



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

VOLUME 11 | ISSUE 4 | APRIL 2018

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Hypothyroidism is a common endocrine problem that requires lifelong treatment with thyroid hormone. The fact that some L-T4-treated hypothyroid patients have symptoms despite normal blood levels of TSH has led to questions as to whether therapy with L-T4 alone is adequate for all patients. The Hypothyroidism Treatment Survey was created by the ATA to find out about the perceptions, other medical conditions, and treatment selections of patients with hypothyroidism who responded to the survey.

Peterson SJ, Cappola AR, Castro MR, Dayan CM, Farwell AP, Hennessey JV, Kopp PA, Ross DS, Samuels MH, Sawka AM, Taylor PN, Jonklaas J, Bianco AC. An online survey of hypothyroid patients demonstrates prominent dissatisfaction. *Thyroid* 2018 [Epub ahead of print]; DOI: 10.1089/thy.2017.0681.

**THYROID AND THE HEART .....7****Thyroid hormone levels and risk of atrial fibrillation**

Both overt and subclinical hyperthyroidism increases the risk of developing atrial fibrillation. Interestingly, some studies suggest that subclinical hypothyroidism may also increase the risk of developing atrial fibrillation. This study was done to determine whether thyroid tests within the normal range and subclinical hypothyroidism are associated with an increased risk of developing atrial fibrillation.

Baumgartner C. et al. Thyroid Studies Collaboration. Thyroid function within the normal range, subclinical hypothyroidism and the risk of atrial fibrillation. *Circulation* 2017;Oct 23;pii: CIRCULATIONAHA.117.028753 [Epub ahead of print].

**THYROID AND PREGNANCY .....8****The effect of thyroid hormone replacement therapy on risk of preterm delivery in pregnant women with subclinical hypothyroidism and negative thyroid peroxidase antibodies.**

At present, expert endocrinologists have not yet reached agreement regarding the treatment of women with subclinical hypothyroidism during pregnancy. To try to study the effect of an increased TSH alone on pregnancy outcomes, this study sought to determine whether thyroid hormone replacement therapy would be beneficial for reducing preterm delivery in pregnant women with subclinical hypothyroidism and negative TPO antibodies.

Nazarpour S, et al. Effects of levothyroxine on pregnant women with subclinical hypothyroidism, negative for thyroid peroxidase antibodies. *J. Clin Endocrinol. Metab.* 2018. 103 (3): 926-935.

**HYPOTHYROIDISM .....10****Probiotic substances do not impair oral levothyroxine intestinal absorption**

Many medications, foods and supplements can affect the absorption of levothyroxine from the intestine. If these items are taken at the same time it can lead to frequent changes in the levothyroxine dose. Probiotics are digestive supplements whose use has markedly increased in recent years. This study is done to assess whether probiotics may affect absorption of levothyroxine.

Spaggiari G, et al. Probiotics ingestion does not directly affect thyroid hormonal parameters in hypothyroid patients on levothyroxine treatment. *Front Endocrinol* 8:316. 2017 PMID: 29184537.

**HYPERTHYROIDISM .....12****Surgery for hyperthyroidism lowers cardiovascular mortality compared with radioactive iodine**

Three main treatment options are currently available for hyperthyroidism, each of them having specific benefits and side effects. To date, only a few studies have evaluated the long-term adverse effects from these treatments. The aim of this study was to compare the long-term death rate of hyperthyroid patients treated with radioactive iodine therapy with those treated with surgery.

Giesecke P et al. 2017 All-cause and cardiovascular mortality risk after surgery versus radioiodine treatment for hyperthyroidism. *Br J Surg.* Epub 2017 Nov 8. PMID: 29116656.

**ATA ALLIANCE FOR THYROID****PATIENT EDUCATION .....14****Friends of the ATA .....15****Support the ATA .....16****ATA Brochure: Hashimoto's Thyroiditis ..17**



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**Clinical Thyroidology for the Public**

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## EDITOR'S COMMENTS

Welcome to another issue of *Clinical Thyroidology for the Public*. In this journal, we will bring to you the most up-to-date, cutting edge thyroid research. We also provide even faster updates of late-breaking thyroid news through [Twitter](#) at [@thyroidfriends](#) and on [Facebook](#). Our goal is to provide patients with the tools to be the most informed thyroid patient in the waiting room. Also check out our friends in the **Alliance for Thyroid Patient Education**. The **Alliance** member groups consist of: the *American Thyroid Association*, *Bite Me Cancer*, the *Graves' Disease and Thyroid Foundation*, the *Light of Life Foundation*, *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.

April is **Hashimoto's Thyroiditis Awareness month**. In honor of this, we discuss the results of the ATA Hypothyroidism Treatment Survey.

