

Short Communication

Quantitative Cross Sectional Study Comparing Subtotal versus Total Thyroidectomy for Benign Lesions of Thyroid

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- Hypoparathyroidism
- Recurrent laryngeal nerve paralysis

Abstract

There exists diversity of opinion regarding Total thyroidectomy for the management of benign Multinodular goiter. As the management differs in different schools of thought, there is further confusion. In our study from July 2012 to October 2014, 55 patients were studied. In these, 49(88.67%) were females and 6(11.32%) were males. 26 patients were allotted to group 1 undergoing Subtotal Thyroidectomy (ST) (n=26), and 29 patients were allotted to group 2, undergoing Total Thyroidectomy (TT) (n=29) by randomization based on preoperative evaluation, FNAC (Fine Needle Aspiration Cytology) and indications for surgery. The age ranges from 21 to 70 years and mean age of 36.8 years. Results showed that there was no significant difference in the rate of major complications between the two procedures. Temporary hypoparathyroidism resulted in 10 (18.2%) patients in our study, of which 5 (17.2%) belonged to total thyroidectomy group and 5 (17.2%) belonged to the subtotal thyroidectomy group, which was statistically insignificant. Temporary recurrent laryngeal nerve palsy was noted in 10(18.2%) patients, of which 4(16%) belonged to Subtotal thyroidectomy group and 6 (21.4%) belonged to Total thyroidectomy group, which was statistically insignificant. Haematoma was noted in 2 patients (7.6%) in Subtotal thyroidectomy group and stitch granuloma was noted in 2 (7.8%) patients in Total thyroidectomy group. Incidental malignancy was noted in 2 (7.8%) patients in group A and 3(9.8%) patients in another group. Over all, the complication rates are comparable in both but total thyroidectomy offers more advantages.

INTRODUCTION

Thyroidectomy is one of the most frequently performed surgical procedures worldwide. Total thyroidectomy, near total thyroidectomy, Subtotal thyroidectomy and thyroid lobectomy has been accepted as the current surgical therapy for benign and malignant thyroid disorders. Extensive resection might increase the risk of post operative complications; limited resection may increase the risk of recurrence of primary pathology and post operative hyperthyroidism as in Graves's disease.

Total thyroidectomy for the management of benign thyroid disorders is being increasingly accepted, although the indications are not well defined. All the treatment modalities have different types of morbidities. As a result most surgeons have been looking for a treatment which results in least recurrence and low complication rate. Many surgeons prefer Subtotal Thyroidectomy (ST), owing to the fact that the chances of permanent hyperparathyroidism, injury to Recurrent

Laryngeal Nerve, Superior Laryngeal Nerve are less and thought that lifelong medications are not required. As far as the fate of recurrent laryngeal nerve is concerned, the outcome varies from surgeon to surgeon.

MATERIALS AND METHODS

Source of data

Patients with benign lesions of thyroid which includes benign Multinodular goitre, mild to moderate Graves' disease, large colloid goiter due to cosmetic and compression reasons undergoing subtotal or total thyroidectomy at Osmania General Hospital, Hyderabad between July 2012 to October 2014.

Method of collection of data

Informed consent is taken for all tests and procedures in this study.

This prospective study incorporated all patients undergoing

Subtotal thyroidectomy (Group 1), and Total Thyroidectomy (Group 2) for benign thyroid disorders, period from July 2012 to October 2014. The decision to do either a total thyroidectomy or subtotal thyroidectomy was based on randomization.

Inclusion criteria

All patients undergoing thyroidectomy whose preoperative clinical diagnosis was benign multinodular goitre, mild to moderate Graves’s disease, large colloid goitre.

Exclusion criteria

All patients with known or suspicion of thyroid malignancy; Previous thyroid or parathyroid surgery; Previous Recurrent laryngeal nerve palsy; Conservative treatment for Graves disease; Recurrent goiter; Solitary thyroid nodules; Hashimotos thyroiditis; (ASA grade 4); 9) Graves disease with severe ophthalmopathy; Inability to comply with the follow up protocol.

