ACADEMIC

Estimation of Visfatin Hormone Levels and Lipid Profile in Obese Patients

Zina L. Hassan*, Imad S. Saleh

College of Applied Sciences, University of Samarra, Samarra, Iraq

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ABSTRACT

This study aimed to examine the Visfatin hormone level and fats in a group of (20) obese males and (10) lean males as control. The study included measuring the Visfatin with biochemical assays; Total cholesterol (TC), Triglycerides (TG), low-density lipoprotein cholesterol LDL-C, High-density lipoprotein cholesterol HDL-C, and Very low-density lipoprotein cholesterol VLDL-C. The results showed a significant increase ($p < 0.05$) of Visfatin and the levels of TC, LDL-C, and VLD-C in the obese group compared to the normal group. In comparison to the research of healthy persons, there was a substantial reduction in HDL-C levels. In addition, the obese group had a significantly higher BMI than the normal group.

Keywords: Body Mass Index (BMI), Obesity, Visfatin.

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INTRODUCTION

Visfatin is one of the hormones that has been recently identified. It has been the subject of intense investigation since its discovery in 2005 to identify its significance.[1] Adipose tissue secretes the hormone, which is found in the cytoplasm and nucleus.[2] It has been found in various tissues and organs, including the brain, kidneys, lung, spleen, and testis, with visceral adipose tissue expressing it the most.[1] The hormone, which has 491 amino acids in humans,[3] is responsible for the secretion of several metabolic diseases, including obesity, diabetes, and metabolic syndrome. The hormone functions as an inflammatory immune cytokine linked to obesity, inflammation, and insulin resistance.[4] By attaching to the insulin receptor, it influences insulin resistance.[5]

Obesity is a disorder characterized by excessive fat buildup in adipose tissue because of an energy imbalance between intake and expenditure. Excess energy is stored as lipids in adipocytes in the body.[6] The nutritional, social, and genetic factors are among the essential factors that lead to obesity.[7] Obesity is a dangerous factor in the occurrence of many health problems[8] as the greater the percentage of fat accumulation in the body, the more it increases the chances of developing diseases resulting from them[9] cardiovascular disease, high blood pressure, type 2 diabetes, some forms of malignancies, infertility issues, and stone formation are just a few examples.[10,11]

MATERIALS AND METHODS

Samples

During this study 30 blood samples were collected for the period of (November 2018 to January 2019), which included 20 blood samples from males with obesity from Samarra district. The ages ranged between (50–25) years, and 10 samples for Healthy males do not suffer from any diseases with ages ranged between (50–25) years.

Preparation of Serum

5 mL of blood samples were drawn and placed in dry, clean, disposable, and plastic tubes. The coagulated part was separated from the clear solution using a centrifuge at a speed of (5000) rotation/minute for ten minutes. The clear solution represented the blood serum, and the serum was frozen at -20^{o}C to measure hormones and fats later.

Body Measurement

The height of the patients and healthy subjects were measured in centimeter unit, and their body weight was determined in kilogram units. The BMI standard was then determined by multiplying the weight in kilograms by the square of the height in meters, as follows:

Determination of Visfatin Hormone Level

The level of the hormone in the blood serum was determined using the ready-made analysis kit and with the ELISA technique.

*Author for Correspondence: zeena.lafta@uosamarra.edu.iq

Table 1: Levels of the Visfatin and serum lipid profile in healthy and obese individuals

Outcomes	*Healthy*	*Obese*	*p*
Visfatin	1.34 ± 0.11	2.44 ± 0.38	p<0.05
	b	a	
Total	96.46 ± 20.09	123.62 ± 32.21	p<0.05
Cholesterol	b	a	
Triglycerides	45.89 ± 11.03	59.36 ± 12.85	p<0.05
	b	a	
HDL-c	49.85 ± 15.77	26.11 ± 8.66	p<0.05
cholesterol		b	
	37.436 ± 11.45	85.657 ± 32.45	p<0.05
LDL-	b	a	
cholesterol			
VLDL-	9.18 ± 3.26	11.86 ± 2.57	p<0.05
cholesterol	b	a	

Biochemical Tests of Blood

The lipid profile represented by total cholesterol, triglycerides, and HDL-C was estimated using a ready-made analysis kit from the French company Biolabo, while the level of low-density lipoprotein cholesterol for cholesterol was counted using the equation: -

LDL-C concentration (mg/dL) = Total cholesterol-(HDL-C)- VLDL-C

For VLDL-C:

VLDL concentration (mg/dL) = (Triglycerides/5)

Statistical Analysis

The data were statistically examined using the statistical package for social sciences (SPSS) with a probability threshold ($p<0.05$) and the T-Test.

RESULTS AND DISCUSSION

Table 1 shows a substantial rise ($p=0.05$) in the efficacy of Visfatin, TC, TG, LDL-C, and VLDL-C in the research. Compared to healthy persons, obese people had a substantial reduction in HDL-C levels ($p=0.05$).

Visfatin is mostly associated with obesity,[12] insulin resistance,[13] type 2 diabetes, metabolic syndrome, cardiovascular disease.[14] Obesity is linked to a chronic inflammatory response, which is marked by the production of aberrant cytokines and the activation of certain pro-inflammatory signaling pathways, altering many inflammatory biomarkers as CRP, interleukin-6 (IL-6), tumor necrosis factor-alpha (TNFa), and visfatin.[15,16]

Visfatin exhibits comparable properties to insulin, as it binds to insulin receptors. Besides, insulin inhibitors also inhibit Visfatin.[17,18]

Also, increasing body fat levels causes an increase in the hormone level due to its relationship with insulin resistance, as the results of studies showed that reducing weight and getting rid of obesity leads to a decrease in hormone levels, due to the reduction of insulin resistance.[19]

The increase in total cholesterol levels may attribute to the high saturated fat diets, which causes an increase in the level of cholesterol.[20] Also, obesity has a fundamental role in increasing the total cholesterol concentrations, as increasing rates of obesity cause a decrease in the number of insulin receptors. It leads to an increase in insulin resistance in the fatty tissues and enhancing the fats metabolism imbalance, which leads to an increase in its level in the blood.[21] The TG level increase may be caused by the obesity-induced insulin resistance as the decrease in insulin level causes Inhibiting the activity of the lipoprotein lipase enzyme, which leads to a decrease in the removal of triglycerides in the chylomicron and VLDL, leading to an increase in the concentrations of glycerides in the blood.[22] Also, insulin deficiency causes the activation of the hormone-sensitive lipase in the fat cells, causing an increase in the degradation processes of stored triglycerides.[23]

The current results also showed an increase in the level of LDL-C. The reason may be the increase in saturated fatty acids resulting from increased fat intake, which will impede the process of filtering LDL-c particles as it reduces the effectiveness of the LDL-c receptors. This leads to the accumulation of LDL particles at high concentrations,[24,25] and that the causes of high levels of VLDL-C are due to the effect of obesity and insulin resistance that affects the production of VLDL-c as it provides fatty acids for manufacturing as the delivery of fatty acids from tissues to the liver increases. Insulin has been found to inhibit the production of VLDL-c. Studies have found that the concentration of VLDL-c in the plasma decreases in response to elevated insulin levels. The decrease in HDL-C occurs because of high fat intake, which causes an increase in triglycerides and total cholesterol levels in tissues and blood vessels.[26] This, in turn, creates an impediment to HDL-work c's and reduces its efficiency in transporting cholesterol from tissues to the liver.[26,27]

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