In this issue, the studies ask the following questions:

- What is the best treatment for hypothyroidism?
- Are thyroid hormone levels in the normal range a risk factor for atrial fibrillation?
- Does levothyroxine treatment affect the risk of preterm delivery in hypothyroid women?
- Do probiotics affect the absorption of levothyroxine?
- Does surgery for hyperthyroidism provide a lower risk for heart problems than RAI therapy?

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

— Alan P. Farwell, MD, FACE



## EDITORIAL

### What is the best treatment for hypothyroidism?

In any clinical practice it is clear that some hypothyroid patients may continue to complain of symptoms they attribute to hypothyroidism, even after being on what is considered adequate therapy. This leads some patients to switch physicians multiple times and to use unconventional/alternative therapies. Indeed, the ongoing clinical challenge in treating hypothyroidism is the many nonspecific symptoms which may be caused by multiple other non-thyroid-related disorders.

To address these issues, and to review the current state of hypothyroidism evaluation and management, the American Thyroid Association (ATA) held a symposium entitled *Hypothyroidism — Where are we now?* in the spring of 2017. In the two months before the symposium, patients with hypothyroidism were invited to complete the online ATA Hypothyroidism Treatment Survey that was created by the program committee members. The survey was posted on the ATA website, emailed to patients in the ATA database, distributed to members of the *Alliance for Thyroid Patient Education*, and further distributed on the websites and social media of multiple patient advocacy groups that are members of the ATA Alliance for Thyroid Patient Education. The preliminary results of the survey were presented and discussed with a panel of patients with hypothyroidism at the symposium. The final analysis of the survey results will be published in the June issue of *Thyroid* and Drs. Angela Leung and Eric Stevens summarized the paper for a future issue of *Clinical Thyroidology*. In this issue, Dr. Sarah Peterson, the lead author of this important paper, has provided a summary of the paper for *CTFP* in advance of its' publication. In the interest of full disclosure, I am also an author of this paper, and the full list of authors is included in the summary.

The ATA Hypothyroidism Survey confirmed that dissatisfaction with treatments and doctors does affect a significant group of hypothyroid patients. In addition, the vast majority of respondents rated that living with hypothyroidism has a major effect on their life and that the development of additional hypothyroidism treatment options is vitally needed. In terms of the current therapeutic options, animal-derived desiccated thyroid extract (DTE) appears to be preferred by the survey respondents over  $T_4/T_3$  combination therapy and  $T_4$  monotherapy. However, even the DTE group reported continued symptoms attributed to hypothyroidism. I am sure that this paper will be illuminating, and controversial, as hypothyroidism is considered by many physicians to be a medical disorder that is rather straightforward to treat.

It is important to realize that this was a voluntary survey and respondents may not represent the majority of the >10 million individuals in the U.S. with hypothyroidism. Indeed, the majority of hypothyroid patients appear to do well on levothyroxine monotherapy. While physicians will often ascribe symptoms persisting despite "adequate" thyroid replacement therapy to non-thyroid causes, some recent studies suggest that there may be some genetic influences on the ability to respond to levothyroxine therapy. In any event, the ATA Hypothyroidism Survey does make clear that more research is needed in this area and that future studies on the optimal management of hypothyroidism are necessary.

— Alan P. Farwell, MD, FACE





## HYPOTHYROIDISM

Guest Author: Sara Peterson, MD

### A patient survey of hypothyroid individuals demonstrates dissatisfaction with treatment and their managing physicians

#### BACKGROUND

Hypothyroidism is a common endocrine problem that requires lifelong treatment with thyroid hormone. The standard treatment for hypothyroidism since the 1960s has been daily administration of levothyroxine (L-T<sub>4</sub>) at doses that keep blood levels of thyroid stimulating hormone (TSH) normal. Outside the thyroid gland, many tissues have enzymes (deiodinases) that activate T<sub>4</sub> to triiodothyronine (T<sub>3</sub>), the active form of thyroid hormone. The current viewpoint is that a dosage of L-T<sub>4</sub> that makes the blood levels of TSH normal also treats most/all hypothyroid symptoms. However, in some studies, L-T<sub>4</sub>-treated patients report not feeling as well as with individuals without hypothyroidism. In any clinical practice it is clear that, despite being on L-T<sub>4</sub> at doses that return the T<sub>4</sub> and TSH levels to the normal range, some patients may continue to complain of sluggishness, lethargy, sleepiness, memory problems, depression, cold intolerance, hoarseness, dry skin, body weight gain, and constipation. They may switch physicians multiple times and may use unconventional therapies, such as dietary supplements, nutraceuticals and over-the-counter products as well as alternative thyroid hormone therapies.

