

# Clinical Thyroidology® for the Public



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Hussain I et al 2021 Safety and efficacy of radiofrequency ablation of thyroid nodules—Expanding treatment options in the United States. *J Endocr Soc* 5(8):bvab110.

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Gunn AH et al 2021 Patient-reported outcomes following total thyroidectomy for Graves' disease. *Thyroid*. Epub 2021 Dec 3. PMID: 34663089

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Patient's anxiety is one of the known factors affecting the decisions regarding management of their medical problems. This is especially true when discussing a cancer diagnosis. The goal of this study was to describe the emotional content of patient-surgeon conversation prior to surgery in patients thought to have low-risk thyroid cancer.

Pitt SC et al 2021 The influence of emotions on treatment decisions about low risk thyroid cancer: A qualitative study. *Thyroid*. Epub 2021 Oct 12. PMID: 34641715.

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Edwards MK et al 2021 Inappropriate use of thyroid ultrasound: A systematic review and meta-analysis. *Endocrine* 74:263–269. PMID: 34379311.

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Many thyroid nodules are detected by PET/CT scans that are done to look for spread of a nonthyroid cancer such as breast cancer or lung cancer. Overall, incidental thyroid nodules are found in 2% of PET/CT scans. The goal of this study is to provide guidance regarding the appropriate management of incidental thyroid nodules discovered by PET/CT scans performed for evaluation of nonthyroid cancers.

Piek MW et al 2021 Retrospective analyses of 18FDG-PET/CT thyroid incidentaloma in adults: Incidence, treatment, and outcome in a tertiary cancer referral center. *Thyroid* 31:1715–1722. PMID: 34340567.

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Bardugo A et al. 2021. Adolescent thyroid disorders and risk for type 2 diabetes in young adulthood. *J Clin Endocrinol Metab* 106(9):e3426–e3435 PMID: 34050759.

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**Clinical Thyroidology for the Public**

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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](http://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/>)

March is [Medullary Cancer Awareness Month](#).

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

- Is radiofrequency ablation (RFA) of thyroid nodules safe and effective?
- How effective is thyroidectomy in treating symptoms in Graves' disease?
- What is the influence of emotions during thyroid cancer management discussion with patients?
- How many thyroid ultrasounds are unnecessary?
- How important are incidental thyroid nodules discovered on PET/CT done for follow up of nonthyroid cancers?
- Is there a relationship between thyroid disease in adolescents and type 2 diabetes?

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,



## THYROID NODULES

# Can radiofrequency ablation (RFA) safely treat and shrink thyroid nodules?

### BACKGROUND

Thyroid nodules are very common and can be found in more than half of the population in the United States. While most of the nodules do not create any problems, about 5% could be cancer and need surgery. Benign (not cancer) nodules can cause trouble if they grow large enough to cause discomfort either due to compression or their appearance. Another situation that can be harmful is when the nodule makes too much thyroid hormone, causing hyperthyroidism. In these situations, the nodules are treated with surgery or radioactive iodine therapy. Both treatments have some risks. They can result in hypothyroidism and lifelong thyroid hormone replacement with a pill may be needed. Surgery would also leave a scar and sometimes it can cause changes in voice.

In the recent years several new treatment options have been successfully used to treat thyroid nodules, especially in Europe, Asia, and South America. One of these methods is radiofrequency ablation (RFA). A thin needle is inserted into the nodule under ultrasound guidance and an electrical current passes through the needle generating heat which burns the cells inside the nodule. The treated nodule shrinks and turns into scar tissue. It can be done in the doctor's office without putting the patient to sleep with general anesthesia. This treatment was approved as a non-surgical option for treatment of benign thyroid nodules several years ago but has not been widely available in the United States.

In this study, the authors report the largest outpatient experience regarding the effectiveness and safety of RFA for the treatment of benign thyroid nodules performed without general anesthesia in the United States.

### THE FULL ARTICLE TITLE

Hussain I et al 2021 Safety and efficacy of radiofrequency ablation of thyroid nodules—Expanding treatment options in the United States. *J Endocr Soc* 5(8):bvab110.

