Clinical THYROIDOLOGY FOR THE PUBLIC

AMERICAN THYROID ASSOCIATION
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www.thyroid.org

TSH measurement is not an appropriate screening test for autonomous functioning thyroid nodules

In patients with a low TSH, thyroid scanning is recommended to determine if the nodule is autonomous, which carries a low risk of cancer. Biopsy can be avoided in this situation The goal of the study was to show examine the frequency that autonomous nodules can exist in patients with normal thyroid function as measured by normal TSH levels.

Chami R et al. TSH measurement is not an appropriate screening test for autonomous functioning thyroid nodules: a retrospective study of 368 patients. Eur J Endocrinol. January 22, 2014 [Epub ahead of print].

Long-term efficacy of modified-release rhTSH prior to radioiodine therapy for benign multinodular goiter

A multinodular goiter can grow big enough that it causes problems swallowing, speaking or breathing or becomes unsightly. Radioactive iodine is an alternative to surgery to shrink a large goiter and relieve obstructive symptoms. In this study, the authors evaluated the effectiveness of modified-release rhTSH given prior to radioactive iodine in shrinking large multinodular goiters.

Fast S, et al Long-term efficacy of modified-release recombinant human TSH (MRrhTSH) augmented radioiodine (131I) therapy for benign multinodular goiter: results from a multicenter international, randomized, placebo-controlled dose-selection study. Thyroid. December 16, 2013 [Epub ahead of print].

Treatment outcomes in patients with TSH-secreting pituitary adenomas

TSH secreting pituitary adenomas are a rare cause of hyperthyroidism. Surgery to remove the pituitary tumor is generally the treatment of choice. If surgery is unsuccessful, radiation therapy may be used. This study describes the effects of surgery and radiation on thyroid levels and tumor control in 70 patients with TSH secreting pituitary adenomas.

Malchiodi E et al Thyrotropin-secreting pituitary adenomas: outcome of pituitary surgery and irradiation. J Clin Endocrinol Metab. February 19, 2014 [Epub ahead of print].

The relationship between obesity and risk of papillary thyroid cancer

Based on current trends, papillary thyroid cancer will become the third most common cancer in American women by the year 2019. Recent estimates suggest that more than one-third of American adults are obese, which has been shown to be associated with several types of cancer. The aim of this study was to examine the relationship between obesity and risk of being diagnosed with papillary thyroid cancer.

Xu L et al Obesity and the risk of papillary thyroid cancer: a pooled analysis of three case-control studies. Thyroid. February 20, 2014 [Epub ahead of print].

Use of BRAF and RET/PTC molecular tumor markers in thyroid cancer biopsies showing papillary thyroid cancer

Recent advances have made molecular marker testing of the biopsy sample available; these represent additional tests that can be used to guide management of the nodule. Two genes in particular are associated with thyroid cancer: BRAF and RET/PTC. The goal of these studies was to see how useful testing for these molecular markers can be in patients in whom thyroid cancer is suggested by biopsy results.

Walczyk A et al The BRAF V600E mutation in papillary thyroid microcarcinoma: does the mutation have an impact on clinical outcome? Clin Endocrinol (Oxf). December 13, 2013 [Epub ahead of print].

Is the long-term prognosis of thyroid cancer affected when first diagnosed during pregnancy?

Thyroid cancer is the second most common cancer diagnosed during pregnancy. The aim of this study was to examine the clinical outcome of women diagnosed with thyroid cancer during pregnancy or shortly thereafter.

Messuti I et al. Impact of pregnancy on prognosis of differentiated thyroid cancer: clinical and molecular features. Eur J Endocrinol. February 7, 2014 [Epub ahead of print].

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EDITOR'S COMMENTS

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

We also provide even faster updates of late-breaking thyroid news through Twitter at @thyroidfriends and on Facebook. Our goal is to provide patients with the tools to be the most informed thyroid patient in the waiting room.

