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Research Article

ASSOCIATION OF HYPOADIPONECTINEMIA TO A COMPLETE CHOLESTEROL TEST AND GLYCEMIC CONDITION IN FEMALES WITH TYPE 2 DIABETES IN THE PRESENCE AND ABSENCE OF CORONARY ARTERY DISEASE (CAD)

¹Dr Sidra Nisar, ²Dr Ghulam Ali Hasnan, ³Dr Salman Mahmood

¹ Combined Military Hospital, Lahore, ² Services Institute of Medical Sciences Lahore, ³ Govt THQ Hospital Raiwind, Lahore.

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Abstract:

Objective: We aimed in this analysis to observe the revolving adiponectin absorption in type 2 diabetic females in the presence and absence of coronary artery disease (CAD) and to develop an association of adiponectin intensity complete cholesterol test and glycemic condition of these females.

Study Design: A cross sectional type of investigative analysis.

Place and duration: This analysis was conducted in the Services Hospital, Lahore for the duration of one year from December 2017 to November 2018. The verification of this analysis was gained from Ethical Committee of Services Hospital, Lahore.

Methodology: The analysis comprised of 74 female patients out of which 26 were with high blood sugar, 24 high blood sugar with coronary artery disease (CAD) and 24 were healthy. All the enrolled patients were sorted out casually. Blood samplings with fasting were gotten from the patients and observed for serum adiponectin intensity, fasting blood glucose (FBG), very low-density lipoprotein cholesterol (VLDL-C), Low density cholesterol (LDL-C), High density lipoprotein cholesterol (HDL-C), total cholesterol (TC), triglycerides (TG) and glycosylated hemoglobin (HbA1c)

Results: The intensity of serum adiponectin and intensity of HbA1c and FBG was instantly minimum and maximum respectively where the value of P was less than 0.001 both found as a matching between type 2 high blood sugar female patients having presence and absence of coronary artery disease (CAD) and healthy women. Negative relativity of adiponectin with FBG where r was - 0.874, value of P was less than 0.01, r - 0.497, value of P was less than 0.01, Triglycerides where r was -0.669, value of P was less than 0.01, r - 0.790, value of P was less than 0.01, total cholesterol where r was - 0.423, value of P was 0.039, r - 0.733, value of was less than 0.01 and HbA1c where r was -0.937, P value was less than 0.01, r - 0.814, P value was less than 0.01 was observed in female participated patients of high blood sugar in the presence and absence of CAD. All three groups which were comprising of healthy females where r was 0.988 with value of P less than 0.01, type 2 high blood sugar with the presence of coronary artery disease where r was 0.775 with P value less than 0.01 and type 2 high blood sugar with the absence of coronary artery disease where r was 0.908 with the P value less than 0.01 shown an instant positive relativity of adiponectin.

Conclusion: Intensity of serum adiponectin is significantly decreased in female patients of type 2 high blood sugar with the presence and absence of coronary artery disease. Furthermore, the hypo adiponectinemia in these female patients is associated with un-balanced glycemic condition and intensity of abnormal lipid profile throughout the flow.

Key words: Lipid profile, Type 2 diabetes mellitus, Glycemic status, Adiponectin, coronary artery disease (CAD).

Corresponding author:

Dr. Sidra Nisar,
Combined Military Hospital, Lahore.

QR code



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INTRODUCTION:

Type 2 high blood sugar with group of metabolic disorders characterized by high blood sugar intensity over a prolonged period is raising in the popularity and grown as a universal issue. A most usual category of high blood sugar is type 2 diabetes mellitus (DM) and accountable in people with high blood sugar above than a percentage of 90.0 % and it influences grown up people with the percentage of 5.1 % [1]. It is developing rapidly which is found as a value of percentage 3.0 % annually and is probable to harm approximately 330 million of population in the world till the year 2030 [2]. The occurrence of high blood sugar is found maximum in Pakistan undergoing the limits between percentage of 7.6 % to 11.0 % [3]. Pakistani high blood sugar people might raise with the number of 5.2 million to 13.9 million from the year 2000 to 2030 reported by Wild et al. the coronary artery disease is one of the usual complexities of high blood sugar mellitus and it goes through the maximum mortalities alone than the combined mortalities causing through cancer, chronic lower respiratory disease, accidents and DM [4]. The occurrence of coronary artery disease is thought to be two times from the year 1990 to 2020 and raise with the percentage of 82.0 % would be happened by the raised load in the progressing countries else than the progressed countries [5]. Adiponectin has currently concerned more courtesy because it got extensive part in health and ailment as it was analyzed before in the year 1995 [6]. It is concealed with adipose tissue besides to adipokines and is a protein hormone consisting amino acids 244 [7]. Adiponectin molecules have the aptitude to self – subordinate and present in minimum three maximum order complicate states named as low molecular weight form (LMW), medium molecular weight form (MMW) and high molecular weight form (HMW) [8]. Adiponectin influences carbohydrates and plays a role as insulin sensitizing, anti-inflammatory, anti-hyperlipidemic, anti-hypertensive, cardio-protective and anti-atherogenic representative [9]. The act of adiponectin in type 2 DM and CAD.

The role of adiponectin in type 2 differs with the pre-existing vascular ailment, race, lifestyle differences, gender and age [10]. We have performed matching of intensity of serum adiponectin among normal female patients and female patients with type 2 high blood sugar having presence and absence of coronary artery disease and strained to develop an association among hypoadiponectinemia and lipid profile and glycemic level in the analyzed number of people through this analysis.

MATERIAL AND METHODS:

The analysis comprised of 74 female patients out of which 26 were with high blood sugar, 24 high blood sugar with coronary artery disease (CAD) and 24 were healthy. All the enrolled patients were sorted out casually. Blood samplings with fasting were gotten from the patients and observed for serum adiponectin intensity, fasting blood glucose (FBG), very low-density lipoprotein cholesterol (VLDL-C), Low density cholesterol (LDL-C), High density lipoprotein cholesterol (HDL-C), total cholesterol (TC), triglycerides (TG) and glycosylated hemoglobin (HbA1c). This analysis was comprised of three groups A, B and C. group A was consisting of controlled healthy female enrolled patients with the number of 24 which have no main disease like diseases of kidney or thyroid, coronary artery disease, diabetes mellitus (DM). Female high blood sugar enrolled patients with the number of 26 were included in Group B having type 2 high blood sugar mellitus since last four years. Number of 24 type 2 high blood sugar female enrolled patients having coronary artery disease which were treated with first heart attack in the duration of last 10 days were included in Group C. A well- developed survey was processed to state the BP, weight, height, BMI and literature of the selected patients where the weight was expressed in Kg and Hight in m2. Total conversant written agreement was collected from the total enrolled patients and verification of the analysis was gotten from the Ethical Committee of Services Hospital, Lahore.

Approximately 5.0 ml of fasting blood samplings was obtained from total selected patients and 3.0 ml clotted blood was processed by centrifugation apparatus for getting clear serum at 4000 rpm for 5 minutes to 10 minutes. Lipid profile and fasting blood glucose were evaluated through processing of fresh samplings. Samplings gathered in the EDTA tubes were processed for the evaluation of glycosylated hemoglobin. The serum stored at -70.0 degree centigrade was used to predict the intensity of adiponectin. Biochemical analysis: enzymatic colorimetric procedure was processed to evaluate the fasting blood glucose, serum triglyceride and serum total cholesterol through kits gotten by Elitech -Sees, in France. High density lipoprotein cholesterol was predicted calorimetrically through equipment given by Diasys Holzheim, in Germany. Low density lipoprotein cholesterol (LDL - C) and VLDL - C were evaluated through Friedewal's formula and Delongs formula accordingly [11,12].

