

# Clinical THYROIDOLOGY FOR THE PUBLIC



AMERICAN  
THYROID  
ASSOCIATION  
FOUNDED 1923

VOLUME 7 • ISSUE 12 • 2014

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

## EDITOR'S COMMENTS .....2

### THYROID AND PREGNANCY .....3

#### Thyroid status and risk of miscarriage

Inadequately treated hypothyroidism has been associated with problems to the baby during pregnancy. Thyroid hormone requirements increase with pregnancy and many women with hypothyroidism need an increase in their thyroid hormone doses in the first trimester of pregnancy. The aim of this study was to examine the relationship between TSH levels in early pregnancy and the risk of adverse pregnancy outcomes.

Taylor PN et al. TSH levels and risk of miscarriage in women on long-term levothyroxine: a community-based study. *J Clin Endocrinol Metab.* July 24, 2014 [Epub ahead of print].

### THYROID AND PREGNANCY .....4

#### High perchlorate exposure in pregnant women is associated with low IQ in their 3-year old children

Perchlorate is a chemical in the environment that arises from rocket fuel, airbags and other sources. In high amounts, perchlorate can lower iodine levels in the body, and thus lower thyroid hormone levels to result in hypothyroidism. This study was done to assess the possible association of perchlorate exposure in mothers during pregnancy and their infants' IQ scores at 3 years of age.

Taylor PN et al. Maternal perchlorate levels in women with borderline thyroid function during pregnancy and the cognitive development of their offspring: data from the Controlled Antenatal Thyroid Study. *J Clin Endocrinol Metab.* 2014 Nov;99(11):4291-8.

### HYPOTHYROIDISM .....5

#### Initiation of metformin use is associated with a decrease in serum TSH levels among patients being treated for hypothyroidism

Some studies suggest that the TSH level is lower in patients with diabetes on metformin. The current study was done to look at the effect metformin on TSH levels in patients with diabetes.

Fournier JP et al. Metformin and low levels of thyroid-stimulating hormone in patients with type 2 diabetes mellitus. *CMAJ.* September 22, 2014 [Epub ahead of print].

### THYROID NODULES .....6

#### Repeat FNA is unnecessary for many nodules

**with nondiagnostic results** While most thyroid biopsies will provide a diagnosis, a nondiagnostic thyroid biopsy result is seen in up to 15-20% of biopsies. Current guidelines recommend repeating the biopsy after a nondiagnostic result. A recent study suggested that the likelihood of cancer at repeat biopsy is lower than for the initial biopsy. The purpose of this study was to identify features of thyroid nodules that may help to predict cancer or benign results after initial nondiagnostic biopsy.

Anderson TJ et al. Management of nodules with initially nondiagnostic results of thyroid fine-needle aspiration: can we avoid repeat biopsy? *Radiology.* April 17, 2014

### THYROID CANCER .....8

#### Hashimoto's thyroiditis is not a risk factor for thyroid cancer

For many years, it was suggested that Hashimoto's thyroiditis is a pre-cancerous condition that predisposes patients to thyroid cancer. In this very large study, the authors use thyroid biopsy to establish relationship between Hashimoto's thyroiditis and thyroid cancer.

Castagna MG et al. Nodules in autoimmune thyroiditis are associated with increased risk of thyroid cancer in surgical series, but not in cytological series: evidence for selection bias.


### THYROID CANCER .....10

#### Elevated thyroglobulin levels at time of radioiodine therapy for thyroid cancer predicts residual or persistent cancer

Currently, radioactive iodine therapy for thyroid cancer is reserved for those patients at moderate or increased risk of thyroid cancer recurrence. Measuring thyroglobulin levels before or just after radioactive iodine therapy when TSH levels are high has been suggested as a predictor of persistent or residual disease. The goal of this study was to examine if stimulated thyroglobulin levels just prior to radioiodine are predictive of cancer persistence or recurrence.

