Original Article

Pregnancy in Overt and Subclinical Hypothyroidism and its Feto-Maternal Outcome

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Abstract

This prospective study was done to find out the maternal and fetal complications of pregnancy in patients with subclinical and overt (TSH level higher than subclinical hypothyroidism) hypothyroidism. Chronic hypertension, anemia with GDM, GDM with preeclampsia and thalassemia with GDM were observed only in patients with overt hypothyroidism. PPH, fetal distress, abortion and IUD were significantly higher ($p<0.05$) in patients with overt hypothyroidism. Fetal distress was found to be more in patients with overt than subclinical hypothyroidism. This study included 50 admitted patients who were pregnant. Among which, 29 were diagnosed as cases of subclinical hypothyroidism and 21 as that of overt hypothyroidism. Duration of marriage was almost identical between two groups. Multipara was predominant in both groups, however abortions were significantly higher ($p<0.05$) in overt hypothyroidism. Duration between first conception and marriage was somewhat longer (3-5 years) in patients with overt hypothyroidism than that (2 years) in patients with subclinical hypothyroidism. The commonest problem in both groups was anemia. 17.2% of patients with subclinical hypothyroidism were anemic whereas 42.9% patients with overt hypothyroidism suffered anemia. Preeclampsia (23.8%) and diabetes mellitus (38.1%) were also predominant in patients with overt hypothyroidism than in patients with subclinical hypothyroidism (Preeclampsia-3.4% and DM-10.3%). Low Birth Weight (LBW) babies were also common in patients with overt hypothyroidism (80%) than in patients with subclinical hypothyroidism (27.6%). 62.1% of babies from mothers having subclinical hypothyroidism had APGAR score of 7 whereas 73.3% of babies from mothers having overt hypothyroidism had APGAR score of 6 in the first minute. None of the babies were hypothyroid as tested from cord blood. Majority of patients underwent C-section in both groups.

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Introduction

Thyroid disorders are one of the most common endocrine disorders seen in pregnancy[1]. Overt hypothyroidism has been reported 1 in 1000 to 1 in 1600 deliveries and subclinical hypothyroidism has been found in 0.19% to 2.5% of pregnancy[2].

Women with hypothyroidism have relatively high rate of subfertility and miscarriages and carry increased risk for obstetric and fetal complications. The main obstetric complications are anemia, preeclampsia, cardiac dysfunction, placental abruption and postpartum hemorrhage. Fetal complications include prematurity, LBW, fetal distress in labour, fetal death, perinatal death and congenital hypothyroidism[3].

Thyroid hormone is essential for fetal development for at least the first half of pregnancy, when the fetus derives the hormone from the mother. Fetal developmental impairment is obvious in maternal hypothyroidism during this time. It is known that, women who are used to be treated with levothyroxine before pregnancy must increase their thyroid hormone replacement by 20% to 40% to keep their thyroid hormone levels within normal range. Most physicians measure the levels of Thyroid Stimulating Hormone (TSH) in early pregnancy and adjust the dose of levothyroxine accordingly. Sometimes, this results in patient becoming transiently hypothyroid before the dose is increased[4].

Over the past twenty years, there has been a major expansion of our knowledge regarding thyroid disorders accompanying with pregnancy. Simultaneously, a doubling of miscarriage rate has been reported in studies on antibody positive euthyroid women and an increase in preterm delivery has been found in women with subclinical hypothyroidism and/or thyroid autoimmunity[5j]

There has always been lack of agreement regarding the correct reference range to be used, whether TSH or Free Thyroxin (FT4) levels are the most important determinants of normality, impact (Maternal or fetal) of inadequate or excess treatment might be and whether correct treatment can improve neonatal outcome. These difficulties are often further complicated by practical issues like suboptimal pre pregnancy control, late gestation at booking, poor compliance and malabsorption caused by iron and calcium supplementation and pregnancy induced vomiting. Recommendations for management are generally based on expert opinion and even protocols from leading groups are not based on strong evidence and do not concur[6].

