Total extracapsular thyroidectomy versus subtotal thyroidectomy in nonmalignant goiter

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Introduction
There is still a debate on the management strategies for diffuse benign thyroid diseases mainly between total extracapsular and subtotal thyroidectomy in terms of efficacy and complications.

Aim
To establish the best operative management of benign thyroid diseases and to determine postoperative complications.

Patients and methods
A prospective comparative study was carried out on patients with benign thyroid disease. Two types of surgical procedures were performed: total extracapsular thyroidectomy and subtotal thyroidectomy.

Results
The study included 60 patients operated for benign thyroid disease. Controlled toxic goiter was found in 36 patients (60%), simple multinodular goiter was found in 14 patients (23.3%), primary toxic goiter was found in eight patients (13.3%), and a dominant toxic nodule was found in two patients (3.3%). Thirty patients underwent total extracapsular thyroidectomy and the other 30 patients underwent subtotal thyroidectomy. In this study, one patient (3.3%) from the total thyroidectomy group developed a complication of transient recurrent laryngeal nerve injury compared with no patients (0%) in the subtotal thyroidectomy group. Also, in this study, two patients (6.7%) in the total thyroidectomy group developed complications of hypoparathyroidism and hypocalcemia, but not in patients (0%) in the subtotal thyroidectomy group.

Conclusion
Total extracapsular thyroidectomy is a safe and highly effective procedure, with low postoperative complications.

Keywords:
benign thyroid disease, subtotal thyroidectomy, total extracapsular thyroidectomy

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Introduction

Total thyroidectomy is increasingly being accepted for the management of patients with benign disease when both lobes of the thyroid gland are involved (such as multinodular goiter, thyroiditis, and Graves' disease). This approach can avoid disease recurrence and eliminate any subsequent risk of malignant change and resurgery. Several authors [1–6] have reported that total thyroidectomy can be performed safely for the treatment of bilateral benign thyroid disease, and that a low complication rate can be achieved with a meticulous surgical technique.

Muller *et al.* [7] reported that the rate of complications associated with total thyroidectomy, namely, recurrent nerve palsy, hypocalcemia, wound infection, and secondary hemorrhage, did not differ significantly from that associated with subtotal resections.

Aim of the work

(1) To evaluate the outcome of total thyroidectomy and subtotal thyriodectomy in the management of nonmalignant goiter (simple and toxic goiter).
(2) To determine the postoperative complications.

Patients and methods

This prospective, observational study was carried out in Assiut University Hospital, Department of General Surgery, during a 2-year period (from August 2012 to August 2014). The study was carried out on patients with clinical manifestations of nonmalignant goiter who were candidates for surgical treatment. The patients included were randomly selected to be subjected to either total extracapsular thyroidectomy or bilateral subtotal thyroidectomy.

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Inclusion criteria

(1) Patients with manifestations of hyperthyroidism after failure of medical treatment.
(2) Patients with clinically manifested goiter with a history of thyrotoxicosis.
(3) Patients with simple multinodular goiter.

Exclusion criteria

(1) Patients with clinically evident malignant goiter.
(2) Patients with preoperative biopsy-based evidence of malignant thyroid disease.
(3) Patients who were candidates for medical treatment.
(4) Patients who were unfit for operation.
(5) Cases of thyroiditis.
(6) Cases of recurrent thyroid.

All the included patients were subjected to the following:

(1) Complete assessment of history foucusing on the onset, course, duration of symptoms, predisposing factors, and medical comorbidities.
(2) Thorough clinical examination.
(3) Routine laboratory investigations and thyroid function.
(4) Imaging studies such as neck ultrasonography.
(5) In some patients in whom there was a clinical suspicion for malignancy, a preoperative fine-needle aspiration cytology was performed.

Operative techniques

Patients underwent total extracapsular thyroidectomy

The surgical technique was the same for every operation. After making an incision in the lower anterior neck and after dissecting the subhyoid muscles (without cutting them), the thyroid gland was exposed and the thyroid capsule was dissected and the lobe was delivered into the wound after ligation of the middle thyroid vein.

