



# Clinical Thyroidology® for the Public

VOLUME 12 | ISSUE 12 | DECEMBER 2019

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In some cases of thyroid cancer, radioactive iodine therapy is needed after surgery to remove thyroid gland. Currently, the American Thyroid Association recommends women to wait at least 6 months to become pregnant after radioactive iodine therapy. This study was done to evaluate risk of abortion, premature birth, and birth defect after radioactive iodine therapy for thyroid cancer.

Kim HO et al. 2019 Association Between Pregnancy Outcomes and Radioactive Iodine Treatment After Thyroidectomy Among Women With Thyroid Cancer. JAMA Int Med. Epub 2019 Oct 21. PMID: 31633736

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#### **Risk of birth defects in babies from mothers with hyperthyroidism treated with Methimazole or Propylthiouracil**

MMI and PTU are the main antithyroid drugs for the treatment of hyperthyroidism. MMI is preferred in non-pregnant patients because PTU can rarely cause liver problems, but is less preferred in pregnancy due to an increased risk of birth defects. The 2017 ATA Guidelines recommends PTU for the treatment of hyperthyroidism in early pregnancy then switching it MMI in the 2nd trimester. This study was performed in order to evaluate these recommendations.

Andersen SL et al (2019) Maternal thyroid function, use of antithyroid drugs in early pregnancy and birth defects. J Clin Endocrinology Epub 2019 Aug 13. PMID: 31408173

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#### **Initiation of levothyroxine therapy for subclinical hypothyroidism during pregnancy in the United States.**

During pregnancy, some, but not all, studies show that treating subclinical hypothyroidism in pregnancy may reduce the risk of miscarriage. As a result, some clinical practice guidelines recommend treating subclinical hypothyroidism with levothyroxine, although there is still no definitive agreement among all the professional societies. The current study examines the prescribing practices for pregnant women with subclinical hypothyroidism to determine the factors that influence who is and who is not given levothyroxine for subclinical hypothyroidism during pregnancy.

Maraka S et al Variation in treatment practices for subclinical hypothyroidism in pregnancy: US national assessment. 2019 J Clin Endocrinol Metab, Epub 2019 Apr 24

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### **Successful chemotherapy is possible for seemingly inoperable anaplastic thyroid cancer**

While the vast majority of thyroid cancers are slow growing and have an excellent prognosis, anaplastic thyroid cancer, which makes up <1% of all thyroid cancer, is one of the most aggressive of all cancers, with a survival averaging ~6 months after diagnosis. Surgery, radiation and single drug chemotherapy is all ineffective in most cases. The aim of this study is to study if combination chemotherapy will make previously inoperable anaplastic thyroid cancers safe to remove with surgery.

Wang JR et al 2019 Complete surgical resection following neoadjuvant dabrafenib plus trametinib in *BRAF*<sup>V600E</sup>-mutated anaplastic thyroid carcinoma. Thyroid 29:1036–1043. PMID: 31319771.

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### **Volume doubling time does not predict cancer in follicular neoplasm nodules**

Up to 15% of biopsied of thyroid nodules nodules are reported as indeterminate, with up to 25% of these reported as follicular neoplasms. Although less than half of follicular neoplasms are cancer, many patients undergo surgery for a definitive diagnosis. The goal of this study was to evaluate whether the growth rate of thyroid nodules with follicular neoplasm cytology can predict the presence of cancer.

Kim M et al 2019 Determining whether tumor volume doubling time and growth rate can predict malignancy after delayed diagnostic surgery of follicular neoplasm. Thyroid. 2019 Oct;29(10):1418-1424 Epub Sep 5. PMID: 31375058.

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Physicians contribute to the opioid epidemic by prescribing opioids after most surgical procedures. Thyroid and parathyroid surgery are generally well-tolerated procedures and many endocrine surgeons are already not prescribing narcotics. In this study, the authors counseled patients on possible opioid use before surgery and then let the patients decided if they needed it.

Ruffolo LI et al 2019 Narcotic free cervical endocrine surgery: a shift in paradigm. Ann Surg. Epub 2019 July 6. PMID: 31356280.

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#### Clinical Thyroidology for the Public

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## EDITOR'S COMMENTS

Welcome to another issue of *Clinical Thyroidology for the Public*. In this journal, we will bring to you the most up-to-date, cutting edge thyroid research. We also provide even faster updates of late-breaking thyroid news through [Twitter](#) at [@thyroidfriends](#) and on [Facebook](#). Our goal is to provide patients with the tools to be the most informed thyroid patient in the waiting room. Also check out our friends in the **Alliance for Thyroid Patient Education**. The **Alliance** member groups consist of: the *American Thyroid Association*, *Bite Me Cancer*, *the Graves' Disease and Thyroid Foundation*, *the Light of Life Foundation*, *MCT8 – AHDS Foundation*, *ThyCa: Thyroid Cancer Survivors' Association*, *Thyroid Cancer Canada*, *Thyroid Cancer Alliance* and *Thyroid Federation International*.

We invite all of you to join our **Friends of the ATA** community. It is for you that the American Thyroid Association (ATA) is dedicated to carrying out our mission of providing reliable thyroid information and resources, clinical practice guidelines for thyroid detection and treatments, resources for connecting you with other patients affected by thyroid conditions, and cutting edge thyroid research as we search for better diagnoses and treatment outcomes for thyroid disease and thyroid cancer. We thank all of the *Friends of the ATA* who support our mission and work throughout the year to support us. We invite you to help keep the ATA mission strong by choosing to make a donation that suits you — it takes just one moment to give online at: [www.thyroid.org/donate](http://www.thyroid.org/donate) and all donations are put to good work. The ATA is a 501(c)3 nonprofit organization and your gift is tax deductible.

December is **[Thyroid and Development Awareness](#)**.

