

Comparison of Complications between Total and Near-Total Thyroidectomy in Non-Toxic Multinodular Goiter Patients

*Ullah MO¹, Siddiquee BH², Razib SFA³, Mia MS⁴, Akter N⁵, Siddiquee NS⁶, Akter N⁷, Haque SMA⁸, Mehataz T⁹, Sharmin R¹⁰, Akter M¹¹

Abstract

Thyroid diseases are common in Bangladesh. Surgical management for multinodular goiter (MNG) include subtotal thyroidectomy, total thyroidectomy (TT), and near-total thyroidectomy (NTT). NTT involves removal of all grossly visible thyroid tissue, leaving a small remnant adjacent to the recurrent laryngeal nerve near Berry's ligament. A prospective, observational study was conducted in the Department of Otorhinolaryngology and Head-Neck Surgery of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, between January 2018 and July 2019, to compare post-operative complications of total and near-total thyroidectomy in non-toxic multinodular goiter patients. A total of 36 patients with non-toxic MNG were enrolled; 18 patients undergoing total thyroidectomy and 18 patients undergoing near-total thyroidectomy were selected through purposive non-randomized sampling method. All operations were performed under general anesthesia by highly experienced surgeons (at least associate professor rank having ≥ 10 years experience). Then serum calcium, serum PTH, intact PTH, and fibre-optic laryngoscopy were assessed at 1st and 7th post-operative days and follow-up after 1 month, and 3 months. Their mean age of the patients was 50.7 ± 7.12 years; 30(83.3%) patients were female. We observed more clinical tetany (44.4% vs. 11.1%; $p=0.025$), more hypocalcemia (38.8% vs. 5.5%; $p=0.04$), more incidence of recurrent laryngeal nerve (RLN) palsy (33.3% vs. 5.5%; $p=0.035$) and more hypoparathyroidism (33.3% vs. 5.5%; $p=0.035$) in total thyroidectomy compared to near-total thyroidectomy among our study patients. Regarding preservation of the parathyroids, ≥ 3 glands were preserved intra-operatively in 72.2% of patients in NTT procedure, while only 33.3% of patients in TT procedure ($p=0.019$). The mean post-operative hospital stay was found more in total thyroidectomy (5.44 ± 0.90 vs. 4.56 ± 0.62 days; $p=0.001$). Our data suggests that NTT carries significantly fewer post-operative complications and less hospital stay than that of TT and should be considered the preferred surgical strategy for non-toxic multinodular goiter.

CBMJ 2026 July: Vol. 15 No. 02 P:385-389

Keywords: Multinodular goiter, near-total thyroidectomy, total thyroidectomy, recurrent laryngeal nerve palsy, hypocalcemia, hypoparathyroidism

1. *Dr. Md. Oli Ullah, Junior Consultant (ENT), Netrokona 250 Bed District Hospital, Netrokona, Bangladesh.
2. Prof. Belayat Hossain Siddiquee, Chief, Head Neck Surgery Division, Ex-Chairman, Department of Otolaryngology-Head & Neck Surgery, Bangladesh Medical University (BMU), Dhaka, Bangladesh.
3. Prof. Dr. Syed Farhan Ali Razib, Department of Otolaryngology-Head & Neck Surgery, Bangladesh Medical University (BMU), Dhaka, Bangladesh.
4. Dr. Md. Shoeb Mia, Phase B Resident, Department of Orthopedics, Combined Military Hospital, Dhaka, Bangladesh.
5. Dr. Naznin Akter, Phase B Resident, Department of Anatomy, Bangladesh Medical University (BMU), Dhaka, Bangladesh.
6. Dr. Nuzhat Sharmin Siddiquee, Phase B resident, Department of Anatomy, Bangladesh Medical University (BMU), Dhaka, Bangladesh.
7. Dr. Nahida Akter, Assistant Professor, Department of Anatomy, Islami Bank Medical College, Rajshahi, Bangladesh.
8. Dr. Shah Md. Atiqul Haque, Assistant Professor, Department of Anatomy, Mymensingh Medical College, Mymensingh, Bangladesh.
9. Dr. Tasnova Mehataz, Indoor Medical Officer, Department of Anaesthesiology, Community Based Medical College Hospital Bangladesh, Mymensingh.
10. Dr. Rezwana Sharmin, Lecturer, (Education Science), Centre for Medical Education (CME), Mohakhali, Dhaka-1213.
11. Dr. Mahmuda Akter, Phase B Resident, Department of Anatomy, Bangladesh Medical University (BMU), Dhaka, Bangladesh.