### SUMMARY OF THE STUDY

This study was done by reviewing the charts of patients who had RFA for their thyroid nodules at The Thyroid Clinic in Salt Lake City, Utah between November 2018 and January 2021. All patients had a physical exam, blood tests for thyroid function, and thyroid ultrasound before the procedure. Patients who had suspicious findings on the ultrasound had a thyroid biopsy. Patients who had metal hardware/pacemaker, pregnancy, or suspicious results on fine-needle aspiration biopsy were not treated with RFA procedure. The nodules that were producing too much thyroid hormone causing hyperthyroidism (autonomous function, AFTN) and nodules that were mostly solid and were bothersome due to their size causing pressure in the neck and choking symptoms or cosmetic concerns, (nonfunctional, NFTN), were treated with RFA. Treatment was considered successful if the nodule size decreased more than 50% within 6 months or if symptoms improved for NFTN or if thyroid hormones levels returned to normal for AFTN within 12 months of RFA treatment.

A total of 53 patients had RFA for 58 nodules and 42 patients were present for follow up evaluations after RFA treatment. Of these, 23 nodules were NFTN and 24 were AFTN. The average decrease in size was 70% on initial evaluation. The volume of the smaller nodules decreased more than the larger nodules. Thyroid blood tests and hyperthyroid symptoms improved in the nodules making too much thyroid hormone. Thyroid function tests remained normal in the nodules that were treated due to size. There were no major complications. Minor complication rate was 4%, such as small bleeding and temporary change in voice.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The authors conclude that RFA is a safe and effective treatment option for benign thyroid nodules that cause



## THYROID NODULES, continued

problems due to their size or function. It has less complications than surgery and radioactive iodine and preserves thyroid function. This study is important for patients since this new treatment method is becoming more available in

the United States and may be a good option for treatment of certain thyroid nodules.

— Ebru Sulanc, MD

### ATA THYROID BROCHURE LINKS

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

### ABBREVIATIONS & DEFINITIONS

**Radiofrequency ablation (RFA):** a non-surgical option for treatment of benign thyroid nodules. A thin needle is inserted into the nodule under ultrasound guidance and an electrical current passes through the needle generating heat which burns the cells inside the nodule. The treated nodule shrinks and turns into scar tissue. It can be done in the doctor's office without putting the patient to sleep with general anesthesia.

**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.

**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.

**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 hormone therapy:** patients with hypothyroidism are most often treated with Levothyroxine in order to return their thyroid hormone levels to normal. *Replacement therapy* means the goal is a TSH in the normal range and is the usual therapy.



## GRAVES' DISEASE

# Thyroidectomy for Graves' disease rapidly improves symptoms and quality of life

### BACKGROUND

Graves' disease is the most common cause of hyperthyroidism in the United States. Treatment options include antithyroid drugs, radioactive iodine therapy and surgery. The goal of treatment is to normalize thyroid hormone levels. Frequently patients are treated with anti-thyroid drugs initially. Radioactive iodine therapy and surgery, so-called definitive treatments as they turn the overactive thyroid into an underactive thyroid, often is only offered when this treatment fails. However, previous studies have suggested that patient quality of life remains decreased even in patients whose hormone levels are normalized on antithyroid drugs. This study was done to evaluate whether thyroid surgery improved general quality of life indicators and thyroid specific symptoms in patients who were already being treated with antithyroid drugs.

### THE FULL ARTICLE TITLE

Gunn AH et al 2021 Patient-reported outcomes following total thyroidectomy for Graves' disease. *Thyroid*. Epub 2021 Dec 3. PMID: 34663089

### SUMMARY OF THE STUDY

Adult patients who underwent total thyroidectomy for Graves' disease between 2015 and 2020 were studied. Patient reported outcomes were evaluated using a thyroid specific survey (questions that specifically relate to symptoms of abnormal thyroid function) and a core quality of life symptom score to develop a Total Symptom Burden Score. Survey data was obtained before surgery (up to 4 mo prior), short term after surgery (less than 1 month) and long term after surgery (greater than 1 month – range 94-548 days).

The study included 85 patients with an average age of 42 years of which 84% were women. Of these, 47%

identified as non-Hispanic white, 35% as non-Hispanic black, 7% as Hispanic and 5% as other. Nearly all patients were on antithyroid medication prior to surgery and of these, 2/3rd had a normal serum free thyroxine (FT4) prior to surgery.

