

Clinical THYROIDOLOGY FOR PATIENTS



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THYROID CANCER Survival is similar in high risk thyroid cancer patients treated with radioactive iodine therapy after either thyroid hormone withdrawal or recombinant human TSH

After the initial surgery for thyroid cancer, many patients are treated with radioactive iodine. Patients are prepared for radioactive iodine treatment by increasing TSH levels, either by withdrawing thyroid hormone and becoming hypothyroid (THW) or by administering TSH in the form of rhTSH (Thyrogen). This study compares the survival of high risk patients with thyroid cancer metastatic to the bones and lung who were treated with radioactive iodine after rhTSH as compared to after THW.

Tala H et al. Five-year survival is similar in thyroid cancer patients with distant metastases prepared for radioactive iodine therapy with either thyroid hormone withdrawal or recombinant human TSH. *J Clin Endocrinol Metab.* May 11, 2011. 3

THYROID AND PREGNANCY Hyperthyroidism in Patients with Gestational Trophoblastic Disease (GTD)

A rare complication of pregnancy is a disorder known as gestational trophoblastic disease (GTD). In these cases, very high levels of hCG are produced which can stimulate the thyroid. The purpose of this study was to examine the thyroid function of patients with GTD.

Walkington L et al. Hyperthyroidism and human chorionic gonadotrophin production in gestational trophoblastic disease. *Br J Cancer* 2011;104:1665-9. *Epub* April 26, 2011. 5

THYROID NODULES A negative FDG-PET scan excludes the diagnosis of cancer in thyroid nodules with non-diagnostic cytology

Patients with thyroid nodules that are biopsied with "non-diagnostic" cytology may need to undergo repeat biopsy or surgery to determine if the nodule is actually cancerous. The authors of this study looked at existing studies to determine if FDG-PET would be helpful in determining if patients with a non-diagnostic FNAB have thyroid cancer.

Giovanella L. et al. ¹⁸FDG-positron emission tomography/computed tomography (PET/CT) scanning in thyroid nodules with nondiagnostic cytology. *Clin Endocrinol* 2011;74:644-8. 6

THYROID NODULES Laser treatment for benign thyroid nodules

Thyroid nodules are extremely common in adults and most nodules are benign. Laser treatments have

been reported to shrink thyroid nodules without surgery. This study was done to see how effective using lasers are in shrinking benign thyroid nodules.

Døssing H et al. Long-term outcome following interstitial laser photocoagulation of benign cold thyroid nodules. *Eur J Endocrinol* 2011;165:123-8. *Epub* May 6, 2011. ... 8

THYROID AND PREGNANCY Radioactive Iodine

Exposure and Pregnancy Radioactive iodine is a common therapy used in the treatment of thyroid. Although generally well tolerated, a number of side effects may occur and there have been concerns about the effect of radioactive iodine on reproductive function and fertility. The effects of radioactive iodine treatment on reproductive function and future pregnancy is reviewed in this study.

Sioka C, Totopoulos A. Effects of I-131 therapy on gonads and pregnancy outcome in patients with thyroid cancer. *Fertil Steril* 2011. 95:1552-9. 9

AUTOIMMUNE THYROID DISEASE Hashimoto's thyroiditis is associated with other autoimmune disorders more frequently than Graves' disease

Hashimoto's thyroiditis and Graves' disease are autoimmune disorders of the thyroid. In general, once someone has one autoimmune disorder, they are at higher risk of developing a second autoimmune disorder. This study was performed to determine how common other autoimmune diseases occur in patients with either Hashimoto's thyroiditis or Graves' disease.

Wiebolt J et al. Clustering of additional autoimmunity behaves differently in Hashimoto's patients compared with Graves' patients. *Eur J Endocrinol* 2011;164:789-94. *Epub* March 4, 2011. 10

THYROID CANCER Increased intake of nitrate in the diet reported by American men diagnosed with thyroid cancer

Thyroid cancer is the fastest rising cancer diagnosed in men. The reasons for this increase are not completely understood, although environmental factors may play a role. This study explored whether nitrate and nitrite taken in the diet may be related to the risk of developing thyroid cancer in an American population.

