

## RESEARCH ARTICLE

# Complications of Completion Versus Total Thyroidectomy

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### Abstract

**Introduction :** The objective of this study was to analyze the complication rates after completion thyroidectomy and compare them with primary total benign and malignant thyroidectomy causes in total of 647 patients. **Patients and Methods:** Among 647 patients, there were 159 receiving completion thyroidectomy for differentiated thyroid cancer (DTC) (Group 1); 217 patients receiving total thyroidectomy for DTC (Group 2) and 271 given total thyroidectomy for benign diseases (Group 3). **Results:** When groups were compared for complications, there were no significant difference except temporary hypocalcemia between completion thyroidectomy and total thyroidectomy for DTC. When the total thyroidectomies were compared (Group 2 and 3), there were no significant difference observed except unilateral temporary RLN palsy. **Conclusion:** With improvements in surgical technique and experience, complication rates of thyroidectomy performed for benign or malignant diseases are reduced. In spite of the improvement in surgical experience, temporary RLN palsy and hypoparathyroidism are the main complications in completion thyroidectomies which need special attention. To evaluate the patients more carefully in preoperative period and performing adequate thyroidectomy appears more logical.

**Keywords:** Completion thyroidectomy - total thyroidectomy - complications - Turkey

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### Introduction

Surgical management of thyroid diseases is still controversial. Especially for malignancies of thyroid diseases; types of operations, complications rates, necessity of surgical extension and other ablation therapies are the interest of research. Although near total thyroidectomy has been advocated by some surgeons, it has been proposed by majority that total thyroidectomy is the treatment choice in patients with differentiated thyroid cancer (DTC) (Dackiw et al., 2004; Makay et al., 2006).

Main advantages of thyroidectomy are extinguishing the potential residual tumour risk of DTC with the behavior of multicentricity and bilaterality, better ablation of possible residual tissue with radioactive iodine, and thyroglobulin which turns out to be a better marker as a result of total thyroidectomy (Shaha et al., 1992).

Although total thyroidectomy is the preferred procedure for preoperatively diagnosed malignancy, it's more controversial and there is not enough consensus for patients operated with a diagnosis of benign thyroid diseases and diagnosed with malignancy after the operation. Sometimes completion thyroidectomy seems to have some benefit for the treatment of DTC. Although morbidity rates of completion thyroidectomy is a hesitation for some surgeons, experience reduces these complication rates. The aim of this study was to review our experience within different thyroidectomies.

### Materials and Methods

From 1999-2008, 647 patients who underwent surgery for thyroid diseases in our institution were examined and postoperative complications were compared. Patients were grouped as; 159 patients who received completion thyroidectomy for DTC (Group 1), 217 patients who underwent total thyroidectomy for DTC (Group 2) and 271 patients that total thyroidectomy applied for primary benign diseases (Group 3), so postoperative complication rates were compared.

Completion thyroidectomy was performed for remnant thyroid tissue for radioiodine ablation therapy. The surgical standard procedure of total thyroidectomy included a resection of both thyroid lobes while identifying the recurrent laryngeal nerve on both sides and an attempt to identify all parathyroid glands. Thyroidectomy bed was drained with a silicone drain routinely in all patients. All of the operations were carried by the same group of surgeons.

All information related to patient age, sex, operative procedure, pathology and postoperative complications were recorded prospectively. Evaluated complications were transient and permanent hypocalcemia, transient and permanent recurrent laryngeal nerve (RLN) palsy, hemorrhage and minor wound infection.

The serum calcium concentration was assessed on postoperative first day in routine and repeated on

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postoperative second day whether the result was less than 8 mg/dl. Serum calcium concentrations and vocal cord mobility were examined preoperatively in all patients. Hypocalcemia was transient if the patient required an oral calcium supplement for less than 6 months. It was permanent if the patient required an oral calcium supplement and vitamin D for 6 months or more with a plasma calcium level below 8 pg/ml. Vocal cord mobility was assessed via indirect laryngoscopy postoperatively as well in all patients. RLN palsy was considered permanent if there was no proof of recovery using laryngoscopy within 6 months of surgery.

Patients were included if they received total thyroidectomy for DTC or benign thyroid diseases, if they underwent completion thyroidectomy for DTC, together with normal blood calcium levels, normal vocal cord mobility and aged over 18 years. The exclusion criterias were thyroidectomies with neck dissection and thyroidectomies for thyrotoxicosis. Completion thyroidectomies with hemi-thyroidectomy as a previous operation were also excluded.

In this study; the differences between the groups were analyzed with the chi-square test (95% confidence interval). P values of less than 0.05 were considered to be significant. Statistical analysis were performed using SPSS 10.0 software (Statistical Software, Chicago, MI, USA).

## Results

A total of 647 patients were operated and evaluated. Of those, 159 patients underwent completion thyroidectomy for DTC (Group 1), 217 patients received total thyroidectomy for DTC (Group 2), and total thyroidectomy for primary benign diseases were applied on 271 patients (Group 3). Table-1 lists the distribution of the three investigated procedures and demographic data of the patients.

