

Clinical THYROIDOLOGY FOR PATIENTS



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Thyroid cancer patients are monitored for cancer recurrence with blood tests measuring thyroglobulin, a thyroid cell protein. A low (<1) thyroglobulin level and a negative stimulated thyroglobulin test usually means that there is no evidence of thyroid cancer remaining in the body. It is not known if or when a stimulated thyroglobulin test should be repeated in patients who previously had a negative test. The goal of this study is to evaluate the value of repeating a stimulated thyroglobulin test in patients with a detectable but low (<1) thyroglobulin level on thyroid hormone treatment.

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Approximately 15-25% of thyroid nodules will have thyroid biopsy cytology read as “suspicious” or “indeterminate”, which generally leads to surgical thyroidectomy because of the difficulty in distinguishing between benign and cancerous nodules with this cytology. In order to improve the diagnosis of thyroid cancer, one approach that is increasingly used is to measure different molecular markers that are much more frequently present in thyroid cancer when compared to benign nodules. These two studies examine the use of molecular markers to help make a diagnosis in thyroid biopsies.

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Patients who have persistently high thyroid hormone levels but whose TSH values are persistently normal (or high) may be resistant to thyroid hormone. Most cases of thyroid hormone resistance turn out to be due to a mutation in the thyroid hormone receptor gene, which is responsible for all of the actions of thyroid hormone. This study examines the difference in presentation of thyroid hormone resistance.

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Clinical Thyroidology for Patients

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CLINICAL THYROIDOLOGY FOR PATIENTS

A publication of the American Thyroid Association

VOLUME 5 • ISSUE 8 • 2012

EDITOR'S COMMENTS

Welcome to **Clinical Thyroidology for Patients**, bringing to you, the patients, the most up-to-date, cutting edge thyroid research. What you read here as research studies will likely become the accepted practice in the future. *Clinical Thyroidology for Patients* is published on a monthly basis and includes summaries of research studies that were discussed in a recent issue of *Clinical Thyroidology*, a publication of the American Thyroid Association for physicians. This means that you, the patients, are getting the latest information on thyroid research and treatment almost as soon as your physicians.

The **Calendar of Events** highlights educational forums and support groups that are organized around the country by members of the **Alliance for Thyroid Patient Education**. The **Alliance** member groups consist of: the *American Thyroid Association*, the *Graves' Disease and Thyroid Foundation*, the *Light of Life Foundation* and *ThyCa: Thyroid Cancer Survivors Association*.

Follow us on **Twitter** at [@thyroidfriends](https://twitter.com/thyroidfriends). Get the most up-to-date thyroid news fast and easy! Be the most informed thyroid patient in the waiting room. Please feel free to submit questions as well as suggestions as to how we can better serve thyroid patients.

Become an ATA fan and Like us on **Facebook**: www.facebook.com/thyroidassociation. Share your thoughts, and join a community that provides you with new knowledge that leads to prevention, diagnosis, and treatment of thyroid diseases.

In this issue, the studies ask the following questions:

- Is subclinical hypothyroidism a risk for high blood pressure during pregnancy?
- Do you need radioactive iodine therapy if you are a low risk thyroid cancer patient?
- Is there any value for repeating stimulated thyroglobulin testing for thyroid cancer once you get a negative result?
- Does molecular marker testing on thyroid biopsy specimens help diagnose thyroid cancer?
- Is thyroid hormone resistance more common than we think?

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.

Have a happy and healthy summer!

— Alan P. Farwell, MD



THYROID AND PREGNANCY

Subclinical hypothyroidism may be a risk factor for high blood pressure problems during pregnancy

BACKGROUND

High blood pressure is associated with many heart problems. In some studies, thyroid dysfunction (hypothyroidism or hyperthyroidism) during pregnancy has been a risk factor for several related disorders caused by high blood pressure. It is unclear if subclinical (mild) thyroid dysfunction carries a similar risk. In patients with subclinical thyroid dysfunction, the TSH is abnormal (high in subclinical hypothyroidism, low in subclinical hyperthyroidism) while the thyroid hormone levels are normal. The current study is one of the largest ones done to determine if there is a strong relationship between thyroid dysfunction and high blood pressure during pregnancy.

THE FULL ARTICLE TITLE

Wilson KL et al. Subclinical thyroid disease and the incidence of hypertension in pregnancy. *Obstet Gynecol* 2012;119:315-20.

