Journal of Cardiovascular Disease Research
ISSN: 0975-3583, 0976-2833 VOL 14, ISSUE 02, 2023

Original Research

Evaluation Of Glycemic And Thyroid Status In Pregnant Women Attending Routine Antenatal Clinic At Our Hospital

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Abstract

Aim and Objectives: to measure the Serum levels of two-hour blood glucose (post 75 gm glucose tolerance test), TSH, FT3 and FT4 in antenatal women, to find out the prevalence of Gestational Diabetes, Sub clinical and overt Hypothyroidism in pregnancy and to measure the levels of anti-TPO antibodies all pregnant women.

Materials and Methods: Basic hematological and biochemical investigations were carried out along with thyroid function tests (TSH, FT3, FT4, anti TPO antibody titers). All the patients were subjected to first trimester ultrasound scan to confirm gestational age less than 12 weeks. The reference interval for thyroid panel were as per ATA guidelines. After general and gynecological examination, two-hour blood samples were collected for 75 g OGTT. Thyroid profiles were done by the chemilumine scence method.

Discussion and Conclusion: This present study revealed an increase in subclinical hypothyroidism in pregnancy in our population. A significant number of SCH with high anti-TPO antibody titre points towards autoimmunity as being a significant cause of the decreased level of thyroid hormones in pregnancy. However, GDM prevalence was at par with the national figure but with no significant association of SCH, and a high anti-TPO ab titre was found with GDM in our study.

Key-words: pregnancy, subclinical hypothyroidism, gestational diabetes mellitus, anti TPO antibodies and thyroid stimulating hormone**.**

INTRODUCTION:

Gestational diabetes mellitus (GDM) commonly appears between the second and third trimesters of pregnancy as a result of hormonal changes that induce a transitory state of insulin resistance (IR) in the mother, allowing a greater supply of glucose to the fetus. After GDM, thyroid disease is the most common endocrine disorder in obstetrics, with an incidence of 5-10%. Some studies speak of the existence of a relationship between diabetes and thyroid disorders but the results remain controversial, limiting the analysis of the effects that both diseases could have on the development of pregnancy.

The prevalence of GDM varies as high as 17.5% as per the reports of International Association of Diabetes in Pregnancy Study Groups (IADPSG). While the problem of thyroid dysfunction is prevalent in 10-15% women during the first half of pregnancy which may be hypothyroidism or hyperthyroidism[1,2].

Pregnancy has a considerable effect on the thyroid gland and its functioning. Few studies have shown that there is a correlation between thyroid disease and GDM, stating that there is high incidence of hypothyroxinaemia and high Anti TPO titre among patients with GDM, while some proposed that hypothyroid patients are at higher risk of GDM[3-10]. Adding to this, gestational diabetes mellitus (GDM) and functional abnormalities in the thyroid can have a variety.

The incidence of hypothyroidism in pregnancy is higher in Asian countries, with more observed in the Indian population being attributed to nutritional as well as immunological origins. Even subclinical hypothyroidism (SCH) with high thyroid-stimulating hormone (TSH) and a normal thyroxine level is commonly associated with endocrine abnormalities in pregnancy [15-19]. Anti-thyroperoxidase (anti-TPO) antibody having the ability to cross the placenta has been suggested to affect fetal growth [20,21]. Euthyroid pregnant women with high anti-TPO antibody titers have been registered with several adversities in obstetric and fetal outcomes [22-24].

Gestational diabetes mellitus (GDM) is a frequent occurrence in the second trimester of pregnancy, with the risk being greater with increasing age [25-27]. Autoimmune diseases like insulin-dependent diabetes mellitus (IDDM), Hashimoto's thyroiditis, pernicious anemia, etc., are more common in women and occur concomitantly. An association between hypothyroidism and different types of diabetes mellitus has been reported previously [The incidence of hypothyroidism in pregnancy is higher in Asian countries, with more observed in the Indian population being attributed to nutritional as well as immunological origins. Even subclinical hypothyroidism (SCH) with high thyroid-stimulating hormone (TSH) and a normal thyroxine level is bcommonly associated with endocrine abnormalities in pregnancy [15-19]. Anti-thyroperoxidase (anti-TPO)
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AIM AND OBJECTIVES:

1) To measure the levels of Serum levels of two-hour blood glucose (post 75 gm glucose load), TSH, FT3 and FT4 in antenatal women.
2) To find out the prevalence of Gestational Diabetes, Sub clinical and overt Hypothyroidism in pregnancy.
3) To measure the levels of anti-TPO antibodies all pregnant women.

