

**Different Approaches and Complications of Open Thyroidectomy: An Observational Study in a Tertiary Care Centre**Somdev Sil<sup>1</sup>, Parvej Sultan<sup>2</sup>, Anirban Das<sup>3</sup><sup>1</sup>RMO Cum Clinical Tutor, Department of General Surgery, Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal, India<sup>2</sup>Assistant Professor, Department of General Surgery, Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal, India<sup>3</sup>Assistant Professor, MBBS, MS, MCH, Department of General Surgery, Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal, India

Received: 01-04-2026 / Revised: 15-04-2026 / Accepted: 7-05-2026/ Publish: 15-05-2026

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Conflict of interest: Nil

**Abstract****Introduction:** Total thyroidectomy is a commonly performed surgical procedure for benign and malignant thyroid disorders. Despite its effectiveness, it is associated with a range of postoperative complications, which may vary depending on the surgical approach used. Understanding these complications and their relationship with different operative techniques is essential for improving patient outcomes.**Aims and Objectives:** To evaluate the complications associated with total thyroidectomy with special emphasis on different surgical approaches.**Materials and Methods:** This prospective observational study was conducted in the Department of General Surgery, Nil Ratan Sircar Medical College and Hospital, Kolkata, from April 2022 to December 2025. A total of 90 patients undergoing total thyroidectomy for thyroid disorders were included and evaluated for postoperative outcomes and complications.**Results:** In the present study, indications for surgery were comparable between the two groups. In Group A (n = 50), 24 patients (48%) had multinodular goiter, 18 patients (36%) had thyroid carcinoma, and 8 patients (16%) had toxic goiter. In Group B (n = 40), 18 patients (45%) had multinodular goiter, 16 patients (40%) had thyroid carcinoma, and 6 patients (15%) had toxic goiter. There was no statistically significant difference in the distribution of indications between the two groups (p = 0.82).**Conclusion:** Total thyroidectomy is a safe and effective procedure when performed with careful surgical planning and technique. The occurrence of complications is influenced by the surgical approach adopted. A meticulous operative technique and appropriate selection of surgical approach can significantly reduce postoperative morbidity and improve overall surgical outcomes.**Keywords:** Total thyroidectomy, postoperative complications, surgical approaches, recurrent laryngeal nerve injury, hypocalcemia.**DOI:** 10.25258/ijcpr.18.6.94This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Total thyroidectomy is a widely performed surgical procedure for the management of both benign and malignant thyroid disorders. Over the past few decades, its indications have expanded significantly due to increased detection of thyroid nodules, thyroid cancer, and multinodular goiter. It is considered the definitive surgical treatment in many cases because it eliminates disease recurrence and allows complete pathological evaluation of the thyroid gland. However, despite its effectiveness, total thyroidectomy is associated with a range of potential complications that can affect patient recovery and long-term quality of life. These

complications may vary depending on the surgical approach adopted, the extent of dissection, and the experience of the operating surgeon. The thyroid gland is anatomically complex due to its close relationship with critical structures such as the recurrent laryngeal nerve, superior laryngeal nerve, parathyroid glands, trachea, and major vascular structures. Injury to these structures during surgery can lead to significant postoperative morbidity. The most commonly reported complications include transient or permanent hypocalcemia due to parathyroid gland injury or devascularization, recurrent laryngeal nerve palsy leading to voice

