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Untreated severe hypothyroidism in the mother has been shown to cause worse pregnancy outcomes and result in developmental defects in the baby. These effects can be prevented if the mother is treated with thyroid hormone early in pregnancy. Despite these data, screening pregnant women for thyroid problems is controversial. This study evaluated the pregnancy outcomes of women with hypothyroidism who were identified and treated in a prenatal screening program.

Bryant SN et al. An analysis of population-based prenatal screening for overt hypothyroidism. *Am J Obstet Gynecol* 2015;213:565.e1-6. Epub July 8, 2015.

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**Antithyroid drug side effects in patients of child-bearing age and during pregnancy**

Antithyroid medications are very useful in the treatment of hyperthyroidism and are the preferred therapy during pregnancy. While generally well tolerated, all ATDs have been reported to cause adverse side effects such as agranulocytosis and birth defects and, rarely, liver failure. The goal of this study was to determine the frequency of side effects of ATDs in a large segment of the Danish population of child-bearing age.

Andersen SL et al. Antithyroid drug side effects in the population and in pregnancy. *J Clin Endocrinol Metab.* January 27, 2016

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**ANCA-positive small-vessel vasculitis is a rare but severe disorder associated with antithyroid drug therapy**

A rare side effect of antithyroid drug therapy is vasculitis associated with antineutrophil cytoplasmic antibodies (ANCA), more often related to PTU than MMI use. The aim of this study is to summarize the published data regarding the frequency and factors that contribute to the development of ANCA and ANCA-associated vasculitis in hyperthyroid patients treated with antithyroid drugs.

Balavoine AS et al. Antineutrophil cytoplasmic antibody-positive small-vessel vasculitis associated with antithyroid drug therapy: how significant is the clinical problem? *Thyroid* 2015;25:1273-81. Epub October 19 2015.

**HYPERTHYROIDISM .....9**

**Women with a history of hyperthyroidism may be at increased risk of breast cancer**

Some studies suggest that high levels of thyroid hormone may increase the number of cells in breast cancer. This study was done to assess any possible association between hyperthyroidism, hypothyroidism and breast cancer risk.

Søgaard M et al. Hypothyroidism and hyperthyroidism and breast cancer risk: a nationwide cohort study. *Eur J Endocrinol* 2016;174:409-14.

**THYROID CANCER .....11**

**Does metformin protect the bone marrow of patients treated with radioactive iodine for thyroid cancer?**

Radioactive iodine therapy for thyroid cancer leads to a decrease in both white blood cell and platelet counts in 15-25% of patients. Some small studies have implied that thyroid cancer patients with diabetes who took metformin had smaller cancers and were cancer-free for longer periods of time after treatment. This study examined thyroid cancer patients with diabetes treated with radioactive iodine therapy to see if metformin had any effect on white blood cell and platelet counts after therapy.

Bikas V et al. Metformin attenuates <sup>131</sup>I-induced decrease in peripheral blood cells in patients with differentiated thyroid cancer. *Thyroid* 2016;26: 280-6

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**Follicular variant of papillary thyroid cancer has a better prognosis than classic or tall-cell variant of papillary thyroid cancer**

There are 3 variants of papillary thyroid cancer that make up the majority of these cancers: classic, follicular and tall-cell. This study compares the 3 variants of papillary thyroid cancer in terms of the patient characteristics as well as pathologic characteristics.

Shi X et al. Differential clinicopathological risk and prognosis of major papillary thyroid cancer variants. *J Clin Endocrinol Metab* 2016;101:264-74. doi: 10.1210/jc.2015-2917

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**Clinical Thyroidology for the Public**

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CLINICAL **THYROIDOLOGY** FOR THE **PUBLIC**

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**EDITOR'S COMMENTS**

Welcome to another issue of *Clinical Thyroidology for the Public*. In this journal, we will bring to you the most up-to-date, cutting edge thyroid research. We will be providing summaries of research studies that were discussed in a recent issue of *Clinical Thyroidology*, a publication of the American Thyroid Association for physicians. These summaries are present in lay language to allow the rapid dissemination of thyroid research to the widest possible audience. This means that you are getting the latest information on thyroid research and treatment almost as soon as your physicians. As always, we are happy to entertain any suggestions to improve *Clinical Thyroidology for the Public* so let us know what you want to see.

We also provide even faster updates of late-breaking thyroid news through **Twitter** at [@thyroidfriends](https://twitter.com/thyroidfriends) and on **Facebook**. Our goal is to provide patients with the tools to be the most informed thyroid patient in the waiting room.

Also check out our friends in the **Alliance for Thyroid Patient Education**. The Alliance member groups consist of: the *American Thyroid Association*, *Bite Me Cancer*, the *Graves' Disease and Thyroid Foundation*, the *Light of Life Foundation*, *ThyCa: Thyroid Cancer Survivors Association*, *Thyroid Cancer Canada* and *Thyroid Federation International*.

May is [International Thyroid Awareness Month](#).

**In this issue, the studies ask the following questions:**

1. Should pregnant women be screened for thyroid problems?
2. Does pregnancy affect the degree of side effects of antithyroid drugs?
3. How common is ANCA-associated vasculitis in patients on antithyroid drugs?
4. Is there an association between breast cancer and hyperthyroidism?
5. Does metformin protect the bone marrow in diabetic patients treated with radioactive iodine for thyroid cancer?
6. Do the variants of papillary thyroid cancer differ in prognosis?

We welcome your feedback and suggestions. Let us know what you want to see in this publication. I hope you find these summaries interesting and informative.

