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Original Article

Comparing Complication Rates in Total Thyroidectomy versus Partial Thyroidectomy

Dr. Arun Prakash Samar

Assistant Professor, General Surgery, Sudha Medical College & Hospital, Kota, Rajasthan

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Corresponding Author:

Dr. Arun Prakash Samar
Assistant Professor, General Surgery, Sudha Medical College & Hospital, Kota, Rajasthan

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ABSTRACT

Background: Thyroidectomy is among the most commonly performed endocrine surgical procedures worldwide. The extent of thyroid resection remains an area of debate, particularly in benign thyroid disorders and selected differentiated thyroid cancers. While total thyroidectomy minimizes recurrence and facilitates postoperative surveillance, it has traditionally been associated with a higher risk of postoperative complications compared with partial thyroidectomy.
Objectives: To compare the postoperative complication rates following total thyroidectomy and partial thyroidectomy.
Materials and Methods: A prospective comparative study included 120 patients undergoing thyroid surgery over two years. Sixty patients underwent total thyroidectomy (Group A), while sixty underwent partial thyroidectomy (Group B). Postoperative complications including hypocalcemia, recurrent laryngeal nerve (RLN) injury, hemorrhage, seroma, wound infection, and hospital stay were compared.
Results: Temporary hypocalcemia occurred more frequently after total thyroidectomy (20%) than partial thyroidectomy (5%). Permanent hypocalcemia occurred in 3.3% and 0%, respectively. Temporary RLN palsy occurred in 5% and 1.7% of patients. Postoperative hematoma and wound infection were uncommon in both groups. Total thyroidectomy showed a longer operative time and hospital stay.
Conclusion: Although total thyroidectomy demonstrated slightly higher complication rates, most complications were transient and manageable. Careful patient selection and meticulous surgical technique remain the key determinants of favorable outcomes.

Keywords: *Thyroidectomy, Total thyroidectomy, Partial thyroidectomy, Hypocalcemia, Recurrent laryngeal nerve injury, Thyroid surgery.*

INTRODUCTION

Thyroid disorders are among the most prevalent endocrine diseases worldwide and constitute a major cause of surgical intervention. The incidence of thyroid diseases has increased over the past few decades due to improved diagnostic modalities, widespread use of ultrasonography, and greater awareness among both clinicians and patients. Surgical management remains the definitive treatment for a variety of thyroid conditions, including multinodular goiter, solitary thyroid nodules, Graves' disease, toxic multinodular goiter, follicular neoplasms, and differentiated thyroid carcinoma. The principal objective of thyroid surgery is complete disease eradication while minimizing postoperative complications and preserving the patient's quality of life (1,2).

India has a substantial burden of thyroid disorders. It is estimated that more than 42 million Indians are affected by thyroid diseases, making thyroid disorders one of the most common endocrine problems in the country (3). Although the implementation of universal salt iodization has significantly reduced iodine deficiency disorders, thyroid enlargement, multinodular goiter, autoimmune thyroid disease, and thyroid malignancies continue to contribute considerably to the surgical workload in tertiary care hospitals across India (3,4). Regional differences in dietary iodine intake, environmental

factors, genetic susceptibility, and healthcare accessibility influence the epidemiology and clinical presentation of thyroid disorders within the Indian population (4).

Thyroidectomy is regarded as one of the most frequently performed endocrine surgical procedures. The operation may involve total thyroidectomy, near-total thyroidectomy, subtotal thyroidectomy, hemithyroidectomy, or thyroid lobectomy, depending on the underlying pathology and the extent of gland involvement. Over recent decades, total thyroidectomy has become increasingly accepted as the preferred surgical procedure for bilateral benign thyroid disease, Graves' disease, and differentiated thyroid carcinoma because it removes all thyroid tissue, minimizes the risk of recurrence, facilitates radioactive iodine therapy when indicated, and enables postoperative surveillance using serum thyroglobulin levels (2,5). Partial thyroidectomy, including hemithyroidectomy and subtotal thyroidectomy, continues to have an important role in carefully selected patients with unilateral benign thyroid disease or indeterminate nodules. Preservation of functional thyroid tissue may reduce the need for lifelong thyroid hormone replacement and has traditionally been considered to carry a lower risk of postoperative hypocalcemia and recurrent laryngeal nerve injury. However, residual thyroid tissue may predispose patients to recurrent nodular disease, necessitating completion thyroidectomy, which is technically more demanding and associated with a higher complication rate than primary surgery (2,6).

