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Research Article

Thyroid dysfunction and autoimmunity in pregnant women with gestational diabetes mellitus: a cross-sectional study

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ABSTRACT

Background: Objective of current to investigate the relation between Thyroid dysfunction and autoimmunity in pregnant women with gestational diabetes mellitus (GDM).
Methods: This is a cross-sectional descriptive study. In this study, 70 pregnant women in the third trimester of pregnancy with GDM (case group) and 70 healthy pregnant women in the same way (control group) were enrolled. Thyroid function tests (including serum TSH, fT4 level) and anti-TPO auto antibodies were measured in all women. Family history of the diabetes mellitus, GDM and thyroid disease was determined in both groups. Information of all patients was entered in checklists and then analyzed by statistical methods in SPSS.19.
Results: The mean age of patients in case group was 29.98±6.23 and in control group was 28.38 ± 6.15. In cases 27.1 % have family history of type 2 diabetes, 2% have history of thyroiditis disorder and 7.1% have history of gestational diabetes. The mean of BMI in cases with 30.52 was more than controls with 29.58. Obtained data showed that TSH level (p=0.033) and anti- TPO (p=0.001) in cases were more than controls and FT4 (p=0.001) level was lower.
Conclusions: The results showed that thyroid disorders in pregnancy women with gestational diabetes were significantly more than control group. So, doing necessary thyroid function tests as routinely was recommended.

Keywords: Pregnancy, Thyroid dysfunction, Gestational diabetes, Diabetes type 2

INTRODUCTION

Thyroid disorders have been demonstrated to have devastating effects on pregnancy and fetal growth. Thyroxin is essential for normal growth of fetus, especially brain growth. Because secretion of fetal thyroid hormones are not began until 20 weeks' gestation; therefore, in the first trimester it is completely dependent on maternal thyroxin which is transferred to the fetus. There exists strong relationship between maternal and fetal thyroid function. Thyroid autoantibodies have been associated with increased early pregnancy wastage, and uncontrolled thyrotoxicosis and untreated hypothyroidism can complicate pregnancy.[1-3] Hyperthyroidism in pregnant women increases complications of gestation including placental abruption, preterm delivery, and low birth weight.[4,5] Various investigations showed that thyroid autoimmune diseases such as increasing thyroid peroxidase antibodies in pregnant women are associated with abortion or preterm delivery.[6,7]

Gestational diabetes mellitus is the most common metabolic disorder in pregnancy. It has adverse effects on pregnancy and fetus.[8] Identification risk factors for gestational diabetes can help the screening program to

recognize gestational diabetes women and to control their blood glucose. So, its adverse effects on maternal and fetus can be prevented.[9] Epidemiologically, gestational diabetes similar to diabetes mellitus type II is related with increasing of age and BMI index.[10]

Incidence of diabetes mellitus in urban population of Iran is almost the same with its rate in developed countries.[11] Studies conducted in Tehran, Iran, reported that incidence rate of gestational diabetes was 2.9-6.9 %.[12,13] This study was designed to assess thyroid function disorders and thyroid autoimmune diseases in women with gestational diabetes.

METHODS

This was a case-control study which conducted on 70 women with gestational diabetes (case group) and 70 healthy pregnant women (control group). Case and control group were matched regarding age. Thyroid functional tests including serum level of thyroid stimulating hormone (TSH) and FT_4, and autoantibodies of anti-TPO were measured for all participants. Data analysis was carried out using SPSS version 16. T-test and Chi-square were used for analytical considerations. Statistically significant difference was indicated at significance level (p value) of 0.05.