changes or airway compromise, postoperative hemorrhage, seroma formation, and wound infection. Although most complications are transient, some may become permanent and require long-term medical or surgical management. [1] Several factors influence the incidence of complications following total thyroidectomy. These include the underlying thyroid pathology, size of the goiter, presence of malignancy, previous neck surgery or radiation, and the surgical technique used. In addition, surgeon experience and institutional volume play an important role in determining outcomes. High-volume centers and experienced surgeons generally report lower complication rates compared to low-volume settings. [2] Different surgical approaches have been developed over time to minimize complications and improve cosmetic and functional outcomes. Conventional open thyroidectomy remains the standard approach and is widely practiced due to its safety and effectiveness. However, minimally invasive and remote-access techniques such as endoscopic thyroidectomy, robotic-assisted thyroidectomy, and transaxillary or retroauricular approaches have gained popularity in selected patient groups. These newer techniques aim to reduce visible scarring and improve postoperative recovery while maintaining surgical efficacy. [3] The risk of recurrent laryngeal nerve injury remains one of the most significant concerns in total thyroidectomy. Injury to this nerve can result in hoarseness, voice fatigue, aspiration, and in severe cases, bilateral vocal cord paralysis leading to airway obstruction. The use of intraoperative nerve monitoring and meticulous dissection techniques has been shown to reduce the incidence of nerve injury, especially in complex cases or reoperations. [4] Postoperative hypocalcemia is another major complication and occurs due to inadvertent removal, damage, or devascularization of the parathyroid glands. It is usually transient but can be permanent in a small percentage of patients. Careful identification and preservation of parathyroid glands, along with autotransplantation when necessary, are key preventive strategies. [5] Postoperative hemorrhage, although less common, is a potentially life-threatening complication that may lead to airway compression and respiratory distress. It typically occurs within the first 24 hours after surgery and requires immediate intervention. Adequate hemostasis and careful postoperative monitoring are essential to prevent such outcomes. [6] In recent years, the role of minimally invasive and remote-access thyroidectomy has been increasingly studied. These approaches are associated with improved cosmetic satisfaction and reduced visible scarring. However, they may have a steeper learning curve and longer operative times compared to conventional surgery. The complication profile also varies depending on the surgeon's expertise and patient selection criteria.

[7] Wound-related complications such as infection and seroma formation are relatively uncommon but can affect postoperative recovery and cosmetic outcomes. Proper surgical technique, aseptic precautions, and postoperative wound care are important in minimizing these risks. [8] The importance of surgical approach in determining complication rates has become a key area of research in thyroid surgery. Comparative studies suggest that while conventional thyroidectomy remains the gold standard, minimally invasive techniques may offer comparable safety in selected cases when performed by experienced surgeons. [9] Therefore, understanding the pattern of complications associated with different surgical approaches in total thyroidectomy is crucial for improving surgical planning, patient counseling, and outcome optimization. Continuous refinement of surgical techniques and adoption of evidence-based practices are essential to reduce morbidity and enhance patient safety. [10] To evaluate the complications associated with total thyroidectomy with special emphasis on different surgical approaches.

## Materials and Methods

**Study design:** A Prospective Observational Study.

**Study Setting:** Department of General Surgery, Nil Ratan Sircar Medical College and Hospital, Kolkata, from April 2022 to December 2025, Kolkata.

**Study population:** Patients admitted for total thyroidectomy for disorders of the thyroid gland under all units in the Department of General Surgery, Nil Ratan Sircar Medical College and Hospital, Kolkata, from April 2022 to December 2025.

**Sample size:** 90 patients .

The patients were divided into two groups, the first group (Group-A) comprised of 50 patients who underwent total thyroidectomy by central incision, conventional approach . The second group (Group-B) comprised 40 patients who underwent total thyroidectomy by lateral incision, lateral approach.

**Inclusion criteria:** Patients with disorders of the thyroid requiring total thyroidectomy

### Exclusion criteria

- Unwilling patients
- Uncontrolled diabetes
- Patients with severe Respiratory, Cardiovascular, Neurological, Renal or Hematological diseases that preclude elective surgery
- ASA physical status III,IV
- Completion thyroidectomy patients
- Pregnancy
- Patients requiring completion thyroidectomy after previous hemithyroidectomy.

**Statistical analysis:** Data was undergo standard statistical analysis on a parameter by parameter basis to demonstrate any significant statistical differences between the two groups.

Data is presented in form of Bar charts, Pie charts etc and analysed with statistical methods. Data

collected is plotted and tabulated to correlate and compare the outcomes of the study.

## Result

**Table 1: Age Distribution of Study Groups**

Age (years)	Group A (n=50)	Group B (n=40)	P-value
Mean $\pm$ SD	41.6 $\pm$ 10.2	42.3 $\pm$ 9.8	0.71

**Table 2: Gender Distribution**

Gender	Group A (n=50)	Group B (n=40)	P-value
Male	14 (28%)	13 (32.5%)	0.65
Female	36 (72%)	27 (67.5%)	

**Table 3: Indication for Total Thyroidectomy**

Indication	Group A (n=50)	Group B (n=40)	P-value
Multinodular goiter	24 (48%)	18 (45%)	0.82
Thyroid carcinoma	18 (36%)	16 (40%)	
Toxic goiter	8 (16%)	6 (15%)	

