Volume 15 | Issue 2 | February 2022

Clinical Thyroidology® for the Public

AMERICAN THYROID ASSOCIATION
Optimal Thyroid Health for All

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Clinical Thyroidology® for the Public

Editor's Comments

Happy New Year and 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/)

February is Hypothyroidism Awareness Month.

In this issue, the studies ask the following questions:

- Are thyroid problems during treatment with new cancer drugs a good sign for cancer survival?
- Are minority populations with thyroid cancer less likely to receive specialty care for their cancer?
- Is the rate of significant thyroid cancers increasing?
- Do asthma patients have an increased risk of hyperthyroidism?
- Is iron deficiency a risk factor for developing low thyroid levels in the mother during pregnancy?
- Can a new parathyroid detection test during surgery decrease the risk of hypoparathyroidism after surgery?

We welcome your feedback and suggestions. Let us know what you want to see in this publication. I hope you find these summaries interesting and informative.

— Alan P. Farwell, MD,

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HYPERTHYROIDISM

Overt thyrotoxicosis may be a good prognostic sign in immune checkpoint inhibitor treatment

BACKGROUND

Immune checkpoint inhibitor (ICI) drugs are now standard-of-care treatments for several types of cancer, including melanoma and kidney cancer. ICI drugs have been shown to significantly prolong patient survival. These cancer drugs help the body recognize cancer and use the immune system to attack and destroy cancer cells. In addition to attacking the cancer cells, some normal cells can be attacked, causing complications known as immune-related adverse events (IrAEs).

The thyroid is a common target for IrAEs, occurring in more than 10% of patients. While a classical inflammation known as a thyroiditis seems to most common, virtually all types of thyroid autoimmune disease patterns have been reported. Thyroiditis is an inflammation of the thyroid, most commonly caused by antibodies that attack the thyroid. It usually begins with a period of increased thyroid function tests (thyrotoxicosis) followed by a period of hypothyroidism followed by the return to normal thyroid function. Interestingly, several prior studies have suggested that the development of thyroid IrAEs might be associated with improvements in survival related to ICI therapy. In the current study, the investigators sought to characterize thyroid IrAEs related to ICI treatment in a large group of patients with melanoma and to investigate associations with survival.

THE FULL ARTICLE TITLE

Muir CA et al 2021 Thyroid immune-related adverse events following immune checkpoint inhibitor treatment. J Clin Endocrinol Metab 106:e3704–e3713. PMID: 33878162.

SUMMARY OF THE STUDY

This study was conducted of adult patients undergoing ICI treatment for melanoma between 2009 and 2019 in an Australian population. Serum TSH measurements were performed in all subjects prior to ICI initiation and repeated at 3- to 4-week intervals for a minimum of 6 months. After 6 months, testing occurred every 6 to 8 weeks for 6 months and then every 12 weeks after 1 year.

There were 1246 patients in the study with an average age of 65 years; 34% were female. Average follow-up was 11.3 months for the group. Thyroid IrAEs occurred in 518 patients (42%) and IrAEs affecting other tissues occurred in 69% of patients. The most common category of thyroid problems was increased thyroid function tests (thyrotoxicosis), affecting 388 patients (31% of the group and 75% of thyroid IrAEs). There were 234 subclinical and 154 overt thyrotoxicosis cases. Both overall thyroid IrAEs and overt thyrotoxicosis were 2.2-times more common in women. Of the patients with subclinical thyrotoxicosis, 97% returned to normal thyroid function during follow-up, whereas only 57% of those with overt thyrotoxicosis returned to normal thyroid function. Hypothyroidism occurred in 100 patients (8% of the group). None of the patients developed thyrotoxicosis that persisted beyond the end of follow-up. More overall thyroid IrAEs, in particular overt thyrotoxicosis, were observed when 2 ICI drugs were used together (47% for combination ICI therapies vs. 19-37% ICI drugs used alone).

While cancer death did not differ between patients with or without thyroid IrAEs as a group, patients with overt thyrotoxicosis had longer overall survival and longer survival without the cancer progressing. No survival benefit was seen with overt hypothyroidism.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that thyroid problems are common in cancer patients treated with ICI drugs. Overt thyrotoxicosis due to thyroiditis is the most common thyroid problem. Further, this may be a good sign that may indicate a much better immune response to ICI drugs, leading to improved cancer survival outcomes.

