Is total thyroidectomy more difficult in Hashimoto's thyroiditis?

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Is total thyroidectomy more difficult in Hashimoto's thyroiditis?

AIM: *Hashimoto's thyroiditis (HT) is accepted as a difficult thyroidectomy for surgeons in practice, but there is not enough data in the literature to support this. The aim of this study was to evaluate whether HT belongs to difficult thyroidectomy class or not.*
MATERIAL AND METHODS: *614 patients who undergoing total thyroidectomy were evaluated. 270 patients with factors that prolong the operation were excluded from the study. Group 1 consisted of 132 patients reported as benign diseases accompanied by HT. Group 2 consisted of 212 patients reported as other benign diseases with no HT as a result of pathology. Patients were statistically analyzed for age, sex, finding for (Recurrent Laryngeal Nerve) RLN, time for reaching RLN, time for operation, transient or permanent RLN injury and other postoperative complications.*
RESULTS: *There were statistically significant differences in terms of age, sex, time for operation and time for reaching RLN (respectively; p=0.01, p=0.007, p<0.001 and p<0.001). There was no significant difference between the groups in terms of finding for RLN rates, transient or permanent RLN injury and other postoperative complications (p>0.05).*
CONCLUSION: *The mean time for operation and mean time for reaching RLN in patients with HT was significantly longer than in patients with other benign pathology results. It has been scientifically shown that HT should be among the causes of difficult thyroidectomy. This result can provide a legal advantage for surgeons who face such a sad complication.*

KEY WORDS: Hashimoto thyroiditis, Recurrent laryngeal nerve, Thyroiditis

Introduction

Thyroid surgery is one of the most frequent operations in general surgery practice [1,2]. RLN (Recurrent Laryngeal Nerve) injury and serious complications such as hypoparathyroidism may occur [3,4]. Complications due to thyroidectomy are more common in patients with thyroid malignancies and Graves' disease, and have been accepted as forced thyroidectomy [5,6]. This is considered in malpractice cases and the surgeon's hand in case of a possible complication.

HT is one of the most common autoimmune and endocrine diseases [7,8]. The thyroid gland undergoes filtration of hematopoietic mononuclear cells. Interstitial connective tissue increases, fibrosis develops. The gland usually expands diffuse, and sometimes it can be small and atrophic due to excessive fibrosis [9,10]. In cases where cytology cannot be detected as benign in thyroid nodules or if the thyroid gland grows sufficiently to compress the cervical structures, surgery comes to the agenda [11]. HT is accepted as a forced thyroidectomy among surgeons with the increase of underlying fibrosis. There is not enough data in literature to support this. In this study, we aimed to objectively evaluate whether HT is a difficult thyroidectomy or not.

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Materials and Methods

Between January 2008 and January 2018, in Mersin University General Surgery Department, 614 patients who underwent total thyroidectomy by the same surgeon with same surgical technique were evaluated. In this surgical technique nerve monitoring was performed in all patients. Semi-sitting with neck hyperextension position was given.

The thyroid gland was reached with the Kocher's collar skin incision and standard technique. Vena thyroidea media was tied and cut. Upper pole mobilized. The upper pole vessels were tied close to the thyroid tissue and cut. Dissection order came to the lower pole and lateral. During the RLN dissection, the possible location of the RLN was determined visually, paying attention to all neighborhood relationships. After RLN detection then, the lower pole veins of the thyroid gland were tied and cut from the medial to the lateral. The thyroid gland was removed with isthmus, and dissection was made towards its high position. The thyroid gland was completely removed by applying the same procedures on the opposite side. After the bleeding control was achieved, the layers were closed in the appropriate plan. From skin incision to skin closure elapsed time was recorded as the total operation time. From entering the thyroid lodge the time until the identification of the RLN was recorded as the time for reaching the nerve. The times recorded in the right and left lobes were averaged. 270 patients who had malignancies, Graves' disease, relapses, complementary thyroidectomies, short neck, mediastinal goiter, retrosternal goiter, intraoperative frozen section, not normal preoperative vocal cord examinations, obesity with a body mass index greater than 30, ASA IV (American Society of Anesthesiologists Physical Status Classification System), bleeding disorders, antithrombotic and/or anticoagulant usage were excluded from the study. The remaining 344 patients were divided into two groups as benign diseases with and without HT. Group 1 consisted of 132 patients reported as benign diseases accompanied by HT. Group 2 consisted of 212 patients reported as other benign diseases without HT as a result of pathology.

