

# Clinical Thyroidology<sup>®</sup> for the Public



AMERICAN THYROID ASSOCIATION  
Optimal Thyroid Health for All



## EDITOR'S COMMENTS .....2

### THYROID FUNCTION .....3

#### The association between TSH and depression may not be what you expect

It is clear that thyroid abnormalities with abnormal TSH and abnormal free hormone levels frequently have symptoms such as fatigue, problems with sleep, concentration or memory and weight changes. On the other hand, we do not really have consistent information whether mild thyroid abnormalities with abnormal TSH but normal free hormone levels can cause similar symptoms. The authors designed this study to look for an association between TSH levels and risk of developing depression going forward in a large group of Brazilian adults.

Varella AC et al Thyroid-stimulating hormone levels and incident depression: Results from the ELSA-Brasil study. Clin Endocrinol (Oxf). Epub 2021 Jan 1. PMID: 33386609.

### HYPERTHYROIDISM .....5

#### Risk of pancreatitis with methimazole

Methimazole is an effective medication that is used to treat hyperthyroidism. While usually well tolerated, there have been some reports of acute pancreatitis from methimazole. This study was done to understand the risk of this condition for patients were taking methimazole and compared with the general population.

Pecere A et al 2020 Methimazole treatment and risk of acute pancreatitis: A population-based cohort study. J Clin Endocrinol Metab 105:dga544. PMID: 32813014.

### THYROID SURGERY .....7

#### Why a person might choose a 'scarless' approach to thyroid surgery

Surgery to remove all, or part, the thyroid gland is a common way to treat some types of thyroid disease. One area of interest for some thyroid surgeons is to try and eliminate the neck scar that develops where this cut is made (scarless surgery). The research described here studied patients planning thyroid surgery to learn what factors were important to them when deciding whether to have their surgery using a 'scarless' approach.

Sukpanich R et al 2020 The influence of cosmetic concerns on patient preferences for approaches to thyroid lobectomy: A discrete choice experiment. Thyroid 30:1306–1313. PMID: 32204688.

### IODINE DEFICIENCY .....9

#### Mothers taking iodine supplementation while breastfeeding may improve child's brain development at 3 years of age

Iodine is an essential element used to make thyroid hormone, which is especially important for baby's normal brain

development during pregnancy. Iodine is taken up into breastmilk in breastfeeding mothers to provide iodine for babies after delivery. This study studied long-term effects of iodine supplements given to breastfeeding mothers on child's development at 3 years of age.

Nazeri P et al 2021 Dose maternal iodine supplementation during the lactation have a positive impact on the neurodevelopment of children? Three-year follow up of a randomized controlled trial. Eur J Nutr. Epub 2021 May 11. PMID: 33974129.

### HYPOTHYROIDISM .....11

#### What is the risk of hypothyroidism after radiation therapy to the head and neck for cancer in children?

Hypothyroidism is a potential long-term complication of external beam radiation (EBR) therapy to the head and neck for treating certain cancers in children, adolescents and young adults. Turning off the thyroid by treating with thyroid hormone to suppress the level of TSH may be one way to prevent long-term damage to the thyroid by EBR. This study examined whether high dose thyroid hormone therapy taken before and during radiation could be protective in reducing the subsequent risk of hypothyroidism in such patients.

Massimino et al Long-term results of suppressing thyroid-stimulating hormone during radiotherapy to prevent primary hypothyroidism in medulloblastoma/PNET and Hodgkin lymphoma: a prospective cohort study. Front. Med. 15, 101–107 (2021). <https://doi.org/10.1007/s11684-020-0752-2>

### HYPOTHYROIDISM .....13

#### MorbiNet: a Spanish registry-based study for the evaluation of chronic illnesses in adult patients with hypothyroidism

Hypothyroidism is common in the US adult population and is treated with thyroid hormone therapy, specifically levothyroxine. While many patients with hypothyroidism will only have that problem, most have other chronic illnesses. The purpose of this study was to evaluate the relationships, positive or negative, of different illnesses with respect to hypothyroidism.

