Clinical THYROIDOLOGY FOR PATIENTS

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HYPERTHYROIDISM

Does high-normal thyroid function increase risk for atrial fibrillation?

Patients with hyperthyroidism are known to be at increased risk for the development of atrial fibrillation. This study looked at the incidence of both thyroid disease and atrial fibrillation in a large population to determine the association between all aspects of thyroid function and atrial fibrillation.

Selmer C et al. The spectrum of thyroid disease and risk of new onset atrial fibrillation: a large population cohort study. BMJ. November 27, 2012 [Epub ahead of print].

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Lower total T_4 levels in the umbilical cord are associated with higher child brain developmental testing scores

Many studies have shown an association between hypothyroidism in the mother during pregnancy and eventual decreased brain development in the baby. This study was performed to look at the association between thyroid hormone levels in the mother and in the umbilical cord after delivery and brain development in their children.

Williams FL et al. Maternal and Umbilical Cord Levels of T_4, FT_4, TSH, TPOAb, and TgAb in Term Infants and Neurodevelopmental Outcome at 5.5 Years. J Clin Endocrinol Metab 2013;98:829-38.

THYROID SURGERY

Robotic thyroidectomy costs more than standard cervical thyroidectomy

Thyroid surgery is traditionally performed through an incision in the neck. This study looked to compare the costs of standard thyroid surgery to the costs of thyroid surgery performed through an incision in the armpit using manual or robotic instruments.

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THYROID CANCER

Life expectancy in thyroid cancer patients is reduced when age at initial treatment is greater than 45

The current staging system for thyroid cancer from stage 1-4 is used to guide recommendations for additional treatment after surgery. The staging system also adjusts prognosis by age. This study was done to examine to role of age in determining prognosis in a large group of thyroid cancer patients.

Verburg FA et al Life expectancy is reduced in differentiated thyroid cancer patients >= than 45 years old with extensive local tumor invasion, lateral lymph node, or distant metastases at diagnosis and normal in all other DTC patients. J Clin Endocrinol Metab 2013;98:172-80.

THYROID CANCER

Long-term salivary gland function in thyroid cancer survivors who received radioactive iodine

Long-term side effects of radioactive iodine treatment in thyroid cancer survivors may include damage to the salivary glands. This study examined the effects of radioactive iodine on salivary gland function as well risk factors for the development of abnormal salivary function.

Jeong SY et al. Salivary gland function five years after a radioiodine ablation in patients with differentiated thyroid cancer: direct comparison of pre and post-ablation scintigraphies and their relation to xerostomia symptoms. Thyroid. November 15, 2012

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EDITOR'S COMMENTS

Welcome to Clinical Thyroidology for Patients, bringing to you, the patient, 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.

We will be providing even faster updates of late-breaking thyroid news through Twitter at @thyroidfriends and on Facebook. Our goal is to provide you with the tools to be the most informed thyroid patient in the waiting room. Also check out our friends in the ATA 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*, *ThyCa: Thyroid Cancer Survivors Association*, *Thyroid Cancer Canada* and *Thyroid Federation International*.

In this issue, the studies ask the following questions:

- What is the relationship between thyroid function and atrial fibrillation?
- Is there an association between thyroid levels in the umbilical cord and brain development?
- Is there a difference in cost between robotic and traditional thyroid surgery?
- What is the role of age in determining prognosis in thyroid cancer patients?
- How frequent is salivary gland dysfunction after radioactive iodine therapy for thyroid cancer?

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

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HYPERTHYROIDISM

Does high-normal thyroid function increase risk for atrial fibrillation?

BACKGROUND

Thyroid hormone has clear effects on heart function. Patients with hyperthyroidism are known to be at increased risk for the development of an irregular heart rhythm known as atrial fibrillation. Indeed, patients that develop atrial fibrillation usually have their blood tested for thyroid hormones to determine if they are hyperthyroid. This also appears to be true with subclinical hyperthyroidism, where the TSH level is low but the thyroid hormone levels are normal. This study looked at the incidence of both thyroid disease and atrial fibrillation in a large population to determine the association between all aspects of thyroid function and atrial fibrillation.

THE FULL ARTICLE TITLE

Selmer C et al. The spectrum of thyroid disease and risk of new onset atrial fibrillation: a large population cohort study. BMJ. November 27, 2012 [Epub ahead of print].

