

ORIGINAL ARTICLE

# Pattern of Outcome of Total Thyroidectomy and Subtotal Thyroidectomy In Multinodulat Goiter

ZIA ULLAH MALIK, MUHAMMAD NOSHAD AKBAR KHAN, AHSAN NASIM, GHULAM MUSTAFA ARAIN, KAMRAN ALI, ZAFAR IQBAL GONDAL, SAJID MALIK.

*Surgical unit I, Allama Iqbal Medical College/Jinnah Hospital Lahore*

## ABSTRACT

Multinodular Goiter is one of the most common endocrine diseases worldwide.[1,22] Multinodular goiter is more prevalent in areas where iodine is deficient in the diet.[1] Subtotal thyroidectomy has been widely used up till now but recurrence is associated with it. Total thyroidectomy is another surgical option with low recurrence. [21, 3]

**Objectives:** To compare the safety of total thyroidectomy with subtotal thyroidectomy in Multinodular goiter with regard to recurrent laryngeal nerve injury and hyperparathyroidism.

**Study Design:** Prospective study.

**Setting:** Department of Surgical unit I, Jinnah Hospital, Lahore.

**Duration with dates:** 1 year from (January 2009 to December 2009)

**Sample Size:** Sixty (60) patients. 30 in group A for total thyroidectomy and also 30 in group B for subtotal thyroidectomy.

**Results:** The mean age of patients in group A was 30.47+9.03 years and in group B the mean age was 31.70+11.49. Twenty nine patients (97%) were female and 1 male patient (3%) in group A and in group B 29 patients (97%) were female and 1 patient (3%) was male. The mean hospital stay was 5.57+2.15 in group A and in group B was 5.90+1.72. There was no comparative difference of complications in the both groups.

**Conclusions:** We concluded that subtotal thyroidectomy because the residual thyroid tissue may cause future recurrence with is difficult to treat. We prefer thoroughly excision to limit the possibility of future recurrence and re-operative surgery by performing total thyroidectomy.

**Keywords:** Multinodular Goiter, Total Thyroidectomy, Subtotal Thyroidectomy.

## INTRODUCTION

Normal thyroid gland is impalpable. The term goiter is used to describe generalized enlargement of thyroid gland in goiter.[1]

There are usually multiple nodules, forming a Multinodular goiter. [1]

Perhaps the most common of all the disorders of thyroid gland is Multinodular goiter. This disease is much more common in women than in men. The diagnosis of Multinodular goiter is based on physical examination, thyroid function tests and by fine needle aspiration cytology (FNAC). [1]

Multinodular goiter is simply detected as mass in the neck. But when it becomes enlarged, it causes pressure symptoms on the trachea and oesophagus. Occasionally sudden increase in the size of the gland is associated with sharp pain and tenderness in one area due to hemorrhage. Surgery is an acceptable choice when it causes pressure symptoms and other complications. [22]

Subtotal thyroidectomy, near total thyroidectomy and total thyroidectomy are the surgical options for Multinodular goiter.[2] Subtotal thyroidectomy has been widely used up till now but recurrence is associated with subtotal thyroidectomy. [2]

Total thyroidectomy is an operation that has been generally reserved for management of differentiated thyroid carcinoma.[6] Over the last decade total thyroidectomy has become a preferred choice for the management of multinodular goiter affecting the entire gland.[22] This approach avoids disease recurrence and the increase risk of morbidity associated with secondary operation, so the total thyroidectomy may be the operation of choice for multinodular goiter. [11,3]

Postoperative hypocalcaemia is the commonest complication of thyroidectomy but its incidence is more in total thyroidectomy. [4,17]

Literature review shows permanent complication rates are similar in both surgical procedures.[2] Total thyroidectomy is relatively a safe operation with a low recurrence rate when performed by surgeons trained in thyroid surgery[21]. Lowest complication rate is associated with subtotal thyroidectomy which is appropriate for benign unilateral thyroid disease [2,12]. Literature also shows, there is no significant difference in the rate of complications like hemorrhage, nerve injury and hyperparathyroidism for total and subtotal thyroidectomy [13,14].

