SERUM TRIGLYCERIDES AND CHOLESTEROL STATUS IN PATIENTS WITH AND WITHOUT GESTATIONAL DIABETES MELLITUS

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ABSTRACT

Objective: To measure the differences of lipids including total cholesterol and triglycerides among subjects with or without GDM.

Study Design: Cross sectional comparative study.

Place and duration of study: This study was carried out between Dec 2010 to Jun 2012 at the department of gynecology & obstetrics Pakistan Naval Ship (PNS) Shifa and department of pathology, PNS Rahat.

Material and Methods: Pregnant women who presented in outpatient department of gynaecology between 24-34 weeks of gestation were randomly selected, and were requested to undergo 100 Gm oral glucose tolerance test for diagnosis of gestational diabetes mellitus (GDM). A total of 93 pregnant women were included in the study. Afterwards they were divided in 2 groups on basis of presence and absence of GDM. Later all the patients were analyzed for total cholesterol and triglycerides. Results of triglycerides and total cholesterol were compared among subjects with or without GDM.

Results: The differences for serum triglycerides and total cholesterol were not found to be significant among subject with or without gestational diabetes mellitus, where 0.05 was considered significant.

Conclusion: There was no difference between serum triglyceride and total cholesterol levels among subjects with or without gestational diabetes mellitus.

Keywords: Gestational diabetes mellitus, triglyceride, total cholesterol, fasting blood glucose.

INTRODUCTION

The hyperglycemia appearing for the first time in pregnant subjects has been related to adverse outcome for both the mother and the incoming newborn[1]. This type of hyperglycemia was termed as gestational diabetes mellitus (GDM) since the times of the first workshop on gestational diabetes mellitus[2]. This is the most common type of medical disorder in pregnancy and is increasing in prevalence worldwide. With advancements in human lifestyles, the frequency of GDM has increased at par with its non-pregnant counterpart "Diabetes Mellitus", partially because of insulin resistance[3]. Up to 22% of all pregnancies are affected by GDM in America and this prevalence may be higher under new diagnostic criteria[4]. In Pakistan, a study conducted in Karachi observed 8% prevalence of GDM[5]. This is of great concern because GDM is a known risk factor for future type 2 diabetes and related longterm poor health outcomes and may be associated with an increased risk of childhood obesity with specific complications both in fetus and mother in the form of early (fetal macrosomia, birth trauma and increased chances for caesarian section[6] and late effects like (chances of type 2 DM in mother and increased risk of obesity and Diabetes in offspring[7,8]. To help reduce the probable complications arising from GDM, various diagnostic criteria were developed to streamline the early diagnosis of GDM for effective and timely interventions. Initially a 2-step strategy using the O' Sullivan's test (Glucose challenge test) was recommended for screening, and later a confirmatory 3-hour oral glucose tolerance test (OGTT) with 100 grams of glucose

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recommended[9]. Later the 4th GDM workshop recommended a clinical criterion to segregate subjects as per their risks[10]. Recently ADA has introduced a simper and straight forward criterion using 75 grams OGTT for GDM diagnosis[11]. Moreover, other countries have also established their own version to diagnose gestational diabetes mellitus[12].

The search to perfect the GDM management has definitely improved our present day understanding of the disease, but again controversies have also been highlighted: 1-Is foetal birth weight and size of head are only affected by blood glucose levels ? Studies have highlighted the role of lipids like triglycerides in the development of macrosmia[13]. 2-The pathogenesis of GDM has been linked to underlying insulin resistance which apart from relying on hyperglycemia as component for diagnosis also involves various pathological effects of lipid metabolism[14]. GDM induces a state of dyslipidemia consistent with insulin resistance. GDM patients do have raised triglycerides but total cholesterol and LDL may be low[15]. 3-Available literature also shows contrasting findings indicating hyperglycemia is not the only significant finding in the development of GDM fetal outcome measures like fetal head circumference[16]. 4-Also reliance on glucose for establishing the diagnosis of GDM is cumbersome, time consuming and requires a

Figure-1: Differences for serum fasting triglycerides among subjects with (n=27) and without (n=66) GDM as defined by Carpenter and Coustan criteria using Univariate GLM model analysis keeping age as a random factor (Model significance: *p*=0.722).