MATERIALS AND METHODS:

This cross-sectional study was conducted in the Department of Obstetrics and Gynecology, National Institute of Medical Sciences, Jaipur. We enrolled 400 eligible pregnant women coming for their first antenatal checkup (ANC).

Study design: Prospective hospital based study.

Sample size: 400 cases of antenatal mothers were included.

Inclusion Criteria: Apparently healthy pregnant women, both primigravida and multi-gravida, with singleton pregnancies were included and written informed consent were obtained from the enrolled cases.

Exclusion Criteria: Pregnant women with preexisting thyroid diseases or any other endocrine disorders, pre-existing diabetes, on any hormone replacement therapy, any other metabolic or chronic disorders, and bad obstetric history with a known cause were excluded from the study.

Data collection: Detailed history was taken regarding the symptoms of thyroid disorders, menstrual history, obstetric history, past medical history, family history, personal and social history. General examination was done. Body temperature, pulse rate, blood pressure, respiratory rate was noted. Systemic examination of the cardiovascular system (CVS), central nervous system (CNS), respiratory system and thyroid gland was done.

Blood Sample Collection and Biochemical Investigations: Basic hematological and biochemical investigations were carried out along with thyroid function tests (TSH, FT3, FT4, anti TPO antibody titers). All the patients were subjected to first trimester ultrasound scan to confirm gestational age less than 12 weeks. The reference interval for thyroid panel were as per ATA guidelines. After general and gynecological examination, two-hour blood samples were collected for 75 g OGTT, the values are interpreted as per DIPSI guidelines (GDM is diagnosed if 2 hour PPBS is >140 mg/dL). Thyroid profiles were done by the chemiluminescence method. For this study, the trimester-specific upper limit value for TSH was taken as <2.5 mIU/mL for the first trimester and <3 mIU/mL for the second and third trimesters as per American Thyroid Association (ATA) 2011 criteria. Patients with TSH levels higher than the trimester specific level and normal fT4 levels were diagnosed with SCH. Anti-TPO level <60 U/L was taken as normal upper limit as per manufacturer's protocol. Level more than 60U/L is considered a raised anti-TPO titer.

This cross-sectional study was conducted in the Department of Biochemistry, in collaboration with the Department of Obstetrics and Gynecology, and 382 eligible pregnant women coming for their first antenatal checkup (ANC) were enrolled in the study.
Apparently healthy pregnant women, both primigravida and multi-gravida, with singleton pregnancies in their first ANC were included and written informed consent was obtained from the enrolled cases. Pregnant women with preexisting thyroid diseases or any other endocrine disorders, pre-existing diabetes, on any hormone replacement therapy, any other metabolic or chronic disorders, and bad obstetric history with a known cause were excluded from the study.
After general and gynecological examination, fasting, one-hour, and two-hour blood samples were collected for 75 g OGTT and estimation of thyroid profile (TSH, fT4, anti-TPO antibody). The biochemical parameters were performed on the Beckman Coulter AU5A00 auto analyzer with commercially available kits. Thyroid profiles were done by the chemiluminescence method in an Siemens Advia Centaur automated Immunoassay analyzer.

For this study, the trimester-specific upper limit value for TSH was taken as <2.5 mIU/mL for the first trimester and <3 mIU/mL for the second and third trimesters as per American Thyroid Association (ATA) 2011 criteria. Patients with TSH levels higher than the trimester specific level and normal fT4 levels were diagnosed with SCH. Anti-TPO level <60 U/L was taken as normal upper limit as per manufacturer's protocol. Level more than 60U/L is considered a raised anti-TPO titer.
GDM was diagnosed using 75 g of glucose challenge test (GCT) with a fasting value of more than 92 mg/dl, a one-hour post-glucose value of more than 180 mg/dl, and a two-hour post-glucose value of more than 153 mg/d

RESULTS:

This cross-sectional study was conducted in the Department of Obstetrics and Gynecology at our hospital. A total of 400 eligible pregnant women coming for their first antenatal checkup (ANC) were enrolled in the study.