It must be emphasized that protection of recurrent laryngeal nerve and parathyroid glands must still be of paramount importance in dealing with benign thyroid disease [14,15,16].

## **OBJECTIVE**

To compare the safety of total thyroidectomy with subtotal thyroidectomy in multinodular goiter with regard to recurrent laryngeal nerve injury and hypoparathyroidism.

## **OPERATIONAL DEFINITIONS**

### **Safety**

Avoidance to RLN injury and ischemia, incidental removal of parathyroid leading to hypoparathyroidism. RLN injury was assessed clinically and confirmed by indirect laryngoscopy. Hypoparathyroidism represents with tetany and it was assessed clinically.

### **Multinodular Goiter**

Generalized enlargement of thyroid gland with multiple nodules. It is diagnosed clinically.[1]

### **Hypothesis**

Total thyroidectomy is as safe as subtotal thyroidectomy in multinodular goiter without any risk of recurrence.

## **MATERIAL AND METHODS**

### **Study Design**

Prospective study

### **Setting**

This study was carried out in the surgical unit I Jinnah Hospital, Lahore

### **Duration of Study**

1 year from January 2009 to December 2009.

### **Sample Size**

Sixty patients the meeting inclusion criteria were enlisted. This is based on the expected number of cases in the period of study. Thirty cases for total thyroidectomy and thirty cases for subtotal thyroidectomy.

## **Sampling Technique**

Purposive non-probability sampling.

## **SAMPLE SELECTION**

### **Inclusion Criteria**

- Patient with bilateral multinodular goiter. These cases were diagnosed clinically with generalized enlargement of thyroid gland and multiple nodules.
- Both sexes and over 12 years of age.

### **Exclusion Criteria**

- Thyroid carcinoma
- Prior cervical surgery
- Associated parathyroid pathology
- Any voice problems.

## **DATA COLLECTION**

The sixty cases meeting the selection criteria in surgical ward admitted through out patients department (OPD) were enlisted. They were asked to sign the informed consent. Patients were allocated in two surgical groups, group A for total thyroidectomy and group B for subtotal thyroidectomy by the surgeon incharge. Both groups were matched demographically.

Demographic information, detailed history and physical examination were taken in each case. Preoperatively IDL, thyroid function test and fine needle aspiration cytology (FNAC) were carried out. Postoperative recurrent laryngeal nerve (RLN) palsy was noted by direct laryngoscopy on operation table. Postoperative IDL was done on second postoperative day. Other outcome measures like transient hypocalcaemia, hemorrhage, hoarseness and infection were also noted. Follow up was done on weekly basis up to one month. All information was collected by using a specially designed proforma (attached).

## **DATA ANALYSIS**

Collected data through specific proforma was entered in SPSS version 11 and analyzed through statistical package.

Baseline information was providing variables like types of symptoms, severity and duration. The positive feature of clinical assessment was providing the nodularity and condition of thyroid. These were presented as a descriptive statistics. The outcome of routine and specialized investigation was presented as frequency tables. The qualitative data (complication like RLN injury, infection etc) were reported as frequency percentage. While numerical data (age, hospital stay) were recorded as means + standard

deviation. The student t-test was applied for numerical outcome measures like postoperative serum calcium level while qualitative measures like complication (RLN injury, hemorrhage, and infection) were calculated by using Chi-square. The p value <0.05 was considered significant.

**RESULTS**

Sixty patients were divided into two groups. Thirty patients in group A for total thyroidectomy and thirty patients in group B for subtotal thyroidectomy (STT). The two groups were matched demographically.

In this prospective study, sixty consecutive cases of multinodular goiter undergoing thyroidectomies were included two patients (3%) were male and fifty eight (97%) were female. In group A one patient (3%) was male and also in group B one patient (3%) was male. In group A 29 patients (97%) were female and also group B 29 patients (97%) were female and 1 patient (3%) was male (Table 2).

The age range from 17 to 48 in group A and B with their Men +SD 30.47+9/03 while in group B was 31.70+11.49 respectively which is statistically not significant (p>0.05) (Table 3).

