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Clinical Thyroidology® for the Public

AMERICAN THYROID ASSOCIATION
Optimal Thyroid Health for All

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Editor's Comments

Welcome to another issue of *Clinical Thyroidology for the Public*! In this journal, we will bring to you the most up-to-date, cutting edge thyroid research. 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, Bite Me Cancer, the Graves' Disease and Thyroid Foundation, the Light of Life Foundation, MCT8 – AHDS Foundation, ThyCa: Thyroid Cancer Survivors' Association, Thyroid Cancer Canada, Thyroid Cancer Alliance* and *Thyroid Federation International.*

We invite all of you to join our **Friends of the ATA** community. It is for you that the American Thyroid Association (ATA) is dedicated to carrying out our mission of providing reliable thyroid information and resources, clinical practice guidelines for thyroid detection and treatments, resources for connecting you with other patients affected by thyroid conditions, and cutting edge thyroid research as we search for better diagnoses and treatment outcomes for thyroid disease and thyroid cancer. We thank all of the *Friends of the ATA* who support our mission and work throughout the year to support us. We invite you to help keep the ATA mission strong by choosing to make a donation that suits you — it takes just one moment to give online at: www.thyroid.org/donate and all donations are put to good work. The ATA is a 501(c)3 nonprofit organization and your gift is tax deductible.

The COVID-19 pandemic has caused an unprecedented upheaval in our daily lives and presented extremely difficult challenges to our healthcare system. We at the American Thyroid Association would like to make sure that you all have access to most accurate, reliable, fact-based and updated information. (https://www.thyroid.org/covid-19/)

September is Thyroid Cancer Awareness Month.

In this issue, the studies ask the following questions:

- Are bad habit good for preventing thyroid cancer?
- Which thyroid nodules should be considered for molecular testing?
- Should we move toward a universal thyroid nodule risk stratification system?
- How often is thyroid hormone needed after lobectomy for thyroid cancer?
- Is Hurtle cell cancer more aggressive than follicular thyroid cacner?
- Is lenvatinib better than sorafenib as first-line treatment of thyroid cancer that no longer responds to radioactive iodine therapy?

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 CANCER

Are "bad habits" good for thyroid cancer? Smoking, alcohol and thyroid cancer risk

BACKGROUND

We do not know the exact causes of thyroid cancer. Researchers have been trying to find out factors that may be associated with thyroid cancer for several years. Smoking and alcohol consumption may cause many cancers. Interestingly, past studies showed either no relation or even decreased risk associated with these factors.

The aim of this study was to find out whether there was an association between cigarette smoking and alcohol consumption and thyroid cancer risk.

THE FULL ARTICLE TITLE

Yeo Y et al 2022 Smoking, alcohol consumption, and the risk of thyroid cancer: A population-based Korean cohort study of 10 million people. Thyroid 32:440–448. PMID: 35236095.

SUMMARY OF THE STUDY

The study was done in Korea using Korean National Health Insurance (KNHI) database which had information on over 9 million individuals over an average of 8 years. In this very large group of people, 89,527 had thyroid cancer diagnosis. The available data included smoking status, use of alcohol, regular exercise, diabetes mellitus, high cholesterol, and income. The specific type of cancer was not available.

Smoking status was divided into: never, past or present. The duration of smoking was divided into categories of less than 10 years, 10 to 20 years, and more than 20 years. Alcohol use was classified as never, mild if less than 15 g/day, moderate if 15-30 g/day, or heavy if more than 30g/day. (15 grams of alcohol is approximately 5 oz of wine or 12 oz of beer, or 1.5 oz of hard liquor.)

Current smokers had a 36% lower risk of thyroid cancer compared to nonsmokers; risk was lower especially if they were also less than 65 years old. Past smokers and never smokers had a similar risk. The amount or duration of smoking did not affect the risk. Alcohol use was also associated with a lower risk of thyroid cancer. More frequent and heavier consumption had lower risk.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Surprisingly, the researchers in this study observed a lower risk of thyroid cancer in individuals with increased alcohol consumption and smoking. The reasons for this are unclear. Certainly, this does not mean your doctor will start recommending smoking or drinking alcohol regularly to prevent thyroid cancer since this would cause more harm than good. However, the findings of this very large study are important and intriguing. Further investigations to better understand how these factors could offer protection from thyroid cancer may help develop new prevention strategies.

