Published in final edited form as:

J Surg Res. 2012 December ; 178(2): 529–532. doi:10.1016/j.jss.2012.09.017.

Is Thyroidectomy in Patients with Hashimoto's Thyroiditis More Risky?

Catherine McManus, B.S., Jie Luo, B.S., Rebecca Sippel, M.D., F.A.C.S., and Herbert Chen, M.D., F.A.C.S.

Section of Endocrine Surgery, Department of Surgery, University of Wisconsin, Madison, WI

Abstract

Background—Hashimoto's thyroiditis (HT) is an organ –specific autoimmune disease characterized by production of antibodies such as anti-thyroperoxidase (TPO), which leads to destruction of the thyroid gland and a decrease in normal thyroid function. Thyroidectomy is performed when the patient presents with symptoms or when potential neoplastic degeneration occurs; however, surgery can be difficult due to the dense inflammatory process around the thyroid gland. We hypothesized that patients with HT may have a higher rate of complications following thyroid surgery.

Methods—We identified 1791 consecutive patients who underwent thyroidectomy from May 1994 to December 2009. Patients with HT were compared to without HT with regard to outcomes with ANOVA and Chi-squared (SPSS, Inc.).

Results—Patients with HT were significantly younger and more likely to be female. There was no significant difference between the two groups in the rate of malignancy. However, patients undergoing thyroidectomy with HT had a significantly higher postoperative complication rate. Specifically, the rates of overall complications, transient complications, and permanent complications were all increased in HT patients.

Conclusion—Patients with HT had a higher rate of complications after thyroidectomy when compared to patients without HT. Therefore, careful consideration must be taken prior to pursuing operative treatment in patients with HT including providing adequate informed consent regarding the increased risks of surgery.

Keywords

Hashimoto's Thyroiditis; Thyroidectomy; Complications

Introduction

Hashimoto's thyroiditis (HT) is an autoimmune disease characterized by the production of anti-thyroid antibodies, such as anti-thyroperoxidase (TPO), that destroy thyroid tissue and can lead to a decrease in normal thyroid function^{1–4}. Known as the most common cause of hypothyroidism and diffuse goiter in the United States, HT occurs more frequently in

© 2012 Elsevier Inc. All rights reserved.

Corresponding Author: Herbert Chen, M.D., F.A.C.S., 600 Highland Avenue, Clinical Science Center K3/705, Madison, WI 53792-7375, Phone: 608.263.1387, Fax: 608.263.7652, chen@surgery.wisc.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

women⁴⁻⁷. On histological appearance, HT is characterized by lymphocyte infiltration, fibrosis, and atrophied follicular cells^{4,8-10}.

Patients with HT are usually treated conservatively with levothyroxine (L-T₄) therapy in an attempt to decrease thyroid volume and supplement thyroid hormone^{5,11,12}. However, there are certain circumstances in which patients with HT are referred for surgery. In general, the indications for surgery in HT patients include suspicion of malignancy, persistent symptoms associated with the disease, or a goiter that is increasing in size^{5,13-15}.

There are some risks associated with thyroid surgery. The most common complication associated with thyroidectomy is hypoparathyroidism, which can occur transiently or permanently as a result of trauma or disruption of the blood supply to the parathyroid glands¹⁶⁻¹⁸. Another frequent complication of thyroidectomy is hoarseness due to recurrent laryngeal nerve (RLN) injury^{3,11,13,19,20}.

When considering surgery, patients must be aware of the risks involved. For patients with HT, thyroidectomy is not usually recommended because the dense inflammatory process that surrounds the thyroid gland can make surgical resection more difficult. Additionally, in patients with HT, the thyroid gland tends to adhere more to its anatomical surroundings, which can increase the risk of damaging structures adjacent to the thyroid such as the parathyroid glands and the recurrent laryngeal nerve¹³. We hypothesized that patients with HT may have a higher rate of complications following thyroid surgery compared to patients without HT.

Materials and Methods

We retrospectively reviewed data from the University of Wisconsin Thyroid Surgery Database. 1791 patients underwent thyroidectomy at the University of Wisconsin from May 1994 to December 2009 and served as our sample population. We divided the total number of patients into two groups for analysis. One group consisted of 311 patients who were diagnosed with HT, either as a primary or associated diagnosis, based on histological analysis of the thyroid tissue. The second group consisted of 1480 patients without a diagnosis of HT based on histology. The following data were collected from patients in both groups: age, gender, and incidence of malignancy.

