

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

Short Communication

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Abstract

This study was made in paediatric patients affected by diabetes mellitus type 1. Fasting blood samples were obtained to determine glucose, bilirubin, uric acid, ascorbic acid, ceruloplasmin, albumin and LDLox levels. We found high levels of LDL ox and glycemia, and low levels of the rest of the antioxidants. We conclude that oxidative stress was present in these patients.

Keywords: Oxidative Stress, Antioxidants, Diabetes Mellitus Type 1, Glycemia, Paediatric

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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 atheroma'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 bilirubin.]

The consideration of the levels of seric uric acid (Au) like measure of the antioxidant activity of the human serves to be a part of an innovative instruction about the antioxidant power of this substance considered until very recently of reject, his capability to receive free present radicals' electrons in the cell like hidroxil (HO.), Lipoperoxil (LOO.) And hypochlorite (ClO.), You give him the possibility of defending us of the whole damage that they involve. The vitamin C, for your part, not only has important antioxidant shows at our organism's watery zone, but also tocoferil is able to regenerate the radicle and the Au, forming radial ascorbilo that is totally innocuous. The possibility of guaranteeing seric levels made suitable through the diet you make her form priority part in the antioxidant humans.

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, fundamental 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. Camagüey 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 decompensation 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 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 de 17 $\mu\text{mol/L}$), albumin (colorimetric method with verde bromocresol, CN: $\geq 33 \text{ g/L}$), ceruloplasmin (modified Ravin, CN: 22-42 mg %), uric acid (Henrry Sabel Kin, CN: 143-339 $\mu\text{mol/L}$), ascorbic acid (method of analysis with 2,4 dinitrofenilhidrazina, CN: 11.6-113.6 $\mu\text{mol/L}$) and LDLox (enzymatic method with suddenness with PEG 6000) CN: 5-15 $\mu\text{g/ml}$

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.

TEST	X \pm DS
Glycemia (mmol/L)	230.90 \pm 6.1
Bilirrubin (mmol/L)	7.38 \pm 2.54
Albumin (g/ L)	4.2 \pm 13
Ceruloplasmin (mg %)	32 \pm 6.4
Uric acid (mmol/L)	158 \pm 60
Ascorbic acid (mmol/L)	33.93 \pm 32.44
LDLoxidada ($\mu\text{g/ml}$)	53.83 \pm 39.37

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

Complementary	Patient Total.	Percentage
Glucemia (mmol/L)	30	100
Bilirrubin (mmol/ L)	0	0
Albumin (g/ L)	13	43
Ceruloplasmin (mg %)	0	0
Uric acid (mmol/L)	8	27
Ascorbic acid (mmol/L)	15	50
LDLox ($\mu\text{g/ml}$)	23	76,6

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 $\mu\text{g/ml}$).

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 theuric 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

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