— Ebru Sulanc, MD

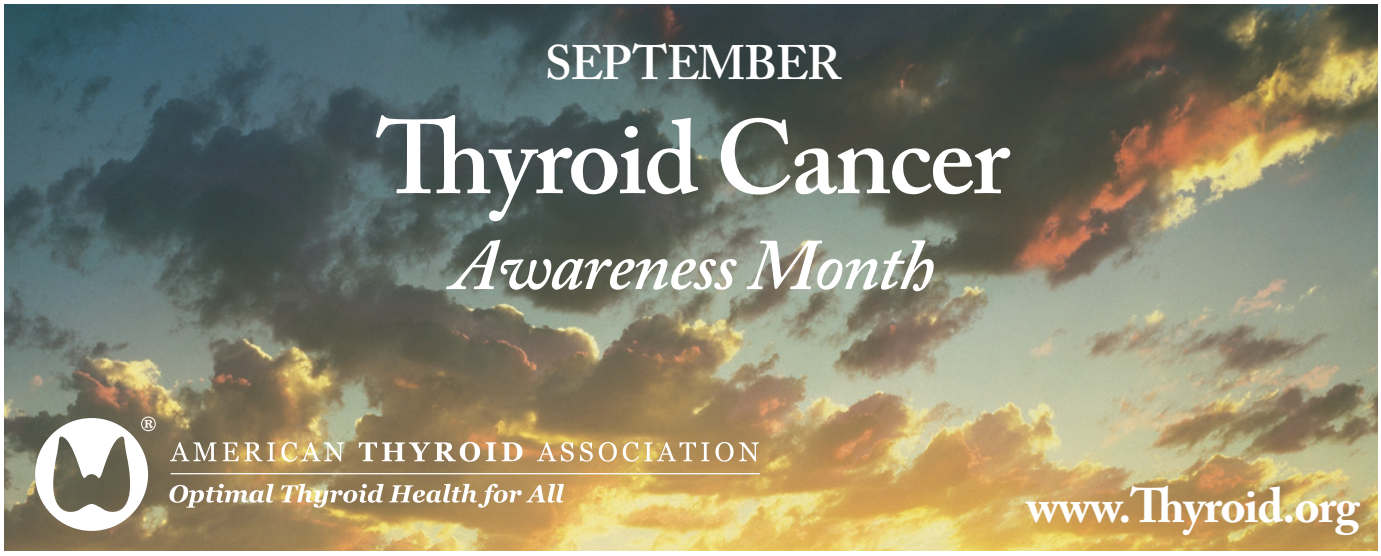
ATA THYROID BROCHURE LINKS

Thyroid Cancer (Papillary and Follicular): https://www.thyroid.org/thyroid-cancer/

THYROID CANCER, continued

ABBREVIATIONS & DEFINITIONS

Papillary thyroid cancer: the most common type of thyroid cancer. There are 4 variants of papillary thyroid cancer: classic, follicular, tall-cell and noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP).



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THYROID NODULES

Which thyroid nodules should be considered for molecular testing?

BACKGROUND

Ultrasound is frequently used to evaluate thyroid nodules. While the appearance of the nodule on ultrasound is used to determine whether nodules should be biopsied, the decision regarding surgery or monitoring is usually made on the basis of subsequent biopsy results with molecular testing when indicated. Currently guidelines recommend using molecular testing if biopsy results are indeterminate. The 2 major commercially available molecular tests are Veracyte Afirma Genomic Sequencing Classifier (GSC) and CBLPath ThyroSeq v3. Patients with benign results on molecular testing can be monitored, while patients with abnormal results will usually undergo surgery. However, molecular testing is expensive and the authors wanted to determine if adding the information on ultrasound characteristics would affect the utility of molecular testing.

THE FULL ARTICLE TITLE

Hu TX et al 2022 The Effect modification of ultrasound risk classification on molecular testing in predicting the risk of malignancy in cytologically indeterminate thyroid nodules. Thyroid. Epub 2022 May 25. PMID: 35611970.

SUMMARY OF THE STUDY

The study group included all patients (343) with indeterminate thyroid nodule cytology (Bethesda classes III and IV) at a major medical center from July 2017 to April 2020. There were 375 indeterminate nodules that were randomly assigned to molecular testing with either Afirma GSC (RNA test) or ThyroSeq v3 (DNA-RNA test). The original study was performed to determine whether either test was superior to the other and found them to be similar. Since the pathologists were blinded to the results of ultrasound when reading the cytology, this group of patients could also be used to study whether there was a difference in utility of molecular testing results depending upon the ultrasound findings.