Patients were evaluated for complications after thyroidectomy. When evaluating patients for hypoparathyroidism, we only considered patients who had a bilateral resection of the thyroid where all of the parathyroid glands were at risk. Consequently, we only included patients who had a total thyroidectomy and excluded patients who had subtotal thyroidectomy or a lobectomy when comparing the two groups for the rate of postoperative hypoparathyroidism. If patients had a parathyroid hormone (PTH) level <10pg/mL within 24 hours of the operation that eventually increased above 10pg/mL within 6 months, they were categorized as having transient hypoparathyroidism. If PTH levels were not recorded and patients had documented hypocalcemia postoperatively that resolved within 6 months, they were also categorized as having transient hypoparathyroidism. If patients had a PTH level of <10pg/mL for longer than 6 months or if they required 1,25-dihydroxycholecalciferol (calcitriol) treatment for 6 months or longer, they were categorized as having permanent hypoparathyroidism. If the patient also had one or more parathyroid glands removed in their thyroidectomy, even if parathyroid tissue was removed unintentionally due to surrounding inflammation, and they experienced hypoparathyroidism, we considered them to have a complication due to thyroid surgery only if they fell into the category of permanent hypoparathyroidism. In other words, when comparing the rates of hypoparathyroidism, we did not include patients who had parathyroid gland tissue found on pathologic diagnosis,

whether it was intentional or non intentional resection, unless that patient had permanent hypoparathyroidism.

We also evaluated patients for hoarseness due to RLN injury. If patients subjectively experienced any voice hoarseness postoperatively that resolved on its own within 6 months, they were categorized as having transient hoarseness. Patients were considered to have permanent hoarseness if their hoarseness continued for 6 months or longer and was associated with a RLN injury, as determined by their evaluation at the Voice and Swallow Clinic at the University of Wisconsin Madison.

18 patients experienced other complications such as hematoma or infection, and these patients were figured into the rates for overall complications.

A final part of our analysis of postoperative complications was to compare HT to non-HT patients when controlling for the incidence of malignancy. Of the 1791 patients in our sample population, 539 had a diagnosis of malignancy on final pathology. When excluding patients with malignancy, our total sample size became 1252 patients, 225 with HT and 1027 without HT and those two groups were evaluated for the presence of postoperative complications. Patient data collection and analysis were approved through the University of Wisconsin Human Subjects and Institutional Review Board.

SPSS statistical software (SPSS, Inc., Chicago, IL) was used to analyze the data and compare HT patients and non-HT patients with regard to outcomes. The data were analyzed with ANOVA and Chi-squared to determine the statistical significance between HT patients and non-HT patients. Statistical significance was defined as a p-value of <0.05.

Results

In analyzing the demographics of the two groups, patients with HT had a mean age of 47 ± 0.9 years (mean $\pm$ SEM) and patients without HT had a mean age of 49 ± 0.4 years. This difference was statistically significant with a p-value of 0.034. With regard to gender, the percent female among patients with HT was 89%, compared to 76% in non-HT patients, and this difference was statistically significant with a p-value of 0.0001. However, the patients with HT were considered similar to patients without HT with regards to incidence of malignancy (Table I).

Operations performed included thyroid lobectomy (47%), subtotal thyroidectomy (3%), total thyroidectomy (49%), or other (<1%). Overall, we found that 47 of 311 HT patients (15.1%) experienced a complication after thyroidectomy, compared to 130 of 1480 non-HT patients (8.8%), and this difference was statistically significant with a p-value of 0.001. When considering transient complications, 37 of 311 patients with HT (11.9%) experienced a transient complication, compared to 100 of 1480 patients without HT (6.8%), with a statistically significant p-value of 0.002 (Table II). More specifically, 30 of 311 patients with HT (9.6%) experienced transient hypoparathyroidism, compared to 75 of 1480 patients without HT (5.1%), and this difference was statistically significant with a p-value of 0.002. There was no significant difference between the two groups in the rate of transient hoarseness (Figure I).

When considering permanent complications, 8 of 311 patients with HT (2.6%) experienced a permanent complication, compared to 12 of 1480 patients without HT (0.8%), with a statistically significant p-value of 0.007 (Table II). 4 of 311 patients with HT (1.3%) experienced permanent hoarseness, compared to 4 of 1480 patients without HT (0.3%) with a statistically significant p-value of 0.015. There was no significant difference between the two groups in the rate of permanent hypoparathyroidism (Figure II).

When excluding patients with malignancy, 28 of the 225 patients with HT (12.4%) experienced a postoperative complication, compared to 59 of 1027 patients without HT (5.7%) with a statistically significant p-value of 0.0001.

Discussion

Treatment for patients with HT is variable and depends on the symptoms that the patient presents with. In general, thyroidectomy is considered for patients if there is a suspicion of malignancy, if patients suffer from persistent symptoms due to the disease, or if patients experience discomfort and compressive symptoms due to an enlarging goiter that does not respond to suppression therapy^{5,9,13–15,21}. However, thyroidectomy is not recommended in general because the thyroid gland is often more difficult to remove in patients with HT.