— Alan P. Farwell, MD

HYPERTHYROIDISM, continued

ATA THYROID BROCHURE LINKS

Thyroiditis: https://www.thyroid.org/thyroiditis/

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

ABBREVIATIONS & DEFINITIONS

Thyrotoxicosis: a condition where there are increased levels of thyroid hormones in the blood. This can be caused by the thyroid being over active (hyperthyroidism) or getting inflamed and leaking thyroid hormone (thyroiditis).

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.

Thyroiditis: inflammation of the thyroid, most commonly cause by antibodies that attack the thyroid as seen in Hashimoto's thyroiditis and post-partum thyroiditis. It can also result from an infection in the thyroid or due to certain drugs/medications. It usually begins with a period of increased thyroid function tests (thyrotoxicosis) followed by a period of hypothyroidism followed by the return to normal thyroid function.

Autoimmune Thyroid Disease: a group of disorders that are caused by antibodies that get confused and attack the thyroid. These antibodies can either turn on the thyroid (Graves' disease, hyperthyroidism) or turn it off (Hashimoto's thyroiditis, hypothyroidism).

TSH: Thyroid Stimulating Hormone — produced by the pituitary gland that regulates thyroid function; also the best screening test to determine if the thyroid is functioning normally.

Immune Checkpoint Inhibitors (ICI Drugs): cancer drugs that help the body recognize cancer and use the body's immune system to attack and destroy cancer cells. These drugs are now standard-of-care treatments for several types of cancer, including melanoma and kidney cancer.

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THYROID CANCER

Minority patients with thyroid cancer are less likely to receive specialist care

BACKGROUND

Thyroid cancer is common and there are effective treatments. As such, the risk of death form thyroid cancer is very low. The initial treatment is usually surgery to remove the cancer. This is best done by experienced surgeons. Depending on the results of the surgery, patients may be treated with radioactive iodine followed by levothyroxine therapy or levothyroxine therapy alone. Follow up of thyroid cancer includes serial neck ultrasounds and blood tests, watching for recurrence of the cancer. This is usually done under the care of specialists (Endocrinologists and/or Oncologists).

Differences in the care of patients with thyroid cancer can affect how things turn out. Patients operated on by surgeons with less experience may stay longer in the hospital due to complications and need repeat operations of all of the cancer is not removed initially. Those that are not followed by specialists may not receive radioactive iodine therapy when they need it or do receive it when it is not indicated. Also, diagnosis of recurrence of thyroid cancer may be missed or delayed. Racial minority groups are more likely to receive cancer care from their PCPs (Primary Care Doctors) as opposed to specialists. This study was done to evaluate differences in the care of thyroid cancer received by minority groups by looking at who was delivering the care, specialists vs PCPs.

THE FULL ARTICLE

Radhakrishnan A et al 2021 Physician specialties involved in thyroid cancer diagnosis and treatment: Implications for improving health care disparities. J Clin Endocrinol Metab. Epub 2021 Oct 26. PMID: 34718629

SUMMARY OF THE STUDY

Patients and physicians responded to a survey. Patients with thyroid cancer diagnosed in 2014 and 2015 were identified from registries. PCPs, defined as the doctors who were most involved in their thyroid cancer care, were named by their patients. Patients answered questions about their age, sex, race/ethnicity, income and health insurance. PCPs questionnaires included age, race/ethnicity, how long have they been in practice, etc. Over 2600 patient and 162 physicians responded to the study. The majority were women, 20% self-identified as Hispanic, 11% as Black and 9% as Asian. Patients were more likely to find out about their cancer diagnosis by their surgeon (40%) and only 13 % by their PCP. But when compared by race, Hispanic patients were more likely to find out about their diagnosis from their PCPs. Other ethnic groups reported similar findings. Black and Asian patients were more likely to discuss treatment with their PCPs in comparison to White patients. In terms of age, the older the patient the more likely they were to discuss treatments with their PCP. Of the PCPs who reported discussing diagnosis and treatment of thyroid cancer, only about half of them felt comfortable discussing treatment options.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

In summary, in older patients and in patients from racial/ethnic minority groups, PCPs were more likely to be engaged in the thyroid cancer care with less involvement of specialist. These findings may point out to inequalities in the care of patients with thyroid cancer and the barriers to seeing specialists. Programs to help facilitate timely PCP referrals to specialists and establishing satellite clinics in underserved areas may be beneficial in reducing these disparities. Educating the PCPs in thyroid cancer management will help them feel more comfortable treating their patients and in this way will result in better patient care.