— Alan P. Farwell, MD, FACE



**THYROID AND PREGNANCY****Prenatal screening for thyroid disease****BACKGROUND**

Thyroid hormone is essential for normal brain development in babies during pregnancy. Early in pregnancy, the baby gets thyroid hormone only from the mother. Untreated severe hypothyroidism in the mother has been shown to cause worse pregnancy outcomes and result in developmental defects in the baby. These effects can be prevented if the mother is treated with thyroid hormone early in pregnancy. The effects of mild hypothyroidism on pregnancy and the development of the baby is less clear. Despite these data, screening pregnant women for thyroid problems is controversial. This study evaluated the pregnancy outcomes of women with hypothyroidism who were identified and treated in a prenatal screening program.

**THE FULL ARTICLE TITLE**

Bryant SN et al An analysis of population-based prenatal screening for overt hypothyroidism. *Am J Obstet Gynecol* 2015;213:565.e1-6. Epub July 8, 2015.

**SUMMARY OF THE STUDY**

A total of 26,518 pregnant women were screened for thyroid problems with a blood test at their first prenatal visit. Those with serum TSH  $>3.0$  mU/L and FT<sub>4</sub>  $<0.9$  ng/dl were referred for confirmatory testing in a hospital-based laboratory. Overt hypothyroidism, defined as an increased TSH and a low FT<sub>4</sub>, was diagnosed and treated. Women with an increased TSH but normal FT<sub>4</sub> (subclinical hypothyroidism) were not treated. Pregnancy outcomes were compared in: (a) women with overt hypothyroidism that were treated, (b) women with subclinical hypothyroidism that were not treated and (c) women with normal thyroid function.

Of the 26,518 pregnant women, a total of 284 women (1%) had abnormal initial values that suggested hypothy-

roidism and 232 (82%) underwent repeat testing. Overt hypothyroidism was confirmed in 47 women (0.2% of those initially screened) and thyroid hormone therapy was started. Pregnancy outcomes of women with treated hypothyroidism were similar to those of women with normal thyroid function. Higher rates of pregnancy-related high blood pressure were identified in the 182 women with subclinical hypothyroidism, but only in the women with an initial TSH  $>4.5$  mU/L, as compared with women with normal thyroid function.

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

The identification and treatment of overt hypothyroidism in pregnant women results in pregnancy outcomes similar to those of women with normal thyroid function as well as those with untreated subclinical hypothyroidism. Women with subclinical hypothyroidism and an initial serum TSH  $>4.5$  mU/L are at risk of high blood pressure during pregnancy. These data suggest that screening for thyroid dysfunction during pregnancy can be effective in improving pregnancy outcomes in women with undiagnosed hypothyroidism. Further, this study suggests that subclinical hypothyroidism may not adversely affect pregnancy outcomes.

— Alan P. Farwell, MD, FACE

**ATA THYROID BROCHURE LINKS**

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

Hypothyroidism: <http://www.thyroid.org/hypothyroidism/>

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

**ABBREVIATIONS & DEFINITIONS**

**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.



**THYROID AND PREGNANCY, continued**

**Overt Hypothyroidism:** clear hypothyroidism an increased TSH and a decreased T<sub>4</sub> level. All patients with overt hypothyroidism are usually treated with thyroid hormone pills.

**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 (T<sub>4</sub>):** 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.



 **MAY**  
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## HYPERTHYROIDISM

# Antithyroid drug side effects in patients of child-bearing age and during pregnancy

### BACKGROUND

Hyperthyroidism is defined as any condition in which there is too much hormone produced in the thyroid gland. The most common cause is Graves' Disease, which tends to run in families, and affects more commonly younger women. Another cause of hyperthyroidism is the presence of thyroid nodules that grow and increase activity (toxic nodular goiter). Currently, there are three types of treatment for hyperthyroidism: antithyroid medications (ATD), surgery and radioactive iodine. A physician will recommend one treatment over another, taking into account factors such as the age of the patient, pregnancy status, other illnesses and also physician/patient preference.

Antithyroid medications are very useful in both the long term treatment of hyperthyroidism as well as in the short term to prepare a patient for surgery or radioactive iodine therapy. Indeed, ATDs are the preferred therapy during pregnancy. In the US, there are two ATD available for use: propylthiouracil (PTU) and methimazole (MMI). In Europe, carbimazole (CMZ) is also an option (this drug is converted to MMI in the body). In general, PTU is used only during pregnancy or if there is an adverse reaction to MMI or CMZ. While generally well tolerated, all ATDs have been reported to cause adverse side effects such as agranulocytosis and birth defects and, rarely, liver failure.

Untreated or inadequately treated hyperthyroidism during pregnancy may poorly affect the mother and the developing baby, so treatment of hyperthyroidism in pregnancy is always recommended. The goal of this study was determine the frequency of side effects of ATDs in a large segment of the Danish population of child-bearing age.

### THE FULL ARTICLE TITLE

Andersen SL et al. Antithyroid drug side effects in the population and in pregnancy. *J Clin Endocrinol Metab.* January 27, 2016

### SUMMARY OF THE STUDY

The Danish Medical Birth Register database, including ~2.3 million parents of babies born in Denmark between 1973 and 2008. This database was matched with data

from the Danish National Prescription Register, which provided information regarding ATD use. The Danish Hospital Register was accessed for information regarding outcomes (liver failure, agranulocytosis and birth defects).

