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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 X (previously known as 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 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.

August is Thyroid Disease and Pregnancy Awareness Month.

In this issue, the studies ask the following questions:

- Are there unintended consequences in molecular tests for thyroid nodules?
- When is it time to stop my thyroid cancer surveillance?
- Are some indeterminate nodules candidates for active surveillance?
- Does Tall-cell subtype of papillary thyroid cancer respond to RAI?
- How deadly is myxedema coma?
- Does thyroid disease affect kidney function?

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

Molecular tests for thyroid nodules: unintended consequences

BACKGROUND

Thyroid nodules are very common, occurring in up to 50% of individuals. Ultrasound is the best way to evaluate a nodule. Nodules that are concerning on ultrasound are then recommended to proceed to a biopsy. In up to 25% of biopsies, the results are indeterminate, meaning that the cells cannot be clearly identified as either normal or abnormal. Prior to being able to test for molecular markers (tests to determine if any gene mutations associated with cancer are present), indeterminate nodules were usually sent to surgery. Now, by measuring molecular markers, those nodules with negative results (ie mutations are absent) are considered benign/not cancer and surgery can be avoided.

Despite their relatively high cost, molecular markers have been found to be cost-effective by virtue of ~50% decrease in thyroid surgery for indeterminate nodules. Molecular markers are now covered by most insurers in the United States and are widely used. In this study, the authors examined how these tests have changed clinical practices in real life.

THE FULL ARTICLE TITLE

Stillman MD et al. Molecular testing for Bethesda III thyroid nodules: Trends in implementation, cytopathology call rates, surgery rates, and malignancy yield at a single institution. Thyroid 2024;34(4):460-466; doi: 10.1089/thy.2023.0664. PMID: 38468547.

SUMMARY OF THE STUDY

This study reports on an analysis of the effect of the availability of molecular testing on the interpretation of thyroid biopsy samples. The authors analyzed almost 9000 thyroid biopsies collected in a variety of settings that included both an academic medical center and an affiliated community site. Both an in-house molecular markers and all commercially available molecular markers were used during the study period. The use of molecular markers for indeterminate biopsies increased steadily during the study period and eventually became standard operating procedure. During the observation period, the rate of biopsies classified as indeterminate rose sharply, from 7.6% to 18.2%. Most of the change occurred at the expense of the benign results, which dropped from 73.5% to 62.1%. The frequency of positive molecular markers in indeterminate samples decreased from 23.6% to 20.4%, but the differences was not statistically significant. The cancer rate in indeterminate nodules submitted to surgery decreased from 57.1% to 50.0%, also not statistically significant.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

These data suggest that the use of molecular markers to confirm the absence or presence of gene mutations associated with cancer resulted in a decrease of reporting benign biopsy results and a corresponding increase in indeterminate results. Thus, cytopathologists appeared to have a lower threshold to call a biopsy indeterminate knowing that the molecular markers will measured because molecular markers are objective instrumental tests designed to improve the cancer risk stratification of thyroid nodules. As a result of these changes, the clinical performance of molecular markers in determining cancer may need to be revisited.

— Alan P. Farwell, MD

ATA RESOURCES

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

Biopsy of Thyroid Nodules: https://www.thyroid.org/fna-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.

Thyroid biopsy: 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.

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™

Mutation: A permanent change in one of the genes.

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

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, TERT and RAS.

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THYROID CANCER

When is it time to stop my thyroid cancer surveillance?

BACKGROUND

Thyroid cancer is being detected in more and more people, but luckily it has an excellent prognosis. Overall, very few patients with thyroid cancer actually die of their cancer. This low death rate, however, does result in many years of follow up visits, labs, and ultrasounds for the patients. Discharging thyroid cancer patients who are low risk of recurrence and many years after their initial thyroidectomy might be beneficial to reduce the financial burden on patients and the patient volume on the hospital systems. During surveillance of thyroid cancer, it can be difficult to differentiate a thyroid cancer recurrence from persistent thyroid cancer that was not completely removed.

The purpose of the study is to identify risk factors and frequency of true recurrences of thyroid cancer in patients whose disease is characterized as low risk of recurrence.