The principal concern in deciding the extent of thyroid resection lies in balancing the long-term benefits of complete disease removal against the immediate risks of surgery. Although advances in operative techniques, anesthesia, energy devices, and perioperative care have substantially improved surgical safety, postoperative complications remain a significant source of patient morbidity. Among these, hypocalcemia resulting from temporary or permanent parathyroid gland dysfunction is the most frequently encountered complication after total thyroidectomy. Temporary hypocalcemia may occur due to manipulation, devascularization, or inadvertent removal of the parathyroid glands during surgery, whereas permanent hypocalcemia usually reflects irreversible parathyroid injury (2,5).

Recurrent laryngeal nerve (RLN) injury is another feared complication of thyroid surgery because it may result in hoarseness of voice, aspiration, ineffective cough, impaired phonation, or, in bilateral injuries, life-threatening airway obstruction requiring urgent intervention. Identification and meticulous preservation of the recurrent laryngeal nerve throughout its course remain the cornerstone of safe thyroid surgery. The increasing use of intraoperative nerve monitoring has further enhanced the surgeon's ability to identify and protect the nerve, although careful anatomical dissection remains the gold standard (2,7).

Other recognized postoperative complications include cervical hematoma, seroma formation, surgical site infection, superior laryngeal nerve injury, tracheal injury, esophageal injury, and hypothyroidism following partial thyroidectomy. Among these, postoperative neck hematoma is particularly important because it can rapidly compromise the airway and requires immediate surgical exploration. Fortunately, with meticulous hemostasis and vigilant postoperative monitoring, its incidence remains low in experienced endocrine surgical centers (5,8).

The relationship between the extent of thyroidectomy and postoperative complications has been extensively investigated. Earlier studies suggested that total thyroidectomy was associated with a higher incidence of hypocalcemia and recurrent laryngeal nerve injury than partial thyroidectomy because of the greater extent of surgical dissection. However, more recent evidence indicates that when performed by experienced surgeons using standardized operative techniques, total thyroidectomy can be accomplished with complication rates comparable to those of less extensive procedures while providing superior long-term disease control (2,5,6).

Several Indian studies have reported outcomes comparable to international literature, demonstrating that thyroidectomy performed in high-volume tertiary centers is associated with low rates of permanent recurrent laryngeal nerve injury and permanent hypocalcemia. Nonetheless, transient hypocalcemia remains relatively common after total thyroidectomy and continues to be the most frequent early postoperative complication reported in Indian surgical practice (4,8). The variability in reported complication rates among Indian institutions highlights the importance of evaluating local surgical outcomes, surgeon experience, patient characteristics, and institutional protocols.

From a clinical perspective, selecting between total and partial thyroidectomy requires careful consideration of patient age, disease pathology, gland size, bilateral involvement, malignancy risk, anticipated need for radioactive iodine therapy, and patient preference. The decision should also incorporate the surgeon's experience and available institutional resources. Comparative evaluation of postoperative complications is therefore essential for guiding evidence-based surgical decision-making and optimizing patient outcomes.

The present study was undertaken to compare the postoperative complication rates associated with total thyroidectomy and partial thyroidectomy in patients undergoing surgery for thyroid disorders. By evaluating the incidence of hypocalcemia, recurrent laryngeal nerve injury, postoperative hemorrhage, seroma, wound infection, operative duration, and hospital stay, this study aims to contribute to the growing body of evidence regarding the safety and effectiveness of different surgical approaches in thyroid disease.

MATERIALS AND METHODS

Study Design

This study was designed as an prospective comparative observational study to compare the postoperative complication rates following total thyroidectomy and partial thyroidectomy in patients undergoing thyroid surgery. The objective was to evaluate the safety profile of the two surgical procedures by assessing the incidence of postoperative complications and perioperative outcomes.

Study Setting

The study was conducted in the Department of General Surgery at a tertiary care teaching hospital over a period of two years, from January 2024 to December 2025. All patients admitted for elective thyroid surgery during the study period who fulfilled the eligibility criteria were considered for inclusion.

Study Population

The study population comprised adult patients diagnosed with thyroid disorders requiring surgical management. Eligible patients underwent either total thyroidectomy or partial thyroidectomy according to the underlying thyroid pathology, clinical indications, radiological findings, cytological diagnosis, and the treating surgeon's clinical judgment.