In this issue, the studies ask the following questions:

- How soon after RAI is it safe to get pregnant?
- Is there a risk for birth defects with taking antithyroid drugs during pregnancy?
- How often is levothyroxine started in pregnant women with subclinical hypothyroidism in the United States?
- Can combination chemotherapy help patients with anaplastic thyroid cancer?
- Does nodule doubling time predict cancer in patients with follicular neoplasms?
- Should patients be treated with opioids after thyroid 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, FACE



## THYROID AND PREGNANCY

### Pregnancy is safe when it occurs at least 6 months after radioactive iodine treatment for thyroid cancer

#### BACKGROUND

In some cases of thyroid cancer, radioactive iodine therapy is needed after surgery to remove thyroid gland. Currently, the American Thyroid Association recommends women to wait at least 6 months to become pregnant after radioactive iodine therapy. This study was done to evaluate risk of abortion, premature birth, and birth defect after radioactive iodine therapy for thyroid cancer.

#### THE FULL ARTICLE TITLE

Kim HO et al. 2019 Association Between Pregnancy Outcomes and Radioactive Iodine Treatment After Thyroidectomy Among Women With Thyroid Cancer. JAMA Int Med. Epub 2019 Oct 21. PMID: 31633736

#### SUMMARY OF THE STUDY

A total of 111,459 women between 20-49 years of age, who had a thyroidectomy for thyroid cancer in South Korea between January 2008 and December 2015 were identified from an insurance database. Among these, 51,976 women (radioactive iodine therapy group) had radioactive iodine therapy treatment and 59,483 women (surgery group) did not. Pregnancy outcomes studied included abortion (both miscarriage and induced), premature birth, and birth defects.

The average age at thyroidectomy or radioactive iodine therapy was 39.8 years in the whole group. A total of 10,842 (9.7%) women became pregnant after treatment (9.4% in the radioactive iodine therapy and 10% in the surgery group). These women were generally younger than the whole group (mean age 31.2 years for the radioactive iodine therapy group and 31.5 years for the surgery group at treatment). The time from treatment to pregnancy was longer in the radioactive iodine therapy group (22 months) compared to the surgery group (25.3 months). The pregnancy rate was lower within the first 12 months after treatment in the radioactive iodine therapy group compared to the surgery group (0.7% vs 2.0% at 0-5 months and 1.4% vs 1.9% at 6-11 months after treatment). There was no significant differences in the rates of abortion, premature birth, or birth defects between the radioactive iodine therapy and surgery groups.

In the radioactive iodine therapy group, there was an about 4 times higher risk of abortion if a woman became pregnant before 6 months after treatment compared to 12-23 months after treatment. Women's age over 35 years at pregnancy was also associated with a higher risk of abortion. In the radioactive iodine therapy group, there was also a 1.7 times higher risk of birth defect if a woman became pregnant before 6 months after treatment compared to 12-23 months after treatment. The dose of radioactive iodine therapy received did not affect risk of birth defect. Pregnancy within 6 months after treatment did not have higher risks of abortion or birth defects in the surgery group. In both radioactive iodine therapy and surgery groups, there was a higher risk of premature birth if a woman became pregnant more than 24 months after treatment.

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

Women are advised to wait 6-12 months before becoming pregnant after treatment with radioactive iodine after thyroidectomy for thyroid cancer because of a concern for possible effects of radiation in developing baby. The findings of this study support such recommendation, since there was no increased risk of abortion, premature birth, or birth defects if pregnancy occurred at least 6 months after treatment with radioactive iodine therapy. Although there was a higher risk of abortion within 6 months after treatment with radioactive iodine therapy, we do not know if abortion was miscarriage (spontaneous abortion) or induced abortion due to worry about possible effects of radiation. A higher risk of birth defects was only seen when pregnancy occurred within 6 months after treatment with radioactive iodine therapy. There was an increased risk of premature birth in both radioactive iodine therapy and surgery group if pregnancy occurred more than 24 months after treatment.

In conclusion, the findings of this study suggest that it is safe to become pregnant at least 6 months after treatment with radioactive iodine after thyroidectomy for thyroid cancer.

— Sun Lee, MD







## THYROID AND PREGNANCY, continued

### ATA THYROID BROCHURE LINKS

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

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

### ABBREVIATIONS & DEFINITIONS

**Premature delivery:** birth of a baby before 38 weeks of pregnancy.

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

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

**Radioactive iodine (RAI):** this plays a valuable role in diagnosing and treating thyroid problems since it is taken up only by the thyroid gland. I-131 is the destructive form used to destroy thyroid tissue in the treatment of thyroid cancer and with an overactive thyroid. I-123 is the non-destructive form that does not damage the thyroid and is used in scans to take pictures of the thyroid (Thyroid Scan) or to take pictures of the whole body to look for thyroid cancer (Whole Body Scan).

## DECEMBER Thyroid & Development Awareness Month



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## THYROID AND PREGNANCY

### Risk of birth defects in babies from mothers with hyperthyroidism treated with Methimazole or Propylthiouracil

#### BACKGROUND:

Hyperthyroidism occurs in up to 4 of every 1,000 pregnancies. The most common cause of hyperthyroidism during pregnancy is Graves' disease. Untreated, hyperthyroidism during pregnancy can cause harm to the mother and the developing baby. Among the complications of hyperthyroidism in pregnancy are miscarriage, early labor, low weight of the newborn, heart failure in the mother and thyroid storm (a severe form of hyperthyroidism). To help avoid these complications, treatment of hyperthyroidism during pregnancy is recommended.