A total number of 55 patients with 40 patients suffering from Multinodular goitre and 11 patients suffering with colloid goitre and 4 patients with Graves’ disease are studied. In that 47(88.67%) were females and 6(11.32%) were males (Table 1). Age ranging from 21 to 70 years; mean age was 36.8 years.

Data was extracted regarding patients’ demographics, indications for surgery, duration of surgery, operation performed, post operative complications, hospital stay, final histological diagnosis and long term Complications i.e. recurrence of primary pathology, recurrent hyperthyroidism as in Graves. Goiter was evaluated by 1) Thyroid function tests 2) Fine Needle Aspiration Cytology (FNAC) to exclude malignancy, Ultrasonography, CT scan was used selectively in patients with massive retrosternal or clinically malignant goiter. Indirect laryngoscopy was performed for all patients preoperatively by an otolaryngologist.

Antithyroid medications were prescribed routinely to achieve euthyroid state and beta-blockers were added for symptomatic control (Figure 1-4). Lugol’s iodine administered for both the group of patients, 3 drops bid 1 week before surgery (Table 1-12).

Percentage of complete thyroidectomies and associated morbidity that could have been avoided in doing total thyroidectomy= (incidence of malignancies in TT + No. of recurrent goitre in ST) / total sample group.

$$= (3+2) \% 55 *100 =9.09.$$

Observation and results

Bleeding during surgery was variable in both the groups since some of the glands were very vascular. Meticulous dissection was used to minimize the blood loss. All the patients are under surveillance till date.

Total number of patients developing complications = 21 (39.62%).

There was no operative mortality and no patient required urgent re exploration for haematoma (Figure 4).

Post operative wound infection occurred in 4 patients in each group, and after surgical drainage the wound was resutured several days later after which the infection resolved.

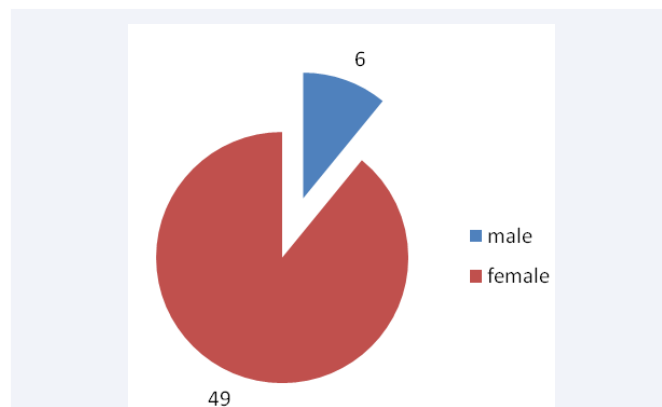


Figure 1 Showing distribution of Patients.

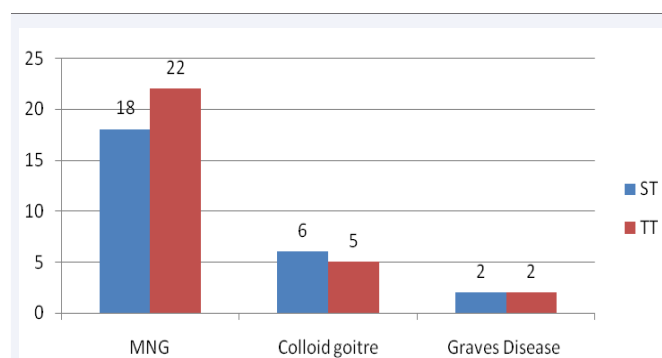


Figure 2 Showing distribution of pathology among two groups.