Among 60 patients of multinodular goiter 52 (88%) patients were euthyroid at the time of presentation in out-patient department, while 8 patients (12%) were initially thyrotoxic. The thyrotoxic patients were made euthyroid by prescribing anti-thyroid drugs and B-blockers. They were admitted only after they have become euthyroid. According to nature of presentation they were equally divided into both groups. Out of 8 patients which were initially thyrotoxic and later on become euthyroid 4 (13%) of patients in group A and also 4 (13%) patients in group B.

Fine needle aspiration and cytology (FNAC) was done in each case. All to them proved to be benign on fine needle aspiration cytology

preoperatively. Postoperatively, the benign or malignant nature of every specimen was confirmed. One patient in group A (3%) and 1 patients (3%) of group B was proved papillary carcinoma on histological Completion thyroidectomy. The Chi square test was applied for significance, the difference was statistically not significant (p> 0.05) (Table 4).

The mean standard deviation of hospital stay was 5.57 + 2.15 in group A and 5.90+72 in group B. T test was applied for significance difference. The statistically difference in hospital stay was not significant (p>0.05)(Table 5).

Nerve damage from thyroid surgery is a feared consequence of the procedure. Damage to recurrent laryngeal nerve, which powers the vocal cord, may occur without symptoms. Leading thyroid surgeons to examine the vocal cords preoperatively by indirect laryngoscopy and also perform indirect laryngoscopy as part of postoperative follow up.

In all sixty patients indirect laryngoscopy was normal preoperatively and vocal cords were intact and mobile. Postoperative IDL was done in all cases. In group A 3 patients (10%) out of thirty showed temporary RLN palsy. It was observed by postoperative hoarseness on IDL, while 29 cases (97%) in group A showed normal IDL. In group B 1 patients (3%) showed abnormal voice and temporary IDL changes while 29 (97%) were normal (Table 6).

Transient hypocalcaemia occur in 5 patients (17%) in group A and 3 patients (10%) in group B. Permanent hypocalcaemia was not occur in any case in group A and group B. Postoperative hemorrhage was not occur in group A as well as in group B. Postoperative seroma did not occur in any patient of group A but occur in 1 patient of group B (3%), Infection of wound did not occur in any case of group A and also in group B (Table 7).

**Table 2:** Sex Distribution in both groups (n=60)

Group A (n=30)			Group B (n=30)		
Sex	No. of Patients	Percentage	Sex	No. of Patient	Percentage
Female	29	97.0%	Female	29	97.0%
Male	1	3.0%	Male	1	3.0%
Total	30	100.0%	Total	30	100.0%

Pattern of Outcome of Total Thyroidectomy and Subtotal Thyroidectomy In Multinodulat Goiter

**Table 3:** Age Distribution in both groups (n=60)

Group A (n=30)			Group B (n=30)		
Age in years	No. of Patients	%age	Age in years	No. of Patient	%age
17-27	09	30.0%	17-27	13	44.0%
28-38	16	54.0%	28-38	07	23.0%
39-48	04	13.0%	39-48	06	20.0%
>48	01	3.0%	>48	04	13.0%
Total	30	100.0%	Total	30	100.0%

Mean  $\pm$ SD = 30.47 $\pm$  9.03      Mean  $\pm$ SD = 31. 70 $\pm$  11.49

P> 0.05

Key: SD=Standard deviation N=Number

**Table 4:** Comparison of Postoperative Biopsy Results (Benign and Malignant Nature) in Two groups (n=60)

Types	Group A (n=30)		Group B (n=30)	
	No. of patients	Percentage	No. of patients	Percentage
Benign on Biopsy	29	97.0%	29	97.0%
Carcinoma	01	3.0%	01	3.0%

P>0.05

**Table 5:** Comparison of Hospital Stay in Both Groups (n=60)

Hospital Stay	Group A (n=30)	Group B (n=30)	P value
		5.57 $\pm$ 2.15	5.90 $\pm$ 1.72