There are two medications available in the US for the treatment of hyperthyroidism. They are Methimazole (MMI) and propylthiouracil (PTU). In non-pregnant adults and in children, MMI is preferred because there is evidence that the other drug, PTU can rarely cause liver problems. For use by pregnant women, however, which medication should be preferred is less clear. Both medications do come in contact with the developing baby and can rarely cause birth defects. Earlier studies from Denmark have shown that PTU causes less frequent and less severe birth defects than MMI. Based on these studies, the 2017 Guidelines of the American Thyroid Association regarding the management of thyroid disease in pregnancy recommends PTU for the treatment of hyperthyroidism in early pregnancy. By the second trimester of pregnancy, however, the organs of the baby have been formed and birth defects from MMI are less likely. It is therefore recommended that by the second trimester, to protect against liver damage, pregnant women with hyperthyroidism should be switched back to MMI.

This study was performed in order to evaluate these recommendations. The study was carried out in a larger number of children than the earlier studies and so provides more accurate data. This study also aimed to examine whether a mother's abnormal thyroid function itself could also be the cause of the birth defects.

#### FULL ARTICLE TITLE

Andersen SL et al (2019) Maternal thyroid function, use of antithyroid drugs in early pregnancy and birth defects. J Clin Endocrinology Epub 2019 Aug 13. PMID: 31408173

#### SUMMARY OF THE STUDY

The authors looked at how often children were diagnosed with birth defects before reaching 2 years of age. The study looked at the frequency in over one million children born between 1997 and 2016. The researchers compared how often the birth defects occurred in children who were exposed to MMI, or PTU or not exposed at all to these antithyroid drugs. The researchers found that birth defects were seen in only 6.7% of children who were not exposed to ATDs, but were higher for those children exposed to MMI, at 9.6%, and 8.3% for those exposed to PTU. The researchers also checked specifically only the kinds of birth defects previous studies have found were especially common in children of mothers who take antithyroid drugs. Of the children who were not exposed to antithyroid drugs only 3.1% had these kinds of birth defects, but of the children who were exposed to MMI, 6.4% had these kinds of birth defects and only 4.4% were seen in PTU exposed children.

In the children who were exposed to PTU, the birth defects were found only in the face, neck and urinary system, while children who were exposed to MMI, the birth defects involved many organs: some had aplasia cutis (lack of skin in the scalp), esophageal or choanal atresia (back of the nasal passage is blocked) and omphalocele (abdominal wall defect with abdominal organs misplaced outside the abdomen). In children of women who switched from MMI to PTU during the first trimester, 5% had this specific type of birth defects as compared to 3.1% in the unexposed children.

When the authors looked at whether a mother's hyperthyroidism in general seemed to cause birth defects, they





## THYROID AND PREGNANCY, continued

found no evidence that it did. However, they did find that in the women who specifically had overt hypothyroidism (low thyroid hormone levels), there were more birth defects.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study supports the current ATA recommendations that PTU should be used in women with hyperthyroidism during the first trimester of pregnancy, because it

shows that children who were exposed to MMI in the first trimester had more frequent and more severe birth defects. Switching from MMI to PTU in early pregnancy has also been found to lower the risk of birth defects as compared to staying on MMI (although it may be best to avoid MMI use completely in the first trimester). Hyperthyroidism alone was not associated with birth defects, but overt hypothyroidism should be avoided because it increases the risk of birth defects.

— Susana Ebner MD

### ATA THYROID BROCHURE LINKS

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

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

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

### 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.

**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.

**Congenital:** Condition that exists at birth.

**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.

**Propylthiouracil (PTU):** an antithyroid medication that blocks the thyroid from making thyroid hormone. Propylthiouracil is used to treat hyperthyroidism, especially in women during pregnancy.

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





## THYROID AND PREGNANCY

### Initiation of levothyroxine therapy for subclinical hypothyroidism during pregnancy in the United States.

#### BACKGROUND

Subclinical hypothyroidism is felt to be an early, mild form of hypothyroidism that is diagnosed when blood tests show that thyroid stimulating hormone (TSH) concentration is high but the free thyroxine ( $T_4$ ) level is still normal. Most people with subclinical hypothyroidism do not have any symptoms, have a TSH level below 10 mU/L and generally do not need treatment with levothyroxine. However, during pregnancy the benefit of using levothyroxine to treat subclinical hypothyroidism is more controversial. Some but not all studies show that treating subclinical hypothyroidism in pregnancy, particularly when anti-thyroid peroxidase antibody levels are positive and particularly when TSH level is above 4 mU/L may reduce the risk of miscarriage. As a result, some clinical practice guidelines recommend treating subclinical hypothyroidism with levothyroxine, although there is still no definitive agreement among all the professional societies.

The current study examines the prescribing practices for pregnant women with subclinical hypothyroidism to determine the factors that influence who is and who is not given levothyroxine for subclinical hypothyroidism during pregnancy.

#### THE FULL ARTICLE TITLE

Maraka S et al Variation in treatment practices for subclinical hypothyroidism in pregnancy: US national assessment. 2019 J Clin Endocrinol Metab, Epub 2019 Apr 24.

#### SUMMARY OF THE STUDY

The authors examined a large US medical claims database and identified 7990 pregnant women who were diagnosed

with subclinical hypothyroidism between January 2010 and December 2014. They found that only 1214 (15.2%) received treatment with levothyroxine. Treatment was more likely in women who a) had higher TSH levels, b) were obese, c) had recurrent miscarriages, d) had thyroid disease before their pregnancy and e) were cared for by an endocrinologist as opposed to a gynecologist or primary care physician. Moreover, endocrinologists started levothyroxine at lower TSH levels than other specialties.

Women who lived in the Northeast and Western US were more likely to receive levothyroxine treatment compared with other regions. Asian women were more likely, whereas Hispanic women were less likely to receive levothyroxine when compared to white women. Finally, the proportion of women treated with levothyroxine increased over time; levothyroxine treatment was twice as likely in 2014 as in 2010, perhaps because in 2012 the Endocrine Society Published guidelines recommending levothyroxine treatment for all pregnant women with subclinical hypothyroidism.