Moratalla-Navarro F et al 2020 MorbiNet study: Hypothyroidism comorbidity networks in the adult general population. J Clin Endocrinol Metab. Epub 2020 Dec 15. PMID: 33319230.

### ATA ALLIANCE FOR THYROID PATIENT EDUCATION .....15

#### Friends of the ATA .....16



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

**Editor**

Alan P. Farwell, MD  
Boston Medical Center  
Boston University School of Medicine  
720 Harrison Ave., Boston, MA 02115  
American Thyroid Association  
Email: [thyroid@thyroid.org](mailto:thyroid@thyroid.org)  
[www.thyroid.org/patients/ct/index.html](http://www.thyroid.org/patients/ct/index.html)

**Editorial Board**

Jessie Block-Galaraza, MD, Albany, NY  
Gary Bloom, New York, NY  
Maria Brito, MD, New York, NY  
Susana Ebner, MD, New York, NY  
Alina Gavriila, MD, MMSC, Boston, MA  
Melanie Goldfarb, MD, MS, FACS, FACE,  
Santa Monica, CA  
Shirin Haddady, MD, MPH, Boston, MA  
Sun Lee, MD, Boston, MA  
Joshua Klopper, MD, Denver, CO  
Priya Mahajan, MD, Houston, TX  
Maria Papaleontiou, MD, Ann Arbor, MI  
Jason D. Prescott, MD PhD, New York, NY  
Marjorie Safran, MD, Worcester, MA  
Anna M. Sawka, MD, Toronto, ON, Canada  
Phillip Segal, MD, Toronto, ON, Canada  
Vibhvasu Sharma, MD, Albany, NY  
Ebru Sulanc, MD, Detroit, MI  
Whitney Woodmansee, MD, Gainesville, FL

**American Thyroid Association**

**President**

Victor J. Bernet, MD (2020-2021)

**Secretary/Chief Operating Officer**

Jacqueline Jonklaas, MD, PhD (2019-2023)

**Treasurer**

Julie Ann Sosa, MD (2017-2021)

**Past-President**

Martha Zeiger, MD (2020-2021)

**President-Elect**

Peter Kopp, MD (2020-2021)

**Treasure-Elect**

Anthony Hollenberg, MD (2020-2021)

**Executive Director**

Amanda K. Perl  
American Thyroid Association  
2000 Duke Street, Suite 300  
Alexandria, VA 22314  
Telephone: 703-998-8890  
Fax: 703-998-8893  
Email: [thyroid@thyroid.org](mailto:thyroid@thyroid.org)

**Designed by**

Karen Durland, [kdurland@gmail.com](mailto:kdurland@gmail.com)

**Clinical Thyroidology for the Public**

Copyright © 2021 by the American Thyroid Association, Inc. All rights reserved.



## Editor's Comments

Happy summer 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](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.

While the Covid-19 pandemic is winding down, it 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/>)

July is [Graves' Disease Awareness Month](#).

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

- Are low TSH levels a risk for depression?
- Does methimazole cause pancreatitis?
- What causes patients to choose scarless surgery?
- Does iodine supplementation during breast feeding improve brain development in the baby?
- Does thyroid hormone therapy before and during head and neck radiation for cancer protect thyroid function?
- Is hypothyroidism associated with any other chronic illnesses?

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 FUNCTION

### The association between TSH and depression may not be what you expect

#### BACKGROUND

Common symptoms in patients with hypothyroidism often include fatigue, anxiety, depression and foggy brain. These symptoms are often attributed to thyroid disease if the TSH is even mildly abnormal, especially if it is high (mild hypothyroidism). On the other hand, depression symptoms are less likely to be attributed to low TSH levels (hyperthyroidism). It is clear that thyroid abnormalities with abnormal TSH and abnormal free hormone levels frequently have symptoms such as fatigue, problems with sleep, concentration or memory and weight changes. On the other hand, we do not really have consistent information whether mild thyroid abnormalities with abnormal TSH but normal free hormone levels can cause similar symptoms.

In the past, some studies showed higher risk of depression with low TSH levels and lower risk with high TSH and some did not show any association. The authors designed this study to look for an association between TSH levels and risk of developing depression going forward in a large group of Brazilian adults.