Key: SD = Standard Deviation N=Number

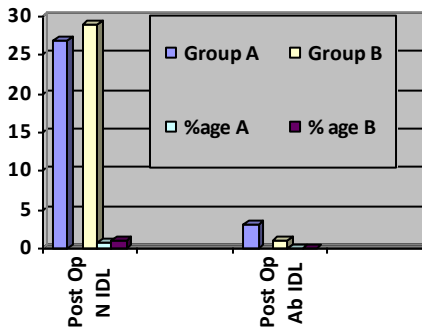
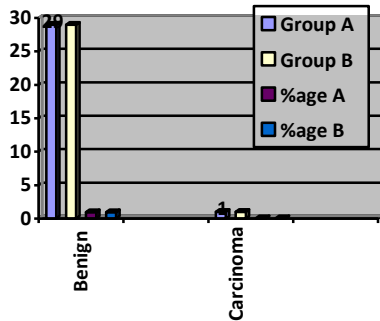
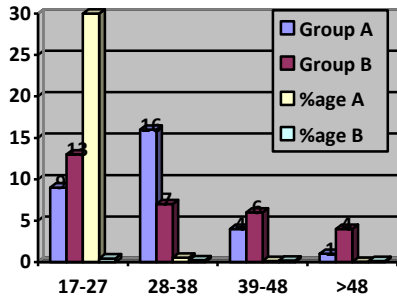
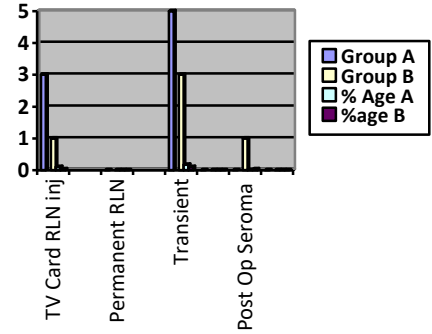
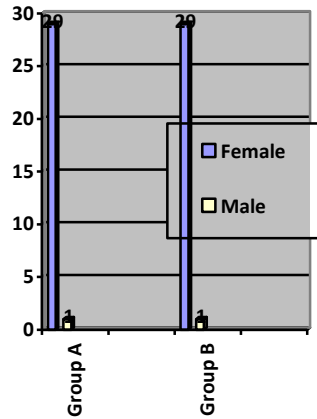
**Table 6:** Comparison of Postoperative IDL in Both Groups (n=60)

IDL Results	Group A (n=30)		Group B (n=30)		P value
	No. of patients	%age	No. of patient	%age	
Postoperative Normal IDL	27	90.0%	29	97.0%	<0.05
Postoperative abnormal IDL	03	10.0%	01	10.0%	<0.05

**Table 7:** Distribution of Complications in Various Thyroidectomy Operations.

Complications	Group A (n=30)		Group B (n=30)	
	No. of patients	%age	No. of patients	%age
Transient vocal cord paralysis (temporary RLN injury)	03	10.0%	01	3.0%
Permanent RLN injury	0	0.0%	0	0.0%
Transient Hypocalcemia	05	17.0%	03	10.0%
Postoperative haemorrhage / hematoma	0	0.0%	0	0.0%
Post operative seroma	0	0.0%	01	3.0%
Infection	0	0.0%	0	0.0%

ORIGINAL ARTICLE



DISCUSSION

Surgical treatment of thyroid disease has become very much safe in modern era.[10] It is associated with very limited morbidity and almost no mortality in majority of current series. [21]

In recent years, advanced surgical centers have been performing increasingly more proportion of total Thyroidectomy in comparison to other types of thyroid surgeries [11].

In our setup, subtotal Thyroidectomy was carried out mostly, but due to increasing popularity of total Thyroidectomy such comparison of outcome was carried out in both types of procedures. For Multinodular goiter, surgery is indicated in patient desiring or requiring rapidly, efficient and definitive treatment. Surgery is a treatment of choice for patients with suspicion of cancer, a massive goiter, symptoms of local compression, urgent need for control of diseases and severe thyrotoxicity. The extent of Thyroidectomy in management of disease is still debatable.

