



Research Paper

An observational study to evaluate the Association between dyslipidaemia and glycemic control in gestational diabetes mellitus

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Abstract

Objective: The main objective of the study was to evaluate the association between dyslipidaemia and glycemic control in gestational diabetes mellitus

Materials and Methods: This observational study was conducted at Diabetes and Gynecology OPD in a multi speciality hospital. All participants were included in this study as they visited for their routine check up at respective clinics. Pearson correlation test were used for the association between HbA1c and VLDL, LDL markers.

Result: Total 230 subjects were participated in this observational study among which 120 were belongs to Non GDM group and 110 were diagnosed with GDM. There was statistically significant difference between Fasting glucose ($p = 0.05$), post prandial plasma glucose ($p = 0.05$), HbA1c ($p = 0.05$), total cholesterol (TC) ($p = 0.05$), Triglycerides (TG) ($p = 0.02$), LDL ($p = 0.04$) in GDM compare then control groups. HbA1c showed positive correlation with TC ($r=0.598$), TG ($r=0.357$), LDL ($r = 0.421$) and there was negative correlation with HDL ($r = -0.289$).

Conclusion: This study concluded that lipid profile including TC, TG and LDL were significantly higher among pregnant women with GDM as compared to those without GDM. This elevated lipid profile if not treated in times may lead to further macro vascular complications among pregnant women with diabetes.

Keywords: Pregnancy, gestational diabetes mellitus, Hemoglobin A1c, dyslipidaemia.

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I. INTRODUCTION:

Gestational diabetes mellitus is defined as “glucose intolerance of any degree with the onset or first recognition during pregnancy” which may or may not resolve after delivery; women with known diabetes, who have an hemoglobin A1c (HbA1c) $\geq 6.5\%$ in the first trimester, type 1 diabetes and monogenic diabetes can sometimes present in pregnancy are said to have overt diabetes and have to be differentiated from true GDM [1,2].

Pregnancy involves a major alteration in the mother’s hormonal milieu, characterised by an increase in oestrogen, progesterone, prolactin, corticosteroid, human chorionic gonadotropin (hCG), prolactin as well as placental hormones [3,4]. This metabolic changes promotes adipose tissue deposition in early pregnancy, followed by increasing insulin resistance and facilitated lipolysis in late pregnancy. If this demands for massive increase in insulin secretion is not adequately fulfilled, it leads to dysglycemia and a clinical presentation of GDM [5,6].

Gestational diabetes mellitus is associated with an increase in maternal as well as fetal morbidity and mortality [7,8]. Not only it increases the risk of development of type 2 diabetes in the mother, but also makes the baby more prone to develop obesity as well as glucose intolerance in the future, thus affecting two generations [9,10]. Hence, an early diagnosis and adequate management go GDM provides us with a golden window of opportunity for intervention which has beneficial effects both on the present pregnancy and the future risk for both mother and baby [11].

During pregnancy cardiovascular disease as well as unmasked cardiovascular disease were frequently confronted with patients specially with the obesity epidemic [12]. Women with preeclampsia, gestational diabetes have more marked derangement of atherogenic lipid profiles than the normal ones [13]. Elevated TG and small, dense LDL fractions with low HDL-C levels is more frequently associated with gestation in obese women [14].

The main objective of the study was to evaluate the associations between dyslipidaemia and glycemic control in gestational diabetes mellitus.

II. MATERIALS AND METHODS:

This observational study was conducted at Diabetes and Gynaecology OPD in a multi speciality hospital. All participants were included in this study as they visited for their routine checkup at respective clinics. Before enrolment in the study it was confirmed that all subjects were willing to participate and signed informed consent were taken after thoroughly describe the procedure and objectives of the current study. Any pregnant women with any history of cardiovascular disease, thyroid and other metabolic disorders were excluded from this study.

At enrolment all demographic details were collected in a predesigned pro forma and all serum biochemical test were performed in hospital pathology department towards the accuracy and authenticity of the study process.

Data were presented as mean±SD and SPSS software version 16.0 were used to do the statistical calculations. Pearson correlation test were used for the association between HbA1c and VLDL, LDL markers. Significant level was set at p=0.05.