#### THE FULL ARTICLE TITLE

Varella AC et al Thyroid-stimulating hormone levels and incident depression: Results from the ELSA-Brasil study. *Clin Endocrinol (Oxf)*. Epub 2021 Jan 1. PMID: 33386609.

#### SUMMARY OF THE STUDY

The study is called the Brazilian Longitudinal Study of Adult Health (Elsa-Brasil). A total of 15,105 civil servants between ages 35 to 74 were enrolled in the study between 2008 and 2010. At baseline, participants completed questionnaires including a well-studied survey called Clinical Interview Schedule-Revised (CIS-R) that was designed to assess mental health disorders across cultures. TSH and free T4 levels were measured at baseline. Participants were classified into categories based on TSH and free T4 levels: overt hyperthyroidism (low TSH, high FT4 or use

of thyroid medication), subclinical hyperthyroidism (low TSH, normal FT4 and no use of thyroid medication), euthyroidism (normal TSH and FT4 and use of no thyroid medication), overt hypothyroidism (high TSH, low FT4, or use of levothyroxine) and subclinical hypothyroidism (high TSH, normal FT4 and no use of thyroid medication). The blood tests and surveys were repeated 4 years later at a follow-up visit. Participants who were taking medications that could affect the thyroid function, were undergoing treatment for cancer, or had depression at baseline were excluded.

At baseline, 169 participants (1.4%) had subclinical hyperthyroidism, 677 (5.7%) had subclinical hypothyroidism and 11,050 (92.9%) were euthyroid. At 4 year follow-up visit new onset depression was diagnosed by the CIS-R survey in 445 participants (3.7%). Depression rates were calculated in 5 different TSH ranges, third range (TSH 1.35-1.78 mU/L) was used as the reference range and had 3.4% depression rate. The lowest range (0-0.96 mU/L) had 4.5%, and highest range (2.59-35.5 mU/L) had 3.1%. The participants in the lowest TSH range had significantly higher rate of depression. When the ranges were compared separately in women and men, women in the lower two ranges had significantly higher rate of depression while there was no significant difference in men. Then the researchers analyzed participants with normal thyroid function only and found that even in the normal range lower TSH was significantly associated with new onset depression in women. There was no association with depression by category of thyroid function. There was also no association with clearly high TSH levels above 10 mU/L, and new onset depression, however, there weren't many participants in this group (36).

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

The authors conclude that below normal and low-normal TSH levels are associated with risk of developing depression, especially in women. The findings from this



## THYROID FUNCTION, continued

study are important and should increase the awareness that mild hypothyroidism is not associated with depressive symptoms in all the studies and the opposite may be true. This knowledge may change the expectation that thyroid

hormone therapy should improve the symptoms and the decision whether to use a medication should be made after a careful discussion between the physician and the patient.

— Ebru Sulanc, MD

### ATA THYROID BROCHURE LINKS

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

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

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

### ABBREVIATIONS & DEFINITIONS

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

**Overt Hypothyroidism:** clear hypothyroidism with an increased TSH and a decreased T4 level. All patients with overt hypothyroidism are usually treated with thyroid hormone pills.

**Subclinical Hypothyroidism:** a mild form of hypothyroidism where the only abnormal hormone level is an increased TSH. There is controversy as to whether this should be treated or not.

**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.

**Subclinical Hyperthyroidism:** a mild form of hyperthyroidism where the only abnormal hormone level is a decreased TSH.

**Levothyroxine (T<sub>4</sub>):** the major hormone produced by the thyroid gland and available in pill form as Synthroid™, Levoxyl™, Tirosint™ and generic preparations

**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



## HYPERTHYROIDISM

### Risk of pancreatitis with methimazole

#### BACKGROUND

Methimazole is an effective medication that is used to treat hyperthyroidism. Methimazole is taken up by the thyroid and interferes with the production of thyroid hormone. While usually well tolerated, there are side effects to methimazole that can require stopping therapy. Well-known side effects that require stopping therapy are agranulocytosis (low white blood cell levels that can lead to infection) and inflammation of the liver. These side effects are rare, occurring in 1 in 500-1000 patients and is often related to the dose of methimazole.

