

Mangifera indica Extract (Vimang) Restored the Redox Balance in Type-1 Diabetic Patients

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Abstract

In diabetes mellitus, atherosclerosis is early, rapid, and widespread, affecting the dyslipoproteinemia secondary to hyperglycemia, lipoproteins glycosylation produced changes, making them more atherogenic and generate free radicals that cause apoprotein oxidation of lipids and macromolecules nearby, we decided to evaluate the presence of oxidative stress in children with Diabetes mellitus type-1 and demonstrated the need for antioxidants as part of drug therapy of this disease. Thirty ambulatory patients of Endocrinology were selected between 6 to 12 years of age, who had been suffering from Diabetes mellitus type-I since 3 years ago. Under their informed consent of the selected group the seric levels of antioxidant was tested: uric acid, vitamin C, bilirubin, ceruloplasmin, albumin and cholesterol, LDL-cholesterol, HDL-cholesterol, triglycerides, oxidized LDL. Vimang tablets (300 mg/24 h) was supplied for three month, and the same tests were repeated every month. Data was processed by means of descriptive statistics methods, with of absolute and relative frequency distribution, performing a hypothesis test for paired observations.

Introduction

The appearing of Diabetes mellitus (Dm) in the tender age of life, represent a serious situation for what's difficult that is to maintain under good control these patients and for the frequent development of complications several years after initiate the disease. For it, it is necessary to accomplish a precocious, forceful and efficacious treatment to avoid or to postpone the presence of those complications, to teach a new style of life to those patients and to improve the prognosis and the living conditions of the same [1,2].

The free radicals are implicated not only in the diabetic's complications, but also with the etiology of diabetes [3,4]. Oxidative balance of the human and essential organism for the metabolic regulation, the production of metabolic energy, the activation and inactivation of bio molecules, the transduction of signs, the cell refill and the control of the vascular tone between other ones. If this balance (generators of reactive species) and antioxidants (preventive, kidnapper and repairer) you become unbalanced in favour of the first ones for free radical's excessive production, the weakening of the antioxidant systems or for both causes will be itself in the presence of what is known like oxidative stress [5-7].

The free radicals attack chemical present compounds in the cells (lipids, proteins and DNA), causing a series of chemical events and the appearing and peaking of the disease can conduct to disorders [8,9]. Vimang is a natural product once varieties studied of the tree were gotten from *Mangifera indica* L (mango), your principal antioxidant property comes once the presence of poly-phenols was taken for (phenols, flavonoids and tannins), terpenoids and polyunsaturated fatty acids. Carry out a protective cell effect for your capability of understanding free radicals; it catches up with textiles and organs for your elevated bioavailability [10-12].

The chemical, analytical, pharmacologic and toxicological studies so much of the active ingredient as of Vimang's formulations they allow insuring that one is in the presence of a product of proven efficacy and of very low frequency of adverse effects after extra of 25 years of practice and clinical controlled assays. A very attractive product for strengthening comes from the mechanisms of antirust protection

(prophylactic) of the human organism for presumably healthy people or the mechanisms of reparation of the damage caused in patients with various pathologies, fundamentally chronicles, for his effects demonstrated in the improvement of the aforementioned diseases and the patients' improvement of the quality of life [11,12].

For it before exposed we intended to evaluate the presence of oxidative stress in children with diabetes mellitus type1 and demonstrated the need of the use of antioxidant as part of Vimang's pharmacologic therapy of this disease through the oral administration of tablets.

Methods

A study on 30 patients attending the Endocrinology Clinic of the Dr. Eduardo Agramonte Pina Provincial Pediatric Teaching Hospital, Camaguey in the period from March to June 2009.

Inclusion criteria

Outpatient diagnosed with type-1 diabetes mellitus, aged 5-16 years and more than three years of disease progression.

Exclusion criteria

- Patients hospitalized for decompensation of the disease.
- Patients with diseases associated with diabetes mellitus.

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- Patients who have taken medications that interfere with lipid levels and/or identify biological antioxidants.
- Patients with adverse reactions to Vimang.

Under informed consent of the parents as proof of approval that the child will participate in the investigation were taken fasting blood samples for determination of total cholesterol (enzymatic method), triglycerides (enzymatic method), LDL, HDL Cholesterol (Enzymatic method), uric acid (enzymatic method), vitamin C (chemical method with 2,4 dinitrophenylhydrazine), bilirubin (Gendrasik Grof), glycemia (RapiglucoTest), ceruloplasmin (Ravin modified), and albumin (Bromocresol Green), a marker of stress oxidative identified oxidized LDL levels (enzymatic method precipitation with PEG 6000).