Also check out our friends in the Alliance for Thyroid Patient Education. The Alliance member groups consist of: the *American Thyroid Association*, 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:

1. Do all autonomous thyroid nodules cause a suppressed TSH?
2. Is modified-release rhTSH helpful in the treatment of large goiters with radioactive iodine?
3. What are the treatment outcomes in TSH-secreting pituitary adenomas?
4. What is the relationship between obesity and thyroid cancer?
5. What is the role of molecular markers in the diagnosis and treatment of thyroid cancer?
6. Is the long-term prognosis of thyroid cancer affected when first diagnosed during pregnancy?

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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THYROID NODULES

TSH measurement is not an appropriate screening test for autonomous functioning thyroid nodules

BACKGROUND

Thyroid nodules are extremely common. In patients that have a normal or elevated TSH, biopsy of thyroid nodules has become standard of care for those nodules which meet size and ultrasound criteria. According to guidelines by the American Thyroid Association, if the TSH is low, typically indicating hyperthyroidism or subclinical hyperthyroidism, thyroid scanning is recommended to determine if the nodule is autonomous (hyperfunctioning). If the nodule is autonomous, biopsy is not recommended because the risk of cancer in these nodules is very low. It is unclear how frequently autonomous nodules occur in patients with normal TSH levels and whether theses nodules also carry the same low likelihood of cancer. The goal of the study was to examine the frequency that autonomous nodules can exist in patients with normal thyroid function as measured by normal TSH levels.

THE FULL ARTICLE TITLE

Chami R et al. TSH measurement is not an appropriate screening test for autonomous functioning thyroid nodules: a retrospective study of 368 patients. Eur J Endocrinol. January 22, 2014 [Epub ahead of print].

SUMMARY OF THE STUDY

Thyroid scans can be performed with either radioactive iodine or sodium pertechnetate. The advantage of pertechnetate scans is that they can be done immediately, whereas the radioactive iodine scans take 4-6 hours. In this study 368 pertechnetate scans of the thyroid in patients that showed a functioning nodule were reviewed. The most common reason for the scanning in women was to evaluate a thyroid nodule and in men, to evaluate thyroid function. In 217 patients where the scans, ultrasounds and TSH levels were all done within 6 months, half had a TSH below 0.4 uU/mL. The larger the thyroid nodule, the more likely a low TSH was present. However, 70% of the patients who had scans for evaluation of a thyroid nodule had normal TSH values and 49% of patients with normal TSH values were found to have an autonomous functioning nodule.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that many autonomous noodles occur in patients with normal TSH levels. It is unclear if autonomous functioning nodules in patients with normal TSH levels carried the same low enough risk of cancer to avoid biopsy as autonomous nodules in patients with low TSH levels and there was not a comparison with thyroid cytopathology to prove the low risk of cancer in these patients. Alternate approaches to the evaluation of thyroid nodules may be important due to the common nature of this problem. However, much more testing of this approach with thyroid scanning and biopsy cytology is needed.

— Julie Hallanger Johnson, MD

ATA THYROID BROCHURE LINKS

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

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

ABBREVIATIONS & DEFINITIONS

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

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

Thyroid scan: this imaging test uses a small amount of a radioactive substance, usually radioactive iodine

THYROID NODULES, continued

but also pertechnetate, to obtain a picture of the thyroid gland. A "cold" nodule means that the nodule is not functioning normally. A patient with a "cold" nodule should have a fine needle aspiration biopsy of the nodule. A "functioning", or "hot", nodule means that the nodule is taking up radioactive substance to a degree that is either similar to or greater than the uptake of normal cells. An "autonomous" nodule is one that takes up all of the radioactive substance, with no uptake in the rest of the gland. The likelihood of cancer in these nodules is very low and a biopsy is often not needed.