There have been some reports of acute pancreatitis (a condition that results from the inflammation of the pancreas) from methimazole. This study was done to understand the risk of this condition for patients were taking methimazole and compared with the general population.

#### THE FULL ARTICLE TITLE

Pecere A et al 2020 Methimazole treatment and risk of acute pancreatitis: A population-based cohort study. *J Clin Endocrinol Metab* 105:dga544. PMID: 32813014.

#### SUMMARY OF THE STUDY

About 4.4 million residence of the Piedmont region of Italy were studied. The study looked at the hospital discharge records to compare the frequency of acute pancreatitis spanning the period 2013–2018 among new methimazole users with those who had never used methimazole. Hospital admissions during the first 18

months of methimazole use were subdivided into 3-month periods for analysis.

Methimazole was started in 23,087 patients during the 5-year study period. There were 61 patients (0.3%) hospitalized with acute pancreatitis during the first 18 months of methimazole treatment, with only 13 of the 61 admissions occurring during the first 3 months of therapy; 4 individuals died while hospitalized. The risk for acute pancreatitis was significantly increased among methimazole users as compared with those who had never used methimazole during the first 9 months of methimazole therapy. Thereafter, there was no difference between the risk acute pancreatitis between the 2 groups. Additionally, the absolute risk increased with age—for example, in the 18-to-39-year-old age group, the risk of acute pancreatitis was 0.02% in men and 0.05% in women, while in the 40-to-59-year-old age group, the calculated risks increased to 0.09% and 0.08%, respectively. There was no difference between male and female patients.

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

This study shows that there is likely a very low but significant risk of developing acute pancreatitis during the initial few months of methimazole treatment. Even though the overall risk was low it is important to educate patients and doctors regarding this possible complication from methimazole therapy. Further studies are needed to define this risk and understand the underlying causes.