SUMMARY OF THE STUDY

The study population consisted of 586,460 adult Danish primary care patients (mean age 50.2 years; 61% women) who underwent thyroid-function testing in Copenhagen between 2000 and 2010. Patients were followed until the end of 2010 or until they moved from the study area or died. Only patients that had no history of either thyroid abnormalities or atrial fibrillation were included in the study.

At baseline, 96% of patients had normal thyroid function, 0.3% had overt hyperthyroidism, 2% had subclinical hyperthyroidism, 2% had subclinical hypothyroidism and 0.7% had overt hypothyroidism. Individuals were followed for a mean of 5.5 years, over which time 17,154 (2.9%) were diagnosed with new atrial fibrillation. As compared with individuals with normal thyroid function, the risk for atrial fibrillation was increased in individuals with both overt and subclinical hyperthyroidism. Interestingly, individuals with low normal TSH values were also found to have an increased risk of atrial fibrillation. Risk for atrial fibrillation was found to be decreased in patients with hypothyroidism as compared with individuals with normal thyroid function.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study confirms that patients with hyperthyroidism have an increased risk of atrial fibrillation. The new finding is that even those patients with normal thyroid hormone levels have an increased risk of atrial fibrillation if their TSH is low normal. This suggests that patients with low normal TSH values should be followed more closely than previously thought. Further research is needed to determine the full extent of effects of thyroid hormones on the risk for atrial fibrillation.

— Alan P. Farwell, MD

ATA THYROID BROCHURE LINKS

Hyperthyroidism: http://www.thyroid.org/what-is-hyperthyroidism

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.

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.

Atrial fibrillation: an irregular heart rhythm where there is loss of coordination between contractions of the chambers of the heart that circulates the blood throughout the body.

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HYPOTHYROIDISM

Lower total T_4 levels in the umbilical cord are associated with higher child brain developmental testing scores

BACKGROUND

Thyroid hormone is essential for normal brain development in the baby during pregnancy. Many studies have shown an association between decreased thyroid levels in the mother (hypothyroidism) during pregnancy and eventual decreased brain development in the baby. Most of these studies measured only thyroid hormone levels in the mother's blood. The umbilical cord contains blood from the baby but can only be safely sampled at the time of delivery of the baby. This study was performed to look at the association between thyroid hormone levels in the mother and in the umbilical cord after delivery and brain development in their children.

THE FULL ARTICLE TITLE

Williams FL et al. Maternal and Umbilical Cord Levels of T_4, FT_4, TSH, TPOAb, and TgAb in Term Infants and Neurodevelopmental Outcome at 5.5 Years. J Clin Endocrinol Metab 2013;98:829-38.

SUMMARY OF THE STUDY

This study looked at 97 women and their children. Thyroid hormone levels were measured in the umbilical cord at delivery as well as in the mother at 10 weeks and 34 weeks of pregnancy and at delivery. Brain development was assessed in these children at 5.5 years of age using various standardized development scoring systems.

There was no association between the mother and the umbilical cord in TSH or FT_4 levels. However, the children with the lowest umbilical cord blood total T_4 levels had higher scores on developmental testing.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This is the first study to suggest that low T_4 levels in the baby may not be as bad as previously thought. However, all of the T_4 levels were still in the normal range – none were in the hypothyroid range. Also, FT_4 and TSH levels were normal. Further studies are needed to determine the significance of these findings.

— Heather Hofflich, DO

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

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.

Thyroxine (T_4): the major hormone produced by the thyroid gland. T_4 gets converted to the active hormone T_3 in various tissues in the body

FT_4 : blood measurement of the free T_4 level. Only the free hormone is active.

Total T_4 : blood measurement of the total T_4 level which includes hormone bound to blood proteins and, thus, not active.

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THYROID SURGERY

Robotic thyroidectomy costs more than standard cervical thyroidectomy

BACKGROUND

Thyroid surgery is performed for multiple reasons including thyroid cancer, non-cancerous thyroid nodules and enlarged thyroid glands and hyperthyroidism. Thyroid surgery is traditionally performed through an incision in the neck. In the past several years, new approaches to thyroid surgery have been developed in Asia to move the incision from the neck to more concealed locations. These new techniques include surgery performed through an incision in the armpit using manual or robotic instruments. This study looked to compare the costs of standard thyroid surgery to the costs of robotic thyroid surgery.