Pertechnetate thyroid scan: This uses sodium pertechnetate – $^{99m}TCO_4$ – instead of radioactive iodine. The advantage of pertechnetate scans is that they can be done immediately, whereas the radioactive iodine scans take 4–6 hours. However, they are less sensitive than radioactive iodine scans.

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.

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

Autonomous nodule: A thyroid nodule that is producing thyroid hormone and lacks the usual regulation of normal thyroid tissue

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GOITER

Long-term efficacy of modified-release rhTSH prior to radioiodine therapy for benign multinodular goiter

BACKGROUND

A goiter can grow big enough that it causes problems swallowing, speaking or breathing or becomes unsightly. In these cases, most patients have surgery (thyroidectomy) to remove the goiter. However, surgery is not an option for all people, particularly the elderly or for those who refuse surgery. Radioactive iodine is an alternative option for treatment that has been shown in many research studies to shrink a large goiter and relieve obstructive symptoms. Recombinant human TSH (rhTSH) can be given prior to the radioactive iodine treatment dose to improve iodine uptake with the goal of improving the decrease in goiter size. However, this can also cause short-lived hyperthyroidism. Modified-release rhTSH (MRrhTSH) is a lower dose of rhTSH that is released more slowly into the blood stream after injection to provide more sustained levels of TSH. In this study, the authors evaluated the effectiveness of modified-release MRrhTSH given prior to radioactive iodine in shrinking large multinodular goiters.

THE FULL ARTICLE TITLE

Fast S, et al Long-term efficacy of modified-release recombinant human TSH (MRrhTSH) augmented radioiodine (^{131}I) therapy for benign multinodular goiter: results from a multicenter international, randomized, placebo-controlled dose-selection study. Thyroid. December 16, 2013 [Epub ahead of print].

SUMMARY OF THE STUDY

This study includes patients between the ages of 35-80 years treated with radioactive iodine to shrink their goiter. One day prior to the radioactive iodine treatment, patients were given an injection of either 0.01mg or 0.03 mg of MRrhTSH in the muscle or they received an injection without the drug. A CT scan was done at 6 months and 36 months after treatment to evaluate the size of the goiter. Patients also filled out a questionnaire to determine whether their symptoms had improved since the radioactive iodine treatment.

The study reports results of 86 patients 36 months after the radioactive iodine treatment. While the patients who received MRrhTSH showed bigger volume decreases by 6 months after iodine ablation, there was no benefit noted by 36 months. In other words, the goiters decreased in size the same amount whether or not the subjects were given MRrhTSH. However, the use of MRrhTSH did have an additional negative effect as significant number of subjects (33% to 45%) became hypothyroid relative to those not receiving MRrhTSH (13%).

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study reinforces other publications that radioactive iodine can be used to shrink goiters effectively with up to 56% size reduction by 3 years. This is an important option for those patients who cannot undergo surgery. The use of MRrhTSH did not demonstrate any additional benefit in decreasing gland volume 3 years after treatment. Hypothyroidism was more common after MRrhTSH treatment. Thus, MRrhTSH cannot currently be recommended for this purpose.

—Wendy Sacks, MD

ATA THYROID BROCHURE LINKS

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

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

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.

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.

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GOITER, continued

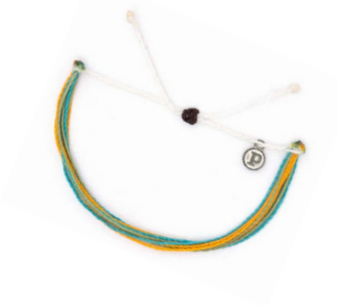
Recombinant human TSH (rhTSH): human TSH that is produced in the laboratory and used to produce high levels of TSH in patients after an intramuscular injection. This is mainly used in thyroid cancer patients before treating with radioactive iodine or performing a whole body scan. The brand name for rhTSH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

Modified-release recombinant human TSH (MRrhTSH): modified-release rhTSH (MRrhTSH) is a lower dose of rhTSH that is released more slowly into the blood stream after injection to provide more sustained levels of TSH.