—Vibhavasu Sharma, MD, FACE

#### ATA THYROID BROCHURE LINKS

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



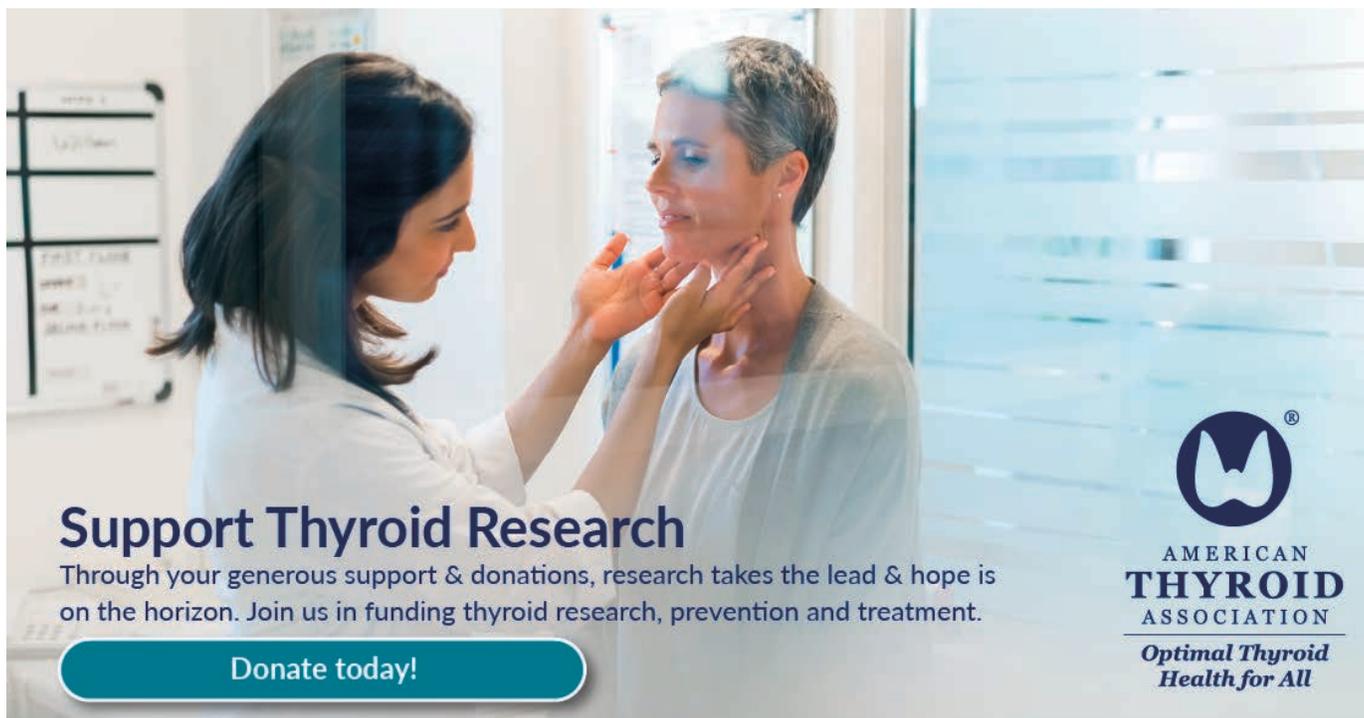
## HYPERTHYROIDISM, continued

### 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.

**Methimazole:** an antithyroid medication that blocks the thyroid from making thyroid hormone. Methimazole is used to treat hyperthyroidism, especially when it is caused by Graves' disease.

**Acute pancreatitis:** acute inflammation of the pancreas, usually caused by gallstones or alcohol use. This can lead to hospitalization and death depending upon the cause and the severity of the inflammation.



**Support Thyroid Research**  
Through your generous support & donations, research takes the lead & hope is on the horizon. Join us in funding thyroid research, prevention and treatment.

[Donate today!](#)



AMERICAN  
**THYROID**  
ASSOCIATION  
*Optimal Thyroid  
Health for All*



## THYROID SURGERY

### Why a person might choose a ‘scarless’ approach to thyroid surgery

#### BACKGROUND

Surgery to remove all, or part, the thyroid gland is a common way to treat some types of thyroid disease. Most common is surgery to treat thyroid cancer but there is often surgery recommended for non-cancer causes of thyroid disease. As long as this is true, thyroid surgeons will try to improve the way that this surgery is done. Because surgery for the thyroid gland, which is located in the front of the neck, requires making an incision (cut) in the neck (traditional approach), one area of interest for some thyroid surgeons is to try and eliminate the neck scar that develops where this cut is made. Although the traditional approach neck incision is usually small and, when healed, invisible, a noticeable (or even ugly) scar will rarely form for some people. Sometimes, treating such a scar can mean more surgery. Because of this, new ways of doing thyroid surgery have been developed that do not require making a cut in neck (‘scarless’ surgery) or hide this incision under the chin. The newest way of doing this is by making cuts inside the mouth and, using cameras and fine surgical instruments, removing the thyroid through these cuts (transoral surgery). Because the cuts are inside the mouth, no visible scar can form after surgery. Although this way of removing the thyroid has been successful for some types of thyroid disease, it is not yet clear if the results of this surgery are as good as when thyroid surgery is done by the traditional approach.

The research described here studied patients planning thyroid surgery to learn what factors were important to them when deciding whether to have their surgery using a ‘scarless’ approach. This is important information, since understanding how patients make decisions about their health care makes providing such care easier and more efficient.

#### FULL ARTICLE TITLE

Sukpanich R et al 2020 The influence of cosmetic concerns on patient preferences for approaches to thyroid lobectomy: A discrete choice experiment. *Thyroid* 30:1306–1313. PMID: 32204688.

