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ORIGINAL ARTICLE

TOTAL THYROIDECTOMY FOR CLINICALLY BENIGN THYROID DISEASE: A PREFERRED OPTION WITH CAPSULAR DISSECTION TECHNIQUE

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Aim: *This study aims to evaluate the use of total thyroidectomy as a preferred option with capsular dissection technique in diffuse bilateral benign disease, multinodular goiter and Grave's disease. The use of total thyroidectomy in treatment for benign thyroid disease remains controversial. On the other hand, the complication rate may have an increase up to 20 times in repeated operation for recurrence or incidental cancer after less than total thyroidectomy.*
Methods: *Prospective study of 55 patients who underwent total thyroidectomy with capsular dissection technique for clinically benign disease at the National Cancer Institute, there were 46 women and 9 men with mean age 45.1 years. Indications of surgery were euthyroid bilateral multinodular goiter, toxic multinodular goiter and Grave's disease in 46 (83.3%), 2 (3.6%) and 7(12.7%) respectively*
Results: *The incidence of incidental thyroid cancer was 9.0% and those patients voided reoperation for completion thyroidectomy. Transient hypocalcaemia, permanent nerve injury, hematoma which needed re-operation occurred in 2 (3.6%), 1(1.8%) and 2(3.8%) patients respectively.*
Conclusion: *Total thyroidectomy is a preferred treatment for multinodular goiter and Grave's disease when there is bilateral involvement of the gland because it decreases the likelihood of future operations for recurrent disease or incidental thyroid cancer.*

Keywords: *Graves Ophthalmopathy, Vocal Cord Pareses, Goiter, Nodular.*

INTRODUCTION

The indication of total thyroidectomy for treatment of well-differentiated thyroid carcinoma is not unanimous, and when total thyroidectomy is performed for benign thyroid diseases, it is even more controversial .Many authors support the indication of total thyroidectomy for non malignant thyroid diseases. The rational for this approach is the diffuse involvement of the thyroid observed in multinodular goiter, chronic thyroiditis and Graves's disease.[1,2] A considerable number of patients undergoing primary treatment with subtotal thyroidectomy need reoperation for recurrence or incidental cancer, which has higher rate of complication compared with the primary procedures. The incidence of thyroid cancer varies from 7.5 to 13 % in multinodular goiter.[3,4] The presence of multiple nodules decreases the diagnostic value of fine needle aspiration biopsy, and incidental thyroid cancer is frequent histological finding in multinodular goiter.[5] The incidence of regrowth of thyroid tissue after partial or less than total thyroidectomy for multinodular goiter is between 12 and 20 percent, and is dependant on the initial volume of diseased tissue as well as the extend of resection. In general, about half of patients who develop recurrence of benign goiter require surgical resection.[6,8,12]

The main controversy surrounding surgical treatment of benign thyroid disease relates the appropriate extent of resection.[10] Proponents of limited resection base their argument on the fact that total thyroidectomy is associated with a higher complication rate, particularly of recurrent nerve injury and hypoparathyroidism, than a lesser

operation. However, with appropriate surgical technique, namely capsular dissection, the complication rate of total thyroidectomy can be minimized.[7,15] In recent literature, the reported incidence of recurrent laryngeal nerve palsy varies between 0.3 and 1.7 percent, whereas the rate of permanent hypoparathyroidism ranges from 0.7 to 3.0 percent.[7,16,20] With the advent of surgical technique and recognition of the pitfalls of incomplete excision of the gland, total thyroidectomy is being performed increasingly for benign disease.[8] In cases of recurrence in which new dissection of the posterolateral face of the thyroid gland was required .because of fibrosis, difficulties with adequate visualization and structure preservation can cause a higher incidence of unilateral recurrent nerve paralysis of up to 10% and of permanent hypothyroidism of up to 20%, increasing the number of complication as much as 20 fold.[1,6,17] The purpose of the present study was to analyze the results of management of patients who required total thyroidectomy for benign disease aiming to decrease the likelihood of future operations for recurrent disease or completion thyroidectomy for incidental thyroid cancer and thus the associated risks of increased morbidity associated with second operation.

