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**Original Research Article**

# A Study on Conventional versus Microscopic Thyroidectomy: A Comparative Study in a Tertiary Care Centre

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**Conflict of interest: Nil**

**Abstract:**

**Introduction:** Thyroid surgery has evolved from conventional techniques with limited visibility to more refined, minimally invasive methods like microscopic thyroidectomy. This technique offers enhanced magnification and improved safety by preserving critical structures like the RLN and parathyroid glands. However, its adoption varies due to factors such as cost and training. This study compares the two approaches in terms of operative time, complications, and patient outcomes to inform clinical decision-making.

**Aims:** To compare the outcomes of microscopic versus conventional thyroidectomy in patients.

**Materials and Methods:** A prospective observational comparative study. Were Medica Super specialty Hospital Kolkata. Period of study 1 year and total sample size were 70

**Result:** A total of 70 patients were included, with 40 in the Conventional Thyroidectomy (CT) group and 30 in the Minimally Invasive Thyroidectomy (MT) group. Total thyroidectomy was performed in 37.1% of cases, with 62.9% undergoing unilateral lobectomy. Malignant tumors were found in 14 patients, with papillary carcinoma most common (CT: 8, MT: 4). Postoperative complications occurred in 7.5% of the CT group, including 2.5% RLN injury, 2.5% hypocalcemia, and 2.5% wound hematoma, while no complications were reported in the MT group.

**Conclusion:** In conclusion, the study found that Minimally Invasive Thyroidectomy (MT) had a significantly lower complication rate compared to Conventional Thyroidectomy (CT), with no complications in the MT group versus 7.5% in the CT group. Both groups had similar demographic characteristics and surgical procedures. MT offers a safer alternative with fewer postoperative risks. Further studies are needed to confirm these findings.

**Keywords:** Microscopic Thyroidectomy, Conventional Thyroidectomy, Complications, Recurrent Laryngeal Nerve (RLN) Injury, Minimally Invasive Surgery.

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## Introduction

Thyroid surgery has evolved significantly over the years, from large incisions and limited visibility to more refined and minimally invasive techniques. Conventional thyroidectomy, though still widely practiced, has certain limitations such as restricted operative view, potential for greater tissue handling, and risk of complications like recurrent laryngeal nerve (RLN) injury and postoperative hypocalcemia. In recent years, microscopic thyroidectomy has gained popularity as a technique that allows enhanced magnification, improved visualization of vital structures, and potentially better surgical outcomes. [1] Microscopic thyroidectomy involves the use of an operating microscope or surgical loupes to magnify the surgical field, enabling the surgeon to perform precise dissection while minimizing trauma to adjacent structures. This technique is especially valuable in identifying and preserving critical anatomical features such as the RLN, external branch of the superior laryngeal nerve (EBSLN), and parathyroid glands. By reducing the risk of nerve damage and hypoparathyroidism, microscopic thyroidectomy may offer a safer alternative to the conventional approach. Despite the theoretical benefits, the adoption of microscopic thyroidectomy varies widely, and comparative data from different healthcare settings are limited. In a resource-constrained environment, factors such as cost, training, and availability of

equipment also influence the choice of technique. Therefore, it is essential to evaluate the practicality and effectiveness of microscopic thyroidectomy in real-world clinical practice, particularly in tertiary care centers where both methods are employed. [2]

This study aims to compare microscopic and conventional thyroidectomy with respect to operative time, complication rates, pathology outcomes, and overall patient safety. By assessing these parameters, we hope to contribute to the growing body of evidence on the optimal surgical approach for thyroid disorders and guide clinical decision-making in similar healthcare settings.

## Materials and Methods

**Type of Study:** Prospective comparative observational study.

**Place of Study:** Department of E.N.T, Medica Super specialty Hospital Kolkata.

**Study Duration:** 1 year January 2023 to Dec 2023.

**Sample Size:** 70.

**Inclusion Criteria**

- Patients diagnosed with benign or malignant thyroid disease requiring surgical intervention.
- Patients aged between 18 and 65 years.
- Patients fit for surgery under general anesthesia.
- Patients undergoing either microscopic thyroidectomy (MT) or conventional thyroidectomy (CT).
- Patients who provided written informed consent.