Patients were statistically analyzed for age, sex, finding for RLN rates, time for reaching RLN, time for operation, transient or permanent RLN injury and other postoperative complications (transient or permanent hypoparathyroidism, seroma, hematoma, re-operation due to bleeding). Preoperative and postoperative laryngoscopy, vocal cord examination and serum calcium levels were evaluated. The damage detected by laryngoscopy and recovered within 6 months was accepted as transient RLN damage and the non-healing damage within 6 months was accepted as permanent RLN damage. Transient hypoparathyroidism, which was determined to be below 7.5 mg/dL in asymptomatic patients and 8.5 mg/dL in symptomatic patients, was accepted as permanent hypoparathyroidism in the first 6 months postoperatively. Levene test was used for continuous variables, independent samples t test was used for controlling variance homogeneity. Chiquare test was used for categorical variables. P-value less than 0.05 ($p<0.05$) is considered statistically significant.

Results

The mean age of the patients in group 1 was 46.6±11.5 years where as in group 2 the mean age was 50.1±12.6 years. Female gender ratio was 89.3% in group 1 and 77.3% in group 2. There was a statistically significant relationship between disease type and gender. There was no significant difference between the groups in terms of finding for RLN ($p>0.05$), but statistically significant differences were found in terms of age, gender, time for reaching RLN, time for operation. (respectively, p=0.01,

Table I

	Grup 1(N=132)		Grup 2(N=212)		
	Mean	Standart deviation	Mean	Standart deviation	P value
Age	46,6	11,561	50,15	12,618	0,010
Time for operation	107,52	17,851	91,39	15,615	<0,001
Time for reaching RLS	15,54	5,115	10,90	2,929	<0,001

Table II

	Grup 1(N=132)		Grup 2(N=212)			
	Number	Percent	Number	Percent	Total	P value
female	118	%41,8	164	%58,2	%100	
male	14	%22,6	48	%77,4	%100	
						0,007

Table III

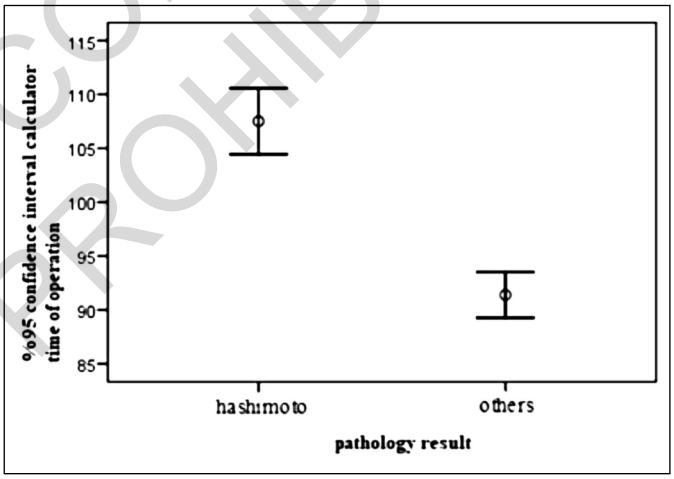
		Grup 1(N=132)		Grup 2(N=212)		Total		
		Number	Percent	Number	Percent	Number	Percent	P Value
Transient Rls Injury	Prevalent	4	%66,7	2	%33,3	6	%100	
	Absent	128	%37,9	210	%62,1	338	%100	
Permanent Rls Injury	Prevalent	0		0		0		
	Absent	132	%38,4	212	%61,6	344	%100	
Transient Hypoparathyroidism	Prevalent	3	%60	2	%40	5	%100	
	Absent	129	%38,0	210	%61,9	339	%100	
Permanent Hypoparathyroidism	Prevalent	0		0		0		
	Absent	132	%38,4	212	%61,6	344	%100	
Seroma	Prevalent	1	%33,3	2	%66,6	3	%100	
	Absent	131	%38,4	210	%61,5	341	%100	
Hematoma	Prevalent	1	%50	1	%50	2	%100	
	Absent	131	%38,3	211	%61,9	342	%100	
Re-Operation Due To Bleeding	Prevalent	0		0		0		
	Absent	132	%38,4	212	%61,6	344	%100	
								>0,05