The major changes noted were between symptoms prior to surgery compared to short term after surgery. Specific thyroid symptoms that improved significantly after surgery included "feeling hot," "racing heartbeat," "diarrhea," and "difficulty swallowing." The quality-of-life symptoms that significantly improved at short-term assessment included "general activity," "mood," "relationships with other people," "walking," "enjoyment of life," and "work." The Total Symptom Burden Score improved significantly within 30 days after surgery. Older patients, men and patients who identified as non-Hispanic other or multiple races seemed to show a greater improvement in symptoms scores.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study concluded that in patients with Graves' disease who reported quality-of-life symptoms on anti-thyroid drugs reported significantly improved symptoms after surgery. It is possible that patients chosen for surgery were ones with worse symptoms initially and were the ones with continued quality-of-life symptoms and that with even longer treatment with anti-thyroid medications, these symptoms would improve even without surgery. However, it does show that surgery can be expected to improve quality-of-life symptoms in patients with Graves' disease and should be considered as an option for some patients.

— Marjorie Safran, MD



## GRAVES' DISEASE, continued

### ATA THYROID BROCHURE LINKS

Hyperthyroidism (Overactive): <https://www.thyroid.org/hyperthyroidism/>

Graves' Disease: <https://www.thyroid.org/graves-disease/>

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

### ABBREVIATIONS & DEFINITIONS

**Graves' disease:** the most common cause of hyperthyroidism in the United States. It is caused by antibodies that attack the thyroid and turn it on.

**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.

**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*).



AMERICAN THYROID ASSOCIATION  
Optimal Thyroid Health for All

MARCH

# Medullary Thyroid Cancer *Awareness Month*



## THYROID CANCER

# Influence of emotions during treatment conversations for low-risk thyroid cancer

### BACKGROUND

The majority of thyroid cancers have an excellent prognosis; they are curable by surgery and not associated with cancer recurrence and death. These are called low-risk thyroid cancers. In the past several years, medical guidelines changed their position regarding the extent of treatment for these cancers. Total thyroidectomy (removing thyroid gland completely) and radioactive iodine therapy are not recommended any more for management of thyroid nodules exhibiting characteristics of a low-risk cancer. Instead, the adopted recommendation is now lobectomy (removing one lobe of thyroid gland). Despite the changes in guidelines, many low-risk thyroid cancers in the United States are still managed by total thyroidectomy. This is considered over-treatment and may be associated with unnecessary complications.

Patient's anxiety is one of the known factors affecting the decisions regarding management of their medical problems. The goal of this study was to describe the emotional content of patient-surgeon conversation prior to surgery in patients thought to have low-risk thyroid cancer.

### THE FULL ARTICLE TITLE

Pitt SC et al 2021 The influence of emotions on treatment decisions about low risk thyroid cancer: A qualitative study. *Thyroid*. Epub 2021 Oct 12. PMID: 34641715.

### SUMMARY OF THE STUDY

This study was done in 2 university hospitals. Thyroid surgeons and their patients were invited to participate and their conversation prior to surgery was recorded and then transcribed. A total of 9 surgeons joined the study; they were in practice for 5-50 years, 67% of them were male and 67% were white. Overall, 30 patients participated in this study. They were all English-speaking, with thyroid nodules with evidence of low-risk cancer prior to surgery. The average age of patients was 48.5 and the range was 20-71 years. Of these patients, 87% were white

and 80% were women. Low risk cancer was defined as a thyroid nodule smaller than 4 cm which was proven to be papillary thyroid cancer or highly suspicious for papillary thyroid cancer by biopsy. In addition, there was no evidence of spread of the cancer to the lymph nodes in the neck or extension of cancer beyond the thyroid gland by imaging studies done prior to surgery.

Patients completed a validated Cancer Worry Scale and 80% expressed worry and anxiety. The source of anxiety for patients were cancer diagnosis (the C word), the possibility of recurrence and advancement of the cancer, potential complications from treatment (for example, change of voice, scar) and taking thyroid hormone for life. In response, most surgeons tried to provide re-assuring information backed by research. However, at times, they missed the opportunity to respond with empathy. When responding with empathy they reminded patients that they would not be abandoned and provided resources and empathic gestures. At the time of preparation of this article, 11 patients had total thyroidectomy, 2 had partial thyroidectomy, 10 were not able to decide and 7 decided to have active surveillance (monitoring the cancer by thyroid ultrasound and deferring surgery).

