

Original Article

Total Thyroidectomy for Bilateral Benign Thyroid Disease: Safety Profile and Therapeutic Efficacy

Salman Yousuf Guraya, Omer Al Faroug Eltinay

Division of General Surgery, Department of Surgery, College of Medicine and King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia

Kuwait Medical Journal 2007, 39 (2):149-152

ABSTRACT

Objective: To analyze the safety and effectiveness of total thyroidectomy in the surgical management of bilateral multinodular goiter

Design: Retrospective

Setting: King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia

Patients and Methods: The medical records of all patients who underwent total thyroidectomy over a five-year period (August 2000 through July 2005) at King Khalid University Hospital, Riyadh, KSA, were examined. The data regarding age, sex, indication for surgery, histological diagnosis, and complications, if any was extracted from the files.

Results: There were a total of 164 patients (113 female and 51 male). Their age ranged from 18 - 63 years with a mean of 40 ± 11.0 years. Seventy six (46.3%) cases presented with compressive and 29 (17.6%) with

thyrotoxic symptoms; 24 (14.6%) for cosmetic reasons, 18 (10.9%) for suspected malignancy and 3 (1.8%) with retrosternal extension. Multinodular goiter was the most frequent histological finding (reported in 88, 51.8% patients) followed by colloid goiter in 22 (13.4%) cases. Incidental thyroid malignancy was recorded in 13 (8%) subjects, (five papillary and six follicular carcinomas, one lymphoma and one follicular variant of papillary carcinoma). Permanent recurrent laryngeal nerve (RLN) palsy and permanent hypoparathyroidism occurred in one (0.6%) and five (3%) patients respectively. There was no mortality.

Conclusion: Total thyroidectomy is a safe alternative for patients with bilateral multinodular goiter. This procedure has low complication rate and eliminates the need for re-operation for recurrent goiter and unexpected thyroid malignancy.

KEYWORDS: hypoparathyroidism, multinodular goiter, recurrent laryngeal nerve palsy, total thyroidectomy

INTRODUCTION

Multinodular goiter (MNG) is the most common indication for thyroidectomy in endemic iodine-deficiency regions^[1]. Although total thyroidectomy represents almost half of all thyroid operations carried out^[2,3], its role in the treatment of benign thyroid disease remains controversial. There is growing evidence that total thyroidectomy is appropriate for patients with MNG when there is significant nodular disease involving both lobes^[4,5]. Subtotal thyroidectomy has previously been advocated for the treatment of bilateral nodular disease but recurrence rates as high as 45 percent have been reported^[6]. 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^[7,8]. At the same time, several studies have demonstrated that total thyroidectomy can be performed with a morbidity rate comparable to that of lesser procedures^[9,10,11].

The central premise of this study was to evaluate the outcome of total thyroidectomy for benign thyroid affections in a tertiary care institution.

PATIENTS AND METHODS

Between August 2000 and July 2005, all patients undergoing total thyroidectomy for bilateral MNG were enrolled in this retrospective study. Patients with thyroid cancer, recurrent goiter and those presenting with solitary thyroid nodules were excluded from the series. Thus the study population represents a select group of patients for whom the preoperative clinical diagnosis and intention was the surgical treatment of bilateral MNG. Data was extracted regarding patients' age, sex, indications for surgery, operation performed, final histological diagnosis and complications. Goiter was evaluated by three components: thyroid function test by free thyroxine and thyroid stimulating hormone, fine needle aspiration

Address correspondence to:

Dr Salman Yousuf Guraya FRCS, Assistant Professor Surgery and Consultant Surgeon, College of Medicine Taibah University, P.O. Box: 30001 Madina Al Munawara, Kingdom of Saudi Arabia, Tel: +966 4 8460008, E- mail: drsyg7@yahoo.com

Table 1: Indications for total thyroidectomy (n = 164)

Indication	Number (female, male)	%
Suspected malignancy	18 (10, 8)	10.9
Thyrotoxicosis	29 (25, 4)	17.6
Cosmetic/patient's apprehension	24 (19, 5)	14.6
Compressive symptoms	76 (49, 27)	46.3
Retrosternal extension	03 (2, 1)	1.8
Unknown	14 (5, 9)	8.5

Table 3: Complications of total thyroidectomy (n = 164)

Complication	Number	%
Hemorrhage	2	1.2
Seroma	14	8.5
Wound abscess	06	3.6
Recurrent laryngeal nerve palsy		
Temporary	11	6.7
Permanent	01	0.6
Hypoparathyroidism		
Temporary	28	17
Permanent	05	03

cytology (FNAC) to exclude malignancy and ultrasonography to define the extent of disease. CT scan was used selectively in patients with massive, retrosternal or clinically malignant goiter, or in a suspected posterior extension of the nodules. A preoperative serum calcium concentration (total and corrected) was checked routinely and laryngoscopic examination of the vocal cords was done, if necessary. Surgeon's assessment of the patients' voice was a reliable method to suspect vocal cord palsy during the postoperative period^[12].