p=0.007, p<0.001 and p<0.001). The mean time for reaching RLN was 15.5±5.1 minutes in Group 1, 10.9±2.9 minutes in Group 2. The mean time for operation was 107.5±17.8 minutes in Group 1, and 91.3±15.6 minutes in Group 2. The time for operation and time for reaching RLN were significantly longer in patients with HT.

While the rate of transient RLN injury was higher in the HT group, There was no statistically significant difference. None of the patients had permanent nerve damage, permanent hypoparathyroidism and re-operation due to bleeding in both groups.

There was no statistically significant difference for seroma, hematoma and transient hypocalcemia in both groups (p>0.05).

Table IV



Discussion

The pathogenesis of HT's thyroiditis initiates activation of thyroid-specific CD4+T lymphocytes. Induces both cellular and humoral responses. While the thyroid parenchyma is destroyed by cellular response, autoantibodies (anti-TSH receptor anti-cores) are synthesized by humoral response. Hypothyroidism develops due to tissue destruction and the inhibition of TSH response by anti-TSH receptor antibodies.

Antibodies such as antithyroglobulin and antithyroid-peroxidase that circulate due to tissue destruction are not the cause of pathogenesis but the result. They are used as markers in diagnosis but do not play an active role in pathogenesis [12,13]. In conclusion, the thyroid gland faces infiltration of hematopoietic mononuclear cells.

Interstitial connective tissue increases and fibrosis develops. Fibrosis brings together hard scar tissue and adhesions. Tissue plans are broken. Dissection of the thyroid gland, parathyroid glands and RLN are difficult to isolate and thus protect. In this study, to make objective situation that surgeon feeling forced during surgery, the time for operation and the time for reaching RLN was taken as basis.

The mean time for operation was 107.5±17.8 minutes and the mean time for reaching RLN was 15.5±5.1 minutes in the group with HT. These parameters were respectively 91.3±15.6 minutes and 10.9±2.9 minutes in the group without HT.

The difference was statistically significant. (p<0.001 and p<0.001). Although it is performed by the same surgeon using the same technique, longer surgical time may be attributed to the more difficult thyroidectomy in HT.

Although there is no significant difference between the groups in terms of RLN injury and transient or permanent hypoparathyroidism, it does not support the idea that thyroidectomy is difficult in HT, but the long time allocated to surgery in these patients indicates difficult thyroidectomy. RLN injuries are one of the most feared complications after thyroid surgery [14].