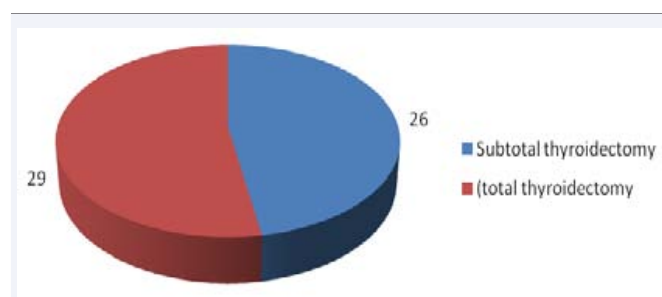


Figure 3 Showing distribution of Procedure.

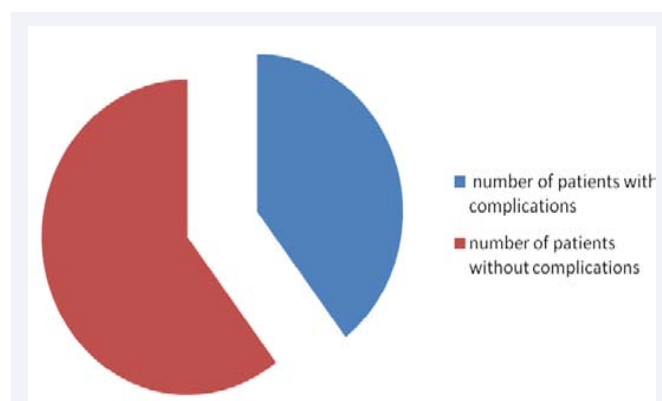


Figure 4 Comparison of with and without complications in patients.

Table 1: showing the distribution of gender among the two groups.

Sex	Group 1; (ST) (subtotal thyroidectomy) n=26	Group 2(TT) (total thyroidectomy) n=29	Total (n=55)
Male	2	4	6
Female	24	25	49

Table 2: Showing distribution of pathology among the two groups.

Group	MNG	COLLOID GOITRE	GRAVES DISEASE
ST	18	6	2
TT	22	5	2
total	40	11	4

Table 3: Showing distribution of procedure.

Procedure	Number of Patients	Percentage
Subtotal thyroidectomy	26	26/55*100%= 47.2%
Total thyroidectomy	29	29/55*100=52.8
Total	55	100%

Table 4: Showing incidence of various complications recorded in the two groups.

Post operative complications	ST (n = 26)	TT(n=29)	Total (55)	P value
1) Temporary RLN palsy	4(16%)	6(21.4%)	10(18.2%)	0.6936
2) Temporary hypoparathyroidism	5(17.2%)	5(17.2%)	10(18.2%)	0.879
3) Haematoma	2(7.6%)	0	2(3.8%)	
4) Stitch granuloma	0	2(7.1%)	2(3.8%)	
5) Haemorrhage	0	0		
6) Wound infection	4(15.4%)	4(15.1%)	8(14.5%)	
7) Pain in the scar site	1(3.8%)	2(6.2%)		
8) Post operative hyperthyroidism	0	0		
9) Permanent RLN palsy	0	0		
10) Permanent hypoparathyroidism	3(12%)	4(14.2%)	7(12.7%)	0.84
11) Recurrence of primary pathology	2(7.6%)	0		
12) Incidental detection of malignancy on HPE	2(7.6%)	3(10.3%)	5(9.1%)	0.78
Mortality rate	0	0		
uneventful	10	12	22	
total	23	26	49	

Table 5: Showing distribution of complications in two groups. Number of variables=12.

Group	Number of complications	Percentage
ST	23	23/26/12*100=7.33%
TT	26	7.47%

Table 6: Showing number of patients with and without complications.

	No. of patients with complications	No. of patients without complications
Group 1 (ST)	15	10
Group 2	17	12

P value is 0.922(> 0.05). Complications of TT are statistically insignificant when compared to ST.

Table 7: Showing distribution of incidentally detected malignancies in HPE after surgery.

	ST	TT
MNG	2 (2/25 *100=8%) FOLLICULAR CA=1 Papillary ca =1	3 (3/28*100=10.7%) Follicular ca =2 Papillary ca =1
COLLOID GOITRE	0	0
GRAVES	0	0

Table 8: Showing final HPE results of coexistence of other disease.