— Susana Ebner MD

THYROID CANCER, continued

ATA THYROID BROCHURE LINKS

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

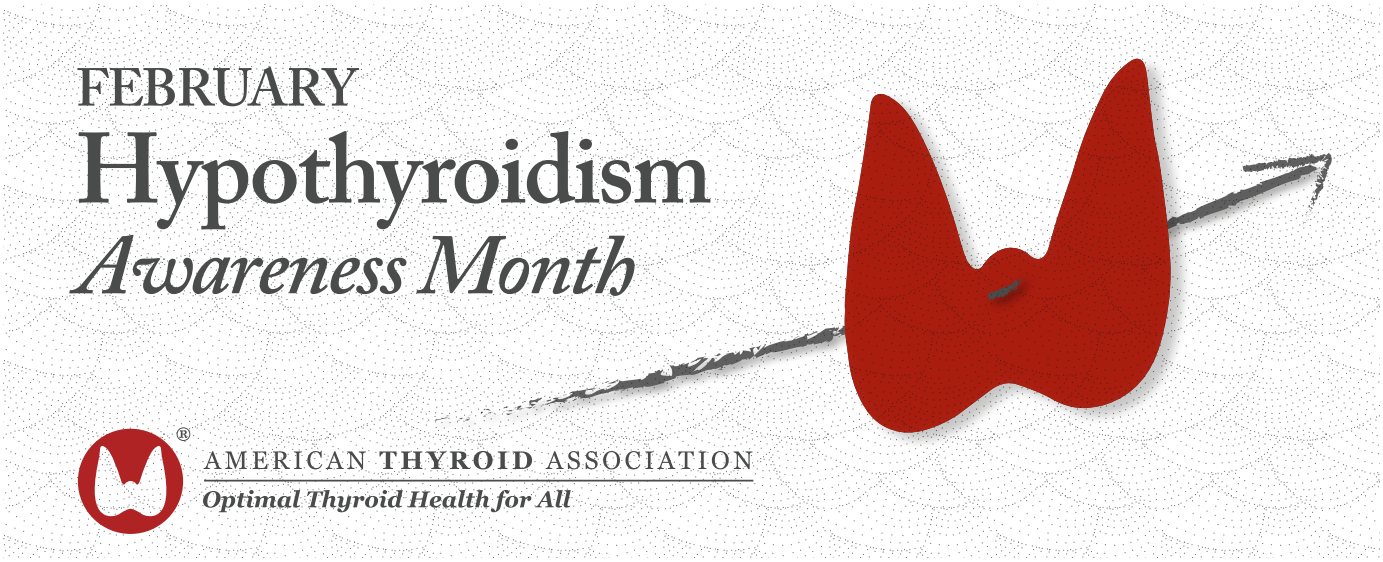
Thyroid Cancer (Papillary and Follicular): https://www.thyroid.org/thyroid-cancer/

ABBREVIATIONS & DEFINITIONS

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.

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*.

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 CANCER

The incidence of significant thyroid cancers remains stable while the total number increases

BACKGROUND

The number of patients diagnosed with thyroid cancer has increased significantly over the last several decades, while death from this cancer has remained consistently low. Part of this is because we have very effective treatments for significant thyroid cancers, meaning those cancers that would cause harm and/or death if not treated. Another part is likely due to the diagnosis of a large number of small thyroid cancers which were found when patients undergo various imaging tests, such as neck ultrasound and CT scans. This is termed "overdiagnosis" of cancer. It is likely that many of these small cancers would never have been diagnosed on their own. As a result, healthy people may undergo unnecessary tests and treatments for small cancers that will never cause any symptoms and will not affect the quality of life or survival of a person. It has been reported that overdiagnosis accounts for up to 60-90% of all cases of thyroid cancer in different countries. This study aimed to evaluate the changes over time in the number significant thyroid cancers that require treatment as well as the number of more aggressive thyroid cancers with worse prognostic factors as defined in the American Thyroid Association (ATA) Guidelines and American Joint Committee on Cancer (AJCC)/TNM staging system.

