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Original Article

Serum Visfatin Levels in Pregnant Women with Gestational Diabetes Mellitus

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Abstract

Objective: The clinical data linking circulating visfatin to the parameters of glucose metabolism and insulin resistance during gestational diabetes mellitus (GDM) pregnancy is widely contentious. Aim of this study is to explore the changes in maternal serum visfatin levels in normal and pregnancy complicated with gestational diabetes mellitus (GDM).

Methods: This study was carried out in Lahore General Hospital /PGMI. Forty two pregnant females in the age range 25-35 years, at 32-36 weeks of gestation was included in this study and divided into two groups. Group1 includes 21 normal healthy pregnant females as control and Group II includes diagnosed cases of GDM. Fasting blood samples were drawn during 32-36 weeks of gestation for serum visfatin, fasting insulin and fasting blood sugar.

Serum visfatin levels were determined by visfatin/Nampt/PBEF human ELISA kit manufactured by Glory science company, USA. Serum Insulin was determined by using Insulin ELISA Kit manufactured by Calbiotech company, USA. Serum glucose was determined by chemistry analyzer Micro lab 300. Homeostasis Model Assessment (HOMA)-IR was used as an insulin resistance index which was obtained by the product of fasting blood glucose and fasting levels of insulin and dividing it by 22.5.

The data was entered and analyzed by using SPSS-23. Mean + SD was calculated for quantitative variables. Independent sample and paired t-test were applied and statistical significance was considered with a $p<0.05$.

Results: Levels of serum Vistafin were compared amongst group I and group II during third trimester revealed a statistically significant difference ($p=0.00$).

Conclusion: Visfatin has been suggested to have a role in pathogenesis of GDM as it appears to be considered in regulation of glucose metabolism and insulin resistance.

Key Words: Visfatin Level, Gestational Diabetes Mellitus, Homeostasis Model Assessment.

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Introduction

Appearance spontaneous hyperglycemia during pregnancy is a common complication and said to be gestational diabetes mellitus (GDM).[1] International diabetes foundation (IDF) has estimated that around 14% pregnancies present with GDM globally and demonstrating approximately 18 million new births per annum.[2] Various risk factors for GDM include micronutrient deficiencies, westernized diet, overweight or obesity, family history of diabetes or insulin resistance and advanced maternal age. Although GDM resolves after delivery for most of the times but may have long term maternal and children health issues comprising cardiovascular disease (CVD), future obesity, type 2 diabetes mellitus (T2DM) and GDM again.[3]

It is pertinent that GDM is connected adverse outcomes of immediate pregnancy. Few of these outcomes include a higher risk of preeclampsia, gestational hypertension and cesarean section. Furthermore, fetal impediments of GDM pregnancies comprise elevated peril of macrosomia, neonatal hypoglycemia, shoulder dystocia, operative delivery and hyper-bilirubinemia. Recent research however, has revealed that GDM lasts to affect neonatal and maternal health stretched after the index pregnancy.[4]

Visfatin is multifunctional protein has activities like

cytokine, phosphoribosyl transferase and adipokine.[5] As an endocrine organ, adipose tissue secretes various factors/ hormones called adipokines.[6] Studies on brown adipocyte cells show that visfatin released from them enhances the NAD+ effect on β cells of pancreas and thus promote insulin secretion mediated by glucose.[7] Most importantly diminished insulin sensitivity has been characterized as a foremost receptor defect deliberating reduced capability of insulin to carry glucose transporter 4 (GLUT4) mobilization from inner side of the cell the outer surfaces.[8] Visfatin also lowers blood glucose and improves insulin sensitivity by affecting the insulin signal transduction pathway.[9] It binds with insulin receptor, consisting glucose uptake inside the adipose tissue as well as skeletal muscles among both human and mice models.[10] Visfatin concentrations are up surged in insulin resistant disorders, though the relationship amongst insulin and visfatin or insulin resistance indices during pregnancy stays unclear. Similarly there is a controversy regarding visfatin levels among patients having GDM as compared to healthy women with pregnancy. In women with GDM decreased concentration of visfatin have been reported by[11] whereas increased visfatin levels during the course of pregnancy as well as after delivery have also been found in women with GDM.[12]

The clinical presentation related to circulating visfatin while the parameters of insulin resistance and glucose metabolism are greatly controversial. The purpose of this study is to explore the changes in maternal serum visfatin during late pregnancy in normal and complicated with GDM pregnancies in our population and to find the association of serum visfatin with insulin resistance in GDM females. This study will help in understanding the role of visfatin in the pathophysiology of gestational diabetes mellitus. It might also help in prevention or possible management of GDM through visfatin level related intervention in the future.