Address of Correspondence:
Email: ullaholi77@gmail.com

Introduction

Enlargement of the thyroid gland is one of the most common endocrine problems worldwide. In Bangladesh, goiter prevalence is particularly high in iodine-deficient districts such as Jamalpur and Rangpur regions.¹

Multinodular goiter (MNG) constitutes a significant surgical burden as many patients present late with large, symptomatic glands. Traditionally, subtotal thyroidectomy was the operation of choice, but recurrence rates are high because the underlying pathology affects the entire gland. Total thyroidectomy (TT) eliminates recurrence but carries an increased risk of permanent hypoparathyroidism and recurrent laryngeal nerve (RLN) injury. Near-total thyroidectomy (NTT), i.e., removal of all grossly visible thyroid tissue leaving only a small remnant adjacent to the RLN near Berry's ligament, has emerged as a viable compromise.^{2,3}

Several studies have reported that NTT achieves a complication profile similar to or better than TT while virtually eliminating recurrence.³⁻⁵

However, there is scarcity of evidence in our country on comparison of total and near-total thyroidectomy in surgical practice. Therefore, we proposed this study to compare post-operative complications of TT versus NTT in patients with non-toxic MNG at a tertiary level specialized hospital in Dhaka city, Bangladesh.

Methods

This prospective, observational study was conducted in the Department of Otorhinolaryngology and Head-Neck Surgery of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, between January 2018 and July 2019. A total of 36 patients were enrolled after adjusting for 20% dropout by

purposive non-randomized sampling; 18 patients undergoing total thyroidectomy and 18 patients undergoing near-total thyroidectomy were selected. Inclusion criteria were: bilateral non-toxic MNG confirmed by FNAC; age ≥ 18 years; both sexes; informed written consent. Our exclusion criteria were: toxic goiter; solitary nodule; prior neck surgery or radiotherapy; refusal of consent. All operations were performed under general anesthesia by highly experienced surgeons (at least associate professor rank having ≥ 10 years experience). The RLN was identified and preserved in all cases. For NTT, a small remnant (<1 g) was left adjacent to the RLN near Berry's ligament. All specimens were sent for histopathology. Serum calcium and intact PTH were measured preoperatively and at 1st and 7th post-operative days, and follow-up after 1 month and 3 months. Fibre-optic laryngoscopy was performed at all time-points. RLN palsy was classified as transient (<6 months) or permanent. Hypoparathyroidism was defined as serum calcium <8 mg/dL or need for supplementation; permanence defined as ongoing need beyond 6 months.

Immediately after the completion of data collection, collected data were checked and verified. Data cleaning, coding and recording were done. Then data was entered into the computer for final analysis. Data analysis was carried using Statistical Package for the Social Sciences (SPSS) version 23.0 for Windows. Data was expressed as mean $\pm$ SD, as well as frequency and percentage, as applicable. Unpaired Student's t-test was used for quantitative variables, while Chi-square and Fisher's Exact tests were used for categorical variables. A p-value <0.05 was accepted as significant. This study was approved by the Institutional Review Board of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

Results

We included a total of 36 patients with non-toxic multinodular goiter. Baseline demographic and clinical characteristics are shown in Table-I. The two groups were comparable for age, sex, and geographical area ($p>0.05$).

Table-I: Baseline characteristics of study population (N=36)

Variables	TT (n=18)	NTT (n=18)	p-value
Age (mean $\pm$ SD, years)	51.7 $\pm$ 6.71	49.6 $\pm$ 5.87	0.79 ^{NS}
Female*	14 (77.7%)	16 (88.8%)	0.37 ^{NS}
Rural*	11 (61.1%)	9 (50.0%)	0.50 ^{NS}

Unpaired Student's t-test and *Chi-square test were done; NS=not significant.

Table-II shows the comparison of different types complications between two groups. We observed more tetanic episodes (44.4% vs. 11.1%; $p=0.025$), more hypocalcemia (38.8% vs. 5.5%; $p=0.04$), more incidence of recurrent laryngeal nerve (RLN) palsy (33.3% vs. 5.5%; $p=0.035$) and more hypoparathyroidism (33.3% vs. 5.5%; $p=0.035$) in total thyroidectomy compared to near-total thyroidectomy among our study patients.

Table-II: Overview of complications between groups (N=36)

Complications	TT (n=18)	NTT (n=18)	p-value
Tetany (clinical)	8 (44.4%)	2 (11.1%)	0.025 ^S
RLN palsy	6 (33.3%)	1 (5.5%)	0.035 ^S
Hypocalcaemia (biochemical)	7 (38.8%)	1 (5.5%)	0.04 ^S
Hypoparathyroidism	6 (33.3%)	1 (5.5%)	0.035 ^S

Fisher's Exact test and Chi-square test were used, as applicable; S=significant.

Table-III shows that ≥ 3 parathyroid glands were preserved intra-operatively in 72.2% of patients in NTT procedure, while only 33.3% of patients in TT procedure ($p=0.019$). Table-IV shows that the mean

post-operative stay was significantly longer in TT (5.44 $\pm$ 0.90 days) than that of NTT (4.56 $\pm$ 0.62 days) ($p=0.001$).