THE FULL ARTICLE TITLE:

Cabot JC et al. Robotic and endoscopic transaxillary thyroidectomies may be cost prohibitive when compared to standard cervical thyroidectomy. Surgery 2012;152:1016-24.

SUMMARY OF THE STUDY

The authors looked at a group of 90 patients that underwent surgery in Seoul, Korea and 50 that underwent surgery in the United States. Costs were looked at from the perspective of reimbursement in the United States. The costs of standard thyroidectomy was $9,028 versus $12,505 for thyroid surgery performed with manual instruments through an incision in the armpit, versus $13,670 when performed with robotic instruments. The higher expense in these new techniques is related to the higher cost of the disposable instruments needed and longer operative time needed to perform these procedures.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

New techniques for thyroid surgery are more costly and take longer to perform. As with any innovation, there may be new costs that with time may result in new benefits for patients, surgeons and the health system. These techniques are currently evolving and whether they will ultimately be widely adopted in the United States remains to be seen. More likely than not, these will continue as niche operations in the United States.

Some patients may be interested in having surgery by these new approaches, but they are not for every patient and not for every surgeon. Patients are typically interested because these techniques eliminate the neck incision of standard thyroid surgery while others are attracted to the idea of having robotic surgery. Studies clearly show that these procedures can be safely performed by well-trained surgeons. In spite of this, these techniques are difficult to learn and have new potential complications that do not occur with standard surgery. Furthermore, the company that manufactures the robot is not currently supporting the use of the technology for thyroid surgery in the United States.

— Ronald B. Kuppersmith, MD, FACS

ATA THYROID BROCHURE LINKS

Thyroid Surgery: http://thyroid.org/patients/patient_brochures/surgery.html

ABBREVIATIONS & DEFINITIONS

Thyroidectomy: surgery to remove the entire thyroid gland. When the entire thyroid is removed it is termed a total thyroidectomy. When less is removed, such as in removal of a lobe, it is termed a partial thyroidectomy.

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THYROID CANCER

Life expectancy in thyroid cancer patients is reduced when age at initial treatment is greater than 45

BACKGROUND

The current staging system for thyroid cancer from stage 1-4 is used to guide recommendations for additional treatment after surgery, such as radioactive iodine therapy, and to determine prognosis. The staging system uses cancer size, presence of cancer extension beyond the thyroid gland into surrounding neck structures, spread of the cancer to the lymph nodes in the neck and spread of the cancer to other parts of the body. The staging system also adjusts prognosis by age, either younger or older than the age of 45. This study was done to examine to role of age in determining prognosis in a large group of thyroid cancer patients.

THE FULL ARTICLE TITLE:

Verburg FA et al Life expectancy is reduced in differentiated thyroid cancer patients >= than 45 years old with extensive local tumor invasion, lateral lymph node, or distant metastases at diagnosis and normal in all other DTC patients. J Clin Endocrinol Metab 2013;98:172-80.

SUMMARY OF THE STUDY

The Wurzburg, Germany thyroid cancer database was begun in 1980. A total of 2011 patients with thyroid cancer had been treated between 1980 - 2011. Most patients had surgery and radioiodine therapy. Patient follow-up included ultrasound, radioactive iodine scans and blood tests for thyroglobulin. Additional therapy was based on evidence of recurrent cancer. Patients were followed for an average of 7.1 years. A total of 14% of the patients had a decreased life expectancy. All of these patients presented with spread of their cancer beyond the neck (stage 4) and were > 45 at the time of initial treatment. All of the other patients >45 had a normal life expectancy as did those patients <45 years.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study confirms that most thyroid cancer patients have an excellent prognosis no matter how extensive their cancer. Further, only patients >45 with stage 4 cancer has a decreased life expectancy. This confirms that these patients need to be targeted for more aggressive therapy.

— Jerrold M. Stock, MD

ATA THYROID BROCHURE LINKS

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

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

Thyroid Surgery: http://thyroid.org/patients/patient_brochures/surgery.html

ABBREVIATIONS & DEFINITION

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.

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

Follicular thyroid cancer: the second most common type of thyroid cancer.

Thyroidectomy: surgery to remove the entire thyroid gland. When the entire thyroid is removed it is termed a total thyroidectomy. When less is removed, such as in removal of a lobe, it is termed a partial thyroidectomy.

