

# CLINICAL THYROIDOLOGY FOR PATIENTS



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## THYROID AND PREGNANCY

During pregnancy, thyroid hormone is very important for the baby to develop normally. While it is rare, fetal and neonatal death is often due to hypothyroidism in their mothers. Further, it appears that the rate of miscarriage is higher in mothers that are hypothyroid during their pregnancy. The purpose of this study was to examine the association between the mother's TSH and FT<sub>4</sub> levels during pregnancy and the rate of miscarriage and fetal and neonatal death.

Benhadi N, Wiersinga WM, Reitsma JB, Vrijkotte TG, Bonsel GJ. Higher maternal TSH levels in pregnancy are associated with increased risk for miscarriage, fetal or neonatal death. *Eur J Endocrinol* 2009;160:985-91. . . . . 3

## HYPOTHYROIDISM

The diagnosis of hypothyroidism is made most often by increased levels of Thyroid Stimulating Hormone (TSH). The upper normal limit of TSH is the subject of considerable controversy. As a result, the TSH normal range limits, as determined from national databases, have not yet been uniformly applied to clinical practice. This study looked at whether the levels of TSH changed according to age groups and ethnic groups.

Boucai L, Surks MI. Reference limits of serum TSH and free T<sub>4</sub> are significantly influenced by race and age in an urban outpatient medical practice. *Clin Endocrinol (Oxf)* 2009;70:788-93. . . . . 5

## GOITER

Multinodular goiters are very common as we get older. Most function normally and do not require any treatment. Occasionally, multinodular goiters can enlarge and put pressure on structures in the neck, causing choking and difficulty swallowing. When that occurs, the usual treatment is surgery. Recently, some studies have suggested that large multinodular goiters can shrink if treated with radioactive iodine (RAI). Further, some studies have shown that the RAI can be more effective if the thyroid is turned on first by treatment with recombinant human TSH (rhTSH), a compound used in patients with thyroid cancer. The aim of this study was to determine how long before the RAI treatment that rhTSH should be given to get the best effect.

Fast S, Nielsen VE, Grupe P, Bonnema SJ, Hegedus L. Optimizing <sup>131</sup>I uptake after rhTSH Stimulation in patients with nontoxic multinodular goiter:

evidence from a prospective, randomized, double-blind study. *J Nucl Med* 2009;50:732-7. . . . . 6

## GRAVES' DISEASE

Graves' disease is the most common form of hyperthyroidism in the United States. A mild anemia, with low hemoglobin levels, can sometimes develop in patients with Graves' disease. A major symptom of anemia is fatigue, so this may play a role in the tiredness that some patients have when the Graves' disease is active. The cause of this anemia is uncertain. The aim of this study was to determine how common it occurs and what might be the cause of anemia associated with Graves' disease.

Gianoukakis AG, Leigh MJ, Richards P, Christenson PD, Hakimian A, Fu P, Niihara Y, Smith TJ. Characterization of the anaemia associated with Graves' disease. *Clin Endocrinol (Oxf)* 2009;70:781-7. . . . . 8

## THYROID CANCER

After surgery, most thyroid cancer patients are treated with radioactive iodine (RAI) to destroy any remaining thyroid cells, both normal and cancerous. In order for the RAI to be effective, the patient's TSH levels need to be increased to stimulate the thyroid cells to take up the RAI and be destroyed. There are two ways to increase TSH: 1) withdraw the patient from thyroid hormone (THW), making the patient hypothyroid for a short period of time or 2) use recombinant human TSH (rhTSH) to allow patients to stay on their thyroid hormone and avoid the short term hypothyroidism. Recently, smaller doses of I-131 have been used effectively with THW to destroy remaining thyroid cells in low-risk-patients with thyroid cancer. This study was done to find out whether smaller amounts of I-131 would also be effective using rhTSH.