While much has been published on the indications for surgery in patients with HT, there is some controversy in the published data on postoperative risks for HT patients. Shimizu, et al. performed a study in which they identified surgical indications for patients with HT and reported that subtotal thyroidectomy was the safest procedure for patients with the disease. The 8 HT patients that were included in the study experienced preoperative symptoms and underwent subtotal thyroidectomy. None of the 8 HT patients suffered from postoperative complications, which the authors attributed to the conservative nature of the subtotal thyroidectomy procedure. However, it was difficult to distinguish whether the lack of postoperative complications was truly due to the particular surgical procedure or if it was impacted by the small sample size of the study. In another study, Gyory et al. performed a retrospective analysis of HT patients who underwent thyroidectomy and examined the incidence of malignancy and postoperative complications. Out of the 118 cases of HT, transient RLN injury occurred in 2 cases and permanent RLN injury in 6. Also, 4 patients experienced transient hypoparathyroidism and one patient had permanent hypoparathyroidism. While the authors looked at postoperative complications in HT patients, there was no comparison to a control group of patients without HT who underwent thyroidectomy. Therefore, their study did not indicate whether those complications were more common in HT patients when compared to patients without HT.

Shih, et al. conducted a study to evaluate the rate of postoperative complications and associated cancer in patients with HT. Out of 474 HT patients who underwent thyroidectomy in their study, 152 patients (32.1%) experienced transient hypocalcemia, 2 (0.4%) had hoarseness or transient RLN palsy, and 4 (0.8%) developed a neck hematoma that required evacuation. No patients experienced permanent complications. The authors compared the rate of postoperative complications in HT patients from their study to the rate of postoperative complications in all patients from other published studies. Based on that comparative analysis, the authors concluded that patients with HT who underwent thyroidectomy did not have a higher risk of postoperative complications than patients without HT. While their study included a large sample size and was similar to our study in categorizing patients with postoperative complications, there was no control group used to directly compare the complication rates of HT patients to non-HT patients. Therefore, it is difficult to conclude whether there is a true difference in the rates of postoperative complications in HT patients and non-HT patients based on their study.

The purpose of this study was to determine whether there was a higher rate of postoperative complications among HT patients compared to non-HT patients after thyroidectomy. Our study found that patients with HT were significantly younger and more likely to be female, which is consistent with other published literature^{6,13,22}. Also, we found that there was no difference in the rate of malignancy between the groups. The rate of overall complications was higher among HT patients (15.1%) compared to non-HT patients, as were the rates of

transient complications (11.9%) and permanent complications (6.8%). We found no statistically significant difference between the two groups when examining transient hoarseness and permanent hypoparathyroidism. However, there were statistically significant differences when looking at transient hypoparathyroidism (9.6% in HT patients compared to non-HT patients) and permanent hoarseness (1.3% in HT patients compared to non-HT patients). Furthermore, when we excluded all patients with malignancy from our sample population, we found that patients with HT still had a higher rate of postoperative complications (12.4%) compared to patients without HT (5.74%) and this difference was statistically significant. Thus in addition to finding no difference in the rate of malignancy between the two groups, we also confirmed that the presence of malignancy was not responsible for the difference in postoperative complication rates between HT and non-HT patients.

One of the limitations of the study is the number of variables analyzed. We therefore only performed a univariate analysis. The rate of complications in patients with HT could also be affected by factors associated with HT rather than HT only. We did not perform a multivariate analysis due to the limited number of variables available at the time of the study. While we were able to confirm that HT was a risk factor independent of malignancy, as discussed above, we certainly did not rule out all potential confounding factors.

In this study, patients undergoing thyroidectomy with HT had significantly higher rates of postoperative complications in terms of overall complications, transient complications and permanent complications. Based on our results, we conclude that HT is a risk factor associated with increased complications from thyroid surgery. Therefore careful consideration must be taken prior to pursuing operative treatment in patients with HT including providing adequate informed consent regarding the increased risks of surgery.

Acknowledgments

National Institute of Health (NIH) T32 DC009401 Training Grant.

