

Total Versus Near Total Thyroidectomy in Treatment of Toxic Goiter

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ABSTRACT

Background: The most common cause of hyperthyroidism and the most common autoimmune disorder in Toxic goiter is Grave's disease. Antithyroid medications, radioiodine therapy, and surgery have all been employed in the treatment of this disease. Nevertheless, thyroidectomy remains an important option for correcting hyperthyroidism. **Objective:** The aim of the study was to compare both total and Near total thyroidectomy as regard "Outcome, Complications and Curability" in patients with controlled Toxic Goiter.

Patients and Methods: This prospective randomized controlled study included a total of 84 patients with toxic goiter, attending at Endocrine Surgery Unit, General Surgery Department, Mansoura University Hospitals. This study was conducted between February 2018 and January 2019. The included subjects were randomly divided into two groups; **Group 1 (TT)** consisted of 42 patients underwent total thyroidectomy, **Group 2 (NTT)** consisted of 42 patients underwent near total thyroidectomy. **Results:** Compared to Near total thyroidectomy, total thyroidectomy gave better results regarding the recurrence of toxic manifestations which occurred in 7% of cases 1 year later. **Conclusion:** It could be concluded that total thyroidectomy (TT) gives good results in management of patients with toxic goiter compared to near total thyroidectomy (NTT). Total thyroidectomy (TT) is advised to be done in patients with toxic goiter due to less liability for postoperative recurrence, provided to be done by experienced endocrine surgeon in a qualified center.

Key Words: Total Thyroidectomy – Near Total – Toxic Goiter.

INTRODUCTION

Over the years, subtotal thyroidectomy (STT) has become the mainstay of treatment for toxic goiter; however, total and near total thyroidectomy (TT & NTT) is increasingly being considered⁽¹⁾. Near-total (NTT) thyroidectomy in which less than 1 g of thyroid tissue remains and Total thyroidectomy (TT) have been utilized in the treatment of Graves' disease for long time⁽¹⁾. There remains controversy in the literature as to which procedure is superior. In determining which surgical procedure to perform, a surgeon must balance the risk of disease recurrence if too little thyroid tissue is removed with the obvious need for lifelong thyroid hormone replacement in all patients who undergo TT and NTT⁽²⁾. Subtotal thyroidectomy has been the standard procedure as it was thought to avoid long-term thyroxin replacement therapy and presumed to be a safer operation with low complication rates compared to (TT) and (NTT). But on the contrary, the long-term results of STT are not without their consequences. This is evidenced by the progressive increase in the incidence of hypothyroidism or recurrent hyperthyroidism from remnant thyroid tissue left behind⁽³⁾.

On the other hand, the advantages of TT are that it avoids recurrent disease and future repeat thyroidectomy which is known to be associated with higher morbidity even if performed with great care and skill⁽⁴⁾. If the risk of complications from TT is no higher than that from STT, and coupled with significant advantages in the prevention of recurrence and avoidance of repeat surgery, perhaps TT should be considered as a treatment option for

toxic goiter. Moreover, TT and NTT are increasingly being accepted as the procedure of choice for toxic multinodular goiter involving both lobes, particularly those with significant compression symptoms^(4,5).

The aim of the current study was to compare both total and near total thyroidectomy as regard "Outcome, Complications and Curability" in patients with controlled Toxic Goiter.

PATIENTS AND METHODS

This prospective randomized controlled study included a total of 84 patients with toxic goiter, attending at Endocrine Surgery Unit, General Surgery Department, Mansoura University Hospitals (MUH). All patients were informed about the surgical procedure and written informed consent of all the subjects was obtained. This study was conducted between February 2018 and January 2019.

Ethical approval:

Approval of the ethical committee was obtained.

Sample size was calculated using G- Power with effect size 0.8 and power of 0.8 and it was 84 patients. The included subjects were randomly divided into two groups; **Group 1 (TT)** consisted of 42 patients underwent total thyroidectomy, **Group 2 (NTT)** consisted of 42 patients underwent near total thyroidectomy.

Inclusion criteria:

Patients with Grave's disease with controlled toxic manifestations, both genders and age was between 25 and 75.

Exclusion criteria:

1. Patients with other thyroid lesions e.g.: (Cancer or Thyroiditis).
2. Uncontrolled toxic manifestations.
3. Patient with vocal cord problems.