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The authors concluded that most patients express negative emotions and anxiety when discussing the treatment options with their surgeons. In response, education regarding the low probability of harm by a low-risk thyroid cancer is provided by surgeons, but some miss the opportunity to offer empathy in addition to teaching. Both patients and surgeons agreed that patient anxiety is one of the reasons total thyroidectomies is chosen over lobectomy.

— Shirin Haddady, MD MPH



## THYROID CANCER, continued

### ATA THYROID BROCHURE LINKS

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

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

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

### ABBREVIATIONS & DEFINITIONS

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

**Total thyroidectomy:** surgery to remove the entire thyroid gland.

**Partial thyroidectomy:** surgery that removes only part of the thyroid gland (usually one lobe with or without the isthmus).

**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 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.

**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).

**Lymph node:** bean-shaped organ that plays a role in removing what the body considers harmful, such as infections and cancer cells.

**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 NODULES

### What is the appropriate use of thyroid ultrasound?

#### BACKGROUND

Thyroid nodules are very common and are found in anywhere from 30-50% of individuals in the United States. Thyroid ultrasound is the main imaging study used to evaluate thyroid nodules. Based on the appearance of the nodule on ultrasound as well as the size of the nodule, further evaluation such as a biopsy is determined. The concern about a thyroid nodule is whether it is a thyroid cancer. Overall, only 5-6% of nodules are cancerous. Further, up to half of the cases of thyroid cancer are small papillary thyroid cancers that likely will never become a significant concern or cause death. This high incidence and low death rate have been interpreted to be a result of overdiagnosis (i.e., the detection of small cancers that will never progress to cause harm). This overdiagnosis seems to be mainly due to widespread use of ultrasound that identifies small nodules and, as a result, small thyroid cancers. Indeed, thyroid microcarcinomas are more likely to be detected by ultrasound than by other imaging methods.

The American Thyroid Association has published guidelines as to the appropriate use of thyroid ultrasound, as do several other national organizations. This study aimed to evaluate the frequency of thyroid ultrasound studies that are deemed “unnecessary” by clinical practice guidelines and/or expert recommendations.

#### THE FULL ARTICLE TITLE

Edwards MK et al 2021 Inappropriate use of thyroid ultrasound: A systematic review and meta-analysis. *Endocrine* 74:263–269. PMID: 34379311.

#### SUMMARY OF THE STUDY

This study was done to look at the use of thyroid ultrasound in the management of patients suspected to have thyroid nodules. Seven studies were included in the final analysis and ~1,500 patient charts were studied. The concept of “inappropriate” was variably defined, using clinical practice guidelines, authors’ opinions, or third-party expert reviewers.

Overall, the frequency of “unnecessary” thyroid ultrasound examinations was 46% and decreased to 34% when including only studies using guideline-based definitions for ordering the study. The frequency of ultrasound examinations due to other nonspecific symptoms without a palpable mass in the thyroid was 11%.

#### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Thyroid ultrasound is a commonly used imaging technique. A better definition of clinical need for doing this procedure is of great importance. This will avoid unnecessary over-use and diagnosis of thyroid nodules which may often lead to further testing and procedures. This will reduce cost of care and patient anxiety. Better clinical guidelines and provider education may help reduce the unnecessary use of thyroid ultrasound.

