

Complication Rates of Two Different Procedures in Thyroid Surgery: Subtotal and Total Thyroidectomies

Tiroid Cerrahisinde İki Farklı Prosedürün Komplikasyon Oranlarının İncelenmesi: Subtotal ve Total Tiroidektomi

Haluk ULUCANLAR, MD,^a
 Ahmet AY, MD,^b
 Aybala AĞAÇ, MD,^a
 Suat KUTUN, MD,^a
 Adnan HASANOĞLU, MD,^b
 Necip Tolga BARAN, MD,^b
 Abdullah DEMİR, MD,^a
 Oğuz TARCAN, MD,^a
 Buğra KAPTANOĞLU, MD,^b
 Abdullah ÇETİN, MD^a

^aDepartment of General Surgery,
 Ankara Oncology Training & Research
 Hospital,

^bDepartment of General Surgery,
 Ankara Training & Research Hospital,
 Ankara

Yazışma Adresi/Correspondence:

Ahmet AY, MD
 Ankara Training and Research Hospital,
 Department of General Surgery, Ankara
 TÜRKİYE/TURKEY
 dr.ahmetay@gmail.com

ABSTRACT The aim of this study is to investigate the differences of complication rates between subtotal and total thyroidectomy procedures to help establishing optimal surgical approach on patients with multinodular goitre. 301 thyroidectomies had been performed in our General Surgery Clinic for euthyroid multinodular goitre. There were 181 total and 120 subtotal thyroidectomies. We investigated the difference of complication ratios between total and subtotal thyroidectomy procedures. The complications investigated retrospectively are tracheostomy performed due to recurrent laryngeal nerve palsy, temporary hypocalcemia, permanent hypocalcemia, temporary vocal cord dysfunction, permanent vocal cord dysfunction, postoperative hematoma and postoperative death. There was no significant difference between two groups in respect to tracheostomy performed due to recurrent laryngeal nerve palsy, temporary hypocalcemia, permanent hypocalcemia, temporary vocal cord dysfunction, permanent vocal cord dysfunction, postoperative hematoma and postoperative death. Our study suggests that total thyroidectomy can be performed with no significantly different complication rates with subtotal thyroidectomy. In the light of our study we think that it can be preferred to perform total thyroidectomy instead of subtotal thyroidectomy in diseases which effects the entire gland to protect the patient from the complications related with reoperative thyroid surgery.

Key Words: Total thyroidectomy, subtotal thyroidectomy, complications

ÖZET Çalışmamızda, multinodüler guatr nedeniyle tiroidektomi yapılmış hastalarda; subtotal veya total tiroidektomi yaklaşımlarına göre komplikasyon oranlarını karşılaştırmayı amaçladık. Kliniğimizde multinodüler guatr tanısıyla tiroidektomi yapılan 301 hasta retrospektif çalışmaya dâhil edildi. 301 hastanın 181'ine total, 120'sine subtotal tiroidektomi uygulanmıştı. Karşılaştırılan postoperatif komplikasyonlar: vokal kord disfonksiyonuna bağlı trakeostomi açılması, geçici hipokalsemi, kalıcı hipokalsemi, geçici vokal kord disfonksiyonu, kalıcı vokal kord disfonksiyonu, postoperatif hematoma ve postoperatif ölüm olarak sınıflandırıldı. Bulgular vokal kord disfonksiyonuna bağlı trakeostomi açılması, geçici hipokalsemi, kalıcı hipokalsemi, geçici vokal kord disfonksiyonu, kalıcı vokal kord disfonksiyonu, postoperatif hematoma ve postoperatif ölüm açısından karşılaştırıldığında, total tiroidektomi ve subtotal tiroidektomi yapılan grupta bütün parametreler açısından anlamlı fark bulunamamıştır. Çalışmamız ışığında bizler diffüz tiroid hastalıkları söz konusu olduğunda, total tiroidektomi'nin de subtotal tiroidektomi kadar güvenli bir şekilde yapılabileceğini düşünmekteyiz. Komplikasyon oranlarını güvenli seviyede tutmak amacıyla subtotal tiroidektomi tercih edilmesinin, olası tamamlayıcı tiroidektomi gereksinimi durumunda komplikasyon oranlarının artmasına sebebiyet verebileceği görüşündeyiz.

