

IS TOTAL THYROIDECTOMY THE OPTIMAL TREATMENT FOR BENIGN THYROID DISEASE?

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(Submitted by Academician D. Damyanov on March 8, 2013)

Abstract

Benign bilateral thyroid disease is the most common indication for surgery in endemic iodine-deficiency regions. Total thyroidectomy is currently the preferred treatment for thyroid cancer, multinodular goiter and Graves disease; however, many surgeons and endocrinologists choose not to perform or recommend total thyroidectomy to treat benign thyroid diseases. We sought to assess whether the results support the hypothesis that total thyroidectomy is safe and can be considered as the optimal surgical approach for treating BTM in endemic region such as Bulgaria.

A total of 500 patients underwent thyroid operation between 2007 and 2009. We excluded patients with thyroid cancer or suspicion of thyroid malignancy. We evaluated indications for total thyroidectomy, complication rates, local recurrence rate and long-term outcome after total thyroidectomy.

Diagnoses before surgery were multinodular goiter ($n = 300$), Graves disease ($n = 100$) and Toxic multinodular goiter ($n = 100$). The incidence of permanent bilateral recurrent laryngeal nerve palsy was 0% and that of permanent unilateral recurrent laryngeal nerve palsy and permanent hypocalcaemia was 1.8–5%. Haemorrhage requiring repeated surgery occurred in 4.5–13% of patients. There was no wound infection, and postoperative mortality was 0%.

Total thyroidectomy is safe and is associated with a low incidence of disabilities. Furthermore, our study showed that total thyroidectomy is the optimal procedure, when surgery is indicated, for Graves disease and toxic multinodular goiter, as total thyroidectomy has the advantages of immediate and permanent cure and no recurrences.

Key words: benign thyroid disease, total thyroidectomy, subtotal thyroidectomy, endemic region

List of the most used abbreviations: TT – total thyroidectomy, ST – subtotal thyroidectomy, BMNG – bilateral multinodular goiter, GD – Graves

disease, TMNG – toxic multinodular goiter, RLN – recurrent laryngeal nerves, PG – parathyroid glands

Introduction. Benign bilateral thyroid disease is the most common indication for surgery in endemic iodine-deficiency regions. Ever since Theodor Koher proposed surgery for goiter about a century ago, there has been a debate about the best surgical resection for the disease. The method Koher used involved sparing enough thyroid tissue bilaterally to ensure euthyroid state. The main problem with this approach was that every patient needed different size of spared thyroid tissue to ensure euthyroid state. Furthermore, the approach of subtotal bilateral thyroidectomy resulted in a recurrence varying from 13.4% to 60% according to the extent of resection. In general, about half of the patients who develop recurrence of benign goiter require surgical re-excision which carries a greatly increased risk of permanent complications. Now there is a changing trend amongst most of the endocrine surgeons towards performing total thyroidectomy for benign bilateral thyroid disease [1, 2]. The aim of this study was to review our experience with total thyroidectomy as the treatment of choice for bilateral multinodular goiter, Greaves disease or toxic multinodular goiter in endemic regions such as Bulgaria.

Patients and methods. This study was conducted in the endocrine surgery department, USBALE – Sofia. All patients who underwent total thyroidectomy between January 2007 and March 2009 were enrolled in this retrospective study. Patients who had thyroid cancer or with high probability for thyroid cancer, recurrent goiter and those presenting with solitary thyroid nodules were excluded from the series. By doing so, the selected population for this study represents a selected group with preoperative clinical diagnosis bilateral multinodular goiter (BMNG), Greaves disease (GD) or toxic multinodular goiter (TMNG). Data were extracted regarding patients age, sex, indication for surgery, operation performed, final histological diagnosis and complications. Every patient was evaluated with thyroid function tests – free thyroxin and thyroid stimulating hormone, TAT, MAT and ultrasonography to define the extent of the disease. Preoperatively every patient underwent laryngoscopic examination of the vocal cords and the serum calcium concentration test. After the operation, every patient was asked if his or her voice changed. If there was a positive answer or if the surgeon suspected postoperative vocal cord palsies during the postoperative period, the patients underwent second postoperative laryngoscopic examination of the vocal cords.