—Vibhavasu Sharma, MD

#### ATA THYROID BROCHURE LINKS

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



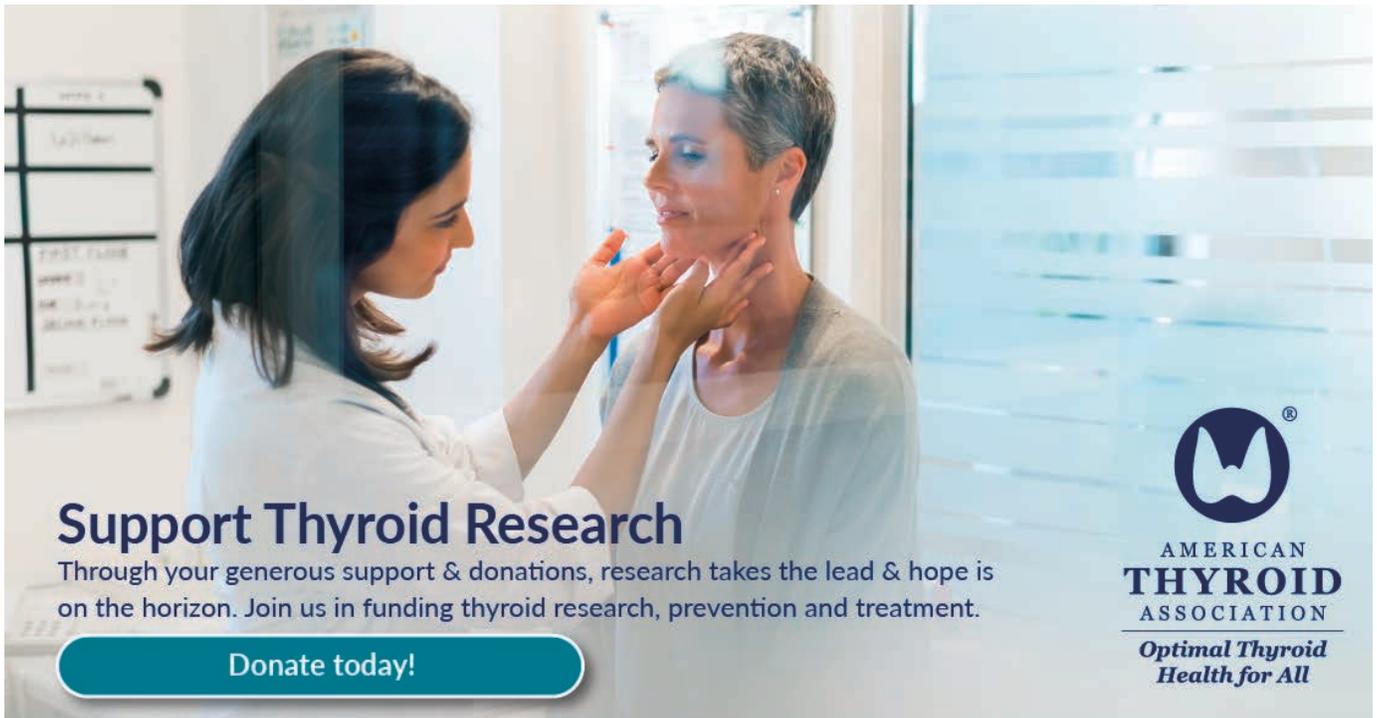
## THYROID NODULES, continued

### ABBREVIATIONS & DEFINITIONS

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

**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.



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## THYROID NODULES

# Rethinking the need for the workup of incidental thyroid nodules in patients with nonthyroid cancers

### BACKGROUND

Thyroid nodules are the most common endocrine problem, occurring in up to half of the general populations. Many of these nodules are detected by imaging studies done for other reasons. These nodules are termed incidental nodules, as they are not related to the reason the study was ordered. One such example are Positron Emission Tomography/Computed Tomography (PET/CT) scans that are done to look for spread of a nonthyroid cancer such as breast cancer or lung cancer. While the CT component of these scans identify the incidental nodule, the PET component of these scans determine the activity of the nodule identified. PET/CT scans are helpful as cancer is usually PET-positive. However, some benign thyroid nodules may also be PET-positive. Overall, incidental thyroid nodules are found in 2% of PET/CT scans. Of these, up to 30% may be thyroid cancer, the vast majority of which are small thyroid cancers.

This study was done to look at the impact of pursuing workup and treatment of incidental thyroid nodules that are found on PET/CT scans. The goal of this study is to provide guidance regarding the appropriate management of incidental thyroid nodules discovered by PET/CT scans performed for evaluation of nonthyroid cancers.

### THE FULL ARTICLE TITLE

Piek MW et al 2021 Retrospective analyses of 18FDG-PET/CT thyroid incidentaloma in adults: Incidence, treatment, and outcome in a tertiary cancer referral center. *Thyroid* 31:1715–1722. PMID: 34340567.