Of the 375 nodules studied, 162 were found to be suspicious by molecular testing and 82% (133) ended up going to surgery. There was a 63.9% rate of cancer or NIFTP based on the pathology of the nodules removed by surgery. The 29 nodules not removed were either monitored with surveillance per patient preference (20), had surgery deferred due to other illnesses (2), were lost to follow up (6), or had surgery with no histologic diagnosis (1). Only 32 of 245 nodules found not to be suspicious on molecular testing were resected and 7 were found to be cancers (2.9%).

ATA ultrasound risk classification was then used to stratify the nodules into benign (<1% risk of cancer), very low suspicion (<3% risk of cancer), low suspicion (5–10% risk of cancer), intermediate suspicion (10–20% risk of cancer), and high suspicion (70–90% risk of cancer) with 1,13,157,172 and 32 nodules respectively. The rate of cancer in ATA low/intermediate suspicious nodules who went to surgery (343) with positive molecular testing was 56% and 67% for Afirma and ThyroSeq respectively and was 3.8% and 2.1% respectively when molecular testing was negative. Of the 19 patients with ATA high suspicion who underwent surgery, all had positive molecular markers except for one patient who was Afirma benign, confirmed benign at surgery. Among the other 18 with positive molecular testing, 80-88% were found to have cancer on pathology depending upon the molecular test used.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The finding of very low cancer rates in patients with low/intermediate ATA (ultrasound) nodules, indeterminate cytology and negative molecular testing confirms that diagnostic surgery may be avoided. However, in patients with highly suspicious ultrasound findings, the addition of molecular testing adds little to the outcome and avoiding this extra cost may be warranted. We should realize that this study is from a single center with experienced ultrasonologists and cytologists and may not be expandable to a larger, more diverse population.

— Marjorie Safran, MD

THYROID NODULES, continued

ATA THYROID BROCHURE LINKS

Thyroid Nodules: https://www.thyroid.org/thyroid-nodules/

ABBREVIATIONS & DEFINITIONS

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. The two most common molecular marker tests are the Afirma™ Gene Expression Classifier and Thyroseq™

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.

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.

Indeterminate thyroid biopsy: this happens a few atypical cells are seen but not enough to be abnormal (atypia of unknown significance (AUS) or follicular lesion of unknown significance (FLUS)) or when the diagnosis is a follicular or hurthle cell lesion. Follicular and hurthle cells are normal cells found in the thyroid. Current analysis of thyroid biopsy results cannot differentiate between follicular or hurthle cell cancer from noncancerous adenomas. This occurs in 15-20% of biopsies and often results in the need for surgery to remove the nodule.

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THYROID NODULES

Interpretation of thyroid ultrasounds in patients with thyroid nodules

BACKGROUND

Thyroid nodules are the most common endocrine diagnosis, occurring in up to 50% of the population. Thyroid nodules are often diagnosed on ultrasound examinations. The main concern of a thyroid nodule is whether the nodules contains a cancer. Currently there are many systems that are available to assess the risks for cancer in these nodules. The systems are called risk stratification systems. Various systems are used based on where the patient lives and the person who is reading the ultrasound report. Occasionally, it may lead to confusion. Different systems may indicate different level of risk based on the findings.

An international survey was done which involved answers to 22 questions. The survey was done online. Different systems of risk assessment of thyroid nodules, such as those recommended by various medical societies, were assessed.

THE FULL ARTICLE TITLE

Hoang JK et al 2022 An International Survey on Utilization of Five Thyroid Nodule Risk Stratification Systems: A Needs Assessment with Future Implications. Thyroid. Epub 2022 Apr 11. PMID: 35229624.

SUMMARY OF THE STUDY

A 22-question online international survey was developed by four members of the steering committee and administered via SurveyMonkey.com. The focus of the survey was on choice and usage of risk stratification systems, practitioner and practice type and demographics, geographic region, specialty, level of training, experience, and volume of thyroid nodule ultrasound and fine-needle aspiration. Invitations to complete the survey were sent out by email by professional organizations including the American Thyroid Association (ATA), Associazione Medici Endocrinologi (AME), European Thyroid Association, Korean Society of Thyroid Radiology, and the Society of Radiologists in Ultrasound. The survey focused on five widely available risk stratification systems including the American Association for Clinical Endocrinology (AACE), American College of Endocrinology (ACE) and AME unified guidelines, ACR TI-RADS, the ATA guidelines, EU-TIRADS, and K-TIRADS. It was designed to be completed in less than 15 minutes and participation was voluntary without reward; respondents did not have to answer all questions.