THE FULL ARTICLE TITLE

Genere N et al 2021 Incidence of clinically relevant thyroid cancers remains stable for almost a century: A population-based study. Mayo Clin Proc 96:2823–2830. PMID: 34736609.

SUMMARY OF THE STUDY

This study that used the Rochester Epidemiology Project database to identify all new cases of thyroid cancer in Olmsted County, Minnesota, U.S.A. from 1935 to 2018. Information regarding the date of cancer diagnosis and type and clinical parameters of the cancer was determined from the patients' medical records. The Rochester Epidemiology Death Data System was used to assess whether the cause of death was related to thyroid cancer. Significant thyroid cancers were defined as: (1) high-risk thyroid cancers, including medullary, poorly differentiated, anaplastic, or differentiated thyroid cancers with spread outside of the neck, (2) any thyroid cancer measuring more than 4 cm, and (3) any cancer with significant invasion outside the thyroid into other neck structures or muscle.

A total of 596 cases of thyroid cancer were diagnosed between 1935 and 2018, and among these, 119 cases represented significant thyroid cancers. The average age at diagnosis was 46 years with 71% of cases being women. Most cases (89%) were papillary thyroid cancers and the average cancer size was 1.5 cm.

The sex- and age-adjusted incidence of thyroid cancer increased from 1.3 per 100,000 person-years between 1935 and 1949 to 12.0 per 100,000 person-years between 2010 and 2018, with an overall period percentage change of 24% and an absolute change of 1.4. The data shows a significant increase of 27% in overall thyroid cancer incidence in patients younger than 55 years of age. There was no difference in the trends of thyroid cancer between males and females. Importantly, death from thyroid cancer did not change significantly over time. In addition, there was no significant change in the incidence of each group of significant thyroid cancers.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study showed an overall significant increase in the diagnosis of thyroid cancers over the past 80 years, especially in adults younger than 55 years of age, without a corresponding increase in the diagnosis of significant thyroid cancers. In addition, there has not been an increase in death from thyroid cancer. These findings support the fact that most newly diagnosed thyroid cancers represent low risk, small cancers with an excellent prognosis.

— Alina Gavrila, MD, MMSc

THYROID CANCER, continued

ATA THYROID BROCHURE LINKS

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

ABBREVIATIONS & DEFINITIONS

Incidence: the number of individuals who develop a disease during a specific time.

Papillary Thyroid Cancer (PTC): 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).

Poorly Differentiated Thyroid Cancer: a rare but aggressive form of thyroid carcinoma with an intermediate prognosis between the well differentiated thyroid cancer and the fast growing often fatal undifferentiated (anaplastic) cancer.

Anaplastic Thyroid Cancer: a very rare but very aggressive type of thyroid cancer. In contrast to all other types of thyroid cancer, most patients with anaplastic thyroid cancer die of their cancer within a few years.

Medullary Thyroid Cancer: a relatively rare type of thyroid cancer that often runs in families. Medullary cancer arises from the C-cells in the thyroid.

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

Neck Ultrasound (US): 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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GRAVES' DISEASE

Asthmatic patients have increased risk of hyperthyroidism

BACKGROUND

Asthma is a condition that is estimated to have affected approximately 262 million people in 2019 worldwide. Graves' disease is the most common cause of hyperthyroidism. Both asthma and Graves' disease are considered to be autoimmune disorders, where the body makes antibodies that cause the disease. These antibodies are produces by blood cells known as T-lymphocytes. Asthma is believed to be cause by the subtype T cell called T helper 2, and Graves' disease is believed to be caused by the subtype T cell called T helper 1. There have been reports of flares of asthma caused by hyperthyroidism as early as 1944. However, whether asthma would be associated with an increased risk for developing hyperthyroidism has not been adequately studied. In this study, the authors aimed at describing a relationship between asthma and potential risk for developing hyperthyroidism.

