

Visfatin Levels in Iraqi Controlled Diabetic Patients and Uncontrolled Diabetic with Cardiomyopathy

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Abstract

The aim of the present study is to evaluate visfatin levels in uncontrolled diabetic patients and uncontrolled diabetic with cardiomyopathy and compare the results with healthy control. The study included ninety subjects with aged ranged (25-40) years and BMI (< 25) Kg/m². These were which divided into three groups as follows : group 1(G1): consist of 30 individuals as healthy control group, group 2(G2), consist of 30 patients with uncontrolled diabetes mellitus (DM). Group 3(G3) consist of 30 patients with uncontrolled DM, and cardiomyopathy as complication. Plasma was used in determination of fasting blood glucose (FBG), lipid profile [total cholesterol (TC), triglyceride (TG), high density lipoprotein (HDL), low density lipoprotein (LDL), very low density lipoprotein (VLDL)], C-reactive protein (CRP), insulin and visfatin. The results showed highly significant elevation in FBG, TC, TG, LDL, VLDL, while there are significant reduction in HDL levels when G2 compared with G1. The results, also showed significant elevation in these parameters when G3 compared with G2. The results revealed highly significant elevation in hs-CRP, insulin and visfatin levels when comparing G2 with G1. Also significant elevation in these parameters were noticed when G3 compared with G2. In conclusion, study found that the concentration of visfatin increase in uncontrolled diabetic patients with cardiomyopathy more than uncontrolled diabetic which indicate positive relation between visfatin and heart diseases. This study is the first of which has investigated these relationships.

Keywords: Visfatin, uncontrolled diabetic patients, uncontrolled diabetic with cardiomyopathy

Introduction:

Diabetes mellitus is a metabolic disorder characterized by hyperglycaemia and dyslipidemia resulting from decreased insulin secretion, resistance to insulin action or both [1,2]. Cardiovascular disease is a common complication of diabetes responsible for 80% of the mortality in the diabetic population [3,4].

Visfatin is a recently adipocytokine secreted by the visceral fat of both human and mice. Like insulin, it increases glucose transport and lipogenesis by adipocyte and myocyte and decreases glucose production by hepatocyte. It binds to insulin receptor but at a different binding site than insulin itself [5]. The affinities of visfatin and insulin for insulin receptors are similar but circulating visfatin concentration is at least 10 times lower than that of insulin in mice. The molecular mechanisms revealed that visfatin activates intracellular cascade for insulin signalling, including tyrosine phosphorylation of the insulin receptor and insulin receptor substrate-1/2 (IRS1/2) as well as downstream activation of protein kinase B [6,7].

Visfatin was also recognized as the formerly described nicotinamide phosphoribosyltransferase (Nampt), the limiting enzyme in nicotinamide adenine dinucleotide (NAD) biosynthesis. In addition to being produced in human leukocytes and adipose tissue, visfatin is also expressed in human and animal hepatocytes and muscles [8,9] and in animal adipocytes, kidney and heart [10]. Visfatin was found to be released predominantly from macrophages rather than from adipocytes in visceral adipose tissue. In this regard, there is sufficient evidence to consider that visfatin is expressed by the macrophages infiltrating adipose tissue and is produced in response to inflammatory signals [11]. It is now believed that visfatin actions can be endocrine, paracrine, and autocrine as well. These autocrine effects of visfatin may play an important role in regulating insulin sensitivity in the liver [12].

The aim of the present study is to evaluate visfatin levels in uncontrolled diabetic patients and uncontrolled diabetic patients with cardiomyopathy and compare the results with healthy control.

Materials & Methods

The study included ninety subjects with aged ranged (25-40) years and BMI (< 25) Kg/m² which divided into three groups as follows : group 1(G1): consist of 30 individuals as healthy control group, group 2(G2), consist of 30 patients with uncontrolled (dyslipidemia) diabetes mellitus (DM). Group 3(G3) consist of 30 patients with uncontrolled DM and cardiomyopathy as complication.

Plasma was used in determination of FBG, lipid profile [TC, TG, HDL] according to the standard procedures of the biochemistry laboratory of the hospital. LDL and VLDL concentrations were commonly calculated by using the Friedwald formula [13]:

LDL (mg/dl) = TC - (HDL + TG/5) and VLDL = TG/5.

C-reactive protein (CRP), insulin and visfatin determined through ELISA [14] according to the reagents working protocol attached to the analyzing kit.