References

1. Beobachtungen K. Indication of operation in various forms of Hashimoto's thyroiditis. Clinical observations. Munch Med Wochenschr. 1975; 117(13):543–546.
2. Kasagi K, Kousaka T, Higuchi K, et al. Clinical significance of measurements of antithyroid antibodies in the diagnosis of Hashimoto's thyroiditis: comparison with histological findings. Thyroid. 1996; 6(5):445–450. [PubMed: 8936669]
3. Stoll SJ, Pitt SC, Liu J, Schaefer S, Sippel RS, Chen H. Thyroid hormone replacement after thyroid lobectomy. Surgery. 2009; 146(4):558–560.
4. Gasbarri A, Sciacchitano S, Marasco A, Papotti M, et al. Detection and molecular characterization of thyroid cancer precursor lesions in a specific subset of Hashimoto's thyroiditis. British J of Cancer. 2004; 91:1096–1104.
5. Thomas CG, Rutledge RG. Surgical intervention in chronic (Hashimoto's) Thyroiditis. Ann Surg. 1981; 193:769–776. [PubMed: 6894684]
6. Repplinger D, Bargren A, Zhang Y, Adler J, Haymart M, Chen H. Is Hashimoto's thyroiditis a risk factor for papillary thyroid cancer? J Surg Res. 2008; 150:49–52. [PubMed: 17996901]
7. Sharma AK, Paliwal RK, Pendse AK. Hashimoto's thyroiditis—a clinical review. J Postgrad Med. 1990; 36(2):87–90. [PubMed: 2097374]
8. LiVolsi VA. The pathology of autoimmune thyroid disease: a review. Thyroid. 1994; 4(3):333–339. [PubMed: 7833672]
9. Cipolla C, Sandonato L, Graceffa G. Hashimoto thyroiditis coexistent with papillary thyroid carcinoma. Am Surg. 2005; 71:874–878. [PubMed: 16468540]

10. Zaletel K. Determinants of thyroid autoantibody production in Hashimoto's thyroiditis. *Exp Rev of Clin Immunol.* 2007; 3(2):217–223.
11. Shimizu K, Nakajima Y, Kitagawa W, Akasu H, et al. Surgical therapy in Hashimoto's thyroiditis. *J Nippon Med Sch.* 2003; 70(1):34–39. [PubMed: 12646974]
12. Gyory F, Lukacs G, Juhasz F, et al. Surgically treated Hashimoto's thyroiditis. *Acta Chir Hung.* 1999; 38(3–4):243–247. [PubMed: 10935132]
13. Shih ML, Lee JA, Hsieh CB, et al. Thyroidectomy for Hashimoto's thyroiditis: complications and associated cancers. *Thyroid.* 2008; 18(7):729–734. [PubMed: 18631001]
14. Tajiri J. Radioactive iodine therapy for goitrous Hashimoto's thyroiditis. *J Clin Endocrinol Metab.* 2006; 91(11):4497–4500. [PubMed: 16895949]
15. Haymart MR, Repplinger DJ, Leverson GE, Elson DF, Sippel RS, Jaume JC, Chen H. Higher Serum TSH Level in Thyroid Nodule Patients is Associated with Greater Risks of Differentiated Thyroid Cancer and Advanced Tumor Stage. *Journal of Clinical Endocrinology and Metabolism.* 2008; 93:809–814. [PubMed: 18160464]
16. Youngwirth L, Benavidez J, Sippel R, Chen H. Parathyroid hormone deficiency after total thyroidectomy: incidence and time. *J Surg Res.* (In Press).
17. Glinioer D, Andry G, Chantrain G, Samil N. Clinical aspects of early and late hypocalcaemia after thyroid surgery. *Eur J Surg Oncol.* 2000; 26(6):571–577. [PubMed: 11034808]
18. Reeve T, Thompson N. Complications of thyroid surgery: how to avoid them, how to manage them, and observations on their possible effect on the whole patient. *World J Surg.* 2000 Aug; 24(8):971–975. [PubMed: 10865043]
19. Chiang FY, Wang LF, Huang YF, et al. Recurrent laryngeal nerve palsy after thyroidectomy with routine identification of the recurrent laryngeal nerve. *Surgery.* 2004; 137:342–347. [PubMed: 15746790]
20. Bergamaschi R, Becouarn G, Ronceray J, Arnaud JP. Morbidity of thyroid surgery. *Am J Surg.* 1998; 176:71–75. [PubMed: 9683138]
21. Nenkov R, Radev R, Khristozoc K, Kuzmanov Ia, et al. Hashimoto's thyroiditis: indications for surgical treatment. *Khirurgiia(Sofiia).* 2005; (3):28–32.
22. Kurukahvecioglu O, Taneri F, Yuksel O, et al. Total thyroidectomy for the treatment of Hashimoto's thyroiditis coexisting with papillary thyroid carcinoma. *Adv Ther.* 2007; (3):510–516. [PubMed: 17660159]

Figure 1.

Figure 2.

Table I

Demographics of HT patients compared to non-HT patients.

	N	Mean Age (years)	% Female	% Malignancy
HT	311	47 ± 0.9	89%	27.7%
No HT	1480	49 ± 0.4	76%	30.6%
P-value	--	0.034	0.0001	0.302

Table II

Postoperative complications in HT patients compared to non-HT patients.

	N	Total Complications	Transient Complications	Permanent Complications
HT	311	15.1%	11.9%	2.6%
No HT	1480	8.8%	6.8%	0.8%
P-value	--	0.001	0.002	0.007