Over 700 respondents participated in the survey. Most of the respondents were physicians in clinical practice. A majority were in Europe and the remainder in North America. There were 54% of respondents from Europe and 28.3% from North America; 61.5% were endocrinologists, 20.6% were radiologists, and 11.4% were surgeons. Alone or in combination, risk stratification system usage was as follows: ATA guidelines (34%), ACR TI-RADS (33.7%), EU-TIRADS (29.6%), AACE/ACE/AME guidelines 20.5%, K-TIRADS (14.6%), other (4.6%), none (5%). Geographic location as well as the specialty of the practicing clinicians were determinants of which system was used. Over two thirds of the respondents indicated a need for a system which is universal.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Although the risk assessing systems for thyroid nodules are helpful, they often may lead to confusion on the part of both patients and physicians due to a lack of uniformity. There is a need for a universal system which would help the patients and clinicians in understanding the ultrasound reports and making appropriate recommendations for choosing the thyroid nodules that require further evaluation including a biopsy.

—Vibhavasu Sharma, MD, FACE

THYROID NODULES, continued

ATA THYROID BROCHURE LINKS

Thyroid Nodules: https://www.thyroid.org/thyroid-nodules/

ABBREVIATIONS & DEFINITIONS

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

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

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

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THYROID CANCER

Predicting need for thyroid hormone treatment after partial thyroid gland removal for low-risk thyroid cancer

BACKGROUND

Surgery to remove all, or part, of the thyroid gland is usually needed when thyroid cancer is discovered. Sometimes, removing only that part, or side, of the thyroid gland that contains cancer (a thyroid lobectomy) is enough to treat this disease. This is especially true for papillary thyroid cancers that have a very low risk of growing and spreading. The main advantage of a thyroid lobectomy is that the remaining thyroid lobe may make enough thyroid hormone to avoid needing thyroid hormone treatment following surgery, as often, but not always, this remaining thyroid tissue will make enough thyroid hormone to meet a person's needs. While a total thyroidectomy affords the lowest risk of thyroid cancer recurrence, it requires life-long treatment with thyroid hormone after surgery.

It would be useful to know, before surgery, if the non-cancerous side of the thyroid gland will produce enough thyroid hormone after surgery to avoid taking a thyroid hormone pill. If this is the case, a person might choose to just have the cancer-containing side of their thyroid removed. The research described here aims to identify features of people diagnosed with thyroid cancer that predict adequate thyroid hormone production when only one side of the thyroid is removed.

FULL ARTICLE TITLE

Dou Y et al 2021 The recovery of thyroid function in low-risk papillary thyroid cancer after lobectomy: A 3-year follow-up study. Front Endocrinol (Lausanne) 11:619841. PMID: 33633689.

SUMMARY OF THE STUDY

The authors of this study looked at 190 people who underwent a thyroid lobectomy for treatment of thyroid cancer. The investigators then asked which of these people had low enough thyroid hormone levels to need treatment with a thyroid hormone pill. Those people in the study who did require thyroid hormone replacement were then further evaluated to try and understand if there was anything about them that might have predicted, before surgery, that they would need a thyroid hormone pill following thyroid lobectomy. The authors found that 113 people in the study (47%) had normal thyroid hormone levels after thyroid lobectomy, while 28 people developed temporary low thyroid hormone levels that returned to normal 3-9 months after surgery. Overall, 49 of 190 (26%) of patients were found to have permanent low thyroid hormone levels after surgery and needed long-term treatment with thyroid hormone pills. The authors found no relationship between the need for thyroid hormone treatment after thyroid lobectomy and gender, age, cancer size, cancer location within the thyroid or body mass index. The authors did find that people who had thyroid hormone levels at the lower end of normal before surgery were more likely to need to take thyroid hormone after thyroid lobectomy. They also found that inflammation of the thyroid (Hashimoto's thyroiditis) before surgery was associated with need for thyroid hormone after thyroid lobectomy. Further, and for unclear reasons, thyroid hormone was more likely to be needed if the right side of the thyroid was removed, compared to the left.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that only ~25% of thyroid cancer patients require thyroid hormone pills after a lobectomy. Another 15% that had low thyroid hormone levels after surgery eventually regained normal thyroid hormone levels within 3-9 months. Predictors of the need for thyroid hormone after a lobectomy include pre-op thyroid levels in the low normal range, the presence of Hashimoto's thyroiditis and a need for a right-sided lobectomy. These findings may help some thyroid cancer patients choose between thyroid surgery options.