Of approximately 2.3 million persons, 28,998 filled prescriptions for ATD, of which 23,103 were for MMI or CMZ, 1,717 were for PTU alone and the rest for both at one time or another. Of this group, 2115 patients were pregnant women. In the total population there were 45 cases of agranulocytosis (0.16%) and 10 cases of liver failure (0.03%). The frequency of both agranulocytosis and liver failure was higher among persons treated with PTU than with MMI and the onset of these adverse effects was shorter in patients on MMI those on PTU.

When looking at the 2115 pregnant women, the frequency of liver failure and agranulocytosis was lower than in the non-pregnant population. Over all, the frequency of birth defects was 3.4% higher than those birth defects reported in the general population.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This data reinforces that ATD therapy is generally safe, with a very low frequency of severe side effects. Compared to PTU, the risk of agranulocytosis with MMI treatment seems lower and the period of greatest risk shorter in a population of individuals of child-bearing age. Interestingly, it appears that pregnant women had a lower risk of severe side effects than non-pregnant women. However, there was a significant increase in birth defects in children who were exposed to ATD during pregnancy. This study also supports the recent American Thyroid Association guidelines for treating hyperthyroidism during pregnancy in that PTU is preferable to MMI because of the lower frequency of severe side effects.

— Jessie Block-Galarza, MD

### ATA THYROID BROCHURE LINKS

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

Hyperthyroidism: <http://www.thyroid.org/hyperthyroidism/>



**HYPERTHYROIDISM**, continued

**ABBREVIATIONS AND DEFINITIONS**

**Hyperthyroidism:** a condition where the thyroid gland is overactive and produces too much thyroid hormone. Hyperthyroidism may be treated with antithyroid meds (Methimazole, Propylthiouracil), radioactive iodine or surgery.

**Graves' disease:** the most common cause of hyperthyroidism in the United States. It is caused by antibodies that attack the thyroid and turn it on.

**Toxic nodular goiter:** characterized by one or more nodules or lumps in the thyroid that may gradually grow and increase their activity so that the total output of thyroid hormone in the blood is greater than normal.

**Methimazole:** an antithyroid medication that blocks the thyroid from making thyroid hormone. Methimazole is used to treat hyperthyroidism, especially when it is caused by Graves disease.

**Propylthiouracil (PTU):** an antithyroid medication that blocks the thyroid from making thyroid hormone. Propylthiouracil is used to treat hyperthyroidism, especially in women during pregnancy.

**Carbimazole (CMZ):** an antithyroid medication that blocks the thyroid from making thyroid hormone, used primarily in Europe. Carbimazole is converted into methimazole in the body.

**Agranulocytosis:** a marked decrease in the white blood cell count that causes a patient to be more likely to develop an infection. This is commonly associated with a fever and a sore throat.

September 21-25, 2016

**86<sup>th</sup> Annual Meeting of the  
American Thyroid Association**

DENVER, COLORADO  
[www.thyroid.org](http://www.thyroid.org)





## **HYPERTHYROIDISM**

# **ANCA–positive small-vessel vasculitis is a rare but severe disorder associated with antithyroid drug therapy**

### **BACKGROUND**

Antithyroid drugs (ATDs), including propylthiouracil (PTU) and methimazole (MMI), represent an important treatment option for hyperthyroidism, and especially Graves' disease. Although ATDs are usually well tolerated, various side effects have been reported since their initial administration in 1946. Most side effects are minor; however, there are two severe side effects from these medications, agranulocytosis and acute liver failure. In addition, cases of blood vessel inflammation (vasculitis) associated with antineutrophil cytoplasmic antibodies (ANCA) have been described, more often related to PTU than MMI use. ANCA-associated vasculitis affects the small vessels in different organs, frequently the kidneys, lungs and skin, thus resulting in various clinical manifestations. The aim of this study is to summarize the published data regarding the frequency and factors that contribute to the development of ANCA and ANCA-associated vasculitis in hyperthyroid patients treated with ATDs.

### **THE FULL ARTICLE TITLE**

Balavoine AS et al. Antineutrophil cytoplasmic antibody-positive small-vessel vasculitis associated with antithyroid drug therapy: how significant is the clinical problem? *Thyroid* 2015;25:1273-81. Epub October 19 2015.

### **SUMMARY OF THE STUDY**

A search of the English medical literature between September 1993 and February 2015 found a total of 261 reports of hyperthyroid patients who developed ANCA-associated vasculitis while taking ATDs. ANCA antibodies were present in the blood in a higher percentage of patients taking PTU (4% to 64%, average 30%) compared to those taking MMI (0% to 16%, average 6%). A high percentage (64%) of children with Graves' disease had ANCA antibodies in a Japanese study. Importantly, only a low proportion of patients with Graves' disease (0% and 13%) had ANCA antibodies before starting ATD treatment. These findings indicate that the initiation of ATD treatment can result in development of ANCA antibodies.

An average of 15% of patients with ANCA corresponding to 3% of all patients taking ATDs developed vasculitis related to ANCA, 75% of these patients being on PTU, while 25% were on MMI. Patients with high blood ANCA levels and those taking ATD treatment for a long period of time had a higher risk to develop vasculitis. Based on the cases reported to the FDA, the risk of vasculitis related to PTU use in children was 50 times higher compared to the risk expected for adults.