THE FULL ARTICLE TITLE

Gau SY et al. 2021 Higher risk of hyperthyroidism in people with asthma: Evidence from a nationwide, population-based cohort study. J Allergy Clin Immunol Pract. 2021 Sep 23: S2213–2198(21)01013–8.

SUMMARY OF THE STUDY

This was a study done in Taiwan, using data from a health insurance database. Patients who were given a new diagnosis of asthma from 2000-2013, who were prescribed inhaled steroids from more than 28 days within 3 months after diagnosis, was the group that was studied. Patients matched by age and sex without the diagnosis of hyperthyroidism or asthma were used as controls.

A total number of 45,182 individuals were included in the final analyses, consisting of 22,591 individuals with asthma and an equal number of matched controls. The overall incidence of hyperthyroidism (per 100,000 person-months) in the asthma and control groups were 16.95 and 12.88 respectively. The asthma group showed a significantly higher cumulative probability of hyperthyroidism than the controls. Further analysis showed that patients with a more recent asthma diagnosis (<3 years) and older age at asthma diagnosis (>30 years of age) had a higher probability of developing hyperthyroidism.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study showed that patients with asthma were at higher risk of developing hyperthyroidism, especially those older than 30 years old. This study is important for patients and for doctors taking care of patients with asthma. Some of the side effects of the medications used to treat asthma such as palpitations, rapid heart rate, emotional lability, are also symptoms of hyperthyroidism. Being aware of the higher risk of developing hyperthyroidism in these patients will help lead to early diagnosis and appropriate management of hyperthyroidism.

— Jessie Block-Galarza, MD

ATA THYROID BROCHURE LINKS

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

GRAVES' DISEASE, continued

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.

Lymphocytes: blood cells involved in the immune response that produce antibodies that fight off infection

Asthma: a condition in which airways narrow and swell and may produce extra mucus. This can make breathing difficult and trigger coughing, wheezing and shortness of breath.

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THYROID AND PREGNANCY

Iron deficiency in late pregnancy may be associated with low thyroid levels in pregnant women

BACKGROUND

Low thyroid hormone levels in mothers during pregnancy have been linked to problems with pregnancy such as miscarriage and preterm delivery as well as delay in the child's development. Hypothyroidism in the mother is well known to be associated with these problems if the hypothyroidism is not diagnosed or is poorly treated. Since the thyroid gland uses iodine to make thyroid hormone, iodine deficiency can also lead to low thyroid hormone levels in both the mother and the baby.

Some recent studies also linked iron deficiency with low thyroid hormone levels in the mother and the baby. A previous study in rats suggested that iron deficiency can interfere with thyroid hormone production. Two previously studies done in Spain and China also suggested iron deficiency is a risk factor for low thyroid hormone levels in pregnant women. The need for both iodine and iron increases during pregnancy to provide for a growing baby. Therefore, pregnant women may be more likely to develop iodine or iron deficiency. This study investigated potential effect of iron deficiency on thyroid hormone levels during pregnancy in mildly iodine-deficient pregnant women.

THE FULL ARTICLE TITLE

Moreno-Reyes R et al 2021 Iron deficiency is a risk factor for thyroid dysfunction during pregnancy: A population-based study in Belgium. Thyroid 31(12):1868-1877. PMID: 34538131.

SUMMARY OF THE STUDY

A total of 1241 pregnant women in their first or third trimesters in Belgium were recruited into the study. Women who were taking thyroid medications were excluded. Blood thyroid function tests (including TSH, free T4, and free T3 levels), iron levels, and red blood cell (hemoglobin) levels, and urine iodine levels were measured. Free T4 levels below the 10th percentile or Free T3 levels below the 10th percentile were defined as low thyroid hormone levels. Potential effects of iodine and iron deficiencies on the risk of low free T4 or low free T3 levels in the third trimester were assessed, taking into account other factors such as age, gestational age at study participation, and body-mass index (BMI).

