by elevated concentrations of CRP (5). SEARCH Case-Control study revealed that inflammation is a characteristic of type 1 diabetes mellitus independently of obesity and glycemic control and that patients with good glycemic control have elevated levels of fibrinogen (6). Cappola and Ladenson concluded in their study that chronic inflammation is a feature of hypothyroidism, characterized by elevated CRP, coagulation abnormalities, and endothelial dysfunction (7). Biondi and Klein marked CRP as a risk factor for atherosclerosis in patients with hypothyroidism (8). Unlike all those mentioned studies we wanted to find out how these two associated diseases (diabetes mellitus type 1 and hypothyroidism) appear with aspects of inflammatory markers in the context of the diagnosis of ischemic heart disease what is shown in our results. Jialal and colleagues in a study from 2007 showed that simvastatin at a dose of 20 mg / d is safe in patients with type 1 diabetes and that shows the pooled benefit for lipid profile and biomarkers of inflammation. They concluded that these results could have implications for the development of guidelines for statin therapy in type 1 diabetes in order to prevent vascular complications in young people with type 1 diabetes (9). In the context of our results, it could be also applied to the associated diseases. Certainly there is a need for further studies with a larger sample of patients and the need for prospective studies that tracked the effects of potential therapeutic correction of changeable factors on the incidence of IHD.

6. CONCLUSION

Patients with both type 1 diabetes mellitus and hypothyroidism who have ischemic heart disease had significantly higher levels of inflammatory markers: CRP and fibrinogen than the patients with the same diseases who did not have coronary heart disease, while HbA1c as a parameter of quarterly blood glucose control did not differ between groups, and in both groups showed values that corresponded to poor disease control. While future medical research has not reached full answers to the atherosclerotic process, seems reasonable therapeutic affect all identified biochemical markers associated with this process.

REFERENCES


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