Ciappuccini R et al. Stimulated thyroglobulin level at ablation in differentiated thyroid cancer: the impact of treatment preparation modalities and tumor burden. *Eur J Endocrinol* 2014;171:247-52. Epub May 27, 2014

### ATA ALLIANCE FOR THYROID PATIENT EDUCATION .....12

 Follow us on Facebook

 Follow us on Twitter



AMERICAN  
THYROID  
ASSOCIATION

FOUNDED 1923

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

**Editor**

Alan P. Farwell, MD

Boston Medical Center

Boston University School of Medicine

88 East Newton St., Boston, MA 02115

Director of Patient Education

American Thyroid Association

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

[www.thyroid.org/patients/ct/index.html](http://www.thyroid.org/patients/ct/index.html)

**Editorial Board**

Jessie Block-Galaraza, MD, Albany, NY

Gary Bloom, New York, NY

Jamshid Farahati, MD, Bottrop, Germany

Alina Gavriile-Filip, MD, Boston, MA

Julie E. Hallanger Johnson, MD, Fargo, ND

Ronald Kuppersmith, MD, College Station, TX

Maria Papaleontiou, MD, Ann Arbor, MI

Angela Leung, MD, Los Angeles, CA

Jennifer Rosen, MD, Washington, DC

Wendy Sacks, MD, Los Angeles, CA

Anna M. Sawka, MD, Toronto, ON, Canada

Phillip Segal, MD, Toronto, ON, Canada

Whitney Woodmansee, MD, Boston, MA

**American Thyroid Association**

**President**

Robert C. Smallridge, MD

**Secretary/Chief Operating Officer**

John C. Morris, III, MD

**Treasurer**

Gregory W. Randolph, MD

**President-Elect**

Antonio Bianco, MD, PhD

**Past-President**

Hossein Gharib, MD

**Secretary-Elect**

Victor J. Bernet, MD

**Executive Director**

Barbara R. Smith, CAE

American Thyroid Association

6066 Leesburg Pike, Suite 550

Falls Church, VA 22041

Telephone: 703-998-8890

Fax: 703-998-8893

Email: [thyroid@thyroid.org](mailto:thyroid@thyroid.org)

**Designed by**

Karen Durland, [kdurland@gmail.com](mailto:kdurland@gmail.com)

**Clinical Thyroidology for the Public**

Copyright © 2015 by the American Thyroid Association, Inc. All rights reserved.

# CLINICAL THYROIDOLOGY **FOR THE PUBLIC**

A publication of the American Thyroid Association

VOLUME 7 • ISSUE 12 • 2014

## EDITOR'S COMMENTS

Happy Holidays!!! Welcome to *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*.

December is **Thyroid and Development Awareness month**.

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

1. Does thyroid function during pregnancy affect the risk for miscarriage?
2. Does perchlorate exposure during pregnancy affect the baby's brain development?
3. Does the diabetes medication metformin affect thyroid function?
4. Do you need to repeat a thyroid biopsy after initially nondiagnostic results?
5. Is Hashimoto's thyroiditis a risk factor for thyroid cancer?
6. Can thyroglobulin levels at the time of RAI predict cancer recurrence?

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





## THYROID AND PREGNANCY

### Thyroid status and risk of miscarriage

#### BACKGROUND

Inadequately treated hypothyroidism has been associated with negative pregnancy outcomes. Thyroid hormone requirements increase with pregnancy and many women with pre-existing hypothyroidism need an increase in their thyroid hormone doses in the first trimester of pregnancy. The Endocrine Society recommends that TSH levels be maintained between 0.2-2.5 mU/L in the first trimester of pregnancy and between 0.3-3 mU/L in the remaining trimesters. The aim of this study was to examine the relationship between TSH levels in early pregnancy and the risk of adverse pregnancy outcomes.

#### THE FULL ARTICLE TITLE

Taylor PN et al. TSH levels and risk of miscarriage in women on long-term levothyroxine: a community-based study. *J Clin Endocrinol Metab.* July 24, 2014 [Epub ahead of print].