#### SUMMARY OF THE STUDY

The authors of this study used a series of questions focusing on risk surgical complications, surgery cost, travel distance for surgery, and the presence/absence of a neck scar to understand how patients planning thyroid surgery decide whether or not to pursue a ‘scarless’ approach. The study involved 109 people scheduled to undergo removal of half of their thyroid gland (thyroid lobectomy) for benign/non-cancer thyroid disease or for thyroid nodules unlikely to be cancerous. All 109 patients were eligible for both traditional and transoral thyroid surgery. Although most patients in the group ultimately chose the traditional thyroid surgery approach (100 of 109), the authors found that patients 60 years old or younger said that they would prefer ‘scarless’ surgery. Compared to the traditional approach, these patients indicated they were willing to pay over \$2000 more, accept a small (2.2%) increased risk of having a surgical complication and travel almost 700 miles more to have ‘scarless’ thyroid surgery. On the other hand, patients over the age of 60 years preferred the traditional approach over ‘scarless’ thyroid surgery. Compared to the ‘scarless’ approach, these patients said they were willing to pay almost \$3500 more, accept a small (3.2%) increased risk of having a surgical complication and travel over 1000 miles further for traditional approach thyroid surgery.

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

The study authors found that avoiding a neck scar is an important factor in deciding on how to proceed with thyroid surgery for some people (especially younger patients), so much so that these patients might pay more, travel farther and accept a higher risk of surgical complications to have ‘scarless’ surgery. It is important to understand that the 109 patients studied here were mostly white, mostly well off and mostly college educated. Compared to this population, it is unclear if people having a different racial, financial and/or educational backgrounds would have the same



## THYROID SURGERY, continued

preferences for surgery approach. It is also important to understand the importance of a surgeon's recommendation. Overall, this has been shown to play the

most important role in selecting an approach to thyroid surgery.

— Jason D. Prescott, MD PhD

### ATA THYROID BROCHURE LINKS

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

### ABBREVIATIONS & DEFINITIONS

**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.

**Lobectomy:** surgery to remove one lobe of the thyroid.

**Scarless thyroid surgery:** novel ways to perform thyroid surgery that does not require making a cut in neck or hide the incision under the chin.

**Trans-oral thyroid surgery:** scarless surgery that makes cuts inside the mouth and, using cameras and fine surgical instruments, removes the thyroid through these cuts.



## IODINE DEFICIENCY

# Mothers taking iodine supplementation while breastfeeding may improve child's brain development at 3 years of age

### BACKGROUND

Iodine is an essential element used to make thyroid hormone, which is especially important for baby's normal brain development during pregnancy. Iodine deficiency is an important cause of hypothyroidism world-wide. Iodine is taken up into breastmilk in breastfeeding mothers to provide iodine for babies. Because brain development continues in early childhood after birth, breastfeeding mothers should have enough iodine intake to provide adequate iodine for their babies. Currently, many societies, including the American Thyroid Association, recommend that women who are planning to be pregnant, are pregnant, or are breastfeeding should take a supplement that contains 150 µg of iodine every day. Severe iodine deficiency in pregnancy and early childhood is well known to have negative effects on child's brain development. However, effects of mild-to-moderate iodine deficiency in breastfeeding mothers are less clear. This study studied long-term effects of iodine supplements given to breastfeeding mothers on child's development at 3 years of age.

### THE FULL ARTICLE TITLE

Nazeri P et al 2021 Dose maternal iodine supplementation during the lactation have a positive impact on the neurodevelopment of children? Three-year follow up of a randomized controlled trial. Eur J Nutr. Epub 2021 May 11. PMID: 33974129.

### SUMMARY OF THE STUDY

A total of 180 breastfeeding mothers without thyroid disease and their full-term babies at 3 to 5 days of age were initially recruited from health care centers in Iran between October 2014 and January 2016. Mothers were randomly assigned to three groups according to types of supplements that were given for 12 months - placebo (no iodine), 150 µg/day of iodine, and 300 µg/day of iodine. Among these mother-child pairs, 122 children (42 children in placebo group, 35 children in 150 µg/day iodine group, and 45 children in 300 µg/day iodine group) had developmental testing at 3 years of age.