Vimang tablets (300 mg/24 h) were administered for three months, taking the measurements of lipids, serum antioxidants, and oxidized LDL in each month in order to demonstrate the presence and correction of oxidative stress, we compared the results obtained.

The data were processed using descriptive statistics, with distribution of absolute and relative frequency, performing a hypothesis test for paired observations.

Results

Before treatment with Vimang showed decreased levels of vitamin C (33%), ceruloplasmin (17%) and albumin (63%) in all the patients had at least one of the specific antioxidants decreased (Table 1).

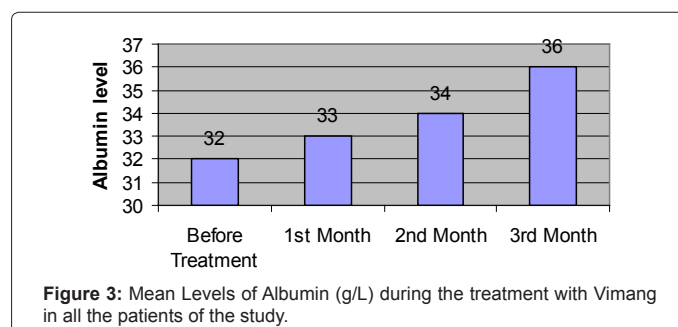
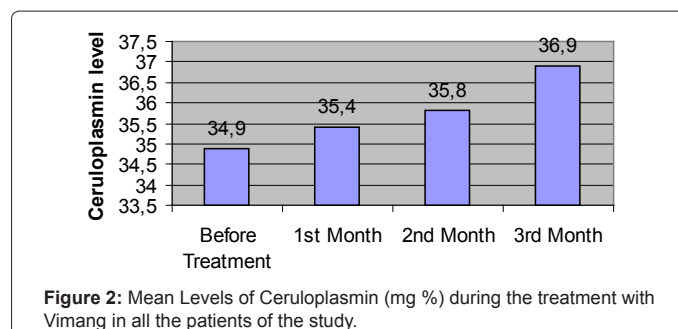
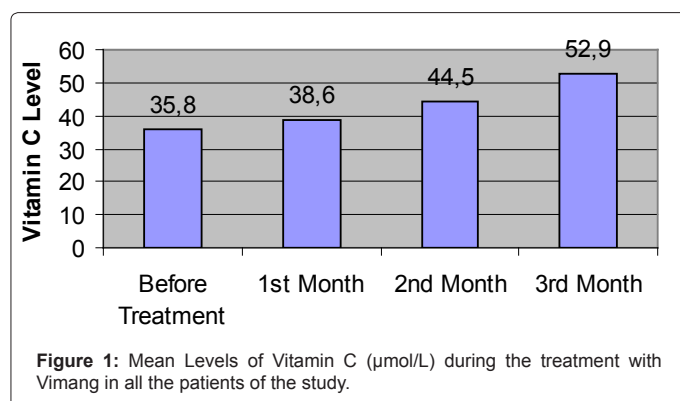
Before the treatment the vitamin C levels found decreased, the same they went increasing monthly even to become stabilized (Figure1-3).

Regarding the lipid profile were detected increased levels of

Parameter	Before treatment	1st Month	2nd Month	3rd Month
Vitamin C (μmol/L)	35.8 ± 26.7	38.6 ± 23.8	44.5 ± 22.6	52.9 ± 29.1
Uric acid (μmol/L)	214 ± 41	236 ± 29	250 ± 46	282 ± 106
Bilirubin (μmol/L)	7.5 ± 2.4	8.7 ± 1.3	11.1 ± 0.9	12.8 ± 9.0
Ceruloplasmin (mg%)	34.9 ± 4.7	35.4 ± 3.8	35.8 ± 2.4	36.9 ± 8.6
Albumin (g/L)	32 ± 6.3	33 ± 9.1	34 ± 3.5	36 ± 8.6
Total Cholesterol (mmol/L)	4.7 ± 1.4	4.6 ± 0.9	4.7 ± 3.5	4.7 ± 5.8
Triglycerides (mmol/L)	3.8 ± 1.1	3.7 ± 0.6	3.8 ± 1.4	3.4 ± 1.7
HDL-Cholesterol (mmol/L)	1.9 ± 0.3	1.8 ± 0.5	2.1 ± 0.1	2.4 ± 0.8
LDL-Cholesterol (mmol/L)	3.0 ± 0.6	3.2 ± 0.4	3.0 ± 0.2	3.4 ± 0.8
Oxidized LDL (μg/ml)	47.4 ± 29.9	43 ± 18.3	39 ± 15.0	31.2 ± 11.7