THE FULL ARTICLE TITLE

Pałyga I etg al. The frequency of differentiated thyroid cancer recurrence in 2302 patients with excellent response to primary therapy. J Clin Endocrinol Metab 2024;109(2):e569-e578. doi:10.1210/clinem/dgad571.

SUMMARY OF THE STUDY

A total of 2,302 patients who had low risk of recurrence thyroid cancers with excellent responses to therapy from Holy Cross Cancer Center in Poland were analyzed from 1998 to 2021. As the majority of patients were treated before the latest release of the American Thyroid Association thyroid cancer guidelines in 2015, only patients with a thyroid cancer less than 1 cm underwent a lobectomy. Patients with thyroid cancer above the size of 1 cm had a total thyroidectomy and central neck lymph node dissection, and if spread to the lymph nodes were detected, a lateral lymph node dissection was performed. Although the dose was not specified, all patients with a thyroid cancer measuring greater than 1 cm received radioactive iodine therapy.

Excellent response to therapy was defined by both suppressed (low-normal TSH) and stimulated (intentionally high TSH following thyrogen injections) thyroglobulin levels less than 1 ng/dL. A local structural recurrence was defined a lymph node that was confirmed to contain thyroid cancer cells by biopsy. Distant metastatic spread of cancer to other organs such as the lungs and bones was detected with radioactive iodine whole body scans or FDG PET scans.

Of the thyroid cancers, 94% of the cancers were papillary thyroid cancers, and 67.7% of the cancers measured less than 1 cm. Of the 2,132 patients, only 32 patients (1.4%) had a recurrence of their cancer. The cumulative recurrence rate at 5 years and 24 years after thyroidectomy were 1.2% and 2.9%, respectively. Of the recurrences, 62.5% were within 5 years of the initial thyroidectomy. Risk factors for a recurrence are a younger age, larger cancer size, spread to the lymph nodes, incomplete resection during surgery, and higher risk classification using the American Thyroid Association guidelines.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study confirms that the recurrence rate of thyroid cancer in patients who are having an excellent response to therapy is very low. Even patients with low risk of recurrence thyroid cancers according to the American Thyroid Association classification who do not receive radioactive iodine still have low rates of recurrent disease. Patients with smaller thyroid cancers, negative lymph nodes, and a low risk of recurrence per the American Thyroid Association guidelines likely do not need indefinite testing for thyroid cancer for surveillance

THYROID CANCER, continued

and can be discharged from cancer follow up. Having confidence that, at some point, a patient can safely be followed symptomatically without surveillance labs or imaging would relieve the burden placed on patients and hospitals. The time point of discharge for these low risk of recurrence thyroid cancer patients who are having an excellent response to therapy is still to be determined, but may be as early as 5 years after surgery.

— Pinar Smith, MD

ATA RESOURCES

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

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).

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

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

Radioactive iodine therapy: 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).

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.

Cancer metastasis: spread of the cancer from the initial organ where it developed to other organs, such as the lungs and bone.

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

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THYROID NODULES

Are some indeterminate nodules candidates for active surveillance?

BACKGROUND

Thyroid nodules are very common, occurring in up to 50% of individuals. Ultrasound is the best way to evaluate a nodule. Nodules that are concerning on ultrasound are then recommended to proceed to a biopsy. In up to 25% of biopsies, the results are indeterminate, meaning that the cells cannot be clearly identified as either normal or abnormal. These biopsies are usually then sent out for molecular analysis to determine if any gene mutations associated with cancer are present. If mutations are absent, the results are considered benign/not cancer. While the decision to send the patient to surgery if any mutation is present is the usual practice, there is a wide range of cancer risk depending on what mutation is identified.

Currently, most nodules containing *RAS* mutations are referred for surgery. However, this mutation is associated with ~50% risk of a low risk cancer or the pre-cancerous NIFTP. Thus, this makes *RAS*+ nodules excellent candidates for active surveillance, which is following nodules by ultrasound and proceeding with surgery only with significant growth of the nodule. This study studied the growth rate of *RAS*+ indeterminate nodules that are currently undergoing active surveillance and compare them with *RAS*+ indeterminate nodules that go immediately to surgery.

