THE STUDY OF THE OXIDATIVE STRESS REGARDING THE DECREASE OF THE B1 VITAMIN CONCENTRATION IN THE CASE OF PATIENTS DIAGNOSED WITH DIABETES AND ITS TREATMENT BY USING BIO PLANTS

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ABSTRACT. Throughout the development of the research we strived to provide an answer best fitted to elucidate the issues under study, correlating our own data with the many suggestions offered to us by the specialty literature. The study consisted of determining the important values of the thiamine deficiency, the B1 vitamin being involved in the development of vascular complications. In the case of patients suffering from diabetes, vascular complications are extremely severe. (Ball GFM, 2004) The tests were carried out on a number of patients diagnosed with type 1 and 2 diabetes, with repetitions and under the influences of stress factors. For the experiment, data was collected from patients of various ages.

Keywords: drug dependency, psychotherapy, personality, complaints and dissatisfaction, clinical approach, heroin

INTRODUCTION

Blood glucose tests are performed in order to measure the glucose level in the blood, to detect both hypoglycemia and hyperglycemia aiding in the diagnosing of diabetes.

The deficiency of proteins, minerals and vitamins reduces globulin synthesis and heme formation, with the appearance of abnormal hemoglobins. The main physicochemical properties of blood can undergo significant changes under various pathological conditions. (Matthew A. Et al., 2011)

Elevated glucose levels can be seen in the following cases: diabetes with pancreatic, pituitary gland, suprarenal and thyroid origins, some infections, poisoning (carbon oxide, caffeine), some tumors, and cerebrovascular accidents.

Low glucose levels (hypoglycemia) can be observed in the following cases: adrenal insufficiency, alcohol abuse, certain liver diseases, hypothyroidism, insulin overdose, starvation. Primary hypoglycemia is rare and is usually diagnosed during childhood.

Thiamine is required for the homeostasis of any cell in the organism and is an essential cofactor of many enzymes involved in the synthesis of the nucleic acids, of certain antioxidants, neurotransmitters, or in the carbohydrate metabolism. (Ana-Maria Iordan, 2007) Thiamine can be found in large concentrations in the muscles, heart, liver, kidneys and brain (Ana-Maria Iordan, 2007).

MATERIALS AND METHODS

For the data collection we compared the B1 vitamin level from the blood of 16 healthy, volunteer patients, 28 patients with type 1 diabetes (insulin dependent) and 32 patients with type 2 diabetes. Patients that suffer from diabetes are probably more frequently affected by a B1 vitamin deficiency than had been known till now. (Thornallez PJ, et al., 2007) The traditional method did not involve the direct measurement of thiamine, but of the activity in the red blood cells of an enzyme named transketolase, and in the case of patients with diabetes, this mechanism (5), the reduction of the said enzyme, does not manifest itself. Thus, in the case of patients with diabetes its activity may be normal even though thiamine is found in small quantities in the blood. (Thornallez PJ, et al., 2007)

Thiamine, also called vitamin B1, is a colorless, chemical compound, with the chemical formula C12H17N4OS, soluble in water and insoluble in alcohol (http://radubuculea.com/tag/vitamina-B1/). Thiamine decomposes under heat. It was first discovered in Japan, by Umetaro Suzuki.

Structural formula

Fig.1 Adapted after http://ro.wikipedia.org/wiki/tiamin

From the patients who had been prepared blood was collected in containers with EDTA as an anticoagulant.
The method used is HPLC, high pressure liquid chromatography.

Chromatography is the technique of separating the components of a mixture, in two phases: a mobile one and a stationary one, as a consequence of the mobile phase moving alongside the stationary one and setting into motion the mixture’s components, at different speeds, thus occupying different positions along the stationary phase. In this way the components are separated and then identified. The sensitivity of the chromatographic methods is extremely high, which means it requires only a small sample amount. At the same time, they can be applied at a preparative scale as well. (Martin J. Salwen, 2007)

The duration of the analysis is more reduced, compared to other methods for analyzing complex mixtures.

**RESULTS AND DISCUSSIONS**

The key to the success of the experiment laid in accumulating data over time, which were statistically processed. Thiamine is responsible for the carbohydrate metabolism. (Shimbo D, et al., 2010) Its absence will stop the substance being metabolized and it will accumulate in the tissues, leading to poisoning, oedema and weakening of the heart muscles. (Naidoo DP. et al., Encefalopathy and alcohol-related disease .postgard Med.) They lead to heart failure, cerebral vascular accidents (strokes), renal dysfunction, diabetic retinopathy and ultimately, to gangrene of the lower limbs.