Kilfoy BA, et al. Dietary nitrate and nitrite and the risk of thyroid cancer in the NIH-AARP Diet and Health Study. *Int J Cancer* 2011;129:160-72. doi: 10.1002/ijc.25650. *Epub* November 18, 2010. 12

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Clinical Thyroidology for Patients

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CLINICAL THYROIDOLOGY **FOR PATIENTS**

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EDITOR'S COMMENTS

Welcome to **Clinical Thyroidology for Patients**. This publication is a collection of summaries of the top articles from the recent medical literature that cover the broad spectrum of thyroid disorders. *Clinical Thyroidology for Patients* is published on a monthly basis and includes summaries of research studies that were discussed in the previous month's issue of *Clinical Thyroidology*, a publication of the American Thyroid Association for physicians. This means that you, the patients, are getting the latest information on thyroid research and treatment almost as soon as your physicians. The **Calendar of Events** highlights educational forums and support groups that are organized around the country by members of the **Alliance for Thyroid Patient Education**. The *Alliance* member groups consist of: the *American Thyroid Association*, the *Graves' Disease Foundation*, the *Light of Life Foundation* and *ThyCa: Thyroid Cancer Survivors Association*.

In this issue, the studies ask the following questions:

- What are the risks of radioactive iodine on future pregnancy?
- How often do high hCG levels cause hyperthyroidism?
- How often do patients with Graves' disease or Hashimoto's thyroiditis have other autoimmune disorders?
- Can benign thyroid nodules be treated with laser therapy and avoid surgery?
- Does FDG-PET scanning have any role in interpreting thyroid biopsy results?
- Do dietary nitrates cause thyroid cancer in men?
- Is recombinant TSH as effective as thyroid hormone withdrawal in treating patients with metastatic thyroid cancer with radioactive iodine?

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

HOW TO NAVIGATE THIS DOCUMENT: The Table of Contents and the Bookmarks are linked to the articles. To navigate, move your cursor over the article title you wish to see (either in the Contents or in the Bookmarks panel) and the hand will show a pointing finger, indicating a link. Left-click the title and the article will instantly appear. To return to the Contents, move the cursor to the bottom of the page and left-click **Back to Table of Contents**.

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THYROID CANCER

Survival is similar in high risk thyroid cancer patients treated with radioactive iodine therapy after either thyroid hormone withdrawal or recombinant human TSH

BACKGROUND

After the initial surgery for thyroid cancer, many patients are treated with radioactive iodine. Patients are prepared for radioactive iodine treatment by increasing TSH levels, either by stopping thyroid hormone therapy for a period of time and becoming hypothyroid (thyroid hormone withdrawal, THW) or by administering TSH in the form of recombinant human TSH (rhTSH, Thyrogen). Either way is effective in treating any remaining cancer that remains in the neck as well as cancer that has spread into the lymph nodes of the neck. It is not clear if whether rhTSH is as effective as THW in treating thyroid cancer that has spread outside of the neck (metastatic) into the bones or lung. This study compares the survival of high risk patients with thyroid cancer metastatic to the bones and lungs who were treated with radioactive iodine after rhTSH as compared to after THW.

THE FULL ARTICLE TITLE:

Tala H et al. Five-year survival is similar in thyroid cancer patients with distant metastases prepared for radioactive iodine therapy with either thyroid hormone withdrawal or recombinant human TSH. *J Clin Endocrinol Metab.* May 11, 2011.

SUMMARY OF THE STUDY

This study examined the records of 175 patients with thyroid cancer and spread to bone (28%), lungs (52%) or both (19%) from 1993 to 2010. A total of 35 patients were treated with radioactive iodine after THW, 58 after rhTSH, and 82 patients had THW with one or more treatments and subsequently radioactive iodine was administered after rhTSH.