Total thyroidectomy was performed by a standard technique of capsular dissection. Recurrent laryngeal nerves and parathyroid glands were routinely identified on both sides. The parathyroid glands with compromised blood supply were excised, diced and reimplanted in the sternocleidomastoid muscle. If there was no risk factors for bleeding, the wounds were closed without suction drains. In the absence of any complication, the patients were discharged on the third day.

Postoperative serum calcium levels were estimated twice for 24 h after surgery. Calcium supplementation was given if serum calcium levels dropped below 2.0 mmol/l. If the patient could be weaned from calcium supplement within six months, hypoparathyroidism was considered transient. If there was laryngoscopic evidence of RLN recovery within six months of operation, the RLN palsy was defined as transient. Oral thyroxin supplementation started from the second day after the operation at a dose of 75–150 micrograms per day, according to body weight. Follow-up was planned after a month, after three months, after six months and after two years of discharge. The data analysis and interpretation were performed on SPSS 19.0 software package (SPSS Inc., Chicago, IL). The difference between groups was analyzed with chi square test and $p < 0.05$ was considered significant.

Results. Of the 500 patients enrolled in this series – 300 patients were with BMNG, 100 patients with TMNG and 100 patients with GD. The majority of patients were women – 447 (89.4%) and only 53 (10.6%) – men with mean age of 44.8 years. The post-operative follow-up for every patient in this study was 2 years. Half of the patient underwent subtotal thyroidectomy – 150 patients with BMNG (group 1 BMNG), 50 patients with TMNG (group 1 TMNG) and 50 patients with GD (group 1GD), and the other half – total thyroidectomy (Group 2) (Table 1). There was recurrence of thyroid disease as follows: BMNG was recorded in 34 (22.66%) patients, TMNG – in 16 (32%) patients and GD – in 10 (20%) in group with subtotal thyroidectomy while there was no recurrence in groups with total thyroidectomy ($p < 0.01$). There was no evidence of malignancy in either group.

T a b l e 1

Patients' distribution and postoperative outcome in group 1 (subtotal thyroidectomy) and group 2 (total thyroidectomy)

	No	Recurrence
Group 1 BMNG	150	34 (22.66%)
Group 2 BMNG	150	0
Group 1 TMNG	50	16 (32%)
Group 2 TMNG	50	0
Group 1 GD	50	10 (20%)
Group 2 GD	50	0

Transient RLN palsy was recorded in 3 (2%) and 2 (1.3%) cases with BMNG, 2 (4%) and 2 (4%) cases with TMNG, 3 (6%) and 4 (8%) cases with GT. Permanent unilateral RLN palsy was noted in 2 (1.3%) and 1 (0.66%) cases with BMNG, 1 (2%) and 2 (4%) cases with TMNG, 3 (6%) and 3 (6%) cases with GD (Table 2). Permanent bilateral RLN palsy was not encountered in any pa-

T a b l e 2

Complications of total and subtotal thyroidectomy in the treatment of benign thyroid disease

Complication	Group 1 BMNG	Group 2 BMNG	Group 1 TMNG	Group 2 TMNG	Group 1 GD	Group 2 GD
Haemorrhage	5 (3.3%)	4 (2.66%)	4 (8%)	2 (5%)	3 (6%)	3 (6%)
Wound seroma	2 (1.3%)	1 (0.66%)	2 (4%)	1 (2.5%)	1 (2%)	1 (2%)
<u>RLN PALSY</u>						
Temporary	3 (2%)	2 (1.3%)	2 (4%)	2 (4%)	3 (6%)	4 (6%)
Permanent	2 (1.3%)	1 (0.66%)	1 (2%)	2 (4%)	3 (6%)	3 (6%)
<u>Hypoparathyroidism</u>						
Temporary	5 (3.3%)	3 (2%)	1 (2%)	3 (6%)	1 (2%)	2 (4%)
Permanent	3 (2%)	2 (1.3%)	1 (2%)	1 (2%)	1 (2%)	1 (2%)

tients in this study. There were no statistically significant differences (p value not significant) between the group with subtotal thyroidectomy and the group total thyroidectomy within the examined benign thyroid diseases.