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

Thyroid Awareness Monthly Campaigns Announced in Cooperation with PuraVida

The ATA will be highlighting a distinct thyroid disorder each month and a portion of the sales for PuraVida bracelets will be donated to the ATA. The month of May is **Graves' Disease Awareness Month** and a bracelet is available through the **ATA Marketplace** to support thyroid cancer awareness and education related to thyroid disease.



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TSH SECRETING PITUITARY TUMORS

Treatment outcomes in patients with TSH-secreting pituitary adenomas

BACKGROUND

Pituitary adenomas are tumors of the pituitary gland. They are relatively common in the population and are generally benign. They cause problems for patients by either disrupting pituitary function (too much or too little hormone production) or causing mass effects such as headaches or vision changes. Individual pituitary adenomas are thought to be a result of one pituitary cell replicating uncontrollably. If the pituitary tumor cell type is derived from a TSH secreting pituitary cell it is called a TSH secreting pituitary adenoma. Patients with this very rare type of pituitary tumor present with signs and symptoms of hyperthyroidism. This type of hyperthyroidism is caused by too much TSH being secreted from the tumor causing the thyroid to make too much thyroid hormone. This is different from the more common hyperthyroidism caused by the thyroid gland acting on its own to secrete too much thyroid hormone. TSH blood levels are used to help differentiate these two causes of hyperthyroidism. Surgery to remove the pituitary tumor is generally the treatment of choice. If surgery is unsuccessful and TSH and thyroid hormone levels do not normalize, radiation therapy may be used. Newer treatments with drugs known as somatostatin analogs also have been show to decrease tumor growth and TSH secretion in patients with these rare tumors. This study describes the effects of surgery and radiation on thyroid levels and tumor control in 70 patients with TSH secreting pituitary adenomas followed in Italy.

THE FULL ARTICLE TITLE

Malchiodi E et al Thyrotropin-secreting pituitary adenomas: outcome of pituitary surgery and irradiation. J Clin Endocrinol Metab. February 19, 2014 [Epub ahead of print].

SUMMARY OF THE STUDY

This study was included 70 patients in Italy with TSH secreting pituitary adenomas. The mean follow up was 64.4 months. The effects of neurosurgery to remove the pituitary adenoma or radiation were described. Most patients (97%) were treated with surgery, with approximately one third also receiving radiation therapy. Approximately 50% (33/70) were treated before pituitary surgery with somatostatin analogs to try to normalize their thyroid hormone levels. Most patients normalized their thyroid function (75% after surgery and 80% at last follow up). Treating patients with somatostatin analogs before surgery did not improve the effect of surgery. Radiation therapy controlled TSH secretion in 37% of patients. Of the patients that received radiation, one third developed a pituitary hormonal deficiency (hypopituitarism). Overall, of the patients who had control of their tumor, 80% had only received surgery and the remaining 20% received surgery followed by radiation.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

TSH secreting pituitary tumors are very rare. The initial treatment of choice is surgery to remove the tumor. If surgery is not curative, patients can be treated with radiation and/or somatostatin analogs. Radiation therapy causes hypopituitarism in approximately one third of patients, so patients must be followed over time to make sure they receive appropriate replacement for any hormonal deficiencies detected.

—Whitney Woodmansee MD

ATA THYROID BROCHURE LINKS

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

ABBREVIATIONS & DEFINITIONS

Pituitary gland: this endocrine gland sits at the base of the brain and secretes hormones that control thyroid and adrenal function, growth and reproduction. The pituitary gland secretes TSH to control thyroid function.

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TSH SECRETING PITUITARY TUMORS, continued

Hypopituitarism: decrease in function of the pituitary gland. Hypopituitarism can be partial (affecting the secretion of 1 or more hormones) or complete (panhypopituitarism, lack of secretion of all of the pituitary hormones. The symptoms of hypopituitarism depend on the gland system affected.