### SUMMARY OF THE STUDY

This study included all patients who underwent PET scans for suspected or known nonthyroid cancer between January 2010 and January 2020 in a cancer center in the Netherlands (a total of 52,593 patients). They screened the reports for those who mentioned a thyroid

abnormality and excluded anyone who had a previously known thyroid disease. They looked at the patients that had PET-positive nodules and what further workup was done (including thyroid ultrasound, thyroid biopsy and surgery) as well as the patient

They found that 1.9% of individuals undergoing a PET/CT imaging had PET-positive incidental thyroid nodules (a total of 1003 patients). The average age of these patients was about 74 years old and most were women (72%). They were able to obtain follow up information on 800 of these patients and found that 42% died during the study period, of which only 1 patient died of thyroid cancer. The incidental thyroid nodules led to 337 ultrasounds, 259 biopsies and 6% of those patients had thyroid surgery. They noticed that the patient survival had nothing to do with the thyroid nodule even if it was a thyroid cancer. Not surprising, survival was dependent on the nonthyroid cancer that led to the PET/CT Scan. After statistical analysis, they determined that there was no survival benefit for patients who underwent evaluation of the incidental thyroid nodules found by PET/CT scans done for nonthyroid cancer.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study concluded that the workup of incidental thyroid nodules noticed on PET/CT scans should depend on the survival expectation of the nonthyroid cancer. It puts into perspective that many patients will undergo unnecessary tests with the anxiety that can come from having a possible second cancer diagnosis with no significant benefit to their quality of life or life expectancy. This study suggests that physicians and patients should have a thorough conversation prior to proceeding with an evaluation of an incidental thyroid nodule to determine if it is an appropriate decision.

— Maria Brito, MD



## THYROID NODULES, continued

### ATA THYROID BROCHURE LINKS

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

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

### ABBREVIATIONS & DEFINITIONS

**Positron-Emission-Tomography/Computed Tomography (PET/CT) scans:** a nuclear medicine imaging test that uses a small amount of radiolabeled glucose to identify cancer. Since cancer cells are more active than normal cells, the cancer cells take up more of the radiolabeled glucose and show up on the PET scan. PET scans are frequently combined with CT scans to accurately identify where the cancer is located.

**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 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 DISEASE AND DIABETES

# The relationship between thyroid disorders in adolescents and adult type 2 diabetes

### BACKGROUND

Diabetes is a condition where your body either doesn't make enough insulin or can't use the insulin it makes as well as it should. When there isn't enough insulin or cells stop responding to insulin, too much blood sugar stays in your bloodstream. Over time, that leads to an increased risk for medical complications, both short term and long term, that can cause serious health problems, such as heart disease, vision loss, and kidney disease. Type 2 diabetes is by far the most common form and affects 46.3 million patients worldwide. Type 2 diabetes is a condition in which the body becomes resistant to insulin and is often associated with obesity. It is predominantly seen in adults and the incidence is increasing in the United States. This is in contrast to type 1 diabetes in which the insulin secreting cells are destroyed by antibodies and the body cannot produce any insulin and is usually seen in children and adolescents.

It is well established that thyroid hormones play a role in controlling metabolism, which are the chemical reactions in the body's cells that change food into energy. Autoimmune thyroid disease is associated with type 1 diabetes, since they are both caused by antibodies that attack the body's own cells, either the thyroid cells or the insulin producing cells of the pancreas. However, the relationship between thyroid problems and risk for type 2 diabetes is not well known. The purpose of this study is to evaluate the risk of early onset or adult type 2 diabetes in adolescents with thyroid disease.

### THE FULL ARTICLE TITLE

Bardugo A et al. 2021. Adolescent thyroid disorders and risk for type 2 diabetes in young adulthood. *J Clin Endocrinol Metab* 106(9):e3426–e3435 PMID: 34050759.

### SUMMARY OF THE STUDY

This was a nationwide study of 1,382,560 Israeli adolescents (average age 17.3 years) who were evaluated before military recruitment between 1988 and 2007 and were followed until the end of 2016. Pre-military recruitment evaluations included a medical interview and physical examination. The diagnosis of thyroid disorders was based on thyroid function blood tests and included euthyroid, hypothyroid and hyperthyroid disease. The diagnosis of diabetes was made with a glycated hemoglobin (HbA1C) level > 6.5%, random blood glucose of 200 mg/dl or higher on two separate occasions at least one month apart, or the purchase of three or more medications to lower blood glucose.