#### SUMMARY OF THE STUDY

This study was an analysis of a historical primary care database of women treated with thyroid hormone during pregnancy in the United Kingdom. Women were included in the analysis if they were between the ages of 18-45 years and had thyroid hormone treatment started for primary hypothyroidism at least 6 months before pregnancy. A total of 1013 pregnancies were identified in 7978 women treated with thyroid hormone for primary hypothy-

roidism. Approximately 63% of pregnant women on thyroid hormone replacement had TSH levels above the recommended level of 2.5mU/L during the first trimester. These women had a higher risk of miscarriage during pregnancy than women whose TSH values were below 2.5mU/L. The risk of miscarriage increased with increasing TSH. Women with a TSH between 4.5-10 mU/L or TSH greater than 10 mU/L had an increased risk of miscarriage of 1.8 or 3.95 times respectively, compared to women who had a normal TSH (0.2-2.5mU/L) during early pregnancy. Women with a TSH between 2.51-4.5mU/L did not appear to have an increased risk of miscarriage.

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

Many women with hypothyroidism on thyroid hormone replacement therapy have TSH levels above the desired 2.5 mU/L level in early pregnancy. Higher TSH levels (TSH levels > 4.5 mU/L) are associated with increased risk for miscarriage and should be avoided in early pregnancy.

— Whitney Woodmansee, MD

#### ATA THYROID BROCHURE LINKS

Hypothyroidism: <http://www.thyroid.org/what-is-hypothyroidism>

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

#### ABBREVIATIONS & DEFINITIONS

**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.

**Miscarriage:** this occurs when a baby dies in the first few months of a pregnancy, usually before 22 weeks of pregnancy.



## THYROID AND PREGNANCY

### High perchlorate exposure in pregnant women is associated with low IQ in their 3-year old children

#### BACKGROUND

Iodine is a micronutrient that is needed to make thyroid hormone, which is important for brain development in infants. Perchlorate is a chemical in the environment that arises from rocket fuel, airbags and other sources. In high amounts, perchlorate can lower iodine levels in the body, and thus lower thyroid hormone levels to result in hypothyroidism. Babies with hypothyroidism may have impaired brain development and developmental delay. This study was done to assess the possible association of perchlorate exposure in mothers during pregnancy and their infants' IQ scores at 3 years of age.

#### THE FULL ARTICLE TITLE

Taylor PN et al. Maternal perchlorate levels in women with borderline thyroid function during pregnancy and the cognitive development of their offspring: data from the Controlled Antenatal Thyroid Study. *J Clin Endocrinol Metab.* 2014 Nov;99(11):4291-8.

#### SUMMARY OF THE STUDY

This study was part of the Controlled Antenatal Thyroid Study (CATS), in which over 21,000 pregnant women in the United Kingdom and Italy participated in a randomized clinical trial. In the trial, women either received either thyroid hormone replacement if they were found to be hypothyroid during the first trimester of their pregnancy or did not have their thyroid function checked until after delivery. All of the children born to hypothyroid pregnant women (whether hypothyroidism was diagnosed in the first trimester or after delivery) had brain testing performed, including IQ tests, at 3 years of age.

As a part of the larger CATS trial, some of the women had urine perchlorate levels measured as well, as reported in the present study. The researchers found that pregnant women with the highest levels of perchlorate in the urine were the most likely to have children with the lowest IQ scores. This finding remained true even after looking at whether or not hypothyroidism was corrected for, if present, beginning in the first trimester of pregnancy, thus suggesting that perchlorate may have adverse effects independent of thyroid hormone status. Pregnant women, in general, had low urinary iodine levels in this study, consistent with inadequate iodine intake.

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

This study raises the question of whether low-level perchlorate exposure from the environment among pregnant women may have negative effects on brain development in their children. It is also interesting to note that correction of maternal hypothyroidism, the target of perchlorate's effects, did not change this negative outcome. Until further research regarding the effects of perchlorate is available, it would be reasonable to ensure that women receive adequate iodine nutrition and maintain normal thyroid hormone levels throughout pregnancy.