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

There is large variation in the treatment practices for subclinical hypothyroidism during pregnancy among endocrinologists, gynecologists and primary care physicians, especially when the TSH is only mildly elevated. Patient characteristics and geographic location also influence the likelihood of levothyroxine therapy and, taken together, these findings suggest ongoing disparities in health access and quality which merits further research

— Philip Segal, MD

#### ATA THYROID BROCHURE LINKS

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







## THYROID AND PREGNANCY, 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.

**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.

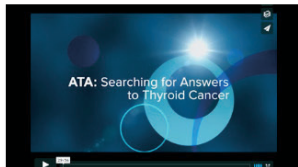
**TPO antibodies:** these are antibodies that attack the thyroid instead of bacteria and viruses, they are a marker for autoimmune thyroid disease, which is the main underlying cause for hypothyroidism and hyperthyroidism in the United States.

**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 (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.

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

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## THYROID CANCER

### Successful chemotherapy is possible for seemingly inoperable anaplastic thyroid cancer

#### BACKGROUND

While the vast majority of thyroid cancers are slow growing and have an excellent prognosis, anaplastic thyroid cancer, which makes up <1% of all thyroid cancer, is one of the most aggressive of all cancers, with a survival averaging ~6 months after diagnosis. Surgery, radiation and single drug chemotherapy is all ineffective in most cases. The aim of this study is to study if combination chemotherapy will make previously inoperable anaplastic thyroid cancers safe to remove with surgery.

#### THE FULL ARTICLE TITLE

Wang JR et al 2019 Complete surgical resection following neoadjuvant dabrafenib plus trametinib in BRAF<sup>V600E</sup>-mutated anaplastic thyroid carcinoma. *Thyroid* 29:1036–1043. PMID: 31319771.

#### SUMMARY OF THE STUDY

In this study from the MD Anderson Cancer Center in Texas, 6 patients with anaplastic thyroid cancer that had the BRAF<sup>V600E</sup> mutation were evaluated. Prior to receiving combination tyrosine kinase inhibitor therapy with dabrafenib and trametinib, 4 patients had some

form of standard chemotherapy and 2 received another tyrosine kinase inhibitor called pembrolizumab. Of the 6 patients that had surgery after this treatment, 4 patients had the entire primary cancer removed and the other 2 patients only had microscopic pieces of cancer left after the surgery. After the surgery, 5 of 6 patients received standard chemotherapy and radiation to the surgical area. Of the 6 patients, 4 patients had no evidence of cancer at the last check, some over 2 years after surgery. The 2 other patients did pass away from anaplastic cancer; however, there was no re-growth of cancer in the area where surgery occurred.

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

In selected patients with anaplastic thyroid cancer with the BRAF<sup>V600E</sup> mutation, treatment with dabrafenib and trametinib may increase the chance of having a successful surgery of the primary tumor. This is important to patients because it gives hope for an improved outcome for a cancer that generally has a terrible prognosis and a high death rate.

— Joshua Klopfer, MD

#### ATA THYROID BROCHURE LINKS

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

#### ABBREVIATIONS & DEFINITIONS

**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 and do so within a few years.

**Mutation:** A permanent change in one of the genes.

**Genes:** a molecular unit of heredity of a living organism. Living beings depend on genes, as they code for all

proteins and RNA chains that have functions in a cell. Genes hold the information to build and maintain an organism's cells and pass genetic traits to offspring.

**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 CANCER, continued

**Tyrosine kinases:** proteins that are overactive in many of the pathways that cause cells to be cancerous. Inhibiting these proteins with drugs known as **tyrosine kinase inhibitors** are effective chemotherapy drugs for cancers, including advanced thyroid cancer

**Cancer-associated genes:** these are genes that are normally expressed in cells. Cancer cells frequently have mutations in these genes. It is unclear whether

mutations in these genes cause the cancer or are just associated with the cancer cells. The cancer-associated genes important in thyroid cancer are **BRAF**, **RET/PTC** and **RAS**

**BRAF gene:** this is gene that codes for a protein that is involved in a signaling pathway and is important for cell growth. Mutations in the **BRAF** gene in adults appear to cause cancer.

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## THYROID NODULES

### Volume doubling time does not predict cancer in follicular neoplasm nodules

#### BACKGROUND

Although thyroid nodules are very common, only 5-7% of them are cancerous. Biopsy of a thyroid nodule can help to differentiate between benign and cancerous nodules, however, its ability to predict cancer is not 100%. Using the Bethesda System, 90-95% of biopsy samples are satisfactory for interpretation with 55-74% being reported as benign, 2-5% being reported as cancer and the rest being reported as indeterminate, meaning a diagnosis cannot be made based on looking at the cells alone. Biopsy performs well for benign or cancer cytology results, as 97-100% of thyroid nodules with benign cytology being benign and 94-96% of thyroid nodules with cancer cytology being cancer. Among the thyroid nodules with indeterminate cytology, up to 25% are reported as follicular neoplasms (FNs). Although less than half (10-40%) of the FNs are cancer, many patients undergo surgery to remove of the nodule for a definitive diagnosis. Molecular testing can further help determine the cancer risk of thyroid nodules; however, their performance is still not 100%. The goal of this study was to evaluate whether the growth rate of thyroid nodules with FN cytology can predict the presence of cancer.

#### THE FULL ARTICLE TITLE

Kim M et al 2019 Determining whether tumor volume doubling time and growth rate can predict malignancy after delayed diagnostic surgery of follicular neoplasm. *Thyroid*. 2019 Oct;29(10):1418-1424 Epub Sep 5. PMID: 31375058.