The fact that some L-T<sub>4</sub>-treated hypothyroid patients have symptoms despite normal blood levels of TSH has led to questions as to whether therapy with L-T<sub>4</sub> alone (*monotherapy*) is adequate for all patients. Some have suggested that low levels of T<sub>3</sub> in the blood contribute to residual symptoms and suggest that therapy with both L-T<sub>4</sub> and T<sub>3</sub> (liothyronine or cytomel) (*combination therapy*) may be a beneficial alternative. A total of 14 trials have examined this and it is not clear that combination therapy is better than monotherapy in managing hypothyroidism, although there was a patient preference for combination therapy in some of the trials. Finally, animal-derived natural thyroid preparations (*desiccated thyroid extracts*, DTE), the original thyroid hormone therapy, has historically been widely used as an option for thyroid hormone replacement therapy.

DTE was replaced by L-T<sub>4</sub> in the 1960s once L-T<sub>4</sub> was able to be produced widely and cheaply. Currently, American Thyroid Association (ATA) guidelines do not recommend the routine use of either combination therapy or DTE.

The goal of the present survey was to find out about the perceptions, other medical conditions, and treatment selections of patients with hypothyroidism who responded to our survey.

#### THE FULL ARTICLE TITLE

Peterson SJ, Cappola AR, Castro MR, Dayan CM, Farwell AP, Hennessey JV, Kopp PA, Ross DS, Samuels MH, Sawka AM, Taylor PN, Jonklaas J, Bianco AC. An online survey of hypothyroid patients demonstrates prominent dissatisfaction. *Thyroid* 2018 [Epub ahead of print]; DOI: 10.1089/thy.2017.0681.

#### SUMMARY OF THE STUDY

The Hypothyroidism Treatment Survey was created by the program committee members of the Satellite Symposium on Hypothyroidism that was held in the spring of 2017, a meeting organized by the American Thyroid Association. In the two months before the symposium, patients with hypothyroidism were invited to complete the online survey with the intent to disseminate its results at the meeting. The survey was posted on the ATA website, emailed to patients in the ATA database, distributed to members of the ATA Alliance for Thyroid Patient Education, and further distributed on the websites and social media of multiple patient advocacy groups.

Respondents were asked to provide demographic data and types of treatment used (L-T<sub>4</sub> monotherapy, L-T<sub>4</sub>+L-T<sub>3</sub> combination therapy, DTE, other supplements). Patients were asked to rank satisfaction with their treatment for hypothyroidism and their treating physician. They also ranked their perception regarding physician knowledge about hypothyroidism treatments, need for new







## HYPOTHYROIDISM, continued

treatments, and life impact of hypothyroidism on a scale of 1 to 10. Additional questions included the number of times they changed physicians due to unsatisfactory treatment of their hypothyroidism, aspects of their life affected by hypothyroidism, and attempts to seek alternative forms of hypothyroidism treatment.

A total of 12,146 individuals completed the survey. The vast majority of patients gave a score of 10 on a scale of 1-10 as to how hypothyroidism has affected their life. Overall degree of satisfaction with their therapy was rated a 5. Among the 3,670 individuals who did not report depression, stressors or medical conditions, those taking DTE reported an average treatment satisfaction score of 7, followed by the L-T<sub>4</sub> + L-T<sub>3</sub> combination therapy treatment group with a satisfaction score of 6 and the L-T<sub>4</sub> monotherapy treatment group with a satisfaction score of 5. Patients taking DTE were also less likely to report problems with weight management, fatigue/energy levels, mood, and memory, compared to those taking L-T<sub>4</sub> monotherapy or L-T<sub>4</sub> + L-T<sub>3</sub> combination therapy. All patients gave a score of 10 to the need for new therapeutic options for hypothyroidism.

## WHAT ARE THE IMPLICATIONS OF THIS STUDY?

In summary, some patients with hypothyroidism are not satisfied with their current therapy, or with their physicians. Higher satisfaction with both treatment and physicians was reported by those patients taking DTE. While the way our study was designed does not allow us to provide an explanation for this observation, future studies should investigate whether preference for DTE is related to T<sub>3</sub> levels in the blood or other unidentified causes.

There is a distinct subset of individuals with hypothyroidism who are dissatisfied with their thyroid hormone replacement therapy and managing physicians. Compared to patients taking LT<sub>4</sub> or LT<sub>4</sub>+LT<sub>3</sub>, those taking DTE were generally more satisfied. The reasons for the high dissatisfaction rates, particularly among individuals taking LT<sub>4</sub> monotherapy, are unclear and deserves further investigation. The vast majority of patients surveyed expressed a strong desire for the development of additional hypothyroidism treatment options.