PATIENTS AND METHODS

Between January 2002 and December 2005, 55 patients 46 women (83.6%) and 9 men (16.3%) with mean age of 45.1±13.3 years (range 18 to72), underwent total thyroidectomy for bilateral benign thyroid disease as a personal series carried out in National Cancer Institute. Patients presented with solitary thyroid nodules or disease limited to one lobe, which required a unilateral lobectomy, was excluded from the study. Previously treated patients were excluded even if their recurrent disease following a previous hemithyroidectomy for benign disease. Hormonal profile, routine laboratory investigation and neck ultrasound done to all patients preoperatively. Computerized tomography done to selected cases, especially in large or when retrosternal goiter is suspected (Figs. 1,2). The indication of surgery was clinically simple nodular goiter in 46 patients and toxic nodular goiter in 2 patients and primary thyrotoxicosis (Grave's disease) in 7 patients Table 1.

Table 1. Clinical diagnosis.

	Total	Grave's disease Primary thyrotoxicosis	Toxic MNG	MNG,
Women	46 (83.6%)	6	2	38
Men	9 (16.3%)	1	o	8
Total	55 (100%)	7 (12.7%)	2 (3.6%)	46 (83.3%)

Surgical technique: Thyroidectomy was performed through a collar incision. The pretracheal fascia is incised in the midline, rarely needed we to divide the pretracheal muscles in large goiters only as in (Figs. 3a. preoperative and 3b. post operative). Thyroid gland was dissected on the plane of the capsule, with careful ligation of all vessels at the capsule of the gland. Also we used the middle thyroid vein as an initial surgical procedure with minimal dissection posterior to the middle thyroid vein. Both recurrent laryngeal nerves were identified routinely in the course of the gland dissection (Figs. 4,5), and every attempt was made to identify and preserve the parathyroid glands leaving them untouched as dissection beyond the vein is not required.[13] When adequate blood supply could not be preserved, the parathyroid gland was excised, sliced and reimplanted in the sternomastoid muscle at the end of the operation. This technique has been employed increasingly since 1995.[8,15] All wounds were closed with suction drains. In absence of complications, patients were discharged on the second day after surgery. Postoperative complaints of paresthesias or muscular spasms and clinical detection of Chvostek`s sign were considered as transient hypoparahyroidism. Serum calcium levels were measured 48 hours after operation in all patients, with values, between 9-11 mg/dl is considered as normal and discharged .Laryngescopy was performed systematically in all patients during recovery to assess the laryngeal nerve function, dysphonia was considered transient nerve injury. The persistence of symptoms and laboratory findings at 2 months after the operation were considered permanent complication of definitive hypoparahyroidism or definitive recurrent nerve injury. After collecting the data statistically means were compared by Student's t test and proportions were compared using an x2 test for values greater than five and Fisher's test for those of five or less.

RESULTS

Total thyroidectomy was done with capsular dissection in the all 55 patients .Only three cases presented with retrosternal goiter .One of these cases was had a huge retrosternal goiter with intrathoracic extension (Fig. 1) and needed muscle cutting with piecemeal reduction of the size then delivered in the neck and capsular dissection is completed. Sternotomy not needed in these three cases. Also we needed to do slicing and reimplantation of the parathyroid gland in the sternomastoid muscle in one case after frozen section from the gland to confirm parathyroid gland tissue.

The post operative diagnosis summarized in Table 2.

Table 2. Post operative pathology.

Item	Number	Percentage
Grave's disease	7	12.7%
Multinodular goiter		
Non toxic	35	63.6%
Toxic	2	3.6%
Malignant		
Papillary carcinoma	4 (3 multicentric)	7.2%
Follicular carcinoma	1	1.8%
Benign tumor		
Follicular adenoma	1	1.8%
Thyroiditis	5	9.0%
Total	55	100%

Based on the post operative pathology most patients had multinodular goiter 35 patients (63.6%), secondary toxic goiter 2 patients (3.6%). Primary thyrtoxicosis (Grave's) disease was diagnosed in 7 patients (12.7%). Patients with primary thyrtoxicosis showed marked clinical improvement of the ophthalmopathy within 4-12 months post operative. Incidental cancer was diagnosed in 5 patients (9.0%), most of them were papillary carcinoma 4 cases (7.2%) although none was apparent clinically before operation, three of them were multicentric and radioactive iodine was given to them. Follicular carcinoma diagnosed only in one case (1.8%) and one case of follicular adenoma with multinodular goiter (1.8%). Thyroiditis incidence in the post operative pathology was 9.0% as 5 patients diagnosed thyroiditis. Diffuse pathology of the gland shown in (Figs. 6a,b).