#### SUMMARY OF THE STUDY

The researchers evaluated patients who underwent thyroid surgery for nodules with FN cytology at a single South Korean medical center between 2014 and 2017. The study included 100 patients who had a thyroid nodule larger than 1 cm, delayed their thyroid surgery more than 1 year after the biopsy showing a follicular neoplasm, and had three or more ultrasound evaluations prior to surgery. Surgical removal of nodules with FN cytology is usually recommended at this institution, however, the study

patients had specific reasons to delay surgery, including pregnancy, other co-existent cancers, patient preference, and initial biopsy showing a lower risk cytology. Therefore, the thyroid nodules were monitored by ultrasound prior to the surgery. The thyroid nodule dimensions were measured on ultrasound and the growth was assessed by calculating the tumor volume doubling time (TVDT).

After the thyroid surgery, 58% of the thyroid nodules with FN cytology were found to be benign and 42% were cancer. The average patient age was 50 years, 82% were female, and the average nodule size at initial ultrasound was 2.0 cm and then 2.5 cm at the time of the surgery. None of these variables or the ultrasound appearance of the thyroid nodules were associated with the presence of cancer.

During an average follow-up of 50 months, both benign and cancerous nodules grew significantly with an increase in their largest dimension and volume measured by ultrasound; however, the rate of growth was not associated with cancer. More than half of both benign and malignant thyroid nodules showed a greater than 50% volume increase at 5 years. In addition, there was no significant difference in the time to achieve greater than 50% volume increase between the two groups. The TVDT for FN nodules ranged from less than 2 years to greater than 10 years. There was no association between the TVDT and the nodule risk of cancer.

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

The study showed no significant difference in the growth rate of benign and cancerous thyroid nodules with FN cytology assessed during ultrasound surveillance, suggesting that the tumor volume doubling time is not helpful to predict malignancy in these nodules prior to surgery. Other studies have showed contrasting results; therefore, additional research is needed to find a clear answer to this question.

—Alina Gavrilă, MD, MMSC





## THYROID NODULES, continued

### ATA THYROID BROCHURE LINKS

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

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

### ABBREVIATIONS & DEFINITIONS

**Thyroid nodule:** an abnormal growth of thyroid cells that forms a lump within the thyroid. Thyroid nodules can be benign (non-cancerous) or malignant (cancerous).

**Thyroid Ultrasound:** a common imaging test used to evaluate the structure of the thyroid gland. Ultrasound uses soundwaves to create a picture of the structure of the thyroid gland and accurately identify and characterize nodules within the thyroid. Ultrasound is also frequently used to guide the needle into a nodule during a thyroid nodule biopsy.

**Thyroid fine needle aspiration biopsy:** a simple procedure that is done in the doctor's office to determine if a thyroid nodule is cancerous or not. The doctor uses a very thin needle to withdraw cells from the thyroid nodule. Patients usually return home or to work after the biopsy without any ill effects.

**Cytology:** a branch of pathology, the medical specialty that examines tissue samples from the body to diagnose different diseases and conditions. Thyroid cytology examines thyroid cells removed during the FNA of thyroid nodules to diagnose thyroid cancer.

**Bethesda System for Thyroid Cytopathology:** a standardized system to report thyroid FNA specimens, which includes six diagnostic categories: non-diagnostic or unsatisfactory; benign; atypia of undetermined significance or follicular lesion of undetermined significance (AUS/FLUS); follicular neoplasm or suspicious for a follicular neoplasm (FN/SFN); suspicious for malignancy; and malignant.

**Indeterminate thyroid biopsy:** this happens when a few atypical cells are seen but not enough to be abnormal (atypia of unknown significance (AUS) or follicular lesion of unknown significance (FLUS)) or when the diagnosis is a follicular or Hurthle cell lesion. Follicular and Hurthle cells are normal cells found in the thyroid. Current analysis of thyroid biopsy results cannot differentiate between follicular or Hurthle cell cancer from noncancerous adenomas. This occurs in 15-20% of biopsies and often results in the need for surgery to remove the nodule.

**Follicular neoplasm:** A tumor that can be benign such as a thyroid adenoma, or malignant such as a follicular thyroid cancer. Fine needle aspiration cannot differentiate between benign and malignant tumors, since all follicular neoplasms show similar results with many thyroid cells arranged in small groups (microfollicular pattern).

**Follicular thyroid cancer:** the second most common type of thyroid cancer.

**Molecular testing:** techniques used to examine genes and microRNAs expressed in thyroid cells to differentiate between benign and malignant thyroid nodules. The two most common molecular marker tests are the Afirma™ Gene Expression Classifier and ThyroSeq™.







## THYROID SURGERY

### Narcotics are not needed after thyroid surgery

#### BACKGROUND

The opioid epidemic is real. While these drugs can be very useful in controlling pain, they are well known to be habit-forming, and some patients are unable to stop their use when the pain is no longer an issue. Physicians contribute to the epidemic by prescribing opioids after most surgical procedures, though in reality, many patients do not use the opioids and they are likely unnecessary. Thyroid and parathyroid surgery are generally well-tolerated procedures with very little discomfort from the actual incision itself in the post-operative period. Though many endocrine surgeons are already not prescribing narcotics, there have been no studies to date that specifically measured opioid use after thyroid surgery. In this study, the authors counseled patients on possible opioid use before surgery and then let the patients decide if they needed it. The amount of opioid use was measured in patients that chose these drugs.

#### THE FULL ARTICLE TITLE

Ruffolo LI et al 2019 Narcotic free cervical endocrine surgery: a shift in paradigm. Ann Surg. Epub 2019 July 6. PMID: 31356280.

#### SUMMARY OF THE STUDY

Over 200 patients at a single institution were counseled before surgery that they could choose to receive narcotics or not after thyroid surgery. They were compared with 100 prior patients at the same institution that did get narcotics. Thyroid, parathyroid, and neck dissections were all included. Less than 5% of patients chose to receive opioids after surgery. Of the >95% of patients that did not choose opioids, none requested a prescription late in the post-operative period or reported pain. Of those that choose opioids, on average, 8 pills were consumed per patients; more than half were chronic pain patients or had baseline narcotic use.