Sample Size

A total of 120 patients were included in this study.

- **Group A:** Total thyroidectomy (n = 60)
- **Group B:** Partial thyroidectomy (n = 60)

Sampling Technique

A consecutive sampling method was employed. All eligible patients presenting during the study period who satisfied the inclusion criteria and provided written informed consent were enrolled until the required sample size was achieved.

Inclusion Criteria

Patients fulfilling all of the following criteria were included:

- Age ≥18 years.
- Patients with benign thyroid diseases requiring surgery, including multinodular goiter, solitary thyroid nodule, toxic multinodular goiter, Graves' disease, and follicular neoplasm.
- Patients with differentiated thyroid carcinoma suitable for surgical treatment.
- Patients fit for surgery under general anesthesia.
- Patients willing to participate and provide written informed consent.

Exclusion Criteria

The following patients were excluded:

- Age below 18 years.
- Patients undergoing emergency thyroid surgery.
- Recurrent thyroid disease requiring reoperation.
- Previous thyroid or neck surgery.
- Previous neck irradiation.
- Patients with severe cardiopulmonary illness making them unfit for general anesthesia.
- Patients with coagulation disorders.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee before commencement of patient recruitment. Written informed consent was obtained from all participants after explaining the nature of the study, the surgical procedures, possible complications, and postoperative follow-up. Confidentiality of patient information was maintained throughout the study. Participation was voluntary, and patients retained the right to withdraw at any stage without affecting their treatment.

Surgical Procedure

All operations were performed under general anesthesia using endotracheal intubation. Patients were placed in the supine position with neck extension using a shoulder roll. A standard transverse cervical (Kocher's) incision approximately 5–7 cm in length was made two fingerbreadths above the suprasternal notch.

Total Thyroidectomy

In patients undergoing total thyroidectomy:

- Superior pole vessels were ligated close to the thyroid capsule.
- Middle thyroid vein was divided.

- Inferior thyroid vessels were carefully ligated.
- The recurrent laryngeal nerve was routinely identified and preserved.
- Superior and inferior parathyroid glands were identified and preserved with intact vascular supply whenever possible.
- Both thyroid lobes and the isthmus were completely removed.
- Hemostasis was meticulously secured.
- Closed suction drain was placed when indicated.

Partial Thyroidectomy

Depending upon disease extent, patients underwent:

- Hemithyroidectomy.
- Near-total thyroidectomy.
- Subtotal thyroidectomy.

The recurrent laryngeal nerve and ipsilateral parathyroid glands were preserved. The contralateral thyroid lobe was left intact.

Postoperative Management

Patients were monitored in the recovery room followed by admission to the surgical ward.

Routine postoperative care included:

- Monitoring of pulse, blood pressure, respiratory rate, oxygen saturation, and temperature.
- Observation for neck swelling and airway compromise.
- Assessment of drain output.
- Pain management using intravenous analgesics.
- Intravenous antibiotics according to hospital protocol.
- Oral feeding initiated once fully awake.

Data Collection

Data were collected using a structured case record form that included:

Demographic profile, Clinical presentation, Laboratory findings, Radiological investigations, FNAC diagnosis, Type of surgery, Operative findings, Operative duration. Intraoperative blood loss, Histopathological diagnosis, Postoperative complications, Hospital stay, Follow-up findings.

Statistical Analysis

The collected data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages.

Comparisons between the total thyroidectomy and partial thyroidectomy groups were performed using:

- Student's independent t-test for continuous variables.
- Chi-square test or Fisher's exact test for categorical variables, as appropriate.

A p-value of less than 0.05 was considered statistically significant. Results were presented using tables and appropriate graphical representations.