The superior thyroid vessels were dissected, ligated, and divided in all patients as near as possible to the thyroid gland to preserve the external laryngeal nerve.

The recurrent laryngeal nerves were systematically searched for, an attempt was made to identify and preserve the parathyroid glands on each side of the thyroid lobe to be removed, and to preserve them with intact blood supply.

The inferior thyroid artery was identified on each side and its branches were ligated at the capsule of the thyroid. This is the cephalocaudal technique for thyroidectomy that was used on most patients in this study, but there is also the caudocephalic technique, in which we start by ligating the inferior thyroid pole, followed by ligation of the superior thyroid artery, and this technique was used on a few number of patients in this study.

The parathyroid glands were separated by tying the small blood vessels running between the thyroid and the parathyroid glands, thus allowing the parathyroid glands to be separated in a lateral direction. The parathyroid glands were usually preserved *in situ* on a pedicle supplied by branches of the inferior thyroid artery.

Branches of the inferior thyroid artery supplying the thyroid gland were ligated near the capsule of the thyroid gland with preservation of the main trunk of the inferior thyroid artery.

Patients underwent bilateral subtotal thyroidectomy

Branches of the inferior thyroid artery supplying the thyroid gland were ligated near the capsule of the thyroid gland (or intracapsular ligation) with preservation of the main trunk of the inferior thyroid artery. We only preserved a small slice of posterior gland tissue on each side and sutured the capsule of the remnant of the thyroid gland with the pretracheal fascia to ensure homeostasis.

Ethical consideration

Each patient provided his/her written consent to participate before the surgery and the Faculty of Medicine Ethics Committee approved this study.

Statistical analysis

Statistical analysis was carried out using the statistical package for the social sciences, version 20 (SPSS Inc., Chicago, IL, USA). The results were expressed as mean ± SD or frequency. Proportions were compared using χ^2-tests.

Results

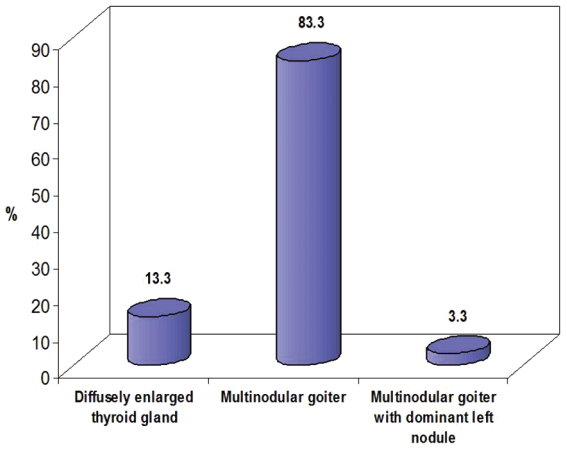
This study included 60 patients with benign goiter disease who were candidates for surgical interference. Thirty patients were subjected to subtotal thyroidectomy and 30 patients were subjected to total thyroidectomy during the period of this study (2 years). The mean age of the patients studied was 37.53 ± 10.48 years (range 20–60 years). Most of the study patients were women, 51 (85%), and there were nine men (15%) (Fig. 1).

Table 1 shows the distribution of the patients studied according to diagnosis.

The relationships between the diagnosis and type of operation are shown in Table 2.

There was no significant difference in the complications reported between the two types of operations as shown in Table 3.

Figure 1



Neck ultrasound findings in the patients studied.