— Angela M. Leung, MD, MSc

#### ATA THYROID BROCHURE LINKS

Iodine Deficiency: <http://www.thyroid.org/iodine-deficiency>

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

#### ABBREVIATIONS & DEFINITIONS

**Iodine:** an element found naturally in various foods that is important for making thyroid hormones and for normal thyroid function. Common foods high in iodine include iodized salt, dairy products, seafood and some breads.

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

Treatment requires taking thyroid hormone pills.

**Perchlorate:** a chemical in the environment that arises from rocket fuel, airbags and other sources. In high amounts, perchlorate can lower iodine levels in the body, and thus lower thyroid hormone levels to result in hypothyroidism.



## HYPOTHYROIDISM

### Initiation of metformin use is associated with a decrease in serum TSH levels among patients being treated for hypothyroidism

#### BACKGROUND

A common medication used for the treatment of diabetes called metformin may have effects on the thyroid. Some studies suggest that the TSH level is lower in patients with diabetes on metformin. This may be important in patients with previously diagnosed hypothyroidism on thyroid hormone. The current study was done to look at the effect of two different diabetes medications, metformin or a sulfonylurea drug, on the TSH of a large number of people some of whom take levothyroxine to treat hypothyroidism.

#### THE FULL ARTICLE TITLE

Fournier JP et al. Metformin and low levels of thyroid-stimulating hormone in patients with type 2 diabetes mellitus. *CMAJ*. September 22, 2014 [Epub ahead of print].

#### SUMMARY OF THE STUDY

This large study included 74,300 people of which 5689 were being treated for hypothyroidism and 59,937 had normal TSH at the start of the study. They followed the TSH levels for many years in these patients. About 500 patients taking levothyroxine who were started on metformin developed a low TSH. The study showed that metformin used as a single treatment for diabetes was linked to having a low TSH compared to those who used a sulfonylurea medication. The results were only significant

for patients taking levothyroxine at the start of the study. Patients with normal TSH at the beginning of the study also had low TSH at times, but there was no difference in low TSH levels for patients who were not hypothyroid at the start of the study no matter if they were taking metformin or a sulfonylurea. The most common time to see a low TSH was within the first 90–180 days after starting metformin.

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

The authors showed that metformin used alone for treating diabetes can cause a low TSH in patients who have hypothyroidism. It is important for patients to know that medications can change their thyroid blood test results as was shown in this study. Even though we do not know why this interaction is happening, the authors recommend changing the levothyroxine dose to get the TSH normal.

—Wendy Sacks, MD

#### ATA THYROID BROCHURE LINKS

Hypothyroidism: <http://www.thyroid.org/what-is-hypothyroidism>

Thyroid Function Tests: <http://www.thyroid.org/blood-test-for-thyroid>

#### ABBREVIATIONS & DEFINITIONS

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

**Metformin** – a medication used to treat insulin resistance or diabetes. It works to help keep blood sugars normal by making the body more sensitive to insulin.

**Sulfonylurea Medications:** Sulfonylureas are a class of medications used to treat diabetes mellitus. They work to lower blood sugar by stimulating insulin production from the pancreas.

**Levothyroxine (T<sub>4</sub>):** the major hormone produced by the thyroid gland and available in pill form as Synthroid™, Levoxyl™, Tyrosint™ and generic preparations.



## THYROID NODULES

### Repeat FNA is unnecessary for many nodules with nondiagnostic results

#### BACKGROUND

Thyroid nodules are very common, occurring in up to 50% of the population in the United States. The concern with any nodule is the possibility of thyroid cancer. A thyroid biopsy is often indicated. Between 80% and 99% of all thyroid biopsies will provide a diagnosis. However, a nondiagnostic thyroid biopsy result is seen in up to 15-20% of biopsies. Current guidelines recommend repeating the biopsy after a nondiagnostic result. A recent study suggested that the likelihood of cancer at repeat biopsy is lower than for the initial biopsy. The purpose of this study was to identify features of thyroid nodules that may help to predict cancer or benign results after initial nondiagnostic biopsy.

