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ORIGINAL ARTICLE

Outcome of Thyroid Dysfunction in Pregnancy in Mashhad, Iran

Taghavi M[a], Saghafi N[b], Shirin S[b]

[a]Departments of Endocrinology, and [b]Gynecology and Obstetrics, Mashhad University of Medical Sciences, Mashhad, I.R.Iran

Thyroid disorders are common in women during pregnancy, when the excess or deficiency of maternal thyroid hormones has been associated with adverse health outcomes for both the mother and child. This study performed to study the prevalence of thyroid disorders and its effect on pregnancy outcomes in pregnant women.

Materials & Methods: In 500 pregnant women in first trimester of pregnancy enrolled for the study, Serum Thyrotropin (TSH), Free T4 (FT4), and Free T3 (FT3) were measured by high-sensitive radioimmunoassay. Overt hyperthyroidism was diagnosed when both TSH was suppressed and FT4 or FT3 were elevated. Subclinical hyperthyroidism was diagnosed when TSH was suppressed with normal FT4 and FT3. The diagnostic criteria for overt hypothyroidism was TSH > 4 mU/L accompanied by decreased FT4, and for subclinical hypothyroidism a TSH > 4 mU/L with normal FT4 level. Those with thyroid disorders were referred to an endocrinologist for medical treatment and all subjects were followed until delivery.

Results: Mean age of women was 24.5±4.9 years. Hypothyroidism, both subclinical (7.4%) and overt (2.4%), was found in 49 (9.8%) women. Overt hyperthyroidism found in 3 (0.6%) and subclinical hyperthyroidism in 21 (4.2%) women and was considered a physiologic change of pregnancy. On follow up, 19 women (3.8%) had preterm labor, and 25 (5%) women developed pre-eclampsia. There was no significant difference in the incidence of preterm labor and pre-eclampsia in pregnant women with or without thyroid dysfunction. Normal neonates were born to 498 women, while 2 (0.4%) euthyroid mothers delivered fetuses with anomalies.

Conclusion: Although thyroid dysfunction is common in pregnant women, the prevalence of complications is not higher in patients with thyroid dysfunction, as compared to normal euthyroid controls.

Correspondence: M. Taghavi, Ahmad Abad Street, Ghaem Hospital, Mashhad, Iran
E-mail: taghavimr@mums.ac.ir

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Introduction

Thyroid disorders are common in women during pregnancy, during which the excess or deficiency of maternal thyroid hormones have been associated with adverse health outcomes for both mother and child.[1,2] Maternal hypothyroidism is a common occurrence during pregnancy, with overt and subclinical hypothyroidism being reported in about 0.2% and 2.3% of pregnancies respectively.[3-6] It is associated with fetal loss, pregnancy-induced hypertension, preterm delivery, placental abruption, and reduced intellectual function in the offspring.[3-6] Overt maternal hyperthyroidism is less common, observed in 0.2% of pregnancies[2] and can cause fetal loss, fetal growth restriction, preeclampsia, and preterm delivery.[1,2,7] Mild or subclin-

ical hyperthyroidism (suppressed serum TSH alone) is found in about 1.7% of pregnancies and has not been specifically associated with adverse pregnancy outcomes.[8] There are different views on the optimal approach to identify thyroid disease in pregnancy, although all share the aim to identify and treat thyroid disorders to improve pregnancy outcomes for mothers and infants. We undertook this study in order to determine the prevalence of thyroid function disorders in pregnant women and their effect on pregnancy outcomes in Mashhad, in the north east of Iran.

Materials and Methods

Subjects

This study was conducted between Sept 2006 and Feb 2008. Pregnant women attending the Ghaem University Hospital Gynecology Clinic, for their first-trimester antenatal screening, were invited for thyroid function tests (TFT). Following data collection on current pregnancy, medical and obstetrical history, patients with miscarriage and known thyroid disease were excluded from the study, leaving a total of 500 pregnant women enrollees. After blood sampling, TSH, FT4 and FT3 were measured using commercially available radio immunoassay kits (Biosourse Europesa, Belgium) on Gammamatic gammacounter (Kontron, Switzerland). Normal ranges were 10.30-24.32 pmol/L for FT4, 1.5–4.1 ng/L for FT3, and 0.4-4 mIU/L for TSH. Inter- and intra-assay coefficients of variation for each assay were as follows: 4.4 and 3.9% for FT4, 15.6% and 13.2% for FT3, and 5.4 and 3.5% for TSH respectively.

According to their TFT results, patients were classified to 4 groups: Healthy-normal serum TSH and FT4; subclinical hypothyroidism- elevated serum TSH concentration and normal serum FT4 concentration; overt hypothyroidism-elevated serum TSH concentration and reduced FT4 concentration; subclinical hyperthyroidism-suppressed serum TSH per se and overt hyperthyroidism-suppressed serum TSH and elevated serum FT4 or FT3 concentrations. Those with thyroid disorders were referred to an endocrinologist for medical treatment and all subjects were followed until delivery. Patients with hypothyroidism were treated with Levothyroxine, while those with subclinical hyperthyroidism did not receive any therapy and were followed closely; 3 patients with overt hyperthyroidism were however treated with antithyroid drugs. All women were followed until delivery and any/all complications of mothers and the fetus were documented precisely. The research ethics committee of the Mashhad University approved this study.