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

ANCA-associated vasculitis is a very rare but severe side effect from ATD treatment. Risk factors for this disorder including the type of medication used (PTU vs. MMI), longer treatment duration and young age. Consistent with the guidelines published by the American Thyroid Association, MMI should be the ATD treatment of choice, since more cases have been associated with PTU than MMI use. ANCA-associated vasculitis develops usually after months to years of treatment. However, there are no current recommendations to screen for the presence of ANCA in the blood the patients who are on ATD treatment for a long period of time. The ATD treatment should be discontinued immediately in patients who develop vasculitis, and this usually results in a rapid clinical improvement. Blood ANCA levels usually decrease; however, they can remain detectable for years after the ATD discontinuation. Children with Graves' disease on ATD treatment should be monitored closely, since they have a higher risk of developing ANCA and ANCA-associated vasculitis.

— Alina Gavrilă, MD, MMSC

### **ATA THYROID BROCHURE LINKS**

Hyperthyroidism: <http://www.thyroid.org/hyperthyroidism/>

Graves' Disease: <http://www.thyroid.org/graves-disease/>

**HYPERTHYROIDISM**, continued**ABBREVIATIONS & DEFINITIONS**

**Antineutrophil Cytoplasmic Antibody (ANCA)**—autoantibodies directed against antigens from polynuclear neutrophils and monocytes, which represent different types of white blood cells, the infection-fighting cells of the blood.

**Vasculitis**: a generalized disorder of the immune system where antibodies attack blood vessels and cause inflammation.

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

**Methimazole**: an antithyroid medication that blocks the thyroid from making thyroid hormone. Methimazole is used to treat hyperthyroidism, especially when it is caused by Graves' disease.

**Propylthiouracil (PTU)**: an antithyroid medication that blocks the thyroid from making thyroid hormone. Propylthiouracil is used to treat hyperthyroidism, especially in women during pregnancy.

**Agranulocytosis**: a marked decrease in the white blood cell count that causes a patient to be more likely to develop an infection. This is commonly associated with a fever and/or a sore throat.

**Hyperthyroidism**: a condition where the thyroid gland is overactive and produces too much thyroid hormone. Hyperthyroidism may be treated with antithyroid medications (Methimazole, Propylthiouracil), radioactive iodine or surgery.

**Graves' disease**: the most common cause of hyperthyroidism in the United States. It is an autoimmune disease caused by antibodies that attack the thyroid and turn it on.



## HYPERTHYROIDISM

# Women with a history of hyperthyroidism may be at increased risk of breast cancer

### BACKGROUND

High level of estrogen may increase the number of cells in breast cancer. Prior laboratory experiments have shown that high levels of thyroid hormone may have the same effect.

However, the observational and population-based studies have not support this idea consistently. Three previous studies showed higher risk of breast cancer for women who have had hyperthyroidism and one showed higher risk for women with hypothyroidism and high TPO antibody levels; while a review from 2012 did not show any relationship between hypothyroidism and breast cancer.

This study was done to assess any possible association between hyperthyroidism, hypothyroidism and breast cancer risk.

### THE FULL ARTICLE TITLE

Søgaard M et al. Hypothyroidism and hyperthyroidism and breast cancer risk: a nationwide cohort study. *Eur J Endocrinol* 2016;174:409-14.

### SUMMARY OF THE STUDY

This study was performed in Denmark, using the information from Danish National Patient Registry (containing records of hospitalizations since 1977, clinic and emergency room visits since 1995) and Danish Cancer Registry (containing breast cancer records; information about estrogen receptor status of the breast cancers was available since 1997). 4,177,429 women lived in Denmark between 1978 to 2013. Women with hyperthyroidism and hypothyroidism were identified by diagnosis codes used by doctors.

A total of 621,873 women were identified with hypothyroidism and 80,434 women were identified with hyperthyroidism in the study period. In the hyperthyroid group, the rate of breast cancer was slightly above the expected level and in the hypothyroid group it was slightly lower. The results were not different when factors like alcohol consumption, existence of other medical problems, obesity, stage of breast cancer and presence of estrogen receptors on breast cancer cells were considered in each group.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This is a large scale study showing that women with hyperthyroidism may have a slight increased risk of breast cancer. However, more research is needed to make sure that this result is not due to other factors that might be common in hyperthyroidism and breast cancer. If there is a connection between breast cancer and hyperthyroidism, it is also important to study whether treatment of hyperthyroidism has any effect in lowering the risk of breast cancer. For now, it is important for patients with hyperthyroidism to follow their doctor recommendations regarding mammography and other screening tests for breast cancer.

— Shirin Haddady, MD

### ATA THYROID BROCHURE LINKS

Hypothyroidism: <http://www.thyroid.org/hypothyroidism/>

Hyperthyroidism: <http://www.thyroid.org/hyperthyroidism/>

## ABBREVIATIONS & DEFINITIONS

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

**Hyperthyroidism:** a condition where the thyroid gland is overactive and produces too much thyroid hormone. Hyperthyroidism may be treated with anti-thyroid medications (Methimazole, Propylthiouracil), radioactive iodine or surgery.

**HYPERTHYROIDISM**, continued

**Estrogen:** the main female hormone. Estrogen levels are increased during pregnancy.

**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.

## Thyroid Awareness Monthly Campaigns

The ATA will be highlighting a distinct thyroid disorder each month and a portion of the sales for Bravelets™ will be donated to the ATA. The month of May is **International Thyroid Awareness Month** and a bracelet is available through the [ATA Marketplace](#) to support thyroid cancer awareness and education related to thyroid disease.



**THYROID CANCER****Does metformin protect the bone marrow of patients treated with radioactive iodine for thyroid cancer?****BACKGROUND**

Radioactive iodine therapy plays an essential role in treating many patients thyroid cancer. While radioactive iodine is taken up and concentrated only in thyroid cells, most tissues of the body get exposed to low doses of radiation while it remains in the bloodstream. The most sensitive cells to radiation are in the bone marrow and it is known that radioactive iodine therapy leads to a decrease in both white blood cell (WBC) and platelet counts in 15-25% of patients. These cells return to normal several months after radioactive iodine therapy and there does not appear to be a significant clinical effect due to this decrease.