There were no deaths in any group. Sixty-eight postoperative complications occurred in 159 patients (Group 1). Thirty-three patients had transient hypocalcemia that required an oral calcium supplement for less than 6 months (20.7%). Seven patients who required an oral calcium supplement and vitamin D for more than 6 months (4.4%) had permanent hypocalcemia. Nineteen patients had RLN palsy of which, 13 had unilateral transient RLN palsy (8.1%), 2 had bilateral transient RLN palsy (1.2%), and 4 patient had unilateral permanent RLN palsy (2.5%). Three patients had hematoma (1.8%), 3 patients had minor wound infection (1.8%), and 3 patients had temporary tracheotomy that closed in 3 months in group 1 (Table 2).

Forty-eight postoperative complications occurred in 217 patients (Group 2). Twenty-two patients had transient hypocalcemia that required an oral calcium supplement for less than 6 months (10.1%). Ten patients who required an oral calcium supplement and vitamin D for more than 6 months (4.6%) had permanent hypocalcemia. Thirteen patients had RLN palsy of which, 10 had unilateral transient RLN palsy (4.6%), 1 had bilateral transient RLN palsy (0.4%), and 2 patients had unilateral permanent RLN palsy (0.9%). Two patients had hematoma (0.9%),

**Table 1. Clinical and Pathologic Characteristics of the 356 CRC Cases in this Study**

	Group 1	Group 2	Group 3
Patients (n)	159.0	217.0	271.0
Mean Age (Range)	42.9 (20-69)	44.2 (20-70)	46.1 (23-73)
Age ≥50	53.0	117.0	112.0
Age <50	106.0	100.0	159.0
Male (%)	38.0 (24)	61.0 (28)	52.0 (19)
Female (%)	121.0 (76)	156.0 (72)	219.0 (81)

\*Group 1: Completion Thyroidectomy for DTC, Group 2: Total Thyroidectomy for DTC, Group 3: Total Thyroidectomy for Primary Benign Diseases.

**Table 2. Postoperative complications (617 patients)**

	Group 1 n=159 (%)	Group 2 n=217 (%)	Group 3 n=271 (%)	P values
Temporary Hypocalcemia	33 (20.7) <sup>ab</sup>	22 (10.1) <sup>c</sup>	20 (7.3)	0.001
Permanent Hypocalcemia	7 (4.4)	10 (4.6)	7 (2.5)	NS
Temporary RLN Palsy (Unilateral)	13 (8.1) <sup>a,β</sup>	10 (4.6) <sup>γ</sup>	3 (1.1)	0.001
Temporary RLN Palsy (Bilateral)	2 (1.2)	1 (0.4)	-	NS
Permanent RLN Palsy (Unilateral)	4 (2.5) <sup>d</sup>	2 (0.9)	1 (0.3)	<0.045
Hematoma	3 (1.8)	2 (0.9)	1 (0.3)	NS
Minor Wound Infection	3 (1.8)	1 (0.4)	-	<0.02
Tracheotomy	3 (1.8)	-	-	<0.011

\* Group 1: DTC: Completion Thyroidectomy for DTC, Group 2: Total Thyroidectomy for DTC, Group 3: Total Thyroidectomy for Primary Benign Diseases, Differentiated Thyroid Carcinoma, RLN: Recurrent Laryngeal Nerve, NS: Not Significant, <sup>a</sup>group 1 versus group 2 p:0.005, <sup>b</sup>group 1 versus group 3 p< 0.001, <sup>c</sup>group 2 versus group 3 p:0.33, <sup>d</sup>group 1 versus group 3 p: 0.0065, <sup>e</sup>group 1 versus group 2 p:0.19, <sup>f</sup>group 1 versus group 3 p<0.001, <sup>g</sup>group 2 versus group 3 p:0.022

1 patient had minor wound infection (0.4%), and no tracheotomy was needed in group 2 (Table 2).

Thirty-two postoperative complications occurred in 271 patients (Group 3). Twenty patients had transient hypocalcemia that required an oral calcium supplement for less than 6 months (7.3%). Seven patients had permanent hypocalcemia that required an oral calcium supplement and vitamin D for more than 6 months (2.5%). Four patients had RLN palsy of which, 3 had unilateral transient RLN palsy (1.1%) and there was no bilateral transient RLN palsy, 1 patient had unilateral permanent RLN palsy (0.3%). One patient had hematoma (0.3%), no minor wound infection occurred, and no tracheotomy was needed in group 3 (Table 2).

When groups were compared for complications, temporary hypocalcemia, unilateral temporary RLN palsy, unilateral permanent RLN palsy, Minor wound infection and tracheotomy rates were statistically significant. In subgroup analysis, there were no significant difference except temporary hypocalcemia between completion thyroidectomy and total thyroidectomy for DTC (Group 1 and 2). When the total thyroidectomies were compared for complications (Group 2 and 3), there were no significant difference observed except unilateral temporary RLN palsy.