RESULTS

Table 1. Demographic Characteristics of Patients Undergoing Total Thyroidectomy and Partial Thyroidectomy

Variable	Total Thyroidectomy (n = 60)	Partial Thyroidectomy (n = 60)	Total (N = 120)	P-value
Age (years)				
Mean ± SD	43.5 ± 11.4	41.9 ± 10.8	42.7 ± 11.1	0.432
Median (Range)	44 (19–68)	42 (20–66)	43 (19–68)	—
Age Group (Years)				
18–30	8 (13.3%)	10 (16.7%)	18 (15.0%)	0.821
31–40	14 (23.3%)	16 (26.7%)	30 (25.0%)	
41–50	18 (30.0%)	17 (28.3%)	35 (29.2%)	
51–60	13 (21.7%)	11 (18.3%)	24 (20.0%)	
>60	7 (11.7%)	6 (10.0%)	13 (10.8%)	

Gender				
Male	12 (20.0%)	15 (25.0%)	27 (22.5%)	0.512
Female	48 (80.0%)	45 (75.0%)	93 (77.5%)	
Male : Female Ratio	01:04.0	01:03.0	01:03.4	—
Body Mass Index (kg/m²)				
Mean ± SD	24.3 ± 3.5	23.8 ± 3.2	24.1 ± 3.4	0.458
Residence				
Rural	32 (53.3%)	35 (58.3%)	67 (55.8%)	0.576
Urban	28 (46.7%)	25 (41.7%)	53 (44.2%)	
Marital Status				
Married	50 (83.3%)	49 (81.7%)	99 (82.5%)	0.814
Unmarried	10 (16.7%)	11 (18.3%)	21 (17.5%)	
Comorbidities				
Hypertension	11 (18.3%)	10 (16.7%)	21 (17.5%)	0.812
Diabetes Mellitus	8 (13.3%)	7 (11.7%)	15 (12.5%)	0.781
Hypothyroidism	5 (8.3%)	4 (6.7%)	9 (7.5%)	0.728
Hyperthyroidism	9 (15.0%)	8 (13.3%)	17 (14.2%)	0.792
No Comorbidity	32 (53.3%)	35 (58.3%)	67 (55.8%)	0.581

The mean age of patients in the total thyroidectomy group was 43.5 ± 11.4 years, while that in the partial thyroidectomy group was 41.9 ± 10.8 years, with no statistically significant difference between the groups ($p = 0.432$). Most patients belonged to the 41–50-year age group (29.2%). Females constituted the majority of participants (77.5%), with a male-to-female ratio of approximately 1:3.4, reflecting the higher prevalence of thyroid disorders among women. The distribution of sex between the two study groups was comparable ($p = 0.512$). The mean BMI, place of residence, marital status, and prevalence of common comorbidities such as hypertension and diabetes mellitus were also similar between the two groups, with no statistically significant differences ($p > 0.05$). These findings suggest that the baseline demographic characteristics were well matched, allowing for a fair comparison of postoperative outcomes.

Table 2. Indications for Surgery Among Patients Undergoing Total Thyroidectomy and Partial Thyroidectomy

Indication for Surgery	Total Thyroidectomy (n = 60)	Partial Thyroidectomy (n = 60)	Total (N = 120)	P-value
Multinodular Goiter	24 (40.0%)	30 (50.0%)	54 (45.0%)	0.274
Solitary Thyroid Nodule	6 (10.0%)	14 (23.3%)	20 (16.7%)	0.048*
Graves' Disease	10 (16.7%)	4 (6.7%)	14 (11.7%)	0.089
Toxic Multinodular Goiter	4 (6.7%)	5 (8.3%)	9 (7.5%)	0.728
Follicular Neoplasm	5 (8.3%)	4 (6.7%)	9 (7.5%)	0.728
Papillary Thyroid Carcinoma	9 (15.0%)	2 (3.3%)	11 (9.2%)	0.028*
Follicular Thyroid Carcinoma	2 (3.3%)	1 (1.7%)	3 (2.5%)	0.558
Total	**60 (100%)**	**60 (100%)**	**120 (100%)**	—

***Statistically significant ($p < 0.05$).**

Among the 120 patients included in this study, multinodular goiter was the most common indication for surgery, accounting for 54 patients (45.0%), followed by solitary thyroid nodules (16.7%), Graves' disease (11.7%), and papillary thyroid carcinoma (9.2%). Multinodular goiter was observed more frequently in the partial thyroidectomy group (50.0%) than in the total thyroidectomy group (40.0%); however, this difference was not statistically significant ($p = 0.274$). Patients with solitary thyroid nodules were significantly more likely to undergo partial thyroidectomy (23.3% vs. 10.0%; $p = 0.048$), reflecting the common practice of performing hemithyroidectomy for unilateral benign or indeterminate nodules.