There was no difference in survival between patients in any of the groups. Age was the only predictor of overall survival, with a decreased survival in the older patients. Separating out the patients with spread of the cancer to the lung also showed that radioactive iodine after rhTSH was equally effective as after THW. The average survival of patients with spread of the cancer to the lung was 12.5 years.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This is the first report to show a similar 5-year survival rate in patients with thyroid cancer metastatic to the lung and bones treated with radioactive iodine after preparation with either THW or rhTSH. This study is exciting because it suggests that most patients can be effectively treated with radioactive iodine after rhTSH and do not have to become hypothyroid for the treatment. More studies need to be done to confirm these findings.

— M. Regina Castro, MD

ATA THYROID BROCHURE LINKS

Thyroid cancer: http://thyroid.org/patients/patient_brochures/cancer_of_thyroid.html

Radioactive Iodine Therapy: http://thyroid.org/patients/patient_brochures/radioactive.html

Hypothyroidism: http://thyroid.org/patients/patient_brochures/hypothyroidism.html

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THYROID CANCER, 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.

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

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).

Recombinant human TSH (rhTSH): human TSH that is produced in the laboratory and used to produce high levels of TSH in patients after an intramuscular injection. This is mainly used in thyroid cancer patients before treating with radioactive iodine or performing a whole body scan. The brand name for rhTSH is Thyrogen™.

Thyroid Hormone Withdrawal (THW): this is used to produce high levels of TSH in patients by stopping thyroid hormone pills and causing short-term hypothyroidism. This is mainly used in thyroid cancer patients before treating with radioactive iodine or performing a whole body scan.



THYROID AND PREGNANCY

Hyperthyroidism in Patients with Gestational Trophoblastic Disease (GTD)

BACKGROUND

The normal pregnancy hormone, human chorionic gonadotropin (hCG), is similar in some ways to TSH. At high enough levels hCG can mimic TSH, bind to the TSH receptor and turn on the thyroid, producing mild hyperthyroidism. This can occasionally be seen in the 1st trimester of pregnancy, especially in women with a lot of morning sickness. A rare complication of pregnancy is a disorder known as gestational trophoblastic disease (GTD). This occurs when the normal placental tissue grows abnormally into a large mass of grape-like structures called a hydatidiform mole. In these cases, very high levels of hCG are produced. The purpose of this study was to examine the thyroid function in patients with GTD.

THE FULL ARTICLE TITLE:

Walkington L et al Hyperthyroidism and human chorionic gonadotrophin production in gestational trophoblastic disease. *Br J Cancer* 2011;104:1665-9. Epub April 26, 2011.

SUMMARY OF THE STUDY

Over a 5 year period, 196 patients with GTD were treated at the Sheffield Trophoblastic Disease Centre

in England. A total of 7% of patients were found to have biochemical hyperthyroidism and 2% patients had clinical hyperthyroidism. Three of the four patients have extremely high hCG levels and one had a life-threatening complication of the hyperthyroidism (congestive heart failure). In all patients, the thyroid function normalized as the serum hCG levels fell with appropriate therapy directed at the GTD.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Although hyperthyroidism is a rare complication of GTD, when it is present, it can be severe and potentially life-threatening. Fortunately, these days, GTD is usually diagnosed at an early stage before the hCG levels reach levels high enough to cause severe hyperthyroidism.

— Glenn Braunstein, MD

ATA THYROID BROCHURE LINKS

Hyperthyroidism: <http://thyroid.org/patients/patient-brochures/hyperthyroidism.html>

ABBREVIATIONS & DEFINITIONS

Gestational Trophoblastic Disease (GTD): this occurs with the normal placental tissue grows abnormally into a large mass of grape-like structures called a hydatidiform mole which secretes large amounts of hCG. In rare cases these high levels of hCG can cause mild hyperthyroidism.

Human Chorionic Gonadotropin (hCG): the major hormone produced by the placenta which is closely

related to thyroid stimulating hormone (TSH). hCG can bind to the TSH receptors present in thyroid tissue and act like a weak form of TSH to cause the thyroid to produce and release more thyroxine and triiodothyronine. hCG is the hormone measured in the pregnancy tests.