SUMMARY OF THE STUDY

Over 24,000 predominantly Hispanic pregnant women living in Texas between 2000-2003 were studied. From blood tests done during the first half of pregnancy, 528 had subclinical hypothyroidism and 584 had subclinical hyperthyroidism. The pregnant women with subclinical hypothyroidism had the highest risk of high blood pressure problems during pregnancy compared to the women with subclinical hyperthyroidism and the women with normal thyroid function.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that there may be an association between subclinical hypothyroidism and high blood

pressure during pregnancy. In another older study, treatment of subclinical hypothyroidism led to a lower risk of high blood pressure during pregnancy. The results of these studies are important and suggest that treatment of subclinical hypothyroidism during pregnancy may be of benefit. However, thyroid function testing during pregnancy is controversial and it is currently not routinely done in all pregnancies.

— Angela Leung, MD

ATA THYROID BROCHURE LINKS

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

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

ABBREVIATIONS & DEFINITIONS

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.

Subclinical Hyperthyroidism: a mild form of hyperthyroidism where the only abnormal hormone level is a decreased TSH.

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

Radioactive iodine therapy does not increase survival in patients with low risk thyroid cancer

BACKGROUND

Thyroid cancer is routinely treated with surgery followed by radioactive iodine therapy. Radioactive iodine is used to destroy any remaining thyroid cells, either normal or cancer cells, and decrease future risk of cancer recurrence. In recent years there has been a debate regarding the use of radioactive iodine therapy in patients with low risk thyroid cancer. The argument is that these patients have an excellent prognosis and will do well, with a low risk of cancer recurrence, irrespective if they received radioactive iodine or not. Thus, it is now recommended that radioactive iodine therapy is not recommended for small thyroid cancers less than 1 cm in size and confined to the thyroid gland. However, there are other patients that are classified as low risk that do not fit these criteria and who still receive radioactive iodine therapy that they might not need.

In this study the authors examined the effect of radioactive iodine on the risk of cancer recurrence and survival of patients with low risk thyroid cancer.

THE FULL ARTICLE TITLE

Schwartz C et al Impact on overall survival of radioactive iodine in low-risk differentiated thyroid cancer patients. *J Clin Endocrinol Metab.* February 16, 2012 [Epub ahead of print].

SUMMARY OF THE STUDY

The study included 1275 French patients (82% female) with low risk thyroid cancer (72% papillary thyroid

cancer) treated between 1975 and 2005. They were classified as low risk (stage 1 or 2) if they had complete removal of their cancer at time of surgery, the cancers measured 1–4 cm and did not invade into surrounding tissues, blood vessels or lymph nodes. Most (70%) had radioactive iodine therapy after surgery. They were followed for 10 years after cancer diagnosis. Overall the cancer-free survival in the patients treated with radioactive iodine was 89% as compared to 93% for those who did not receive radioactive iodine. Cancer recurrences were found in 1.6% of those who received radioactive iodine and 1% of those who did not receive radioactive iodine. Thus, in these patients, radioactive iodine therapy had no effect on the risk of tumor recurrence and did not increase survival from thyroid cancer.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The results of this study support the observation of other studies that radioactive iodine does not benefit patients presenting with low risk thyroid cancer and can put them at risk for potential side effects.

— Mona Sabra, MD

ATA THYROID BROCHURE LINKS

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

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

ABBREVIATIONS & DEFINITIONS

Papillary thyroid cancer: the most common type of thyroid cancer.

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).



THYROID CANCER

Stimulated thyroglobulin tests 5 years after initial treatment detect thyroid cancer recurrence in otherwise low risk patients

BACKGROUND

Thyroid cancer is initially treated with surgery and frequently followed by radioactive iodine therapy to destroy any remaining thyroid cancer cells. Patients are then placed on thyroid hormone doses to suppress the growth any remaining thyroid cells. Patients are monitored for thyroid cancer recurrence with blood tests measuring thyroglobulin, a protein made only by thyroid cells and that serves as a thyroid cancer marker. Undetectable thyroglobulin levels while the patient is on thyroid hormone usually indicate that there is no evidence of residual or recurrent thyroid cancer. Similarly, a detectable but low (<1) thyroglobulin level that is stable over time usually indicates that there is no evidence of residual or recurrent thyroid cancer. Periodically, stimulated thyroglobulin testing may be performed by increasing TSH levels by stopping thyroid hormone or by treating with recombinant TSH (rhTSH, Thyrogen™). A negative stimulated thyroglobulin test means that there is no evidence of thyroid cancer remaining in the body. It is not known if or when a stimulated thyroglobulin test should be repeated in patients who previously had a negative test. The goal of this study is to evaluate the value of repeating a stimulated thyroglobulin test in patients with a detectable but low (<1) thyroglobulin level on thyroid hormone treatment.

