

Total Thyroidectomy for Benign Thyroid Diseases: What is the Price to be Paid?

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ABSTRACT

Introduction: Total thyroidectomy has been used to treat patients with malignant thyroid disease. But for patients with benign thyroid disease, the safety and efficacy of total thyroidectomy is a matter of debate. Subtotal thyroidectomy that was previously the treatment of choice for benign thyroid disease has been associated with high recurrence rates. The risk of permanent complications is greatly increased in patients who undergo surgery for recurrence of benign thyroid disease. Total thyroidectomy is an operation that can be safely performed, with low incidence of permanent complications, which allows one to broaden its indications in various benign thyroid diseases, thus avoiding future recurrences and reoperations.

Aim: To assess the benefits of total thyroidectomy for benign thyroid diseases.

Materials and Methods: This randomized prospective study was conducted between Feb 2013 and Nov 2014 in the Department of General Surgery at Bangalore Medical College and Research Institute. It included 116 patients undergoing total thyroidectomy procedure for benign thyroid disease. All cases were followed-up for a period of 6 months for incidence of RLN palsy, hypoparathyroidism, disease recurrence and number of

incidental malignancies detected on postoperative histological analyses of the thyroid specimens.

Results: Most of the patients were in the third decade of their lives. The female to male ratio was 6.7:1. Total thyroidectomy was done for 116 benign thyroid diseases with multinodular goiter as the most common diagnosis. The incidence of postoperative hypocalcaemia was 16.37% (however, only 1 patient developed permanent hypocalcaemia) and that of wound infection was 2.58% and seroma formation was 2.58%. None of the patients included in this study had haematoma formation or RLN paralysis. An incidental malignancy was identified in 11.20% patients.

Conclusion: Total thyroidectomy shows benefits in eradicating multinodular goiter, alleviating Grave's ophthalmopathy, treating Hashimoto's thyroiditis and preventing recurrence. It decreases the likelihood of future operations for recurrent disease or completion thyroidectomy for incidental thyroid cancer thus decreasing the associated risks of increased morbidity associated with second operation. Therefore, for benign thyroid diseases requiring surgical management total thyroidectomy can be considered the treatment of choice.

Keywords: Goitre, Hypocalcaemia, Hypoparathyroidism, Recurrence, Thyroid neoplasms

INTRODUCTION

The wide range of surgeries proposed to treat benign thyroid disease is a testament to the fact that the debate still rages on as to the ideal and most appropriate surgery in patients afflicted with benign thyroid disease. The surgeries range from the more conservative Bilateral sub-total thyroidectomy (BST) to a Total thyroidectomy (TT). Indications for surgery in these patients include cosmesis, compression related symptoms, hyperthyroidism and a suspicion of malignancy [1-3].

TT was suggested as a feasible modality of surgery for benign thyroid disease by Kocher a century ago [4]. The arguments that ensued have since captivated the imagination of surgeons. There are equally strong points in favour of both conservative (BST/NTT) and TT. The heterogeneity of information available in published literature from different schools of surgery and various regions fuels the already raging debate.

Proponents of a more conservative option such as a near total (NTT) or BST are backed by the potentially lesser incidence of dreadful complications like Recurrent Laryngeal Nerve (RLN) palsy and hypoparathyroidism along with the possibility of attaining a drug free postoperative euthyroid state in these patients [5]. However, they are deterred by a significant risk of disease recurrence and that a number of patients with BST also require thyroxine supplementation. Furthermore, proponents of TT argue that with careful surgical technique, complication rates are similar

in both BST and TT [6-9]. They are also backed by the fact that a repeat thyroid surgery is a potentially nightmarish situation that every surgeon wishes to avoid [2,5,10,11]. The discovery of incidental malignancies of the thyroid on histopathology also favour the performance of TT over BST or NTT.

The varied nature of conditions broadly classified as benign thyroid disease also hugely influences the decision of doing a TT. While TT is the more advocated option in disorders like Grave's disease and Hashimoto's thyroiditis which are of an immunological origin, it is more in the grey zone for diseases like multi-nodular goiter (MNG) [12-14].

TT is an essential part of the ever-widening armamentarium in the hands of today's surgeon. The onus is on the surgeon to strike a balance between these two essential facets of thyroid surgery. This carries even more relevance in India, where the entire responsibility of the choice of surgery lies on the surgeon, as the patients are often poorly informed about the repercussions of the decisions they make regarding the nature of the surgery. The patients trust the surgeon with this decision and in this situation it is the patients who pay the price for the surgeon's decision in the event of a complication.

AIM

This study aimed to evaluate the role of total thyroidectomy in patients with presumed benign thyroid diseases in the Indian set up.

MATERIALS AND METHODS

A total of 116 patients who underwent TT for a condition diagnosed to be benign on preoperative work-up including cytology and imaging were prospectively studied from Feb 2013 to Nov 2014 after obtaining ethical committee clearance.

Patients included in the study were those undergoing total thyroidectomy for benign thyroid diseases and were above the age of 18 years. Patients who were being operated for malignant thyroid diseases, who were undergoing completion thyroidectomy for recurrent thyroid disease or remnant malignant disease and those who were below the age of 18 years were excluded from the study.