All patients were subjected to the following:

- A) **History:** Detailed history taking from each patient regarding age, with special reference to present, past, medical history.
- B) General, body built, look of patients, decubitus, mental state, vital signs (Sleeping pulse, blood pressure and temperature), facial expression, upper and lower limbs, chest, heart, abdomen and skeletal examinations.
- C) Examination of the thyroid was done including: inspection, palpation, percussion and auscultation, Comment on thyroid swelling: Site, side, size, shape, surface, overlying skin, E.N.T examination and assessment of vocal cords mobility (all patients should have negative results).
- D) Thyroid function tests (Serum T3, T4 and TSH). Complete Laboratory tests, E.C.G, Neck U/S, Preoperative F.N.A.C, Post-operative pathology.

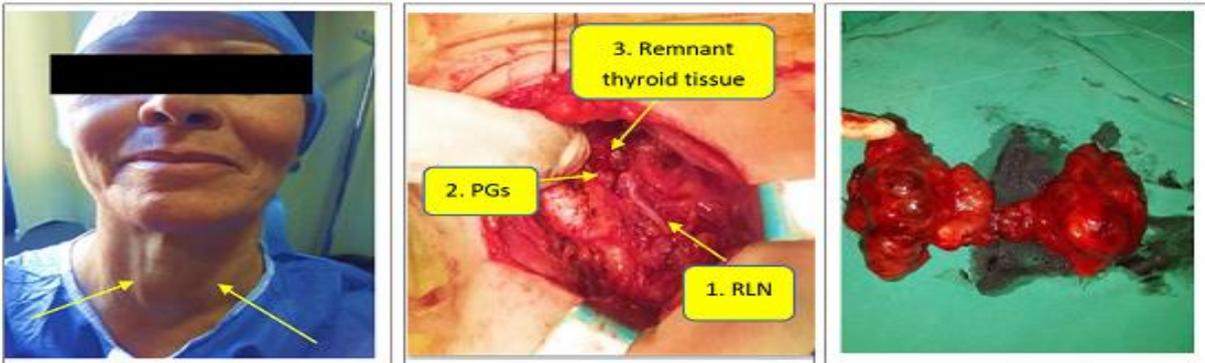
Thyroidectomy technique:

Total thyroidectomy was performed by extra capsular dissection to remove both thyroid and pyramidal lobes. We preferred to identify the nerve just caudal to the point where it crosses the inferior thyroid artery and to dissect it in both directions: caudally to the mediastinum and cranially to the cricothyroid junction .

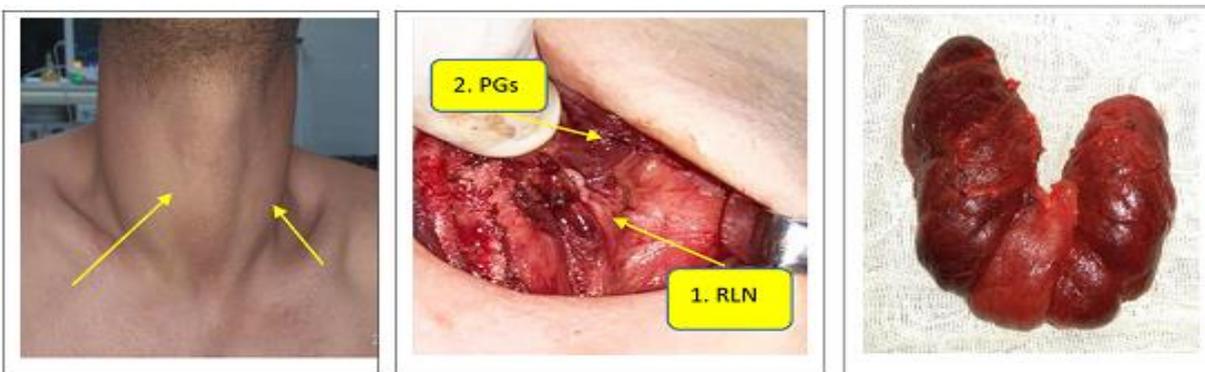
After the thyroid gland was mobilized medially, the connective tissue on the tracheoesophageal space was dissected to identify the nerve. If the nerve bifurcates in branches, which is not a rare condition, all of the branches are identified.

All vessels were ligated close to the thyroid gland especially the branches of the inferior thyroid artery. Parathyroid glands and RLNs was observed and preserved in a similar way while performing NTT. In the NTT group, lobectomy was performed on the larger or the more nodular thyroid lobe or including the dominant nodule with contra lateral subtotal resection leaving an average of 1–2 gm. of thyroid tissue. Non-viable parathyroid glands were auto transplanted immediately.

SAMPLE OF CASES



Case (1): Shows 61 years old female patient with Toxic goiter underwent Near Total Thyroidectomy (NTT), Bed of the removed thyroid gland showing 1. RLN 2. Parathyroid Gland "PGs" 3. Remnant of thyroid tissue, Removed specimen after near total thyroidectomy.