The evaluation of Glycosylated hemoglobin was processed calorimetrically through the equipment given by Human Diagnostic in Germany. The prediction of intensity of Adiponectin was processed through Human adiponectin ELISA equipment where the Bio-vendor Cat.no. RD 195023100 in Germany. The information was studied through SPSS 19. The outcomes were presented as Average \pm Standard Deviation. Matching of different values between the groups was processed through independent student's examination. Value of P was less than 0.05 suggested as definite. The relativity of adiponectin with glycosylated hemoglobin, fasting lipid profile and fasting blood glucose was observed by Pearson's correlation coefficient.

RESULTS:

The intensity of serum adiponectin and intensity of HbA1c and FBG was instantly minimum and maximum respectively where the value of P was less than 0.001 both found as a matching between type 2 high blood sugar female patients having presence and absence of coronary artery disease (CAD) and

healthy women. Negative relativity of adiponectin with FBG where r was - 0.874, value of P was less than 0.01, r - 0.497, value of P was less than 0.01, Triglycerides where r was -0.669, value of P was less than 0.01, r - 0.790, value of P was less than 0.01, total cholesterol where r was - 0.423, value of P was 0.039, r - 0.733, value of was less than 0.01 and HbA1c where r was -0.937, P value was less than 0.01, r - 0.814, P value was less than 0.01 was observed in female participated patients of high blood sugar in the presence and absence of CAD.

All three groups which were comprising of healthy females where r was 0.988 with value of P less than 0.01, type 2 high blood sugar with the presence of coronary artery disease where r was 0.775 with P value less than 0.01 and type 2 high blood sugar with the absence of coronary artery disease where r was 0.908 with the P value less than 0.01 shown an instant positive relativity of adiponectin. Group A comprised of number of 24 healthy female patients with average age of 44 years where the standard deviation is \pm 4.6, Group B comprised of number of 26 type 2 high blood sugar female patients having average age of 56.8 years where standard deviation is \pm 11.3 and Group C comprised of type 2 high blood sugar female patients having coronary artery disease with average age of 58.7 years where standard deviation is \pm 9.1. Intensity of serum adiponectin was maximum in the control group that is 12.7 ± 2.5 as a matching difference from type 2 high blood sugar female patients that is 3.3 ± 1.4 and type 2 high blood sugar female patients of coronary artery disease which is 3.5 ± 1.1 . Intensity of serum HDL - C was minimum in type 2 high blood sugar female patients with CHD where average and SD was 35.04 ± 7.7 versus type 2 high blood sugar female patients and the control female patients where average and SD was 39.04 ± 1.3 and 43.5 ± 10.6 respectively. The matching of the two alimented groups was indefinite almost both presented lesser glycemic control and unbalanced lipid profile. Details of the above given outcomes are shown below in following tabular forms.

Table No 01: Demographic, clinical and biochemical characteristics of all groups

Variables	Group A	Group B	Group C
Age (years)	44 ± 4.60	56.8 ± 11.3	58.7 ± 9.1
BMI (kg/m ²)	28.8 ± 3.30	27.1 ± 4.20	27.9 ± 3.02
SBP (mmHg)	123.1 ± 8.50	136.9 ± 18.7	128.5 ± 31.7
DBP (mmHg)	80 ± 4.10	85.5 ± 9.80	86.04 ± 14.5
FBG (mg/dL)	96.0 ± 12.5	182.7 ± 83.3	208.7 ± 111.3
HbA1C (%)	5.1 ± 0.41	8.1 ± 1.20	8.8 ± 1.60
TC (mg/dL)	186.6 ± 29.5	223.6 ± 37.5	215.3 ± 45.8
TG (mg/dL)	183.1 ± 73.8	251.7 ± 77.02	218.1 ± 75.2
HDL – C (mg/dL)	43.5 ± 10.6	39.04 ± 11.3	35.04 ± 7.70
LDL – C (mg/dL)	106.1 ± 29.3	134.1 ± 36.8	136.7 ± 41.8
VLDL – C (mg/dL)	36.4 ± 14.9	50.4 ± 15.5	43.5 ± 15.1
Adiponectin (µg/mL)	12.7 ± 2.5	3.3 ± 1.4	3.5 ± 1.1