TSH Receptor: a molecule (protein) located on the thyroid cell surface that binds TSH and stimulates the production of the thyroid hormones within the thyroid cell.



THYROID NODULES

A negative FDG-PET scan excludes the diagnosis of cancer in thyroid nodules with non-diagnostic cytology

BACKGROUND

Thyroid nodules are very common and raise the possibility of thyroid cancer. Fine needle aspiration biopsy (FNAB) is the best test to determine whether a thyroid nodule is cancerous outside of surgery. In some cases, the FNAB is described as “non-diagnostic” by the pathologist, meaning that they are unable to provide information about the nodule, usually because there was not enough material obtained during the biopsy. These patients may need to undergo repeat biopsy or surgery to determine if the nodule is actually cancerous. ¹⁸F-2-fluoro-2-deoxy-d-glucose-positron emission tomography (FDG-PET), which is commonly used in the evaluation of cancer, has been studied with regard to its role in thyroid nodules. The authors of this study looked at existing studies to determine if FDG-PET would be helpful in determining if patients with a non-diagnostic FNAB have thyroid cancer.

THE FULL ARTICLE TITLE:

Giovanella L. et al. ¹⁸FDG-positron emission tomography/computed tomography (PET/CT) scanning in thyroid nodules with nondiagnostic cytology. *Clin Endocrinol* 2011;74:644-8.

SUMMARY OF THE STUDY

The authors looked at 151 patients that had non-diagnostic results on FNAB. The FNAB was repeated in these patients and 88 of the 151 patients had a non-diagnostic second biopsy. All of these patients underwent an FDG-PET scan followed by surgery to remove the lobe of the thyroid that contained the nodule. All 29 patients with cancer had a positive FDG-PET scan. Of the 59 patients with a benign nodule, 35 patients had a negative FDG-PET scan and the other 24 had a positive FDG-PET scan. This means that if surgery was based solely on the FDG-PET scan, then 40%

of patients with non-diagnostic results on FNAB would not have needed surgery.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study showed that a negative FDG-PET scan in patients with non-diagnostic FNAB results rules out the diagnosis of thyroid cancer. Conversely, while a positive FDG-PET scan was found in all thyroid cancers, over half of the positive scans were produced by benign thyroid nodules. This study is similar to the article in the July issue of *Clinical Thyroidology for Patients*, which looked at the role of FDG-PET scanning of patients with FNAB findings that are indeterminate. (http://thyroid.org/patients/ct/volume4/issue6/ct_patients_v46_3_4.html)

As the cost of FDG-PET scans is currently high, this test is unlikely to be routinely performed as part of the work-up of thyroid nodules. But as the cost comes down, there may be a role in for FDG-PET in patients with thyroid nodules with a non-diagnostic and indeterminate FNAB to rule out thyroid cancer and potentially avoid surgery in a large number of patients.

— Ronald Koppersmith, MD

ATA THYROID BROCHURE LINKS

Thyroid cancer: http://thyroid.org/patients/patient_brochures/cancer_of_thyroid.html

Thyroid Surgery: http://thyroid.org/patients/patient_brochures/surgery.html

Thyroid Nodules: http://thyroid.org/patients/patient_brochures/nodules.html

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THYROID NODULES, continued

ABBREVIATIONS & DEFINITIONS

Thyroid Fine Needle Aspiration Biopsy (FNAB): a simple procedure that is done in the doctor's office to determine if a thyroid nodule is benign (non-cancerous) or cancer. The doctor uses a very thin needle to withdraw cells from the thyroid nodule. Patients usually return home or to work after the biopsy without any ill effects.

¹⁸F-2-Fluoro-2-Deoxy-d-Glucose-Positron Emission Tomography (FDG-PET): is a scan that is commonly performed to determine whether metastatic cancer is present or after treatment to determine the resolution of certain cancers. Its' role in thyroid cancer is still being studied.

Non-Diagnostic Thyroid Biopsy: this happens when there are not enough thyroid cells or atypical cells obtained during the biopsy to provide a diagnosis. This occurs in 5-10% of biopsies. This often results in the need to repeat the biopsy.