Probability index: $P \leq 0.05$ for all the measured compounds

Table 1: Average levels of antioxidants and lipids in patients before and during treatment with Vimang.



triglycerides (13%), total cholesterol (50%) and oxidized LDL, the main marker of oxidative stress in 100% of patients.

The figure 4 show the significative reduction of LDLox level during the treatment with Vimang.

In 93% of patients in blood glucose levels were high without throwing hospitalization criteria, therefore it was concluded that they had a poor metabolic control of the disease, which is basically attributed to the diet [10-12].

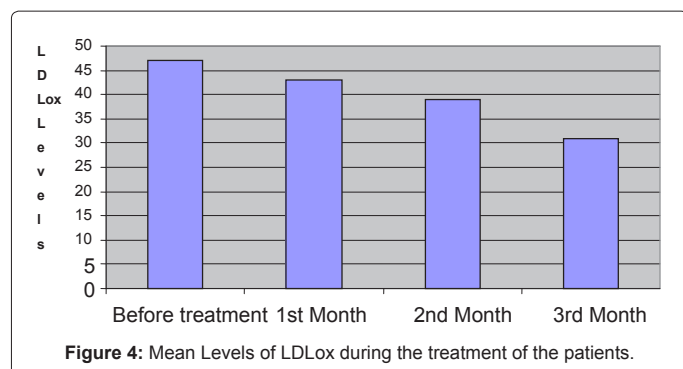
At the conclusion Vimang treatment, showed that increased serum levels of certain antioxidants, lipid levels as total cholesterol and LDL-C remained unchanged, HDL-C increased slightly and significantly reduced oxidized LDL. This suggests a decrease in the levels of lipoperoxides and therefore greater protection against oxidative damage of lipids thus might prevent or delay complications of diabetes mellitus in whose etiology involves oxidative stress.

Discussion

The decrease in antioxidant reserves produced the accumulation of free radicals, on the other hand, uric acid acts as an antioxidant together with vitamin C, the former has an unshared electron pair that captures the reactive oxygen species and the yield to vitamin C, forming a safe complex that is easily removed in the organism, finding reduced levels of either establishing the imbalance [7-9].

Studies in the Clinical Laboratory provincial pediatric teaching hospital "Eduardo Agramonte Piña" have shown that the sensitivity of LDL to oxidation is not associated with hyperlipidemia, but the degree of oxidative stress, which can unbalance the disease, the principal marker of the oxidative stress was the LDLox, due to this is the more atherogenic lipoprotein and the response of several events in the oxidative state.

Oxidation the LDLs alive in depends of several factors, some of whom they are subordinate to the midway like the activity of the



lipooxygenase in macrophages or free radicals' selection principal the anion superoxide that they are responsible of the peroxidation [1,3].

It has been demonstrated in diabetic patients than alterations for glucosylation of the structure of the LDL, they turn her the oxidation into a most prone particle, and this will be subject to the frequency of hyper-glycaemia. The LDL's oxidation not only results in a deep alteration of the lipids, but also of proteins [5,6].

The diagnosis of the stress oxidative for the clinical laboratory can sell off of easy way if we are able to lead spectrophotometric technicians toward the quest of the peroxidising- antioxidant unbalance that is triggered in any situation of stress itself. It is well known that this diagnosis comes true in a rut through the measurement of the damages caused on important macromolecules at its organism and no for these free radicals' direct measurement than they are approximately intangible for your fleeting nature [14,15].

Conclusions

- There is an oxidative stress in children affected by type-1 diabetes mellitus for 76% of diagnosed patients.
- In 100% of patients had a poor metabolic control of the disease associated with diet.
- It corrects the oxidative stress in diabetic children 300 mg daily for 3 months Vimang.

Recommendations

- Including the pharmacological treatment of type-1 diabetes mellitus an antioxidant drug to correct the oxidative stress.
- Insist on the metabolic control of the disease, based on achieving a balanced diet.

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