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THYROID AND PREGNANCY

High levels of thyroid antibody is associated with decreased response of thyroid gland to the main pregnancy hormone early in pregnancy

BACKGROUND

The main pregnancy hormone is human chorionic gonadotropin (hCG). This hormone is made by placenta during early pregnancy and is the basis for a positive pregnancy test. The highest levels of hCG are seen in the first trimester. This hormone can also bind to the thyroid gland and stimulate it, similar to TSH but much weaker. During pregnancy, hCG stimulates the thyroid gland of the pregnant mother to make more thyroid hormone, which is important for normal development of the baby. TSH levels in the mother decrease as hCG levels rise. However, if the mother has autoimmune thyroid disease with high levels of antibodies to thyroid gland, such as thyroid peroxidase antibody (TPOAb) or thyroglobulin antibody (TgAb), the thyroid gland may not respond as well to hCG. Because of this, TSH levels may not decrease as much as would be seen in the absence of these antibodies. This study was done to assess response of thyroid gland to hCG in pregnant women with and without thyroid antibodies during the first 20 weeks of pregnancy.

THE FULL ARTICLE TITLE

Hou Y et al 2019 Different Thyroidal Response to Human Chorionic Gonadotropin Under Different Thyroid Peroxidase Antibody and/or Thyroglobulin Antibody Positivity Conditions During the First Half of Pregnancy. Thyroid 29(4):577-585

SUMMARY OF THE STUDY

A total of 822 pregnant women in 7-20 weeks of pregnancy in three cities in China were included in the study. All women had normal serum TSH levels by the pregnancy-specific normal ranges. None of the women had twin or higher order pregnancy, history of thyroid disease, or took medications that might affect thyroid function. Blood levels of hCG, TSH, free thyroxine (FT_4), TPOAb, and TgAb were measured when they enrolled in the study. Pregnant women were divided into 4 groups: group 1 had both TPOAb and TgAb, group 2 had TPOAb only, group 3 had TgAb only, and group 4 did not have TPOAb or TgAb. There were 128 pregnant women in group 1, 90 women in group 2, 188 women in group 3, and 416 women in group 4. For group 2 and group 3, pregnant women were further divided into three groups each, from lowest level of thyroid antibody to highest level of thyroid antibody.

Higher hCG levels correlated with lower TSH levels in all groups. However, hCG level did not correlated with TSH levels in pregnant women with highest levels of TPOAb in group 2 and in pregnant women with highest levels of TgAb in group 3. Higher hCG levels correlated with higher FT_4 levels in group 2 and group 4, but not in group 1 (pregnant women with both TPOAb and TgAb). However, hCG level did not correlated with FT_4 level in pregnant women with highest levels of TgAb in group 3.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

In pregnant women with normal TSH levels in pregnancy, high levels of thyroid antibodies, including TPOAb and TgAB, were associated with decreased response of thyroid gland to hCG. The findings of this study suggest that having high levels of thyroid antibodies may interfere with increased thyroid hormone production caused by high levels of pregnancy hormone in early pregnancy. More studies are needed to confirm the findings of current study and to study possible effects of high levels of thyroid antibody in pregnancy with normal TSH levels.

— Sun Lee, MD

ATA THYROID BROCHURE LINKS

Pregnancy and Thyroid Disease: https://www.thyroid.org/thyroid-disease-pregnancy/
Thyroid Function Tests: https://www.thyroid.org/thyroid-function-tests/

THYROID AND PREGNANCY, continued

ABBREVIATIONS & DEFINITIONS

hCG: human chorionic gonadotropin — the major hormone produced by the placenta which is closely related to thyroid stimulating hormone (TSH). hCG can bind to the TSH receptors present in thyroid tissue and act like a weak form of TSH to cause the thyroid to produce and release more thyroxine and triiodothyronine. hCG is the hormone measured in the pregnancy tests.

TSH: thyroid stimulating hormone — produced by the pituitary gland that regulates thyroid function; also the best screening test to determine if the thyroid is functioning normally.

Thyroxine (T4): the major hormone produced by the thyroid gland. T_4 gets converted to the active hormone T_3 in various tissues in the body.

Free Thyroxine (FT4): thyroxine (T_4) that is not bound to thyroid-binding globulin. This is a more active form of thyroxine in the blood.

Antibodies: proteins that are produced by the body's immune cells that attack and destroy bacteria and viruses that cause infections. Occasionally the antibodies get confused and attack the body's own tissues, causing autoimmune disease.

TPO antibodies (TPOAb): these are antibodies that attack the thyroid instead of bacteria and viruses, they are a marker for autoimmune thyroid disease, which is the main underlying cause for hypothyroidism and hyperthyroidism in the United States.

Thyroglobulin antibodies (TgAb): these are antibodies that attack the thyroid instead of bacteria and viruses, they are a marker for autoimmune thyroid disease, which is the main underlying cause for hypothyroidism and hyperthyroidism in the United States.