Anahtar Kelimeler: Total tiroidektomi, subtotal tiroidektomi, komplikasyonlar

Turkish Medical Journal 2009;3(2):92-6

P rimary thyroidectomy is associated with a low incidence of recurrent laryngeal nerve injury and permanent hypoparathyroidism when performed by an experienced surgeon. However, in the setting of re-

current thyroid disease in the central compartment, reoperation may be associated with a higher complication rate.¹ Total thyroidectomy replaced more conservative approaches for the treatment of both benign and malignant thyroid diseases. Reoperations and surgery for thyroid cancer carried a higher risk of complications.² In our study we investigated the differences of complication rates between subtotal and total thyroidectomy procedures to help establishing optimal surgical approach on patients with multinodular goitre.

MATERIAL AND METHODS

During the period from 2003 to 2007, 301 thyroidectomies had performed in our General Surgery Clinic for euthyroid multinodular goitre. 181 were total and 120 were subtotal thyroidectomies. Patients' average age was 39 (22-67), 204 were female-97 were male. Patients who underwent head and neck surgery, who were given radiotherapy to thyroid region were not included to the study. All information relating to these operative procedures, and to their pathologic conditions and complications had recorded and stored in our department which allow retrospective investigation for this study. We investigated the difference of complication ratios between total and subtotal thyroidectomy procedures. The complications investigated are tracheostomy performed due to recurrent laryngeal nerve palsy, temporary hypocalcemia, permanent hypocalcemia, temporary vocal cord dysfunction, permanent vocal cord dysfunction, postoperative hematoma and postoperative death.

Preoperative investigations, including thyroid function tests (all patients were euthyroid) and routine biochemistry, had performed on all patients. Other tests, nuclear and ultrasonographic scanning and usg assessed fine-needle aspiration biopsy to dominant thyroid nodule, had performed. Preoperative fine needle biopsy of all patients had reported as benign. Patient who diagnosed thyroid cancer were also excluded because of the possibility of extended granulation tissue due to the tumor. Vocal cord function had assessed routinely before and after operation by an independent otolaryngologist, as well as by the anesthetist at the

time of extubation. No patient had had vocal cord dysfunction preoperatively. Stat-free serum calcium levels had also measured preoperatively and postoperative 5th day, and after extubation from the hospital they had visited our clinic once a week to postoperative 2nd month. After 2nd month patients had visited hospital every 3 months for follow-up. 18 of 120 patient who underwent subtotal thyroidectomy and 29 of 181 patient who underwent total thyroidectomy had diagnosed as thyroid papillary carcinoma with postoperative histopathological examination. 18 of 120 patient who underwent subtotal thyroidectomy had performed completion thyroidectomy.

Patients divided into two groups as total and subtotal thyroidectomy. These two groups compared retrospectively in respect to the complications of surgery: tracheostomy performed due to recurrent laryngeal nerve palsy, temporary hypocalcemia, permanent hypocalcemia, temporary vocal cord dysfunction, permanent vocal cord dysfunction, postoperative hematoma and postoperative death. Ki-square and student-t tests used statistical assesment.

RESULTS

During the period from 2003 to 2007, 301 thyroidectomies were performed in our General Surgery Clinic for multinodular goitre. 181 were total and 120 were subtotal thyroidectomies. We investigated the difference of complication ratios between total and subtotal thyroidectomy procedures. The complications investigated are tracheostomy performed due to recurrent laryngeal nerve palsy, temporary hypocalcemia, permanent hypocalcemia, temporary vocal cord dysfunction, permanent vocal cord dysfunction, postoperative hematoma and postoperative death.

When the procedures examined with respect to tracheostomy performed due to laryngeal nerve palsy. There was no significant difference between total thyroidectomy (2/181-1,10%) and subtotal thyroidectomy (1/120-0,80%) groups (p:0,816).

When the procedures examined with respect to temporary hypocalcemia. There was no significant difference between total thyroidectomy

(16/181-8,84%) and subtotal thyroidectomy (12/120-10,0%) groups (p:0,734).

When the procedures examined with respect to permanent hypocalcemia. There was no significant difference between total thyroidectomy (1/181-0,55%), subtotal thyroidectomy (1/120-0,80) groups.

When the procedures examined with respect to temporary vocal cord disfunction. There was no significant difference between total thyroidectomy (18/181-9,94%) and subtotal thyroidectomy (14/120-11,7%) groups (p:0,635).

