

# TOTAL VERSUS SUBTOTAL THYROIDECTOMY FOR THE MANAGEMENT OF NON TOXIC MULTINODULAR GOITER

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## **Abstract**

**Background:** Non toxic multinodular goiter had been treated primarily by subtotal thyroidectomy, but the high incidence of recurrences and the higher risk of morbidity following a second operation lead to the introduction of total thyroidectomy as an alternative procedure.

**Objectives:** To compare the safety and the efficacy of total thyroidectomy with subtotal thyroidectomy for treatment of nontoxic multinodular goiter.

**Methods:** Six hundred forty cases were assessed preoperatively clinically and biochemically by thyroid function tests, U/S of the neck & thyroid scan, serum calcium level, indirect laryngoscopy, x-ray of the soft tissue of the neck and thoracic inlet, Chest x-ray and ECG. 494 cases were treated by total thyroidectomy, 146 cases were treated by subtotal thyroidectomy.

**Results:** Total thyroidectomy was conducted in 74% of the cases while only 26% of patients underwent subtotal thyroidectomy. Temporary recurrent laryngeal nerve palsy occur in 3% of cases in the first group and 0.6% in the second group. Permanent recurrent

laryngeal nerve palsy was not reported in both groups. Temporary hypoparathyroidism was reported in 6.9% of the cases in first group and in 2.7% of the cases in second group. In first group 1.4% of the cases develop permanent hypoparathyroidism, while no case of the second group developed this complication.

Only one patient (0.6%) of the subtotal thyroidectomy group developed immediate post operative hemorrhage that needs urgent re-exploration which was not reported in the total thyroidectomy group. Acute laryngeal edema occurs in 0.6% of the cases in the first group and in 1.4% of the cases in the second group.

**Conclusion:** Total thyroidectomy had been found to be safe with comparable rate of complications with subtotal thyroidectomy as primary management of bilateral nontoxic multinodular goiter.

**Keywords:** Total thyroidectomy, Subtotal thyroidectomy, Non-toxic multinodular goiter.

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## **Introduction**

In the nineteenth century thyroid surgery was rarely performed as primary treatment for thyroid diseases. Biliroth and Gross had great difficulties with operation. The mortality and morbidity rates were significantly high, therefore lesser resection procedures were performed to reduce the morbidity.

Kocher and Halsted introduce the technical advances in thyroid surgery and made these operations relatively safe, they prefer hemi-thyroidectomy and operations less than total thyroidectomy<sup>(1)</sup>.

Until the last quarter of the twentieth century total thyroidectomy was only done for thyroid cancer, later they use this procedure for cases other than cancer. Recently, Thompson of Ann Arbor<sup>(2)</sup>, Clark of San Francisco<sup>(3)</sup>, and Reeve of Sydney, Australia<sup>(4)</sup> advocates the use of total thyroidectomy for treatment of benign thyroid diseases. With

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the advent of safe surgical techniques and recognition of pitfalls of subtotal thyroidectomy, total thyroidectomy is being performed increasingly for benign thyroid disorders<sup>(5,6)</sup>.

Recent literatures show comparable complication rates of total and subtotal thyroidectomy. Total thyroidectomy for benign thyroid disorders are being evolved and preferred option, as reoperation for recurrent goiter is associated with increased morbidity<sup>(7, 8)</sup>. In this study we present a highlight on the relevance of total thyroidectomy for management of multinodular nontoxic goiter.

#### **Methods**

A prospective study was conducted on 640 patients undergo thyroid surgery for nontoxic multinodular goiter between (March 1995 - March 2005) at Alkindy teaching hospital. The main indications for surgery were pressure symptoms, goiter with retrosternal extension, and recent thyroid enlargement of an already present long-standing multinodular goiter.

The patients were subdivided randomly into two major groups: Group I: includes 494 patients (74%) undergo total thyroidectomy. Group II: includes 146 patients (26%) undergo subtotal thyroidectomy.

The patients were assessed preoperatively clinically and biochemically including thyroid function tests, thyroid scan, ultrasound, serum calcium level, and indirect laryngoscopy, X-ray of soft tissue of the neck and thoracic inlet, chest X-ray and ECG.

Through collar incision, the thyroid gland lobes were exposed following dissection of skin flaps and splitting of strap muscles of the neck in the mid line. Total thyroidectomy was performed by uniform technique of capsular dissection with ligation of terminal branches of the

inferior thyroid artery are divided on the thyroid capsule preserving the blood supply to the parathyroid glands, recurrent laryngeal nerve and the four parathyroid glands were identified and preserved in all cases.

In subtotal thyroidectomy five grams of thyroid tissue was left on each side. Radi vac drains were left behind for 36 hours. All thyroid specimens were submitted for histopathological examination. All patients who undergone total thyroidectomy were put on thyroxin therapy replacement.