Table V

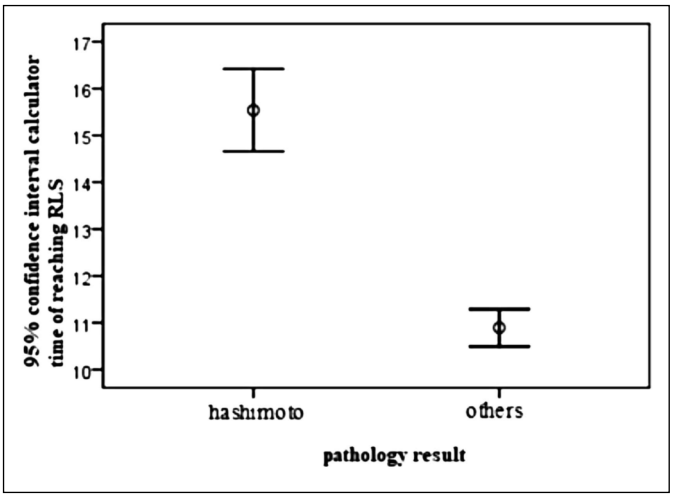
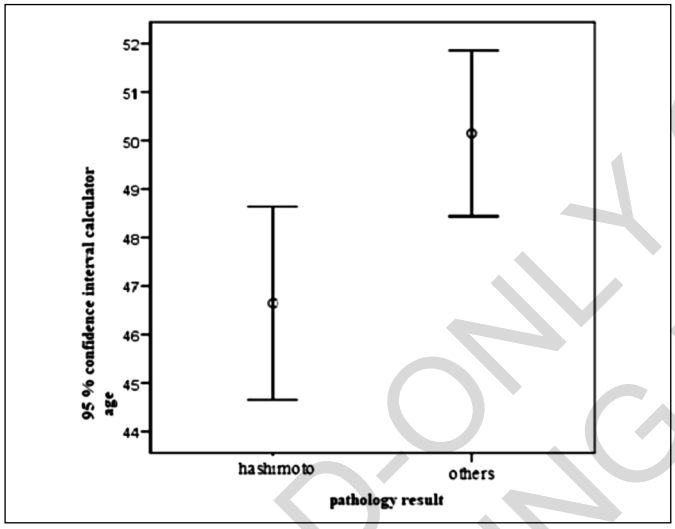


Table VI



RLN is very sensitive and can be easily damaged by intraoperative movements such as heat, compression, shear, and stretching [15]. Damage to the RLN leads to paresis or paralysis of the vocal cord. Dysphonia occurs in the patient associated with or independent of dysphagia or dyspnoea. Depending on the type of injury, symptoms may regress or persist over time [16-18].

Permanent RLN injuries have been reported in the literature from 0.5% to 5% [18,19]. However, this rate may be higher in difficult thyroidectomies. No permanent RLN injury occurred in both groups in our study, so no difference was found between the groups. This situation can be attributed to the fact that all cases are performed by the same surgeon on the basis of finding and preserving the nerve using a monitor.

Hypocalcemia after thyroidectomy is a common complication with short and long term morbidity [20]. In a multicenter study involving 14,934 patients, symptomatic hypocalcemia caused by transient or permanent hypoparathyroidism was reported as the most common complication after thyroidectomy. Hypocalcemia was found to be transient in 8.3% and permanent hypocalcemia in 1.7% [21]. In our study, transient hypocalcemia developed in 1.45% of the cases, but no permanent hypocalcemia was detected. This rate is already lower in experienced institutions, such as our center, where more than 250 thyroidectomies are performed per year [22]. However, the fact that Graves' disease were not included in our study may be another reason for the low rates. Because in Graves' disease, there is a 20-fold higher risk of transient hypocalcemia after thyroid operations compared to other diseases [23]. Mechanical stress, devascularization or unintentional removal of the parathyroid glands may play an important role in the development of hypocalcemia as well as surgical stress, hungry bone syndrome, and calcitonin release during surgical manipulation [24,25].

For preventable factors, it is essential to be familiar with the embryology and anatomy of the cervical region, to present with the vascular pedicles of the glands and to respect the tissues.

In our study, the mean age of the HT group was significantly lower than the other group. However, it is similar to the mean age of patients with HT in the literature [27]. The female sex ratio was 89.3% in the HT group and 77.3% in the other group. There was a statistically significant relationship between disease type and gender. Female predominance in HT was partially explained by fetal microchimerism and X-chromosome inactivation [28-30].