It is generally accepted that, a proportion of women with hypothyroidism need to increase their dose of thyroxin during pregnancy, but it is unclear how their dose changes should be decided. While, some studies suggest that decisions should be based on Thyroid Function Tests (TFT) at the booking visit and during pregnancy and many women would not need an increase if they were taking stable dose of thyroxin during pregnancy[7], other studies proposed a global increase in the thyroxin dose as soon as pregnancy is confirmed. Moreover, inadequate pre pregnancy control of thyroid function is associated with a need to increase thyroxin dosage during pregnancy. There are concerns that not only it may be unnecessary for many women but also fetal exposure to excess T4 and T3 may be associated with miscarriage and LBW[8]. In cases of treated hypothyroidism (all patients were made euthyroid), none of the babies had congenital anomalies[9].

This study was carried out to find out maternal and fetal complications during pregnancy with hypothyroidism and to note the pattern of thyroxin dose adjustment.

Materials and methods

This cross sectional study was carried out at the feto-maternal medicine unit, Department of Obstetrics and Gynecology, BSMMU. Sample size was 50 patients and study period was 6 months. All patients were divided into 2 groups: Group I consisted of patients with subclinical hypothyroidism (elevated TSH with normal T4) and group II consisted of patients with overt hypothyroidism (elevated TSH with low T4). Recently diagnosed hypothyroid pregnant women (either during the study or within 6 months prior to the study) and admitted patients who were diagnosed as overt or subclinical hypothyroid during Antenatal Checkup (ANC) were included in the study. Data were collected with a questionnaire and were analyzed by computer based SPSS (Statistical Package for Social Sciences, Chicago) program, version 16.0.

Results

86.2% of patients in group I conceived for the first time within 2 years after marriage. However, 66.7% in group II conceived within 3-5 years after marriage. Significant difference ($p<0.05$) was observed in between the two groups regarding number of abortions. 52.4% of patients in group II gave history of 2 abortions whereas, 13.8% patients in group I gave history of 2 abortions. However, 14.3% of patients in group II had history of 3 abortions but none in group I had this history.

Associated medical illnesses were more common in group II patients than in group I. Anemia was the commonest sign found in 17.2% of patients in group I and in 42.9% of patients in group II.

Preeclampsia was found in 3.4% of patients in group I and in 23.8% of patients in group II. Whereas, diabetes mellitus was found in 10.3% of patients in group I and 38.1% of patients in group II. Other medical disorders like chronic hypertension, anemia with GDM, GDM with preeclampsia and thalassemia with GDM were observed only in group II patients.

History of thyroxin intake revealed 55.2% of study patients received 50µg of thyroxin per day in group I. However, 71.4% of patients in group II received 150µg thyroxin per day.

Complications during delivery were observed mostly in group II patients. Impending eclampsia was found in 3.4% of patients in group I and in 19.0% of patients in group II. Prolonged second stage of labour was more common in group II (42.9%) than in group I (13.8%) patients. Fetal distress was also more frequent in group II (80.9%) patients compared to that in group I (41.4%) patients. PPH, abortion and IUD were observed only in group II patients.

The mean TSH level (mean±SD) in group I patients was 12.6±19 µIU/ml and that in group II patients was 13.9±10.4 µIU/ml during the first trimester of pregnancy which was not statistically significant ($p>0.05$) according to unpaired t-test. However, mean TSH level at the second trimester of pregnancy was 0.41±0.7 µIU/ml in group I patients and 0.93±0.23 µIU/ml in group II patients, which was statistically significant ($p<0.05$) as determined by unpaired t-test. During third trimester of pregnancy, mean TSH level was 2.0±1.1 µIU/ml in group I patients and 2.9±1.3 µIU/ml in group II patients - which was found statistically significant by unpaired t-test.

Regarding mode of delivery, majority of the study patients underwent LUCS in both groups, which was 24 (82.8%) in group I and 15 (83.3%) in group II. There were 3 abortions, out of which, 2 required evacuation under anesthesia.

Considering fetal outcome, it was observed that, 27.6% and 80.0% of the babies had LBW (fetal weight < 2.5kg) in group I and group II respectively. In group I, 62.1% of the babies had APGAR score of 7 but in group II, 73.3% of the babies had that of 6 at the 1st minute. During the 5th minute, APGAR score was 7 in 86.2% and 80.0% of babies in group I and group II respectively. Only 13.8% of babies in group I and 20.0% of babies in group II were sent to NICU. Cord blood investigation revealed no hypothyroidism in any of the test subject. Birth weight and APGAR score at the 1st minute revealed statistically significant ($p<0.05$) difference between groups, but others were non-significant ($p>0.05$).