Iodine status at population level can be evaluated by measuring an average urinary iodine concentration (UIC) of many people, although this is not a good measure for an individual person. An average UIC  $\geq 100$  µg/L means that the studied population has adequate iodine nutrition as a group. Mothers in this study had mild-to-moderate iodine deficiency because their average UIC was  $< 100$  µg/L. However, their infants in all groups all had adequate iodine with their average UIC  $> 100$  µg/L. The average scores for brain, language, and motor development were similar among all the treatment groups. There was no significant difference in number of children with neurodevelopmental delays among the treatment groups. However, brain scores were higher in children of mothers who received 150 µg/day iodine supplementation than children whose mothers received placebo, when other factors that may affect child's test scores were taken into account. There were no significant differences in brain scores between children in 300 µg/day iodine group and placebo group, or between children in 300 µg/day iodine group and 150 µg/day iodine group. There were no significant differences in language or motor scores across the treatment groups.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that supplementing breastfeeding mothers who have mild-to-moderate iodine deficiency with 150 µg/day of iodine may benefit children's brain development. It would be important for breastfeeding mothers to have adequate iodine nutrition if their infants were exclusively breastfed. However, adequate iodine nutrition for infants, regardless of the source of iodine, may be able to overcome effects of iodine deficiency in the mother during the child's early life, and iodine may be supplemented via formula to babies if needed. Larger trials would be needed to further assess the benefits of iodine supplementation in breastfeeding mothers.

— Sun Y. Lee, MD



## IODINE DEFICIENCY, continued

### ATA THYROID BROCHURE LINKS

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

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

### ABBREVIATIONS & DEFINITIONS

**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.

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



## HYPOTHYROIDISM

### What is the risk of hypothyroidism after radiation therapy to the head and neck for cancer in children?

#### BACKGROUND

External beam radiation therapy (EBR) is an effective treatment for several types of cancer. In particular, two cancers that often present in children, Hodgkin's lymphoma and medulloblastoma/primitive neuroectodermal tumors (PNET), respond very well to EBR. The field of EBR in these cases includes the front of the neck where the thyroid gland is located. Because of this, the thyroid is frequently in the field of radiation and the EBR can damage the thyroid and cause it to fail, causing hypothyroidism. Indeed, hypothyroidism is a potential long-term complication of EBR therapy for certain cancers in children, adolescent, and young adults, specifically head, neck, brain, or spinal radiation.

While hypothyroidism can be treated with thyroid hormone replacement, prevention of thyroid damage during EBR would be a better option. Turning off the thyroid by treating with thyroid hormone to suppress the level of thyroid stimulating hormone (TSH) may be one way to prevent long-term damage to the thyroid by EBR. This study examined whether high dose thyroid hormone therapy taken before and during radiation could be protective in reducing the subsequent risk of hypothyroidism in such patients.

#### THE FULL ARTICLE TITLE

Massimino et al Long-term results of suppressing thyroid-stimulating hormone during radiotherapy to prevent primary hypothyroidism in medulloblastoma/PNET and Hodgkin lymphoma: a prospective cohort study. *Front. Med.* 15, 101–107 (2021). <https://doi.org/10.1007/s11684-020-0752-2>

#### SUMMARY OF THE STUDY

The study patients were children, adolescents, and young adults (age 1 to 21 years) that were treated with EBR involving the head or neck in a children's cancer center in Milan, Italy, between January, 1998 and February,

2001. The cancer diagnosis of patients was medulloblastoma/PNET or Hodgkin's lymphoma. Starting 14 days before EBR, all patients were prescribed levothyroxine 1 to 2 µg/kg daily in the morning on an empty stomach (1 or more hours before breakfast) and the dose was adjusted every three days with the goal of achieving a TSH level < 0.3 µIU/L (below normal). The levothyroxine was continued during the entire course of radiation treatment.

A total of 37 patients with medulloblastoma/PNET and 14 patients with Hodgkin's lymphoma were treated with thyroid hormone during their EBR. The target TSH levels of < 0.3 µIU/L during EBR were achieved in 32% (7/22) of the medulloblastoma/PNET patients and 57% (8/14) of the Hodgkin's lymphoma patients. At last reported follow-up, the percentage of patients with TSH values at target during radiotherapy who were diagnosed with hypothyroidism was 14% (1/7) of the medulloblastoma/PNET patients and 25% (2/8) Hodgkin's lymphoma patients. The percentage of patients with TSH values that were not at target during radiotherapy who were diagnosed with hypothyroidism at follow up was: 60% (9/15) of the medulloblastoma/PNET patients and 100% (6/6) Hodgkin's lymphoma patients.

