



Quantitative Cross Sectional Study at Our Institute Comparing Subtotal Versus Total Thyroidectomy for Benign Lesions of Thyroid

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ABSTRACT

Total thyroidectomy for the management of benign Multinodular goiter is controversial and since the development of other subspecialties, it adds to further confusion. 47(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 and indications for surgery with age ranged from 21 to 70 years; mean age was 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 total out of which 5 (17.2%) belonged to total thyroidectomy group and 5 (17.2%) belonged to the subtotal thyroidectomy group respectively which was statistically insignificant. Temporary recurrent laryngeal nerve palsy was noted in 10(18.2%) in total out of which 4(16%) belonged to ST group and 6(21.4%) belonged to TT group respectively, which was statistically insignificant. Haematoma was recorded in 2 (7.6%) in ST group and stitch granuloma was recorded in 2 (7.8%) in TT group. Incidental malignancy was noted in 2 (7.8%) patients in group A and 3(9.8%) patients in group 2. Recurrence was noted.

KEYWORDS

Bilateral Benign Multinodular Goiter; Total Thyroidectomy; Sub-Total Thyroidectomy; Hypoparathyroidism; Recurrent laryngeal Nerve Paralysis.

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, but 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' 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 the different types and incidence 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 RLN, SLN, are less and thought that lifelong medications are not required. As far as the fate of RLN is concerned, the outcome varies from surgeon to surgeon.

Materials and methods

Source of data: Patients with benign lesions of thyroid which includes benign MNG, 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 will be taken for all tests and procedures included as part of study.

This prospective study incorporated all patients undergoing ST (Group 1), and TT (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 disease, large colloid goitre.

Exclusion criteria:

Patients with known or suspicion of thyroid malignancy; Hyperthyroidism; Previous thyroid or parathyroid; surgery; Previous RLN palsy; Conservative treatment for graves disease; Recurrent goiter; Solitary thyroid nodules; Hashimotos throiditis; ASA grade 4; 9) Graves disease with severe ophthalmopathy; Inability to comply with follow up protocol

A total number of 55 patients with 40 patients are suffering from Multinodular Goitre and 11 patients suffering with colloid goitre and 4 patients with Graves' disease. 47(88.67%) were females and 6(11.32%) were males (tables 1). Age ranged 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 test 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 for all patients by an otolaryngologist.

Antithyroid medications were prescribed to patients routinely to achieve euthyroidism and in addition, beta-blocker was 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 1-14).

Sex	Group1; (ST) (subtotalthyroidectomy) n=26	Group 2(TT) (total thyroidectomy)n=29	Total(n=55)
Male	2	4	6
Female	24	25	49

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

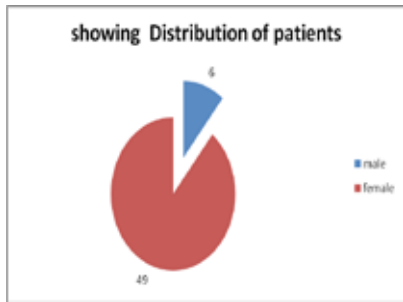


Figure 1: Showing distribution of Patients

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

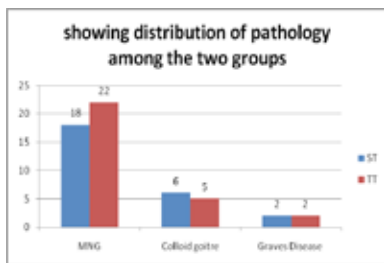


Figure 2: Showing distribution of pathology among two groups

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%

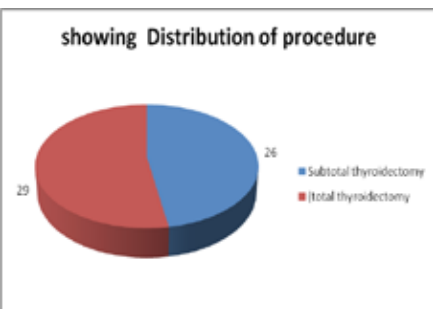


Figure 3: Showing distribution of Procedure

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
Group1 (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 comparison of complications between ST and completion thyroidectomy group

group	Group1(ST)	Completion thyroidectomy
No. of complications	23	12
No. of patients without complications	10	0

X² = 5.01, P value = 0.03. Statistically significant, implies that complication rate of CT is statistically significant to ST

Table 8: Showing Patient characteristics and post operative out come in the two groups

Feature	No.	Female	Male	Completion thyroidectomy	Recurrent goitre	Malignancy
ST	26	24	2	3	2	2
TT	29	25	4	0	0	3
total	55	47	6	3	2	5

Table 9: Showing distribution of recurrence of primary pathology in the two groups

group	MNG (%)	graves	Colloid goitre
ST(25)	2(2/26 * 100 = 7.69%)	0	0
TT(28)	0	0	0
Total = 55	2	0	0

Bar diagram.