Conversely, papillary thyroid carcinoma was significantly more common in patients undergoing total thyroidectomy (15.0% vs. 3.3%; $p = 0.028$), consistent with current surgical recommendations favoring total thyroidectomy for selected malignant thyroid lesions. No statistically significant differences were observed between the two groups with respect to Graves' disease, toxic multinodular goiter, follicular neoplasm, or follicular thyroid carcinoma ($p > 0.05$).

Table 3. Operative Findings in Patients Undergoing Total Thyroidectomy and Partial Thyroidectomy

Operative Variable	Total Thyroidectomy (n = 60)	Partial Thyroidectomy (n = 60)	P-value
Duration of Surgery (minutes)			
Mean ± SD	118.4 ± 19.6	86.7 ± 17.8	<0.001*
Range	90–165	60–130	
Estimated Blood Loss (mL)			
Mean ± SD	104.8 ± 28.5	81.6 ± 20.7	0.002*
Range	60–180	40–140	
Identification of Recurrent Laryngeal Nerve			
Bilateral	60 (100%)	—	—
Unilateral	—	60 (100%)	—
Parathyroid Glands Preserved			
All glands identified and preserved	55 (91.7%)	58 (96.7%)	0.244
Accidental parathyroid excision	2 (3.3%)	0 (0.0%)	0.154
Parathyroid autotransplantation performed	3 (5.0%)	2 (3.3%)	0.648
Drain Placement			
Drain inserted	52 (86.7%)	38 (63.3%)	0.003*
No drain inserted	8 (13.3%)	22 (36.7%)	
Thyroid Gland Weight (g)			
Mean ± SD	52.6 ± 18.3	46.9 ± 15.8	0.061
Range	20–110	18–95	
Retrosternal Extension			
Present	6 (10.0%)	3 (5.0%)	0.298
Absent	54 (90.0%)	57 (95.0%)	
Enlarged Cervical Lymph Nodes			
Present	8 (13.3%)	2 (3.3%)	0.046*
Absent	52 (86.7%)	58 (96.7%)	
Intraoperative Tracheal Injury			
Yes	0 (0.0%)	0 (0.0%)	—
No	60 (100%)	60 (100%)	
Intraoperative Esophageal Injury			
Yes	0 (0.0%)	0 (0.0%)	—
No	60 (100%)	60 (100%)	

***Statistically significant (p < 0.05).**

The mean operative duration was significantly longer in the total thyroidectomy group (118.4 ± 19.6 minutes) than in the partial thyroidectomy group (86.7 ± 17.8 minutes) ($p < 0.001$). This difference reflects the additional time required for bilateral thyroid dissection, identification and preservation of both recurrent laryngeal nerves, and meticulous preservation of all parathyroid glands during total thyroidectomy. The estimated intraoperative blood loss was also significantly higher in patients undergoing total thyroidectomy (104.8 ± 28.5 mL) compared with those undergoing partial thyroidectomy (81.6 ± 20.7 mL) ($p = 0.002$). Despite this difference, blood loss remained within acceptable limits in both groups, and no patient required intraoperative blood transfusion. The recurrent laryngeal nerve was successfully identified and preserved in all patients. Bilateral nerve identification was performed in every patient undergoing total thyroidectomy, whereas unilateral nerve identification was adequate in patients undergoing partial thyroidectomy. Parathyroid preservation was achieved in the majority of patients. All identified parathyroid glands were preserved in 91.7% of patients undergoing total thyroidectomy and 96.7% of those undergoing partial thyroidectomy. Accidental parathyroid excision occurred in 2 patients (3.3%) in the total thyroidectomy group, while parathyroid autotransplantation was performed in 3 (5.0%) and 2 (3.3%) patients in the total and partial thyroidectomy groups, respectively. Closed suction drains were inserted significantly more frequently following total thyroidectomy (86.7%) than partial thyroidectomy (63.3%) ($p = 0.003$), reflecting the greater extent of surgical dissection and surgeon preference for postoperative drainage. The mean thyroid gland weight was slightly greater in the total thyroidectomy group (52.6 ± 18.3 g) than in the partial thyroidectomy group (46.9 ± 15.8 g); however, this difference did not reach statistical significance ($p = 0.061$). Retrosternal extension was observed in 10.0% of patients undergoing total thyroidectomy and 5.0% of those undergoing partial thyroidectomy, with no statistically significant difference. Enlarged cervical lymph nodes were encountered more frequently in the total thyroidectomy group (13.3%)

than in the partial thyroidectomy group (3.3%) (p = 0.046), likely reflecting the higher proportion of malignant thyroid disease in the former.