Some small studies have implied that patients with diabetes who take metformin have a lower risk for some cancers. Additionally, a small study of thyroid cancer patients with diabetes reported that patients who took metformin had smaller cancers and were cancer-free for longer periods of time after treatment. This study examined a single institutions' experience with thyroid cancer patients with diabetes treated with radioactive iodine therapy to see if metformin had any effect on white blood cell and platelet counts after therapy.

**THE FULL ARTICLE TITLE**

Bikas V et al. Metformin attenuates <sup>131</sup>I-induced decrease in peripheral blood cells in patients with differentiated thyroid cancer. *Thyroid* 2016;26: 280-6

**SUMMARY OF THE STUDY**

A total of 77 thyroid cancer patients were studied: 57 diabetic (40 taking metformin, 17 that were not) and 22 non-diabetic. All were treated with a total thyroidectomy

and radioactive iodine therapy that had available blood work and follow-up.

At 1 and 6 months after radioactive iodine therapy, the WBC count has fallen twice as much in diabetics not taking metformin compared to those taking metformin; at one year, the WBC count was back to normal in metformin patients but still 20% lower than baseline in those that were not taking metformin. The platelet count fell the most, though similarly in both groups during the first 6 month, but at 1 year was only 16% below baseline in the metformin group compared to 40% below baseline in the non-metformin group. There was no change in red-cell count and the dose of metformin did not mater.

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

This study shows that the WBC and platelet counts do indeed fall after radioactive iodine therapy and that metformin appears to be protective in preventing this fall in patients with diabetes. At this point, since the fall in these cells does not appear to be cause a significant clinical effect, metformin should not be used in non-diabetic patients for this purpose but may be considered in patients that have low blood counts from other co-existing medical problems. Further research needs to be done on whether metformin can decrease some of the effects of chemotherapy and radiation on the bone marrow for other cancer treatments.

— Melanie Goldfarb MD, MS, FACS, FACE

**ATA THYROID BROCHURE LINKS**

Radioactive Iodine Therapy: <http://www.thyroid.org/radioactive-iodine/>

**ABBREVIATIONS & DEFINITIONS**

**Radioactive iodine:** this plays a valuable role in diagnosing and treating thyroid problems since it is taken up only by the thyroid gland. I-131 is the destructive form used to destroy thyroid tissue in the treatment of thyroid cancer and with an overactive thyroid.

**Total thyroidectomy:** surgery to remove the entire thyroid gland.

**Bone Marrow:** the internal center of bones that generate the cellular components of the blood: red blood cells, white blood cells and platelets

**White blood cells (WBC):** the infection-fighting cells of the blood.

**Platelets:** the clotting cells of the blood.

**THYROID CANCER****Follicular variant of papillary thyroid cancer has a better prognosis than classic or tall-cell variant of papillary thyroid cancer****BACKGROUND**

Papillary thyroid cancer is the most common type of thyroid cancer. There are 3 types or variants of papillary thyroid cancer that make up the majority of these cancers: classic, follicular and tall-cell. The difference between these various papillary cancers is how they look under the microscope. The tall-cell variant of papillary thyroid cancer is the least common and more aggressive than follicular or classic papillary thyroid cancer, with higher risk for the spread of the cancer to lymph nodes in the neck and higher rates of recurrence of the cancer. This study compares the 3 variants of papillary thyroid cancer in terms of the patient characteristics as well as pathologic characteristics. The authors are looking to provide physicians with useful information that may help to improve and personalize the care of patients with these variants of papillary thyroid cancer.

**THE FULL ARTICLE TITLE**

Shi X et al. Differential clinicopathological risk and prognosis of major papillary thyroid cancer variants. *J Clin Endocrinol Metab* 2016;101:264-74. doi: 10.1210/jc.2015-2917

**SUMMARY OF THE STUDY**

The study included 6282 patients (4799 women and 1483 men) from 26 hospitals in 14 countries. The average age of patients was 44 years old and they were followed for an average of 37 months. About 75% of cases were classic papillary thyroid cancer, 18% follicular and 4% tall-cell

variants. Patients with the follicular variant of papillary thyroid cancer were seen to have less invasion of their tumors, less frequently involved lymph nodes, lower stages of papillary thyroid cancer and didn't require radioactive iodine treatment as frequently as the classic and tall-cell variants. Cancer recurrence was seen in 16% of classic, 9% follicular, and 27% in tall-cell papillary thyroid cancer. The rate of death was lowest in the follicular variant 0.6%, followed by 2.5% of classic and 6.7% of tall-cell. When they looked only at patients under age 45, the risk for recurrence and death was not different between the three variants of papillary thyroid cancer, however, those younger than age 45 had slightly greater rate of death than the other variants.

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

The results of this study show that the three major papillary thyroid cancer variants have an order of risk: tall-cell > classic > follicular. This is important for patients because it helps the physician customize management of each patient's cancer instead of requiring all patients to be treated the same way. This would be especially important for patients with the follicular variant of papillary thyroid cancer which this study showed have better outcomes than both classic and tall-cell papillary thyroid cancer.

—Wendy Sacks, MD

**ATA THYROID BROCHURE LINKS**

Thyroid cancer: <http://www.thyroid.org/thyroid-cancer/>

**ABBREVIATIONS & DEFINITIONS**

**Papillary thyroid cancer:** the most common type of thyroid cancer. There are 3 variants of papillary thyroid cancer: classic, follicular and tall-cell.