RESULTS

Age group 20-30 with 94.3% was the most common. 64 (91.42%) from case group and 63(90%) from control group were household. 27 (38.6%) from case group were gravid 1, while 23 (32.9%) from control group were gravid 2. The mean ± SD age of gravid 1 in case group was 23 ± 6.03 which was significantly higher than control group (21.2 ± 3.56) (p value = 0.001). 27.1% from case group, and 12.9% from control group had family history of type II diabetes mellitus. 2(2.9%) from cases and 6 (8.6%) had history of thyroid disorders. Our results showed that 5 (7.1%) from case group had history of gestational diabetes, but none of individuals in control group reported this history. The mean ± SD gestational age in case group was significantly lower compared with control group (31.32 ± 5.82 and 35.57 ± 4.75 respectively) (p value = 0.001). Our finding showed higher average BMI in GDM (gestational diabetes mellitus) compared with control group.

The mean ± SD of TSH level were reported significant in comparing case and control group (2.53 ± 1.29 and 2.14 ± 0.81 µg/dl; respectively). 7.1% of case group and 1.4% of control group were reported with hyperthyroidism (Figure 1).

The mean ± SD free T_4 in case and control group was reported statistically significant (0.96 ± 0.17 and 1.14 ± 0.17 respectively). 17.1% of individuals in case group had free T_4 level less than normal range (Figure 2). The average level of free T_4 in case group was reported significantly lower than control group.

The average level of Anti TPO in case group was reported significantly more than control group (p=0.001). 9 patients in case group had anti TPO level more than normal (0-35 UA Anti TPO) (Figure 3).

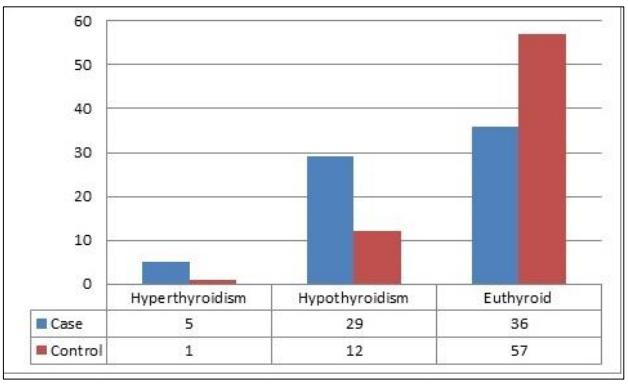

Figure 1: Frequency of TSH level in two groups.

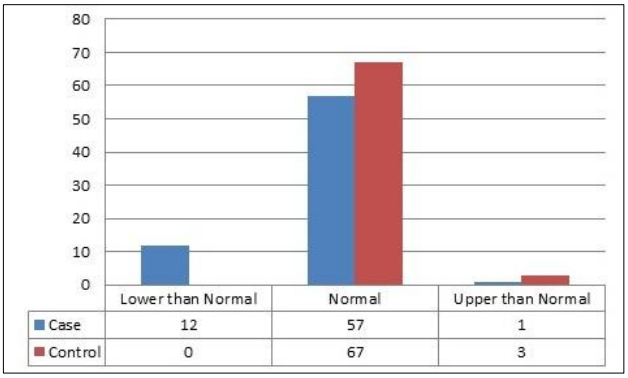

Figure 2: Frequency of FT4 level in two groups.

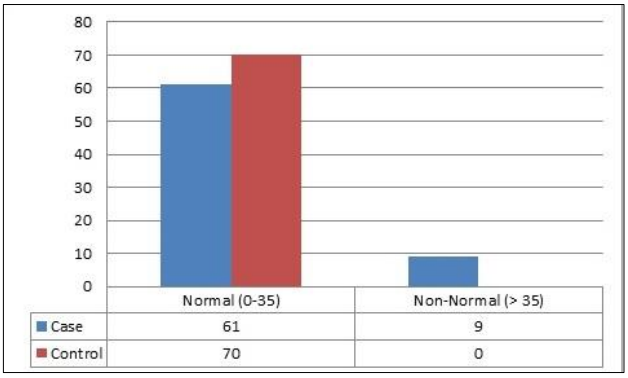

Figure 3: Frequency of anti TPO level in two groups.