— Sarah Peterson, MD, Chicago, IL

## ATA THYROID BROCHURE LINKS

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

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.

**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.

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

**Thyroxine (T<sub>4</sub>):** the major hormone produced by the thyroid gland. T<sub>4</sub> gets converted to the active hormone T<sub>3</sub> in various tissues in the body.





## HYPOTHYROIDISM, continued

**Triiodothyronine (T<sub>3</sub>):** the active thyroid hormone, usually produced from thyroxine, available in pill form as Cytomel™.

**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.

**Desiccated thyroid extract:** thyroid hormone pill made from animal thyroid glands. Currently desiccated thyroid extract is made from pig thyroids and is available as Armour Thyroid™ and Nature-Throid™.

**Deiodinase enzymes:** these enzymes convert T<sub>4</sub> to T<sub>3</sub> on the cellular level by removing an iodine molecule from T<sub>4</sub>.

APRIL

# Hashimoto's Thyroiditis *Awareness Month*



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## Thyroid Awareness Monthly Campaigns

The ATA will be highlighting a distinct thyroid disorder each month and a portion of the sales for Bravelets™ will be donated to the ATA. The month of April is **Hashimoto's Thyroiditis Awareness Month** and a bracelet is available through the ATA Marketplace to support thyroid cancer awareness and education related to thyroid disease.





## THYROID AND THE HEART

### Thyroid hormone levels and risk of atrial fibrillation

#### BACKGROUND

Thyroid hormone has direct effects on the heart. Hyperthyroidism increases the heart rate and can cause palpitations as well as abnormal heart rhythms. One such abnormal heart rhythm is atrial fibrillation, which is an irregular beating of the heart and can lead to heart failure and stroke. Both overt and subclinical hyperthyroidism increases the risk of developing atrial fibrillation. Interestingly, some studies suggest that subclinical hypothyroidism may also increase the risk of developing atrial fibrillation.

This study was done to determine whether thyroid tests within the normal range and subclinical hypothyroidism are associated with an increased the risk of developing atrial fibrillation.

#### THE FULL ARTICLE TITLE

Baumgartner C. et al. Thyroid Studies Collaboration. Thyroid function within the normal range, subclinical hypothyroidism and the risk of atrial fibrillation. *Circulation* 2017;Oct 23;pii: CIRCULATIONAHA.117.028753 [Epub ahead of print].

#### SUMMARY OF THE STUDY

This study was done by reviewing previous publications that had looked at thyroid tests and atrial fibrillation. There were 30,000 patient charts reviewed. The average age was 69 years and 52% of the patients were women. The follow up period was up to 17 years. Patients were not on any medications that could affect thyroid tests.

Patients who had higher levels of thyroid hormone within the normal range were found to have increased risk of developing atrial fibrillation. Age, gender and whether the patients had heart disease to begin with had no impact on these results. On the other hand, subclinical hypothyroidism did not increase the risk.

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

This study suggests that higher levels of the thyroid hormone even within the normal range increases the risk of developing atrial fibrillation. However, it is not known whether any treatment is indicated or if treatment would affect this risk. This study suggests that screening for thyroid disease may be beneficial in some instances.

—Vibhavasu Sharma, MD

#### ATA THYROID BROCHURE LINKS

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

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

#### 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.

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

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





## THYROID AND PREGNANCY

### The effect of thyroid hormone replacement therapy on risk of preterm delivery in pregnant women with subclinical hypothyroidism and negative thyroid peroxidase antibodies.

#### BACKGROUND

Normal thyroid function in the mother is important during pregnancy. It is clear that overt hypothyroidism in the mother (high TSH, low FT<sub>4</sub>) is associated with poor pregnancy outcomes, including preterm delivery (delivery before the usual pregnancy term of 40 weeks). It is less clear that subclinical hypothyroidism (high TSH only) is associated with poor outcomes, although there are studies that suggest that preterm delivery is increased. At present, expert endocrinologists have not yet reached agreement regarding the treatment of women with subclinical hypothyroidism during pregnancy. Areas of disagreement include the level of TSH in which to start thyroid hormone treatment during pregnancy and whether anti-thyroid peroxidase (TPO) antibody positivity should impact this decision. Since TPO antibodies are a marker of autoimmune thyroid disease, if they are present, it is more likely that the increased TSH represents something abnormal. To try to study the effect of an increased TSH alone on pregnancy outcomes, this study sought to determine whether thyroid hormone replacement therapy would be beneficial for reducing preterm delivery in pregnant women with subclinical hypothyroidism and negative TPO antibodies.

#### THE FULL ARTICLE TITLE

Nazarpour S, et al. Effects of levothyroxine on pregnant women with subclinical hypothyroidism, negative for thyroid peroxidase antibodies. *J. Clin Endocrinol. Metab.* 2018. 103 (3): 926-935.