Chianelli M, Todino V, Graziano FM, Panunzi C, Pace D, Guglielmi R, Signore A, Papini E. Low-activity (2.0 GBq; 54 mCi) radioiodine post-surgical remnant ablation in thyroid cancer. *Endocrinol* 2009;160:431-6. . . . . 9

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[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)

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Treasurer

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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

Email: [kdurland@gmail.com](mailto:kdurland@gmail.com)

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# CLINICAL THYROIDOLOGY FOR PATIENTS

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## EDITOR'S COMMENTS

Welcome to *Clinical Thyroidology for Patients*. This publication is a collection of summaries of recently published articles from the medical literature that covers the broad spectrum of thyroid disorders. *Clinical Thyroidology for Patients* is published on a monthly basis and includes summaries of research studies that were discussed in the previous month's issue of *Clinical Thyroidology*, a publication of the American Thyroid Association for physicians. The **Calendar of Events** highlights educational forums and support groups that are organized by members of the **Alliance for Thyroid Patient Education**. The **Alliance** member groups consist of: the *American Thyroid Association*, the *Graves' Disease Foundation*, the *Light of Life Foundation* and *ThyCa: Thyroid Cancer Survivors Association*.

### IMPORTANT MEETING NOTICE

I would like to invite all of you to attend the Annual Alliance Patient Educational Forum at The Breakers in Palm Beach, FL on Saturday September 26, 2009. This is free and open to the public. Come and get answers to your questions about thyroid disease diagnosis and management. Please see details later in this issue.

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

- What is the relationship between TSH and miscarriage in pregnant women?
- Is the TSH normal range different according to age and race?
- What is the best time to give rhTSH to increase RAI uptake into the thyroid?
- How common is anemia in Graves' disease?
- What is the best way to give RAI to thyroid cancer patients after their initial surgery?

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 Farwell, MD

**HOW TO NAVIGATE THIS DOCUMENT:** The Table of Contents and the Bookmarks are linked to the articles. To navigate, move your cursor over the article title you wish to see (either in the Contents or in the Bookmarks panel) and the hand will show a pointing finger, indicating a link. Left-click the title and the article will instantly appear on your screen. To return to the Contents, move the cursor to the bottom of the page and left-click **Back to Table of Contents** which appears on every page. If you would like more information about using Bookmarks please see the help feature on the menu bar of Acrobat Reader.



## THYROID AND PREGNANCY

### WHAT IS THE STUDY ABOUT?

During pregnancy, thyroid hormone is very important for the baby to develop normally. This is especially true for the baby's brain to develop normally. Hypothyroidism in the mother that is not treated can lead to brain damage and lower intelligence. Appropriate treatment prevents these problems. It also appears that thyroid hormone is important for a successful pregnancy overall. While it is rare, fetal death is often due to hypothyroidism in their mothers. Further, it appears that the rate of miscarriage is higher in mothers that are hypothyroid during their pregnancy. The purpose of this study was to examine the association between the mother's TSH and FT<sub>4</sub> levels during pregnancy and the rate of miscarriage and fetal death.

**THE FULL ARTICLE TITLE:** Benhadi N, Wiersinga WM, Reitsma JB, Vrijkotte TG, Bonsel GJ. Higher maternal TSH levels in pregnancy are associated with increased risk for miscarriage, fetal or neonatal death. *Eur J Endocrinol* 2009;160:985-91.

### WHAT WAS THE AIM OF THE STUDY?

The aim of this study was to examine the association between the mother's TSH and FT<sub>4</sub> levels during pregnancy and the rate of miscarriage and fetal and neonatal death.

### WHO WAS STUDIED?

The study was performed using information from pregnant Dutch women without known thyroid disease who participated in the Amsterdam Born Children and their Development (ABCD) study in Amsterdam from March 2003 through January 2004. A total of 8266 pregnant women filled out a questionnaire.

### HOW WAS THE STUDY DONE?

Of the 8266 women who filled out the questionnaire, 4267 women provided consent for blood collection during their first doctor's visit, which on average took place during the 13th week of pregnancy. Miscarriage and fetal and neonatal death was determined from three overlapping sources: (1) the National Midwife Registry, (2) the National Obstetricians Registry, and (3) the National Neonatal Registry. The TSH normal range in this study was 0.35 – 5.6. Women with hypothyroidism or hyperthyroidism were removed from the study.

### WHAT WERE THE RESULTS OF THE STUDY?

A total of 2497 women completed the study. The average age of the study group was 32 years. TPO antibodies were positive in 146 women. A total of 11 women had a miscarriage. There were 10 cases of fetal death and 6 cases of neonatal death. The average TSH in these 27 women was 1.48 mU/l as compared to an average TSH of 1.11 mU/l in women without child loss. The risk of child loss increased by 60% for every doubling in TSH concentration. Despite this increased risk, the actual numbers of child loss were very small. There was no effect of FT<sub>4</sub> level on child loss.