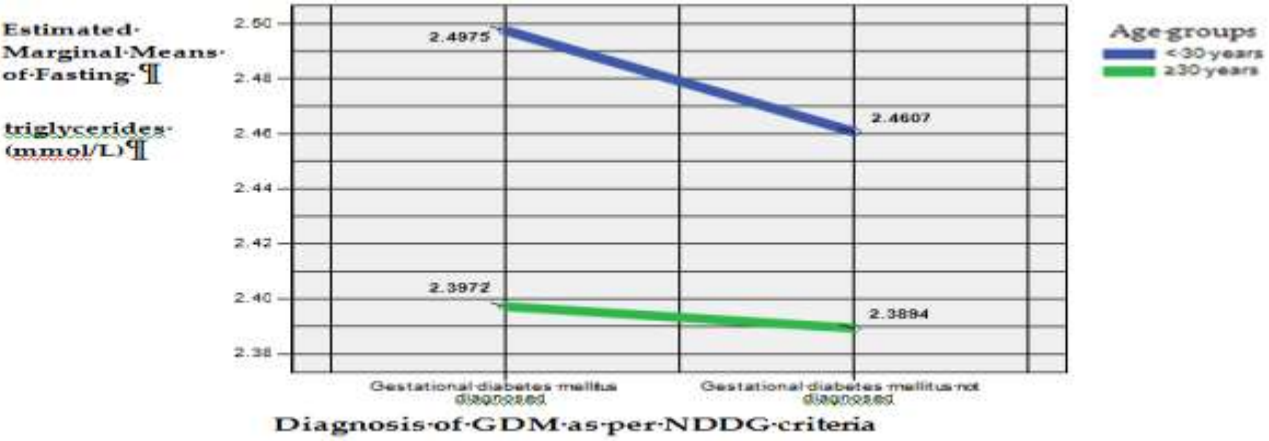

Figure-2: Differences for serum fasting triglycerides among subjects with (n=24) and without (n=69) GDM as defined by NDDG using Univariate GLM model analysis keeping age as a random factor (Model significance: *p*=0.958).

minimum of two lab visit to confirm the diagnosis. 5-Studies have also highlighted the need of for further research to identify pathogenesis of GDM[17].

Based upon the highlighted observation it was planned to evaluate lipid changes in pregnant subjects with or without diagnosed GDM in our set up.

MATERIALS AND METHODS

After approval from ethical committee, this study was carried out at the departments of gynecology Pakistan Naval Ship (PNS) Shifa and department of pathology PNS Rahat from Dec 2010 to Jun 2012. Pregnant subjects known to have an associated diagnosis (like hypertension, any infectious disorder, liver disease or other chronic illnesses), inability to complete OGTT, poorly prepared, known diabetics or on medications were excluded from study .Pregnant women, who presented in gynecology OPD between 24-34 weeks of gestation were subjected to OGTT. Total 93 patients were recruited in study. Later these pregnant women were divided in two groups; Women with GDM and women without GDM. All patients in both groups underwent total cholesterol and triglyceride testing and the results of lipid profile were compared in both groups.

Analysis

All samples were analyzed using following methods: glucose, triglycerides and total cholesterol were analyzed using hexokinase, GPO-PAP and CHOD-PAP methodologies respectively. All analysis were carried out on Hitachi-902 (Clinical chemistry analyzer)

Operational Definitions

Gestational Diabetes Mellitus (GDM)

Oral Glucose Tolerance Test (OGTT)

Out Patient Department (OPD)

Statistical Analysis

All data was analyzed using SPSS version 15. For age and gestational age mean and standard deviation was calculated. For GDM and deranged lipid profiles frequency was calculated.