Table-III: Intra-operative parathyroid preservation (N=36)

Groups	≥ 3 glands preserved	< 3 glands preserved	p-value
TT (n=18)	6 (33.3%)	12 (66.6%)	0.019 ^S
NTT (n=18)	13 (72.2%)	5 (27.7%)	

Chi-square test was used; S=significant.

Table-IV: Post-operative hospital stay (N=36)

Groups	Mean $\pm$ SD (days)	p-value
TT (n=18)	5.44 $\pm$ 0.90	0.001 ^S
NTT (n=18)	4.56 $\pm$ 0.62	

Unpaired Student's t-test was used; S=significant.

Discussion

In the present study, a total of 36 patients with non-toxic multinodular goiter participated – among them, 18 patients underwent total thyroidectomy (TT) and 18 patients underwent near-total thyroidectomy (NTT). The mean age of the patients was 51.7 $\pm$ 6.71 in TT group and 49.6 $\pm$ 5.87 in NTT group ($p>0.05$). Goiter is mostly found in older patients and most of them have nontoxic multinodular goiter (51.3%).⁶

Higher complication rates in the TT group were observed compared to NTT group, particularly in hypocalcemia (38.8% vs. 5.5%) and hypoparathyroidism (33.3% vs. 5.5%) ($p<0.05$). Ozbas *et al.* reported that in NTT group 39 patients (12.2%) developed transient hypocalcaemia, while in TT group 78 patients (30%) had transient hypocalcaemia whereas only 1 patient (0.4%) suffered permanent hypoparathyroidism.⁷ Rosato *et al.* found that persistent hypoparathyroidism occurred after 1.7% of all the operations, and temporary hypoparathyroidism was noted in 8.3%.⁸ However,

Vaiman *et al.* found similar rates of permanent hypocalcemia (2% vs. 2%) and permanent hypothyroidism occurred in all patients in the TT and NT groups.⁹ In contrast, Ulpan *et al.* reported that TT had a 33-fold increased risk for hypocalcemia.¹⁰ Erbil *et al.* also reported higher transient hypoparathyroidism (26% vs. 9.8%) and asymptomatic hypocalcemia (27% vs. 7.4%) in TT group compared to NTT group ($p < 0.001$).¹¹ We observed more clinical tetany in TT group (44.4%) than that of NTT group (11.1%) ($p < 0.05$). Ahmed *et al.* reported that 3 patients (7.89%) developed tetany in TT group, which is much lower than that of our finding.¹²

Recurrent laryngeal nerve (RLN) palsy is a long recognized and potentially catastrophic complication of any thyroid surgery.¹³ Our recurrent laryngeal nerve (RLN) palsy rates were 33.3% vs. 5.5% – much higher in TT compared to NTT ($p < 0.05$). Our result of RLN in the TT group (33.3%) is much higher than that of the findings of the several published reports. Hayward *et al.* reported that permanent RLN palsies were observed in 0.3-3% of patients, with transient palsies were observed in 5-8% patients.¹³ Ozbas *et al.* reported that 5 patients (1.9%) had temporary RLN injury but none of them remained permanent.⁷ Rosato *et al.* reported permanent palsy of the laryngeal recurrent nerve (LRN) occurred in 1% of patients, transient palsy in 2%.⁸ Vaiman *et al.* found permanent recurrent laryngeal nerve (RLN) injury in 1.4% in the TT group and 1.1% in the NTT group.⁹ The higher rates observed in this study may reflect the learning curve of the institution and the complex anatomy associated with large endemic goiters, which is more prevalent among Bangladeshi people. However, another study done in Bangladesh by Ahmed *et al.* found RLN palsy in 5.3% patients in TT group, which is much lower than that of our finding.¹² Evidence also

showed that the patients undergoing re-operative thyroid surgery and thyroid surgery for malignancies are at increased risk of RLN palsy.¹³

Intraoperative damage, devascularization or accidental removal of the parathyroid glands lead to hypoparathyroidism following any thyroid surgery.¹⁴ In our study, a significantly higher intra-operative parathyroid preservation rate was observed in NTT group (72.2% vs. 33.3%; $p = 0.019$), which explains the difference in biochemical outcomes (hypoparathyroidism) and confirms better functional parathyroid preservation in NTT procedure.