Permanent hypoparathyroidism occurred in 3 (2%) and 2 (1.3%) cases with BMNG, 1 (2%) and 1 (2%) cases with TMNG, 1 (2%) and 1(2%) cases with GD. In our study we encountered temporary hypoparathyroidism in 5 (3.3%) and 3 (2%) cases with BMNG, 1 (2%) and 3 (6%) cases with TMNG, 1 (2%) and 1 (2%) cases with GD. Again we found no statistically significant differences (p value not significant) in the complication rates between the group with subtotal thyroidectomy and the group total thyroidectomy within the examined benign thyroid diseases.

Discussion. Total thyroidectomy is a well-established surgical therapy for well-differentiated thyroid carcinoma. In some centres, it represents almost half of all thyroid operations carried out [3, 4]. Its role in the treatment of benign thyroid disease is not well established yet. There is increasing recognition that total thyroidectomy is appropriate for patients with benign thyroid disease when there is significant nodular disease involving both lobes [5]. There is usually no normal tissue in patients with multinodular disease. Therefore, if a surgeon leaves abnormal thyroid tissue in a patient with bilateral multinodular disease, subsequent reoperation might be required [6]. The use of total thyroidectomy among patients with Graves disease is controversial owing to the extent of resection; however, research in this area has indicated that a more radical resection is beneficial to such patients. Total thyroidectomy, therefore, is now recommended for these patients because it eliminates the source of the Graves disease autoantibodies; it eliminates the risk of disease recurrence; hypothyroidism is predictable and controllable by immediate thyroxin replacement; it alleviates any associated endocrine ophthalmopathy in 80%–85% of the patients; and the risk of malignancy among patients

with Graves disease is only about 4%, although the incidence can increase to 15% if cold nodules are present [2, 7–9]. The goal of surgical treatment in BTM should be to eliminate the disease with a low complication rate and to minimize the necessity for reoperation because the risk of complications in secondary (recurrent) operations is much higher than in primary operations. MENEGAUX et al. [10] documented in 203 thyroid reoperations for benign thyroid disease that the permanent complication rate was higher in thyroid reoperations than in primary thyroid operations. One of the advantages of total thyroidectomy is to eliminate the risk for a more hazardous thyroid reoperation. Our data suggest that total thyroidectomy can be carried out with minimum morbidity among patients with benign thyroid conditions, including multinodular goiter and Graves disease, when surgery is indicated. In our study, permanent unilateral recurrent laryngeal nerve injury and permanent hypoparathyroidism occurred in only 1 (1.12%) BMNG, 2 (5%) TMNG, 3 (13%) GD and 2 (2.27%) BMNG, 1 (2.5%) TMNG, 1 (4.3%) GD of patients, respectively. Identification of laryngeal nerves during mobilization and dissection of thyroid lobes helped to prevent accidental injury and visualization of the 4 parathyroid glands and preservation of their blood supply minimized inadvertent damage to these structures. We documented that performance of total thyroidectomy instead of subtotal resection as the primary procedure significantly reduced the rate of recurrence of the thyroid disease. With experience in the surgical technique, total thyroidectomy has been recommended not only for the management of thyroid carcinoma, but also for BTM, because total thyroidectomy is an appropriate approach to prevent recurrence [11, 12].

Conclusion. Our data support that total thyroidectomy is a valuable option, when surgery is indicated, for treating benign thyroid conditions such as multinodular goiter, toxic multinodular goiter and Graves disease. It has been shown that total thyroidectomy achieves immediate and permanent cure with no risk of disease recurrence or repeating surgeries. Long-term euthyroidism after total thyroidectomy is achieved easily with L-thyroxin supplementation, while cosmetic outcome is good with patient satisfaction and acceptance.

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