When the procedures examined with respect to permanent vocal cord disfunction. There was no permanent vocal cord dysfunction occurred in both total thyroidectomy and subtotal thyroidectomy groups.

There was no hematoma and no postoperative exitus in both of the groups (Table 1).

DISCUSSION

Thyroid gland surgery today is not saddled with high incidence of main complications. Miscellaneous surgical institutions with different surgical ap-

proach, operative technique have published reports with great discrepancy in incidence of complications, analyzing them with different methods of diagnosis and result evaluation. In the same way it is well known that higher latitude of operative procedure gave better control of thyroid diseases, but it can be accompanied with more complications. All of that motivate us to analyze complications of operative treatment in our patients under well known criteria, with hypothesis that higher radical operative procedure do not increase incidence of complications, and that this incidence is in correlations with results published in world literature.¹

Thyroid surgery is one of the most frequent operations performed in iodine-deficient regions. The goal of surgical treatment in thyroid disease should be to eliminate the disease with low complication rates and to minimize the necessity for re-operative procedures. The most frequent complications of thyroid surgery are RLN palsy and hyperparathyroidism. Although the overall complication rate is low, RLN palsy is a devastating life-long handicap when it occurs. The incidence of RLN injury in literature varies from 0 to 4% and is greater in extensive resection and in case of reope-

TABLE 1: The ratios between two groups.

				Subtotal, Total Thy.		p
		Total Thy.	Subtotal Thy.	X ²	X ²	
Tracheostomy	Negatif	179 (98.9%)	119 (99.2%)	36.927	0.054	0.816
	Pozitif	2 (1.10%)	1 (0.80%)			Ns***
Temporary Hypocalcemia	Negatif	165 (91.2%)	108 (90.0%)	73.604	0.115	0.734
	Pozitif	16 (8.84%)	12 (10.0%)			Ns***
Permanent Hypocalcemia	Negatif	180 (99.5%)	119 (99.2%)	NA	NA	
	Pozitif	1 (0.55%)	1 (0.80%)			NA
Temporary vocal cord disfunction	Negatif	163 (90.1%)	106 (88.3%)	42.014	0.225	0.635
	Pozitif	18 (9.94%)	14 (11.7%)			Ns***
Permanent vocal cord disfunction	Negatif	181 (100%)	120 (100%)	15.796	NA	NA
	Pozitif	0 (0.00%)	0 (0.00%)			
Postoperative Hematoma	Negatif	181 (100%)	120 (100.0%)	NA	NA	NA
	Pozitif	0 (0.00%)	0 (0.00%)			
Exitus	Negatif	181 (100%)	120 (100%)	NA	NA	NA
	Pozitif	0 (0.00%)	0 (0.00%)			
N		181	120			

Ns: There is no statistically significant difference

NA: analyse couldn't performed

ration, thyroid carcinoma, and Graves's disease. Even experienced surgeons report inadvertent injury to the nerve and persistent RLN palsy in about 1-2% of patients.²

Primary thyroidectomy is associated with a low incidence of recurrent laryngeal nerve injury and permanent hyperparathyroidism when performed by an experienced surgeon. However, in the setting of recurrent thyroid disease in the central compartment, reoperation may be associated with a higher complication rate. Reoperative thyroid surgery is technically more demanding because of the presence of scar tissue and distorted anatomy, which may result in a greater risk of injury to the recurrent laryngeal nerve and parathyroid glands.³

Subtotal thyroidectomy is associated with a high rate of hypothyroidism and large remnants have potential for recurrence.⁴ After subtotal resection of thyroid gland, rates of up to 40% are reported for recurrent goiter in the long-term follow-up.⁵ And on the other hand patients with thyroid cancer are sometimes deny further thyroid operations for fear of an increased risk of complications.⁶

Subtotal thyroidectomy was associated with relapse as well as hypothyroidism in a significant proportion of patients during long-term follow up.⁷ The failure to demonstrate any 'hormonal advantage' in preserving thyroid tissue by subtotal thyroidectomy, and the low morbidity rate and no need for re-operation after primary total thyroidectomy, make the latter the procedure of choice for the management of non-toxic multinodular goiter and differentiated thyroid carcinomas.⁸