### HOW DOES THIS COMPARE WITH OTHER STUDIES?

Many studies have shown that severe hypothyroidism in the mother is associated with increased child loss. Another study has shown that the major adverse pregnancy outcome of an elevated serum TSH concentration from the second trimester onward is an increased rate of fetal death. Finally, a prior study found that the risk for child loss not only increased with higher TSH levels, but occurred even when maternal FT<sub>4</sub> concentrations were normal. This study also shows that the risk of child loss is related to a higher TSH level.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Pregnant women with high TSH levels but normal FT<sub>4</sub> levels are at increased risk of miscarriage and fetal and neonatal loss. However, the actual rate of child loss is very low. This study raises the idea that pregnancy outcome might be improved by levothyroxine treatment in these patients.

— Alan P. Farwell, MD

### ATA THYROID BROCHURE LINKS

Thyroid and Pregnancy: [http://thyroid.org/patients/patient\\_brochures/pregnancy.html](http://thyroid.org/patients/patient_brochures/pregnancy.html)

Hypothyroidism: [http://thyroid.org/patients/patient\\_brochures/hypothyroidism.html](http://thyroid.org/patients/patient_brochures/hypothyroidism.html)



## **THYROID AND PREGNANCY, continued**

### ABBREVIATIONS & DEFINITIONS

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

**Thyroxine (T<sub>4</sub>):** the major hormone secreted by the thyroid gland. Thyroxine is broken down to produce Triiodothyronine which causes most of the effects of the thyroid hormones.

**Triiodothyronine (T<sub>3</sub>):** the active thyroid hormone, usually produced from thyroxine.

**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 .

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

**Fetal death:** this occurs when a baby dies later in pregnancy (usually after 22 weeks of pregnancy) before delivery.

**Neonatal death:** this occurs when a baby is born dead or dies in the first 7 days after being born.



## HYPOTHYROIDISM

### WHAT IS THE STUDY ABOUT?

The diagnosis of hypothyroidism is made most often by increased levels of Thyroid Stimulating Hormone (TSH). The upper normal limit of TSH is the subject of considerable controversy. Depending on the population and database, the upper limit of normal can be reported as high as 4-5. Some groups recommend a lower upper limit in the 2.5-3 range. These two extremes would result in different numbers of people being told that they have mild hypothyroidism. As a result, the TSH normal range limits, as determined from national databases, have not yet been uniformly applied to clinical practice. This study looked at whether the levels of TSH changed according to age groups and ethnic groups.

**THE FULL ARTICLE TITLE:** Boucai L, Surks MI. Reference limits of serum TSH and free T<sub>4</sub> are significantly influenced by race and age in an urban outpatient medical practice. *Clin Endocrinol (Oxf)* 2009;70:788-93.

### WHAT WAS THE AIM OF THE STUDY?

The aim of the study was to see if there were differences in TSH levels that could be attributed to age and race.

### WHO WAS STUDIED?

The study patients were identified from outpatient medical practices of the Montefiore Medical Center, Bronx, New York. A total of 22,116 patients without thyroid problems had TSH levels done; 16,343 were female (74%) and 5773 were male (26%), and all were older than 10 years of age. The adult population was represented by 18,243 patients (83%) older than 20 years of age. The self-designated race distribution was 32.8% black or African American, 14.7% white, 5% Hispanic in 5%, and 47.5% undesignated.

### HOW WAS THE STUDY DONE?

The records of the patients were reviewed as to age, race and TSH levels. The TSH levels were compared to national reference ranges.

### WHAT WERE THE RESULTS OF THE STUDY?

This study found that, indeed, TSH levels significantly varied according to race and age. Differences in TSH levels were seen in African American and Hispanic populations compared to white populations, for example. Older (>80 years) people have higher TSH levels in all races, while whites tend to have higher TSH readings than African American across all ages. The study concluded that the

yardstick for measuring TSH differs between races and with age and unless this yardstick is adapted to account for age and race, many people will be misdiagnosed as hypothyroid when they are not; or misdiagnosed as hyperthyroid, when they are not.