The aims of surgical management of Multinodular goiter are to eliminate the hyperthyroidism, minimize the need to re-operate for carcinoma and to avoid the recurrence of goiter with high complication rates.[19]

Surgical options for patients of Multinodular goiter include total Thyroidectomy, near total Thyroidectomy and subtotal Thyroidectomy in the present study, total Thyroidectomy (Group A) and subtotal thyroidectomy (Group B) were compared.

In the present study, all patients had benign thyroid lesion on fine needle aspiration cytology but on in group A (3%) and one in group B (3%) turned up to be carcinoma on biopsy. Completion Thyroidectomy was done for this patient of group B. Total Thyroidectomy should be regarded as a logical procedure of choice for the treatment of Multinodular goiter. Subtotal Thyroidectomy leaves behind presumably abnormal thyroid tissue and

exposes the patient to potential risk of recurrent disease. The selection of subtotal Thyroidectomy for benign thyroid disease is further challenged by the possibility of incidentally found malignancy in resected specimen.

Subtotal Thyroidectomy carries the risk of a second thyroid surgery either due to recurrence or detected malignancy in the resected specimen.[23] Because of the post surgical fibrosis, new dissection of the thyroid gland can cause high rate of complication regarding recurrent laryngeal nerve injury [5,7]. In the study done by Giles papillary cancer was found 7.3% in subtotal Thyroidectomy [19]. They recommended total or near total Thyroidectomy in Multinodular goiter to eliminate the necessity for early completion. [19]

Major precaution in every thyroidectomy is to avoid recurrent laryngeal nerve injury. Patients with unilateral vocal cord paralysis present with postoperative hoarseness or breathlessness. Presentation is often temporary and subacute.[5,14] In the present study postoperative complication of temporary recurrent laryngeal nerve palsy was (10%) in group A and (3%) in group B. Permanent recurrent laryngeal nerve injury did not occur in any case of both groups. In the study of Shah and Khan the postoperative hypocalcemia was commonest complication of total thyroidectomy occurring in 17.2% and temporary RLN injury was in 2.4% [20]. They explained that postoperative hypocalcemia was temporary, and it improves on supplementation [20].

In the present study the postoperative transient hypocalcemia was high in group A (17%) for total thyroidectomy while in group B was (10%) for subtotal thyroidectomy. In another study Spell total Thyroidectomy was done in 233 (69%) patients of Multinodular goiter. Temporary hypocalcemia was occurring in 13.4%. The rate of postoperative hemorrhage was 0.9%. There was no postoperative mortality. They conclude that total Thyroidectomy removes disease process completely and lowers local recurrence rates and risks of re operative surgery. They also conclude that total Thyroidectomy is a safe procedure.

In the study of Moalem[22], there are more risk of RLN injury both temporary (0-22% versus 0.5 – 18.1) and permanent (0-13% versus 0-4%) [22]. In secondary versus primary thyroid surgery, they also reported that permanent hyperparathyroidism (0-22% versus 0-4%) appeared to be more common in the redo groups. They concluded that

definitive management and prevention of recurrence of benign goiter is primarily surgical resection.[22]

In another study Lefevre also reported that RLN injury is (1.2%) and hyperparathyroidism is (5%0 in secondary surgical groups. These results are higher than primary surgical resection groups.[23]

The identification of the anatomy and blood supply of parathyroid glands is very important in thyroid surgery.[16] If parathyroid gland is dissected, it is re-transplanted in sternocleidomastoid muscle.[16]

## CONCLUSION

Both groups were studied. Total Thyroidectomy and subtotal Thyroidectomy were compared in patients of Multinodular goiter.

There appear to be no significant difference in the rate of complications regarding recurrent laryngeal nerve injury, hemorrhage, seroma and infection. Postoperative transient hypocalcemia was higher in total Thyroidectomy. If both procedures are done by experienced surgeons then there is no significant difference in the complication rates.

We are conscious about subtotal Thyroidectomy because the residual thyroid tissue may lead to future recurrence with is difficult to treat. Therefore we prefer thoroughly excision of thyroid gland. This will decrease the recurrence and need for re-operative surgery.