Table 4. Postoperative Complications in Patients Undergoing Total Thyroidectomy and Partial Thyroidectomy

Postoperative Complication	Total Thyroidectomy (n=60)	Partial Thyroidectomy (n=60)	Total (N=120)	P-value
Hypocalcemia				
Temporary hypocalcemia	12 (20.0%)	3 (5.0%)	15 (12.5%)	0.014*
Permanent hypocalcemia	2 (3.3%)	0 (0%)	2 (1.7%)	0.154
No hypocalcemia	46 (76.7%)	57 (95.0%)	103 (85.8%)	
Recurrent laryngeal nerve (RLN) injury				
Temporary RLN palsy	3 (5.0%)	1 (1.7%)	4 (3.3%)	0.309
Permanent RLN palsy	1 (1.7%)	0 (0%)	1 (0.8%)	0.315
No RLN injury	56 (93.3%)	59 (98.3%)	115 (95.8%)	
Postoperative hemorrhage/neck hematoma	2 (3.3%)	1 (1.7%)	3 (2.5%)	0.558
Seroma formation	3 (5.0%)	2 (3.3%)	5 (4.2%)	0.648
Surgical site infection	2 (3.3%)	1 (1.7%)	3 (2.5%)	0.558
Wound dehiscence	1 (1.7%)	0 (0%)	1 (0.8%)	0.315
Hypertrophic scar/keloid formation	2 (3.3%)	2 (3.3%)	4 (3.3%)	1
Chyle leak	1 (1.7%)	0 (0%)	1 (0.8%)	0.315
Tracheostomy requirement	0 (0%)	0 (0%)	0 (0%)	—
Re-exploration required	2 (3.3%)	1 (1.7%)	3 (2.5%)	0.558
Overall complication rate	23 (38.3%)	8 (13.3%)	31 (25.8%)	0.002*

***Statistically significant (p < 0.05)**

In this study, postoperative complications were more frequent among patients undergoing total thyroidectomy compared with partial thyroidectomy (38.3% vs 13.3%; p = 0.002).Temporary hypocalcemia was the most common postoperative complication observed. It occurred in 20.0% of patients following total thyroidectomy compared with 5.0% after partial thyroidectomy, and this difference was statistically significant (p = 0.014). The higher incidence following total thyroidectomy may be related to increased manipulation of the parathyroid glands, possible temporary impairment of vascular supply, and more extensive thyroid dissection. Permanent hypocalcemia was uncommon, occurring in 2 patients (3.3%) in the total thyroidectomy group and none in the partial thyroidectomy group. Although the incidence was higher after total thyroidectomy, the difference was not statistically significant (p = 0.154). Recurrent laryngeal nerve palsy occurred in four patients overall. Temporary RLN palsy was observed in 3 patients (5.0%) after total thyroidectomy and 1 patient (1.7%) after partial thyroidectomy. One patient in the total thyroidectomy group developed permanent RLN palsy. The difference between groups was not statistically significant. Postoperative neck hematoma was observed in 3 patients (2.5%), with slightly higher incidence in the total thyroidectomy group (3.3%) compared with partial thyroidectomy (1.7%). All cases were managed appropriately, and some required surgical exploration. Seroma formation, wound infection, wound dehiscence, and chyle leak were uncommon complications and showed no statistically significant difference between the two groups.

Table 5. Duration of Hospital Stay in Patients Undergoing Total Thyroidectomy and Partial Thyroidectomy

Duration of Hospital Stay (Days)	Total Thyroidectomy (n=60)	Partial Thyroidectomy (n=60)	Total (N=120)	P-value
Mean ± SD	4.6 ± 1.3	3.2 ± 0.9	3.9 ± 1.3	<0.001*
Median (Range)	4 (3–9)	3 (2–6)	3 (2–9)	—
Hospital Stay (Days)				
1–2 days	4 (6.7%)	15 (25.0%)	19 (15.8%)	
3–4 days	34 (56.7%)	40 (66.7%)	74 (61.7%)	
5–6 days	16 (26.7%)	5 (8.3%)	21 (17.5%)	
>6 days	6 (10.0%)	0 (0%)	6 (5.0%)	
Prolonged hospital stay (>5 days)	12 (20.0%)	5 (8.3%)	17 (14.2%)	0.057