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

Very few patients need narcotics after head and neck surgery, except for those on baseline narcotics or with chronic pain. Narcotics should not routinely be prescribed to patients after thyroid and parathyroid surgery unless they request it.

— Melanie Goldfarb, MD, FACS

#### ATA THYROID BROCHURE LINKS

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

#### ABBREVIATIONS & DEFINITIONS

**Narcotics:** opioid-based drugs that provide excellent pain control but are habit forming





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## Connect with the ATA on Social Media



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



## ATA Alliance for Thyroid Patient Education

**GOAL** The goal of our organizations is to provide accurate and reliable information for patients about the diagnosis, evaluation and treatment of thyroid diseases. We look forward to future collaborations and continuing to work together toward the improvement of thyroid education and resources for patients.



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Optimal Thyroid  
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ThyCa: Thyroid Cancer  
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THYROID CANCER  
ALLIANCE



Thyroid Cancer Canada  
Cancer de la thyroïde Canada



Thyroid  
Federation  
International

### American Thyroid Association

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

ATA Patient Resources:

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

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

(Toll-free): 1-800-THYROID

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

### Bite Me Cancer

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

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

### Graves' Disease and Thyroid Foundation

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

(Toll-free): 877-643-3123

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

### Light of Life Foundation

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

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

### MCT8 – AHDS Foundation

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

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

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

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

(Toll-free): 877-588-7904

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

### Thyroid Cancer Alliance

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

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

Rotterdam, The Netherlands

### Thyroid Cancer Canada

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

416-487-8267

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

### Thyroid Federation International

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




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



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

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

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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



“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

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 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.



# Hyperthyroidism in Pregnancy

## 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 ARE THE NORMAL CHANGES IN THYROID FUNCTION ASSOCIATED WITH PREGNANCY?

**HORMONE CHANGES.** A normal pregnancy results in a number of important physiological and hormonal changes that alter thyroid function. These changes mean that laboratory tests of thyroid function must be interpreted with caution during pregnancy. Thyroid function tests change during pregnancy due to the influence of two main hormones: human chorionic gonadotropin (hCG), the hormone that is measured in the pregnancy test and estrogen, the main female hormone. HCG can weakly turn on the thyroid and the high circulating hCG levels in the first trimester may result in a slightly low TSH. When this occurs, the TSH will be slightly decreased in the first trimester and then return to normal throughout the duration of pregnancy. Estrogen increases the amount of thyroid hormone binding proteins in the serum which increases the total thyroid hormone levels in the blood since >99% of the thyroid hormones in the blood are bound to these proteins. However, measurements of "Free" hormone (that are not bound to protein, representing the active form of the hormone) usually remain normal. The thyroid is functioning normally if the TSH and Free T4 remain in the trimester-specific normal ranges throughout pregnancy.

**SIZE CHANGES.** The thyroid gland can increase in size during pregnancy (enlarged thyroid = goiter). However, pregnancy-associated goiters occur much more frequently in iodine-deficient areas of the world. It is relatively uncommon in the United States. If very sensitive imaging techniques (ultrasound) are used, it is possible to detect an increase in thyroid volume in some women. This is usually only a 10-15% increase in size and is not typically apparent on physical examination by the physician. However, sometimes a significant goiter may develop and prompt the doctor to measure tests of thyroid function.

## WHAT IS THE INTERACTION BETWEEN THE THYROID FUNCTION OF THE MOTHER AND THE BABY?

For the first 18-20 weeks of pregnancy, the baby is completely dependent on the mother for the production of thyroid hormone. By mid-pregnancy, the baby's thyroid begins to produce thyroid hormone on its own. The baby, however, remains dependent on the mother for ingestion of adequate amounts of iodine, which is essential to make the thyroid hormones. The World Health Organization recommends iodine intake of 250 micrograms/day during pregnancy to maintain adequate thyroid hormone production. Because iodine intakes in pregnancy are currently low in the United States, the ATA recommends that US women who are planning pregnancy, pregnant, or breastfeeding should take a daily supplement containing 150 mcg of iodine.

## HYPERTHYROIDISM & PREGNANCY

### WHAT ARE THE MOST COMMON CAUSES OF HYPERTHYROIDISM DURING PREGNANCY?

Overall, the most common cause of hyperthyroidism in women of childbearing age is Graves' disease (see [Graves' Disease brochure](#)), which occurs in 0.2% of pregnant patients. In addition to other usual causes of hyperthyroidism (see [Hyperthyroidism brochure](#)), very high levels of hCG, seen in severe forms of morning sickness (hyperemesis gravidarum), may cause transient hyperthyroidism in early pregnancy. The correct diagnosis is based on a careful review of history, physical exam and laboratory testing.

### WHAT ARE THE RISKS OF GRAVES' DISEASE/ HYPERTHYROIDISM TO THE MOTHER?

Graves' disease may present initially during the first trimester or may be exacerbated during this time in a woman known to have the disorder. In addition to the classic symptoms associated with hyperthyroidism, inadequately treated maternal hyperthyroidism can result in early labor and a serious complication known as pre-eclampsia. Additionally, women with active Graves' disease during pregnancy are at higher risk of developing very severe hyperthyroidism known as thyroid storm. Graves' disease often improves during the third trimester of pregnancy and may worsen during the post partum period.



# Hyperthyroidism in Pregnancy

## WHAT ARE THE RISKS OF GRAVES' DISEASE/ HYPERTHYROIDISM TO THE BABY?

The risks to the baby from Graves' disease are due to one of three possible mechanisms:

### 1) UNCONTROLLED MATERNAL HYPERTHYROIDISM:

Uncontrolled maternal hyperthyroidism has been associated with fetal tachycardia (fast heart rate), small for gestational age babies, prematurity, stillbirths and congenital malformations (birth defects). This is another reason why it is important to treat hyperthyroidism in the mother.