THE FULL ARTICLE TITLE

Sfreddo HJ, Koh ES, Zhao K, et al. *RAS*-mutated cytologically indeterminate thyroid nodules: Prevalence of malignancy and behavior under active surveillance. Thyroid. Epub 2024 Mar 28.

SUMMARY OF THE STUDY

This is a multicenter study performed on patients with *RAS*+ indeterminate nodules at Memorial Sloan Kettering, New York University Langone Medical Center, and Mount Sinai Health System. *HRAS, NRAS,* or *KRAS* gene mutations were identified via DNA-based sequencing assays (ThyroSeq v2-v3, CBL Path, Rye Brook, New York). At all sites, active surveillance was offered to patients with *RAS*+ nodules from 2010 to 2023 who met the following criteria: isolated *RAS* variant, nodule ≤4 cm and lacking high-risk features on ultrasound. The decision to undergo active surveillance versus immediate surgery was made via shared decision making between patient and physician. The active surveillance group had ultrasound evaluation of the thyroid and lateral neck every 6 months for 2 years and then annually. Nodule growth was defined as an increase in nodule volume from baseline >72%. The immediate surgery group was comprised of *RAS*+ nodules that underwent diagnostic surgery at Memorial Sloan Kettering or New York University Langone Medical Center from 2016 to 2020.

The active surveillance group consisted of 63 nodules in 62 patients. The average nodule size was 1.7 cm, and 74.6% were between 1 and 3 cm. The majority of the patients were female (73.0%), were mainly White (63.5%), and had an average age at diagnosis of 46 years (40-67 years). In terms of molecular alterations, the most common was *NRAS* (50.8%), followed by *KRAS* (22.2%), *HRAS* (22.2%), and then *RAS* of unspecified subtype (4.8%). The average duration of observation while under active surveillance was 23 months. Growth was detected in 1.9% at 1 year, 15% at 2 years, 23% (95% CI, 12–44) at 3 years, and 28% at 4 and 5 years. The average doubling time for nodules that showed growth was 39 months. A total of 6 nodules underwent surgery after an average surveillance of 6.5 months, but only one of these nodules had the indication of growth, whereas the rest were resected based on patient or physician preference. Of the resected nodules, all but one had a diagnosis that was benign or noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP) on pathology. No patient had spread of cancer into the neck our outside of the neck and there were no deaths from any cause. At the end of the study, 90.5% of patients continued with active surveillance.

THYROID NODULES, continued

The immediate surgery group consisted of 209 nodules. Surgical pathology revealed that 33% were cancer and 67% were benign, of which 35.4% were classified as NIFTP. Most cancerous nodules were ATA low-risk thyroid cancers (72.5%), 15 (21.7%) were ATA intermediate-risk thyroid cancer, and only 4 (5.8%) were ATA high-risk thyroid cancers. The most common cancer was follicular variant of papillary thyroid carcinoma.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study demonstrates that most *RAS*+ indeterminate nodules under active surveillance exhibited stability over time. The majority of *RAS*+ indeterminate that underwent immediate surgery were benign, and those that were cancer were mainly classified as ATA low-risk cancers. These is an important study to give both doctors and patients additional options to manage these low risk nodules.

— Alan P. Farwell, MD

ATA RESOURCES

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

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

Biopsy of Thyroid Nodules: https://www.thyroid.org/fna-thyroid-nodules/

ABBREVIATIONS & DEFINITIONS

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THYROID NODULES, continued

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THYROID CANCER

Radioiodine therapy does not impact survival in Tall-Cell subtype of Papillary Thyroid Cancer

BACKGROUND

Papillary thyroid cancer is the most common type of thyroid cancer. Overall prognosis of papillary thyroid cancer is excellent, as we currently have very effective treatments. There are several subtypes of papillary thyroid cancer. One such subtype is tall-cell subtype, defined as a cancer containing more than 30% tall cells, which have a height at least three times their width. Tall-cell papillary thyroid cancer displays a more aggressive behavior compared to the classical papillary thyroid cancer. Because of this, tall-cell papillary thyroid cancer is included in the American Thyroid Association (ATA) intermediate-risk for cancer recurrence category. According to the 2015 ATA Guidelines, radioactive iodine therapy should be considered after total thyroidectomy in these patients. However, 90% of patients with tall-cell papillary thyroid cancer have a *BRAF* gene mutation, which is known to decrease the cancer responsiveness to radioactive iodine therapy.