THE FULL ARTICLE TITLE

Rosario PW et al. Value of repeat stimulated thyroglobulin testing in patients with differentiated thyroid carcinoma considered to be free of disease in the first year after ablation. *Thyroid*. December 16, 2011 [Epub ahead of print]. doi: 10.1089/thy.2011.0214.

SUMMARY OF THE STUDY

The study included 203 patients with papillary thyroid cancer followed for a mean period of ~11.5 years with follow up thyroglobulin levels <1 on thyroid hormone treatment and no clinical evidence of cancer recurrence

5 years after the initial therapy. A total of 192 patients (94.6%) had stimulated thyroglobulin levels of <2 and 188 of these patients had stimulated thyroglobulin levels of <1. None of the patients with a low stimulated thyroglobulin level 5 years after the initial therapy had cancer recurrence over the course of the study. A total of 11 (5.4%) patients had a stimulated thyroglobulin level >2 and cancer recurrence was identified in 8 of these 11 patients.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that only 4% of thyroid cancer patients with a thyroglobulin level <1 on thyroid hormone have a recurrence of their cancer 5 years after their initial treatment. A stimulated thyroglobulin test identified these patients with cancer recurrence. Thus, this study shows that performing a repeat stimulated thyroglobulin test is reasonable 5 years after initial treatment for thyroid cancer in patients with low but detectable thyroglobulin levels on thyroid hormone treatment. Further, this study suggests that no further stimulated thyroglobulin tests are necessary if the test is negative at 5 years.

— Alina Gavrila, MD

ATA THYROID BROCHURE LINKS

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

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

Thyroid Surgery: <http://www.thyroid.org/why-thyroid-surgery>

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

Thyroid Hormone Treatment: <http://www.thyroid.org/thyroid-hormone-treatment>

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THYROID CANCER, continued

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.

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.

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 hormone therapy: patients with hypothyroidism are most often treated with Levothyroxine (T_4) in order to return their thyroid hormone levels to normal. Replacement therapy means the goal is a TSH in the normal range and is the usual therapy. Suppressive therapy means that the goal is a TSH below the normal range and is used in thyroid cancer patients to prevent growth of any remaining 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).

Cancer recurrence: this occurs when the cancer comes back after an initial treatment that was successful in destroying all detectable cancer at some point.



THYROID NODULES

Use of molecular markers on thyroid biopsy specimens to diagnose thyroid cancer

BACKGROUND

Thyroid nodules are very common, occurring in up to half of individuals who have any form of neck imaging study. Thyroid biopsy is performed on many thyroid nodules based on the size of the nodules or certain characteristics on thyroid ultrasound. Approximately 15-25% of thyroid nodules will have thyroid biopsy cytology read as “suspicious” or “indeterminate”, which generally leads to surgical thyroidectomy because of the difficulty in distinguishing between benign and cancerous nodules with this cytology. In order to improve the diagnosis of thyroid cancer, one approach that is increasingly used is to measure different molecular markers (genes and microRNAs) that are much more frequently present in thyroid cancer when compared to benign nodules. These molecular approaches are showing promise in helping to distinguish benign from cancerous nodules and avoiding unnecessary surgery. These two studies examine the use of molecular markers to help make a diagnosis in thyroid biopsies that are initially read as “suspicious” or “indeterminate”.

THE FULL ARTICLE TITLES

Prasad NB et al. Three-gene molecular diagnostic model for thyroid cancer. *Thyroid*. 2012;22:275-84.

Keutgen XM, et al. A panel of four microRNAs accurately differentiates malignant from benign indeterminate thyroid lesions on fine needle aspiration. *Clin Cancer Res*. February 20, 2012

SUMMARY OF THE STUDIES

In the Prasad study, the authors took biopsy samples from 95 thyroid nodules at the time of surgery. Of these biopsies, 27 had “indeterminate” or “suspicious” cytology. These samples were subjected to analysis of 10 genes previously shown to be promising candidates for

identifying cancer cells. The combination of 3 of these genes – MRC2 + HMGA2 + SFN – was shown to be very helpful in accurately predicting which nodules would be cancerous (96% test specificity, 91% test negative predictive value).