Patients were followed up for a minimum period of six months. The main parameters that were studied were the incidence of RLN palsy, hypoparathyroidism and disease recurrence. Also, the number of incidental malignancies that were found on postoperative histology but not detected on preoperative cytology was noted.

All patients underwent a preoperative evaluation with direct or indirect laryngoscopy to assess vocal cord movement. In addition, all had preoperative calcium level estimation and they were diagnosed with a combination of FNAC and ultrasonography of the neck.

Informed and written consent was obtained from all patients participating in the study.

Operative technique: The thyroid gland was approached through a collar crease transverse incision. The strap muscles were split in the midline after the raising of superior and inferior sub-platysmal flaps. The dissection of the gland per se was initiated with the visualization of the superior parathyroid and the ligation of the superior pole of the thyroid gland. Dissection of the inferior pole was carried out close to the gland and branches of the inferior thyroid vessels were ligated. A minimum of two parathyroid glands were preserved in every patient with their vascularity intact. If a parathyroid gland was inadvertently injured or devascularized, it was re-implanted to the ipsilateral sternocleidomastoid muscle after frozen section confirmation. The gland was then dissected of the pre-tracheal fascia. The contra-lateral lobe was similarly approached. The gland was then delivered by dissection of the isthmus or pyramidal lobe. Closure was then done with a suction drain in situ. All patients were given postoperative intravenous antibiotics for a period of 24 hours. The suction drain was removed on postoperative day one at the discretion of the treating surgeon. Patients if fit, were discharged on the second postoperative day.

Patients confirmed to have benign thyroid disease on histopathological examination were started on a replacement dose of L-thyroxine on post-op day three. If a malignancy was noted in the specimen, the L-thyroxine was withheld and the patient was referred to the surgical oncologist for further follow-up with uptake studies and management as required.

Hypoparathyroidism was defined as serum calcium levels (adjusted to albumin) of less than 8mg/dl on two separate occasions and or the presence of symptoms (perioral paraesthesia) or signs (positive Chvostek or Trousseau) of hypocalcaemia clinically irrespective of the serum calcium levels. The hypocalcaemia was treated with intravenous calcium gluconate and serial assessment of the calcium status followed by oral calcium supplementation. Hypocalcaemia resolving within six months was classified as temporary and that persisting beyond this follow-up period was considered permanent.

RLN palsy was defined as a hoarseness of voice resulting from a laryngoscopy confirmed palsy of a vocal cord. If it persisted beyond six months, it was labeled permanent, else classified as temporary RLN palsy.

All patients were monitored with serial measurements of the TSH levels, initially at two-month intervals and later at six-month intervals. The dose was adjusted such that the thyroid function was adequate and the TSH was within normal limits.

RESULTS

In this study, a total of 116 patients who underwent TT for diseases diagnosed to be benign were analysed. Of these, 101 were female (87.06%). Most of these patients were in the third decade of their lives. The youngest of these patients was an 18-year-old girl and the oldest was a 68-year-old lady.

The most common symptom at presentation was with a swelling in front of the neck. A total of 103 patients (88.79%) had a goiter that was WHO Grade 3 (visible at rest without extension). The rest had Grade 2 goitre (a palpable goiter, but not readily visible on inspection of the neck in normal position). Coincidentally it was found that 8 out of the 13 patients with WHO Grade 2 goitres presented with a dysfunctional thyroid status.

Among all patients, 27 were hyperthyroid at presentation. Their main complaints included palpitations, sweating and insomnia. 60 were at a euthyroid status at presentation and the rest 29 suffered from hypothyroidism. The main symptoms of hypothyroidism in this study included weight gain, fatigue and hair loss. Patients were started on appropriate medical treatment for preoperative optimization.

All of them were worked up for surgery and had benign diagnoses preoperatively. Sixty four patients were diagnosed to have MNG. Twenty five patients had nodular autoimmune Hashimoto's thyroiditis. Twenty seven patients had a clinical and cytological picture fitting that of graves disease.

None of the patients had complications with respect to bleeding or haematoma formation. None of the patients had to be taken up for a re-operation. The most common complication encountered in this study was temporary hypoparathyroidism that was noted in 19 patients. In one patient, symptoms of hypocalcaemia persisted beyond six months and the patient was classified as having permanent hypoparathyroidism.

None of the patients in this study had permanent RLN palsy, however, four patients who had hoarseness of voice postoperatively were encountered. These were confirmed to be due to impaired movement of a vocal cord. Of these, three patients had palsy of the left sided vocal cord. All patients improved within a six-week period postoperatively.

Seroma formation was another complication that was encountered infrequently in this study. Three patients had seroma and were drained percutaneously. They improved without any further complications. Wound infection was noted in three patients. All three improved with oral antibiotic regimens which were started in accordance to the pus culture and sensitivity reports [Table/Fig-1].

In this study group, 13 patients had incidental malignancy of the thyroid that was picked up on histopathological examination. These patients had preoperatively been diagnosed to have MNG in 9 patients (7.75%) and Hashimoto's thyroiditis in 4 patients (3.44%) on cytology. It is probably worthwhile to note that all 13 of these patients had undergone FNAC, which was done as a blind, office setting procedure, not under ultrasonic guidance.