**2) EXTREMELY HIGH LEVELS OF THYROID STIMULATING IMMUNOGLOBULINS (TSI):** Graves' disease is an autoimmune disorder caused by the production of antibodies that stimulate the thyroid gland referred to as thyroid stimulating immunoglobulins (TSI). These antibodies do cross the placenta and can interact with the baby's thyroid. High levels of maternal TSI's have been known to cause fetal or neonatal hyperthyroidism, but this is uncommon (only 1-5% of women with Graves' disease during pregnancy). Fortunately, this typically only occurs when the mother's TSI levels are very high (many times above normal). Measuring TSI in the mother with Graves' disease is recommended in early pregnancy and, if initially elevated, again around weeks 18-22.

When a mother with Graves' disease requires antithyroid drug therapy during pregnancy, fetal hyperthyroidism is rare because antithyroid drugs also cross the placenta and can prevent the fetal thyroid from becoming overactive. Of potentially more concern to the baby is when the mother has been treated for Graves' disease (for example radioactive iodine or surgery) and no longer requires antithyroid drugs. It is very important to tell your doctor if you have been treated for Graves' Disease in the past so proper monitoring can be done to ensure the baby remains healthy during the pregnancy.

**3) ANTI-THYROID DRUG THERAPY (ATD).** Methimazole (Tapazole) or propylthiouracil (PTU) are the ATDs available in the United States for the treatment of hyperthyroidism (see [Hyperthyroidism brochure](#)). Both of these drugs cross the placenta and can potentially impair the baby's thyroid function and cause fetal goiter. Use of either drug in the first trimester of pregnancy has been associated with birth defects, although the defects associated with PTU are less frequent and less severe. Definitive therapy (thyroid surgery or radioactive iodine treatment) may be considered prior to pregnancy in order to avoid the need to use PTU or methimazole in pregnancy. When ATDs are required, PTU is preferred until week 16 of pregnancy. It is recommended that the lowest possible dose of ATD be used to control maternal hyperthyroidism in order to minimize the development of hypothyroidism in the baby. Overall, the benefits to the baby of treating a mother with hyperthyroidism during pregnancy outweigh the risks if therapy is carefully monitored.

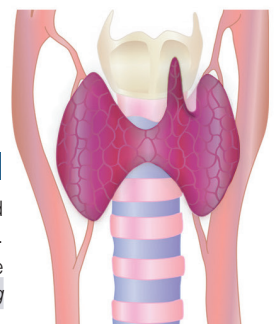
## WHAT ARE THE TREATMENT OPTIONS FOR A PREGNANT WOMAN WITH GRAVES' DISEASE/ HYPERTHYROIDISM?

Mild hyperthyroidism (slightly elevated thyroid hormone levels, minimal symptoms) often is monitored closely without therapy as long as both the mother and the baby are doing well. When hyperthyroidism is severe enough to require therapy, anti-thyroid medications are the treatment of choice, with PTU being preferred in the first trimester. The goal of therapy is to keep the mother's free T4 in the high-normal to mildly elevated range on the lowest dose of antithyroid medication. Addition of levothyroxine to ATDs ("block-and-replace") is not recommended. Targeting this range of free hormone levels will minimize the risk to the baby of developing [hypothyroidism](#) or [goiter](#). Maternal hypothyroidism should be avoided. Therapy should be closely monitored during pregnancy. This is typically done by following thyroid function tests (TSH and thyroid hormone levels) monthly.

## 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)





# Hyperthyroidism in Pregnancy

In patients who cannot be adequately treated with anti-thyroid medications (i.e. those who develop an allergic reaction to the drugs), surgery is an acceptable alternative. Surgical removal of the thyroid gland is safest in the second trimester.

Radioiodine is contraindicated to treat hyperthyroidism during pregnancy since it readily crosses the placenta and is taken up by the baby's thyroid gland. This can cause destruction of the gland and result in permanent hypothyroidism.

Beta-blockers can be used during pregnancy to help treat significant palpitations and tremor due to hyperthyroidism. They should be used sparingly due to reports of impaired fetal growth associated with long-term use of these medications. Typically, these drugs are only required until the hyperthyroidism is controlled with anti-thyroid medications.

## WHAT IS THE NATURAL HISTORY OF GRAVES' DISEASE AFTER DELIVERY?

Graves' disease typically worsens in the postpartum period or may occur then for the first time. When new hyperthyroidism occurs in the first months after delivery, the cause may be either Graves' disease or postpartum thyroiditis and testing with careful follow-up is needed to distinguish between the two. Higher doses of anti-thyroid medications may be required during this time. As usual, close monitoring of thyroid function tests is necessary.

## CAN THE MOTHER WITH GRAVES' DISEASE, WHO IS BEING TREATED WITH ANTI-THYROID DRUGS, BREASTFEED HER INFANT?

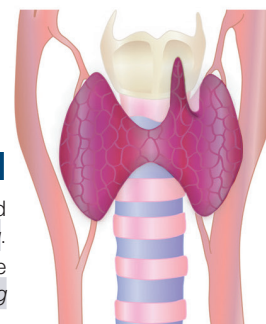
Yes. Although very small quantities of both PTU and methimazole are transferred into breast milk, total daily doses of up to 20mg methimazole or 450mg PTU are considered safe and monitoring of the breastfed infants' thyroid status is not required.



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# Hypothyroidism in Pregnancy

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## WHAT IS THE INTERACTION BETWEEN THE THYROID FUNCTION OF THE MOTHER AND THE BABY?