Total thyroidectomy was performed by a standard technique of capsular dissection. Recurrent laryngeal nerves (RLN) were routinely identified on both sides and every attempt was made to identify and preserve the parathyroid glands. Those glands with compromised blood supply were excised, diced and reimplanted in the sternocleidomastoid muscle. All wounds were closed with suction drains and in the absence of any complication patients were discharged on the third day.

Postoperative serum calcium levels were estimated twice daily for 48 hours after surgery and then subsequently as required. Calcium supplement was given if serum calcium level dropped below 1.9 mmol/l or in case of symptomatic hypocalcemia. Hypoparathyroidism was considered transient if the patient could be weaned from calcium supplement within six months and labeled as permanent if the patient required calcium treatment to maintain normal serum calcium for six months or longer. Laryngoscopy was advised postoperatively in patients with hoarseness or loss

Table 2: Histological diagnosis of thyroid specimens (n = 164)

Histopathology	Number	%
Benign	151	92
Multinodular goiter	85	51.8
Colloid goiter	22	13.4
Thyroid hyperplasia	14	8.5
Hashimoto's thyroiditis	17	10.3
Grave's disease	08	4.8
Follicular adenoma	05	3.0
Malignant	13	8.0
Papillary carcinoma	05	3.0
Follicular carcinoma	06	3.6
Lymphoma	01	0.6
Follicular variant of papillary carcinoma	01	0.6

of voice quality and RLN palsy was defined as transient if there was a laryngoscopic evidence of RLN recovery within six months of operation. Oral thyroxine supplementation was started on the day of discharge at a dose of 100-200 microgram per day, according to the body weight. Follow up was planned two weeks after discharge, every three months for the first year and then every six month thereafter with thyroid function test and serum calcium, if indicated. The data analysis and interpretation was performed on SPSS 10.0 software package (SPSS Inc., Chicago, IL).

RESULTS

One hundred and sixty-four patients were included in this study which included 113 women and 51 men with a mean age of 40 ± 11.0 years (range = 18-63 years). Compressive symptoms observed in 76 (46.3%) patients were the most frequent indication for total thyroidectomy (Table 1). FNAC analyses reported 116 colloid goiters, 13 thyroid hyperplasia, 14 thyroiditis, 3 follicular adenoma, and 18 inconclusive aspirates. The histological diagnoses of the resected thyroid gland specimens is detailed in Table 2 and includes 13 (8%) patients with thyroid cancer: 5 (3%) papillary, 6 (3.6%) follicular carcinoma, 1 (0.6%) lymphoma, and 1 (0.6%) follicular variant of papillary carcinoma. Thyroid malignancy was not detected by FNAC in these patients preoperatively. Table 3 lists the complications encountered in this study. Major early postoperative complications such as hemorrhage, huge seromas or wound infection requiring re-operation occurred in 22 (13.4%) patients collectively. Temporary RLN was observed in 11 (6.7%) cases (7 right sided and 4 left sided). One (0.6%) patient sustained permanent right RLN palsy. Twenty eight (17%) patients developed transient and five (3%) permanent hypoparathyroidism. Permanent RLN and hypoparathy-

roidism were seen in the same patient who had tough adhesions between the gland and surrounding tissue (histopathology: papillary carcinoma). There was no mortality in this study.

DISCUSSION

The outcome of endocrine surgical diseases is measured by the success of the operation at relieving the endocrinopathy and the ability of the surgeon to minimize postoperative morbidity^[13]. Currently, opinions differ on both the proper extent of primary resection and the need for re-operation for nodular benign thyroid disease^[14]. Subtotal thyroidectomy was advocated to be safer than total thyroidectomy^[15] as it was thought that leaving behind some thyroid tissue would prevent subsequent thyroxine replacement. However, nodules can also arise from portions of the gland that were previously normal, and small nodules can become symptomatic. In addition, recurrence rates as high as 42 to 45 percent have been reported following subtotal thyroidectomy^[16,17]. The incidence of recurrence has been directly related to a long postoperative follow up and to large amounts of remnant tissue^[18,19]. Most recurrences develop 10 to 20 years after the primary surgery^[20]. It has been documented that total thyroidectomy can be performed safely in benign nodular goiter, but re-operations carry a five-fold risk of surgical complications where both sides had been dissected previously^[11,20,21,22,23]. Patients with recurrent MNG often present with severe symptoms, including dyspnea, dysphagia, and pain which may be due to a small postero-lateral lobule of the thyroid left behind during subtotal thyroidectomy. This often extends into the retro-esophageal area, causing significant pressure symptoms^[9]. Scarring and disruption of normal tissue planes make further thyroid surgery more hazardous.