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).

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THYROID CANCER, continued

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.

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THYROID CANCER

Long-term salivary gland function in thyroid cancer survivors who received radioactive iodine

BACKGROUND

Radioactive iodine is commonly used in the treatment of thyroid cancer. Long-term side effects of radioactive iodine treatment in thyroid cancer survivors may include damage to the salivary glands. Symptoms may include: dry mouth (xerostomia), pain or swelling in the glands (sialedenitis) and changes in taste. The authors of this study examined the effect of a single dose of radioactive iodine treatment on salivary gland function of thyroid cancer survivors. The authors examined salivary gland function using nuclear medicine testing before and about 5 years after a single dose administration of radioactive iodine, as well as salivary gland symptoms at follow-up. Risk factors for the development of abnormal salivary function were also examined.

THE FULL ARTICLE TITLE

Jeong SY et al. Salivary gland function five years after a radioiodine ablation in patients with differentiated thyroid cancer: direct comparison of pre and post-ablation scintigraphies and their relation to xerostomia symptoms. Thyroid. November 15, 2012.

SUMMARY OF THE STUDY

The authors studied 213 thyroid cancer patients who were treated at a single hospital in Korea. The patients all received one dose of radioactive iodine with doses ranging from 100 mCi to 150 mCi. None of the patients had salivary gland symptoms before radioactive iodine treatment and no one had external beam radiation treatment to the neck. Salivary gland function was checked prior to radioactive iodine treatment, as well as 5-6 years later. About 16% of survivors (35/213) reported having a dry mouth at follow-up about 5 years after radioactive iodine treatment. Furthermore, about 18% of survivors reported having short-term pain or salivary gland swelling after radioactive iodine treatment. About 20% of salivary glands had some evidence of worsening salivary function on nuclear medicine testing. There was a direct relationship between the patients' reported salivary symptoms and the presence of significant abnormalities on salivary gland nuclear medicine testing. Significantly higher rates of dry mouth were reported by patients who were treated with about 150 mCi of radioactive iodine (17.9%), compared to those who received about 100 mCi (7.8%). Also, on nuclear medicine testing, moderate to severe worsening of salivary gland function was more commonly seen in patients treated with 150 mCi of radioactive iodine compared to 100 mCi.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that radioactive iodine therapy at doses of 100 - 150 mCi causes salivary gland dysfunction in 16% - 20% of patients. Thus, salivary gland symptoms are not uncommon in thyroid cancer patients treated with radioactive iodine therapy. In general there is a trend for using less radioactive iodine therapy and at lower doses when used in low risk patients and this study certainly supports this approach. More research is needed to examine the risk of salivary gland side effects in thyroid cancer patients treated with doses lower than those examined in this study.

— Anna Sawka, MD

ATA THYROID BROCHURE LINKS

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

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

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THYROID CANCER, continued

ABBREVIATIONS & DEFINITIONS

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

Follicular thyroid cancer: the second most common type of thyroid cancer.

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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).

Thyroid Remnant Ablation: destruction of the small amount of thyroid tissue that remains after surgery (thyroidectomy) with the use of radioactive iodine.

mCi: millicurie, the units used for I-131.

Sialadenitis: inflammation of salivary gland.

Xerostomia: dry mouth due to lack of saliva, frequently observed after radiation to the head and neck and after I-131 therapy.

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ATA Alliance for Thyroid Patient Education

WELCOME

The American Thyroid Association is pleased to welcome our two newest members, **Thyroid Federation International** and **Thyroid Cancer Canada**, to the 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

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.

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ThyCa: Thyroid Cancer Survivors' Association, Inc.
www.thyca.org

GRAVES' DISEASE & THYROID FOUNDATION

Thyroid Cancer Canada
Cancer de la thyroïde Canada

Light of Life Foundation
checkyourneck.com

Thyroid Federation International

ATA Alliance for Thyroid Patient Education

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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.

THYROID CANCER CANADA

www.thyroidcancercanada.org
Phone: 416-487-8267
Fax: 416-487-0601
e-mail: 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

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

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ThyCa: Thyroid Cancer Survivors' Association, Inc. www.thyca.org

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Light of Life Foundation checkyourneck.com

Thyroid Federation International