Statistical analysis:

Mean±SD were used for description of study participants. Student's test was used to compare means values between groups. Statistical computations were done using SPSS 11.0 for Windows software.

Results:

We screened thyroid function in 500 pregnant women, mean age 24.5±4.9 years; 49 (9.8%) women had raised TSH (>4 mu/L), of whom 12 (2.4%) had overt hypothyroidism and 37 (7.4%) subclinical hypothyroidism. A suppressed TSH level was found in 24 (4.2%) women, 3 (0.6%) of whom also had raised FT4 and were diagnosed as having overt hyperthyroidism, whereas the remainder (21) had subclinical hyperthyroidism. If subclinical hyperthyroidism is considered to be a physiologic change occurring during pregnancy, thyroid dysfunction was found in 52(10.4%) women. All women were followed until delivery; nineteen women (3.8%) had preterm labor; 25 women developed (5%) pre-eclampsia. Comparing patients with thyroid dysfunction as a whole to euthyroid subjects, there was no significant difference in the incidence of preterm labor (p= 0.938) and pre-eclampsia (p= 0.930) in pregnant women with and without thyroid dysfunction (Tables 1 and 2) Normal neonates were born

to 498 women, whereas 2 euthyroid mothers (0.4%) delivered fetuses with anomalies.

Table 1: Comparison of occurrence of preeclampsia between women with thyroid dysfunction and euthyroid subjects

	Preeclampsia	%
Euthyroid women (427)*	23	5.3
Subclinical hypothyroidism (37)	1	2.7
Overt hypothyroidism (12)	0	0
Subclinical hyperthyroidism (21)	1	4.7
Overt hyperthyroidism (3)	0	0
Total (500)	25	12.7
P=0.930		

*Numbers in parenthesis denotes number of patients

Table 2: Comparison of occurrence of preterm delivery between women with thyroid dysfunction and euthyroid subjects

	Preterm	%
Euthyroid women (427)*	17	3.9
Subclinical hypothyroidism (37)	1	2.7
Overt hypothyroidism (12)	0	0
Subclinical hyperthyroidism (21)	1	4.7
Overt hyperthyroidism (3)	0	0
Total (500)	19	11.3
P=0.938		

*Numbers in parenthesis denotes number of patients

Discussion:

Currently, there is no consensus regarding systematic screening for thyroid dysfunction during pregnancy. The AACE (American Association of Clinical Endocrinologists) recommends screening for all women in the first trimester.[9] An expert panel of the AACE, ATA (American Thyroid Association) and Endocrine Society advocate that TSH testing should be performed routinely during the pre-pregnancy evaluation or as soon as pregnancy is diagnosed.[10] More recently, an international task force created under the auspices of the Endocrine Society concluded that universal screening of pregnant women for thyroid disease is not yet supported by adequate studies, although screening specific groups at increased risk is strongly supported.[11] Several European authors also recommend systematic screening for thyroid dysfunction during pregnancy.[12]

Our data showed that thyroid dysfunctions are more common in pregnant Iranian women, than in other countries. Close to the prevalence of 7.8% (52/664) reported from China,[17] there was a 10% prevalence of thyroid disorders in this study; hypothyroidism was observed in 9.8% of women (subclinical in 7.4%, and overt in 2.4%), a rate higher than the those between 2.2% and 2.5% reported in European and American pregnant women.[3,13-16] In developing countries, considering its higher prevalence, the priority of thyroid dysfunction in these areas, despite multiparity, the serious related risks, and cost of tests involved, needs to be reviewed.

In this study, the risk of fetal anomaly, preterm labor and pre-eclampsia was not higher in subjects with thyroid dysfunction. Other studies also have shown that adverse events occur in pregnant women with overt and subclinical hypothyroidism, but not in women with hypothyroidism, on replacement therapy with Levothyroxine.[4,6] A report by Negro et al has shown that therapy in pregnant women with autoimmune thyroid disease, improves outcomes and reduces the rate of miscarriage and pre-term labor.[5] These findings provide

evidence for the importance of identification and treatment of thyroid dysfunction in pregnancy.

Regarding the limitations of our study, first our study used a single thyroid function test for screening. Second we used non-pregnant population reference intervals; the percentage of potentially misclassified cases of thyroid dysfunction in pregnant women changes when gestational age-specific reference intervals are used as diagnostic criteria during pregnancy. Our results would also have been more accurate had we measured anti thyroid antibodies.

To conclude, our study shows high prevalence of thyroid dysfunction in pregnant women in Mashhad, although the prevalence of complications is not higher in patients with thyroid dysfunction, as compared to normal euthyroid controls.

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