**Lymph node:** bean-shaped organ that plays a role in removing what the body considers harmful, such as infections and cancer cells.

**Radioactive iodine (RAI):** this plays a valuable role

in diagnosing and treating thyroid problems since it is taken up only by the thyroid gland. I-131 is the destructive form used to destroy thyroid tissue in the treatment of thyroid cancer and with an overactive thyroid. I-123 is the non-destructive form that does not damage the thyroid and is used in scans to take pictures of the thyroid (Thyroid Scan) or to take pictures of the whole body to look for thyroid cancer (Whole Body Scan).



## ATA Alliance for Thyroid Patient Education

### GOAL

The goal of our organizations is to provide accurate and reliable information for patients about the diagnosis, evaluation and treatment of thyroid diseases.

We look forward to future collaborations and continuing to work together towards the improvement of thyroid education and resources for patients.

### WHO WE ARE (in alphabetical order)

- **American Thyroid Association**
- **Bite Me Cancer**
- **Graves' Disease and Thyroid Foundation**
- **Light of Life Foundation**
- **ThyCa: Thyroid Cancer Survivors' Association, Inc.**
- **Thyroid Cancer Canada**
- **Thyroid Federation International**

### AMERICAN THYROID ASSOCIATION

[www.thyroid.org](http://www.thyroid.org)

ATA Patient Resources: <http://www.thyroid.org/patients-portal/>

Find a Thyroid Specialist: [www.thyroid.org](http://www.thyroid.org)

Phone (toll-free): 1-800-THYROID

e-mail: [thyroid@thyroid.org](mailto:thyroid@thyroid.org)

**ATA Mission:** The ATA leads in promoting thyroid health and understanding thyroid biology.

**ATA Vision:** The ATA is the leading organization focused on thyroid biology and the prevention and treatment of thyroid disorders through excellence and innovation in research, clinical care, education, and public health.

**ATA Values:** The ATA values scientific inquiry, clinical excellence, public service, education, collaboration, and collegiality.

To further our mission, vision and values the ATA sponsors "Friends of the ATA" online to advance the information provided to patients and the public such as this publication, *Clinical Thyroidology for the Public*. We welcome your support.

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AMERICAN  
THYROID  
ASSOCIATION  
FOUNDED 1923



ThyCa: Thyroid Cancer  
Survivors' Association, Inc.<sup>SM</sup>  
[www.thyca.org](http://www.thyca.org)





**ATA Alliance for Thyroid Patient Education**

**Continued...**

**BITE ME CANCER**

<http://www.bitemecancer.org>

Bite Me Cancer was formed as a nonprofit foundation in September, 2010, by Nikki Ferraro, who was 17-years old at the time. Nikki was diagnosed with a rare form of thyroid cancer in April 2010 when she was a junior at Chantilly HS in Virginia. Nikki was determined to lead a Relay for Life team just two weeks after her diagnosis. She named the team Bite Me Cancer and experienced immediate success. When Nikki decided to create a foundation a few months later, she wanted to continue the legacy of her team name and thus her foundation became the Bite Me Cancer Foundation.

e-mail: [info@bitemecancer.org](mailto:info@bitemecancer.org)

**GRAVES' DISEASE AND THYROID FOUNDATION**

[www.gdatf.org](http://www.gdatf.org)

Phone (toll-free): 1-877-NGDF-123 or 643-3123

e-mail: [Gravesdiseasefd@gmail.com](mailto:Gravesdiseasefd@gmail.com)

Founded in 1990, the Graves' Disease Foundation offers support and resources to Graves' disease patients, their families, and health care professionals. Their mission is to find the cause of and the cure for Graves' thyroid disease through research, to improve the quality of life for persons with Graves' disease and their caregivers and to educate persons with Graves' disease, their caregivers, healthcare professionals, and the general public about Graves' disease and its treatment. The web site features a monitored bulletin board.

**LIGHT OF LIFE FOUNDATION**

[www.checkyourneck.com](http://www.checkyourneck.com)

email: [info@checkyourneck.com](mailto:info@checkyourneck.com)

The Light of Life Foundation, founded in 1997, is a nonprofit organization that strives to improve the quality of life for thyroid cancer patients, educate the public and professionals about thyroid cancer, and promote research and development to improve thyroid cancer care.

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ThyCa: Thyroid Cancer  
Survivors' Association, Inc.<sup>SM</sup>  
[www.thyca.org](http://www.thyca.org)





**ATA Alliance for Thyroid Patient Education**

**Continued...**

**THYCA: THYROID CANCER SURVIVORS' ASSOCIATION, INC.**

[www.thyca.org](http://www.thyca.org)

Phone (toll-free): 877 588-7904

e-mail: [thyca@thyca.org](mailto:thyca@thyca.org)

ThyCa: Thyroid Cancer Survivors' Association, Inc., founded in 1995, is an international nonprofit organization, guided by a medical advisory council of renowned thyroid cancer specialists, offering support and information to thyroid cancer survivors, families, and health care professionals worldwide.

**THYROID CANCER CANADA**

[www.thyroidcancercanada.org](http://www.thyroidcancercanada.org)

Phone: 416-487-8267

Fax: 416-487-0601

e-mail: [info@thyroidcancercanada.org](mailto:info@thyroidcancercanada.org)

Thyroid Cancer Canada is a non-profit organization founded in 2000. The organization works towards creating an environment in which people who are dealing with thyroid cancer, especially the newly diagnosed, are met with support and information. Their goals & objectives include facilitating communication among thyroid cancer patients, providing credible information about the disease, providing emotional support, and assisting thyroid cancer patients with voicing their needs to health care professionals and those who are responsible for health care policy.