	ST	TT
Malignancy	2	3
Adenoma	0	0
Thyroiditis	1	1

Table 9: Showing distribution of complete thyroidectomy in between the two groups.

Group	No. Of Complete thyroidectomies.
ST(26)	3 (11.53%)
TT(29)	0

Bar diagram.

Table 10: Showing distribution of number of complications in three types of thyroid surgeries.

Type of surgery	ST(n=26)	TT(n=29)	Complete thyroidectomy N=3)
No of complications	23	26	12

Table 11: Showing number of patients with and without complications.

No. of patients who developed complications	No. of patients with no complications
21	34

Table 12: Showing the percent of complications following ST, TT and completion thyroidectomies.

	Group 1 (n=25)	Group 2 (n=28)	Completion thyroidectomy (n=3)
No. of complications	23	26	12
%	22/25*100/12= 7.33%	7.47%	12/3*100/12=33.3%

No. of variables = 12.

The median post operative stay was 4 days and similar for the two groups i.e (3-8) days. The incidence of temporary hypoparathyroidism was 4 (16%) for patients in group 1 and 5(17.8%) for patients in group 2, which was statistically insignificant ($p>0.05$). The incidence of permanent hypoparathyroidism was 3 (12%) for patients in group 1 and 4(14.2.8%) for patients in group 2, which was statistically insignificant ($p>0.05$).

The incidence of temporary Recurrent laryngeal nerve palsy was 4 (15.4%) for patients in group 1 and 6(20.6%) for patients in group 2, statistically insignificant ($p>0.05$). No patient developed permanent recurrent laryngeal nerve palsy in this study. When Histopathological Examination (HPE) results of the resected specimen revealed incidental micropapillary or microinvasive follicular carcinoma, the patients were followed up, regardless of which surgical procedure had been performed. 2 Patients initially treated by Subtotal Thyroidectomy, in group 1 required further surgery for malignant disease following HPE of the resected specimen. HPE of one revealed follicular and the other one revealed as papillary carcinoma. 3 Patients initially treated by TT, in group 2, whose HPE of the resected specimen shows malignant disease. HPE of 2 patients revealed follicular carcinoma and the other revealed as papillary carcinoma. As soon as the HPE reports were obtained, second surgery (Completion thyroidectomy) was done within 2 weeks after the initial operation.

Following confirmation of benign nature of the goitre on FNAC, one patient was managed conservatively by increasing L-thyroxine dose from 100 microgm to 150microgm daily. The other patient underwent Completion Thyroidectomy (CT) due to cosmetic reason and patient's will for surgery.

The complications following completion thyroidectomy was very high when compared to group 1. Stitch granuloma was reported in 2 (6.89%) patients in group 2 and 0 patients in group 1, which was attributed to defective suture material which was managed conservatively.

3 months later 1 patient in group 1 and 2 patients in group 2 developed pain in the scar site which was considered to be some sort of neurogenic nature and managed conservatively. Haematoma and stitch granuloma had no statistical significance in the two groups suggesting that they can occur in both the groups equally ($p\text{ value}>0.05$), statistically insignificant. 16 (61.5%), 18(62.06%), 0(0 %) in group 1, 2 and completion thyroidectomy patients are devoid of any complications respectively.

DISCUSSION

The present study had an overall complication rate of 7.78%. Recurrence of goiter and reoperation rates after surgery was significantly lower after Total Thyroidectomy. In Subtotal Thyroidectomy, the surgeon does not come near the nerve but in Total Thyroidectomy the entire tissue of the thyroid gland is removed. It has the disadvantage of high recurrence rates and carries the risk for increased surgical morbidity during the course of reoperation [1,2]. The incidence of recurrence after Subtotal Thyroidectomy varies in different studies and may be as high as 23% [3,4]. The recurrent rate following Subtotal Thyroidectomy is largely dependent on the length of follow up, and has been reported as 42% in one study with 13 year follow [2].