The goal of this study is to evaluate the impact of the radioactive iodine therapy on cancer-specific survival (CSS) in patients with tall-cell papillary thyroid cancer, using the Surveillance, Epidemiology, and End Results (SEER) database.

THE FULL ARTICLE TITLE

Dai P et al. Effect of radioactive iodine therapy on cancer-specific survival of papillary thyroid cancer tall cell variant. J Clin Endocrinol Metab 2024;109(3):e1260-e1266; doi: 10.1210/clinem/dgad580. PMID: 37804527.

SUMMARY OF THE STUDY

This study included 1281 adult patients from the SEER database who underwent total thyroidectomy for patients with tall-cell papillary thyroid cancer between 2004 and 2019. Patients who were less than 18 years of age, had less than one month of follow-up data, received external-beam radiation, or had missing data were excluded from analysis. Information collected for each patient included age at diagnosis, gender, race, cancer size and stage, degree of spread outside the thyroid, number of lymph nodes involved, radioactive iodine therapy, follow-up outcomes, survival time, and cause of death. For the statistical analysis, patients were grouped based on age at diagnosis (younger than 55 years of age or 55 and older), cancer size (smaller than 20 mm, 20–40 mm, or larger than 40 mm), and year of diagnosis (2004–2008, 2009–2014, or 2015–2019). The patients who received radioactive iodine therapy were compared to those who did not receive radioactive iodine therapy treatment. The main study outcome was the cancer-specific survival (CSS), which was calculated as the time from diagnosis to death from thyroid cancer or the last follow-up visit.

Among the 1281 patients with tall-cell papillary thyroid cancer included in the study, 866 (68%) received radioactive iodine therapy and 415 (32%) did not. Patients who received radioactive iodine therapy had a higher proportion of males, larger cancer size, more advanced stage, more frequent spread outside the thyroid, and higher proportion of positive lymph nodes as compared to those who did not receive radioactive iodine therapy. The study group was followed for an average of 60 months (range 27-102 months). A total of 58 patients (4.5%) died from thyroid cancer during this time. The 5-year and 10-year CSS for the entire group was 96.1% and 92.4%, respectively. Unfavorable prognostic factors were age of 55 or older, presence of distant metastasis and more than 5 positive neck lymph nodes.

There was no difference in cancer-specific survival between the radioactive iodine therapy and non- radioactive iodine therapy treatment groups. Subgroup analysis showed no effect of the radioactive iodine therapy treatment on cancer-specific survival even in patients with more aggressive features, including age of 55 or older, cancer size larger than 40 mm, advanced cancer stage, distant metastasis and more than 5 positive neck lymph nodes.

THYROID CANCER, continued

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that survival of patients with the rare tall-cell papillary thyroid cancer is worse than with classical papillary thyroid cancer. Still, the 5 and 10-year survivals continue to be well higher than 90%. This study suggests that radioactive iodine therapy does not improve survival in tall-cell papillary thyroid cancer regardless of age, gender, race, and cancer stage, including size, spread outside of the thyroid and number of positive lymph nodes. Additional larger and longer studies are needed for a definitive answer regarding the usefulness of radioactive iodine therapy in tall-cell papillary thyroid cancer to help tailor the treatment for these patients.

— Alina Gavrila, MD, MMSC

ATA RESOURCES

Thyroid Cancer (Papillary and Follicular): https://www.thyroid.org/thyroid-cancer/
Radioactive Iodine Therapy: https://www.thyroid.org/radioactive-iodine/

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).

Tall-cell papillary thyroid cancer: papillary thyroid cancer containing more than 30% tall cells, which have a height at least three times their width. Tall-cell papillary thyroid cancer displays a more aggressive behavior compared to the classical papillary thyroid cancer.