**THYROID FEDERATION INTERNATIONAL**

[www.thyroid-fed.org](http://www.thyroid-fed.org)

e-mail: [tfi@thyroid-fed.org](mailto:tfi@thyroid-fed.org)

Thyroid Federation International (TFI) was established in Toronto in 1995. Thyroid Federation International aims to work for the benefit of those affected by thyroid disorders throughout the world by providing a network of patient support organizations.



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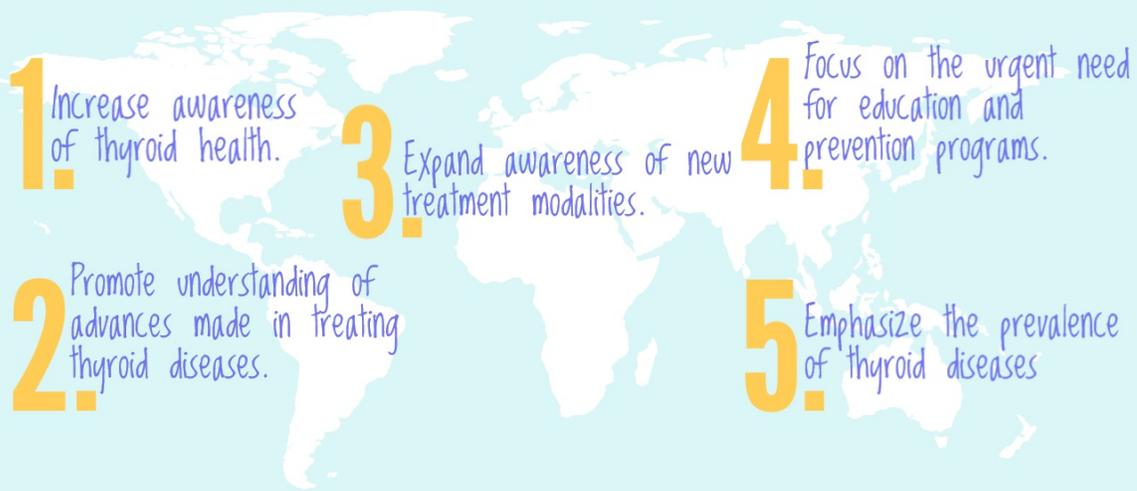
ThyCa: Thyroid Cancer  
Survivors' Association, Inc.™  
[www.thyca.org](http://www.thyca.org)



May 25th

# WORLD THYROID DAY

## GOALS

- 
1. Increase awareness of thyroid health.
  2. Promote understanding of advances made in treating thyroid diseases.
  3. Expand awareness of new treatment modalities.
  4. Focus on the urgent need for education and prevention programs.
  5. Emphasize the prevalence of thyroid diseases.

## impact of thyroid disease & thyroid cancer

Tens of millions of people worldwide are affected by diseases of the thyroid. The thyroid gland, butterfly-shaped and located in the middle of the lower neck, produces hormones that influence every cell, tissue and organ in the body. The thyroid hormones regulate the body's metabolism—the rate at which the body produces energy from nutrients and oxygen—and affects critical body functions, such as energy level and heart rate.

## JOIN US IN CELEBRATING AND SUPPORTING



for more information visit  
[www.thyroid.org](http://www.thyroid.org)

# Hashimoto's Thyroiditis (Lymphocytic Thyroiditis)

## WHAT IS THE THYROID GLAND?

The thyroid gland is a butterfly-shaped endocrine gland that is normally located in the lower front of the neck. The thyroid's job is to make thyroid hormones, which are secreted into the blood and then carried to every tissue in the body. Thyroid hormone helps the body use energy, stay warm and keep the brain, heart, muscles, and other organs working as they should.

## WHAT IS HASHIMOTO'S THYROIDITIS?

The term "Thyroiditis" refers to "inflammation of the thyroid gland". There are many possible causes of thyroiditis (See [Thyroiditis](#) brochure). Hashimoto's thyroiditis, also known as chronic lymphocytic thyroiditis, is the most common cause of hypothyroidism in the United States. It is an autoimmune disorder in which antibodies directed against the thyroid gland lead to chronic inflammation. It is not known why some people make antibodies, although this condition tends to run in families. Over time, however, this results in impaired ability of the thyroid gland to produce thyroid hormones, leading to gradual failure and eventually an underactive thyroid (Hypothyroidism). Hashimoto's thyroiditis occurs most commonly in middle aged women, but can be seen at any age, and can also affect men, and children.

## WHAT ARE THE SYMPTOMS OF HASHIMOTO'S THYROIDITIS?

There are no signs or symptoms that are unique to Hashimoto's thyroiditis.

Because the condition usually progresses very slowly over many years, people with Hashimoto's thyroiditis may not show any symptoms early on, even when the characteristic TPO antibodies may be detected in blood tests. However, over time, thyroiditis causes slow and chronic cell damage leading to the development of a goiter (enlarged thyroid) with gradual thyroid failure. Eventually, most patients will develop symptoms of hypothyroidism (See [Hypothyroidism](#) brochure). Hypothyroid symptoms may include fatigue, weight gain, constipation, increased sensitivity to cold, dry skin, depression, muscle aches and reduced exercise tolerance, and irregular or heavy menses.