#### SUMMARY OF THE STUDY

These investigators performed a trial of thyroid hormone replacement therapy in pregnant women with subclinical hypothyroidism and negative TPO antibodies. They recruited 2 groups of TPO antibody negative pregnant women: those with subclinical hypothyroidism (366

women) and thyroid with normal thyroid function (1092 women). Subclinical hypothyroidism was defined as a TSH >2.5-10 mIU/L with a normal free thyroxine index. They randomized the women with subclinical hypothyroidism to receiving thyroid hormone or not and compared them to control women with normal thyroid function. The main outcome measurement was rate of preterm delivery.

Results of the initial analysis did not show any significant reduction in the rate of preterm delivery in women with subclinical hypothyroidism treated with thyroid hormone compared to untreated women. However, they repeated the analysis using a TSH cut off of >4 mIU/L and found a benefit in terms of reduced preterm deliveries in the women receiving thyroid hormone. In other words, thyroid hormone treatment did not result in a significant reduction in preterm delivery in TPO antibody negative women with TSH > 2.5, but did appear to benefit women if a TSH cut off >4 mIU/L was used. These results support the newest (2017) American Thyroid Association guidelines for thyroid hormone treatment of subclinical hypothyroidism in pregnancy in which a TSH  $\geq$  4mIU/L is a recommended cut off for consideration of thyroid hormone therapy.

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

These results suggest that pregnant women with subclinical hypothyroidism with a TSH  $\geq$  4 mIU/L may benefit from thyroid hormone replacement therapy to reduce rates of preterm delivery regardless of the TPO antibody status. These data support a TSH cutoff of  $\geq$ 4 mIU/L for starting therapy rather than the lower cutoff of TSH < 2.5mIU/L.

—Whitney W. Woodmansee MD







## THYROID AND PREGNANCY, continued

### ATA THYROID BROCHURE LINKS

Pregnancy and Thyroid Disease: <https://www.thyroid.org/thyroid-disease-pregnancy/>

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

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

### ABBREVIATIONS & DEFINITIONS

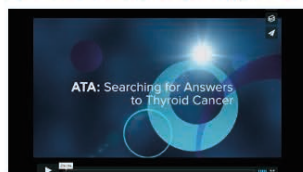
**Hypothyroidism:** a condition where the thyroid gland is underactive and doesn't produce enough thyroid hormone. Treatment requires taking thyroid hormone pills.

**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.

**Overt Hypothyroidism:** clear hypothyroidism an increased TSH and a decreased T<sub>4</sub> level. All patients with overt hypothyroidism are usually treated with thyroid hormone pills.

**TPO antibodies:** these are antibodies that attack the thyroid instead of bacteria and viruses, they are a marker for autoimmune thyroid disease, which is the main underlying cause for hypothyroidism and hyperthyroidism in the United States.

## Watch how your donations help find answers to thyroid cancer



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Anaplastic Thyroid Cancer – Support Research for Treatments  
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## HYPOTHYROIDISM

### Probiotic substances do not impair oral levothyroxine intestinal absorption

#### BACKGROUND

Hypothyroidism occurs when the thyroid gland fails to make enough thyroid hormone for the needs of the body. Thyroxine, the major hormone produced by the thyroid gland, can be taken orally in the form of levothyroxine to treat hypothyroidism. Many medications, foods and supplements can affect the absorption of levothyroxine from the intestine. If these items are taken at the same time or close to the time of levothyroxine intake, the amount of levothyroxine taken up into the body is often decreased, leading to inadequate treatment of the hypothyroidism and frequent changes in the levothyroxine dose. Calcium and iron pills are the most common examples of this. Because of the possibility of interfering with absorption, it is generally recommended that levothyroxine be taken by itself on an empty stomach. However, this can be challenging for many patients, so it is important to identify those medications and supplements that to directly affect levothyroxine absorption.

Probiotics are live bacteria, available over-the-counter in pharmacies and health stores, and are thought to limit the growth of harmful bacteria in intestine. Their use as digestive supplements has markedly increased in recent years. This study is done to assess whether probiotics may affect absorption of levothyroxine.

#### THE FULL ARTICLE TITLE

Spaggiari G, et al. Probiotics ingestion does not directly affect thyroid hormonal parameters in hypothyroid patients on levothyroxine treatment. *Front Endocrinol* 8:316. 2017 PMID: 29184537.

#### SUMMARY OF THE STUDY

In this study, 80 subjects were randomly assigned to either take oral levothyroxine with probiotics or alone.