Indeterminate Thyroid Biopsy: this happens usually when the diagnosis is a follicular or hurtle cell lesion. Follicular and hurtle cells are normal cells found in the thyroid. Current analysis of thyroid biopsy results cannot differentiate between follicular or hurtle cell cancer from noncancerous adenomas. This occurs in 15-20% of biopsies and often results in the need for surgery to remove the nodule.



THYROID NODULES

Laser treatment for benign thyroid nodules

BACKGROUND

Thyroid nodules are extremely common in adults. Large nodules (>1 cm) are usually biopsied and a diagnosis of either thyroid cancer or suspicious for cancer is made in about 20-30% of nodules, leading to thyroid surgery. The remaining 70-80% are benign (non-cancerous) and usually monitored without surgery. However, there are other options that are not commonly used to try to shrink these benign nodules. One such treatment is using laser treatments to shrink the nodule. This is performed by inserting the laser probe into the thyroid through a large biopsy needle. This study was done to see how effective using lasers are in shrinking benign thyroid nodules.

THE FULL ARTICLE TITLE:

Døssing H et al. Long-term outcome following interstitial laser photocoagulation of benign cold thyroid nodules. *Eur J Endocrinol* 2011;165:123-8. Epub May 6, 2011.

SUMMARY OF THE STUDY

The study included 78 Danish patients with a single benign thyroid nodule. Each patient received one laser treatment to the nodule. Treatments varied and lasted anywhere from 5-40 minutes. On average, nodules

shrank to about half of the original size and most patients reported an improvement in neck pressure and their cosmetic appearance. The best response occurred in those with smaller nodules. However, 36% of patients needed to eventually have thyroid surgery because of an unsatisfactory result. The major complication was a moderate amount of pain to the neck for up to 4 days.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The results of this study suggest an alternative treatment for patients with benign thyroid nodules. Laser treatment can shrink thyroid nodules in patients for whom surgery is not a suitable option. However, the treatment can be expensive, take a long time and requires special equipment. The results are somewhat unpredictable and work best in patients with small nodules. Most times, the patients with these small nodules may not even require any treatment other than routine monitoring with an ultrasound.

— Angela Leung, MD

ATA THYROID BROCHURE LINKS

Thyroid Nodules: http://thyroid.org/patients/patient_brochures/nodules.html

ABBREVIATIONS & DEFINITIONS

Thyroid Nodule: an abnormal growth of thyroid cells that forms a lump within the thyroid. While most thyroid nodules are non-cancerous (Benign), ~5% are cancerous.

Thyroid Fine Needle Aspiration Biopsy (FNAB): a simple procedure that is done in the doctor's office to determine if a thyroid nodule is benign (non-cancerous) or cancer. The doctor uses a very thin needle to withdraw cells from the thyroid nodule. Patients usually return home or to work after the biopsy without any ill effects.



THYROID AND PREGNANCY

Radioactive Iodine Exposure and Pregnancy

BACKGROUND

Radioactive iodine is a common therapy used in the treatment of thyroid cancer and hyperthyroidism. It is taken up and concentrated by the thyroid cells and the radiation, in turn, kills the cells. Much higher doses are used for the treatment of thyroid cancer than hyperthyroidism. Although generally well tolerated, a number of side effects may occur and there have been concerns about the effect of radioactive iodine on reproductive function and fertility. In this article, the authors reviewed the published medical literature on the effects of radioactive iodine treatment use in thyroid cancer on reproductive function and future pregnancy.

THE FULL ARTICLE TITLE:

Sioka C, Totopoulos A. Effects of I-131 therapy on gonads and pregnancy outcome in patients with thyroid cancer. *Fertil Steril* 2011. 95:1552-9.