#### THE FULL ARTICLE TITLE

Anderson TJ et al. Management of nodules with initially nondiagnostic results of thyroid fine-needle aspiration: can we avoid repeat biopsy? *Radiology*. April 17, 2014

#### SUMMARY OF THE STUDY

Ultrasound-guided thyroid biopsy was performed on 5349 nodules; 776 (14.5%) were reported as having nondiagnostic results. A total of 393 patients with a single nodule with nondiagnostic biopsy results were included in the study. Their medical records, ultrasound characteristics of the nodule, results of subsequent biopsies and ultrasound examinations and final pathology result if the patient had surgery were reviewed. Ultrasound images acquired at the time of biopsy were later reviewed by an experienced radiologist who did not know the results of the biopsy. After a nondiagnostic biopsy result, repeat FNA was obtained on 336 nodules (85.5%); 18 of these nodules (5.4%) were suspicious for cancer, for which surgical removal and pathologic examination was done, leading to a diagnosis of 2 cancers (0.6%). Repeat biopsy was benign

in 245 of 336 nodules (73%). Of the remaining 73 nodules, 49 were removed by surgery, revealing 5 cancers; 24 other nodules were followed up with ultrasound. Among patients who did not have repeat biopsy, 27 had surgery, which led to the diagnosis of 2 cancers. In total, 92 nodules (92 of 393, 23%) were removed at surgery; 85 of these (92%) were benign and 7 (8%) were cancer.

Patients who underwent surgery had larger nodules than those who did not undergo surgery. Male patients were 4 times more likely than women to have cancerous nodules. Patients with cancer were also generally older (63 years) than those with benign nodules (55 years). No cancers were found in spongiform or cystic nodules or those with eggshell calcifications.

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

The likelihood of a repeat biopsy result that was suspicious for malignancy after a nondiagnostic biopsy was low (5.4%), and importantly, the majority (89%) proved to be benign at the time of surgery. Only 2 cancers were diagnosed with repeat biopsy while 7 cancers were found after surgery. The authors suggest that nodules with a nondiagnostic biopsy result without other risk factors and benign appearance at ultrasound can be followed with serial ultrasound examinations, avoiding repeat biopsy.

— M. Regina Castro, MD

#### ATA THYROID BROCHURE LINKS

Thyroid Nodules: <http://www.thyroid.org/what-are-thyroid-nodules>

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

#### ABBREVIATIONS & DEFINITIONS

**Thyroid nodule:** an abnormal growth of thyroid cells that forms a lump within the thyroid. While most thyroid nodules are non-cancerous (Benign), ~5% are cancerous.

**Thyroid Ultrasound:** a common imaging test used to evaluate the structure of the thyroid gland. Ultrasound uses soundwaves to create a picture of the structure of the thyroid gland and accurately identify and



## **THYROID CANCER**, continued

characterize nodules within the thyroid. Ultrasound is also frequently used to guide the needle into a nodule during a thyroid nodule biopsy.

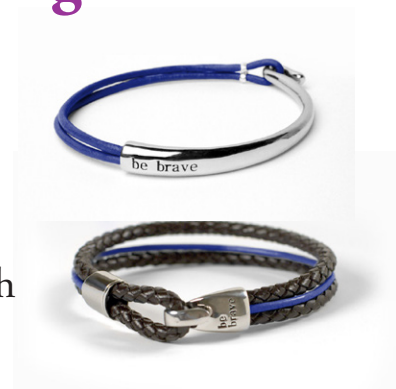
**Thyroid fine needle aspiration biopsy (FNAB):** a simple procedure that is done in the doctor's office to determine if a thyroid nodule is benign (non-cancerous) or cancer. The doctor uses a very thin needle to withdraw cells from the thyroid nodule. Patients usually return home or to work after the biopsy without any ill effects.