DISCUSSION

In our study, in the case group the mean ± SD age was 28.38 ± 6.15 years old and the mean ± SD BMI kg/cm^2 was 30.52, while the mean BMI in control group was 29.54 kg/cm^2. In a study, Velkoska and et al. [14] showed

the mean age 32.1 years old, the mean gestational age 24.7 weeks, the mean BMI 28.9% kg/cm^2 in GDM group, while their control group had the mean maternal age, gestational age, and BMI of 30.5 years old, 25.4 weeks, 28.5 kg/cm^2 respectively. In another study done by Vitacolonna and et al.[15] reported, in case group, the average maternal age and BMI of 33 years old and 29.8 kg/cm^2 respectively, and the average maternal age and BMI of 29 years old and 28.1 kg/cm^2 respectively in control group.

In present study, we found the mean ± SD TSH levels were 2.53 ± 1.29 µg/dl in case group, and 2.14 ± 0.81 µg/dl in control group (p value = 0.018).

We found the prevalent of hyperthyroidism and hypothyroidism in case group were 7.1% and 41.42% respectively. In control group, in our study, we observed the prevalent of hyperthyroidism and hypothyroidism in case group were 1.4% and 17.14% respectively, (p value = 0.001). Gonzalez-Jimenez and et al. in their study showed[16] women with diabetes mellitus type I were 26%, and 4% in healthy women complicated with thyroid function disorders after delivery.

However, in a study done by Ortega-Gonzalez et al,[17] they observed no statistically significant difference between three groups of study regarding free T_4 level. Moreover, in another study by Agarwal et al they found similar results. They observed no statistically significant difference in free T_4 level between 2 group of gestational diabetes and healthy pregnant women.[18] Although, in a study, Velkoska et al indicated significant differences in free T_4 level in three groups of GDM, diabetes mellitus type I, and control group (11.7, 13.8, and 13.8 respectively) (p value <0.0001). In current study, women with gestational diabetes had normal TSH, but 10 % of them had free T_4 level below normal range. But in a study of Vitacolonna et al.[15] there was no significant association between gestational diabetes and free T_4 level. Our data confirm the result of previous studies showing free T_4 level in women with diabetes mellitus type I significantly lower than healthy pregnant women.[16,17] Several studies showed no statistically significant difference in TSH serum level between gestational diabetes group and healthy group.[14,15,17,18] In a study by Karakosta et al conducted on 1170 pregnant women. In this study thyroid tests showed that presence of high level TSH and gestational autoimmune thyroid disorder increases risk of gestational diabetes up to 4 fold, and the risk of low birth weight up 3 times.[20] In addition they showed that the risk of early delivery in women with thyroid autoantibodies but with normal plasma TSH is higher compared with women with thyroid autoantibodies but with high level of plasma TSH. In a study by Lercher-Hartlieb et al.[22] there was no association between gestational diabetes and thyroid function test disorders. In their study high level TPO antibodies in gestational diabetes group was significantly higher compared with healthy pregnant women. Also, previous study by Olivieri et al did not show significant differentiate in anti-thyroid antibodies between GDM and non GDM group (14.6% and 12.5% respectively).[19] Nevertheless, anti-thyroid antibodies was significantly higher in cases with GDM and history of diabetes mellitus in first degree relatives (30.7%). Gonzalez and et al. in their study showed higher level of Anti-TPO in case group (diabetes mellitus type I). Several studies showed contradict findings, which found no significant differentiate between GDM and non GDM groups regarding anti-TPO level.[17-19] In a study done by Agarwal et al, they observed that increased TSH level was associated with higher anti-TPO level (p value <0.001).[18] Velkoska et al reported prevalence of positive anti-TPO test in GDM, diabetes mellitus type I, and control group (15%, 30.8%, and 10% respectively). The results of study by Vitacolonna and et al. showed the rate of positive thyroid antibodies test in GDM, and control group (17.6% and 14.4% respectively). They also found that prevalence of thyroid antibodies in women with history of gestational diabetes is significantly higher (p <0.001). Montaner et al in their study reported[23] that 10% of their study's population had thyroid antibodies and 6.9% had GDM. Moreover, they did not observed significant association between existence of thyroid antibodies and incidence of gestational diabetes.

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