#### **Results**

Out of 640 patients included in the study there were 512 females and 128 males with female: male ratio 5:1. The mean age group was 36 years ranging from (14-79 years) with the highest incidence in the fourth decade as in (Figure 1).

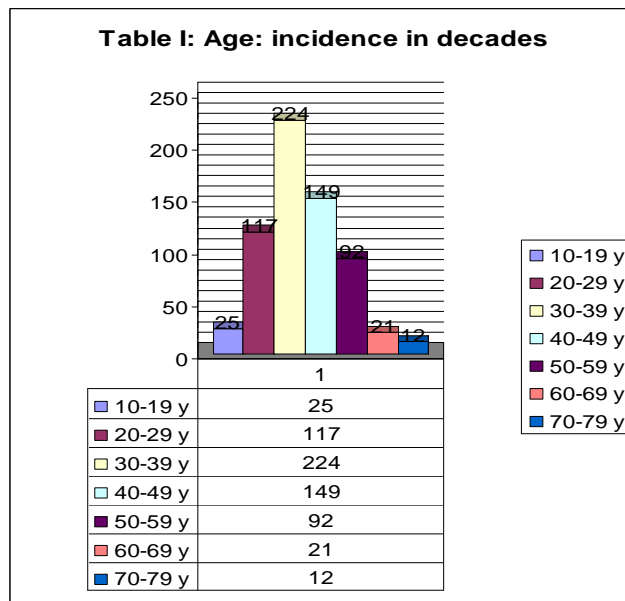
Total thyroidectomy was performed for 494 patients (74%) and subtotal thyroidectomy for 146 patients (26%). The mean hospital stay was 36 hours ranging from (24-48 hours). There were no mortalities in both groups.

The main reported complications includes: Temporary recurrent laryngeal nerve palsy in 15 patients (3%) in total thyroidectomy group and in 1 patient (0.6%) in subtotal thyroidectomy group. No permanent recurrent laryngeal nerve palsy was reported in both groups.

Temporary hypoparathyroidism was reported in 33 patients (6.9%) in total thyroidectomy group while only 4 patients (2.7%) of the subtotal thyroidectomy group develop such complication. Only 7 patients (1.4%) of the total thyroidectomy group develop permanent hypoparathyroidism. No case of permanent hypoparathyroidism was reported in the other group.

One patient from subtotal thyroidectomy group develops hemorrhage (0.6%) that needs urgent re-exploration which was not reported in the other group. One case (0.2%) of the total thyroidectomy group and two cases (1.4%) of the subtotal thyroidectomy group develop acute laryngeal edema only one case of the second group need urgent temporary tracheostomy (Table 2).

No case of tracheomalacia was reported in both groups. Histopathological examination of the whole series discover the presence of 11 malignant thyroid tumors, 6 papillary carcinoma, 4 follicular carcinoma and 1 anaplastic carcinoma that was not diagnosed neither clinically or by preoperative investigations.



**Figure 1: Age incidence of 640 patients with nontoxic multinodular goiter**

**Table 2: The complication after total and subtotal thyroidectomy for multinodular goiter**

Operation	RLN				HPT				hemorrhage		Acute laryngeal edema	
	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.				
<b>Total thyroidectomy</b>	15	3%	0	0%	33	9.6%	7	1.4%	0	0%	1	0.2%
<b>Subtotal thyroidectomy</b>	1	0.6%	0	0%	4	2.7%	0	0	1	0.6%	2	1.4%

RLN = recurrent laryngeal nerve palsy, Temp. = temporary, Perm. = permanent

### **Discussion**

In the recent years there were increasing tendencies towards performing total thyroidectomy for bilateral nontoxic multinodular goiter specially in endemic regions<sup>(9, 10)</sup>. Long follow up of bilateral nontoxic multinodular goiters shows that goiter tends to recur after surgery (subtotal thyroidectomy) and the recurrence rate increases with time<sup>(11)</sup>.

Rojdmark and Jarhult<sup>(11,12)</sup> noted 42% recurrence rate after 30 years follow up of patients with multinodular goiter underwent subtotal thyroidectomy. Re-operation after recurrence has been associated with high morbidity<sup>[13]</sup>.

Postoperative thyroxin had been advocated to prevent goiter recurrence after subtotal thyroidectomy but many others<sup>(12, 14)</sup> had observed failure of prevention of goiter recurrence.

Pressure symptoms due to posteriorly located thyroid nodules (retro esophageal and retro tracheal) might be missed after subtotal thyroidectomy and so the symptoms will not resolve after surgery. In long-standing multinodular goiter no normal tissues could be found considering such facts total thyroidectomy for multinodular Non-toxic goiter should be considered<sup>(15,13)</sup>.