Bron *et al*^[23] concluded in their study on 834 patients that total thyroidectomy for benign thyroid disease prevented disease recurrence and minimized the morbidity associated with secondary operation. Giles and associates^[1] reported 8.2 percent incidence of thyroid cancer in MNG without previous suspicion of malignancy and that subtotal thyroidectomy resulted in a substantial number of completion thyroidectomies. Our study revealed an 8 percent incidence of incidentally diagnosed thyroid malignancy without the need for reoperation.

The only strong argument against total thyroidectomy is the potentially higher associated complication rate. However, with experience and appropriate surgical technique, the morbidity of total thyroidectomy can be minimized^[24,25]. Present study demonstrated 0.6 percent incidence of permanent RLN palsy and 3 percent incidence of

permanent hypoparathyroidism while recent studies of total thyroidectomy for benign disease have reported an incidence of 0.3 to 1.7 percent and 0.7 to 3 percent respectively^[20,26,27]. This is little different from the complication rates recorded after subtotal thyroidectomy; 0.2 percent for permanent RLN palsy and 0.3 percent for permanent hypoparathyroidism^[20]. Capsular dissection technique, which reduces damage to parathyroid glands and protects RLN, has reduced the morbidity in comparison to the complication rates described earlier^[28]. During re-operation the incidence of RLN palsy ranges from 15 to 23 percent for temporary and 2.6 to 15.5 percent for permanent palsy^[8, 29] which makes total thyroidectomy the procedure of first choice by many surgeons, whenever the whole gland shows nodular transformation^[7,30]. Published data described 47 to 53 percent incidence for malignancy in prophylactic completion thyroidectomy specimens after initial lobectomy for solitary thyroid nodule^[31,32]. This observation further substantiates the role of total thyroidectomy in case of unexpected thyroid malignancy, which will allow I¹³¹ scanning to detect and treat metastatic disease. The reported incidence of 0.9 to 1.6 percent^[7,30] for permanent hypoparathyroidism is slightly higher than 0.6 percent noted in our study. The current policy to reimplant diced parathyroid glands in muscle is widely accepted as an efficient way to avoid long term hypoparathyroidism^[33].

CONCLUSION

We recommend total thyroidectomy for bilateral multinodular goiter to prevent disease recurrence and to obviate the need for completion thyroidectomy in case of a final diagnosis of thyroid malignancy.

REFERENCES

1. Giles Y, Boztepe H, Terzoiglu T, Tezelman S. The advantage of total thyroidectomy to avoid reoperation for incidental thyroid cancer in multinodular goiter. *Arch Surg* 2004; 139:179-182.
2. Gough IR, Wilkinson D. Total thyroidectomy for management of thyroid disease. *World J Surg* 2000; 24:962-963.
3. Khadra M, Delbridge M, Reeve TS, Poole AG, Crummer P. Total thyroidectomy: its role in the management of thyroid disease. *Aust N Z J Surg* 1992; 62:91-95.
4. Rossi RL, Cady B, Silverman ML, Wool MS, Horner TA. Current results of conservative surgery for differentiated thyroid carcinoma. *World J Surg* 1986; 10:612-622.
5. Liu Q, Dijuricin G, Prinz R. Total thyroidectomy for benign thyroid disease. *Surgery* 1998; 123:2-7.
6. Waldstrom C, Zedenius J, Guinea A, Reeve T, Delbridge L. Multinodular goiter presenting as a clinical single nodule: how effective is hemithyroidectomy? *Aust NZ J Surg* 1998; 69:34-36.
7. Mishra A, Agarwal A, Agarwal G, Mishra SK. Total

