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Assessment Of Thyroid Hormonal Status Among Hyperglycemic Pregnant Women At Tertiary Level Of Health Care System Of Haryana,INDIA

Medical Science

KEYWORDS : GDM, DM, Thyroid profile

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ABSTRACT

Introduction:*Gestational diabetes mellitus (GDM) and thyroid disease are the most common endocrine abnormalities during pregnancy. GDM is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. Diabetes complication and abnormal thyroid profile during pregnancy is associated with adverse maternal and foetal outcome. Therefore this study was designed to find out thyroid hormonal status in hyperglycemic pregnant women.*

Objective: *To find out thyroid hormonal status among hyperglycaemic pregnant women attending OPD/IPD.*

Material and methods: *20 pregnant women having increased blood glucose (GDM and Diabetic pregnant women) were included in test group and 20 gestational age matched females with normal blood glucose were taken as control. Plasma glucose was estimated by enzymatic method by autoanalyzer. Serum free thyroxine, free tri-iodothyronine, and thyroid stimulating hormone were assessed in each subjects by chemiluminescence technique.*

Results: *In the present study thyroid disorder in patients of GDM and DM have found no significant association ($p>0.05$) with control group. However subclinical hypothyroidism is more prevalent thyroid dysfunction in the three groups.*

Conclusion: *This study showed that Subclinical hypothyroidism is more prevalent thyroid dysfunction in hyperglycemic pregnant women, so that It is suggested to screen the thyroid profile in patients of GDM and DM.*

Introduction

Diabetes is one of the most prevalent endocrine disorders during pregnancy. It is classified as gestational diabetes (diabetes which was first diagnosed during pregnancy) or pre-gestational diabetes.Gestational diabetes mellitus (GDM) and thyroid disease are the most common endocrine abnormalities during pregnancy. GDM is defined as any degree of glucose intolerance which is first recognised during pregnancy.[1,2]The prevalence of DM during pregnancy is about 7%, most of them are gestational, there is a constant increase of the prevalence of DM due to the gradual increase in pregnant women's BMI (Body Mass Index) and increase of obesity in pregnant women during recent decades.[3] Depending on the population studied and the diagnostic test employed, prevalence of Gestational Diabetes in India may range from 3.8 to 21 per cent of all pregnancies.[4,5,6]

The increasing prevalence in developing countries is related to increasing urbanization, decreasing levels of physical activity, changes in dietary patterns and increasing prevalence of obesity.[7,8] In India it is difficult to predict any uniform prevalence levels because of wide differences in living conditions, socioeconomic levels and dietary habits.Diabetesecomplicationg pregnancy is associated with adverse maternal and fetal outcome.[9]Lesser degrees of glucose intolerance have also been shown to be harmful during pregnancy.[10]Nearly 50 % of women with GDM will become overt Diabetes, type II DM over a period of 5-20 years of follow up and there is recurrence risk in subsequent pregnancy is also more than 50 %.[11]

Timely detection of GDM is vital step for further prevention of GDM complication among mother and foetus. Screening for GDM, for all pregnant women who tested negative in early pregnancy, should be performed between 24 and 28 weeks of gestation.[12]

Hypothyroidism is the second most common endocrinopathy during pregnancy, and its incidence range from 2% to 5%. Autoimmune thyroiditis (also known as Hashimoto's thyroiditis) and iatrogenic thyroid gland destruction as a therapeutic measure for hyperthyroidism are the most common etiologies for this endocrinopathy in pregnant women.[13,14,15]

Pregnant women with hypothyroidism, experience a higher rate of first trimester abortions 16), anemia, post-partum hemorrhage, gestational hypertension and placental abruption [17]. Fetuses of pregnant women with uncontrolled hypothyroidism are at a greater risk to develop multinodulargoiter and have a higher tendency to be small or large for gestational age [18].

There is inconsistent evidence regarding Co-incidence of thyroid dysfunctionand GDM. Some reports found an association an increased risk for later onset diabetes in women who had hypothyroidism during pregnancy, and women with an increased risk for GDM, especially those with familial history of both DM and hypothyroid disorders, also have an increased prevalence of positive antithyroid autoantibodies [19]

Universal thyroid screening is controversial, Americal College of Obstetrician and Gynaecologist recommend thyroid testing

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in symptomatic pregnant women, on the contrary American association of clinical endocrinologist recommends routine thyroid function screening before pregnancy or during their first trimester Oral Glucose Tolerance Test helps to detect hyperglycemia in pregnant women and serum thyroid profile of pregnant women reveals the thyroid status of pregnant mothers[20]. Co-incidence of thyroid dysfunction and hyperglycemia in pregnancy is fatal conditions for fetus as well as mother ,so to have a vigilant care during pregnancy specially for above mentioned endocrionpathies is a key concern of care.