Table 1 Distribution of the patients studied according to diagnosis

Diagnosis	*n* = 60 [*n* (%)]
Controlled secondary toxic goiter	36 (60.0)
Dominant toxic nodule	2 (3.3)
Primary toxic goiter	8 (13.3)
Simple multinodular goiter	14 (23.3)

Table 2 Relation between the diagnosis and type of operation

Diagnosis	Operation [*n* (%)]		*P*-value
	Subtotal thyroidectomy (*n* = 30)	Total extracapsular thyroidectomy (*n* = 30)	
Controlled secondary toxic goiter	9 (30.0)	27 (90.0)	0.000*
Dominant toxic nodule	2 (6.7)	0 (0.0)	0.472
Primary toxic goiter	8 (26.7)	0 (0.0)	0.008*
Simple multinodular goiter	11 (36.7)	3 (10.0)	0.015*

*Means significant.

Table 3 Relation between the type of the operation and the resulting complications

Complications	Operation [*n* (%)]		*P*-value
	Subtotal thyroidectomy (*n* = 30)	Total extracapsular thyroidectomy (*n* = 30)	
Nerve injury	0 (0.0)	1 (3.3)	0.313
Postoperative hypocalcemia	0 (0.0)	2 (6.7)	0.472
Postoperative bleeding	0 (0.0)	1 (3.3)	0.313
Wound complications	1 (3.3)	1 (3.3)	–

Discussion

The extent of thyroidectomy in benign thyroid disease is still a matter of debate and shows a large spectrum of management strategies. The aim of these procedures is to perform the most effective treatment with the less complications, without an incidence of recurrence and without the need for secondary surgical intervention, which will be difficult because of disturbed anatomy and adhesions.

Thirty patients were subjected to total thyroidectomy and the other 30 were subjected to subtotal thyroidectomy as a surgical management for benign goiter disease. Postoperative follow-up for those patients was performed to detect any complications, especially recurrent laryngeal nerve injury and hypoparathyroidism.

In our study, one patient (3.3%) in the total thyroidectomy group developed a complication of recurrent laryngeal nerve injury that was transient compared with no patients (0%) in the subtotal thyroidectomy group.

Also, in our study, two patients (6.7%) in the total thyroidectomy group developed a complication of hypoparathyroidism and hypocalcemia, but not in patients (0%) of the subtotal thyroidectomy group.

Dener [8], in his study on 102 patients to evaluate the safety of total thyroidectomy, reported that total thyroidectomy or lobectomy can be performed with minimal morbidity in cases of benign thyroid disease affecting the entire gland as one (0.9%) temporary superior laryngeal nerve palsy, one (0.9%) temporary recurrent nerve palsy, and one (0.9%) temporary hypoparathyroidism occurred. Wound seroma developed in two patients (1.9%). There were no deaths or permanent complications.

However, Prades *et al.* [9] reported that permanent (>12 months) unilateral recurrent paralysis occurred in four patients (1.4%), permanent (>12 months) hypoparathyroidism in 10 patients (3.7%), and hypertrophic or keloid scar in 14 patients (5.1%).

Their results suggest that total thyroidectomy is a safe surgical procedure for multinodular goiter patients. Low rates of postoperative complications were observed.

However, Muller *et al.* [7] reported that the rate of complications associated with total thyroidectomy, namely, recurrent nerve palsy in 0.9%, hypocalcemia in 0.9%, wound infection in 0.9%, and secondary hemorrhage in 0.6%, did not differ significantly

from that associated with subtotal resections/ hemithyroidectomies. Moreover, 88.3% of the patients who underwent total thyroidectomy were satisfied with the results of surgery. These findings indicate that total thyroidectomy is an acceptable surgical alternative for benign multinodular goiters.

Reoperative surgery for recurrent benign thyroid disease is associated with increased morbidity when preceded by initial subtotal thyroidectomy. Associated high levels of recurrence and increased permanent recurrent laryngeal nerve injury and hypoparathyroidism rates observed in this setting so subtotal thyroidectomy should not be recommende [10].

Conclusion

The study pointed out that subtotal thyroidectomy is safe despite the late complication of recurrence and morbidity of reoperation. There is an obvious decrease in the rate of complications associated with total thyroidectomy, especially with increasing experience and refinement of surgical technique. Total extracapsular thyroidectomy is a safe and highly effective procedure in most patients, with acceptable transient postoperative complications.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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