Table 10: 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 11: Showing final HPE results of coexistence of other disease

	ST	TT
malignancy	2	3
adenoma	0	0
thyroiditis	1	1

Table 12: Showing distribution of completion thyroidectomy in between the two groups

Group	No. Of Completion thyroidectomies.

ST(26)	3 (11.53%)
TT(29)	0

Bar diagram.

Table 13: Showing distribution of post operative complications in completion thyroidectomy patients.

Post operative complications	Completion thyroidectomy N=3(%)
1)Temporary RLN palsy	2(66%)
2)Permanent RLN palsy	1(33%)
3)Haematoma	1(33%)
4)Stitch granuloma	1(33%)
5)Haemorrhage	0
6)Wound infection	2(66%)
7)Pain in the scar site	1(33%)
8)Post operative hyperthyroidism	0
9)Permanent hypoparathyroidism	2(66%)
10)Temporary hypoparathyroidism	2(66%)
Total	12

Table 14: Showing distribution of number of complications in three types of thyroid surgeries.

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

Percentage of completion thyroidectomies and associated morbidity that could have 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%) (Table 15).

Table15: Showing number of patients with and without complications.

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

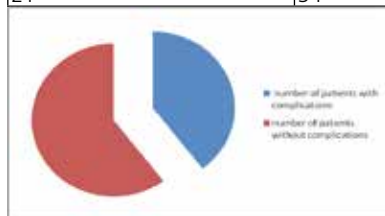


Figure 4: Comparison of with and without complications in patients

Number of patients developed complications in group1 =10 (40%)

Number of patients developed complications in group2 =11 (39.28%).

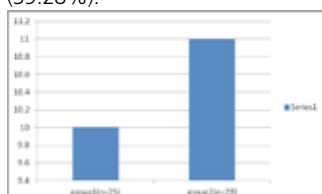


Figure 5: Total number of complications in the group

Total number of complications in group 1 = 23(23/26=0.88)

Total number of complications in group 2= 26(26/29=0.894)

Total number of complications in completion thyroidectomy, 12(12/3=4)

There was no operative mortality and no patient required urgent re exploration for haematoma (Figure 4,5).

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.

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 for 4 (16%) patients in group 1 and for 5(17.8%) patients in group 2, statistically insignificant. (p>0.05). The incidence of permanent hypoparathyroidism was for 3 (12%) patients in group 1 and for 4(14.2.8%) patients in group 2, statistically insignificant (p>0.05).

The incidence of temporary RLN palsy was for 4 (15.4%) patients in group 1 and for 6(20.6%) patients in group 2, statistically insignificant (p>0.05).No patient developed permanent RLN palsy in this study. When 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 ST, 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 are obtained second surgery (Completion thyroidectomy) 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 will for surgery.

Table 16: 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 complication following completion thyroidectomy was very high when compared to group1. 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 in 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 value>0.05), statistically insignificant (Table 16).

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 TT. In ST, the surgeon does not come near the nerve but in TT 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 ST varies in different studies and may be as high as 23% [3,4]. The recurrent rate following ST 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 ST and TT accounting to 8% recurrence in ST group.

Reoperation for recurrent disease carries a significant risk of damage to both RLN 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 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 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 ST and TT 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 TT 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 RLN have been reported in secondary thyroidectomy [9].

Under these circumstances, TT offers complete initial treatment eliminating the need for completion thyroidectomy while ST, 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. ST is associated with significant recurrence of goiters, inadequate treatment of incidentally detected thyroid cancers and insignificant advantage over TT. 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 RLN palsy and post operative hyperthyroidism TT is consistent with ST in experienced hands and provide more predictable outcome immediately after surgery and long term follow up with thyroxine replacement.

TT provides a radical but definitive control of the disease in BMNG, 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 TT are acceptably low and are comparable with that of ST, as it is evident from the results of this study.

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