There were 6,152 subjects with thyroid disease (48% euthyroid, 41% hypothyroid, 10% hyperthyroid). A majority were female (75%) and subjects were more likely to be overweight or obese when compared to those without thyroid disorders. During an average follow-up of 18.5 years, 1.12% of the adolescents with thyroid disease were also diagnosed with type 2 diabetes compared to 0.77% of those without thyroid dysfunction.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Thyroid disease in adolescents is a risk factor of adult onset of type 2 diabetes. This 2-fold increase risk of developing early onset type 2 diabetes in adolescents with thyroid disorders remained significant after correction for known variables such as sex, age, body-mass index, and socioeconomic status. It is important to understand the association between thyroid disease in adolescents and adult type 2 diabetes.

— Priya Mahajan, MD



## THYROID DISEASE AND DIABETES, continued

### ATA THYROID BROCHURE LINKS

Thyroid Function Tests: <https://www.thyroid.org/thyroid-function-tests/>

Hyperthyroidism (Overactive): <https://www.thyroid.org/hyperthyroidism/>

Hypothyroidism (Underactive): <https://www.thyroid.org/hypothyroidism/>

Hypothyroidism in Children and Adolescents: <https://www.thyroid.org/hypothyroidism-children-adolescents/>

### ABBREVIATIONS & DEFINITIONS

**Diabetes:** a condition where your body either doesn't make enough insulin or can't use the insulin it makes as well as it should, leading to high levels of blood sugar. Over time, that leads to an increased risk for medical complications, both short term and long term that can cause serious health problems, such as heart disease, vision loss, and kidney disease.

**Type 1 Diabetes:** diabetes caused by antibodies that destroy the insulin producing cells of the pancreas. Patients with this form of diabetes require insulin to control their blood sugar.

**Type 2 Diabetes:** diabetes in which the body becomes resistant to insulin and is often associated with obesity. It is predominantly seen in adults and the incidence is increasing in the United States. Patients with this for may be treated with diet, pills or insulin,

**Euthyroid:** a condition where the thyroid gland as working normally and producing normal levels of thyroid hormone.

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

**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.

**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.



## 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.



ThyCa: Thyroid Cancer Survivors' Association, Inc.<sup>SM</sup>  
[www.thyca.org](http://www.thyca.org)



MCT8 - AHDS Foundation



### American Thyroid Association

[www.thyroid.org](http://www.thyroid.org)

ATA Patient Resources:

[www.thyroid.org/thyroid-information/](http://www.thyroid.org/thyroid-information/)

Find a Thyroid Specialist: [www.thyroid.org](http://www.thyroid.org)

(Toll-free): 1-800-THYROID

[thyroid@thyroid.org](mailto:thyroid@thyroid.org)

### Bite Me Cancer

[www.bitemecancer.org](http://www.bitemecancer.org)

[info@bitemecancer.org](mailto:info@bitemecancer.org)

### Graves' Disease and Thyroid Foundation

[www.gdatf.org](http://www.gdatf.org)

(Toll-free): 877-643-3123

[info@ngdf.org](mailto:info@ngdf.org)

### Light of Life Foundation

[www.checkyourneck.com](http://www.checkyourneck.com)

[info@checkyourneck.com](mailto:info@checkyourneck.com)

### MCT8 – AHDS Foundation

[mct8.info](http://mct8.info)

[Contact@mct8.info](mailto:Contact@mct8.info)

### Thyca: Thyroid Cancer Survivors' Association, Inc.

[www.thyca.org](http://www.thyca.org)

(Toll-free): 877-588-7904

[thyca@thyca.org](mailto:thyca@thyca.org)

### Thyroid Cancer Alliance

[www.thyroidcanceralliance.org](http://www.thyroidcanceralliance.org)

[www.thyroidcancerpatientinfo.org](http://www.thyroidcancerpatientinfo.org)

Rotterdam, The Netherlands

### Thyroid Cancer Canada

[www.thyroidcancerCanada.org](http://www.thyroidcancerCanada.org)

416-487-8267

[info@thyroidcancerCanada.org](mailto:info@thyroidcancerCanada.org)

### Thyroid Federation International

[www.thyroid-fed.org](http://www.thyroid-fed.org)

[tfi@thyroid-fed.org](mailto:tfi@thyroid-fed.org)

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

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- ✓ Updates on the latest patient resources through the ATA website and elsewhere on the world wide web
- ✓ Special e-mail alerts about thyroid topics of special interest to you and your family

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[www.thyroid.org](http://www.thyroid.org)