- thyroidectomy for benign thyroid disorders in an endemic region. *World J Surg* 2001; 25:307-310.
8. Reeve TS, Delbridge L, Brady P, Crummer P, Smyth C. Secondary thyroidectomy: a twenty-year experience. *World J Surg* 1988; 12:449-453.
 9. Colak T, Akca T, Kanik A, Yapici D, Aydin S. Total versus subtotal thyroidectomy for the management of benign multinodular goiter in an endemic region. *Aust NZ J Surg* 2004; 74:974-978.
 10. Koru N, Ascı C, Yilmazlar T, *et al.* Total thyroidectomy or lobectomy in benign nodular disease of the thyroid: changing trends in surgery. *Int Surg* 1997; 82:417-419.
 11. Pappalardo G, Guadalaxara A, Frattaroli FM, Illomei G, Falaschi P. Total compared with subtotal thyroidectomy in benign nodular disease: personal series and review of published reports. *Eur J Surg* 1998; 164:501-506.
 12. Menegaux F, Turpin G, Dahman M, *et al.* Secondary thyroidectomy in patients with previous surgery for benign disease: a study of 203 cases. *Surgery* 1999; 126:479-483.
 13. Reeve TS, Delbridge L, Cohen A, Crummer P. Total thyroidectomy: the preferred option for multinodular goiter. *Ann Surg* 1987; 206:782-786.
 14. Wilson DB, Staren ED, Prinz RA. Thyroid Reoperations: Indications and risk. *Am Surg* 1998; 64:674-678.
 15. Hay ID, Grant CS, Taylor WF, McConahey WM. Ipsilateral lobectomy versus bilateral lobar resection in papillary thyroid cancer: a retrospective analysis of surgical outcome using a novel prognostic scoring system. *Surgery* 1987; 102:1088-1095.
 16. Rojdmarm J, Jarhult J. High long term recurrence rate after subtotal thyroidectomy for nodular goiter. *Eur J Surg* 1995; 161:725-727.
 17. Geerdsen JP, Frolund L. Recurrence of non toxic goiter with and without prospective thyroxine medication. *Clin Endocrinol* 1984; 21:529-533.
 18. Piraneo S, Vitri P, Galimberti A, Salvaggio A, Bastalgi A. Ultrasonographic surveillance after surgery for euthyroid goiter in patients treated or not treated with thyroxine. *Eur J Surg* 1997; 163:21-26.
 19. Zelmanovitz T, Zelmanovitz F, Genro S, Gus P, de Azevedo MJ, Gross JL. Analysis of the factors associated with the recurrence of post thyroidectomy goiter. *Rev Assoc Med Bras* 1995; 41:86-90.
 20. Delbridge L, Guinea AI, Reeve TS. Total thyroidectomy for bilateral benign multinodular goiter: effect of changing practice. *Arch Surg* 1999; 134:1389-1393.
 21. Siragusa G, Lanzara P, Di Pace G. Subtotal thyroidectomy or total thyroidectomy in the treatment of benign thyroid disease: our experience [in Italian]. *Minerva Chir* 1998; 53:233-238.
 22. Gough IR, Wilkinson D. Total thyroidectomy for management of thyroid disease. *World J Surg* 2000; 24:962-965.
 23. Bron LP, O'Brien CJ. Total thyroidectomy for clinically benign disease of the thyroid gland. *Br J Surg* 2004; 91:569-574.
 24. Gough IR. Total thyroidectomy: indications, technique and training. *Aust NZ J Surg* 1992; 62:87-89.
 25. Bhattacharyya N, Fried MP. Assessment of the morbidity and complications of total thyroidectomy. *Arch Otolaryngol Head Neck Surg* 2002; 128:389-392.
 26. Thomusch O, Machens A, Sekulla C, Ukkat J, Lippert H, Gastinger I. Multivariate analysis of risk factors for postoperative complications in benign goiter surgery: prospective multicenter study in Germany. *World J Surg* 2000; 24:1335-1341.
 27. Liu Q, Dijuricin G, Prinz RA. Total thyroidectomy in management of 909 patients with thyroid disease. *Surgery* 1998; 123:2-7.
 28. Martensson H, Ternis J. Recurrent laryngeal palsy rate in thyroid gland surgery related to operations and nerves at risk. *Arch Surg* 1985; 120:475-477.
 29. Wheeler MI. Thyroid surgery and the recurrent laryngeal nerve. *Br J Surg* 1999; 86:291-292.
 30. Muller PE, Kabus S, Robens E, Spelsberg F. Indication, risks, and acceptance of total thyroidectomy for multinodular goiter. *Surg Today* 2001; 31:958-962.
 31. Eroglu A, Berberglu U, Buruk F, Yildirim E. Completion thyroidectomy for differentiated thyroid cancer. *J Surg Oncol* 1995; 59:261-267.
 32. Pasiaka JL, Thompson NW, Mcleod MK, Burney RE. The incidence of bilateral well differentiated thyroid cancer found at completion thyroidectomy. *World J Surg* 1992; 16:711-717.
 33. de Roy van Zuidewijin DBW, Songun I, Kievit J, van de Velde CJH. Complications of thyroid surgery. *Ann Surg Oncol* 1995; 2:56-60.