### HOW DOES THIS COMPARE WITH OTHER STUDIES?

The issue of whether mild increases in TSH indicate hypothyroidism and should be treated as opposed to indicating normal variations has been discussed and debated in many articles for the last 5–10 years. This study is yet more evidence that older patients may have a different normal range as was reported in last month's issue of *Clinical Thyroidology for Patients* (Atzmon et al as cited in Farwell, 2009). This also provides information that there may be differences in TSH normal ranges between races. (Farwell A. *Clinical Thyroidology for Patients* [serial online]. 2009;2(2):3. Available at: [http://www.thyroid.org/patients/ct/volume2/issue2/ct\\_patients\\_v22\\_3.pdf](http://www.thyroid.org/patients/ct/volume2/issue2/ct_patients_v22_3.pdf). Accessed August 18, 2009.)

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The implications of this study are that we are not using accurate yardsticks for measuring TSH in many groups of patients, and this is causing many to be misdiagnosed as hypothyroid when they are not, or even hyperthyroid, when they are not. These type of results can be explained by a historical exclusion of minorities from clinical studies, originally done to protect certain populations from abuses in clinical research. We can see now that we have a lot to learn about normal ranges in different ethnic groups.

— M. Sara Rosenthal, PhD

### ATA THYROID BROCHURE LINKS

Hypothyroidism: [http://thyroid.org/patients/patient\\_brochures/hypothyroidism.html](http://thyroid.org/patients/patient_brochures/hypothyroidism.html)

Thyroid Function Tests: [http://thyroid.org/patients/patient\\_brochures/function\\_tests.html](http://thyroid.org/patients/patient_brochures/function_tests.html)

### 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.

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



## GOITER

### WHAT IS THE STUDY ABOUT?

Multinodular goiters are very common as we get older. They also are common in areas that have low amounts of iodine in their diet, such as parts of Europe and Asia. In the United States, anywhere from one-third to one-half of people over the age of 50 will have one or more nodules in their thyroid. While multinodular goiters can be over active or the nodules could indicate that a cancer is present, most function normally and do not include a cancer. Occasionally, multinodular goiters can enlarge and put pressure on structures in the neck, causing choking and difficulty swallowing. When this occurs, the usual treatment is surgery. Recently, some studies have suggested that large multinodular goiters can shrink if treated with radioactive iodine (RAI). Further, some studies have shown that the RAI can be more effective if the thyroid is turned on first by treatment with recombinant human TSH (rhTSH). At present, rhTSH is mainly used for treating patients with thyroid cancer and has not yet been approved by the Food and Drug Administration for this reason. The aim of this study was to determine how long before the RAI treatment that rhTSH should be given to get the best effect.

### THE FULL ARTICLE TITLE:

Fast S, Nielsen VE, Grupe P, Bonnema SJ, Hegedus L. Optimizing <sup>131</sup>I uptake after rhTSH Stimulation in patients with nontoxic multinodular goiter: evidence from a prospective, randomized, double-blind study. *J Nucl Med* 2009;50:732-7.

### WHAT WAS THE AIM OF THE STUDY?

The aim of this study was to determine how long before the RAI treatment that rhTSH should be given to get the best effect.

### WHO WAS STUDIED?

The study group included 90 patients referred for RAI treatment of large multinodular goiters at the Nuclear Department of the Odense University Hospital in Odense, Denmark. There were 78 women (87%) and 12 men (13%) with an age range from 22 to 83 years. A multinodular goiter was defined as a thyroid gland with two or more nodules larger than 1 cm determined by ultrasound. Patients routinely had a clinical evaluation, thyroid function tests and a neck ultrasound examination. Fine-needle aspiration biopsy was performed on large nodules to determine if a cancer was present.

### HOW WAS THE STUDY DONE?

The patients were given either an injection of 0.1 mg of rhTSH or saline that did not contain any rhTSH 24, 48, or 72 hours before giving a small dose of RAI that would not harm the thyroid. The amount of RAI taken up by the thyroid was measured 24 and 96 hours later.

### WHAT WERE THE RESULTS OF THE STUDY?

Giving rhTSH 24 hours before the RAI increased the amount of RAI taken up by the thyroid 2-fold over baseline before the rhTSH treatment. The increase in the amount of RAI taken up by the thyroid was less if the rhTSH was given 48 hours before the RAI (1.8-fold increase) or 72 hours before the RAI (1.5-fold increase). The results showed that the increase in the amount of RAI taken up by the thyroid seen 24 hours after rhTSH was significantly higher than the increase seen in the 48 and 72 hour groups.