Total thyroidectomy is an operation that has generally been reserved for the management of differentiated thyroid carcinoma. Over the last dec-

ade total thyroidectomy has become used increasingly and is now the preferred option for the management of diseases affecting the entire gland. Total thyroidectomy is an appropriate operation for the management of well differentiated thyroid carcinomas, diffuse multinodular goiter where the entire gland is involved because it precludes patients from requiring further surgery for recurrent disease, with its high associated risks.⁹ It is thought that the morbidity of total thyroidectomy relates primarily to the stage of malignancy and extracapsular extension, necessitating en bloc excision accompanied by additional lymph node dissection. The low incidence of permanent complications in benign thyroid disease suggests the feasibility of total thyroidectomy as the operation of choice when surgeons are familiar with the technique and indications.¹⁰

In our experience total thyroidectomy is the gold standard for diffuse diseases of the thyroid, because, without more specific complication than subtotal thyroidectomy, it ensures: no recurrences, an easy control of postoperative hypothyroidism, the removal of microscopic malignant foci.¹¹

Total thyroidectomy replaced more conservative approaches for the treatment of both benign and malignant thyroid diseases. Reoperations and surgery for thyroid cancer carried a higher risk of complications.¹²

Our study suggests that total thyroidectomy can be performed with no significantly different complication rates with subtotal thyroidectomy. In the light of our study we think that it can be preferred to perform total thyroidectomy instead of subtotal thyroidectomy in diseases which effects the entire gland to protect the patient from the complications related with reoperative thyroid surgery.

REFERENCES

1. Ignjatović M, Cuk V, Ozeđović A, Cerović S, Kostić Z, Romić P. Early complications in surgical treatment of thyroid diseases: analysis of 2100 patients. *Acta Chir Iugosl* 2003; 50(3): 155-75.
2. Barbaros U, Salmaslıođlu A, Yanik BT, Bozboru A, Ozarmađan S. The advantage of near-total thyroidectomy to avoid postoperative hypoparathyroidism in benign multinodular goiter. *Langenbecks Arch Surg* 2006; 391(6): 567-73.
3. Kim MK, Mandel SH, Baloch Z, Livolsi VA, Langer JE, Didonato L, et al. Morbidity following central compartment reoperation for recurrent or persistent thyroid cancer. *Arch Otolaryngol Head Neck Surg* 2004; 130(10):1214-6.
4. Lal G, Ituarte P, Kebebew E, Siperstein A, Duh QY, Clark OH. Should total thyroidectomy become the preferred procedure for surgical management of Graves' disease? *Thyroid* 2005; 15(6):569-74.

5. Thomusch O, Sekulla C, Dralle H. Is primary total thyroidectomy justified in benign multinodular goiter? Results of a prospective quality assurance study of 45 hospitals offering different levels of care. *Chirurg* 2003;74(5):437-43.
6. Levin KE, Clark AH, Duh QY, Demeure M, Siperstein AE, Clark OH. Reoperative thyroid surgery. *Surgery* 1992 ; 111(6):604-9.
7. Ku CF, Lo CY, Chan WF, Kung AW, Lam KS. Total thyroidectomy replaces subtotal thyroidectomy as the preferred surgical treatment for Graves' disease. *ANZ J Surg* 2005; 75(7): 528-31.
8. Marchesi M, Biffoni M, Tartaglia F, Biancari F, Campana FP. Total versus subtotal thyroidectomy in the management of multinodular goiter. *Int Surg* 1998; 83(3):202-4.
9. Reeve TS, Delbridge L, Cohen A, Crummer P. Total thyroidectomy. The preferred option for multinodular goiter. *Ann Surg* 1987; 206(6): 782-6.
10. Tovi F, Noyek AM, Chapnik JS, Freeman JL. Safety of total thyroidectomy: review of 100 consecutive cases. *Laryngoscope* 1989; 99(12):1233-7.
11. Siragusa G, Lanzara P, Di Pace G. Subtotal thyroidectomy or total thyroidectomy in the treatment of benign thyroid disease. Our experience. *Minerva Chir* 1998;53(4): 233-8.
12. Misiakos EP, Liakakos T, Macheras A, Zachaki A, Kakaviatos N, Karatzas G. Total thyroidectomy for the treatment of thyroid diseases in an endemic area. *South Med J*. 2006; 99(11):1224-9.