Short Communication

A Correlation of Alarin with Some Anthropometric Measurements in Iraqi Type II Diabetic Patients

Russell S. A. Al-Shaabani, Shakir F. T. Alaaraj

Department of Chemistry, College of Education for Pure Science, University of Anbar, Ramadi, Iraq

Abstract

Background: Diabetes mellitus (DM) is a group of chronic metabolic diseases that affect the body's ability to produce insulin. It is one of the most common endocrine disorders. **Objectives:** This study aims to measure whether there was any association between alarin and some anthropometric measurements (AMs) such as waist/nick (W/N), waist/thoracic (W/T), waist/hip (W/H) in Iraqi type II diabetic patients. **Materials and Methods:** This study included 43 patients from Ramadi Teaching Hospitals, in addition to 43 healthy controls. Enzyme-linked immunosorbent assay was used to determine serum alarin level, while the fasting serum glucose (FSG) level was determined by enzymatic colorimetric methods. **Results:** Serum alarin (ng/mL) was higher in DM patients than in HCs ($P < 0.0001$), body mass index (BMI) was significantly higher in patients with T2DM, in addition, FSG) mg/dL (was higher in T2DM than HCs. Furthermore, alarin was positively associated with BMI (0.151), W/H (0.006), W/T (0.008), W/N (0.1260), and FSG (0.612). The receiver operating characteristic (ROC) curve indicates that alarin and FSG were excellent sensitive markers in the diagnosis of T2DM. Moreover, ROC indicated that W/N gave good sensitive signs. New values of the cutoff value for studied variables have been estimated as follows: alarin (>2.035 ng/mL), W/H (>0.9554), W/T (>0.9633), W/N (>2.665), H/T (>1.06), and FSG (>116.5 mg/dL). **Conclusion:** A very weak correlation appeared for alarin with AMs; the serum level of alarin was higher in T2DM than HCS; this means alarin may be used as a novel biomarker in the detection of T2DM and may be an effective biomarker in the diagnostic test for the disease.

Keywords: Alarin, fasting serum glucose, waist/hip, waist/thoracic

Introduction

Hyperglycemia is a hallmark of type 2 diabetic metabolic disorder, in which an interaction between genetic and environmental factors leads to chronic hyperglycemia. Five hundred thirty-seven million people have been diagnosed with diabetes mellitus (DM) worldwide. According to the International Diabetes Federation, nearly 90% of these adults have this form of T2DM. Hyperglycemia, a key characteristic of diabetes, occurs because insulin's usual role as a hormone controlling glucose metabolism is abnormal.[1] Diabetes problems are linked to poor glycemic control, which can be prevented by effective diabetes management. Poor control has been linked to a number of variables, including age, gender, obesity, exercise, and education, in a number of contexts.[2] Galanin-like peptides, alarin, and spexin are members of the galanin polypeptide family, which may regulate glucose metabolism, treat insulin resistance (IR), and reduce the risk of T2DM, a physiologically active peptide called alarin contains 25 amino acids, which is newly found, with a wide range of activities in the central, peripheral and nervous system, galanin family is a multidirectional group of neuropeptides.[1]

Alarin has been found in primary ganglion cells of human neuroblastoma. The term "alarin" comes from the amino acid alanine from the N end of serine. The diverse distribution of alarin draws attention to a range of

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Address for correspondence: Russell S. A. Al-Shaabani, Department of Chemistry, College of Education for Pure Science, University of Anbar, Ramadi, Iraq.
E-mail: rus21u4003@uoanbar.edu.iq

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physiological functions connected to its localization in a particular region of the body. Its fundamental regulatory role in controlling eating behavior is linked to its expression in the brain. Besides its perivascular location, blood vessels to the skin and eyes, homeostasis of energy, and glucose are also present. Alarin has been linked to a number of clinical diseases, including obesity, metabolic syndrome, T2DM, IR, and diabetes retinopathy; alarin plays an important role in maintaining glucose homeostasis.[3]

Alarin is a fatty molecule that plays a functional role in insulin-mediated glucose uptake in a number of rodent organs. Previous studies found that alarin reduced plasma glucose and retinol-binding protein 4 levels in male rats, despite the fact that the exact mechanism underlying the effect of alarin on glucose uptake and insulin sensitivity remains obscure. Zhang *et al.*[4] also found that increased glucose influx is closely associated with increased alarin release. This indicates that central alarin treatment in rats with T2DM increases glucose uptake in skeletal muscle. Several plausible processes have been postulated, but the actual mechanism behind the effect of alarin on glucose uptake and insulin sensitivity remains unknown.[5] Alarin suggested that raising GLUT4 levels and translocation from intracellular aggregates to the plasma membranes of fat and muscle cells would enhance cellular glucose uptake and insulin sensitivity. According to recent data, people with newly diagnosed T2DM had higher levels of alarin than control groups.[6] Another study discovered that when compared to healthy people, those with diabetes and impaired glucose tolerance had significantly greater alarin concentrations. However, T2DM serum alarin levels were significantly greater than HCs.[7]