### HOW DOES THIS COMPARE WITH OTHER STUDIES?

Several studies have looked at the use of rhTSH to increase that amount of RAI taken up by goiters. The initial concerns were that rhTSH stimulation would increase the release of T<sub>4</sub> and T<sub>3</sub> from the thyroid and possibly cause some problems. The early studies showed this was not a problem. The dose of rhTSH used was also examined and the most safe and effective dose was found to be 0.1 mg. This dose is 1/3 of the dose used in thyroid cancer. The present study provides more information as to when the rhTSH should be given.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

In patients with multinodular goiters, the best time interval to increase the amount of RAI into the thyroid is 24 hours after rhTSH injection.

— Alan P. Farwell, MD

### ATA THYROID BROCHURE LINKS

Thyroid Nodules: [http://thyroid.org/patients/patient\\_brochures/nodules.html](http://thyroid.org/patients/patient_brochures/nodules.html)

Radioactive Iodine Therapy: [http://thyroid.org/patients/patient\\_brochures/radioactive.html](http://thyroid.org/patients/patient_brochures/radioactive.html)



## **GOITER**, continued

### ABBREVIATIONS & DEFINITIONS

**Goiter** — a thyroid gland that is enlarged for any reason is called a goiter. A goiter can be seen when the thyroid is overactive, underactive or functioning normally. If there are nodules in the goiter it is called a nodular goiter; if there is more than one nodule it is called a multinodular goiter.

**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

**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™.

**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)



## GRAVES' DISEASE

### WHAT IS THE STUDY ABOUT?

Graves' disease is the most common form of hyperthyroidism in the United States. A mild anemia, with low hemoglobin levels, can sometimes develop in patients with Graves' disease. A major symptom of anemia is fatigue, so this may play a role in the tiredness that some patients have when the Graves' disease is active. The cause of this anemia is uncertain. The aim of this study was to determine how common it occurs and what might be the cause of anemia associated with Graves' disease.

**THE FULL ARTICLE TITLE:** Gianoukakis AG, Leigh MJ, Richards P, Christenson PD, Hakimian A, Fu P, Niihara Y, Smith TJ. Characterization of the anaemia associated with Graves' disease. *Clin Endocrinol (Oxf)* 2009;70:781-7.

### WHAT WAS THE AIM OF THE STUDY?

The aim of this study was to determine how common anemia is in Graves' disease and what might be the cause.

### WHO WAS STUDIED?

The study group was made up of patients treated in the Endocrine Clinic at Harbor-UCLA Medical Center. A total of 87 patients with newly diagnosed Graves' disease participated in the study. Ten women and 9 men without hyperthyroidism or any known autoimmune disease were randomly recruited from the primary care clinic to serve as controls.

### HOW WAS THE STUDY DONE?

The patient's records were reviewed and values of thyroid hormones and hemoglobin were obtained. Patients who had been treated with antithyroid meds or corticosteroids were excluded from the study.

### WHAT WERE THE RESULTS OF THE STUDY?

On initial presentation, 1/3 of the patients with Graves' disease had anemia with low hemoglobin levels. Of those with anemia, a cause was found for 1/3 of them, so a total of 22% had anemia that was solely due to the Graves' disease. Over 40% of men with Graves' disease had anemia as compared to ~18% of women. Hemoglobin levels increased and the anemia resolved in almost 90% of patients treated with antithyroid drugs.

### HOW DOES THIS COMPARE WITH OTHER STUDIES?

A prior study showed that 18% of women and 28% of men with hyperthyroidism had anemia. Some of these people also had iron deficiency. The anemia improved after treating the hyperthyroidism. Others have also suggested that hyperthyroidism routinely decreases hemoglobin levels.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Anemia in Graves' disease is common and may play a role in the tiredness that some patients have when the Graves' disease is active. The anemia resolves with treatment of the Graves' disease.

— Alan P. Farwell, MD

### ATA THYROID BROCHURE LINKS

Graves disease: [http://thyroid.org/patients/patient\\_brochures/graves.html](http://thyroid.org/patients/patient_brochures/graves.html)

Hyperthyroidism: [http://thyroid.org/patients/patient\\_brochures/hyperthyroidism.html](http://thyroid.org/patients/patient_brochures/hyperthyroidism.html)

### ABBREVIATIONS & 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.

**Anemia:** low blood count, specifically low levels of red blood cells which carry oxygen around to all of the cells in the body. Fatigue is a common symptom of anemia.

**Hemoglobin:** the protein in red blood cells that binds oxygen to carry around to all the cells in the body. Hemoglobin levels are low with anemia.