Total thyroidectomy: surgery to remove the entire thyroid gland.

Radioactive iodine (RAI): this plays a valuable role in diagnosing and treating thyroid problems since it is taken up only by the thyroid gland. **I-131** is the destructive form used to destroy thyroid tissue in the treatment of thyroid cancer. **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*).

BRAF gene mutation: this gene codes for a protein that is involved in a signaling pathway and is important for cell growth. A permanent change (mutation) in the *BRAF* gene in adults appears to cause cancer.

SEER: **S**urveillance, **E**pidemiology and **E**nd **R**esults program, a nation-wide anonymous cancer registry generated by the National Cancer Institute that contains information on 26% of the United States population. Website: http://seer.cancer.gov/

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

Cancer metastasis: spread of the cancer from the initial organ where it developed to other organs, such as the lungs and bone.

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HYPOTHYROIDISM

High mortality of myxedema coma in the United States

BACKGROUND

Myxedema coma is an extreme, life-threatening form of hypothyroidism that can affect patients with untreated hypothyroidism. This can occur in patients who are undiagnosed as well as patients with known hypothyroidism who are undertreated or have run out of their thyroid hormone medication. Myxedema coma is usually provoked by another medical condition, such as an infection, heart attack, stroke, and surgery, and is often seen in the winter months. Myxedema coma is characterized by the failure of many organs and body functions, for example, difficulty in keeping the body temperature warm and the heart pumping normally, and affects the mental status causing from confusion to coma. Patients with Myxedema coma need admission to the hospital and ICU care. Death from Myxedema coma is high, about 25-50%. Fortunately, Myxedema coma is rare. The authors of this study wanted to find out what are the characteristics of patients admitted to the hospital with Myxedema coma and what happens to them.

THE FULL ARTICLE TITLE

Chen DH et al. Clinical features and outcomes of myxedema coma in patients hospitalized for hypothyroidism: analysis of the United States National Inpatient Sample. Thyroid. Epub 2024 Jan 27. doi: 10.1089/thy.2023.0559. PMID: 38279788

SUMMARY OF THE STUDY

The authors looked at 18,635 patients who were hospitalized from 2016 to 2018 with a diagnosis of hypothyroidism with and without Myxedema coma. Of these patients, 2495 (13%) had Myxedema coma. Patients with Myxedema coma, as compared to hypothyroid patients without Myxedema coma, were older, more likely to have Medicare insurance and being unhoused and more likely to present in the winter months. Patients with Myxedema coma were more likely to need assistance with breathing, including intubation to deliver oxygen, more likely to receive medications to bring the blood pressure up and more likely to need hemodialysis treatment for kidney failure. Death in hypothyroid patients with Myxedema coma was almost 10 times higher than in those without Myxedema coma (7% versus 0.7%). The stay in the hospital was longer in patients with Myxedema coma (9 days) as compared to patients without Myxedema coma (4 days). The cost of the hospitalization was not surprisingly higher, three times as much, for patients with Myxedema coma as compared to those without Myxedema coma, due to longer stay and more intensive care.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Patients with this severe form of hypothyroidism known as Myxedema coma have a high risk of dying. The health care costs to manage patients with Myxedema coma are high. Prevention of Myxedema coma in patients at risk (for example the elderly), includes prompt treatment of their hypothyroidism and complicating medical illness. Improving treatment for Myxedema coma will help decrease death.

— Susana Ebner MD

ATA RESOURCES

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

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

HYPOTHYROIDISM, continued

ABBREVIATIONS & DEFINITIONS

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

Myxedema Coma: a medical emergency and complication of severe hypothyroidism triggered by other events like infection, causing malfunction of other organs; some of the symptoms may include low body temperature, slow heart rate, change in mental status.

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. Suppressive therapy means that the goal is a TSH below the normal range and is used in thyroid cancer patients to prevent growth of any remaining cancer cells.

