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Correlation Between Thyroid Dysfunctions and Pregnancy

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Abstract

The thyroid diseases are the most common disorders that effect the women in reproductive period due to several factors. However, if thyroid dysfunction is not treated or delayed in diagnosis in early pregnancy, they will effect both mother and fetus by sever outcomes. Moreover, the subclinical hypothyrodism is the most common thyroid disorder in pregnancy. The rate of clinical hypothyroidism was 2.4%, subclinical hypothyroidism was 11.3%, and 1.5% of pregnant women with overt hyperthyroidism, and subclinical hyperthyroidism was 0.3%. Inaddition, the best choice of treatment in pregnant women with hypothyroidism is a replacement therapy with levothyroxine, while the propylthiouracil is preferred in hyperthyrodism.

Introduction

Pregnancy is an important reproductive period, with reversible effects on thyroid gland in pregnant women such as: thyroid function, size, and iodine metabolism, in addition, the immune system changes can occur.^(1,5) If these changes are not detected and untreated in early pregnancy, will lead to sever maternal and fetal outcomes.⁽²⁾ Estimation of thyroid diseases in pregnancy is essential for normal and healthy gestational period, beacause the changes during pregnancy will lead to thyroid dysfunction.^(2,4) Furthermore, thyroid function tests such as Free Thyroxine (FT4), Free triiodothyonine (FT3), thyroid-stimulating hormone (TSH), anti-thyroid peroxidase antibodies (TPO), and measurement of iodine level in urine is important in early diagnosis to prevent maternal and fetal complications.^(1,2) Moreover, the most common thyroid disorders in pregnancy is maternal hypothyroidism.⁽²⁾ furthermore, the normal physiological changes that occur in pregnancy period have many signs and symptoms according to type of dysfunction:

- i. Hypothyroidism: fatigue, anxiety, constipation, muscle cramps and weight gain.
- ii. Hyperthyroidism: increase rate of metabolism and heart rate, fatigue, anxiety, palpitation, warm and wet skin, hand tremors, weight loss even with taking adequate food.⁽⁵⁾

In addition, the main causes of thyroid dysfunctions in pregnancy are smoking, history of thyroid disease, obesity and oral contraceptive, Glucocorticoids, Dopamin, or antiepileptic drugs.⁽³⁾

Aim of the study

The aim of the study is to illustrate and investigate the frequency of thyroid diseases, pregnancy outcomes, changes in thyroid hormones during the pregnancy and the management of thyroid dysfunction in pregnancy.

Material and methods

Prospective study was performed on 600 pregnant women aged between 18 to 35 years old on 15 to 28 week of gestation, and variety of studies from randomized clinical trials, and an experiment was done on case report study and cohort prospective study. Review of thyroid hormone therapy of hypothyroidism in pregnancy, and management of thyroid disorders in pregnancy according to Pakistan medical association.

Pubmed was used to collect all reviews and studies used in this report

Key words: thyroid diseases, hypothyroidism, hyperthyroidism and pregnancy.

Results

The rate of clinical hypothyroidism was 2.4%, subclinical hypothyroidism was 11.3%, and 1.5% of pregnant women with overt hyperthyroidism, and subclinical hyperthyroidism was 0.3%. Moreover, the rate of delivery in 16.2% of the pregnant women was cesarean section. In addition, the clinical hypothyroidism is associated with preterm delivery while the subclinical hypothyroidism is not associated with pregnancy outcomes. Moreover, preterm delivery was in 11.1% of all pregnant women with clinical hyperthyroidism while the subclinical hyperthyroidism is not associated with pregnancy outcomes.

Discussion

During the pregnancy both the mother and fetus requirements of thyroid hormones increased, however, thyroid hormones secretion will be increased at the beginning of 4-6 weeks of gestation because the fetal thyroid gland forms at week 12 of gestation, therefore, the fetus until week 12 depends on maternal thyroid hormones.⁽⁶⁾In addition, At first trimester, the production of human chorionic gonadotropin (HCG) will increase that stimulates the thyroid hormones production, however, the thyroid stimulation will decrease, due to the regression in HCG level of second and third trimester.⁽⁶⁾At the

beginning of 6 week of gestation the level of TBG (thyroxine binding globulin) will be increased, therefore, lead to elevation in TT4 (total thyroxine) level and decrease in FT4 level.⁽⁶⁾ During the second and third trimester, the placental type 2 and type 3 deiodinase enzyme activity will increased, therefore, converting of T4 into T3 and reverse T3 and decrease in FT4 level. ⁽⁶⁾ Moreover, in iodine sufficient area, these changes during pregnancy are well tolerated, in contrast, in iodine deficient area these physiological changes lead to thyroid dysfunction.⁽⁵⁾ Moreover, Iron deficiency play a role in these changes, by decreasing the activity of TPO enzyme, therefore, reducing in FT4 level, a previous study suggest that, the high BMI is an indicator of thyroid dysfunction.^(3,6)

According to a recent study done on 600 healthy pregnant women aged between 18 to 35 years old at 15 weeks of gestation, after taken a blood sample of them in second trimester for thyroid function test revealed that 2.4% have clinical hypothyroidism, 11.3% with subclinical hypothyroidism, while only 0.3% diagnosed with subclinical hyperthyroidism, and 1.2% were have clinical hyperthyroidism. In addition, the rate of delivery in 16.2% of the pregnant women was cesarean section, while others women undergo to normal delivery. The rate of preeclampsia in hypothyroidism pregnant women was 7.5%, while IUGR (intrauterine growth retardation) was in 13.7% of pregnant women, the preterm delivery represent the serious complication in 21.2% of all pregnant women and the rate of low apgar score found in 13.7% of the women.⁽⁴⁾

In addition, the fate of hypothyroidism are anemia, pregnancy induced hypertension, placental abruption, congenital hypothyroidism, postpartum hemorrhage, low birth weight, neonatal respiratory distress, and dysfunction in brain development, due to the essential role of thyroid hormones in the growth and maturation of fetus tissue such as brain, bone and muscles.^(4,5) Otherwise, the subclinical hypothyroidism is not associated with pregnancy outcomes, while a recent studies suggest a chance for placental abruption, preterm birth, miscarriage, gestational hypertension and fetal distress, and the risk is increase when it accompanied by TPOAb positively.^(5,6) In contrast, the rate of preeclampsia in hyperthyroidism is not found 0% of all pregnant women, while IUGR was in 22.2% of women, preterm delivery and low apgar score were in 11.1% of all pregnant women. In addition to fate of hyperthyroidism is fetal thyroid dysfunction

or neonatal thyrotoxicosis.⁽⁴⁾ Otherwise, the subclinical hyperthyroidism is not associated with pregnancy outcomes.⁽⁵⁾

Conclusion

The hyperthyroidism and hypothyroidism in pregnant women have multiple outcomes on mother and fetus. However, there are still suggestions about the effect of subclinical hypothyroidism and subclinical hyperthyroidism on pregnant women and fetus. In addition, the best choice of treatment in pregnant women with hypothyroidism is replacement therapy with levothyroxine, while the propylthiouracil is preferred in hyperthyroidism.

Future work

The effects on thyroid glands in pregnant women are reversible changes but they must be managed to prevent later complications. However, the future study should include more about the effect of iodine intake.

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