## THYROID CANCER

### WHAT IS THE STUDY ABOUT?

For most patients who are diagnosed with thyroid cancer, the first step is surgery to remove the cancer as well as the entire normal thyroid. After surgery, most patients are treated with radioactive iodine (RAI) to destroy any remaining thyroid cells, both normal and cancerous. In order for the RAI to be effective, the patient's TSH levels need to be increased to stimulate the thyroid cells to take up the RAI and be destroyed. The traditional way to raise TSH levels has been to withdraw the patient from thyroid hormone (THW), making the patient hypothyroid for a short period of time. Even short-term hypothyroidism can cause fatigue, depression, lack of concentration and other exhausting symptoms. Within the last year, the FDA has approved the use of recombinant human TSH (rhTSH) to raise TSH levels allowing patients to stay on their thyroid hormone and avoid the short term hypothyroidism. Using high doses of I-131 (100 mCi), both treatments with rhTSH and THW have been shown to be equally effective. Recently, smaller doses of I-131 have been used effectively with THW to destroy remaining thyroid cells in low-risk-patients with thyroid cancer. This study was done to find out whether smaller amounts of I-131 (54 mCi) would also be effective using rhTSH.

**THE FULL ARTICLE TITLE:** Chianelli M, Todino V, Graziano FM, Panunzi C, Pace D, Guglielmi R, Signore A, Papini E. Low-activity (2.0 GBq; 54 mCi) radioiodine post-surgical remnant ablation in thyroid cancer. *Endocrinol* 2009;160:431-6.

### WHAT WAS THE AIM OF THE STUDY?

To determine the effectiveness of low-dose I-131 therapy in patients with low-risk thyroid cancer after THW or rhTSH.

### WHO WAS STUDIED?

A total of 42 patients with low-risk thyroid cancer (tumor size of 1 cm or smaller and without lymph-node metastases) were included in this study.

### HOW WAS THE STUDY DONE?

All patients underwent a total thyroidectomy then were divided into two groups to be treated with 54 mCi of

I-131 after THW or rhTSH.

**THW** – this group were treated with RAI 37 days after THW. Some of the patients were treated with T<sub>3</sub> for the first 28 days

**rhTSH** – this group were treated with two daily injections of rhTSH and the RAI was done 24 hours after the last injection of rhTSH.

6–12 months after the I-131-therapy, the success rate of RAI treatment was determined in both groups by a diagnostic whole-body scan after THW. A successful treatment was one that had a negative whole body scan.

### WHAT WERE THE RESULTS OF THE STUDY?

Both THW and rhTSH were very effective options to raise TSH levels before the low dose RAI. A total of 20/21 patients in the THW groups had negative whole body scans while 19/21 patients in the rhTSH group had negative scans. There was no difference in the success rate between the two groups.

### HOW DOES THIS COMPARE WITH OTHER STUDIES?

There is controversy as to whether treating low risk patients with RAI is needed, although it has been shown to decrease the risk of having the cancer come back. For those recommending treatment, the lowest dose possible is the best option. Previous studies have shown that 30 mCi of I-131 is too low of a dose for rhTSH to be effective. Another study showed that 100 mCi I-131 is effective in both THW or rhTSH.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

In low-risk patients with thyroid cancer, rhTSH can be used along with low dose RAI (54 mCi I-131) to effectively destroy both normal and cancerous cells after surgery.

— Jamshid Farahati, MD

### ATA THYROID BROCHURE LINKS

Thyroid cancer: [http://thyroid.org/patients/patient\\_brochures/cancer\\_of\\_thyroid.html](http://thyroid.org/patients/patient_brochures/cancer_of_thyroid.html)

Hypothyroidism: [http://thyroid.org/patients/patient\\_brochures/hypothyroidism.html](http://thyroid.org/patients/patient_brochures/hypothyroidism.html)



## THYROID CANCER, continued

### ABBREVIATIONS & DEFINITIONS

**Total thyroidectomy** — Surgery to remove the entire thyroid gland.

**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).

**mCi** — millicurie, the units used for I-131.

**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.

**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™.

**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.

**Levothyroxine** — the major hormone produced by the thyroid gland and available in pill form as Levoxyl™, Synthroid™, Levotheroid™ and generic preparations.

**Triiodothyronine (T<sub>3</sub>)** — the active thyroid hormone, usually produced from thyroxine, available in pill form as Cytomel™.