In the Keutgen study the authors evaluated a set of six microRNAs in 72 thyroid biopsy samples from patients with “indeterminate” thyroid nodules. All these patients had surgery. Of these 72 specimens, 50 were benign and 22 were cancerous on final pathology. The authors found that after using a sophisticated statistical model, four of the six miRNAs (miR-222, miR-328, miR-197 and miR21) when used in combination, were very helpful in accurately classifying 90% (65 of 72) of the samples. (100% test sensitivity and 86% test specificity for the diagnosis of cancer).

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

These 2 studies show that using a combination of thyroid biopsy cytology with molecular markers such as microRNA or gene analysis is feasible and may help in accurately distinguishing benign from cancerous nodules in those with “indeterminate” cytology, reducing the need for surgery for nodules that turn out to be benign. The selection of the best molecular markers is still a matter of debate.

— M. Regina Castro, MD

ATA THYROID BROCHURE LINKS

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

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

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THYROID NODULES, continued

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.

Indeterminate thyroid cytology: this happens usually when the diagnosis is a follicular or Hürthle cell lesion. Follicular and Hürthle cells are normal cells found in the thyroid. Current analysis of thyroid biopsy results cannot differentiate between follicular or Hürthle cell cancer from noncancerous adenomas. This occurs in 15-20% of biopsies and often results in the need for surgery to remove the nodule.

Suspicious thyroid cytology: this happens when there are atypical cytological features suggestive of, but not diagnostic for malignancy. Surgical removal of the nodule is required for a definitive diagnosis.

Genes: a molecular unit of heredity of a living organism. Living beings depend on genes, as they code for all proteins and RNA chains that have functions in a cell.

Genes hold the information to build and maintain an organism's cells and pass genetic traits to offspring.

microRNA: a short RNA molecule that has specific actions within a cell to affect the expression of certain genes.

Molecular markers: genes and microRNAs that are expressed in benign or cancerous cells. Molecular markers can be used in thyroid biopsy specimens to either to diagnose cancer or to determine that the nodule is benign.

Test sensitivity: the proportion of patients with a certain disease in whom the test used to diagnose that disease is positive.

Test specificity: the proportion of patients without a certain disease in whom the test used to diagnose that disease is negative.

Negative predictive value: the likelihood that a patient does not have a disease when the test used to diagnose that disease is negative.



THYROID HORMONE ACTION

Patients with two abnormal copies of the thyroid hormone receptor gene have more severe symptoms of thyroid hormone resistance

BACKGROUND

Patients who have persistently high thyroid hormone levels but whose TSH values are persistently normal (or high) may be resistant to thyroid hormone. After ruling out other possible diagnoses, most cases of thyroid hormone resistance turn out to be due to a mutation in the thyroid hormone receptor gene, which is responsible for all of the actions of thyroid hormone. Each person has 2 copies of every gene, with only 1 being active at any one time. There have been multiple mutations in the thyroid hormone receptor described and they differ widely in their effects and in the degree of resistance observed in different tissues. The same mutation can be associated with very different clinical manifestations, even in members of the same family. Some patients are unaware of symptoms or merely have a long-standing goiter, while others may have symptoms suggesting hyperthyroidism. In children, delays in neurologic and skeletal development can suggest hypothyroidism. Part of the difference is related to whether the mutation affects one copy or both copies of the gene. This study examines the difference in presentation of thyroid hormone resistance.

THE FULL ARTICLE TITLE

Ferrara AM et al. Homozygous thyroid hormone receptor β -gene mutations in resistance to thyroid hormone: three new cases and review of the literature. *J Clin Endocrinol Metab.* February 8, 2012 [Epub ahead of print]. doi: 10.1210/jc.2011-2642.