For the first 18-20 weeks of pregnancy, the baby is completely dependent on the mother for the production of thyroid hormone. By mid-pregnancy, the baby's thyroid begins to produce thyroid hormone on its own. The baby,

however, remains dependent on the mother for ingestion of adequate amounts of iodine, which is essential to make the thyroid hormones. The World Health Organization recommends iodine intake of 250 micrograms/day during pregnancy to maintain adequate thyroid hormone production. Because iodine intakes in pregnancy are currently low in the United States, the ATA recommends that US women who are planning to become pregnant, who are pregnant, or breastfeeding, should take a daily supplement containing 150 mcg of iodine.

## HYPOTHYROIDISM & PREGNANCY

### WHAT ARE THE MOST COMMON CAUSES OF HYPOTHYROIDISM DURING PREGNANCY?

Overall, the most common cause of hypothyroidism is the autoimmune disorder known as Hashimoto's thyroiditis (see [Hypothyroidism brochure](#)). Hypothyroidism can occur during pregnancy due to the initial presentation of Hashimoto's thyroiditis, inadequate treatment of a woman already known to have hypothyroidism from a variety of causes, or over-treatment of a hyperthyroid woman with anti-thyroid medications. Approximately, 2.5% of women will have a TSH of greater than 6 mIU/L (slightly elevated) and 0.4% will have a TSH greater than 10 mIU/L during pregnancy.

### WHAT ARE THE RISKS OF HYPOTHYROIDISM TO THE MOTHER?

Untreated, or inadequately treated, hypothyroidism has increased risk of miscarriage, and has been associated with maternal anemia, myopathy (muscle pain, weakness), congestive heart failure, pre-eclampsia, placental abnormalities, and postpartum hemorrhage (bleeding). These complications are more likely to occur in women with severe hypothyroidism. Some risks also appear to be higher in women with antibodies against thyroid peroxidase (TPO). Women with mild hypothyroidism may have no symptoms or attribute symptoms they have to the pregnancy.



# Hypothyroidism in Pregnancy

## WHAT ARE THE RISKS OF MATERNAL HYPOTHYROIDISM TO THE BABY?

Thyroid hormone is critical for brain development in the baby. Children born with congenital hypothyroidism (no thyroid function at birth) can have severe cognitive, neurological and developmental abnormalities if the condition is not recognized and treated promptly. With early treatment, these developmental abnormalities largely can be prevented. Consequently, all newborn babies in the United States are screened for congenital hypothyroidism so they can be treated with thyroid hormone replacement therapy as soon as possible.

Untreated severe hypothyroidism in the mother can lead to impaired brain development in the baby. Recent studies have suggested that mild developmental brain abnormalities also may be present in children born to women who had mild untreated hypothyroidism during pregnancy. At this time, there is no general consensus of opinion regarding screening all women for hypothyroidism during pregnancy. However, the ATA recommends checking a woman's TSH as soon as pregnancy is confirmed in women at high risk for thyroid disease, such as those with prior treatment for hyper- or hypothyroidism, a family history of thyroid disease, a personal history of autoimmune disease, and those with a goiter.

Women with established hypothyroidism should have a TSH test as soon as pregnancy is confirmed. They also should immediately increase their levothyroxine dose, because thyroid hormone requirements increase during pregnancy. (See below for specific dosing recommendations.) If new onset hypothyroidism has been detected, the woman should be treated with levothyroxine to normalize her TSH values (see *Hypothyroidism brochure*).

## WHO SHOULD BE TREATED FOR HYPOTHYROIDISM DURING PREGNANCY?

Women found to have a TSH level greater than 10 mIU/L in the first trimester of pregnancy should be treated for hypothyroidism. Conversely, women with a TSH of 2.5 or less, do not need levothyroxine treatment. For women with TSH measured between these (2.5-10), ATA recommendations for treatment vary and may depend on whether or not the mother has TPO antibodies. When TPO antibodies are positive, treatment is recommended when the TSH is above 4 and should be considered when the TSH is between 2.5-4.0. However, when

there are no TPO antibodies (i.e. negative), current ATA recommendations are less strong and suggest that treatment 'may be considered' when TSH is between 2.5-10.0 mIU/L. These recommendations are based on the degree of evidence that exists that treatment with levothyroxine would be beneficial.

## HOW SHOULD A WOMAN WITH HYPOTHYROIDISM BE TREATED DURING PREGNANCY?

The goal of treating hypothyroidism in a pregnant woman is adequate replacement of thyroid hormone. Ideally, hypothyroid women should have their levothyroxine dose optimized prior to becoming pregnant. Levothyroxine requirements frequently increase during pregnancy, usually by 25 to 50 percent. Hypothyroid women taking levothyroxine should independently increase their dose by 20%–30% as soon as pregnancy is diagnosed and should notify their doctor for prompt testing and further evaluation. One means of accomplishing the dose increase is to take two additional tablets weekly of their usual daily levothyroxine dosage. Thyroid function tests should be checked approximately every 4 weeks during the first half of pregnancy to ensure that the woman has normal thyroid function throughout pregnancy. As soon as delivery of the child occurs, the woman may go back to her usual pre-pregnancy dose of levothyroxine. It is also important to recognize that prenatal vitamins contain iron and calcium that can impair the absorption of thyroid hormone from the gastrointestinal tract. Consequently, levothyroxine and prenatal vitamins should not be taken at the same time and should be separated by at least 4 hours.

## SPECIAL CONSIDERATIONS FOR WOMEN WITH A HISTORY OF GRAVES' DISEASE

In addition to the dosing and testing considerations explained in this brochure, women with a history of *Graves' disease* who were treated with radioiodine (RAI) or surgical thyroidectomy should also have Graves' antibodies (TRAb) tested early in pregnancy to assess the risk of passing antibodies on to the fetus. If antibodies are elevated, follow-up testing is recommended at weeks 18-22, and if antibodies are still elevated, additional follow-up is recommended at weeks 30-34 to evaluate the need for fetal and neonatal monitoring.



## 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).

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