Methods

This study was carried out in Lahore General Hospital /PGMI. 42 pregnant females in the age range 25-35 years, at 32-36 weeks of gestation were included in this study and divided into two groups. Group 1 includes 21 normal healthy pregnant females as control and Group II includes diagnosed cases of GDM. Fasting blood samples were drawn during 32-36 weeks of gestation for serum visfatin, fasting insulin and fasting blood sugar.

Serum visfatin levels were determined by visfatin/ Nampt/ PBEF human ELISA kit manufactured by Glory science company, USA. Serum Insulin was determined by using Insulin ELISA Kit manufactured by Calbiotech company, USA. Serum glucose was determined by chemistry analyzer Micro lab 300. Homeostasis Model Assessment (HOMA)-IR was used as an insulin resistance index which was obtained by the product of fasting blood glucose and fasting levels of insulin and dividing it by 22.5.

Results:

In group I eighty five percent of the subjects had normal blood glucose levels whereas in group II, 28% of the subject has normal blood glucose levels (table1) Insulin was raised in 52% of the subjects in group II (Table 2). HOMA IR was also raised in 81% of the subjects in group II (Table 3). Comparison of Serum Visfatin, Plasma Insulin, Blood Glucose and HOMA IR Before delivery showed a statistical significant difference of p=0.00 respectively.(Table 4)

Table 1: *Frequency Distribution of Blood Glucose Levels in the Study Groups before Delivery*

Blood glucose levels (mg/dl)	Group I		Group II	
	Frequency	Percentage	Frequency	Percentage
Low<70	2	10%	1	5%
Normal 70-100	18	85%	6	28%
High >100	1	5%	14	67%
Total	21	100	21	100
Median IQR	85(72-97)		104(89-107)	

Table 2: *Frequency Distribution of Serum Insulin Levels in the Study Groups before Delivery*

Serum insulin levels (µIU/mL)	Group I		Group II	
	Frequency	Percentage	Frequency	Percentage
<10	15	71%	4	19%
10 -20 (Normal)	6	29%	6	29%
>20	0	0	11	52%
Mean±SD	9.04±1.78		20.81±11.22	

Table 3: *Frequency of Allergies in a Sample of 300 Medical Students in Lahore, Pakistan, in 2014*

HOMA IR	Group I		Group II	
	Frequency	Percentage	Frequency	Percentage
<2.37	18	85%	4	19%
>2.38	3	15%	17	81%
Mean±SD	1.89±473		5.16±2.73	

Table 4: *Frequency Distribution of HOMA IR Levels in the Study Groups before Delivery*

Biochemical Parameter	Group I	Group II	P-Value
Visfatin(ng/ml).	13.28±3.73	34.64±6.06	0.00***
Insulin(µIU/mL)▲	9.04±1.78	20.81 ±11.22	0.00***
HomaIR▲	1.89±.473	5.16±2.73	0.00***
Glucose(mg/dl) ●	85(72-97)	104(89-107)	0.00***

Discussion

In this study serum visfatin levels along with HOMA IR have been measured and compared in 42 pregnant women divided in two groups. Group 1 has been described as healthy pregnant women and group 2 as pregnant women categorized of having GDM.

When serum levels of visfatin are compared between the groups before delivery, a statistically significant difference (p=0.000) is seen with values being higher in GDM. Similar results are reported[13] they have shown increased level of visfatin in GDM pregnant women as compared to normal pregnancy before delivery. However contrary to our study lower levels of visfatin in GDM have been shown[14] they have attributed this to some unknown factor, variations about sampling times throughout pregnancy, different criteria of diagnosis and racial differences also.

Our study observed that the serum level of insulin, HOMA IR and fasting blood glucose are significantly increased among women having GDM as compared to control group before delivery. Raised HOMA IR in GDM subjects has been reported.[15]

Levels of visfatin are higher in normal pregnant women compared to non-obese, non-diabetic and non-pregnant indicating increase in visfatin during the course of pregnancy. Normally during pregnancy there is a progressive increase in IR.

Conflict of interest

None

Funding Source

None

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