III. RESULT:

Total 230 subjects were participated in this observational study among which 120 were belongs to Non GDM group and 110 were diagnosed with GDM. Table 1 demonstrated the clinical characteristic of the study subjects of both the groups. There was statistically significant difference between Fasting glucose (p = 0.05), post prandial plasma glucose (p = 0.05), HbA1c (p = 0.05), total cholesterol (TC) (p = 0.05), Triglycerides (TG) (p = 0.02), LDL (p = 0.04) in GDM compare then control groups.

Table 1: Clinical characteristics of the study subjects

Variables	Non GDM (Mean ± SD) (N= 120)	GDM (Mean ± SD) (N= 110)	p value
Age (Years)	26.3 ± 3.21	27.2 ± 4.1	0.43
Gestational weeks	25.14 ± 1.2	25.31 ± 1.4	0.13
Body weight (kg)	59.7 ± 10.4	62.7 ± 9.8	0.34
BMI (kg/m ²)	23.9 ± 4.5	25.93 ± 5.1	0.23
SBP (mm of Hg)	106.67±9.98	113.09±8.46	0.01
DBP (mm of Hg)	71.59 ± 8.46	74.23 ± 7.72	0.01
Fasting glucose (mg/dL)	72.45 ± 7.23	88.6 ± 9.48	0.05
Post Prandial Glucose (mg/dl)	126.8 ± 11.41	147.6 ± 15.23	0.05
HbA1c%	5.4 ± 0.7	6.8 ± 1.2	0.05
Total Cholesterol (mg/dL)	176.3 ± 38.31	142.2 ± 31.2	0.05
Triglycerides (mg/dL)	182.15 ± 42.26	202.74 ± 42.17	0.05
HDL mg/dL	67.71 ± 24.67	61.93 ± 19.68	0.05
LDL mg/dL	77.33 ± 37.9	108.02 ± 28.95	0.05

Correlation analysis was done between lipid profile and HbA1c and its correlation among GDM. HbA1c showed positive correlation with TC ($r=0.598$), TG ($r=0.357$), LDL ($r = 0.421$) and there was negative correlation with HDL ($r = -0.289$).

Table 2. Correlation between glycemic status and lipids profiles in GDM

Glycaemic Parameters	Biochemical Markers	r value	p value
HbA1c Vs	TC	0.598	0.002
	TG	0.357	0.004
	HDL	-0.289	0.005
	LDL	0.421	0.001

IV. DISCUSSION:

For metabolic disturbances diabetes and lipid profile have been shown to be the important predictors including dyslipidemia, hypertension, and cardiovascular diseases [15]. In GDM other metabolism are not affected which is mainly because of abnormalities of Carbohydrate metabolism especially lipid metabolism [16].

In current study as compare to normal or control group there were higher and statistically significant increase in total cholesterol (TC) ($p = 0.05$), Triglycerides (TG) ($p = 0.02$), LDL ($p = 0.04$) were observed in GDM group. In line with our observation there were several documentation which confirms the lipid abnormality during pregnancy related as well as in type 2 diabetes [17-19].

During pregnancy induced diabetes condition due to increased oxidation of free fatty acids also little increase in lipids profiles ratio lead to increased concentrations of acetyl CoA which is regulated to synthesis of cholesterol, fatty acids and triglycerides [20]. During diabetic pregnancy this plasma lipids and lipoproteins changes have been studied by many researchers [20-23].

In current study, HbA1c showed positive correlation with TC ($r=0.598$), TG ($r=0.357$), LDL ($r = 0.421$) and there was Negative correlation with HDL ($r = -0.289$). In line with our current observation there were several other studies which also found strong correlation between serum glycemic levels with elevated serum lipid profile [24-26]. Though this study demonstrated a strong correlation with LDL but there are also few previous study which fails to demonstrated such significant difference in LDL values in GDM and normal pregnancy [27].

The limitation of the study was low sample size and there were no parameters to evaluate for insulin resistance markers in Gestational diabetes mellitus. But despite the limitation the study was able to draw a conclusion regarding the co relation of glycemic levels and lipid profiles in this study population.

V. CONCLUSION:

This study concluded that lipid profile including TC, TG and LDL were significantly higher among pregnant women with GDM as compared to those without GDM. This elevated lipid profile if not treated in times may lead to further macro vascular complications among pregnant women with diabetes. Thus the authors strongly recommended routine estimation of lipid profile during pregnancy to prevent deleterious effects of hyperlipidemia associated with pregnancy.

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