Body mass index (BMI); Systolic blood pressure (SBP); Diastolic blood pressure (DBP); Fasting blood glucose (FBG); Total cholesterol (TC); Triglycerides (TG); High density lipoprotein – cholesterol (HDL – C); Low density lipoprotein – cholesterol (LDL – C).
{Data is expressed as mean ± SD}

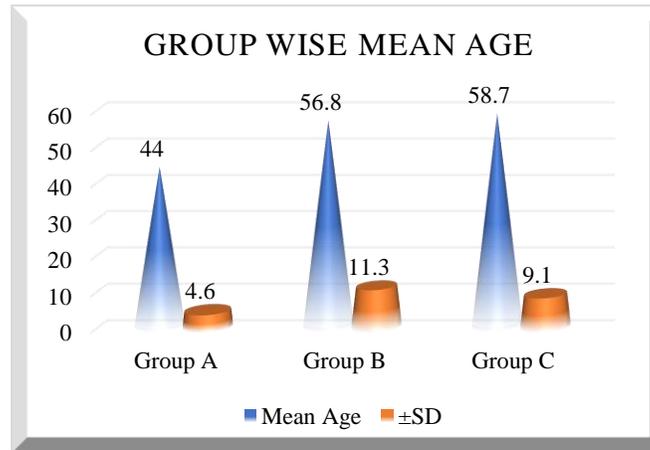


Table No 02: Matching of various characteristics among the analyzed groups

Variables	Group A with group B	Group A with group C	Group B with Group C
Age	< 0.001	< 0.001	NS
BMI	NS	NS	NS
SBP	< 0.05	NS	NS
DBP	< 0.05	NS	NS
FBG	< 0.001	< 0.001	NS
HbA1c	< 0.001	< 0.001	NS
TC	< 0.05	< 0.05	NS
TG	< 0.05	NS	NS
HDL – C	NS	< 0.05	NS
LDL – C	< 0.05	< 0.05	NS
VLDL – C	< 0.05	NS	NS
Adiponectin	< 0.001	< 0.001	NS

P value is significant at < 0.05 and < 0.001 level, NS nonsignificant

Table No 03: Correlation of adiponectin with different parameters in the analyzed groups

Variables	Group A		Group B		Group C	
	r	p	r	p	r	p
Age	-0.96	0.654	0.117	0.568	-0.130	0.545
BMI	-0.136	0.526	-0.190	0.354	-0.244	0.251
HDL-C	0.988	<0.01**	0.908	<0.01**	0.775	<0.01**
LDL-C	-0.104	0.629	-0.707	<0.01**	-0.367	0.077
VLDL-C	-0.532	0.007**	-0.793	<0.01**	-0.668	<0.01**
SBP	-0.089	0.680	0.103	0.617	-0.096	0.654
DBP	-0.167	0.435	0.148	0.471	-0.085	0.694
FBG	0.285	0.223	-0.497	0.010**	-0.874	<0.01**
HbA1C	-0.160	0.456	-0.814	<0.01**	-0.937	<0.01**
TC	-0.030	0.889	-0.733	<0.01**	-0.423	0.039*
TG	-0.515	0.010*	-0.790	<0.01**	-0.669	<0.01**

*Significance at 0.05 level, **Significance at 0.01 level

DISCUSSION:

Insulin resistance evaluates for the major cause of type 2 diabetes mellitus DM delivering hyperglycemia as the major analytic and predictive aggressive disease [13]. Better glycemic control of these patients needs HbA1 decrease to less than 7.0 % [14]. Adiponectin is major factor of glucose metabolism and hypo adiponectinemia is observed to be associated with insulin resistance and type 2 high

blood sugar mellitus [15]. The actual biochemical experience by which the glucose metabolism is affected by adiponectin is indistinct till now although many experiences were offered. Adiponectin is a molecule or gene that cause aggressive disease of liver peroxisome – proliferator activation receptor γ (PPAR γ) which enhances it to be an insulin sensitizing representative [16]. If the mice analyzed by a geniting material formed by recombination of

adiponectin after cholesterol maximum diet shows reduced circulating intensities of glucose and free cholesterol acids. This is clarified because of adiponectin activation of AMP activated protein kinase (AMPK) relating to raised cholesterol acid oxidation and muscular acceptance of glucose [17].

It is observed that the processing of insulin sensitizing representatives such as thiazolidinedione and proglitazone in high blood sugar persons follow towards raise absorption of adiponectin [18]. Type 2 DM were almost associated with polymorphism of adiponectin molecule (apM1), that is existed on a high blood sugar vulnerability locus available at chromosome 3q27 [19]. Adiponectin is able in serving to protect the hear. It initiates peroxisome – proliferator activation receptor α (PPAR α), controls adhesion molecules and prevents indications of nuclear factor kB [20]. Adiponectin refers to raised development of nitric oxide that helps in controlling the BP and prevents the cardiac myocytes from hypertrophy in influence to stress overload through the AMPK initiation in cardiovascular structure [21]. Adiponectin provide security to atherogenesis by enhancing reduced proliferation of smooth cells of muscle and preventing macrophage revolution to foam cell [22]. Reduced intensities of adiponectin reduce HDL cholesterol and raises triglycerides due to reduced PPAR α initiation, decreased lipoprotein lipase function and raised VLDL configuration [23].

HDL-C is athero-protective because it gives out extra cholesterol by reverse cholesterol transport (RCT) in vitriol [24]. Raised TG and decreased intensities of HDL – C take a part in type 2 high blood sugar and coronary artery disease [25,26]. The outcomes of this analysis presented that serum adiponectin intensity was reduced instantly in type 2 high blood sugar females with the presence and absence of CAD as a matching difference to healthy controlled females. Analysis verified the hypoadiponectinemia in type 2 high blood sugar cases having presence and absence of CAD. The matching of intensity of serum adiponectin among healthy females and type 2 high blood sugar females was done by Goddarzi et al [27]. They observed definite hypoadiponectinemia in high blood sugar females as a value of 7.29 ± 1.42 as compared to 10.29 ± 1.93 where the value of P was less than 0.001. Menghua et al verified hypoadiponectinemia in Asian Indian women with reduced glucose tolerance [28].

In the analyzed groups, dyslipidemia almost convoyed hypoadiponectinemia. Definite reduced HDL – C and maximum total cholesterol, LDL – C and triglycerides were observed in type 2 high blood

sugar patients in the presence and absence of coronary artery disease. Similar outcomes were stated through other analyses [29]. Adiponectin was observed to be negatively relative to fasting blood glucose, triglycerides and glycosylated hemoglobin and positively relative to maximum density lipoprotein cholesterol in type 2 high blood sugar female patients with CAD and without CAD. Same outcomes were gotten through else analyses [30]. Few analyses opposed the defensive act of adiponectin in contradiction of coronary artery disease although till now there is no opposition regarding the useful act of adiponectin in type 2 high blood sugar mellitus [31,32].

CONCLUSION:

Decreased intensity of adiponectin and HDL – C and increased intensity of TG in type 2 high blood sugar females in the presence and absence of coronary artery disease is verified by our analyses. Furthermore, adiponectin presented definite negative relativity to TG, FBG and HbA1c and definite positive relativity to HDL – C in the analyzed number of people. Intensity of serum adiponectin is significantly decreased in female patients of type 2 high blood sugar with the presence and absence of coronary artery disease. Furthermore, the hypoadiponectinemia in these female patients is associated with un-balanced glycemic condition and intensity of abnormal lipid profile throughout the flow.

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