Case (2): Shows 37 years old male patient with Toxic goiter underwent Total Thyroidectomy (TT), Bed of the removed thyroid gland showing 1. RLN 2. Parathyroid Gland (PGs), Removed specimen after Total Thyroidectomy.

Statistical analysis

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following tests were done:

- Independent-samples t-test of significance was used when comparing between two means.
- Chi-square (x²) test of significance was used in order to compare proportions between two qualitative parameters.
- The confidence interval was set to 95% and the margin of error accepted was set to 5%. The p-value was considered significant as the following:
- Probability (P-value)
- P-value <0.05 was considered significant.

- P-value <0.001 was considered as highly significant.
- P-value >0.05 was considered insignificant.

RESULTS

This prospective randomized controlled study was conducted on 84 patients at general surgery department, Endocrine surgery unit at MUH. The main clinical features of study group are shown in the following tables and charts.

Age: The mean age was 41.43 ± 9.27 years. With 32 (38%) patients within age of (51-75) and 52 (62%) patients within age of (25-50). **Sex:** Males represented 12 patients (14%) while females represented 72 patients (86%). **Pre-Op. TSH:** The mean Pre-op TSH level was 0.11 ± 0.07 in TT group and 0.12 ± 0.08 in NTT group. **FNAC:** Pre-op. cytological examination showed 100% of our cases was benign (table 1).

Table (1): Pin years, Sex, Pre-Operative TSH and fine needle aspiration cytology of the patients among the study group.

		TT (n = 42)		NTT (n = 42)		χ ²	P
Gender	Male	4	9.5%	8	19.0%		
	Female	38	90.5%	34	81.0%		
Age	Middle (25-50)	24	57.1%	28	66.7%	0.808	0.369
	Old (51-75)	18	42.9%	14	33.3%		
Pre-operative TSH		0.11 ± 0.07		0.12 ± 0.08		1.052	0.296
FNAC "Benign"		42	100.0%	42	100.0%	-	-

Table (2) shows Sonographic data among the study group: 18 patients with TIRADS 2 (21%) while 58 (69%) presented with TIRADS 3, 8 patients classified with U/S as TIRADS 4a.

Table (2): Sonographic data of cases.

		TT (n = 42)		NTT (n = 42)		χ ²	P
		No	%	No	%		
Pre-operative U/S							
TIRADS 2		6	14.3%	12	28.6%	4.069	0.131
TIRADS 3		30	71.4%	28	66.7%		
TIRADS 4a		6	14.3%	2	4.8%		

Table (3) shows that in our study 5 patients (6%) of all 84 cases experienced a post-operative hematoma. Only 2 of the whole study group (2.3%) needed to be re-explored intra operatively, and 4 patients (4.7%) of all 84 cases experienced a post-operative bleeding, it was controlled by conservative treatment and anti-hemorrhagic drugs, and Among all patients 6 patient showing post-operative temporal recurrent laryngeal nerve injury (7%), only one patient showed signs of RLN injury at long term period in total thyroidectomy group

Table (3): Post Op. Hematoma, Bleeding, Temporary and Permanent RLN injury in our study group

Post-Operative		TT (n = 42)		NTT (n = 42)		χ ²	P
		No	%	No	%		
Hematoma	Occurred	2	4.8%	3	7.1%	0.718	0.397
	Not Occurred	40	95.2%	38	90.5%		
	Re-explored	0	0%	2	2.3%		
Bleeding	Occurred	0	0.0%	4	9.5%	4.200	0.040
	Not Occurred	42	100.0%	38	90.5%		
RLN Injury Permanent	Occurred	1	2.4%	0-	0%	0.718	0.397
	Not Occurred	41	97.6%	42	100%		
RLN Injury Temporary	Occurred	2	4.8%	4	9.5%	0.718	0.397
	Not Occurred	40	95.2%	38	90.5%		

Table (4) shows that among the study group 6 cases (7%) showed early post-operative Hypocalcemia manifestations. Only 3 of these 6 cases (3.5%) showed late manifestations of long-term hypocalcemia and needed medical treatment of these manifestations.

Table (4): Post-operative values of early and late Hypocalcemic.

		TT (n = 42)		NTT (n = 42)		χ ²	P
		No	%	No	%		
Post-Op. Hypocalcemia	Present	2	4.8%	4	9.5%	0.718	0.397
	Absent	40	95.2%	38	90.5%		
Late Serum Calcium		1	2.4%	2	4.8%	-	-
Early Serum Calcium		2	4.8%	4	9.5%	0.718	0.397

Table (5) shown that serum TSH levels post-operatively at the 1st month showed no significant change in TSH values, After 6 months the follow up TSH levels showed lowered levels in 2 cases (4.8%) in the Near total thyroidectomy (NTT) group and the toxic manifestations began to be presented on patients, On follow up of the two group of cases for TSH levels after 1 year 6 patients (14.3%) from the (NTT) group showed lowered TSH levels and re-presentation of the toxic manifestations on patients.