RESULTS

This means age among our data subject (n=93) was 30.48 (± 5.44) years. Age wise the subjects with gestational diabetes mellitus demonstrated higher age than subjects without GDM. [{Coustan & Carpenter criteria: GDM diagnosed=33. 56 (± 5.46) years, GDM not diagnosed=29. 30 (± 4.99)} {NDDG criteria: GDM diagnosed=33.29 (± 5.53) years, GDM not diagnosed=29.58 (± 5.18)]. Keeping the confounding age factor as constant, the differences among GDM and non-GDM subjects with regards to triglycerides and cholesterol are shown in fig-1 & 2, (table).

Table: Differences for total cholesterol among subjects with or without GDM diagnosis (n=93).

S. No	Criteria for GDM diagnosis	Serum total cholesterol		Significance (*p*-value)
		GDM Diagnosed	GDM not diagnosed	
1	Carpenter & Coustan criteria	5.28	5.32 (± 1.12)	0.779
2	NDDG criteria	5.28	5.32 (± 1.12)	0.678

DISCUSSION

Our study is a pioneer local study which has attempted to compare triglyceride and total cholesterol levels among subjects with and without gestational diabetes mellitus. In our study we did not find significant difference among both groups. Hypertriglyceridemia is a characteristic feature of pregnancy as found in many early studies like Montelongo (1992). Serum LDL AND triglyceride level is increased with the increase in gestational age as by Schafer et al (2008), and Van-Stiphout et al (1987) It is also in line with the studies of munoz et al (1995), who reported raised LDL and triglyceride in normal pregnancy in association with circulating estrogen and progesterone[18]. In this regard the review of literature evaluating serum fasting

triglycerides and total cholesterol among subjects with and without GDM were found to be minimal. However, there are few studies which have shown significant role of triglycerides in the causation of macrosmia and increased neonatal body weight[13]. Our study in this regard may contrast with the literature.

Sobki et al reported lower level of triglycerides in patients with gestational diabetes Mellitus when compared with non GDM patients[19]. In another study conducted in Peshawar Pakistan, showed elevated level of serum triglycerides and LDL level in GDM patients compared to non GDM patients[20].

Our study did not demonstrate significant differences for serum lipids among pregnant women with or without GDM. This was a simple cross-sectional comparative study carried out to demonstrate differences in serum fasting lipid levels among patients, diagnosed with GDM or otherwise, so as to use them for prediction or early detection of GDM. In this regard we could not find any study to evaluate the effect of lipids on the diagnosis of diabetes mellitus. Secondly, gestational diabetes mellitus becomes fearsome due to its anticipated outcomes like increased body weight and head circumference in the neonate[6], and long term effects in the form of dyslipidemia and metabolic disorder in women and her offspring[8]. We feel that these fetal outcomes may be related to multiple causative factors involved in pathogenesis of GDM and not just lipids. Literature does show other factors which could lead to increased neonatal macrosmia and body weights[14].

Our study has demonstrated age as a major as risk factor in the diagnosis of GDM, which is in accordance with few other studies where they found increasing maternal age over 30 years among the most important risk factor linked with GDM[21,22]. Aging has always been known to result in adverse outcomes in pregnancies[23]. Moreover, aging is also linked to worsening of metabolic profiles, especially hyperglycemia. Thus multiplicity of risk factors in the development of gestational diabetes mellitus may be acknowledged and further evaluated through further controlled trials[17].

The study results must be evaluated in terms of it's weaknesses: Firstly, the probability of statistical type-2 error cannot be excluded; however, this aspect can be addressed by enhancing sample size. Secondly, the sampling technique employed was non-probability convenience sampling, which may have its own inherent weaknesses.

CONCLUSION

We did not observe any difference between serum triglyceride and total cholesterol among subjects with or without gestational diabetes mellitus.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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