In the present study, post-operative hospital stay was significantly shorter after NTT compared to TT (4.56 ± 0.62 days vs. 5.44 ± 0.90 days; $p = 0.001$). Our findings are consistent with the lower complication burden and reduced need for supplementation monitoring. However, Ahmed *et al.* reported a higher mean postoperative hospital stay in TT group (6.21 ± 0.99) than that of our finding.¹²

Regarding multinodular goiter, iodizing salt is a safe, effective, and affordable approach that is essential for implementation for goiter endemic countries like Bangladesh. Global experience has shown that salt iodization programs are the most equitable, effective, and sustainable way to ensure that all population groups maintain adequate iodine levels, which is crucial for controlling iodine deficiency disorders (IDD) in the long term.¹⁵

Limitations of this study include single-center design, small sample size, purposive (non-randomized) sampling, and three cases of loss to follow-up managed by hot-deck imputation. Further studies with larger samples accommodating multicenter and designed as randomised controlled trials are warranted to confirm our findings.

Conclusion

Our data suggests that near-total thyroidectomy (NTT) is associated with significantly fewer post-operative complications including hypocalcemia, recurrent laryngeal nerve (RLN) palsy, and hypoparathyroidism compared to total thyroidectomy in patients in non-toxic multinodular goiter, while offering near-identical protection against recurrence. NTT should be considered the preferred surgical strategy for this condition, particularly in iodine-deficient endemic settings.

References

1. Sarker FH, Taufiqun-Nessa UK, Chowdhury SA. Use of iodized salt and the prevalence of goiters in an endemic area of Bangladesh. *Mymensingh Med J*. 2002;11(1):22-5.
2. Haugen BR, Alexander EK, Bible KC, Doherty GM, Mandel SJ, Nikiforov YE, et al. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer: The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer. *Thyroid*. 2016;26(1):1-133.
3. Cirocchi R, Trastulli S, Randolph J, Guarino S, Di Rocco G, Arezzo A, et al. Total or near-total thyroidectomy versus subtotal thyroidectomy for multinodular non-toxic goitre in adults. *Cochrane Database Syst Rev*. 2015;2015(8):CD010370.
4. Acun Z, Comert M, Cihan A, Ulukent SC, Veen B. Near total thyroidectomy could be the best treatment for thyroid diseases in endemic regions. *Arch Surg*. 2004;139(4):444-7.
5. Alimoglu O, Akdag M, Sahin M, Korkut C, Okan I, Kurtulmus N. Comparison of surgical techniques for treatment of benign toxic multinodular goiter. *World J Surg*. 2005;29(7):921-4.
6. Díez JJ. Goiter in adult patients aged 55 years and older: etiology and clinical features in 634 patients. *J Gerontol A Biol Sci Med Sci*. 2005;60(7):920-3.
7. Ozbas S, Kocak S, Aydintug S, Cakmak A, Demirkiran MA, Wishart GC. Comparison of the complications of subtotal, near total and total thyroidectomy in the surgical management of multinodular goitre. *Endocr J*. 2005;52(2):199-205.
8. Rosato L, Avenia N, Bernante P, De Palma M, Gulino G, Nasi PG, et al. Complications of thyroid surgery: analysis of a multicentric study on 14,934 patients operated on in Italy over 5 years. *World J Surg*. 2004;28(3):271-6.
9. Vaiman M, Nagibin A, Hagag P, Buyankin A, Olevson J, Shlamkovich N. Subtotal and near total versus total thyroidectomy for the management of multinodular goiter. *World J Surg*. 2008;32(7):1546-51.
10. Unalp HR, Erbil Y, Akguner T, Kamer E, Derici H, Issever H. Does near total thyroidectomy offer advantage over total thyroidectomy in terms of postoperative hypocalcemia? *Int J Surg*. 2009;7(2):120-5.
11. Erbil Y, Barbaros U, Salmaslioğlu A, Yanik BT, Bozbora A, Ozarmağan S. The advantage of near-total thyroidectomy to avoid postoperative hypoparathyroidism in benign multinodular goiter. *Langenbecks Arch Surg*. 2006;391(6):567-73.
12. Ahmed N, Ahmad S, Ahmed F, Hossain MA, Saha K. Comparison of complications between total and subtotal thyroidectomy in simple multinodular goitre. *J Shaheed Suhrawardy Med Coll*. 2018;9(2):55-9.
13. Hayward NJ, Grodski S, Yeung M, Johnson WR, Serpell J. Recurrent laryngeal nerve injury in thyroid surgery: a review. *ANZ J Surg*. 2013;83(1-2):15-21.
14. Dzodic R, Santrac N. In situ preservation of parathyroid glands: advanced surgical tips for prevention of permanent hypoparathyroidism in thyroid surgery. *J BUON*. 2017;22(4):853-5.
15. Yusuf HK, Rahman AM, Chowdhury FP, Mohiduzzaman M, Banu CP, Sattar MA, et al. Iodine deficiency disorders in Bangladesh, 2004-05: ten years of iodized salt intervention brings remarkable achievement in lowering goitre and iodine deficiency among children and women. *Asia Pac J Clin Nutr*. 2008;17(4):620-8.