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.

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.

Somatostatin analog: drugs that usually works to inhibit other hormones. It is taken as a daily injection into the skin.

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THYROID CANCER

The relationship between obesity and risk of papillary thyroid cancer

BACKGROUND

In recent years, there has been a rise in the number of people being diagnosed with thyroid cancer in the United States. Based on current trends, experts predict that papillary thyroid cancer will become the third most common cancer in American women by the year 2019. Recent estimates suggest that more than one-third of American adults are obese. Furthermore, obesity is associated with increased risk of a number of cancers and has been reported to contribute to the cause of some cancers. The aim of this study was to examine the relationship between obesity and risk of being diagnosed with papillary thyroid cancer.

THE FULL ARTICLE TITLE

Xu L et al Obesity and the risk of papillary thyroid cancer: a pooled analysis of three case-control studies. Thyroid. February 20, 2014 [Epub ahead of print].

SUMMARY OF THE STUDY

The authors combined the data from three separate studies which collected data on a total of 1917 thyroid cancer patients and 2127 cancer-free individuals (controls). The three studies were conducted in the United States, Italy and Germany. Using data on recorded height and weight of study participants, the authors estimated the degree to which individuals were overweight or obese, by calculating body mass index (BMI), percentage of body fat, and body surface area (BSA). The authors combined data from all three studies to estimate the relationship between these values and the estimated risk of papillary thyroid cancer. The authors reported that being overweight (BMI 25-29.9 kg/m2) or obese (BMI ≥30 kg/m2) was associated with a significantly higher risk of papillary thyroid cancer compared to being underweight or normal weight individuals (BMI <25 kg/m2). Similar results were observed for analyses using body fat percentage measures (ie. an increased risk of papillary thyroid cancer with higher body fat percentage). Greater BSA was also significantly positively associated with increased risk of papillary thyroid cancer, but there were some differences in estimates across the different study sites.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The authors of this study concluded that increasing body mass and body fat percentage are significantly related to increased risk of papillary thyroid cancer. More studies are needed to determine the exact cause of this relationship and whether losing weight changes this increased risk. In any event, it is important for all individuals to be aware of the health benefits of maintaining a healthy weight and preventing obesity.

— Anna Sawka, MD

ATA THYROID BROCHURE LINKS

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

ABBREVIATIONS & DEFINITIONS

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

Body-mass index (BMI): a standardized measure of obesity calculated by dividing the weight in kilograms by the square of the height. A normal BMI is 18.5-24.9, overweight is 25-30 and obese is >30.

Body surface area (BSA): a measurement or calculated estimate of the total surface area of the human body for an individual.

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THYROID CANCER

Use of BRAF and RET/PTC molecular tumor markers in thyroid cancer biopsies showing papillary thyroid cancer

BACKGROUND

Thyroid nodules are very common. When a thyroid nodule of sufficient size is found, a biopsy of the nodule is usually performed to suggest whether it is benign (non-cancerous) or malignant (cancerous). While the biopsy results are usually clear, sometimes it can be difficult to clearly identify a cancer and surgery is required to make the diagnosis. Recent advances have made molecular marker testing (mutation testing of thyroid cancer genes) of the biopsy sample available; these represent additional tests that can be used to guide management of the nodule. Two genes in particular are associated with thyroid cancer: BRAF and RET/PTC.

Two studies were recently done to report the frequency of the BRAF and RET/PTC mutations in patients with thyroid nodule biopsies who underwent thyroid surgery. Although it is controversial, some researchers think that having a BRAF mutation suggests that the cancer (usually papillary thyroid cancer, the most common form of thyroid cancer) will be more aggressive, particularly when the initial nodule is large.