The most common malignancy was that of papillary carcinoma, followed by a mixed variant of both papillary and follicular carcinoma. Purely follicular carcinoma type picture was noted in one patient only [Table/Fig-2].

All these patients with incidental malignancy were in an age group ranging from 27 to 43 years and all were female. All of them were notably euthyroid at presentation. The Levothyroxine

Complication	Number	Percentage
Bleeding	0	0%
Haematoma	0	0%
Seroma	3	2.58%
Wound infection	3	2.58%
Temporary hypoparathyroidism	19	16.37%
Permanent hypoparathyroidism	1	0.86%
Temporary RLN palsy	4	3.44%
Permanent RLN palsy	0	0%
Malignancy	13	11.20%

[Table/Fig-1]: Complications associated with total thyroidectomy in the present study.

	Number	Percentage
Total incidental malignancy	13	11.20%
Preop diagnosis of MNG	9	7.75%
Preop diagnosis of Hashimoto's thyroiditis	4	3.44%
Incidence of Papillary Carcinoma	9	7.75%
Incidence of mixed variant	3	2.58%
Incidence of Pure Follicular Carcinoma	1	0.86%

[Table/Fig-2]: Incidence of thyroid malignancy in the current study.

supplementation was withheld in all these women and they were referred for further studies and work up. One of the ladies developed temporary RLN palsy and two of them had hypocalcaemic features, all of which resolved with time.

DISCUSSION

The role of TT for MNG and other benign diseases can be described best as controversial. The only substantial argument for not performing a TT in these patients is the previously reported higher incidence of complications with increasing extents of thyroid resections [4-7]. The introduction of capsular dissection and increasing experience with total thyroidectomies has led many surgeons to believe that TT is more preferable operation in these cases [14-19].

In this study, the most common complication encountered was that of temporary hypoparathyroidism noted in 16.37% of patients. Delbridge et al., concluded that a state of transient hypoparathyroidism must be an accepted outcome after bilateral thyroidectomies [14]. They also concluded that the incidence of temporary hypoparathyroidism increased with the extent of dissection, with highest incidence noted after TT. Other studies however, have reported almost similar incidences of hypoparathyroidism with some even reporting rates lower in TT than for BST and NTT [7,12,16,20]. They also note that temporary hypoparathyroidism with hypocalcaemia is a complication that is managed relatively easily with medical therapy. This study also concurs with the above findings in that among all patients with hypocalcaemia, none of them required intensive care and all resolved spontaneously with supportive oral therapy following initial calcium infusions.

In this study, there was a sole patient who developed permanent hypoparathyroidism and is currently on follow-up with calcium and vitamin D supplementation. The rate of permanent hypoparathyroidism is 0.86% in this study. This compares well with literature that reports similar rates [21,22].

In this study, there were no cases of permanent RLN palsy and 3.44% patients developed temporary hoarseness of voice that eventually improved. Other studies like Liu et al., and Reeve et al., have reported similar incidences [15,16]. The authors opine that careful identification of the RLN goes a long way in the prevention of RLN palsy and is potentially safer than leaving it hidden posteriorly

under thyroid tissue. Also, the dissection is easier in TT as the field is comparatively less bloody due to better control of the vessels. In a TT all the vessels are ligated as compared to a BST or NTT wherein vascularized thyroid tissue is left behind with often less than optimum haemostasis.

The other significant drawback with BST or NTT is that of recurrence and the need for a reoperation in cases of incidental malignancy. A TT is a definitive surgery in these patients and in most cases obviates the need for a reoperation owing to the slow growing nature of well-differentiated thyroid cancers. It is universally agreed that there is a much higher rate of complications that occur in secondary thyroid surgeries especially when the gland has been dissected on both sides like for a BST or NTT. There are numerous studies that have proved this fact [4,5,23-27].

The previous notion of postoperative thyroid suppression with higher doses of levothyroxine is also now being applied with much caution. This has come from the realization of the fact that goiter is a heterogeneous entity with factors other than TSH that cause growth and that there is dissociation between growth and function in the gland that leads to an autonomous growth pattern [28,29]. This has led to reports of recurrence following lobectomy and sub-total thyroidectomy to the tune of even up to 45% [9,14,30]. Application of higher doses of levothyroxine also has significant side effects which cannot be taken lightly.

LIMITATION

The major limitation of this study was the lack of randomization and a relatively small number of patients that were included in the study. Currently the plan is underway to start a randomized control trial on the same subject.

CONCLUSION

This study has shown that in experienced hands and in high volume centers, a total thyroidectomy can be safely performed with complication rates similar to those of more conservative thyroid surgeries. Total thyroidectomy represents the optimum surgery in cases of benign thyroid diseases, but must be used with caution in peripheral centers and among surgeons with less than extensive experience in thyroid surgeries.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Jan 18, 2016**

Date of Peer Review: **Feb 20, 2016**

Date of Acceptance: **Apr 27, 2016**

Date of Publishing: **Jun 01, 2016**