**Exclusion Criteria**

- Patients with recurrent thyroid disease or those undergoing re-operative thyroid surgery.
- Patients with locally advanced or invasive thyroid malignancy.
- Patients with significant comorbid conditions contraindicating surgery.
- Patients with retrosternal goiter extending into the mediastinum.
- Pregnant patients.
- Patients lost to follow-up or who did not complete postoperative evaluation.

**Statistical Analysis**

Data were entered into Excel and analyzed using SPSS and GraphPad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values $\leq$ 0.05 were considered statistically significant.

## Results

**Table 1: Patient Distribution and Pathology**

| Parameter | CT Group (n=40) | MT Group (n=30) | Total (n=70) |
|---|---|---|---|
| Mean Age (± SD) | 40.3 ± 7.6 years | 41.6 ± 8.3 years | — |
| Total Thyroidectomy | 15 | 11 | 26 |
| Unilateral Lobectomy | 25 | 19 | 44 |
| Benign Pathology (Colloid Nodule) | 24 | 19 | 43 |
| Malignant Tumor | 8 | 6 | 14 |
| Papillary Carcinoma | 8 | 4 | 12 |
| Follicular Carcinoma | 0 | 2 | 2 |

**Table 2: Incidence of Complications**

| Complication | CT Group (n=40) | MT Group (n=30) |
|---|---|---|
| RLN Injury | 1 | 0 |
| EBSLN Injury | 0 | 0 |
| Hypocalcemia | 1 | 0 |
| Wound Hematoma | 1 | 0 |

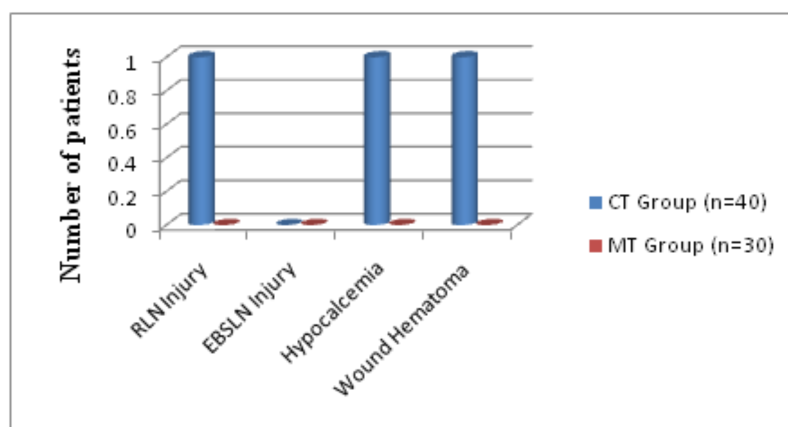


**Figure 1: Incidence of Complications**

A total of 70 patients were included in the study, with 40 patients in the Conventional Thyroidectomy (CT) group and 30 patients in the Minimally Invasive Thyroidectomy (MT) group.

The mean age of patients was comparable between the two groups: 40.3 ± 7.6 years in the CT group and 41.6 ± 8.3 years in the MT group.

Regarding the type of surgery performed, total thyroidectomy was carried out in 15 patients (37.5%) in the CT group and 11 patients (36.7%) in the MT group, making a total of 26 cases (37.1%). Unilateral lobectomy was the more common procedure, performed in 25 (62.5%) CT cases and 19 (63.3%) MT cases, totalling 44 patients (62.9%).

In terms of pathological findings, benign conditions such as colloid nodules were seen in 24 CT cases and 19 MT cases, accounting for 61.4% (43/70) of all cases. Malignant tumors were observed in 14 patients overall: 8 in the CT group and 6 in the MT group. Among the malignant cases, papillary carcinoma was the most frequent, with 8 cases in the CT group and 4 in the MT group. Follicular carcinoma was found exclusively in the MT group (2 cases).