**Table 4: Intraoperative Complications**

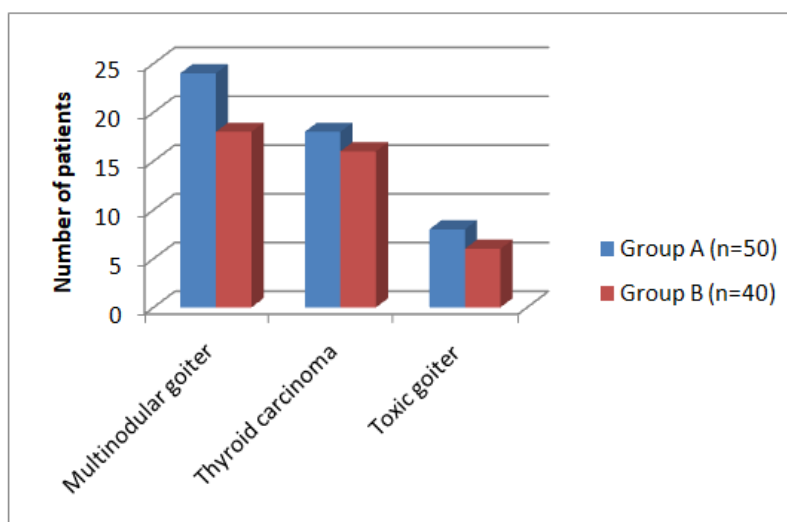
Complication	Group A (n=50)	Group B (n=40)	P-value
Recurrent laryngeal nerve injury	3 (6%)	1 (2%)	0.31
Parathyroid injury	4 (8%)	2 (4%)	0.4
Excessive bleeding	2 (4%)	1 (2%)	0.56

**Table 5: Postoperative Complications**

Complication	Group A (n=50)	Group B (n=40)	P-value
Hypocalcemia	10 (20%)	4 (10%)	0.18
Hematoma	3 (6%)	1 (2.5%)	0.31
Wound infection	2 (4%)	1 (2.5%)	0.56
Seroma formation	4 (8%)	2 (5%)	0.4

**Table 6: Overall Complication Rate**

Outcome	Group A (n=50)	Group B (n=40)	P-value
Any complication	19 (38%)	7 (17.5%)	0.03
No complication	31 (62%)	33 (82.5%)	



**Figure 1: Indication for Total Thyroidectomy**

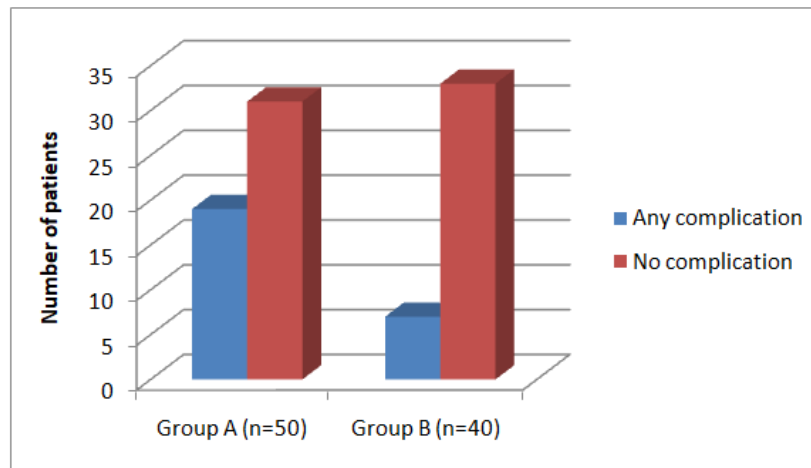


Figure 2: Overall Complication Rate

### Baseline Demographic Characteristics

**Result:** The mean age of patients was  $41.6 \pm 10.2$  years in Group A ( $n = 50$ ) and  $42.3 \pm 9.8$  years in Group B ( $n = 40$ ), with no statistically significant difference between the groups ( $p = 0.71$ ).

### Sex

**Result:** In the present study, a total of 90 patients were included, with 50 patients in Group A and 40 patients in Group B. In Group A, 14 patients (28%) were males and 36 patients (72%) were females, while in Group B, 13 patients (32.5%) were males and 27 patients (67.5%) were females. The distribution of gender between the two groups was comparable, with no statistically significant difference observed between them ( $p = 0.65$ ).