Mediastinal goiter, retrosternal goiter, ectopic thyroid topography; non-recurrenary laryngeal nerve and preoperative vocal cord paralysis anatomically; recurrent cases, locally advanced malignancies and autoimmune thyroiditis are technically difficult thyroidectomy cases.

It has been reported that Graves' disease are more disadvantageous compared to HT because of the risk of significant vascularization and subsequent bleeding [31]. In our study, the time for reaching RLN and time for operation were taken as the criteria of forced thyroidectomy. Trying to realize a subjective situation is the limited side of this research.

RLN injury after thyroid surgery [32,33] is one of the leading causes of medical lawsuits against surgeons [34]. In our country, bilateral RLN injury due to thyroidectomy is considered as malpractice. However, bilateral RLN injury is considered a complication in difficult thyroidectomies. Our study shows thyroidectomy is difficult in HT. This result can provide a legal advantage for surgeons who face such a sad complication.

Riassunto

La tiroidite di Hashimoto (HT) è ritenuta una patologia che presenta nella pratica difficoltà nell'esecuzione della

tiroidectomia, ma non ci sono dati sufficienti in letteratura per sostenere ciò. Lo scopo di questo studio era di valutare se questo dato potesse essere confermato.
Sono stati valutati 614 pazienti sottoposti a tiroidectomia totale. 270 pazienti con fattori che prolungano l'operazione sono stati esclusi dallo studio. Il gruppo 1 era composto da 132 pazienti segnalati come malattie benigne accompagnate da HT. Il gruppo 2 era composto da 212 pazienti segnalati come altre malattie benigne senza HT quale causa di patologia. I pazienti sono stati analizzati statisticamente per età, sesso, reperimento e tempi di individuazione del nervo ricorrente superiore (RLS), durata dell'intervento, lesione permanente o transitoria del nervo ricorrente superiore e altre complicanze postoperatorie.
Risultati: ci sono state differenze statisticamente significative in termini di età, sesso, tempo dell'intervento e tempo per individuazione del RLS (rispettivamente; p=0,01, p=0,007, p<0,001 e p<0,001). Non si è rilevata alcuna differenza significativa tra i gruppi in termini di tasso di individuazione di RLS, lesioni RLS transitorie o permanenti e altre complicanze postoperatorie (p>0,05).
Conclusione: il tempo medio per l'operazione e il tempo medio per raggiungere RLS nei pazienti con HT è risultato significativamente più lungo rispetto ai pazienti con altro tipo di patologia benigna. Risulterebbe dunque dimostrato che l'HT dovrebbe essere tra le cause della tiroidectomia difficile. I risultati di questo studio possono offrire un vantaggio legale ai chirurghi che devono affrontare una triste complicazione

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Commento e Commentary

Prof. Nicola Picardi
Già Ordinario di Chirurgia Generale

Le precisazioni documentate concernenti le difficoltà di una tiroidectomia su tiroidite di Hashimoto sono molto opportune. C'è però da sottolineare una complicazione evitabile, che è quella che consegue all'allacciatura della vena tiroidea media prima di ridurre l'apporto arterioso alla ghiandola con l'allacciatura e sezione dei tre rami dell'arteria tiroidea superiore e reperimento del nervo laringeo. È opportuno posporre questa allacciatura alla devascolarizzazione arteriosa, quanto meno dal polo superiore, per evitare la congestione ed ingrossamento della tiroide e maggiore pericoli di sanguinamento, con prolungamento del tempo di intervento.

* * *

The documented clarifications concerning the difficulties of a thyroidectomy on Hashimoto's thyroiditis are very appropriate. However, there is an avoidable complication, which is the result of the tying and section of the middle thyroid vein before reducing the arterial supply to the gland tying and section of the three branches of the upper thyroid artery and the finding of the laryngeal nerve. It is advisable to postpone this vein tying to arterial devascularization, at least from the upper pole, to avoid congestion and enlargement of the thyroid gland and greater dangers of bleeding, with prolongation of the intervention time.