These two studies report the relationship between how often these thyroid cancer genes were initially positive and the aggressiveness of thyroid cancer through longterm monitoring. The goal of both studies was to see how useful testing for these molecular markers can be in patients in whom thyroid cancer is suggested by biopsy results.

THE FULL ARTICLES' TITLES

Walczyk A et al The BRAF V600E mutation in papillary thyroid microcarcinoma: does the mutation have an impact on clinical outcome? Clin Endocrinol (Oxf). December 13, 2013 [Epub ahead of print].

Guerra A et al Concomitant BRAF(V600E) Mutation and RET/PTC rearrangement is a frequent occurrence in papillary thyroid carcinoma. Thyroid 2014;24:254-9. Epub August 25, 2013; doi: 10.1089/thy.2013.0235.

SUMMARY OF THE STUDIES

Walczyk and colleagues studied how often the BRAF mutation was positive from 113 samples from patients seen at a Polish hospital during 2012. All patients had been diagnosed with micropapillary thyroid cancer (cancers that are <10 mm in size) following thyroid surgery. Since BRAF mutations have been found usually in larger cancers, this study is novel in that it was studied only in these smaller cancers. The researchers found that surprisingly, a large percentage (78 of 113) of the micro-papillary cancers contained the BRAF mutation, although none of the patients showed persistence or recurrence of the cancer after the patients were followed up on average for 4.8 years.

Previous studies have reported that having both the BRAF and RET/PTC gene mutations in a single tumor is quite rare. In the second study, Guerra and researchers reported how often both mutations were found in 72 Italian patients with papillary thyroid cancer to show whether having dual mutations may carry a unique prognosis. The BRAF mutation was found in 44.4% of the cancers, of which 36.1% also had the RET/PTC mutation. The RET/PTC was found in 69.5% of the cancers, of which 30.5% also had the BRAF mutation. Positive mutations of both genes were not more common in the patients with Stage IV thyroid cancer. The main conclusion is that although both the BRAF and RET/PTC mutations were more frequently found in this group of papillary thyroid cancer patients, this does not necessarily indicate a worse prognosis.

WHAT ARE THE IMPLICATIONS OF THESE STUDIES?

These two studies report on the frequencies of two common thyroid cancer gene mutations, BRAF and RET/PTC in patients with papillary thyroid cancer living in Poland and Italy. Published literature has reported that these mutations usually signal more aggressive disease at initial diagnosis and during longterm monitoring. The main findings from these current studies were that the

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THYROID CANCER, continued

BRAF mutation in patients with micropapillary thyroid cancers and both the BRAF and RET/PTC mutations in patients with all sizes of papillary thyroid cancers do not necessarily suggest more aggressive disease. Further research is needed to show whether these findings are similarly applicable for papillary thyroid cancer patients living in the U.S. using larger groups of patients with longer follow-up.

— Angela M. Leung, MD, MSc

ATA THYROID BROCHURE LINKS

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

ABBREVIATIONS & DEFINITIONS

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

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

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

Papillary microcarcinoma: a papillary thyroid cancer smaller than 1 cm in diameter.

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.

Cancer-associated genes: these are genes that are normally expressed in cells. Cancer cells frequently have mutations in these genes. It is unclear whether mutations in these genes cause the cancer or are just associated with the cancer cells. The cancer-associated genes important in thyroid cancer are BRAF, RET/PTC and RAS.

BRAF gene: this is gene that codes for a protein that is involved in a signaling pathway and is important for cell growth. Mutations in the BRAF gene in adults appear to cause cancer.

Mutation: A permanent change in one of the genes.

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THYROID CANCER AND PREGNANCY

Is the long-term prognosis of thyroid cancer affected when first diagnosed during pregnancy?