Discussion

In this study, we observed that, 62.1% of the patients were in the age range of 15 to 24 years in the group containing patients with subclinical hypothyroidism and 66.7% of the patients were in the age range of 25 to 44 years in the group containing patients with overt hypothyroidism. Age ranges of 15 to 24 years and 25 to 44 years were significantly ($p<0.05$) higher in patients with subclinical hypothyroidism and overt hypothyroidism respectively compared to control. This result resembles other study results showing higher maternal age in hypothyroid women[1,7,9].

Studies have shown that, pregnant women with hypothyroidism usually have high rate of multiple abortions or miscarriages[9]. We also had significantly ($p<0.05$) high rate of multiple abortions among our study subjects.

Previous studies have shown that, patients with overt hypothyroidism had high rate of gestational diabetes and neonatal complications in the form of birth asphyxia, jaundice, hypoglycemia etc. needing admission into NICU[1]. Our study results also have close resemblance to the fact. Most of the women with hypothyroidism, who are on maintenance dose of thyroxin, require an increase in the dose during pregnancy - as stated by previous work[9]. 71.4% of patients with overt hypothyroidism in this study, required increase in dose of thyroxin.

As we stated above, maternal complications are significantly higher in most of the patients with overt hypothyroidism, other studies have also stated the same[9]. Fetal complications were almost the same as described by others[10, 11] and no significant association was found between cord blood study and maternal TSH[1].

Though the study has helped us correlate the facts related to hypothyroidism in pregnancy and its outcomes in mother and fetus, it is a comparative study and thus it has its limitations. Further investigations in each of the segments of the study are necessary to reveal the exact mechanisms of different outcome in maternal hypothyroidism.

References

1. Sahu MT, Das V, Mittal S, Agarwal A, Sahu M. Overt and subclinical thyroid dysfunction among Indian pregnant women and its effect on maternal and fetal outcome. Arch Gynecol Obstet. 2010;281:215-220.
2. Decherney AH, Nathan L, Goodwin TM, Laufer N. Current diagnosis and treatment Obstetrics and Gynecology. 10th ed. McGraw Hill Professional: LANGE; 2004.
3. Poppe K, Glinoer D. Thyroid autoimmunity and hypothyroidism before and during pregnancy. Human Reproduction Update. 2003;9(2):149-161.
4. Dunn JT. Choice of therapy in young adults with hyperthyroidism of Grave's disease. Ann Intern Med. 1984;100:891-893.
5. Rashid M, Rashid MH. Obstetric management of thyroid disease. Obstet Gynecol Surv. 2007;62(10):680-688.
6. Abalovich M, Amino N, Barbour LA, Cobin RH, DeGroot LJ, Glinoer D, et al. Management of thyroid dysfunction during pregnancy and postpartum: an endocrine society clinical practice guideline. J Clin Endocrinol Metab. 2009;92(8) (Supp 1):S1-S47.
7. Kothari A, Girling J. Hypothyroidism in pregnancy: Pre-pregnancy thyroid status influences gestational thyroxin requirements. BJOG. 2008;115:1704-1708.
8. Vaidya B, Anthony S, Bilous M, Shields B, Drury J, Hutchison S, et al. detection of thyroid dysfunction in early pregnancy: Universal screening or targeted high-risk case finding? J Clin Endocrinol Metab. 2007;92(1):203-207.
9. Miah SM, Islam R, Sardar S, Uddin M, Sharmin S. Outcome of pregnancy in treated hypothyroidism. Bang J Nucl Med. 2009;12(2):13-17.
10. Leung AS, Miller LK, Koonings PP, Montoro MM, Mestman JH. Perinatal outcome in hypothyroid pregnancies. Obstet Gynecol. 1993;81:349-353.
11. Mestman JH, Goodwin TM, Montoro MM. Thyroid disorders of pregnancy. Endocrinol Metab Clin N Am. 1995;24:41-71.