SUMMARY OF THE STUDY

A total of 54 studies were selected for this review article. Only studies on the effects of radioactive iodine used for thyroid cancer therapy on male and female reproductive function (testicular and ovarian function), lactation (breastfeeding) and pregnancy outcomes were included. In women, radioactive iodine exposure for thyroid cancer therapy appears to cause short-lived menstrual irregularities in approximately 30% of patients and may be associated with an earlier age of menopause. In men,

decreased sperm counts following radioactive iodine therapy have been observed, but these changes generally resolve. Radioactive iodine exposure does not appear to be associated with an increased risk of miscarriage or abnormal subsequent pregnancies. Information on radioactive iodine and breastfeeding is lacking, but due to the potential for exposure to a baby via breast milk, radioactive iodine treatment should be avoided if a woman is breastfeeding.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Although radioactive iodine therapy is associated with alterations in reproductive function in both men and women, these changes are usually short-lived. Pregnancies achieved after exposure to radioactive iodine treatment do not appear to be at increased risk for negative outcomes. Nevertheless, it is recommended that pregnancy be avoided for 1 year following radioactive iodine therapy to allow reproductive function to normalize.

— Whitney Woodmansee, MD

ATA THYROID BROCHURE LINKS

Thyroid cancer: http://thyroid.org/patients/patient_brochures/cancer_of_thyroid.html

Radioactive Iodine Therapy: http://thyroid.org/patients/patient_brochures/radioactive.html

Thyroid and Pregnancy: http://thyroid.org/patients/patient_brochures/pregnancy.html

ABBREVIATIONS & DEFINITIONS

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).

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



AUTOIMMUNE THYROID DISEASE

Hashimoto's thyroiditis is associated with other autoimmune disorders more frequently than Graves' disease

BACKGROUND

Hashimoto's thyroiditis is the most common cause of hypothyroidism in the United States and Graves' disease is the most common cause of hyperthyroidism. Both of these are autoimmune disorders, meaning that they are caused by the body's immune system producing antibodies that get confused and attack the body's own tissues. In general, once someone has one autoimmune disorder, they are at higher risk of developing a second autoimmune disorder. This study was performed to determine how common other autoimmune diseases, such as type 1 diabetes, celiac disease, Addison's disease and pernicious anemia, occur in patients with either Hashimoto's thyroiditis or Graves' disease.

THE FULL ARTICLE TITLE:

Wiebolt J et al. Clustering of additional autoimmunity behaves differently in Hashimoto's patients compared with Graves' patients. *Eur J Endocrinol* 2011;164:789-94. Epub March 4, 2011.

SUMMARY OF THE STUDY

A total of 882 patients were studied: 523 patients with Graves' disease and 359 with Hashimoto's thyroiditis. The patient's average age was 50 years. Type 1 diabetes was

most often associated with the thyroid disorders and was more common in patients with Hashimoto's thyroiditis (15.9%) than Graves' disease (9.2%). Similarly, Addison's disease was more common in patients with Hashimoto's thyroiditis (5.3%) than Graves' disease (1.7%). There was no difference between the occurrence of pernicious anemia or celiac disease within the two thyroid disorders.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Type 1 diabetes and Addison's disease more commonly seen in patients with Hashimoto's thyroiditis than Graves' thyroid disease. This study shows that doctors certainly need to be aware of these two disorders in patients with Hashimoto's thyroiditis or Graves' disease. Further, this study suggests that patients with Hashimoto's thyroiditis should be periodically screened for diabetes and adrenal insufficiency. Further studies are needed before making this a general recommendation.

— Heather Hofflich, DO

ATA THYROID BROCHURE LINKS

Thyroiditis: http://thyroid.org/patients/patient_brochures/thyroiditis.html

ABBREVIATIONS & DEFINITIONS

Hashimoto's Thyroiditis: the most common cause of hypothyroidism in the United States. It is caused by antibodies that attack the thyroid and destroy the gland.

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.

Antibodies: proteins that are produced by the body's immune cells that attack and destroy bacteria and viruses that cause infections. Occasionally the antibodies get confused and attack the body's own tissues, causing autoimmune disease.

