Oxidative Stress in Paediatric Patients with Diabetes Mellitus Type 1 And Relationship with Glucemic Levels

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Introduction

The oxidative stress has total success in a rut through the measurement of the damages caused on important macromolecules at our organism of the stress, and no for these free radicals' direct measurement than for your fleeting nature they are approximately impossible (1).

The measurement of the damage to lipids would be able to evaluate her by means of the calculation of the damage to lipoproteínas for the increment of the sensibility of the LDL to oxidation. This LDLox has a potential aterogénic height and contributes to of direct mode the endothelial damage and formation of ateroma's plate. The LDL's glicosilation can be one of the factors that contribute to the increase of this sensibility like may happen in diabetes mellitus (2).

You can try on the damage to proteins determining seric concentrations our organism's of important proteins and that definitively provide us information about the system of antioxidant defense like they are: Albumin, ceruloplasmin and total bilirrubin.]

In diabetic patients, the oxidative stress can result from an excessive production of reactive species of oxygen (ROS), especially the super-oxide anion; Or for decrease of the antioxidant stock, fundalmental albumin, ceruloplasmin and uric acid (1, 2). For it before exposed we intended to diagnose the oxidative stress in diabetic children type 1 at our clinical laboratory.

Method

Type accomplished a study in 30 diabetic patients itself 1 taken in Endocrinology's consultation of Especialidades's Poly-Clinician Pediatric. Camaguey in the period once February 2012 was understood between October 2011.

Criteria of inclusion

Diabetic children type 1, ambulatory, with over 5 elderly years and with a minimum of 3 years of evolution of the disease.
Criteria of exclusion
- Children that take treatment with vitaminic supplements or another drug that you interfere in any one of the complementary to accomplish.
- Patients hospitalized by decapsulation of the disease.
- Patients with associated to diseases the Diabetes Mellitus type 1.
- One considered like children with bad metabolic control (MCM) all those that they do not do their job with the following criteria proposed by Diabetes’s Latin American Association (ALAD): (3)
- Average of glucemias inside the following limit - under 5 elderly years: 5.5-11 mmol/L and older of 5 elderly years: 4.4-10 mmol/L.

Total seric bilirrubin took signs of blood without eating to determine levels (Gendrasik Grof) (CN: Less de17 μmol/L), albumin (colorimetric method with verde bromocresol, CN: ≥ 33 g/L), ceruloplasmin (modified Ravin, CN:22-42 mg %), uric acid (Henry Sabel Kin, CN: 143-339 μmol/L), ascorbic acid (method of analysis with 2,4 dinitrofenilhidrazina, CN:11.6-113.6 μmol/L) and LDLox (enzymatic method with suddeness with PEG 6000) CN: 5-15 μg/ml

Excell accomplished the statistical analysis of the data himself by means of the program.

Results

Table 1. Seric levels half of antirust and oxidized LDLox in the patients of study.

<table>
<thead>
<tr>
<th>TEST</th>
<th>X ± DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycemia (mmol/L)</td>
<td>230.90 ± 6.1</td>
</tr>
<tr>
<td>Bilirrubin (mmol/L)</td>
<td>7.38 ± 2.54</td>
</tr>
<tr>
<td>Albumin (g/L)</td>
<td>4.2 ± 13</td>
</tr>
<tr>
<td>Ceruloplasmin (mg%)</td>
<td>32 ± 6.4</td>
</tr>
<tr>
<td>Uric acid (mmol/L)</td>
<td>158 ± 60</td>
</tr>
<tr>
<td>Ascorbic acid (mmol/L)</td>
<td>33.93 ± 32.44</td>
</tr>
<tr>
<td>LDLoxidada (µg/mL)</td>
<td>53.83 ± 39.37</td>
</tr>
</tbody>
</table>

You observe the incidence of decreased levels in the board of antioxidant such as: Albumin, uric acid and vitamin C and increased levels of LDLox which evidences oxidative stress for unbalance. The elevated levels of glycemia evidence the bad metabolic control of the disease.

Table 2. Patients’ total with decreased numbers of antioxidant and increased numbers glucemia and LDLox

<table>
<thead>
<tr>
<th>Complementary</th>
<th>Patient Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucemia (mmol/L)</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>Bilirrubin (mmol/L)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Albumin (g/L)</td>
<td>13</td>
<td>43</td>
</tr>
<tr>
<td>Ceruloplasmin (mg%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Uric acid (mmol/L)</td>
<td>8</td>
<td>27</td>
</tr>
<tr>
<td>Ascorbic acid (mmol/L)</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td>LDLox (µg/mL)</td>
<td>23</td>
<td>76,6</td>
</tr>
</tbody>
</table>

As it is appreciated, the system of antirust defense was decreased (low moral values of albumin in 43 % of patients, of uric acid in a 27 % and of vitamin C in a 50 %), for your part the LDLox showed up incremented in 76,6 % of the patients, being this one definite marker for the diagnosis of oxidative stress, in 7 patients the LDLox showed up with numbers within the doubtful range (15-40 μg/mL).

Discussion
I raise objections of study in all the children demonstrated him a bad metabolic control of diabetes mellitus type 1 according to criteria of Diabetes's Latin American Association (ALAD), (3).

You are demonstrated the hyper-glycemia produces glicosilation not enzymatic of proteins, which causes endothelial damage and this in turn induces free radicals’ production.

The decrease of the antioxidant stock, such I eat: Uric acid, ascorbic acid and albumin triggers also free radicals’ accumulation, especially super-oxide anion. (1.2).

You perform on theoric acid like antirust together with the vitamin C, the first one possesses a couple of electrons shared in that you perceive the reactive sorts of oxygen and it gives them up to the second one, creating for oneself an innocuous complex that is debugged easily at the organism; The unbalance becomes established when you find any of them decreasedly (4).

Conclusions
- Exists a stress oxidativo in over 50 % of the infantile studied population.
- Type demonstrated the bad metabolic control in diabetic children itself 1.
- LDLox’s levels found lifted I raise objections of study in 76,6 % of the children

Recommendations
- Having an effect on the Diabetes Mellitus’s metabolic control type 1

References