Dyslipidemia, a long term risk factor during pregnancy and gestational diabetes mellitus

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ABSTRACT

Background: GDM is a condition where there is glucose intolerance during pregnancy. During this period,lot of disturbance is seen in carbohydrate metabolism and also in other metabolic pathways mainly in lipid metabolism. These associated with insulin resistance and dyslipidemia. **Materials and Methods**: The study was conducted in 80 pregnant women of rural population of Puducherry in two groups. Group 1 includes 40 newly diagnosed GDM patients by DIPSI and Group II with 40 normal pregnant women, age group were between 17- 40 years. Fasting blood glucose, 2-hour post glucose and lipid profile were estimated by auto analyzer. For comparisons of means student t-test was used to determine the significance between GDM and controls. **Results:** There was statistically significant difference in lipid profiles, HDL-C, VLDL, LDL-C in GDM groups. There was statically significant difference FBS and lipids profiles ratio levels in GDM. **Conclusion:** This study was found to be associations between lipids profiles and Gestational diabetes mellitus in GDM groups.

Keywords : Gestational diabetes mellitus (GDM), Dyslipidemia

INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as glucose intolerance that is first diagnosed during pregnancy[1]. It affects approximately 6% of pregnant women and prevalence is increasing in parallel with obesity.During current situation, the prevalence of GDM increases from 1% to 28% [2]. Other pregnancy related complications mainly cardiovascular risk factors like hypertension, metabolic syndrome, type2 diabetes and atherosclerosis are increasing along with GDM[2-6].

Dyslipidemia is one of the metabolic syndrome characterized by high levels of TG's, elevated levels of LDL-C and decreased levels of HDL-C . obesity before pregnancy and overweight gained during pregnancy are some of the main contributors for GDM[5]. Maternal diet is one of the factor for the development of GDM[6]. Previous

studies says that GDM has 1.4-1.8 fold risk for dyslipidemia which leads to atherosclerosis[9].

During pregnancy, insulin resistance causes maternal adiposityand placental products like prolactin, estrogen and human placental lactogen are desensitized and this is balanced by increase in βcell proliferation which finally leads to the release of insulin[10]. Carbohydrates are less utilized which there is deficiency in the secretion of insulin dur to improper functioning of β cells[11].

Insulin resistance and dyslipidemia are strongly associated with each other. However less attention has been given in previous studies. Thus it is necessary to assess the lipid levels during gestational period inorder to avoid the future complications for both mother and fetus.

AIMS AND OBJECTIVES

Aim of the present study is to assess the lipid levels in both healthy pregnant women and also in GDM women

MATERIALS AND METHODS

Present case control study was carried out in the hospital of _____ medical sciences who attended the OPD. Study is done by obtaining Institute Ethical committee approval and informed consent from study subjects during the period of November 2020 to September 2021.

Our study included 80 pregnant women out of which 40 are diagnosed as GDM patients and 40 are healthy pregnant women in the age group of about 17-40 years. Pregnant women asked to take 75g of oral glucose tolerance test (OGTT) performed during 24-28 weeks of pregnancy.

Inclusion criteria

 Age group of 17-40 years, Pregnancy with DM

Exclusion criteria

Women with stroke, peripheral vascular disease, ischemic heart disease known Dm diagnosed prior to conception, hypertension & dyslipidemia.

3ml of fasting blood samples are collected in plain tubes for estimation of lipid profile and fluoride tubes for estimation of glucose. To evaluate the dyslipidemia, total serum cholesterol, TG's and HDL-C were measured using CHOD-POD method. LDL

was calculated by using Friedwald's formula i.e; LDL= TC-(TG/5)-HDL and glucose is estimated with the help of GOD-POD method.

GDM was defined according to Carpenter and Coustan, the presence of two or more of the following values in the OGTT: fasting serum glucose ≥95mg/ dL (5.3mmol/L), 1hour serum glucose ≥180mg/dL (10.0mmol/L), 2hours serum glucose ≥155mg/dL (8.6mmol/L) or 3hours serum glucose ≥140mg/dL (7.8mmol/L), all other women were defined as non-GDM.

STATISTICAL ANALYSIS

Data was analyzed by statistical software package by using Mean±SD. Comparisons of mean student T-test was used to determine the significance between GDM and healthy pregnant women.

RESULTS

A total of 80 were included in our study out of which 40 comes under GDM and remaining 40 are having normal healthy pregnancy. In or study, most of the GDM patients are overweight and comes under obese. During follow-up, fasting lipid profile has been done which shows significantly increased serum TG, Cholesterol, LDL concentrations, and decreased LDL concentrations compared to control groups, P < 0.001 for each.

Table:1 Mean ±Standard deviation between cases and controls

	cases	controls	P value
FBS	114.03±27.05	101.90 ±28.89	<0.001
LDL-C	112±29.6	100.8±26.5	<0.001
HDL-C	45.9±14.3	55.0±11.1	<0.001
Total cholesterol	198.9±41.5	172.4±41.5	<0.001
Triglycerides	146.5±82.9	110.9±66.3	<0.001

DISCUSSION

Result of the case control study indicates hyperlipidemia is the added risk factor mainly for GDM when compared with normal healthy pregnant ladies. Our findings shows that LDL-C is more in cases (112±29.6) compared to controls(100.8±26.5) , total cholesterol is around 198.9±41.5 in cases and in controls 172.4±41.5 whereas triglycerides is around 146.5±82.9 in cases and in controls it is around 110.9±66.3

Our study is similar to the result of Carpenter and coustan which explains us patients with history of GDM shows lipid profile where there is a significant difference in total cholesterol, TG's and LDL

During pregnancy, insulin resistance is one of the primary defect where we can observe changes in lipid profile during pregnancy. Present study shows tatal cholesterol ,LDL-Cas p<0.001 which is stastically significant in GDM groups and there is small difference in HDL-C compared to controls.

This is similar to Friedrick et al, Micheal etal where they explained significant elevation in Tg's and decrease in HDL. Disturbance in the lipid profile is due to increased fatty acid oxidation which leads to increase in the release of Acetyl coA[12-13].

During Insulin resistance in type 2 diabetes mellitus abnormalities in lipids metabolism is seen causing elevated triglyceride concentrations, decreased HDL cholesterol and a LDL-cholesterol particles [13] . this is in contrast to the study of Bartha and colleagues as they reported maternal total cholesterol and triglyceride concentrations were similar in GDM and normal pregnancy[13].

some important limitations has to be discussed in our study. In the present analysis we were unable to characterize fully the metabolic characteristics which includes missing information on diet, dietary carbohydrate consumption that may have affected lipid levels. Although data on weight measurements in the index pregnancy were available for the majority of research cohorts, increased intake of rapidly absorbable carbohydrates that is positively associated with GDM2 may have explained some of the associations observed in our study.

CONCLUSION

Present study shows that women with previous GDM shows significant increase in the risk of dyslipidemia indicating that increased awareness on postnatal interventions and also among caregivers who should begin early after delivery focusing on modification of lifestyle and to avoid the excess future risk of dyslipidemia and its complications.

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