**Non-diagnostic thyroid biopsy:** this happens when some atypical cells are found but not enough to provide a diagnosis. This occurs in 5-10% of biopsies. This often results in the need to repeat the biopsy.

**Eggshell calcifications:** Flecks of calcium that can be seen in the periphery of a thyroid nodule, usually seen as large bright spots on ultrasonography.

## 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 December is **Thyroid and Development Awareness month** and a bracelet is available through the [ATA Marketplace](#) to support thyroid cancer awareness and education related to thyroid disease.





## THYROID CANCER

### Hashimoto's thyroiditis is not a risk factor for thyroid cancer

#### BACKGROUND

Other than radiation exposure, there are no known causes for thyroid cancers. For many years, it was suggested that Hashimoto's thyroiditis, the most common cause of hypothyroidism, is a pre-cancerous condition that predisposes patients to thyroid cancer. This is mainly the results of studies that demonstrated increased presence of Hashimoto's thyroiditis surrounding cancerous lesions at the time of thyroidectomy. However, that association was not demonstrated in other studies that used thyroid biopsy to determine a diagnosis of either thyroid cancer or Hashimoto's thyroiditis.

In this very large study, the authors use thyroid biopsy to establish relationship between Hashimoto's thyroiditis and thyroid cancer. In addition, they studied that same relationship in a subset of their patients who were selected to have surgery.

#### THE FULL ARTICLE TITLE

Castagna MG et al. Nodules in autoimmune thyroiditis are associated with increased risk of thyroid cancer in surgical series, but not in cytological series: evidence for selection bias.

#### SUMMARY OF THE STUDY

A total of 2504 patients had a biopsy of 3990 thyroid nodules. The patients were grouped into four categories

depending on the presence or absence of markers of thyroiditis by lab and/or ultrasound features. Biopsy cytology results were classified into five categories depending on the risk of thyroid cancer.

The large study did not demonstrate an association between Hashimoto's thyroiditis and risk of thyroid cancer when biopsy cytology results were used. However, Hashimoto's thyroiditis was more likely to be found in those referred to surgery. Thyroid cancer was more common in those with elevated TSH level before surgery

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

There is no association between Hashimoto's thyroiditis and thyroid cancer. This is very reassuring to the many patients with hypothyroidism due to Hashimoto's thyroiditis.

— Mona Sabra, MD

#### ATA THYROID BROCHURE LINKS

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

Hypothyroidism: <http://www.thyroid.org/what-is-hypothyroidism>

Thyroid Nodules: <http://www.thyroid.org/what-are-thyroid-nodules>

#### ABBREVIATIONS & DEFINITIONS

**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).

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

**Hashimotos thyroiditis:** the most common cause of hypothyroidism in the United States. It is caused by antibodies that attack the thyroid and destroy it.

**Thyroid nodule:** an abnormal growth of thyroid cells that forms a lump within the thyroid. While most thyroid nodules are non-cancerous (Benign), ~5% are cancerous.

**Thyroid Ultrasound:** a common imaging test used to evaluate the structure of the thyroid gland. Ultrasound uses soundwaves to create a picture of the structure of the thyroid gland and accurately identify and characterize nodules within the thyroid. Ultrasound is also frequently used to guide the needle into a nodule during a thyroid nodule biopsy.





## **IODINE DEFICIENCY**, continued

**Thyroid fine needle aspiration biopsy (FNAB):** a simple procedure that is done in the doctor's office to determine if a thyroid nodule is benign (non-cancerous) or cancer. The doctor uses a very thin needle to withdraw cells from the thyroid nodule. Patients usually return home or to work after the biopsy without any ill effects.