The complications summarized in Table 3. The post operative course was uneventful in 48 patients. Seven patients had post operative complications (12.7%). Significant early post operative complications such as a hematoma and needed operation occurred in two patients (3.6%). Minor wound infection occurred in two patients (3.6%). Transient hypocalcaemia occurred in two patients (3.6%), one improved after two weeks and the other case improved after five weeks, those two cases of hypocalcaemia occurred after total thyroidectomy in Grave`s disease may be due to hypercalcaemia that was associated with primary thyrtoxicosis. Despite of identification of the recurrent laryngeal nerve, hoarseness of voice occurred in one patients (1.8%). This patient didn't improve after two months and considered permanent nerve injury nerve injury, this occurred in a case of huge retrosternal goiter. There were no operative or post operative deaths after surgery.

Table 3. Morbidity and Mortality.

	Indications of surgery				
Item	**MNG**	**Grave's disease**	**thyroiditis**	**Total**	**Percentage**
Morbidity:					
Hematoma	1		1	2	3.6%
Wound infection	1	1		2	3.6%
Transient hypocalcaemia		2		2	3.6%
Hoarseness of voice			1	1	1.8%
Mortality	0	0	0	0	0%

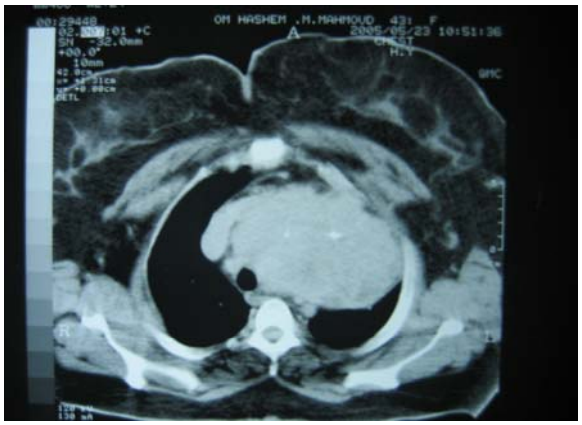

Fig 1. Retrosternal goiter (CT).

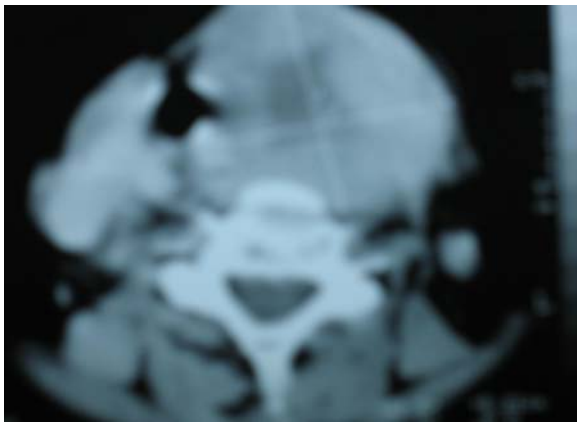

Fig 2. Large goiter (CT).

Fig 3a. Preoperative huge goiter.

Fig 3b. Post operative of the previous case.

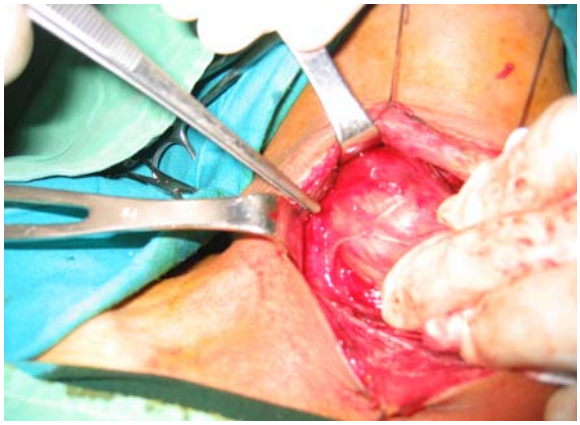

Fig 4. Capsular dissection.

Fig 5. Exposure of the recurrent laryngeal nerve.

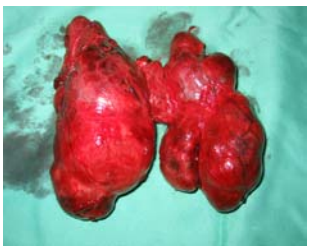

Fig 6a. Diffuse pathology of the gland (Bilateral).

Fig 6b. Diffuse pathology of the gland (Bilateral).