— Jason D. Prescott, MD PhD

THYROID CANCER, continued

ATA THYROID BROCHURE LINKS

Thyroid Hormone Treatment: https://www.thyroid.org/thyroid-hormone-treatment/

Thyroid Surgery: https://www.thyroid.org/thyroid-surgery/

Thyroid Cancer (Papillary and Follicular): https://www.thyroid.org/thyroid-cancer/

ABBREVIATIONS & DEFINITIONS

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

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

Papillary thyroid cancer: the most common type of thyroid cancer. There are 4 variants of papillary thyroid cancer: classic, follicular, tall-cell and noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP).

Total thyroidectomy: surgery to remove the entire thyroid gland.

Lobectomy: surgery to remove one lobe of the thyroid.

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

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.

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THYROID CANCER

Hürthle-Cell cancer with extensive vascular invasion has a higher risk of recurrence than follicular-cell cancer

BACKGROUND

Thyroid cancer is the most common endocrine cancer. When thyroid cancer spreads outside of the thyroid, it most often ends up in the lymph nodes in the neck. However, thyroid cancer can spread through the body by invading blood vessels, which is called vascular invasion. Follicular thyroid carcinoma and Hürthle-cell carcinoma are closely related thyroid cancer subtypes that are known to spread by vascular invasion. While only 10% of all thyroid cancer cases are follicular cancers and 5% from Hürthle-cell cancers, they are both felt to be more severe than other cancer subtypes such as papillary thyroid cancer, the most common type of thyroid cancer. However, there is very little data comparing outcomes such as overall survival, cancer recurrence and distant cancer spread between these two cancer subtypes. In particular, scientists still are not sure how the extent of vascular invasion affects one's prognosis.

This study examined how the degree of vascular invasion affects the clinical outcomes of patients with follicular cancer compared to Hürthle-cell thyroid cancer.

THE FULL ARTICLE TITLE

Matsuura D et al 2022 Follicular and Hürthle cell carcinoma: Comparison of clinicopathological features and clinical outcomes. Thyroid 32:245–254.

SUMMARY OF THE STUDY

The authors studied 190 patients with follicular thyroid carcinoma and Hürthle-cell carcinoma treated at Memorial Sloan Kettering Cancer Center in New York City between 1986 and 2015. First, the pathology slides were reviewed by specialists who did not know each patient's clinical outcome. Next, each case was classified into four groups depending on the degree of vascular invasion: minimally invasive; focal vascular invasion, extensive vascular invasion and widely invasive. Then they compared important clinical outcomes such as overall survival, disease-specific survival, and recurrence-free survival between the various groups

There were 111 patients with Hürthle-cell cancer and 79 with follicular thyroid cancer. Patients with Hürthle-cell cancer were more likely to be older than 55 and tended to present with more extensive vascular invasion than with follicular cancer (33% vs. 19%). Regardless of the type of thyroid cancer, patients with extensive vascular invasion had worse recurrence rates compared with focal or no vascular invasion (10-year recurrence-free survival 77% if extensive vascular invasion, 95% if focal vascular invasion and 100% if no vascular invasion). In addition, patients with Hürthle-cell cancers with extensive/wide vascular invasion were more likely to experience a recurrence of their cancer than follicular thyroid cancer with extensive/wide vascular invasion (10-year recurrence-free survival 98%, vs 78%).

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Hurthle-cell carcinoma appears to be a more severe cancer subtype than follicular thyroid cancer. The degree of vascular invasion is a particularly important factor that affects the behaviour of Hürthle-cell cancer, as Hürthle-cell cancers with significant vascular invasion have high recurrence rates and more frequent spread outside of the neck. Therefore, Hürthle-cell carcinoma may require more aggressive treatment strategies such as total thyroidectomy and radioactive iodine therapy.