The other issue of under diagnosed malignancy in cases of multinodular goiter had been raised where subtotal thyroidectomy is inadequate treatment<sup>(16)</sup>. The mean hospital stay was 36 hours ranging from (24-48 hours) this was shorter than the result of Gough and Wilkinsin<sup>(17)</sup> who had mean hospital stay of 3.8 days for total thyroidectomy and 4.6 days for subtotal thyroidectomy, while in the study of Colak et al, they reported longer hospital stay in total thyroidectomy group than subtotal thyroidectomy<sup>[18]</sup>. In our study there were no mortalities in both groups this goes with the studies of Giles

et al<sup>(19)</sup>, Ozbas et al<sup>[20]</sup> and Chung-Yau<sup>(21)</sup>.

In our study temporary recurrent laryngeal nerve palsy occur in 15 patients (3%) of the total thyroidectomy group and in 1 patient (0.6%) of the subtotal thyroidectomy group, while no permanent recurrent laryngeal nerve palsy was reported in both groups. The study of Ozbas et al reported higher incidence of temporary recurrent laryngeal nerve palsy in subtotal thyroidectomy than total thyroidectomy 2.4% and 1.9 respectively<sup>(20)</sup>.

In the study of Colak et al, temporary recurrent laryngeal nerve palsy occur in 9.3% of the total thyroidectomy group and 6.3% of the patients undergoing subtotal thyroidectomy while permanent recurrent laryngeal nerve palsy was observed in 0.95% of cases<sup>(18)</sup>. Gough and Wilkinsin reported a higher incidence of temporary recurrent laryngeal nerve palsy than subtotal thyroidectomy group 2.4% versus 0% respectively and permanent recurrent laryngeal nerve palsy occurs in 1.5% in total thyroidectomy and 0% in the subtotal thyroidectomy group<sup>(17)</sup>.

Temporary hypoparathyroidism was reported in 33 patients (6.9%) in total thyroidectomy group while only 4 patients (2.7%) of the subtotal thyroidectomy group develop such complication. Only 7 patients (1.4%) of the total thyroidectomy group develop permanent hypoparathyroidism. No case of permanent hypoparathyroidism was reported in the other group in our series.

Gough and Wilkinsin reported temporary hypoparathyroidism in 24.1% in the total thyroidectomy and in 8.3% of cases of subtotal thyroidectomy, while permanent hypoparathyroidism was reported in 2.13% of the patients in the total thyroidectomy group and no

permanent hypoparathyroidism was reported in the subtotal thyroidectomy group<sup>(17)</sup>.

Temporary hypoparathyroidism was reported in 11.4% in the total thyroidectomy and in 9.5% of cases of subtotal thyroidectomy while permanent hypoparathyroidism was observed in 0.95% of cases in the total thyroidectomy group and not reported in the subtotal thyroidectomy group in the study of Colak et al<sup>(18)</sup>. Ozbas et al show temporary hypoparathyroidism in 8.2% in the subtotal thyroidectomy group and in 30% of cases in total thyroidectomy group patients while permanent hypoparathyroidism was observed in 4% after total thyroidectomy only<sup>(20)</sup>.

One patient from subtotal thyroidectomy group develops hemorrhage (0.6%) that needs urgent re-exploration which was not reported in the other group in our patients, this was comparable with the study of Gough and Wilkinsin who reported hemorrhage in 2.13% of total thyroidectomy group versus 4.1% of cases in the subtotal thyroidectomy group<sup>(17)</sup>.

One case (0.2%) of the total thyroidectomy group develop acute laryngeal edema which was due to difficult intubation as the patient was proved to be a case of papillary carcinoma of the thyroid who needs temporary tracheostomy. Two cases (1.4%) of the subtotal thyroidectomy group developed this complication which resolve by conservative management. No case of tracheomalacia was reported in both groups, while tracheomalacia was reported in 1.6% of cases after total thyroidectomy in the study of Mishra et al<sup>(21)</sup>.

Histopathological examination of the whole series discover the presence of 11 malignant tumors 2.3% of the total

thyroidectomy group, 6 papillary carcinoma, 4 follicular carcinoma and 1 anaplastic carcinoma that was not been suspected clinically or by preoperative assessment. This goes with the study of Mishra et al<sup>(21)</sup> who reported incidental thyroid cancer in 6.3% of cases after total thyroidectomy also Paolo et al<sup>(22)</sup> who reported an incidence of 8.6% of occult carcinoma after multinodular goiter operations. Only one case (0.6%) of the subtotal thyroidectomy group show malignant thyroid tumor (papillary carcinoma) which was treated and followed postoperatively by radioactive iodine therapy.

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