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Apelin level and biochemical parameters in Iraqi dyslipidemia diabetic patients

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Abstract

Type 2 diabetes is a metabolic disease that is typically characterized by alterations in adipocyte metabolism, which contribute significantly to insulin resistance and vascular issues. In light of this, the study's objective was to ascertain how apelin levels and a few other biochemical alterations affected Iraqi individuals with diabetes and dyslipidemia. In this study, 45 diabetic patients with dyslipidemia also exhibited higher blood levels of apelin and several other biochemical indicators. Hemoglobin A1c, triglycerides, low-density lipoprotein, and high-density lipoprotein are a few instances. These samples were compared to forty-five samples from the healthy group.. The examination of the data showed that, in comparison to the healthy group, the diseased group had considerably higher levels of total cholesterol, low-density lipoprotein, and triglycerides ($P > 0.001$). In comparison to the healthy group, the study discovered a significant difference ($P < 0.001$) in the blood serum's HDL levels. According to the study, apelin levels can be utilized to recognize and classify type 2 diabetes. Furthermore, these adipokines may aid in the development of insulin resistance given the significant variations in blood apelin levels seen in type 2 diabetic patients.

Keywords: Apelin, Dyslipidemia, HbA1c, Lipid profile, Type 2 diabetes mellitus

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Introduction

Apelin is an adipocytokine that was just recently discovered [1] and is extensively articulated in various organs, including the liver, heart, endothelium kidney, adipose tissue, and lung. Additionally, apelin promotes angiogenesis and the growth of endothelial cells [2]. By partially reducing oxidative stress, APJ, the receptor for apelin, exhibits pleiotropic effects in both humans and animals and is involved in the prevention of cardiovascular diseases. The development of DN is significantly influenced by oxidative stress [3].

Therefore, apelin might be involved in DN. In this study, I looked at a cohort of people with and without type 2 diabetes mellitus to determine the apelin concentration and its correlation

with the urine protein to creatinine ratio and other metabolic markers. A lot of study has been done recently to pinpoint the molecular functions of apelin and the signaling pathways that are connected to the emergence of disease [4]. Apelin is an adipokine that may be useful in the early diagnosis of diabetes mellitus [5]. Several adipocyte-derived secretory factors (also known as "adipokines") have been shown to exist in numerous investigations over the past 10 years and have been implicated in the regulation of glucose metabolism and body energy homeostasis [6]. A novel peptide with the name apelin (also known as APJ receptor ligand) [7] has just been discovered among them. [Boucher et al. showed that apelin, which functions as an adipokine, is generated and secreted by both human and mouse white adipose tissue. T2DM is characterized by diminished pancreatic beta-cell insulin production and decreased peripheral tissue insulin sensitivity, which results in overt hyperglycemia [8]. the goal of this research was to evaluate the effect of apelin levels and some biochemical markers in Dyslipidemia Diabetic Iraqi Patients.

Material and Methods

In this study, participated (45) diabetic dyslipidemia patients were compared to 45 healthy people. Healthy samples were taken from the general public, whereas patient samples were taken from Al-Yarmouk Teaching Hospital. After a 12-hour fast was followed by the collection of blood samples, three ml of venous serum was separated using a centrifuge for 10 minutes at 3500 rpm after the blood was drawn and allowed to clot for 30 minutes at room temperature. Measured level serum of the (Apelin, FBG, HbA1c, HDL, TC, TG, and LDL) by using collected information about age. Weight and height were measured for Body mass estimation, the following equation was used to determine body mass index, which is equal to weight in kilograms divided by height in square meters (kg/m^2):

BMI = Weight (kg) / (Height) (m))^2.

The results were analyzed using the SPSS 26.0 program, and the following tests:

- (T-test): If the p-value for the difference between the means of any two groups is less than (0.05), the difference is considered significant.
- Pearson correlation coefficient: is used to determine the state and strength of the link between Apelin and other biochemical markers.

Result

Table (1) shows the clinical and anthropometric data for the control group and Diabetic Dyslipidemia Patients. Levels of (age, weight, and BMI) increased in diabetes patients with dyslipidemia compared with control groups, with a significant difference ($P \leq 0.05$). Regarding the clinical features, it was shown that the dyslipidemia diabetic group had higher serum levels of (FBS, HBA1c, TC, TG, LDL, and Apelin) than the control group, with a highly significant difference ($P \leq 0.001$). While it was observed that the levels of (HDL) decreased compared to the control group with a highly significant difference ($P \leq 0.001$), figure (1) shows the levels of the groups examined. The connection between activity (apelin) and other parameters in Dyslipidemia Diabetic Patients was explained in (Table 2) where appear apelin a weak negative association with (age, height, weight, and HDL) while with each of (BMI, HBA1c, TC, and TG) have a weak positive link, As for the association of LDL with Apelin it is association is medium weak.

Table 1.

(Mean±SD) Demographic and clinical characteristics of the studied groups

Parameter	Mean±SD		p-value
	Control (n=45)	Dyslipidemia patients (n=45)	
Age (year)	47.31±4.36	50.15±4.08	0.002
Weigh(kg)	74.24±10.94	82.06±10.67	0.001
Height(cm)	169.06±5.34	164.83±9.22	0.011
BMI (kg/m2)	25.95±3.4	30.21±3.78	0.0001
APELIN	125.48±85.22	502.11±342.136	0.0001
FBS(mg/dl)	84.33±5.15	207.64±60.28	0.0001
HbA1c (%)	4.82±0.30	8.79±1.27	0.0001
TC(mg/dl)	158.06±29.32	229.88±54.52	0.0001
TG(mg/dl)	91.64±4.49	265.4±59.03	0.0001
HDL(mg/dl)	53.31±5.31	34.75±1.44	0.0001
LDL	86.42±29.61	142.05±57.23	0.0001

Figure 1.