DISCUSSION

The goal of surgical treatment in thyroid disease should be to eliminate the disease with low complication rates and to minimize the necessity for reoperative procedures. Reoperation are under taken for post operative histological diagnosis evidence of cancer or recurrent goiter during follow up are associated with higher complication compared with the primary procedures.[15,21,22] Total thyroidectomy is increasingly being accepted as a treatment for differentiated thyroid cancer. However, because of presumed increased morbidity associated with this procedure, it is still not considered a viable option for management of benign thyroid disorders. Total thyroidectomy has an important role in management of thyroid disease. In some centers, it represents almost half of all thyroid operations carried out.[2] There is increasing recognition that total thyroidectomy appropriate for patients with multinodular goiter when there is significant disease involving both lobes.[8,13,14] In goiter, nodular areas among presumably normal tissue, but frequently these areas seemed to be heterogeneous when evaluated by ultrasongraphy and by intra operative palpation.[9,13]

The preservation of some heterogeneous parenchyma as an attempt to maintain the euthyroid is not always successful. Permanent hypothyroidism occurred even in partial resection, 38.10% in unilateral and 59.28% of bilateral procedures.[13] The incidence of incidental thyroid cancer was found to be 8.2% in patients without any preoperative or operative suspicious of malignancy, so total thyroidectomy as primary procedures significantly reduced the rate of completion thyroidectomy for incidentally discovered thyroid cancer in multinodular goiter[5].In the present study ,the incidental cancer was found to be 9.0 % in patients comparable to the reported incidence of thyroid cancer which varies from 7.5 to 13 % in multinodular goiter.[3-5] So this documented that performance of total thyroidectomy instead of subtotal resection as a primary procedure significantly reduced the rate of completion thyroidectomy for incidentally found thyroid cancer in diffuse bilateral thyroid disease. Baudin et al., analyzed 281 patients with thyroid carcinoma (<1cm) and documented patients with more than one focus had significantly higher rate of recurrence compared with unifocal tumors and multifocality significantly influenced the prevalence of radioactive iodine ablation. Radioactive iodine ablation was found to be an important factor in prolonging the disease free survival and survival in patients with differentiated thyroid cancer, even in low risk patients.[23,24] Multicentric papillary thyroid carcinoma was found in three cases in this study and they received radioactive iodine ablation without need to do completion. Subtotal thyroidectomy has previously been advocated by some for the treatment of bilateral nodular disease, but recurrence rates as high as 45% has been reported.[25,26] In cases of recurrence in which new dissection of the posterolateral face of the thyroid gland was required .because of fibrosis, difficulties with adequate visualization and structure preservation can cause a higher incidence of unilateral recurrent nerve paralysis of up to 10% and of permanent hypothyroidism of up to 20%, increasing the number of complication as much as 20 fold.[1,6] The introduction of capsular dissection, which reduces the injury of the parathyroid gland while protecting the recurrent nerves,[8,11] has contributed to decrease in surgical morbidity in comparison to rates described in old series In recent literature, the reported incidence of recurrent laryngeal nerve palsy varies between 0.3 and 1.7 percent, whereas the rate of permanent hypoparathyroidism ranges from 0.7 to 3.0 percent.[7,16,20] The over all complication in this study as regards the recurrent nerves and the parathyroid glands, one case of permanent nerve injury 1.8%.Transient hypocalcaemia, occurred in two cases(3.6%) after total thyroidectomy for Grave's disease may be due to associated hyperocalcaemia preoperatively, both of them are improved within two weeks. So the main complication can be avoided by capsular dissection technique with minimal manipulation of the tissue posterior to the middle thyroid vein to protect the recurrent laryngeal nerve and the parathyroid glands. In patients with Grave's, the convenience of near total thyroidectomy is the obtainment of euthyroidism in attempt to avoid long-term dependence on medication, however, it does not reliably prevent hypothyroidiosm, which occurs in up to 70 percent of patients ,or risk of hyperthyroidism which may occur in as many as 20 percent.[16] Apparently, ophthalmopathy did not have its evolution modified by near total thyroidectomy.[18] Razak et al. concluded that total thyroidectomy has pronounced improvement of exophthalmopathy because it lowers thyroid released antibodies.[19] In this study, total thyroidectomy done for Grave's disease in 12.7% and toxic nodular goiter in 3.6% of all cases and those with Grave's disease showed marked improvement in the ophthalmopathy as total thyroidectomy may be the preferred option in those patients.[11,19]

In conclusion, total thyroidectomy based on etiological, anatomical and pathological concepts, is a useful treatment for benign diseases that involve the entire gland. Total thyroidectomy shows benefits in eradicating multinodular goiter, alleviating Grave's opthalmopathy, treating associated cancer, and preventing recurrence. It decreases the likelihood of future operations for recurrent disease or completion thyroidectomy for incidental thyroid cancer and thus decreasing the associated risks of increased morbidity associated with second operation.

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