



## THYROID DISEASE AND PREGNANCY

### Thyroid antibodies in the mother are associated with cardiac and metabolic risk factors in the children at age 16

#### BACKGROUND

There has been recent interest on how factors in the mother during pregnancy may affect their children later in life. Approximately 17% of pregnant women have thyroid antibodies (a marker of autoimmune thyroid disease) and 2-3% of women have mild abnormalities in thyroid tests known as subclinical hypothyroidism. One study found that children of women with lower TSH and higher thyroid hormone levels during pregnancy were leaner at the age of 6 years. Another study found that children of women with subclinical hypothyroidism during pregnancy had higher blood pressure by the age of 20 than those whose mother's had normal thyroid blood tests during pregnancy. Obesity and high blood pressure are 2 of the components of the cardiometabolic syndrome, which is associated with the development of heart disease and diabetes. The other components are intolerance to glucose with resistance to insulin and abnormal lipid (fat) profile in the blood.

Despite these studies, the association between the thyroid status of the mother during pregnancy and her child's health later in life has not been well studied. This study set up to study whether there is an association between thyroid autoimmunity and the child's risk to develop the cardiometabolic syndrome in later life.

#### THE FULL ARTICLE TITLE

Heikkinen AL et al. Maternal thyroid antibodies associates with cardiometabolic risk factors in children at the age of 16. *J Clin Endocrinol Metab*. September 11, 2017 [Epub ahead of print].

#### SUMMARY OF THE STUDY

This study used the Northern Finland Birth Cohort, which includes a total of 9362 mothers and 9479 children (99% of the births in two provinces of Finland from July 1985 to June 1986). Mothers were enrolled at their first pregnancy visit between 8 and 24 weeks' of pregnancy and children have been followed since birth. Demographics, pregnancy and health histories, delivery information, and neonatal outcomes were obtained at routine clinic visits

and by questionnaires. Child health and demographic data were obtained at clinic visits to free community child welfare clinics and using questionnaires and national registries. The study included 4176 mother-child pairs. The mother's serum TSH, free T<sub>4</sub>, TPO antibodies, and Thyroglobulin (Tg) antibodies were measured around 10.7 weeks of gestation and reference ranges were determined for the study population. TSH reference ranges were between 0.07 and 3.1 mIU/L in the first trimester and between 0.10 and 3.5 mIU/L in the second trimester. Women with TPO antibodies above 167.7 IU/ml or Tg Ab ≥47.7 IU/ml were considered antibody-positive. Outcomes were available in 74% by the age of 16. Outcomes included weight, height, waist circumference, blood pressure, fasting serum glucose, insulin, lipids profile and information about puberty, smoking, and alcohol use. The cardiometabolic syndrome was defined as abdominal obesity with two or more of the following: elevated blood pressure, increased glucose, increased triglycerides, or low HDL cholesterol (good cholesterol).

Of the women with TSH measurements, 90% had normal thyroid function, 2% were hyperthyroid, 7% were hypothyroid, 1% had low T<sub>4</sub> levels with normal TSH. Of the women with TPO Ab measurements, 5% were antibody-positive. Of the women with Tg antibodies measurements, 5% were antibody-positive. Mother's thyroid function and Tg antibodies status were not associated with a child's lipids, fasting glucose, waist circumference, blood pressure, presence of metabolic syndrome, BMI, or resistance to insulin. Children of mothers who were TPO antibody-positive were more 1.6 times more likely to have a greater waist circumference, 1.56 times more likely to have a body mass index (BMI) in the overweight range and 2.57 times more likely to have the cardiometabolic syndrome.

#### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study found that positive TPO antibodies in the mother were associated with a higher risk for the child to develop cardiometabolic syndrome. This suggests that





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women with positive TPO antibodies during pregnancy may need to be counseled regarding the importance of monitoring their children's diet, weight, blood pressure and metabolic parameters over time.

The results are surprising as there was no association with thyroid function or thyroglobulin antibodies. It is unclear whether this association is related to the thyroid

antibodies per se or to other factors which may be present in women with positive TPO antibodies. Results need to be validated and more research is needed to better understand this relationship and possible ways to improve the outcome. Also, this information adds to the discussion about the usefulness of screening for thyroid disease in pregnant women, a controversial topic.

— Liuska Pesce, MD

### ATA THYROID BROCHURE LINKS

Hypothyroidism (Underactive): <https://www.thyroid.org/hypothyroidism/>

Pregnancy and Thyroid Disease: <https://www.thyroid.org/thyroid-disease-pregnancy/>

Thyroid Function Tests: <https://www.thyroid.org/thyroid-function-tests/>

Thyroid and Weight: <https://www.thyroid.org/thyroid-and-weight/>

### ABBREVIATIONS & DEFINITIONS:

**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.

**Autoimmune thyroid disease:** a group of disorders that are caused by antibodies that get confused and attack the thyroid. These antibodies can either turn on the thyroid (Graves' disease, hyperthyroidism) or turn it off (Hashimoto's thyroiditis, hypothyroidism).

**Cardiometabolic syndrome:** A combination of metabolic dysfunctions mainly characterized by insulin resistance with abnormal tolerance to glucose, abnormal fat concentrations in blood, high blood pressure and obesity

**Hypothyroidism:** a condition where the thyroid gland is underactive and doesn't produce enough thyroid hormone. Treatment requires taking thyroid hormone pills.

**Subclinical Hypothyroidism:** a mild form of hypothyroidism where the only abnormal hormone level is an increased TSH. There is controversy as to whether this should be treated or not.

**Thyroxine (T4):** the major hormone produced by the thyroid gland. T<sub>4</sub> gets converted to the active hormone T<sub>3</sub> in various tissues in the body.

**Triiodothyronine (T3):** the active thyroid hormone, usually produced from thyroxine, available in pill form as Cytomel™.

**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.

**TPO antibodies:** 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:** 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.