**Table 1.** Thiamine determination in type 1 diabetic patients.

<table>
<thead>
<tr>
<th>No.</th>
<th>Patient age</th>
<th>Average measured value of thiamine (mg/l)</th>
<th>Bonification level</th>
<th>Evaluation result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30-35 years</td>
<td>2,104</td>
<td>*</td>
<td>a bit abnormal</td>
</tr>
<tr>
<td>2</td>
<td>35—40 years</td>
<td>2,006</td>
<td>*</td>
<td>moderately abnormal</td>
</tr>
<tr>
<td>3</td>
<td>40—50 years</td>
<td>1,984</td>
<td>**</td>
<td>abnormal</td>
</tr>
<tr>
<td>4</td>
<td>50—60 years</td>
<td>1,152</td>
<td>***</td>
<td>acutely abnormal</td>
</tr>
</tbody>
</table>

The test results have led us to the conclusion that the bonification level corresponds statistically * --a bit abnormal, ** -- abnormal, ***---acutely abnormal

**Table 2.** Thiamine determination in type 1 diabetic patients.

<table>
<thead>
<tr>
<th>No.</th>
<th>Patient age</th>
<th>Average measured value of thiamine (mg/l)</th>
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</thead>
<tbody>
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<td>1</td>
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<td>2,034</td>
<td>*</td>
<td>moderately abnormal</td>
</tr>
<tr>
<td>2</td>
<td>35—40 years</td>
<td>2,056</td>
<td>*</td>
<td>moderately abnormal</td>
</tr>
<tr>
<td>3</td>
<td>40—50 years</td>
<td>1,895</td>
<td>**</td>
<td>abnormal</td>
</tr>
<tr>
<td>4</td>
<td>50—60 years</td>
<td>1,212</td>
<td>***</td>
<td>acutely abnormal</td>
</tr>
</tbody>
</table>

The test results have led us to the conclusion that the bonification level corresponds statistically * --a bit abnormal, ** -- abnormal, ***---acutely abnormal

**Table 3.** Thiamine determination in healthy, volunteer patients.

<table>
<thead>
<tr>
<th>No.</th>
<th>Patient age</th>
<th>Average measured value of thiamine (mg/l)</th>
<th>Bonification level</th>
<th>Evaluation result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30-35 years</td>
<td>3,034</td>
<td>*</td>
<td>normal</td>
</tr>
<tr>
<td>2</td>
<td>35—40 years</td>
<td>3,956</td>
<td>*</td>
<td>normal</td>
</tr>
<tr>
<td>3</td>
<td>40—50 years</td>
<td>4,014</td>
<td>*</td>
<td>normal</td>
</tr>
<tr>
<td>4</td>
<td>50—60 years</td>
<td>4,212</td>
<td>*</td>
<td>normal</td>
</tr>
</tbody>
</table>

The test results have led us to the conclusion that the bonification level corresponds statistically * --a bit abnormal, ** -- abnormal, ***---acutely abnormal
The study of the oxidative stress regarding the decrease of the B1 vitamin concentration in the case of patients diagnosed with diabetes and its treatment by using bio plants

Graph 1. The average thiamine variation (mg/l)

The B1 vitamin deficiency observed in patients with diabetes of either type is not due to a reduced food intake (Thornallez PJ, et al., 2007), the test patients showing an increased thimine elimination in their urine.

The thiamine deficiency leads to a major risk regarding the vascular system in diabetic patients, and what was noticed as a result of the tests carried out on a number of healthy patients and on the diabetic ones, was that the latter exhibit a pronounced thiamine deficiency which may have an effect on the serum markers that reflect an increased risk for atherosclerosis. (Ana-Maria Iordan, 2007)

In the case of patients with diabetes, it is assumed that several mechanisms are responsible for the B1 vitamin deficiency, the decreased and inadequate food intake, consumption increased due to the need of metabolizing the glucose and the need to neutralize the oxidative stress.

This decrease of the thiamine values in the bodies of type 1 and 2 diabetic patients can also be detected in other patient categories that require diuretic therapy (http://radubuculea.com/tag/vitamin-B1//). In the case of diabetics as well as other categories of patients receiving chronic diuretic treatment the thiamine elimination seems to increase, predisposing them to a high vitamin increased level, in comparison to healthy patients.

Benfotiamine may be more efficient than thiamine, controlling the inconveniences caused by diabetes, because it triggers the enzyme called transketolase. This is a factor that leads to the removal of glucose derivates from the vascular cells (blood vessels) and nerve cells.

The food sources richest in thiamine are poultry, pork, whole grains, liver, egg yolk, wheat germ, vegetables, oilseeds, brown rice, fish, peas and rice bran. Other sources are dulse seaweed, broccoli, yeast, kelp, watercress, most soybeans, asparagus, oats, plums, grapes and spirulina.

The plants containing thiamine are lucerne, brown algae, burdock root, cat grass, Chayenne pepper, chamomile, stinging nettle, parsley, mint, sweetbriar, yarrow.

Nowadays, these plants are affected by ultraviolet radiation, electromagnetic radiation, ozone depletion, the use of chemical agents which lead to the destruction of the benefits these herbs have to offer, as well as to their destruction as species. Radiation exposure and contamination can be prevented or even treated with the help of a series of nutriments which help the human body to better withstand the pollution and radiation effects. Fresh food consumption reduces the risk of accumulating chemicals.

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