BACKGROUND

Thyroid cancer is the fastest rising cancer in women. It is also the second most common cancer diagnosed during pregnancy. It is suggested that the changes associated with pregnancy may play a role in thyroid cancer development and growth. However, little is known regarding the outcome of thyroid cancer related to pregnancy and only a few studies have been conducted examining the long-term outcome of women with thyroid cancer related to pregnancy. The aim of this study was to examine the clinical outcome of women diagnosed with thyroid cancer during pregnancy or shortly thereafter, as compared to non-pregnant women diagnosed with thyroid cancer.

THE FULL ARTICLE TITLE

Messuti I et al. Impact of pregnancy on prognosis of differentiated thyroid cancer: clinical and molecular features. Eur J Endocrinol. February 7, 2014 [Epub ahead of print].

SUMMARY OF THE STUDY

A total of 340 patients were divided into 3 groups according to the time of thyroid cancer diagnosis: women with a diagnosis of thyroid cancer at least two years after delivery, women with a diagnosis of thyroid cancer during pregnancy or within two years after delivery and women who had never had children at the time of diagnosis of thyroid cancer. Several clinical parameters were measured, such as thyroglobulin and thyroglobulin antibodies, estrogen and progesterone receptor expression and prevalence of BRAF V600E mutations.

The study found that persistence or recurrence of thyroid cancer was significantly higher in women when the diagnosis was made during pregnancy or within two years after delivery as compared to the other two groups. There were no significant differences among groups in any of the other clinical parameters studied.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that persistence or recurrence of thyroid cancer is significantly higher in pregnant patients, suggesting that pregnancy may have an unfavorable prognosis in patients with thyroid cancer. This study is important as more aggressive initial thereapy may be parrenbted when thyroid cancer is diagnosed during or soon after pregnancy. Certainly, careful follow-up is needed when diagnosis of thyroid cancer occurs during pregnancy or shortly thereafter.

— Maria Papaleontiou, MD

ATA THYROID BROCHURE LINKS

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

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

DEFINITIONS AND ABBREVIATIONS

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.

Thyroglobulin 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.

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

Progesterone: a female hormone. Progesterone levels are increased during pregnancy.

BRAF V600E mutations: mutations in a cancer-associate gene important in thyroid cancer.

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ATA Alliance for Thyroid Patient Education

GOAL

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

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

WHO WE ARE (in alphabetical order)

AMERICAN THYROID ASSOCIATION

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 the Public*. 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.

continued on next page

AMERICAN THYROID ASSOCIATION
FOUNDED 1923

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

Continued...

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.

To register for this FREE event visit www.snmmi.org/2014PED.

2014 PATIENT EDUCATION DAY

held by the

Society of Nuclear Medicine and Molecular Imaging (SNMMI)

Sunday, June 8, 2014

10:00 AM – 6:00 PM

St. Louis Convention Center
America's Center, 701 Convention Plaza, St. Louis, MO 63101

General Session

For the 4th year, the SNMMI Patient Advocacy Advisory Board has developed a "Patient Program" to address key topics of interest to the patient and patient advocacy community. This program provides a unique opportunity to network with passionate advocates and leading experts in colorectal cancer, prostate cancer, thyroid cancer, and neuroendocrine tumors.

- Learn nuclear medicine and molecular imaging is and how it can help you
- Ask questions and engage with patients and medical professionals
- Hear about the latest advances in technology and treatment for colorectal cancer, prostate cancer, thyroid cancer, and neuroendocrine tumors
- Listen to a panel of patients and their doctors as they share their stories about how their relationship has improved their care management.

Feel empowered through the stories of other cancer survivors as they share their personal journeys about how nuclear medicine and molecular imaging has made a difference in their lives or the lives of their loved ones.

Breakout Session 3 — 3:15 – 6:00 pm

The Nitty Gritty of Thyroid Cancer I-131 Ablation — Interactive Session
(SNMMI, the American Thyroid Association and ThyCa: Thyroid Cancer Survivors' Inc.)

To register for this FREE event and get more information about the Patient Education Day at the St. Louis Convention Center on June 8th, visit www.snmmi.org/2014PED.