Aims & Objective

To find out thyroid hormonal status among hyperglycaemic pregnant women attending OPD/IPD .

Material and Methods

It was cross sectional prospective study conducted at Department of Clinical Biochemistry andOut patient Department of Obstetrics of Pt. B.D.Sharma Post Graduate Institute of Medical Sciences Rohtak,Haryana within the study Period of three months i.e. May 2015 to Aug 2015.

Total 40 pregnant women of more than 24-28 weeks of gestational period who had attended OPD/IPD of Obstetrics Department and had increased blood glucose level due to DM and after undergone oral GTT were enrolled in the study with the help of a proforma containing general information on demographic characteristics, socioeconomic status, education level, parity, family history of diabetes and/or hypertension in first degree relatives and past history of GDM was filled up for each women after applying Inclusion criterias i.e. Study participants having gestational period more than 20 weeks and who were willing to participate in the study were included in the present study and vice versa were excluded from the study and their serum Thyroid profile has also been investigated.These 40 participants were divided in two groups i.e. 20 in control group (normal GTT and non Diabetic.) and remaining 20 were enrolled in the test group which were further divided in two sub groups like mothers having pre pregestational DM and mothers with impaired GTT.

Adopted Guidelines for Diagnosis of GDM[3]-

American Diabetes Association (ADA) criteria for 75g 2 hour oral glucose tolerance test after overnight fasting and then fasting blood sugar 1 hour post parandial and 2hour post parandial were measured and GDM is diagnosed if two or more plasma glucose levels meet or exceed the following thresholds

I)fasting glucose concentration of 95 mg/dl

II)1hour glucose concentration of 180 mg/dl

III)2hour glucose concentration of 155 mg/dl

Plasma glucose was estimated by enzymatic method basedauto-analyzer

Adopted Guidelines for estimation of Thyroid hormonal level[21]

The Endocrine Society Clinical Practice Guidelines of 2007 were followed for cut off values for TSH, T3 and T4 (based on pregnancy specific and trimester specific). Serum free thyroxine, free tri-iodothyronine, and thyroid stimulating hormone were assessed in each subjects by chemiluminescence technique.

Laboratory Parametersand investigation-

In this study FT3, FT4, TSH were measured after taking 4 ml fasting blood samples among in all GDM and pre-gestational diabetic pregnant women and control group. T3, T4,hormones measured by RIA method, TSH by IRMA. Pre-gestational diabetes had been distinguished before pregnancy. For the confirmation of GDM the women were advised to take their regular diet for three days and to come to ANC clinic after observing overnight fast (at least 8 h but not more than 14 h) for oral glucose tolerance test (OGTT). After estimating fasting capillary glucose all participants were subjected to OGTT with 75g anhydrous glucose powder dissolved in 250-300 ml water to be consumed within five minutes. Time was counted from the start of the drink. Fasting, 1 and 2 h postglucose (FPG & PG) load, plasma glucose levels were estimated by enzymatic method in Auto analyser.GDM in pregnant women had been considered if two of the four criteria were detected following75 g glucose tolerance test:(FBS $\geq$ 95, 1h BS $\geq$ 180,2hBS $\geq$ 155).

In the present study individuals Trimester specific cutoff values for TSH, that is, 0.1–2.5 mIU/L, 0.2–3.0 mIU/L and 0.3–3.0 mIU/L, respectively, in first, second and third trimester of pregnancy were used to diagnose hypothyroidism and hyperthyroidism. Women with FT3, FT4 below the reference range along with elevated TSH were classified as having overt hypothyroidism while those having FT3, FT4 in normal range with TSH more than 2.5 mIU/L were diagnosed as having SCH. Women with FT3, FT4 above the reference range along with TSH value <0.1 mIU/L were classified as having overt hyperthyroidism while those having FT3, FT4 in normal range with TSH <0.1 mIU/L were diagnosed as having subclinical hyperthyroidism.[21]

Data analysis- appropriate statistical analysis was done with the help of inStat-graph pad software and chi square test and p value were appropriately applied.

Results

In this study among of three groups and most of the participants were from normal pregnant females 20(50%) and out of remaining ,diabetic mothers were only 4 (10%) of the total sample size and 16 (40%) mothers were of Gestational Diabetes Mellitus**.(Table No.1)**

Table No-1.
Distributions of pregnant women in control and test groups-

Groups	Number	Percentage
Healthy pregnant female(Control)	20	50
Pre Gestational Diabetic female	4	10
GDM female	16	40
Total	40	100

Where Healthy female means Pregnant women having normal level of Blood Glucose.