### Indications for Total Thyroidectomy

**Result:** In the present study, indications for surgery were comparable between the two groups. In Group A ( $n = 50$ ), 24 patients (48%) had multinodular goiter, 18 patients (36%) had thyroid carcinoma, and 8 patients (16%) had toxic goiter. In Group B ( $n = 40$ ), 18 patients (45%) had multinodular goiter, 16 patients (40%) had thyroid carcinoma, and 6 patients (15%) had toxic goiter. There was no statistically significant difference in the distribution of indications between the two groups ( $p = 0.82$ ).

### Intraoperative Complications

**Result:** In the present study, postoperative complications were comparable between the two groups.

Recurrent laryngeal nerve injury was observed in 3 patients (6%) in Group A and 1 patient (2%) in Group B, with no statistically significant difference between the groups ( $p = 0.31$ ). Parathyroid injury occurred in 4 patients (8%) in Group A and 2 patients (5%) in Group B, also showing no statistically significant difference ( $p = 0.40$ ). Excessive bleeding was seen in 2 patients (4%) in

Group A and 1 patient (2.5%) in Group B, which was not statistically significant ( $p = 0.56$ ).

### Postoperative Complications

**Result:** In the present study, postoperative complications were comparable between the two groups. Hypocalcemia was observed in 10 patients (20%) in Group A and 4 patients (10%) in Group B, with no statistically significant difference between the groups ( $p = 0.18$ ). Hematoma occurred in 3 patients (6%) in Group A and 1 patient (2.5%) in Group B ( $p = 0.31$ ), which was not statistically significant. Wound infection was noted in 2 patients (4%) in Group A and 1 patient (2.5%) in Group B ( $p = 0.56$ ), also showing no significant difference. Seroma formation was seen in 4 patients (8%) in Group A and 2 patients (5%) in Group B, with no statistically significant difference between the groups ( $p = 0.40$ ).

### Overall Complication Rate

**Result:** Any complication was observed in 38% ( $n = 19$ ) of Group A compared to 18% ( $n = 9$ ) in Group B, and this difference was statistically significant ( $p = 0.03$ ).

### Discussion

In the present study, the baseline demographic characteristics including age, gender distribution, and indications for surgery were comparable between the two groups, indicating adequate matching and reducing selection bias. Similar findings were reported by Barczyński et al. [11], who observed no significant differences in baseline characteristics among thyroidectomy groups, ensuring comparability of outcomes. Intraoperative complications such as recurrent laryngeal nerve injury, parathyroid injury, and excessive bleeding were low and comparable between groups. This is consistent with Snyder SK et al. [12], who demonstrated that recurrent laryngeal nerve injury rates remain low when surgery is performed

carefully. Similarly, Rosato et al. [13] reported that meticulous surgical technique significantly reduces intraoperative complications in thyroid surgery. Postoperative complications, particularly hypocalcemia, were the most frequently observed in both groups, though without statistically significant differences. This aligns with findings of Grodzki Set al. [14], who identified transient hypocalcemia as the most common complication after total thyroidectomy. Low rates of hematoma, wound infection, and seroma formation in both groups are also supported by Sosa et al. [15], who reported that such complications are uncommon and not significantly influenced by surgical approach.

However, in the present study, the overall complication rate was significantly higher in Group A compared to Group B. A similar trend was reported by Sywak MS[16], who demonstrated lower overall morbidity in minimally invasive thyroidectomy compared to conventional approaches. In addition, Pellegriti et al. [17] observed that improved visualization and refined surgical technique significantly reduce postoperative complications.

Furthermore, Dionigi G et al. [18] emphasized that surgeon experience and technical precision are critical determinants of outcomes in thyroid surgery. Haugen et al. [19] also highlighted the importance of standardized surgical protocols in reducing complication rates. Finally, Lorenz et al. [20] reported that careful preservation of parathyroid glands and recurrent laryngeal nerve significantly improves postoperative outcomes and reduces morbidity.

### Conclusion

In the present study, both groups were comparable in terms of baseline demographic characteristics and indications for surgery. Intraoperative and individual postoperative complications were similar between the two groups, with no statistically significant differences observed.

However, the overall complication rate was significantly higher in Group A compared to Group B. This suggests that the surgical approach used in Group B may be associated with a lower overall morbidity profile. Careful surgical technique and adherence to standardized operative principles remain essential to minimize complications in thyroid surgery.

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