The types of probiotics in this study were *Lactobacilli* and *Bifidobacteria*. Only hypothyroid adults who were taking the same levothyroxine dose for the past 6 months and had normal thyroid hormone levels on this dose were selected. Individuals with any disorder causing absorption problems in the intestine or use of any other medication or supplement which could potentially alter levothyroxine absorption were excluded.

The participants in the study were divided into two groups: 39 individuals took probiotics 2 hours after taking Levothyroxine and 41 individuals only took levothyroxine. Both groups were followed for 4 months. Probiotics were taken only for the first two months of the study.

Thyroid stimulating hormone (TSH) and thyroid hormone levels were measured every 4 weeks during the study period. There was no difference between the two groups at any point of time during the study.

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

This study showed that the use of particular probiotics (*Lactobacilli* and *Bifidobacteria*) if taken two hours after Levothyroxine, does not cause any change in TSH and thyroid hormone level.

Because the use of probiotics as a supplement is very popular and hypothyroidism is also a common medical problem, it was important to investigate the potential effect of probiotics on Levothyroxine absorption. It is important to mention some of the limitations of this study; for example, intake of probiotics at the same time with Levothyroxine was not studied and only the above-mentioned probiotics were investigated.

— Shirin Haddady, MD

#### ATA THYROID BROCHURE LINKS

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

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





## HYPOTHYROIDISM, continued

### ABBREVIATIONS & DEFINITIONS

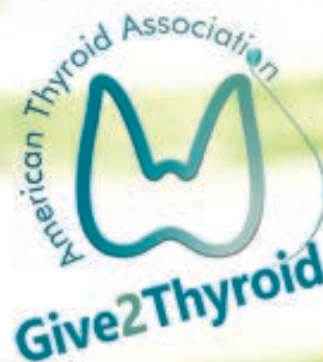
**Hypothyroidism:** a condition where the thyroid gland is underactive and doesn't produce enough thyroid hormone. Treatment requires taking thyroid hormone pills.

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

**Probiotics:** live organisms, usually specific strains of bacteria, that directly add to the population of healthy microbes in your gut and are thought to limit the growth of harmful bacteria in intestine. Lactobacilli and Bifidobacteria are examples of probiotics available over-the-counter in pharmacies and health stores. Yogurt, sauerkraut, kombucha and kimchi are foods containing probiotics.

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## HYPERTHYROIDISM

# Surgery for hyperthyroidism lowers cardiovascular mortality compared with radioactive iodine

### BACKGROUND

The most common cause of hyperthyroidism by far is Graves' disease, followed by toxic multinodular goiter and toxic adenoma. Three main treatment options are currently available for hyperthyroidism, each of them having specific benefits and side effects. Antithyroid drugs are frequently used, however, they can result in rare but serious side effects and the hyperthyroidism reoccurs in many patients once the treatment is discontinued. Radioactive iodine therapy and thyroid surgery are definitive treatment options that result in hypothyroidism because of permanent destruction or removal of the thyroid gland; both treatments have a very low relapse rate. However, radioactive iodine therapy can worsen the thyroid-associated eye disease in patients with Graves' disease, while surgery can result in damage of the recurrent laryngeal nerve causing hoarseness and to the parathyroid glands causing hypoparathyroidism with low blood calcium levels. The individual patient profile and preference should be taken into consideration when choosing treatment for hyperthyroidism. To date, only a few studies have evaluated the long-term adverse effects from these treatments. The aim of this study was to compare the long-term death rate of hyperthyroid patients treated with radioactive iodine therapy with those treated with surgery.

### THE FULL ARTICLE TITLE

Giesecke P et al. 2017 All-cause and cardiovascular mortality risk after surgery versus radioiodine treatment for hyperthyroidism. *Br J Surg*. Epub 2017 Nov 8. PMID: 29116656.

### SUMMARY OF THE STUDY

This study used the national Swedish registry that collects demographic and medical information for the entire country population. In the Stockholm area, between 1976 and 2000, a total of 10,250 patients received radioactive iodine therapy, as registered in the Stockholm Radioiodine Cohort, and 742 patients underwent thyroid surgery, as registered in the Swedish National Patient

Register. Information regarding the patients' other medical conditions related to prior hospitalizations was obtained from the National Patient Register database. Vital status was assessed during a mean follow-up period of 16 to 22 years. The cause of death was obtained from death certificates.

Women represented 85% of the patients in both groups. Patients treated with radioactive iodine therapy were older as compared to patients treated with surgery (average age 64 vs. 47 years) and had more baseline medical problems, including heart disease, such as myocardial infarction and atrial fibrillation, stroke, hypertension, diabetes and cancer. A higher percentage of the patients in the surgery group had thyroid-associated eye disease as compared to the radioactive iodine therapy group (13.2% vs. 8.5%).