SUMMARY OF THE STUDY

Three children from two families were noted to have tachycardia, goiter, deafness, defective speech and delays

in growth and intellectual development. In both of the families, the parents were related to each other. In one family, both parents had mild hearing loss as the only manifestation of thyroid hormone resistance. In the other family, the father had a goiter and the mother had abnormal thyroid levels but was otherwise normal. Analysis of the thyroid hormone receptor genes showed that the parents had one normal copy of the gene and one mutated copy of the gene. The children all had 2 mutated copies of the gene.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

These reports suggest that patients with severe forms of thyroid hormone resistance will have 2 mutated copies of the thyroid hormone receptor gene. Further, individuals with one normal and 1 mutated copy of the gene may have few, if any, symptoms. These patients may be more common than initially thought, especially if there is a family history of the thyroid abnormalities starting at a young age. Identification of such individuals will help future generations of their families avoid unnecessary treatment, which may include surgery.

— Alan P. Farwell, MD

ATA THYROID BROCHURE LINKS

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

Goiter: <http://www.thyroid.org/what-is-a-goiter>

ABBREVIATIONS & DEFINITIONS

Thyroid hormone receptor genes: genes that bind thyroid hormone and are responsible for causing all of the actions of thyroid hormone. There are 2 copies of each thyroid hormone receptor gene, with only one being active at any one time.

Genes: a molecular unit of heredity of a living organism. Living beings depend on genes, as they code for all proteins and RNA chains that have functions in a cell. Genes hold the information to build and maintain an organism's cells and pass genetic traits to offspring.

Mutation: A permanent change in one of the genes.

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THYROID HORMONE ACTION, continued

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.



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

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

Find a Thyroid Specialist: www.thyroid.org

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

e-mail: 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 AND THYROID FOUNDATION

www.gdatf.org

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

e-mail: 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

email: 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

Phone (toll-free): 877 588-7904

e-mail: 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

ATA Conferences www.thyroid.org

Nothing is scheduled at this time. Please visit the website for updates.

Graves' Disease Conferences www.gdatf.org

July 31, 2012 — San Francisco, CA

Celebrate the conclusion of the **Greater Than Graves' ride** by joining us at this **Patient Education Workshop** hosted by the Let's Face It Together Foundation. Details at www.gdatf.org

August 18, 2012 — Fairfield, Ohio — **1st Annual Graves' Disease & Thyroid Awareness Motorcycle Ride and Party**. Charity Motorcycle Benefit & Ride to raise awareness for Graves Disease & other thyroid related disorders. Details at www.gdatf.org

August 25, 2012 — Wind Gap, PA — **Drewstock**. All Ages Event Bring your own drinks, food will be onsite or bring your own. Details at www.gdatf.org

October 26- 28, 2012 - San Diego, CA

Patient & Family Conference at the beautiful Kona Kai Resort & Spa. Details at www.gdatf.org

Light of Life Foundation www.checkyourneck.com

Ongoing — www.checkyourneck.com

Thyroid Cancer Awareness campaign with Cindy Crawford and Brooke Shields

June 12, 2010 — a previous symposium available online at:

<http://www.checkyourneck.com/About-Thyroid-Cancer/Thyroid-Cancer-Symposium-Presentations>

**Thyroid Cancer Symposium Presentations: What's New in Thyroid Cancer?
A Day for Patients and Their Families**

Please visit the Light of Life Foundation website to view the Patient Educational Symposium which took place in NYC in 2010. As part of the Patient Educational Program these online presentations provide valuable information in hopes that patients everywhere can gain further information and support about their disease.

November 17, 2012 — New York, NY

Annual Light of Life Foundation Patient Symposium. Details at www.checkyourneck.com

ThyCa Conferences www.thyca.org

Every Month

ThyCa Support Group Meetings around the United States and in Canada,

Costa Rica, and Philippines. Complete list of groups, meetings, and contacts at www.thyca.org/sg/local

September 2012 — **Thyroid Cancer Awareness Month**

Worldwide observance sponsored by ThyCa: Thyroid Cancer Survivors' Association, Inc., with many partnering organizations. Details at www.thyca.org

October 19–21, 2012 — Chicago, Illinois. **The 15th International Thyroid Cancer Survivors' Conference** Sponsored by ThyCa: Thyroid Cancer Survivors' Association, Inc. Details at www.thyca.org

October 20, 2012 — Chicago, Illinois

**The 10th Annual Dinner/Auction Fundraiser for Thyroid Cancer Research,
in conjunction with the 15th International Thyroid Cancer Survivors' Conference**

Sponsored by ThyCa: Thyroid Cancer Survivors' Association, Inc. Details at www.thyca.org