Data are presented as mean± SD. The differences between two groups were analyzed by student's t-test. P-value of <0.05 and 0.001 considered significant and highly significant, respectively.

Results & Discussion

The levels of descriptive parameters in patients and control groups are summarized in table (1). The results which expressed as (mean± SD), showed highly significant elevation in FBG, TC, TG, LDL, VLDL, while there are significant reduction in HDL levels when comparing G2 with G1. The results, also, showed significant elevation in these parameters when comparing G3 with G2.

Table (1): levels of descriptive parameters in patients and control groups

Groups parameters	G1 n=30	G2 n=30	G3 n=30	P*	p**	p***
FBG(mg/dl)	89.3±19.7	206.8±29.8	404.1±45.9	<0.001	<0.001	<0.05
HbA1C%	5.83±0.97	8.90±0.82	10.2±0.54	<0.001	<0.001	<0.05
TC(mg/dl)	150.5±24.3	255.6 ±34.7	390.4±55.9	<0.001	<0.001	<0.05
TG(mg/dl)	120 ±30.4	245.7 ±33.9	390±31.8	<0.001	<0.001	<0.05
HDL(mg/dl)	48.8±2.88	32.9 ±4.9	28.2±5.9	<0.001	<0.001	<0.05
LDL(mg/dl)	77.1±12.8	173.4±33.7	283.2±42.5	<0.001	<0.001	<0.05
VLDL(mg/dl)	24.1±1.99	49.4±2.45	78.3±12.8	<0.001	<0.001	<0.05

P* P-value between G1 &G2, p** P-value between G1 &G3,p*** P-value between G3 &G2

A well-described pathway for the development of diabetic vascular complications involves activation of the diacylglycerol (DAG)-PKC pathway which induces by hyperglycemia this results in the development of complications through altered gene expression and/or protein function, thus contributing to cellular dysfunction and damage. A well-described pathway for the development of diabetic vascular complications involves activation of the diacylglycerol (DAG)-PKC pathway [15].

The most important risk factor for CHD (myocardial infarction, angina pectoris) was high LDL cholesterol, followed by low HDL cholesterol and HbA1c. Indeed, subjects having only a slight elevation of glucose often have hyperinsulinemia, VLDL , triglycerides and LDL [16].

The levels of CRP, insulin and visfatin in patients and control groups are illustrated in table (2). The results revealed highly significant elevation in CRP, insulin and visfatin levels when comparing G2 with G1. Also a significant elevation was found in these parameters when G3 compared with G2.

Table(2): levels of CRP, insulin and visfatin in patients and control groups

Groups parameters	G1 n=30	G2 n=30	G3 n=30	P*	p**	p***
hs-CRP(g/L)	2.36±0.38	4.12±0.49	6.54±0.63	<0.05	<0.05	<0.05
Insulin(μU/ml)	4.88±0.41	8.83±1.3	11.97±1.9	<0.0001	<0.001	<0.001
Visfatin(ng/ml)	22.4±6.1	42.3±9.5	58.7±12.3	<0.05	<0.0001	<0.05

P* P-value between G1 &G2, p** P-value between G1 &G3,p*** P-value between G3 &G2

Evidence suggests that increases in systemic markers of inflammation, such as hs-CRP are associated with DM and its complications [17].

It is suggested that increased levels of visfatin in insulin resistant diabetes mellitus might have been neutralized by other adipocytokines and have resulted in visfatin resistance and hyperglycaemia because visfatin acts on the same receptor as that for the insulin. They further established that visfatin used the system of tyrosine phosphorylation-dependent signaling for its action comparable to that of the insulin receptor [18]. Studies on adiposities have demonstrated that visfatin release is regulated by hormones and cytokines which influence glucose homeostasis [19,20]. Apart from the hypoglycaemic action, visfatin causes proliferation and production of type I collagen similar to that mediated by the insulin receptor transduction pathway[21].

Other study demonstrated that serum visfatin levels are decreasing with the improvement of serum lipid profiles. In addition, recent research showed that visfatin levels positively correlated with total cholesterol and LDL cholesterol levels [22].

In conclusion, study found that the serum concentration of visfatin increase in uncontrolled diabetic patients with cardiomyopathy more than uncontrolled diabetic which indicate the relation between visfatin and heart diseases..This study is the first of which has investigated these relationships.

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