After adjusting the analysis for the difference in the patients' age and comorbid conditions, the surgery group had a lower risk of all-cause mortality and cardiovascular mortality, especially due to heart disease as compared to radioactive iodine therapy group during long-term follow-up. Subgroup analysis, however, revealed that only men and not women had a higher risk of death after radioactive iodine therapy when compared to thyroid surgery. The risk of death due to cancer or other causes was similar for the two treatment groups.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Surgery for hyperthyroidism was associated with a lower risk of all-cause and cardiovascular death as compared to radioactive iodine therapy during long-term follow-up, particularly in men. This is the first study reporting a difference in the long-term outcome of the two treatment options for hyperthyroidism, especially related to cardiovascular disease in men. However, this study did not include information and did not adjust the analysis for the patients' thyroid status after the radioactive iodine therapy and surgery, including relapse data, since it is known that persistent hyperthyroidism by itself is associated







## HYPERTHYROIDISM, continued

with an increased all cause and cardiovascular mortality. Additional studies are needed to further evaluate whether hyperthyroid men have better long-term outcomes with thyroid surgery. At present, radioactive iodine therapy is the preferred definitive therapy for Graves' hyperthyroid-

ism in the US. Importantly, and similar to prior studies, this study showed no increased risk of cancer following radioactive iodine therapy treatment during long-term follow-up.

— Alina Gavrilă, MD, MMSC

### ATA THYROID BROCHURE LINKS

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

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

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

### ABBREVIATIONS & DEFINITIONS

**Hyperthyroidism:** a condition where the thyroid gland is overactive and produces too much thyroid hormone. Causes of hyperthyroidism include Graves' disease, toxic nodular goiter and toxic adenoma. Hyperthyroidism may be treated with antithyroid medications (Methimazole, Propylthiouracil), radioactive iodine or surgery.

**Thyroid eye disease (TED):** also known as Graves ophthalmopathy. TED includes inflammation of the eyes, eye muscles and the surrounding tissues. Symptoms include dry eyes, red eyes, bulging of the eyes and double vision.

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

**Thyroidectomy:** surgery to remove the entire thyroid gland.

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

**Hypoparathyroidism:** low calcium levels due to decreased secretion of parathyroid hormone (PTH) from the parathyroid glands located next to the thyroid. This can occur as a result of damage to the parathyroid glands during thyroid surgery and usually resolves.





## 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.

### WHO WE ARE (in alphabetical order)

#### AMERICAN THYROID ASSOCIATION

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

ATA Patient Resources:

<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

<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)

#### 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 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)



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

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

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## JOIN US

### PLEASE JOIN OUR JOURNEY TO ADVANCED DISCOVERIES AND TREATMENT FOR THYROID DISEASE AND THYROID CANCER

As patients with thyroid disease navigate the challenges to their quality of life and researchers and physicians look for more effective directions, we at the ATA have our own destination—**funding for critical thyroid research, prevention, and treatment.** For 94 years, the ATA has led the way in thyroidology. It's a daily obstacle course to find new drugs, better treatments, advanced surgical methods, and more rapid diagnoses for the 20 million Americans who have some form of thyroid disease.

“The ATA was a valuable resource for our family when my dad was diagnosed with Anaplastic Thyroid Cancer. When you're faced with a detrimental diagnosis where even a few days can make the difference in life or death, understanding your options quickly is critical. The ATA website offers a one-stop shop for patients and caregivers to find specialists, current clinical trials, general thyroid cancer information, and links to other patient support groups and information.”

Mary Catherine Petermann

- Father who was diagnosed with Anaplastic Thyroid Cancer in 2006
- He was treated at Mayo Clinic
- He has clean scans as of October 2016

*The ATA has paved the way with management guidelines for clinicians who diagnose and treat thyroid disease. For physicians treating pregnant women diagnosed with thyroid disease, our recent publication presents 97 evidence-based recommendations making sure that best practices are implemented with the latest, most effective treatment.*



Through your generous support and donations, research takes the lead and hope is on the horizon. **Will you join us** in our campaign to raise **\$1.5 million** for thyroid research, prevention, and treatment? Your compassionate, tax-deductible gift will provide funds for:

- Research grants that pave the way for 1,700 ATA physicians and scientists who have devoted their careers to understanding the biology of and caring for patients affected by thyroid disease.
- Patient education for individuals and families looking for life-changing clinical trials, the best thyroid specialists, and cutting edge treatment and drugs.
- Professional education that offers a wealth of knowledge and leading-edge research for trainees and practitioners.
- A website that is the go-to resource for thyroid information for patients and practitioners alike. In 2016 alone, there were more than 3,700,000 website views of ATA's library of online thyroid information patient brochures.