Two patients in this study developed recurrence of goitre, one of them 12 months and the other 16 months after the initial operations but the follow up period is too short to make any comparison between Subtotal thyroidectomy and Total Thyroidectomy accounting to 8% recurrence in Subtotal Thyroidectomy group.

Reoperation for recurrent disease carries a significant risk of damage to both Recurrent Laryngeal Nerve and parathyroid glands and during completion thyroidectomy there is a tenfold increase in iatrogenic injuries [3]. As a general rule, the risk of injuries increases with the number of reoperations performed. It has been well documented, however, that to leave a small amount of thyroid remnant *in situ* will not prevent the onset of hypothyroidism [4]. This finding has been confirmed in our study with 100% of all patients treated by ST in group 1, requiring atleast 100 microgram of L- thyroxine daily. Furthermore in the presence of unrecognized malignancy, ST may represent inadequate surgery [5]. The incidence of occult malignancy is generally thought to be 7 -10 % [4]. The tumors are generally well differentiated and usually follicular or papillary carcinoma [6]. In this study the overall occult malignancy rate is 9.1% (5/55*100).

Delbridge et al [4] stated that transient hypoparathyroidism should be an accepted outcome of bilateral thyroid surgery rather than a complication. It should be noted that the degree and duration of hypocalcaemia increases with the extent of thyroid surgery. Results of this study concur with literature with an incidence of temporary hypoparathyroidism little increased with the extent of surgery, 4(16%) vs 5(17.8%) in Subtotal Thyroidectomy and Total Thyroidectomy respectively.

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 (Colak et al., 2004) [7]. Total thyroidectomy is a well-accepted surgical therapy for well-differentiated thyroid carcinoma. Equal rates of complications have been reported in Total Thyroidectomy and partial thyroidectomies (Colak et al., 2004) [7], which are consistent with the results of our study. The use of L-thyroxine supplementation has been suggested to efficiently prevent recurrence (Kraimps et al., 1993) [8].

High rates of temporary (15.5% to 23.6%) and permanent (2.6% to 15.5%) damage of Recurrent Laryngeal Nerve have been reported in secondary thyroidectomy [9].

Under these circumstances, Total Thyroidectomy offers complete initial treatment eliminating the need for completion thyroidectomy while Subtotal Thyroidectomy, an inadequate surgery, would mandate a completion thyroidectomy, steeply increasing the morbidity by fifteen folds [10,11]. Palit et al [12] in their meta-analysis showed that remnant size was negatively correlated with hypothyroidism, with an 8.9% decline in the rate of hypothyroidism for each gram of thyroid remnant left.

CONCLUSION

Total thyroidectomy is a safe and effective surgery of choice for the treatment of benign lesions of thyroid. Subtotal Thyroidectomy is associated with significant recurrence of goiters, inadequate treatment of incidentally detected thyroid

cancers and insignificant advantage over Total Thyroidectomy. Increased risks of secondary or completion thyroidectomy outweigh any potential advantage in terms of lower complication rates.

Despite the adoption of subtotal thyroidectomy as surgery for Graves' disease, apart from the substantial rate of recurrence, a significant number of patients develop hypoparathyroidism and required long term L-thyroxine replacement. With regard to ophthalmopathy progression, post operative bleeding, temporary hypoparathyroidism, temporary recurrent Laryngeal Nerve palsy and post operative hyperthyroidism Total Thyroidectomy is consistent with Subtotal Thyroidectomy in experienced hands and provide more predictable outcome immediately after surgery and long term follow up with thyroxine replacement.

Total Thyroidectomy provides a radical but definitive control of the disease in Benign Multi Nodular Goitre, and colloid goiter, completely removes the abnormal thyroid tissue and prevents the future need of surgery for recurrence and incidentally detected malignancy and it assures total relief of compressive symptoms, comparable low incidence of complications and also obviates the need for completion thyroidectomy and its related complications by many folds.

The complication rates of Total Thyroidectomy are acceptably low and are comparable with that of Subtotal Thyroidectomy, as is evident from the results of this study.

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