***Statistically significant (p < 0.05)**

The mean hospital stay was 4.6 ± 1.3 days in the total thyroidectomy group and 3.2 ± 0.9 days in the partial thyroidectomy group, with the difference being statistically significant ($p < 0.001$). Most patients undergoing partial thyroidectomy were discharged within 3–4 days after surgery (66.7%), whereas patients undergoing total thyroidectomy more frequently required longer postoperative observation due to monitoring of serum calcium levels, assessment for hypocalcemia symptoms, drain management, and surveillance for complications. A prolonged hospital stay (>5 days) was observed in 20.0% of patients following total thyroidectomy compared with 8.3% following partial thyroidectomy. Although this difference showed a higher trend in the total thyroidectomy group, it did not reach statistical significance ($p = 0.057$).

DISCUSSION

Thyroidectomy is one of the most frequently performed endocrine surgical procedures worldwide. The extent of thyroid resection has remained a subject of continuous debate, particularly in patients with benign thyroid disorders where the surgeon must balance the risk of recurrence against the possibility of postoperative complications. Total thyroidectomy provides definitive removal of thyroid tissue and is increasingly preferred for bilateral multinodular goiter, Graves' disease, and differentiated thyroid carcinoma. However, partial thyroidectomy continues to have a role in selected unilateral benign lesions because it preserves thyroid tissue and may reduce the risk of complications such as hypocalcemia and recurrent laryngeal nerve injury.

The present study compared postoperative complications between total thyroidectomy and partial thyroidectomy. In this, patients undergoing total thyroidectomy demonstrated a higher overall complication rate, mainly due to an increased incidence of temporary hypocalcemia and longer postoperative hospital stay. These findings are comparable with observations reported in several national and international studies.

In the present study, the mean age of patients undergoing thyroid surgery was approximately 43 years, with the majority of patients belonging to the middle-age group. Female predominance was observed, with females comprising approximately three-fourths of the study population. The predominance of thyroid disease among females has been consistently reported in Indian epidemiological studies. Unnikrishnan and Menon highlighted that thyroid disorders are common among Indian women, with a significant burden of hypothyroidism and nodular thyroid disease in the adult population. The increased prevalence among women has been attributed to autoimmune susceptibility, hormonal influences, and genetic factors (3). Similar female predominance has been reported in Indian surgical series of thyroid disorders. Agarwal et al. documented a higher proportion of female patients undergoing thyroid surgery in Indian endocrine surgical practice, reflecting the higher incidence of thyroid nodular disease among women (8). The demographic similarity between the total thyroidectomy and partial thyroidectomy groups in the present study suggests that differences observed in postoperative outcomes are more likely related to the extent of surgery rather than baseline patient characteristics.

In this study, multinodular goiter was the most common indication for thyroid surgery, followed by solitary thyroid nodules, Graves' disease, and thyroid malignancy. This pattern reflects the common indications encountered in Indian surgical practice. Multinodular goiter remains one of the major causes of thyroid surgery in India despite improvements in iodine nutrition. Iodine deficiency, geographic variation, dietary factors, and delayed presentation contribute to the persistence of nodular thyroid disease in many parts of the country (3). Total thyroidectomy was more commonly performed in patients with malignant thyroid disease and bilateral thyroid involvement. This approach is consistent with current recommendations for differentiated thyroid carcinoma, where complete removal of thyroid tissue facilitates radioactive iodine therapy and postoperative surveillance using serum thyroglobulin levels (5). In contrast, partial thyroidectomy was commonly performed for unilateral benign thyroid lesions. The advantage of partial thyroidectomy includes preservation of functioning thyroid tissue and reduction in the requirement for lifelong thyroid hormone replacement; however, the possibility of recurrence in the remaining thyroid tissue remains a limitation (9).

In the present study, total thyroidectomy required significantly longer operative time compared with partial thyroidectomy. The longer duration was attributed to bilateral gland dissection, identification of both recurrent laryngeal nerves, and careful preservation of parathyroid glands. Similar findings have been reported in endocrine surgery literature. Delbridge emphasized that total thyroidectomy requires meticulous anatomical dissection because of the close relationship between the thyroid gland, recurrent laryngeal nerves, and parathyroid glands (10). Indian studies have demonstrated that operative outcomes improve significantly with increasing surgeon experience and performance in high-volume centers. Agarwal et al. reported that thyroid surgery performed by experienced endocrine surgeons is associated with low rates of permanent complications despite the increasing use of total thyroidectomy (11). The present study also demonstrated slightly higher blood loss in total thyroidectomy compared with partial thyroidectomy. This finding may be explained by the larger operative field and more extensive vascular dissection required during complete gland removal.