AMERICAN  
THYROID  
ASSOCIATION  
FOUNDED 1923



*Friends of the ATA*  
Founded 2005

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Get the latest thyroid health information. You'll be among the first to know the latest cutting-edge thyroid research that is important to you and your family.



## 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.

### WHO WE ARE

#### 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 Patients*. We welcome your support.

#### GRAVES' DISEASE FOUNDATION

[www.ngdf.org](http://www.ngdf.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.

#### 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.





## ATA Alliance for Thyroid Patient Education CALENDAR OF EVENTS

Educational forums, patient support groups and other patient-oriented meetings

DATE	EVENT	PLACE	ORGANIZATION
September 2009	<b>Thyroid Cancer Awareness Month</b> <a href="http://www.ThyCa.org">www.ThyCa.org</a>		ThyCa
September 12, 2009	<b>ThyCa Workshop and Symposium</b> <a href="http://www.ThyCa.org">www.ThyCa.org</a>	Denver, CO	ThyCa
September 12-13	<b>Drewstock — a musical tribute to the life of Drew Glackin, who died of uncontrolled Graves' disease</b> <a href="http://www.drewstock.com">www.drewstock.com</a>	Easton, PA	Drewstock, Inc Benefitting the American Thyroid Association and the Graves' Disease Foundation
September 23–27, 2009	<b>ATA 80th Annual Meeting</b> <a href="http://www.thyroid.org">www.thyroid.org</a> <a href="http://www.thyroid.org/ann_mtg/2009_80th/index.html">http://www.thyroid.org/ann_mtg/2009_80th/index.html</a>	The Breakers Hotel Palm Beach, FL	ATA
Saturday, September 26, 2009 1–3 pm	<b>ATA Alliance for Patient Education Public Forum</b> <a href="http://www.thyroid.org">www.thyroid.org</a>	The Breakers Hotel Palm Beach, FL	ATA
October 1, 2009	<b>Light of Life Annual Fundraiser</b> <a href="http://www.checkyourneck.com">www.checkyourneck.com</a>	New York, NY	Light of Life
October 16-18, 2009	<b>ThyCa 12th International Thyroid Cancer Survivors' Conference</b> <a href="http://www.ThyCa.org">www.ThyCa.org</a> <a href="http://www.thyca.org/conferences.htm">http://www.thyca.org/conferences.htm</a>	Boston, MA	ThyCa
October 16–18, 2009	<b>Patient &amp; Family Conference</b> <a href="http://www.ngdf.org">www.ngdf.org</a> <a href="http://www.ngdf.org/conference.php">http://www.ngdf.org/conference.php</a>	Charlotte, NC	Graves' Disease Foundation
Spring 2010	<b>Light of Life Educational Symposium</b> <a href="http://www.checkyourneck.com">www.checkyourneck.com</a>	New York City	Light of Life



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## FREE PUBLIC HEALTH FORUM

### Physician experts will discuss thyroid disorders.

Please come if you have questions, symptoms, or concerns about a thyroid problem.  
Receive free educational materials.

### Thyroid Disease and You

#### Who should attend?

Anyone who has had an overactive or underactive thyroid, thyroiditis, a thyroid nodule, thyroid cancer, or a family history of thyroid problems or related disorders, including rheumatoid arthritis, juvenile diabetes, pernicious anemia, or prematurely gray hair (starting before age 30)

**Saturday, September 26, 2009**

**1:00 p.m. -3:00 p.m.**

The Breakers Hotel One South County Road, Palm Beach, FL 33480 Phone: (561) 655-6611

Reservations requested. Walk-ins welcome. E-mail [thyca@thyca.org](mailto:thyca@thyca.org) to RSVP (Please indicate in your message the thyroid condition you are most concerned about.)

Complimentary parking vouchers will be available for attendees of the patient forum.

Online educational information for patients is provided by all members of the ATA Alliance for Patient Education co-sponsoring this forum: ThyCa: Thyroid Cancer Survivors' Association, Light of Life Foundation, and Graves' Disease Foundation. Go online to [www.thyroid.org](http://www.thyroid.org) and click on Patients and Public to access the resources you need.

**Please Save and Print this Invitation** — Please feel free to print and post this invitation on any public bulletin boards in the Palm Beach County area where health information is posted. Give to your physician at your next visit, if before September 26.