Shows the levels of the groups examined

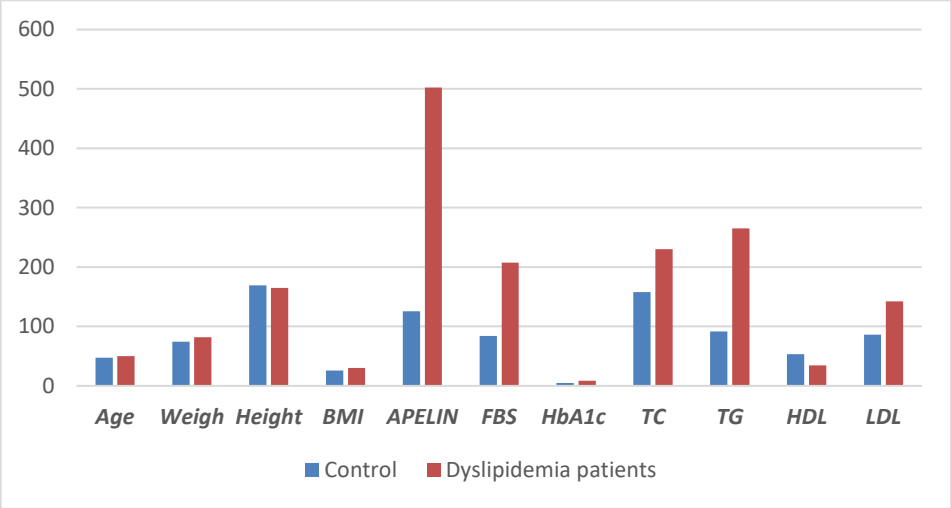

Table 2.

Correlations between Apelin activity and other variables in the Dyslipidemia Diabetic Patients Group

Parameters	Apelin		
	r	p-value	Correlation state
Age	-0.010	0.150	Weak negative correlation
High	-0.015	0.134	Weak negative correlation
Weight	-0.016	0.115	Weak negative correlation
BMI	0.339*	0.301*	Weak positive correlation
FBS	0.314*	0.925**	Weak positive correlation
HBA1c	0.323*	0.880**	Weak positive correlation
TC	0.370*	0.650**	Weak positive correlation
TG	0.027*	0.858**	Weak positive correlation
HDL	-0.272*	0.358*-	Weak negative correlation
LDL	0.576**	0.618**	Weak middle correlation

Discussion

When the body cannot utilize the insulin that is produced by the pancreas or when it does not produce enough of it, develops a chronic disease known as diabetes [9]. Inside the human body, adipocytes secrete a group of molecules called adipokines, In type 2 diabetes, Among the numerous adipokines that contribute to blood glucose regulation and bodily energy is the peptide known as "Apelin" [10]. Apelin is a hormone peptide. It is present in high concentrations in the heart, kidneys, adipose tissue, lung, liver, and endothelium [11]. Apelin contributes to the treatment of obesity because apelin regulates the process of lipolysis within the adipose tissue [12], also apelin participates as a treatment in insulin resistance, in a study conducted on mice and humans, it was found that intravenous injection of apelin leads to a decrease in blood sugar by increasing the use of glucose in the skeleton and muscles[13]. In the current study, higher levels serum of apelin were found in the patient's group in contrast to the healthy group, and this is identical to the findings of earlier studies [14], the reason for the elevated level of apelin in this group of patients is that the pathophysiology of various diseases, including hypertension, diabetes, dyslipidemia, heart disease, and obesity is significantly influenced by the apelin/APJ system. [15].Also This research, found high levels serum of (TC, TG, LDL) and low levels serum of (HDL) This is similar to the study [16] [17], The reason is that a lack of insulin leads to a rise metabolism of free fatty acids and lipid metabolism, and increased vascular risk is significantly affected by lipid metabolism. Fat cells may degrade from their stored TAG forms as a result of insulin resistance in T2DM patients, increasing the release of free fatty acids into the bloodstream. Increased plasma fatty acid levels cause the liver to absorb more fatty acids. These fatty acids are taken by the liver, which turns them back into TAGs. Apolipoprotein B and VLDL-C are secreted and assembled more readily when there are more TAGs present [18]. Particularly in obese people with diabetes, an increase in TC may be caused by decreased cholesterol absorption and increased cholesterol production, which implies that diabetes modifies lipid metabolism [19] Reduced lipoprotein lipase (LPL) activity in T2DM may be the cause of lower HDL-C activity [20]. This study showed that diabetic patients' FBG and HbA1c levels were significantly higher when compared to the control group. Hyperglycemia, which is the primary characteristic of DM, makes these findings likely [21].

Conclusions

The study found that compared to the healthy group, those with T2DM and dyslipidemia had significantly elevated apelin levels. Where the results are that dyslipidemia is more

common in people who have poor glycaemic control. This could play a significant role in how quickly diabetic patients' CVD progresses.

Abbreviations

Not applicable

Declarations

Ethics approval and consent to participate

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Competing Interests

The author declares that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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