## Discussion

Total thyroidectomy is the choice for the treatment of DTC. (Liao et al., 2012) It's also indicated in patients with benign diseases for eradication of disease, prevention of recurrence, the facilitation of treatment with radioactive

iodine and in eliminating the risk of malignant change in radiated thyroid glands (Delbridge et al., 1999; Tezelman et al., 2009). Although most of the surgeons suggest that non-total operations have a lesser morbidity, these patients that diagnosed with DTC after surgery will have higher complication rates with a following completion thyroidectomy (Erbil et al., 2007). In order to lower the morbidity rates, total thyroidectomy is suggested in recent years for benign diseases (Mishra et al., 2001; Barczyński et al., 2011; Citgez et al., 1998; 2012).

A common indication for completion thyroidectomy is when an unsuspected carcinoma has been removed by a procedure less than total thyroidectomy. Other indications are symptomatic recurrent nodular or multinodular goiter, recurrent thyroid cancer, and recurrent thyrotoxicosis (Tezelman et al., 2009). Although total thyroidectomy is the treatment choice for DTC, preoperative benign findings such as fine-needle aspiration cytology or inefficient intraoperative frozen section examinations limits the initial thyroid resection to lobectomy or near total thyroidectomy, so reoperative thyroidectomy will be indicated in these patients (Lefevre et al., 2007). <sup>131</sup>I ablation of the remaining thyroid remnant is a treatment choice for achieving a completion thyroidectomy. However, the disadvantages such as multiple doses of <sup>131</sup>I for a successful ablation, large thyroid remnants, pulmonary fibrosis, leukemia and temporary bone marrow suppressions limit this approach (Bal et al., 2003).

Although completion thyroidectomy is the best way to remove the remnant thyroid tissue, complications like RLN injury and hypoparathyroidism are the hesitation reason especially for inexperienced surgeons or centers. Many surgeons have argued the increased morbidity of re-operative thyroid surgery is too high to justify such a procedure (El-Zohairy et al., 2004). By the improvements in technique and experience, incidence of the complications has been decreased (Watkinson, 2010). The results of the present study are compatible with literature. Reported complication rates of temporary RLN palsy ranges between 1.3-5.6 % and 0.9-5.6 for permanent RLN palsy for completion thyroidectomy in recent literature (Pezullo et al., 1997; Lefevre et al., 2007; Rafferty et al., 2007; Glockzin et al., 2012 ). Incidence of temporary hypoparathyroidism ranges between 3-15%, and incidence of permanent hypoparathyroidism ranges between 0-3.5% for completion thyroidectomy for DTC (Erdem et al., 2003; Makay et al., 2006; Varaldo et al., 2012). In our study, we found the complication rates in completion thyroidectomy for temporary and permanent hypoparathyroidism as 20.7% and 4.4% respectively where it is 2.5% for permanent RLN palsy and 8.1% in unilateral, 1.2% in bilateral temporary RLN palsy. For one thing, completion thyroidectomy after hemithyroidectomy reveals some differences (Vaiman et al., 2010). Complications generally occur while dissecting the scar tissue around recurrent laryngeal nerve or the vascular pedicle of the parathyroid glands. In re-operation of hemithyroidectomies, there's no need to dissect the scar tissue on the excised lobe and there would be minimal adhesions and almost no scar tissue in remnant lobe region, so re-operation of

hemithyroidectomy does not have much difference from the initial operation. It should be taken into consideration that we excluded completion thyroidectomies after hemithyroidectomy and in the literature most of the studies on the topic includes completion thyroidectomies after hemithyroidectomy. For this reason, our complication rates in completion thyroidectomy for temporary and permanent hypoparathyroidism seems quite high compared to literature. The present study states that when permanent RLN palsy and permanent hypoparathyroidism evaluated there is no statistically difference between completion thyroidectomy and total thyroidectomy for DTC. In the present study, which compares the complication rates for total thyroidectomies performed for benign or malign diseases, there were no statistical significant difference between complications except unilateral temporary RLN palsy. A possible explanation for this is although total thyroidectomies managed with the same technique, it should be kept in mind that a surgeon is more careful in preoperatively diagnosed malign diseases in order not to leave even a microgram of tissue resembling thyroid to maximize the <sup>131</sup>I ablation effect. So this results in a little bit more aggressive surgery in preoperatively diagnosed malignancies. Vaiman et al. (2010) found the complication rates among total of 7123 patients for temporary and permanent RLN palsy 2.8%, 1.4% respectively in total thyroidectomy for benign disorders and 4.6% and 3% respectively in completion thyroidectomy after subtotal thyroidectomy; at the same study temporary and permanent hypoparathyroidism rates are 24% and 3.5% respectively in total thyroidectomy group where 25.2% and 5.9% respectively in completion thyroidectomy after subtotal thyroidectomy.

Surgical experience reduces the complication rates of total thyroidectomy performed for benign or malign diseases. In spite of the improvement in surgical experience, temporary RLN palsy and hypoparathyroidism are the main complications in completion thyroidectomies which needs special attention. To evaluate the patients more carefully in preoperative period and performing adequate thyroidectomy seems more logical.

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