Mainly the prevalent condition among all three groups is Sub clinical Hypothyroidism. In case of control group of pregnant women 10% were have subclinical Hypothyroidism but in case of hypothyroidism and hyperthyroidism only 1 (5 %) mother was in both of the group and most of women of control group 16 (80%) were belong to bio chemically euthyroid condition. Simalarly in case of DM group of pregnant women 3 out of 4 (75%) were belong to euthyroid condition and one out 4 (25%) belongs to sub clinical hypothyroidism condition and in case of Gestational Diabetes group of women again most of them 11(68.75%) were also belong to euthyroid group. Among of GDM women 4 (25%) were belong to subclinical Hypothyroidism. The overall distribution of thyroid status among all three group was found not to be statistically significant (p>0.05) (**Table No 2)**

Table No. 2
Distribution of subjects with Thyroid Hormonal status in GDM, Diabetes Mellitus and control Group-

Thyroid function Group	Number of normal thyroid function (%)	Number of Hypothyroid (%)	No.of Subclinical Hypothyroid (%)	Number of Hyperthyroid (%)	No. of Subclinical Hyperthyroid (%)
Control	16 (80%)	1(5%)	2 (10%)	1(5%)	0(0.0%)
Diabetes mellitus	3 (75%)	0(0.00)	1(25%)	0(0.00%)	0(0.00%)
Gestational Diabetes Mellitus(GDM)	11(68.75%)	1(6.25%)	4(25%)	0(0.00%)	0(0.00%)

Chi square =0.600,p=0.741

Discussion-

Among of three groups of participants most of the participants were from normal pregnant females 20(50%),diabetic mothers were only 4 (10%) of the total sample size and 16 (40%) mothers were of Gestational Diabetes. This small number of participants may be due to short duration of study period and it may be due to that the prevalence of DM, GDM in pregnant women is lesser in the particular study area. Similar group of participants among pregnant women were also have been studied by HajiehShahbazian et al (2013)[22] in Pakistan .They have enrolled 61 participants in study group and 35 participants in control group it was due to that their study period was longer than the present study.

Mainly the prevalent condition among all three groups is Sub clinical Hypothyroidism. Presence of goitrogens in diet and micronutrient deficiency such as selenium or iron deficiency that may cause hypothyroidism specially in developing country like India. In other hand because of consumption of iodine salt for correction of iodine deficiency in our country, it can increase thyroid auto-immunity and rise in thyroid auto antibodies titer hence this can also lead hypothyroidism.

Most of women of control group 16 (80%) were belong to bio chemically euthyroid condition. Simalarly in case of DM group of pregnant women 3 out of 4 (75%) were belong to euthyroid condition and one out 4 (25%) belongs to sub clinical hypothyroidism condition and in case of Gestational Diabetes group of women again most of them 11(68.75%) were also belong to euthyroid group.Hence in the present study thyroid disorder in patients of GDM and DM have found no significant association (p>0.05) .Similarly in some studies thyroid disorder in patients of GDM also have found no association and some believe that hypothyroid patients are at higher risk of GDMin accordance with present study i. e. Di Gilio AR et al[23] also found there was no significant difference between TSH, FT4, FT3 levels in diabetic and healthy pregnant women and study conducted by byGonzalez et[24] al also found that 26% of pregnant women with type 1 diabetes and 4% of healthy pregnant women had thyroid dysfunction.

In the studies by Gllas PR et al[25] and Lois Jovanic P et al [26] found that thyroid dysfunction in pregnant women with type 1 diabetes was 40% and 40.9% respectively, that is higher than our study. The cause of this difference may be because most of our patients had type 2 diabetes.

In the present study hypothyroxinemia was found more among hyperglycemic pregnant women i.e.of DM or GDM women and similarly VelkoskaNakova et al[27] also reported higher prevalence of hypothyroxinemia in GDM than non-diabetic controls.

Similarly study conducted by HajiehShahbazian,et al in Pakistan (2013)[22] also found subclinical hypothyroidism was more common among GDM women but Agarwal et al[28] reported that thyroid dysfunction rate is similar in GDM and non-diabetic pregnant women. Tudela CM, Casey BM[29] et al from USA found that about only 2 % of the GDM women has association of subclinical hypothyroidism. Although the findings of different studies can vary in magnitude of association due to change in sample size and study area but further more studies are needed to be investigated to conclude if there is any particular association is universally exist among GDM, Pre GDM mothers and their thyroid status because the combination of all such conditions is highly morbid for maternal as well as for foetal out come.

Conclusions

As per the findings of the present study of higher prevalence of sub clinical hypothyroidism in GDM pregnancies and Diabetic pregnancies than in healthy pregnant women warrants routine screening for thyroid abnormalities in these groups of pregnant women so that better outcome of maternal and foetal side can be achieved in case of endocrinopathies during pregnancy.

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