According to the new paper, the concentration of both plasma and aqueous alarin levels in DR patients are substantially greater than in the HCs; this demonstrates the significance of alarin in DR, albeit it is still unknown whether alarin acts as a preventative measure or a contributor to the onset of diabetic retinopathy.

Materials and Methods

Patients and study design

Eighty-six subjects were included in this study, forty-three of whom had T2DM; they were diagnosed with the disease through a fasting serum glucose (FSG) test after at least 8 h of fasting. Forty-three subjects were enrolled in the study as HCs; they were matched by age, gender, and ethnic background with T2DM patients. The age of all respondents ranged from 30 to 60 years. Al-Ramadi Teaching Hospital was chosen as the place for sampling between November 2022 and January 2023. The concentration of alarin in the samples was determined using enzyme-linked immunosorbent assay (ELISA) (BT LAB Inc, China). All study participants were given anthropometric measurements (AMs). Body mass index (BMI) was computed by dividing weight (kg) by height squared (m^2), (waist/nick [W/N]), (waist/thoracic [W/T]), (waist/hip [W/H]), and the ratio of the hip to chest (H/T) was determined.

Sample collection and analysis

Samples were collected from Ramadi Teaching Hospital. The blood used in this study is venous blood after 8 h of fasting. The blood was centrifuged at 1500 × *g* for 10 min to separate the serum. The serum was then stored in eppendorff tubes at 20°C until the time of analysis. The serum of each individual was analyzed for alarin using an ELISA kit purchased from (BT LAB/China); Measurement was performed using an ELISA microplate reader. The FSG level of each sample was measured by the spectrophotometric method.

Statistical analysis

Statistical investigations of these results were performed with Graph Pad Prism version 7.04 (Graph Pad Software, La Jolla, California). Consequences are stated as the mean, standard error of the mean (SEM), and standard deviation (SD). The statistical significance of the interpersonal differences was verified with a *t*-test, while the accuracy of the investigation was measured by the area under the curve (AUC) of the receiver operating characteristic (ROC) curve. $P < 0.05$ was measured to be statistically significant. Cutoff values, sensitivity, and specificity were determined.

Ethical approval

All subjects involved in this work were informed, and the agreement was obtained verbally from each one before the collection of the samples. This study was approved by a local committee of publication ethics at Anbar Health Directorate, Iraq, under reference number BMS 0392/016, on November 15, 2022.

Results

As shown in Table 1, results for the patients and the control group are expressed as the mean and the SD. Standard experimental features were described with a mean age (years) of 48 years for healthy subjects and 50 years for patients.

The association of alarin with other study variables is listed in Table 2. It was tested in the form of Pearson correlation coefficient and *p*-value. Alarin showed a moderate association with a medium correlation with FSG (r=0.612, p=<0.0001). While it gave a weak positive correlation with each of Age (r=0.208, p=0.054).

Table 3 shows that if the test value is higher than the table value (0.5), then all the tested parameters have some relevance to the T2DM prediction, and the result of the AUC hypothesis can be considered important.

Table 1: Comparisons of parameters between two studied groups

Parameter	Healthy controls			T2DM patients			*P*-value
	Mean	SD	SEM	Mean	SD	SEM	
Alarin (ng/mL)	1.479	0.411	0.063	2.518	0.557	0.085	<0.0001
Age (year)	48.21	8.399	1.281	50.35	6.74	1.028	0.1962
BMI (kg/m^2)	26.83	2.964	0.452	28.14	2.767	0.4219	0.0375
W/H	0.9549	0.1827	0.02786	1.029	0.1872	0.02855	0.0657
W/T	0.9945	0.1847	0.02817	1.088	0.205	0.03126	0.0290
W/N	2.637	0.4153	0.06333	3.002	0.4501	0.06864	0.0002
H/T	1.049	0.112	0.01708	1.066	0.1468	0.02238	0.5518
FSG (mg/dL)	92.7	8.199	1.25	167.9	39.71	6.056	<0.0001

Table 2: Association of Alarin with studied parameters

Correlation of alarin with all studied parameters		
Parameter	***r* (alarin, ng/mL)**	***P*-value**
Alarin (ng/mL)	1.000	0.000
Age (year)	0.208	0.054
BMI (kg/m^2)	0.151	0.174
W/H	0.006	0.957
W/T	0.008	0.943
W/N	0.126	0.259
H/T	-0.005	0.961
FSG (mg/dL)	0.612	<0.0001

The following assessment can be performed for each parameter in this context. While the variable in our research provided a very accurate indicator for diagnosing diabetes, as values of alarin [AUC=0.9424; P < 0.0001; 95% CI: 0.8903 to 0.9945 and SE: 0.02657].