**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.



## THYROID CANCER

### Elevated thyroglobulin levels at time of radioiodine therapy for thyroid cancer predicts residual or persistent cancer

#### BACKGROUND

Currently, radioactive iodine therapy for thyroid cancer is reserved for those patients at moderate or increased risk of thyroid cancer recurrence. In order to effectively treat with radioactive iodine, TSH levels have to be increased to stimulate any thyroid cells into taking up the radioactive iodine. This is done by either making patients hypothyroid after stopping thyroid hormone (thyroid hormone withdrawal, THW) or by treating with recombinant human TSH (rhTSH, Thyrogen™).

To plan appropriate therapy, methods for predicting residual or persistent thyroid cancer after surgery have been studied. Measuring thyroglobulin levels before or just after radioactive iodine therapy when TSH levels are high has been suggested as a predictor of persistent or residual disease. The goal of this study was to examine if stimulated thyroglobulin levels just prior to radioiodine are predictive of cancer persistence or recurrence.

#### THE FULL ARTICLE TITLE

Ciappuccini R et al. Stimulated thyroglobulin level at ablation in differentiated thyroid cancer: the impact of treatment preparation modalities and tumor burden. *Eur J Endocrinol* 2014;171:247-52. Epub May 27, 2014.

#### SUMMARY OF THE STUDY

A total of 308 consecutive patients were evaluated with thyroglobulin just before radioiodine treatment. A total of 123 patients were prepared using rhTSH and 185 were prepared with THW. More of the patients prepared with THW had spread of the cancer outside the neck. All 8 of

the patients with poorly-differentiated thyroid cancer were treated with THW. Patients prepared with THW more commonly had larger tumors and either unknown lymph node status or more lymph node metastasis than patients prepared with rhTSH. The patients were followed for 43 months on average. A total of 56 patients had persistent or residual cancer: 42 were in the THW group, 14 in the rhTSH group.

Patients with definite metastatic disease had higher stimulated thyroglobulin levels with THW preparation than with rhTSH. In patients with persistent or residual disease, thyroglobulin levels after THW were 99.5ng/mL as compared to 13.5ng/mL after rhTSH. In patients who were disease-free, the after thyroglobulin was 1.2 ng/mL after rhTSH and 3.2 ng/mL after THW. Thyroglobulin levels above 2.8 after rhTSH preparation and above 28 ng/mL after THW were predictive of persistent or residual cancer.

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

This study indicates that thyroglobulin levels prior to radioactive iodine therapy can be used to predict persistent or residual cancer. This is helpful to identify patients that need to be followed more closely for cancer recurrence.

— Julie Hallanger Johnson, MD

#### ATA THYROID BROCHURE LINKS

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

#### ABBREVIATIONS & DEFINITIONS

**Thyroglobulin:** a protein made only by thyroid cells, both normal and cancerous. When all normal thyroid tissue is destroyed after radioactive iodine therapy in patients with thyroid cancer, thyroglobulin can be used as a thyroid cancer marker in patients that do not have thyroglobulin antibodies.

**Recombinant human TSH (rhTSH):** human TSH that is produced in the laboratory and used to produce high levels of TSH in patients after an intramuscular injection. This is mainly used in thyroid cancer patients before treating with radioactive iodine or performing a whole body scan. The brand name for rhTSH is Thyrogen™.



## **HYPERTHYROIDISM, continued**

**Thyroid Hormone Withdrawal (THW):** this is used to produce high levels of TSH in patients by stopping thyroid hormone pills and causing short-term hypothyroidism. This is mainly used in thyroid cancer patients before treating with radioactive iodine or performing a whole body scan.

**Stimulated thyroglobulin testing:** this test is used to measure whether there is any cancer present in a patient that has previously been treated with surgery and radioactive iodine. TSH levels are increased, either by withdrawing the patient from thyroid hormone or treating the patient with recombinant human TSH, then

levels of thyroglobulin are measured. Sometimes this test is combined with a whole body iodine scan.

**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/>

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.

*continued on next page*



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.

*continued on next page*



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...

### 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

<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.



AMERICAN  
THYROID  
ASSOCIATION  
FOUNDED 1923



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