Table (5): Post-operative TSH levels follow up at 1st and 6th and 12th months among all the studied cases.

Post-Operative Follow up TSH		TT (n = 42)		NTT (n = 42)		χ ²	P
		No	%	No	%		
After 1st Month	Normal	42	100.0%	42	100.0%	-	-
	Lowered	0	0%	0	0%	-	-
After 6th Months	Normal	42	100.0%	40	95.2%	2.049	0.152
	Lowered	0	0.0%	2	4.8%		
After 1 Year	Normal	42	100.0%	36	85.7%	6.462	0.011
	Lowered	0	0.0%	6	14.3%		

DISCUSSION

The surgical treatment of multinodular thyroid disease remains controversial, but since 2010, total thyroidectomy (TT) or near-total thyroidectomy (NTT) has emerged as a surgical option to treat patients with multinodular toxic goiter ⁽⁶⁾.

The present study we carried out as a comparative controlled study on 84 patients who underwent total and near total thyroidectomy over a period of one year (February 2018 and January 2019). 42 patients underwent total thyroidectomy (group TT), the other 42 underwent near total thyroidectomy (group NTT).

Haluk Unalp has found in his study over 143 patients with controlled toxic goiter. Patients in group 1 (n ¼ 75) performed total thyroidectomy, and patients in group 2 (n ¼ 68) performed near total thyroidectomy. The mean (SD) for preoperative serum calcium, postoperative serum calcium, were 9.3 ± 0.4 mg/dL, 37.7±13 pg./dL, 8.4 ±0.6 mg/dL, 0.9 ±0.7 mg/dL, 9.4±7.8%, The postoperative serum calcium level was lower than the preoperative serum calcium level (8.4 ± 0.6 mg/dL vs. 9.3 ±0.4 mg/dL) ⁽⁷⁾.

In our study we agree with previous studies as postoperative temporary hypocalcemia was recorded in 2 patients (4.8%) in the total thyroidectomy group and in 4 patients in the near total thyroidectomy

group (9.5%). While 1 patient (2.4%) in our study had permanent post total thyroidectomy hypocalcemia and 2 patients (4.8%) had permanent post near total thyroidectomy hypocalcemia one year after surgery. In our study, we found that more PGs identified intraoperative may decrease the risk of developing of hypocalcemia after thyroidectomy.

Serdar Ozbas had found in his study on 117 patients that in NTT group 39 patients (39/117 – 33.3%) 2 patients developed (0.6%) transient voice disturbances. None of the patients in this group experienced permanent complications. However, in TT group 78 patients had (78/117 – 66%) 5 patients (5/117 – 4.27%) had temporary RLN injury but none of them remained permanent ⁽⁸⁾.

We agree with previous researchers as in our study 84 patients were operated with identification and preservation of bilateral RLN. Recurrent laryngeal nerve injury was (4.8% transient and 2.4% permanent) in total thyroidectomy group and (9.5% transient and 0% permanent) in near total thyroidectomy group. The majority was noted more in huge goiters. Patient with transient RLN injury improved during the 1st 6 months postoperative. We agree with some authors that RLN injury during TT can be decreased when operation performed by an experienced endocrine surgeon.

Efremidou *et al.* ⁽⁹⁾ reported that hemostasis can be better achieved with total thyroidectomy. Postoperative hemorrhage requiring reoperation occurred in 2 patients (0.2%).

In our study one patient observed with postoperative hematoma (4.2% in total thyroidectomy group) and (9.5% in near total thyroidectomy group) conservative management was enough in 3 cases. Only 2 of the whole study group (2.3%) needed to be re-explored intra operatively. We agree with other authors that hemostasis can be controllable more in total thyroidectomy.

In our study the post-operative TSH levels are calculated at the 1st month, at 6th months and 12th months. In total thyroidectomy group the TSH levels post operatively after 1st month was normal with no abnormalities, and the same unchanged after 6 and 12 months. There was a progressive change after 12 months in near total thyroidectomy group in 4.8% of cases which indicates recurrence of toxic manifestations of the disease. There was no wound infection, in our study.

CONCLUSION

It could be concluded that total thyroidectomy (TT) gives better results in management of patients with toxic goiter compared to near total thyroidectomy (NTT). Total thyroidectomy (TT) is advised to be done in patients with toxic goiter due to less liability for postoperative recurrence, provided to be done by experienced endocrine surgeon in a qualified center.

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