Autoimmune disorders: a diverse group of disorders that are caused by antibodies that get confused and attack the body's own tissues. The disorder depends on what tissue the antibodies attack. Graves' disease and Hashimoto's thyroiditis are examples of autoimmune thyroid disease. Other autoimmune disorders include: type 1 diabetes mellitus, Addison's disease (adrenal insufficiency), vitiligo (loss of pigment of some areas of the skin), systemic lupus erythematosus, pernicious anemia (B12 deficiency), celiac disease, inflammatory bowel disease, myasthenia gravis, multiple sclerosis and rheumatoid arthritis.

Type 1 Diabetes: diabetes caused by antibodies that destroy the insulin producing cells of the pancreas. Patients with this form of diabetes require insulin to control their blood sugar.



AUTOIMMUNE THYROID DISEASE, continued

Addison's Disease/Adrenal Insufficiency: a rare, chronic endocrine disorder where the adrenal glands are destroyed by antibodies and do not produce enough steroid hormones (glucocorticoids and often mineralocorticoids).

Celiac Disease: an autoimmune disorder of the small intestine that occurs in genetically predisposed people of all ages from middle infancy onward.

Pernicious Anemia/B12 Deficiency: caused by antibodies that destroy the cells in the stomach that produce a protein that is needed for the body to absorb vitamin B12, causing a severe anemia (low blood count).



THYROID CANCER

Increased intake of nitrate in the diet reported by American men diagnosed with thyroid cancer

BACKGROUND

Thyroid cancer is the fastest rising cancer diagnosed in men as well as women. The reasons for this increase are not completely understood, although environmental factors may play a role. One such environmental factor is nitrate in the diet because: a) nitrate prevents iodide from being transported into the thyroid gland where it is used to make the thyroid hormones and b) nitrate is converted to nitrite by bacteria in the mouth and nitrite may be involved in the production of particles that may increase the risk of cancer in animals. Nitrates are found in lettuce, spinach and broccoli while nitrites are found in cold cuts, pasta and bread. This study explored whether nitrate and nitrite taken in the diet may be related to the risk of developing thyroid cancer in an American population.

THE FULL ARTICLE TITLE:

Kilfoy BA, et al. Dietary nitrate and nitrite and the risk of thyroid cancer in the NIH-AARP Diet and Health Study. *Int J Cancer* 2011;129:160-72. doi: 10.1002/ijc.25650. Epub November 18, 2010.

SUMMARY OF THE STUDY

The authors used a data from the NIH-AARP Diet and Health Study, in which a written survey was mailed to 3.5 million AARP members who were 50 to 71 years of age, starting in 1995. A total of 490,194 questionnaires were completed and analyzed. The intake of nitrates and nitrites was estimated for each participant, based on responses to dietary questions in the survey and a review of the literature on nitrate and nitrite content of foods. The major sources of nitrate in the diet were found to be lettuce, spinach and broccoli. The major sources of nitrite in the diet were found to be cold cuts, pasta and bread. A total of 370 cases of

thyroid cancer were identified in the study participants over a 7 year time period, using data from state cancer registries and a national database on deaths. There were 170 men and 200 women with thyroid cancer in the study. A total of 67% of the thyroid cancers were papillary cancers and 18% of the thyroid cancers were follicular cancers. Men who reported a higher intake of nitrate in the diet, had a higher risk of being diagnosed thyroid cancer (including papillary or follicular types of thyroid cancer). There was no significant relationship between level of nitrate intake and thyroid cancer in women. Level of nitrite intake was not related to thyroid cancer risk in either men or women.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The authors conclude that nitrates in the diet may be related to thyroid cancer risk and that further studies examining this issue are needed. This study does not prove that nitrates cause thyroid cancer, since there may have been other factors that could have affected the risk of thyroid cancer in the people in this study (such as other dietary factors, lifestyle, possible exposure to pesticides on vegetables or other causes). Also there could have been some mistakes in reporting of the dietary questionnaires by participants. Individuals also need to consider the positive effects of vegetables on general health and discuss any possible changes in their diet with their healthcare provider, since eliminating vegetables from diet could potentially contribute to other negative health effects.

— Anna Sawka, MD

ATA THYROID BROCHURE LINKS

Thyroid cancer: http://thyroid.org/patients/patient_brochures/cancer_of_thyroid.html

ABBREVIATIONS & DEFINITIONS

Papillary Thyroid Cancer: the most common type of thyroid cancer.