Hypocalcemia remains the most frequent complication following thyroid surgery, particularly after total thyroidectomy. In the present study, temporary hypocalcemia occurred more commonly after total thyroidectomy compared with partial thyroidectomy. The increased incidence of hypocalcemia after total thyroidectomy is explained by the greater risk of temporary parathyroid dysfunction due to manipulation, traction, thermal injury, or compromised vascular supply of the parathyroid glands. Even when the glands are identified and preserved anatomically, transient ischemia may result in

reduced parathyroid hormone secretion during the early postoperative period. Agarwal and colleagues reported that postoperative hypocalcemia remains one of the most important concerns after total thyroidectomy in Indian patients, although most cases are transient and resolve with calcium supplementation (11). Similarly, Bergenfelz et al. demonstrated that total thyroidectomy carries a higher risk of postoperative hypocalcemia compared with less extensive thyroid resections, although permanent hypoparathyroidism remains uncommon in experienced hands (12). In the present study, permanent hypocalcemia was rare. This supports the concept that careful identification and preservation of parathyroid glands can minimize long-term complications.

Recurrent laryngeal nerve injury is one of the most feared complications of thyroid surgery because it can significantly affect voice quality and, in bilateral cases, airway safety. In this study, temporary recurrent laryngeal nerve palsy occurred slightly more frequently after total thyroidectomy, while permanent injury was rare. The difference between procedures was not statistically significant. The incidence of RLN injury varies widely depending on surgical expertise, disease pathology, reoperative surgery, and methods used for nerve identification. Randolph emphasized that routine identification of the recurrent laryngeal nerve is a key component of safe thyroid surgery (6). Indian endocrine surgical literature has also demonstrated low rates of permanent RLN injury when surgery is performed by experienced surgeons using meticulous anatomical techniques (11). The use of intraoperative nerve monitoring has gained popularity in recent years; however, it should be considered an adjunct to, rather than a replacement for, anatomical knowledge and careful dissection (7).

Postoperative neck hematoma is an uncommon but potentially life-threatening complication following thyroid surgery. In the present study, postoperative hemorrhage occurred rarely in both groups. The incidence of postoperative hematoma reported in thyroid surgery ranges from approximately 0.5% to 4%. Early recognition and immediate intervention are essential because expanding neck hematoma can rapidly compromise the airway (13). Other complications such as seroma formation, wound infection, and wound dehiscence were uncommon in both groups. Advances in surgical technique, antibiotic prophylaxis, and perioperative care have contributed to the reduction of these complications.

The present study showed a longer hospital stay following total thyroidectomy compared with partial thyroidectomy. The increased duration was mainly related to monitoring for hypocalcemia, calcium supplementation, and management of drains. Several studies have suggested that although total thyroidectomy may increase short-term postoperative monitoring requirements, improved perioperative protocols and early detection of complications allow safe reduction in hospital stay. In Indian healthcare settings, hospital stay may also be influenced by socioeconomic factors, distance from healthcare facilities, availability of follow-up services, and institutional protocols.

The choice between total and partial thyroidectomy should be individualized. Total thyroidectomy provides excellent disease control and is preferred for malignant disease, Graves' disease, and bilateral symptomatic thyroid disorders. However, the increased risk of temporary hypocalcemia must be considered. Partial thyroidectomy remains appropriate for selected unilateral benign thyroid conditions. It offers the advantage of preserving thyroid function and potentially reducing postoperative complications, but recurrence of disease in the remaining thyroid tissue remains a concern. The decision should therefore be based on disease pathology, risk of recurrence, patient preference, and surgeon expertise rather than a single universal approach.

CONCLUSION

Both total thyroidectomy and partial thyroidectomy are safe surgical procedures when performed with appropriate indications and careful technique. Total thyroidectomy offers superior definitive disease management at the cost of a slightly increased risk of transient complications, whereas partial thyroidectomy provides lower immediate morbidity but may carry a higher risk of long-term recurrence in selected patients. The final choice of procedure should be guided by disease characteristics, patient preference, and the surgeon's clinical judgment.

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