Women in this study were found to have mild iodine deficiency, which was the more common in the first trimester. Iron deficiency was about 10-times more common in the third trimester than in the first trimester. Both low free T4 levels and low free T3 levels were about 16-times more common in the third trimester than in the first trimester. Urine iodine levels were not associated with thyroid hormone levels. In simple correlation, both iron deficiency and anemia were associated with low free T4 levels in the first trimester. In the third trimester, only anemia was associated with low free T4 levels. Anemia, but not iron deficiency, was associated with low free T3 levels in both first and third trimesters. Iron or hemoglobin levels were not associated with TSH levels.

In analysis adjusting for age, gestational age, and BMI, women in the third trimester with iron deficiency or anemia had higher risks of having low free T4 and low free T3 levels, compared to women without iron deficiency or anemia.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study concluded that iron deficiency, but not mild iodine deficiency, was associated with a higher risk of low free T4 levels in pregnant women in the third trimester.

One thing to note is that the researchers used a higher cutoff for low free T4 or free T3 levels than used in some other studies, so women with low thyroid hormone levels in this study may only have very mild cases. The adjusted calculations for risks of low free T4 or low free T3 levels could be only done in the third trimester because of the number of women with iron deficiency or anemia in the

THYROID AND PREGNANCY, continued

first trimester was too small. Therefore, it is unclear if the findings of this study has a significant impact in clinical care. The baby's own thyroid gland is working in the third trimester, and T3 does not cross from mother to baby in significant amount. Thus, a baby may not be as affected by mother's low thyroid levels at this time. Iron deficiency or anemia was also not associated with TSH, a sensitive screening test for thyroid abnormalities.

Further studies on potential effects of iron deficiency or anemia in the first trimester on mother's thyroid hormone levels would help evaluate clinical importance of this study's finding. A study on potential benefit of iron supplementation on low thyroid hormone levels in pregnant women would also be useful to determine values of the findings of this study as well as other previous studies.

— Sun Y. Lee, MD, MSc

ATA THYROID BROCHURE LINKS

Thyroid Disease in Pregnancy: https://www.thyroid.org/thyroid-disease-pregnancy/

Iodine Deficiency: https://www.thyroid.org/iodine-deficiency/

ABBREVIATIONS & DEFINITIONS

Miscarriage: this occurs when a baby dies in the first few months of a pregnancy, usually before 22 weeks of pregnancy.

Preterm Delivery: this is when a baby is born too early, before 37 weeks of pregnancy.

Iodine: an element found naturally in various foods that is important for making thyroid hormones and for normal thyroid function. Common foods high in iodine include iodized salt, dairy products, seafood and some breads.

Iron: Iron is a major component of hemoglobin, a type of protein in red blood cells that carries oxygen from your lungs to all parts of the body. Without enough iron, there aren't enough red blood cells to transport oxygen, which leads to fatigue.

Hemoglobin: the protein in red blood cells that binds oxygen to carry around to all the cells in the body. Hemoglobin levels are low with anemia.

Gestational Age: the common term used during pregnancy to describe how far along the pregnancy is. It is measured in weeks, from the first day of the woman's last menstrual cycle to the current date. A normal pregnancy can range from 38 to 42 weeks.

TSH: Thyroid Stimulating Hormone — produced by the pituitary gland that regulates thyroid function; also the best screening test to determine if the thyroid is functioning normally.

Thyroxine (T4): the major hormone produced by the thyroid gland. T4 gets converted to the active hormone T3 in various tissues in the body.

Triiodothyronine (T3): the active thyroid hormone, usually produced from thyroxine.

Body-Mass Index (BMI): a measure of body fat based on height and weight that applies to adult men and women.

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THYROID SURGERY

Does a new detection test for parathyroid glands during thyroid surgery affect hypoparathyroidism rates?

BACKGROUND

The parathyroid glands are usually 4 small glands that are next to the thyroid gland – 2 on each side. The parathyroid glands secrete parathyroid hormone (PTH) which regulates the body's calcium levels. Damage to the parathyroid glands during surgery can lead to low calcium levels (hypocalcemia) which may be short-lived or, rarely, can be permanent. This risk is mainly during a total thyroidectomy when all 4 glands may be damaged. Lobectomies rarely cause hypocalcemia since at least 2 parathyroid glands are not at risk of being damaged.