Donations **of all sizes** will change the future for thyroid patients. You will make a direct impact on patients like Mary Catherine's father as he deals with Anaplastic Thyroid Cancer. You will help scientists like ATA Associate Member Julia Rodiger, Ph.D., a scientist at the National Institutes of Health, as she analyzes thyroid hormones for intestinal stem cell development.



# Hashimoto's Thyroiditis (Lymphocytic Thyroiditis)

## WHAT IS THE THYROID GLAND?

The thyroid gland is a butterfly-shaped endocrine gland that is normally located in the lower front of the neck. The thyroid's job is to make thyroid hormones, which are secreted into the blood and then carried to every tissue in the body. Thyroid hormone helps the body use energy, stay warm and keep the brain, heart, muscles, and other organs working as they should.

## WHAT IS HASHIMOTO'S THYROIDITIS?

The term "Thyroiditis" refers to "inflammation of the thyroid gland". There are many possible causes of thyroiditis (See [Thyroiditis](#) brochure). Hashimoto's thyroiditis, also known as chronic lymphocytic thyroiditis, is the most common cause of hypothyroidism in the United States. It is an autoimmune disorder in which antibodies directed against the thyroid gland lead to chronic inflammation. It is not known why some people make antibodies, although this condition tends to run in families. Over time, however, this results in impaired ability of the thyroid gland to produce thyroid hormones, leading to gradual decline in function and eventually an underactive thyroid (Hypothyroidism). Hashimoto's thyroiditis occurs most commonly in middle aged women, but can be seen at any age, and can also affect men, and children.

## WHAT ARE THE SYMPTOMS OF HASHIMOTO'S THYROIDITIS?

There are no signs or symptoms that are unique to Hashimoto's thyroiditis.

Because the condition usually progresses very slowly over many years, people with Hashimoto's thyroiditis may not have any symptoms early on, even when the characteristic TPO (thyroid peroxidase) antibodies may be detected in blood tests. TPO is an enzyme that plays a role in the production of thyroid hormones. However, over time, thyroiditis causes slow and chronic cell damage leading to the development of a goiter (enlarged thyroid) with gradual thyroid failure, and most patients will eventually develop symptoms of hypothyroidism. (See [Hypothyroidism](#) brochure). Hypothyroid symptoms may include fatigue, weight gain, constipation, increased sensitivity to cold, dry skin, depression, muscle aches and reduced exercise tolerance, and irregular or heavy menses.

## HOW IS THE DIAGNOSIS OF HASHIMOTO'S THYROIDITIS MADE?

The diagnosis of Hashimoto's thyroiditis is often made when patients present with symptoms of hypothyroidism, often accompanied by the finding of a goiter (an enlarged thyroid gland) on physical examination, and laboratory tests consistent with hypothyroidism, an elevated serum TSH with low thyroid hormone (Free thyroxine) levels. Antibodies against TPO, when measured, are usually elevated.

Occasionally, the disease may be diagnosed early on, especially in people with a strong family history of thyroid disease, during routine laboratory screening, even before the patient develops symptoms of hypothyroidism. In these cases, often isolated mild elevation of serum TSH is seen, with normal levels of thyroid hormones and positive TPO antibodies.

## HOW IS HASHIMOTO THYROIDITIS TREATED?

Patients with elevated TPO antibodies but normal thyroid function tests (TSH and Free thyroxine) do not require treatment.

For those patients with overt hypothyroidism (elevated TSH and low thyroid hormone levels) treatment consists of thyroid hormone replacement (see [Thyroid Hormone Treatment](#) brochure). Synthetic levothyroxine taken orally at an appropriate dose, is inexpensive, very effective in restoring normal thyroid hormone levels and results in improvement of symptoms of hypothyroidism. Most patients with Hashimoto's thyroiditis will require lifelong treatment with levothyroxine. Finding the appropriate dose, particularly at the beginning may require testing with TSH every 6-8 weeks after any dose adjustment, until the correct dose is determined. After that, monitoring of TSH once a year is generally sufficient.

When levothyroxine is taken in the appropriate dose, it has no side effects. However, when an insufficient dose is taken, serum TSH remains elevated and patients may have persistent symptoms of hypothyroidism (See [Hypothyroidism](#) brochure). If the dose is excessive, serum TSH will become suppressed and patients may develop symptoms of hyperthyroidism (See [Hyperthyroidism](#) brochure).



## FURTHER INFORMATION

Further details on this and other thyroid-related topics are available in the [patient thyroid information section](#) on the American Thyroid Association® website at [www.thyroid.org](http://www.thyroid.org).

For information on thyroid patient support organizations, please visit the [Patient Support Links](#) section on the ATA website at [www.thyroid.org](http://www.thyroid.org)