Follicular Thyroid Cancer: the second most common type of thyroid cancer.

Nitrate: a naturally occurring substance in the diet that prevents iodide from being transported into the

thyroid gland where it is used to make the thyroid hormones. The major sources of nitrate in the diet were found to be lettuce, spinach and broccoli.

Nitrite: a naturally occurring substance in the diet that may be involved in the production of particles that may increase the risk of cancer in animals. Nitrite is produced from nitrate by bacteria in our mouths. The major sources of nitrite in the diet were found to be cold cuts, pasta and bread.



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.

WHO WE ARE

AMERICAN THYROID ASSOCIATION

www.thyroid.org

ATA Patient Resources: <http://www.thyroid.org/patients/>

Find a Thyroid Specialist: www.thyroid.org

Phone (toll-free): 1-800-THYROID

e-mail: thyroid@thyroid.org

ATA Mission: The ATA leads in promoting thyroid health and understanding thyroid biology.

ATA Vision: The ATA is the leading organization focused on thyroid biology and the prevention and treatment of thyroid disorders through excellence and innovation in research, clinical care, education, and public health.

ATA Values: The ATA values scientific inquiry, clinical excellence, public service, education, collaboration, and collegiality.

To further our mission, vision and values the ATA sponsors “Friends of the ATA” online to advance the information provided to patients and the public such as this publication, *Clinical Thyroidology for Patients*. We welcome your support.

GRAVES’ DISEASE FOUNDATION

www.ngdf.org

Phone (toll-free): 1-877-NGDF-123 or 643-3123

e-mail: Gravesdiseasefd@gmail.com

Founded in 1990, the Graves’ Disease Foundation offers support and resources to Graves’ disease patients, their families, and health care professionals. Their mission is to find the cause of and the cure for Graves’ thyroid disease through research, to improve the quality of life for persons with Graves’ disease and their caregivers and to educate persons with Graves’ disease, their caregivers, healthcare professionals, and the general public about Graves’ disease and its treatment. The web site features a monitored bulletin board.

LIGHT OF LIFE FOUNDATION

www.checkyourneck.com

email: info@checkyourneck.com

The Light of Life Foundation, founded in 1997, is a nonprofit organization that strives to improve the quality of life for thyroid cancer patients, educate the public and professionals about thyroid cancer, and promote research and development to improve thyroid cancer care.

THYCA: THYROID CANCER SURVIVORS’ ASSOCIATION, INC.

www.thyca.org

Phone (toll-free): 877 588-7904

e-mail: thyca@thyca.org

ThyCa: Thyroid Cancer Survivors’ Association, Inc., founded in 1995, is an international nonprofit organization, guided by a medical advisory council of renowned thyroid cancer specialists, offering support and information to thyroid cancer survivors, families, and health care professionals worldwide.





ATA Alliance for Thyroid Patient Education CALENDAR OF EVENTS

Educational forums, patient support groups and other patient-oriented meetings

ATA Conferences www.thyroid.org

Nothing is scheduled at this time. Please visit the website for updates.

Graves' Disease Conferences www.ngdf.org

Fall, 2011 — Boston, MA

Annual Patient & Family Conference

Light of Life Foundation www.checkyourneck.com

Ongoing — www.checkyourneck.com

Thyroid Cancer Awareness campaign with Cindy Crawford and Brooke Shields

June 12, 2010 — a previous symposium available online at:

<http://www.checkyourneck.com/About-Thyroid-Cancer/Thyroid-Cancer-Symposium-Presentations>

Thyroid Cancer Symposium Presentations: What's New in Thyroid Cancer? A Day for Patients and Their Families

Please visit the Light of Life Foundation website to view the Patient Educational Symposium which took place in NYC in 2010. As part of the Patient Educational Program these online presentations provide valuable information in hopes that patients everywhere can gain further information and support about their disease.

ThyCa Conferences www.thyca.org

Nothing is scheduled at this time. Please visit the website for updates.