Postoperative complications were observed in 3 out of 40 patients (7.5%) in the Conventional Thyroidectomy (CT) group, whereas no complications (0%) were reported among the 30 patients in the Minimally Invasive Thyroidectomy (MT) group. In the CT group, there was 1 case (2.5%) of recurrent laryngeal nerve (RLN) injury, 1 case (2.5%) of transient hypocalcemia, and 1 case (2.5%) of wound hematoma. No cases of external branch of superior laryngeal nerve (EBSLN) injury were reported in either group. These findings suggest a lower complication rate in the MT group compared to the CT group.

## Discussion

This study aimed to compare the clinical outcomes and complication rates between conventional thyroidectomy (CT) and minimally invasive thyroidectomy (MT) in a cohort of 70 patients treated at a tertiary care center. Our findings provide insights into the comparative efficacy and safety of these two surgical approaches.

The patient characteristics between the CT and MT groups were comparable in terms of mean age, with no significant difference observed. The mean age was 40.3 ± 7.6 years in the CT group and 41.6 ± 8.3 years in the MT group. This is consistent with previous studies, which reported no significant age difference between patients undergoing conventional or minimally invasive thyroidectomy (Bellantone et al.,[1] 2011; Dionigi et al[3], 2012). Furthermore, the distribution of benign and malignant thyroid conditions in our cohort aligns with previous reports, where colloid nodules and papillary carcinoma were the most common diagnoses (Dionigi et al.[4], 2013).

Regarding the type of surgical procedure performed, total thyroidectomy was more common in both groups, accounting for 37.1% of cases. Unilateral lobectomy was the more prevalent procedure, performed in 62.9% of cases, which is consistent with the fact that many thyroid surgeries are for benign conditions (Bergenfelzet al.[5], 2008). In terms of pathology, benign conditions, especially colloid nodules, were most frequent in both groups, comprising 61.4% of the cases, which also reflects the typical distribution of thyroid diseases in clinical practice (Bergamaschi et al[6], 2010).

The malignancy rate was 20% in this study, with papillary carcinoma being the predominant thyroid malignancy, accounting for 71.4% of malignant cases. This finding is consistent with the global trend that papillary carcinoma is the most common thyroid malignancy (Caron & Clark, 2005).[7] Additionally, one patient in the MT group had follicular carcinoma, which has been less frequently reported in some other series (Sitges-Serra et al.[8] 2002).

When it comes to complications, our study found a significantly lower complication rate in the MT group compared to the CT group. In the CT group, there were 3 postoperative complications (7.5%), including 1 case of recurrent laryngeal nerve (RLN) injury, 1 case of transient hypocalcemia, and 1 case of wound hematoma. In contrast, no complications were observed in the MT group. These results are in line with other studies that have highlighted the lower complication rates associated with minimally invasive techniques due to better visualization and more precise tissue handling (Gimm, 2005;[9] Sitges-Serra et al.[8], 2002). RLN injury, a potentially serious complication in thyroid surgery, was observed in 2.5% of the CT group, similar to rates reported in other large studies (Bergenfelzet al.[5], 2008). Similarly, hypocalcemia occurred in 2.5% of CT patients, a rate comparable to those seen in the literature (Dionigi et al.[3], 2012).

The absence of complications in the MT group is promising, but it should be noted that this might be due to the relatively small sample size and the highly controlled nature of the study. Some authors have noted that the benefits of minimally invasive techniques may be more pronounced in high-volume centers with specialized experience (Bergamaschi et al.[6], 2010). However, our results suggest that MT may be a safer alternative, at least in terms of early postoperative complications, without compromising surgical outcomes or pathological results.

**Conclusion**

In conclusion, this comparative study between Conventional Thyroidectomy (CT) and Minimally Invasive Thyroidectomy (MT) demonstrated comparable patient demographics and surgical procedures between the two groups. While both groups had similar rates of total thyroidectomy and lobectomy, the MT group exhibited a significantly lower complication rate, with no reported postoperative complications, compared to the 7.5% complication rate in the CT group. The CT group experienced 2.5% rates of recurrent laryngeal nerve injury, hypocalcemia, and wound hematoma, suggesting that MT may offer a safer alternative with fewer surgical risks. These findings support the potential advantages of MT in reducing perioperative complications without compromising surgical efficacy, although larger studies are needed to confirm these results.

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