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

This study suggested that suppressing TSH levels with thyroid hormone treatment in children during EBR may decrease the risk of developing hypothyroidism. Importantly, thyroid hormone treatment that failed to suppress TSH levels did not appear to be protective. While promising, further research is needed to definitively determine whether thyroid hormone treatment before and during radiotherapy may be beneficial in reducing subsequent development of underactive thyroid.

— Anna M. Sawka, MD, PhD



## HYPOTHYROIDISM, continued

### ATA THYROID BROCHURE LINKS

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

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

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

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

### ABBREVIATIONS & DEFINITIONS

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

**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.

**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.



## HYPOTHYROIDISM

### MorbiNet: a Spanish registry-based study for the evaluation of chronic illnesses in adult patients with hypothyroidism

#### BACKGROUND

Hypothyroidism is common in the US adult population and is treated with thyroid hormone therapy, specifically levothyroxine. Indeed, levothyroxine is among the most commonly prescribed medications in the US. While many patients with hypothyroidism will only have that problem, most have other chronic illnesses. The presence of two or more chronic illnesses at the same time in one person is referred to as multimorbidity. One can study the relationships between different chronic conditions using a computer programs that develop a “network” analysis, creating a visual diagram with “nodes” (the chronic conditions) and “edges” (the lines that connect the nodes). The purpose of this study was to evaluate the relationships, positive or negative, of different illnesses with respect to hypothyroidism.

#### THE FULL ARTICLE

Moratalla-Navarro F et al 2020 MorbiNet study: Hypothyroidism comorbidity networks in the adult general population. *J Clin Endocrinol Metab.* Epub 2020 Dec 15. PMID: 33319230.

#### SUMMARY OF THE STUDY

The authors used a registry of electronic health records from Catalonia, Spain. For their analysis, they included data of a little over 3 million adults living in that area with multiple chronic illnesses. Almost 10% of these individuals had hypothyroidism. They analyzed these data by age and sex and they calculated the chances of having multiple chronic illnesses in patients with and without hypothyroidism. The results were presented as odds ratios (OR). If the OR was higher than 1.2, they considered the

relationship significant. If the OR was less than 0.8, they considered the relationship negative or non-significant.

In their network-based analysis, the authors found a significant positive relationship between hypothyroidism and respiratory cancers (OR 2.5), birth disorders (OR 2.2), thyroid cancer (OR 2.1), hyperthyroidism (OR 1.6) and type 1 Diabetes (OR 2.13). These associations were found to be stronger in men than women. Other associations included irregular heart rhythms, enlarged thyroid and cholesterol disorders.

Other conditions were negatively associated, meaning that were less likely to co-occur in patient with hypothyroidism: HIV/AIDS (OR 0.7), tobacco abuse (OR 0.7), and, for women in particular, chronic alcohol use and lung cancer.

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

This study shows that hypothyroidism is frequently associated with multiple other medical conditions. Some of these associations are not unexpected since they are either indirectly leading to hypothyroidism (for example, thyroidectomy after thyroid cancer or hyperthyroidism) or sharing autoimmunity as their cause (for example, type 1 diabetes). Multimorbidity can increase the health burden of the individual and particularly for hypothyroidism, it can make the management more complicated. It is important to be aware of these associations in patients with hypothyroidism.

— Susana Ebner MD

#### ATA BROCHURE LINKS

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



## 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.



## 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

THYROID CANCER ALLIANCE



### 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)



AMERICAN  
**THYROID**  
ASSOCIATION  
ATA | *Founded 1923*

# Friends of the ATA

FOUNDED 2005



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.

## **Become a Friend of the ATA!** **Subscribe to *Friends of the ATA e-news***

By subscribing to *Friends of the ATA Newsletter*, you will receive:

-  *Friends of the ATA e-news*, providing up-to-date information on thyroid issues, summaries of recently published articles from the medical literature that covers the broad spectrum of thyroid disorders., and invitations to upcoming patient events
-  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

We will use your email address to send you *Friends of the ATA e-news* and occasional email updates. We won't share your email address with anyone, and you can unsubscribe at any time.

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