— Phillip Segal, MD

THYROID CANCER, continued

ATA THYROID BROCHURE LINKS

Thyroid Cancer (Papillary and Follicular): https://www.thyroid.org/thyroid-cancer/

ABBREVIATIONS & DEFINITIONS

Papillary thyroid cancer: the most common type of thyroid cancer. There are 4 variants of papillary thyroid cancer: classic, follicular, tall-cell and noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP).

Follicular thyroid cancer: The second most common type of thyroid cancer

Hurtle-cell thyroid cancer: A rare form of thyroid cancer.

Disease Specific Survival: The percentage of people in a study or treatment group who have not died from a specific disease in a defined period of time.

Recurrence Free survival (RFS): he length of time after primary treatment for a cancer ends that the patient survives without any signs or symptoms of that cancer

Vascular Invasion: The presence of tumor cells within a blood vessel, producing circulating tumor cells

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THYROID CANCER

Is lenvatinib better than sorafenib as first-line treatment of thyroid cancer that no longer responds to radioactive iodine therapy?

BACKGROUND

The usual initial treatment of thyroid cancer includes thyroid surgery. For patients whose cancer has a higher risk of recurrence, surgery is followed by radioactive iodine therapy. The vast majority of patients respond to these treatments. However, when thyroid cancer spreads, often the cancer cells do not respond to radioactive iodine therapy. In those cases, if the cancer progresses, a special type of chemotherapy agent, called tyrosine kinase inhibitors (TKIs), is used as treatment. There are two TKIs approved for use in thyroid cancer, lenvatinib and sorafenib.

In this study, the authors compared the efficacy of these two drugs in patients with progressive thyroid cancer that does not respond to radioactive iodine therapy.

THE FULL ARTICLE

Kim M et al 2022 Lenvatinib compared with sorafenib as a first-line treatment for radioactive iodine-refractory, progressive, differentiated thyroid carcinoma: Real-world outcomes in a multicenter retrospective cohort study. Thyroid. Epub 2022 May 17. PMID: 35443825.

SUMMARY OF THE STUDY

The authors studied 136 patients who were seen in six referral hospitals in Korea. The study group included patients with thyroid cancer with progressive cancer not responsive to radioactive iodine therapy as well as patients with poorly differentiated thyroid cancer. All patients were treated with either sorafenib or lenvatinib. The authors looked at progression free-survival (PFS), which means the time from starting the treatment until the cancer gets worse or progresses, response to treatment assessed by radiological studies, clinical benefit and safety. The average age of the patients was 68 and about 66% were women. Overall 80 patients received sorafenib and 56 patients received lenvatinib.

In average, PFS was 13 months in the sorafenib group and 35 months in the lenvatinib group, meaning, it took longer for cancer to progress on the patients taking lenvatinib as compared to sorafenib. Patients in the lenvatinib group had decreased progression of the disease as compared with patients in the sorafenib group. Patients in both groups reported side effects; however, patients in the lenvatinib group have higher chances of needing dose reductions or interruption of the treatment due to side effects.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Both sorafenib and lenvatinib are approved for treatment of thyroid cancer, but direct comparisons of these two drugs are lacking. This study shows that lenvatinib is more effective than sorafenib; however, lenvatinib appeared to have more side effects. More studies are needed to be able to compare "head to head" both drugs in a prospective, randomized fashion.

— Susana Ebner MD

ATA THYROID BROCHURE LINKS

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

Thyroid Cancer (Papillary and Follicular): https://www.thyroid.org/thyroid-cancer/

THYROID CANCER, continued

ABBREVIATIONS & DEFINITIONS

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.

Tyrosine kinases: proteins that are overactive in many of the pathways that cause cells to be cancerous. Inhibiting these proteins with drugs known as tyrosine kinase inhibitors are effective chemotherapy drugs for cancers, including advanced 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 toward the improvement of thyroid education and resources for patients.

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GRAVES' DISEASE & THYROID FOUNDATION®

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

Light of Life Foundation checkyourneck.com

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THYROID CANCER ALLIANCE

Thyroid Cancer Canada / Cancer de la thyroïde Canada

Thyroid Federation International

American Thyroid Association
www.thyroid.org
ATA Patient Resources:
www.thyroid.org/thyroid-information/
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thyroid@thyroid.org

Bite Me Cancer
www.bitemecancer.org
info@bitemecancer.org

Graves' Disease and Thyroid Foundation
www.gdatf.org
(Toll-free): 877-643-3123
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Light of Life Foundation
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www.thyroidcancerpatientinfo.org
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