Discussion

A significant worldwide health issue is type 2 diabetes. Abnormalities in the metabolism of carbohydrates, lipids, and proteins are a hallmark of T2DM. It is caused by either IR, insufficient insulin security, or both. T2DM is the most prevalent of the three primary kinds of the disease. The key factor is the gradually declining ability of pancreatic cells to secrete insulin, which typically occurs in the context of pre-existing IR in the muscles, liver, and adipose tissue.[15]

This study shows that the disease biomarkers FSG are more sensitive and specific for the diagnosis of T2DM; it was discovered that patients with T2DM had higher alarin levels than the control group. It has been discovered that alarin is a multifunctional peptide with a variety of physiological roles, most of which are related to its anatomical location in a specific region of the body. Alarin and the whole-body insulin sensitivity index were found to be negatively associated, according to a number of data. Serum alarin levels are often decreased by severe hyperinsulinemia, although increased alarin levels have been reported following oral glucose injection. Alarin levels are much higher in both plasma and water, according to Gül *et al.*,[8] comparing patients with diabetic retinopathy and a control group. Although it is not yet clear whether alarin has a protective effect or contributes to the development of diabetic retinopathy, this indicates that alarin plays an important role in the disease. However, a compensatory reaction to diabetic retinopathy or possible alarin resistance may result in higher levels of alarin in the aqueous humor. Elevated levels of alarin may indicate diabetic retinopathy, which is associated with a change in the structure of blood vessels in the retina.[9,10]

A growing body of research shows that alarin plays a role in several disease disorders, including heart failure, high blood pressure, obesity, T2DM, and MetS. These roles can be nurse or protective. Previous research found that obese T2DM patients had significantly higher plasma alarin levels than the group of nonobese T2DM patients.[11-14] Additionally, compared to normal-weight healthy subjects, overweight individuals showed more alarin. A positive association between alarin and body measurements such as BMI, waist circumference, and hip circumference has been detected in several studies. This suggests that alarin may contribute to the development of obesity.[15,16]

It has been demonstrated that MetS has an independent relationship with the levels of alarin in the blood, which is characterized by central obesity, high blood pressure, high triglyceride levels, low HDL cholesterol levels, and IR. Additionally, it has been noted that people with MetS have blood alarin levels that are much greater than those of healthy individuals; results of our study support a study (2022) that serum alarin levels are higher in women with MetS, which supports that FSG, BMI, waist circumference, blood pressure, triglycerides, total cholesterol, hemoglobin were positively associated with alarin in MetS patients.[16,17]

AMs of general obesity (BMI) are a major risk factor for people with T2DM. In a previous study, a positive relationship between alarin and BMI was revealed.[7] According to this study, our data also showed that (W/H, W/T, and W/N) were higher in T2DM patients than in the control group. Present results revealed a statistically

Table 3: Area under ROC curve for all analyzed Parameters in T2DM

Parameter	Positive if cutoff value	AUC	Sen%	Spec%	LHR	*P*-value
Alarin (ng/mL)	>2.035	0.9424	90.7	90.7	9.75	<0.0001
W/H	>0.9554	0.6301	58.14	58.14	1.389	0.0378
W/T	>0.9633	0.6344	65.12	65.12	1.867	0.0318
W/N	>2.665	0.7363	69.77	69.77	2.308	0.0002
H/T	>1.06	0.5549	58.14	58.14	1.389	0.3807
FSG (mg/dL)	>116.5	1	100	100		<0.0001

significant increase in the level of Alarin in patients with T2DM when compared to the control group; according to the results of the current research, a high level of alarin in the blood is associated with a high level of glucose in the blood, which leads to an imbalance, and in agreement with a previous study showing that alarin plays a role in regulating the balance of glucose in blood.[17]

Conclusion

The present study found that the serum alarin level was significantly higher in T2DM patients than in HCs, and it is strongly associated with FSG. Thus, our results revealed that periodic assessment of serum alarin levels could be a good biomarker for predicting the risk of T2DM infection.

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Conflicts of interest

There are no conflicts of interest.

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