Table 1: Shows baseline characteristics of the study patients

Parameters	Mean ± SD
Age	27.60 ± 4.23
Gestational age	9.41 ± 2.68
2-hour Glucose	106.11 ± 23.88
TSH	2.35 ± 1.62
FT3	2.4 ± 0.86
FT4	1.39 ± 0.58

Table 2: Shows the number and percentage of various thyroid disorders in the study population

Parameters	Number	Percent
Euthyroid	242	60.5%
Overt hypothyroidism	34	8.5%
Subclinical hyperthyroidism	12	3%
Subclinical hypothyroidism	112	28%
Total	400	100%

Table 3: Shows the Anti TPO antibody titres

Parameters	Number	>60 U/L	<60 U/L
Euthyroid	242	68 (30%)	174
Overt hypothyroidism	34	19 (55.88%)	15
Subclinical hypothyroidism	112	80 (71.4%)	32

DISCUSSION:

In the present study, we included 400 antenatal women based on inclusion and exclusion criteria. We measured thyroid function tests to calculate and study the prevalence of subclinical hypothyroidism and overt hypothyroidism in pregnant women. We found the prevalence of 5.5% GDM in pregnant women, 8.5% overt hypothyroidism and 28% subclinical hypothyroidism. Further we evaluated for anti TPO antibodies, we found that the titres were elevated (>60 U/L) in 30% euthyroid pregnant women, 55.88% of overt hypothyroidism pregnant women and 71.4% of subclinical hypothyroidism pregnant women.

Primary maternal hypothyroidism is characterized by an increase in the serum TSH levels during pregnancy. It is further classified as subclinical hypothyroidism (SCH) which has normal free T4 levels and overt hypothyroidism (OH) which has decreased free T4 levels. This differentiation is crucial as it has clinical and management implications. Maternal complications reported to be associated with overt hypothyroidism include pre-eclampsia, placental abruption, polyhydramnios, oligohydramnios, hyperemesis, gestational diabetes, premature rupture of membranes, and chronic hypertension. For the fetus too, there is a high risk of fetal death, prematurity, low birth weight,

congenital malformations, foetal distress, perinatal hypoxic encephalopathy, and deficit in the mental developmental coefficient. Some epidemiological studies have also pointed towards the association of maternal hypothyroidism and adverse neurological outcomes in the progeny ranging from neurological cretinism, congenital hypothyroidism, to decreased intelligence quotient.

The prevalence of SCH in pregnancy differs extensively worldwide. In India, the prevalence of SCH varies from 2.8% to 32.94% in different parts of the country, as documented in various studies. Gayathri et al. reported the prevalence of SCH of 2.8% among pregnant women in Chennai and 57.1% of the subclinical hypothyroid patients had positive TPO antibodies. Aggarwal et al. documented the prevalence of SCH to be 10.9% among pregnant women in a study conducted in a premier institute in north India, and TPO antibody positivity was 59% among the subclinical hypothyroid pregnant women in their study.
More than 50 years ago, the first criteria for the diagnosis of GDM were established by O'Sullivan & Mahan. Although they have undergone modifications over time, they are still widely used. Although the main purpose is to identify women at high risk of developing GDM or adverse perinatal outcomes, they can also be used for screening subjects at risk of postpartum diabetes. Opinions on these criteria are often divided, with some claiming that the current criteria may be restrictive in some respects, overlooking minor hyperglycemic states that increase the risk of maternal and fetal complications[11-17].
In our study, we documented a comparatively higher prevalence of subclinical hypothyroidism, which is quite high compared to other studies but almost in accordance with Mandal et al. as we used ATA 2011 criteria with an upper limit of TSH of 2.5 mIU/L in the first trimester and 3 mIU/L in the second and third trimesters. The prevalence of GDM in India, as per current statistics, varies from 4% to 18%. Literature also shows the prevalence rate is higher in urban areas than in rural areas. Our study population was heterogenous in geographical and social distribution.

CONCLUSION:

This present study revealed an increase in subclinical hypothyroidism in pregnancy in our population. A significant number of SCH with high anti-TPO antibody titer points towards autoimmunity as being a significant cause of the decreased level of thyroid hormones in pregnancy. However, GDM prevalence was in concordance with the national figure but with no significant association of SCH, and a high anti-TPO ab titre was found with GDM in our study.

We declare no financial support (self-funding) and nil conflict of interest.
Institutional Ethical Clearance was obtained for this study from IEC NIMS University.

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