The risk of injury to parathyroid glands and the resulting hypoparathyroidism causing hypocalcemia has long been a concern during a total thyroidectomy for thyroid cancer, and it carries major long term problems for patients. To reduce the risk of hypoparathyroidism during surgery, the parathyroid glands are individually identified and carefully preserved as possible. Sometimes, clearly damaged parathyroid glands are transplanted into surrounding muscle to preserve some function. However, it takes ~6-8 weeks for the transplanted parathyroid glands to regain function. Despite these efforts, up to 30% of patients undergoing total thyroidectomy have temporary hypoparathyroidism and 4% have permanent hypoparathyroidism. These percentages are lower with high volume thyroid surgeons.

New imaging technologies have been developed to increase the identification of the parathyroid glands and possibly decrease the rate of post-operative hypoparathyroidism. One of these new technologies is near-infrared autofluorescence (NIRAF) imaging, which detects a specific optical signal of parathyroid tissue when an infrared light is directed at it. This signal allows the surgeon to distinguish parathyroid tissue from surrounding structures such as the thyroid gland. Some previous studies have shown that this technology can help the surgeon to better identify parathyroid glands during surgery. The article discussed here is a randomized study comparing the postoperative hypoparathyroidism rates in patients undergoing total thyroidectomy with and without the aid of NIRAF technology.

THE FULL ARTICLE TITLE

Benmiloud F et al. 2020 Association of autofluorescence-based detection of the parathyroid glands during total thyroidectomy with postoperative hypocalcemia risk: Results of the PARAFLUO multicenter randomized clinical trial. JAMA Surg 155:106–112. PMID: 31693081.

SUMMARY OF THE STUDY

This study was a trial of patients 18 years of age or older undergoing a total thyroidectomy. The most important aspect of this study was the way in which the technology was used in the operating room. In the group without the technology, surgeons performed standard operation, and if parathyroid glands were identified, they would be preserved. In the technology group, a portion of the operative time was dedicated specifically to the use of the NIRAF device, taking care to find and preserve all four parathyroid glands. Patients were followed for 6 months to determine temporary (≤6 months) and permanent (>6 months) hypoparathyroidism.

The study included 241 patients who were randomly assigned – 120 to standard surgery and 121 to surgery aided by NIRAF. All 4 parathyroid glands were identified in the NIRAF group more often (47%) than in the standard surgery group (19.2%). The authors found that temporary postoperative hypocalcemia was significantly lower in the NIRAF group than in those treated with standard surgery. The risk of permanent hypoparathyroidism was not statistically different between groups.

THYROID SURGERY, continued

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that the use of NIRAF technology in patients undergoing total thyroidectomy improved identification of the parathyroid glands and decreased the risks of temporary postoperative hypoparathyroidism. There was no difference in the risk of permanent hypoparathyroidism. This is an important new technology that should be studied further.

— Alan P. Farwell, MD

ATA THYROID BROCHURE LINKS

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

ABBREVIATIONS & DEFINITIONS

Parathyroid Glands: usually four small glands located around the thyroid that secrete parathyroid hormone (PTH) which regulates the body's calcium levels.

Parathyroid Hormone (PTH): the hormone that regulates the body's calcium levels. High levels of PTH cause hypercalcemia, or too much calcium in the blood. Low levels of PTH cause hypocalcemia, or too little calcium in the blood.

Hypocalcemia: low calcium levels in the blood, a complication from thyroid surgery that is usually short-term and relatively easily treated with calcium pills. If left untreated, low calcium may be associated with muscle twitching or cramping and, if severe, can cause seizures and/or heart problems.

Hypoparathyroidism: low calcium levels due to decreased secretion of parathyroid hormone (PTH) from the parathyroid glands next to the thyroid. This can occur as a result of damage to the glands during thyroid surgery and usually resolves. This may also occur as a result of autoimmune destruction of the glands, in which case it is usually permanent.

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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.

ATA® *Optimal Thyroid Health for All*

American Thyroid Association
www.thyroid.org
ATA Patient Resources:
www.thyroid.org/thyroid-information/
Find a Thyroid Specialist: www.thyroid.org
(Toll-free): 1-800-THYROID
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
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 Cancer Canada
www.thyroidcancercanada.org
416-487-8267
info@thyroidcancercanada.org

Thyroid Federation International
www.thyroid-fed.org
tfi@thyroid-fed.org

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