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THYROID AND KIDNEY DISEASE

Impact of thyroid disease on kidney function and chronic kidney disease

BACKGROUND

Both thyroid disease and chronic kidney disease (CKD) are common conditions with significant clinical effects. Previous studies have identified a relationship between these 2 diseases. Hypothyroidism can damage the structure of the kidney, reducing its weight and mass and altering the kidney structure in animal studies. Furthermore, the reduction in the glomerular filtration rate (GFR), the most common measure of overall kidney function, has been observed in patients with hypothyroidism. The consequences of hyperthyroidism with regard to renal function are largely unknown. Some studies in patients with thyroid disease have also shown a link with CKD, although it is not yet clear if the thyroid is responsible for kidney failure.

In this study, the authors investigate whether hypothyroidism and hyperthyroidism are associated with higher CKD occurrence and progression.

THE FULL ARTICLE TITLE

You AS et al. Impact of thyroid status on incident kidney dysfunction and chronic kidney disease progression in a nationally representative cohort. Mayo Clin Proc 2024:39-56; doi: 10.1016/j.mayocp.2023.08.028. PMID: 38176833.

SUMMARY OF THE STUDY

This is a study of 4,152,830 adults; 59% were women, the average age was 55 years, and 75%were non-Hispanic White. Two TSH assessments determined thyroid status and to categorize the population into hypothyroid, euthyroid (normal thyroid function) and hyperthyroid groups, which were further subdivided according to the severity of thyroid disease. The TSH values were also assessed as a continuous predictor of development of CKD or CKD progression.

Hypothyroidism and hyperthyroidism were each present in 2.1% of the entire group, and the presence and progression of CKD were higher in both of these groups as compared to the euthyroid group. When subdivided according to severity, TSH levels in the high-normal/hypothyroid range (≥3.0 mIU/L) and hyperthyroid range (<0.5 mIU/L) also were associated with a more significant risk of the presence of CKD or CKD progression.

In subgroup analysis, stronger associations between hypothyroidism CKD were observed for age <55 years, male sex, non-Hispanic Black race/ethnicity or absence of high blood pressure. In contrast, for hyperthyroidism, stronger estimates were found for subgroups of younger age, male sex, non-Hispanic White and Hispanic or absence of diabetes, coronary artery disease, congestive heart failure, atrial fibrillation, hyperlipidemia, or hypertension.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that both hypothyroidism and hyperthyroidism, in particular, TSH levels ≥3.0 mIU/L and <0.5 mIU/L, are risk factors for the development and progression of CKD. These findings show that abnormal levels of thyroid hormones have a negative impact on kidney function. Further studies to determine the effect of improvement in thyroid function on kidney function in patients with hypothyroidism or hyperthyroidism need to be done.

— Alan P. Farwell, MD

ATA RESOURCES

Hyperthyroidism (Overactive): https://www.thyroid.org/hyperthyroidism/
Hypothyroidism (Underactive): https://www.thyroid.org/hypothyroidism/

THYROID AND KIDNEY DISEASE, continued

ABBREVIATIONS & DEFINITIONS

Hyperthyroidism: a condition where the thyroid gland is overactive and produces too much thyroid hormone. Hyperthyroidism may be treated with antithyroid meds (Methimazole, Propylthiouracil), radioactive iodine or surgery.

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

Glomerular filtration rate (GFR): the most common lab measure of overall kidney function

AMERICAN THYROID ASSOCIATION
Optimal Thyroid Health for All

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Clinical Thyroidology® for the Public

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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thyroid@thyroid.org

Bite Me Cancer
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info@bitemecancer.org

Graves' Disease and Thyroid Foundation
www.gdatf.org
(Toll-free): 877-643-3123
info@ngdf.org

Light of Life Foundation
www.checkyourneck.com
info@checkyourneck.com

MCT8 – AHDS Foundation
mct8.info
Contact@mct8.info

Thyca: Thyroid Cancer Survivors' Association, Inc.
www.thyca.org
(Toll-free): 877-588-7904
thyca@thyca.org

Thyroid Cancer Alliance
www.thyroidcanceralliance.org
www.thyroidcancerpatientinfo.org
Rotterdam, The Netherlands

Thyroid Federation International
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tfi@thyroid-fed.org

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