## REFERENCES

1. Kruskowski ZH. The thyroid gland and the thyroglossal tract. In; russell RCG, Williams NS, Bulstrode CJK editors. Bally and Love's Short Practice of Surgery 24<sup>th</sup> ed. London: Arnold, 2004; 776-804.
2. Ozbas S, Kocak S, Aydintug S, Cakmak A, Demirkir MA, Wishart GC. Comparison of the complications of subtotal, near total and total Thyroidectomy in the surgical management of Multinodular goiter, *Endocr J* 2005; 52: 199-205.
3. Gough IR, Wilkinsan D. Total Thyroidectomy for management of thyroid disease. *World J Surg* 2000; 24:962-5).
4. Anjum MA, Malik A, Haq A. Postoperative hypocalcemia after thyrodectomy: analysis of risk factors. *Pak postgrad Med J* 2003; 14: 112-5.

5. Arif M, Ahmed i. Recurrent laryngeal nerve palsy during thyroidectomies. *J Surg Pak* 2001; 6: 12-5.
6. Fernandes jK, Day TA, Richardson MS, Sharma AK. Overview of the management of differentiated thyroid cancer. *Curr Treat options Oncol* 2005; 6: 47-7.
7. Goncalves Filho J, Kowalski LP. Surgical complications after thyroid surgery performed in a cancer hospital. *Otolaryngol Head Neck Surg* 2005; 132: 490-4.
8. Delbridge I. Total Thyroidectomy: the evaluation of surgical technique. *ANZ J Surg* 2003; 73: 761-8.
9. Born LP, O'Brien CJ. Total Thyroidectomy for clinically benign disease of the thyroid gland. *Br J Surg* 2004; 91: 569-74. .
10. Friguglietti CU, Lin CS, Kulcsar MA. Total Thyroidectomy for benign thyroid disease. *Laryngoscope* 2003; 113: 1820-6.
11. Thomusch O, Sekulla C, Dralle H. Is primary total Thyroidectomy justified in benign Multinodular goiter? Results fo prospective quality assurance study of 45 hospitals offering different levels of care. *Chirurg* 2003; 74: 437-43.
12. Delbridge L, Guinea AI, Reeve TS. Total Thyroidectomy for bilateral benign Multinodular goiter; effect of changing practice. *Arch Surg* 1999; 134: 1389-93.
13. Reeve T, Thompson NW. Complication of thyroid surgery: how to avoid them, how to manage them and observation on their possible effect on whole patient. *World J Surg* 2000; 24: 971-5.
14. Whecler MH. Thyroid surgery and the recurrent laryngeal nerve. *BR J Surge* 1999; 86 291-2.
15. Page C, Strunski V. Parathyroid risk in total Thyroidectomy for bilateral benign Multinodular goiter; report of 351 surgical cases. *J Laryngol Otol* 2007; 121: 237-41.
16. Shah AR, Jaffe BM. Parathyroid preservation during thyroid surgery. *Am J Otolargol* 1998; 19: 113-7.
17. Wingert DO, Friesen S, Illopolos JL, Pierce GE, Thomas JH, hermerk AS. Post Thyroidectomy hypocalcemia. *Am J Surge* 1998; 152 606-9.
18. Lo CY. Recurrence after total Thyroidectomy for benign Multinodular goiter. *Would J Surg* 2007; 31: 599-600.
19. Giles y, Bozt4epe H, Terzioglu T, Tezelman S. The advantage of total Thyroidectomy to avoid reoperation for incidental thyroid cancer in Multinodular goiter. *Arch Surg* 2004; 139: 179-82.
20. Shah SS, Khan A. Assessment of the complications of total Thyroidectomy, *J Surg Pak* 2005; 10: 24-6.
21. Serpell Safety to total thyroidectomy. *ANZ J Surg* 2007; 77: 15-9.
22. Moalem J, Suh I, Duh QY. Treatment and prevention of recurrence of multinodular goiter. an evidence-based review of the literature. *World J Surg* 2008; [Epub ahead of print].
23. Lefevre JH, Tresallet C, |Leenhardt L, Jublane C, Chigot JP Menegaux F. Reoperative surgery for thyroid disease. *Langenbecks Arch Surg* 2007; 392: 685-91