## HOW IS THE DIAGNOSIS OF HASHIMOTO'S THYROIDITIS MADE?

The diagnosis of Hashimoto's thyroiditis is usually made when patients present with symptoms of hypothyroidism, often accompanied by the finding of a goiter (an enlarged thyroid gland) on physical examination, and laboratory tests consistent with hypothyroidism (an elevated serum TSH with low thyroid hormone [Free thyroxine] levels). Antibodies against TPO (thyroid peroxidase), when measured, are usually elevated. TPO is an enzyme that plays a role in the production of thyroid hormones.

Occasionally, the disease may be diagnosed early on, especially in people with a strong family history of thyroid disease, during routine laboratory screening, even before the patient develops symptoms of hypothyroidism. In these cases, often isolated mild elevation of serum TSH is seen, with normal levels of thyroid hormones and positive TPO antibodies.

## HOW IS HASHIMOTO THYROIDITIS TREATED?

Patients with elevated TPO antibodies but normal thyroid function tests (TSH and Free thyroxine) do not require treatment.

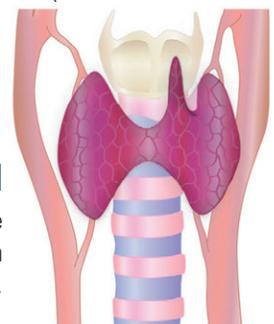
For those patients with overt hypothyroidism (elevated TSH and low thyroid hormone levels) treatment consists of thyroid hormone replacement (see [Thyroid Hormone Treatment](#) brochure). Synthetic levothyroxine taken orally at an appropriate dose is inexpensive, very effective in restoring normal thyroid hormone levels, and results in improvement of symptoms of hypothyroidism. All patients with Hashimoto's thyroiditis who develop hypothyroidism will require lifelong treatment with levothyroxine. Finding the appropriate dose, particularly at the beginning may require testing with TSH every 6-8 weeks after any dose adjustment, until the correct dose is found. After that, monitoring of TSH once a year is generally sufficient.

When levothyroxine is taken in the appropriate dose, it has no side effects. However, when an insufficient dose is taken, serum TSH remains elevated and patients may have persistent symptoms of hypothyroidism (See [Hypothyroidism](#) brochure). If the dose is excessive, serum TSH will become suppressed and patients may develop symptoms of hyperthyroidism (See [Hyperthyroidism](#) brochure).



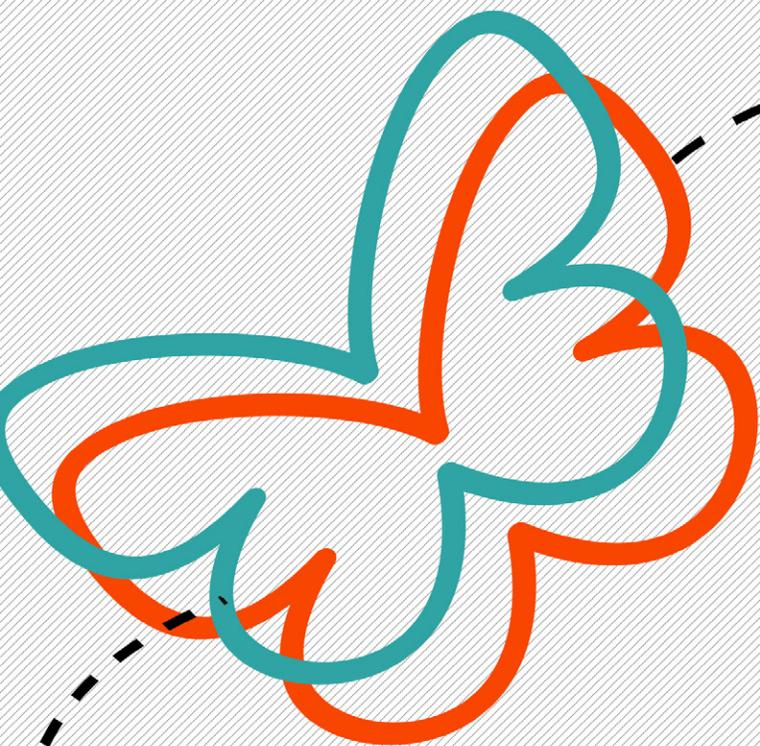
## FURTHER INFORMATION

Further details on this and other thyroid-related topics are available in the patient information section on the American Thyroid Association® website at [www.thyroid.org](http://www.thyroid.org).



# Reasons to #GIVE2THYROID

[www.thyroid.org/donate](http://www.thyroid.org/donate)



Reason **1**

## Public & Thyroid Patients

The American Thyroid Association® is dedicated to serving as an educational resource for the public by supporting thyroid research and promoting the prevention, treatment and cure of thyroid-related diseases and thyroid cancer. Help support the continuation of our patient/public education programs and resources including:

- +thyroid brochures
- +summarized medical literature
- +endocrinologist referral
- +monthly newsletters
- +support links
- +patient alliance community
- +health and education forums

## Reason **2** Thyroid Physicians, Scientists & Professionals

The American Thyroid Association® provides outstanding leadership in thyroidology by promoting excellence and innovation in clinical management, research, education, and patient care. Help support thyroid specialists and the development of resources that advance our understanding of thyroid disorders and cancer including:

- +clinical practice guidelines
- +position statements
- +early career training
- +research and education grants
- +leadership & service awards
- +community for collaboration
- +continuing education programs
- +peer-review biomedical journals
- +summarized medical literature
- +up to date thyroid news & publications
- +patient education

American Thyroid Association

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