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Original Research Article

Total Thyroidectomy versus Hemithyroidectomy: A Comparative Study of Complications and Surgical Outcomes

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Abstract

Introduction: Thyroidectomy is a commonly performed surgical procedure for the management of benign and malignant thyroid disorders. The two principal approaches, total thyroidectomy and hemithyroidectomy, differ in extent of resection and are associated with varying complication profiles. Understanding these differences is essential for optimal surgical decision-making. The study aimed to compare the complication rates between total thyroidectomy and hemithyroidectomy and to evaluate associated operative and postoperative outcomes.

Materials and Methods: This hospital-based comparative observational study was conducted in the Department of ENT and Head and Neck Surgery at Deccan College of Medical Sciences, Hyderabad, from January 2025 to December 2025. A total of 50 patients undergoing thyroid surgery were included and divided into two groups: total thyroidectomy (n=25) and hemithyroidectomy (n=25). Demographic and clinical variables were recorded. Postoperative complications including hypocalcaemia, recurrent laryngeal nerve injury, haemorrhage, and wound infection were assessed. Statistical analysis was performed using SPSS version 26.0, with $p<0.05$ considered significant.

Results: The overall complication rate was significantly higher in the total thyroidectomy group (44.0%) compared to the hemithyroidectomy group (20.0%) ($p=0.04$). Transient hypocalcaemia was significantly more frequent following total thyroidectomy (32.0% vs. 4.0%, $p=0.01$). No significant differences were observed in permanent hypocalcaemia, recurrent laryngeal nerve injury, hemorrhage, or wound infection. The mean duration of surgery and hospital stay were significantly higher in the total thyroidectomy group ($p<0.001$).

Conclusion: Total thyroidectomy is associated with a higher complication rate, particularly hypocalcaemia, along with increased operative time and hospital stay compared to hemithyroidectomy. Careful patient selection and surgical planning are essential to balance treatment efficacy and safety.

Keywords: Thyroidectomy, Hemithyroidectomy, Hypocalcaemia, Recurrent laryngeal nerve injury, Postoperative complications.

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Introduction

Thyroidectomy is one of the most commonly performed surgical procedures in the field of head and neck surgery, indicated for a wide range of benign and malignant thyroid disorders [1]. The two principal surgical approaches include total thyroidectomy and hemithyroidectomy, with the choice of procedure largely dependent on the underlying pathology, extent of disease, and surgeon preference [2]. While total thyroidectomy is often preferred in cases of malignancy and bilateral disease, hemithyroidectomy is typically performed for unilateral benign lesions [3]. Over the years, advances in surgical techniques and perioperative care have significantly improved patient outcomes; however, postoperative complications remain an important concern [4]. Despite its effectiveness, thyroid surgery is associated with several potential complications, most notably hypocalcaemia and recurrent laryngeal nerve (RLN) injury [5]. Hypocalcaemia,

resulting from inadvertent injury or devascularization of the parathyroid glands, is particularly common following total thyroidectomy [6]. Similarly, injury to the RLN can lead to hoarseness of voice and, in severe cases, airway compromise [7]. Other complications such as postoperative haemorrhage and wound infection, although less frequent, can contribute to morbidity and prolonged hospital stay [8]. The incidence of these complications varies widely across studies, depending on factors such as surgical expertise, extent of resection, and patient-related variables [9].

A key consideration in thyroid surgery is balancing adequate disease management with minimization of complications [9]. While total thyroidectomy offers the advantage of complete disease removal and reduces the risk of recurrence in malignant conditions, it is often associated with a higher complication rate compared to hemithyroidectomy [10]. On the other hand, hemithyroidectomy is associated with a lower risk of complications but may not be sufficient in certain clinical scenarios [11]. Therefore, a clear understanding of the comparative safety profiles of these two procedures is essential for optimal surgical decision-making.

Given these considerations, the present study was undertaken to compare the complication rates between total thyroidectomy and hemithyroidectomy in patients undergoing thyroid surgery at a tertiary care centre. The study aimed to evaluate and compare the incidence of postoperative complications, including hypocalcaemia, recurrent laryngeal nerve injury, haemorrhage, and wound infection, as well as operative duration and hospital stay between the two surgical approaches.

Materials and Methods

This hospital-based comparative observational study was conducted in the Department of ENT and Head and Neck Surgery at Deccan College of Medical Sciences over a period of one year, from January 2025 to December 2025. A total of 50 patients undergoing thyroid surgery during the study period were included and categorized into two groups based on the surgical procedure performed: total thyroidectomy (n = 25) and hemithyroidectomy (n = 25). Adult patients with thyroid disorders, both benign and malignant, were included in the study. Patients with previous thyroid surgery, recurrent disease, incomplete clinical data, or those lost to follow-up were excluded.

All patients underwent thorough preoperative evaluation including detailed history, physical examination, thyroid function tests, and ultrasonography of the neck. Fine-needle aspiration cytology (FNAC) was performed in all cases to establish diagnosis and guide management. Baseline variables such as age, gender, body mass index (BMI), and indication for surgery were recorded. The choice of surgical procedure was based on clinical findings, cytological diagnosis, and surgeon discretion. All surgeries were performed under general anesthesia by experienced surgeons following standard operative techniques.

Intraoperative parameters, including duration of surgery, were documented. Postoperatively, patients were closely monitored for complications such as hypocalcaemia (transient and permanent), recurrent laryngeal nerve injury, postoperative haemorrhage, and wound infection. Serum calcium levels were assessed in the immediate postoperative period to detect hypocalcaemia. Transient hypocalcaemia was defined as hypocalcaemia resolving within six months, while permanent hypocalcaemia persisted beyond six months. Vocal cord function was evaluated clinically and confirmed with laryngoscopic examination when indicated.

Patients were followed up during their hospital stay and subsequent outpatient visits to assess postoperative outcomes. Duration of hospital stay was recorded in days. Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics for Windows, Version 26.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The independent t-test was used to compare continuous variables, and the Chi-square test or Fisher's exact test was applied for categorical variables. A p-value of <0.05 was considered statistically significant.

Results

The baseline characteristics of the study participants were comparable between the two groups. The mean age in the total thyroidectomy group was 44.8 ± 11.2 years, while in the hemithyroidectomy group it was 42.6 ± 10.5 years, with no statistically significant difference ($p = 0.48$). Gender distribution was also similar, with males comprising 24.0% and 28.0% in the total and hemithyroidectomy groups, respectively ($p = 0.75$).

The mean BMI was 25.9 ± 3.8 kg/m² in the total thyroidectomy group and 24.8 ± 3.5 kg/m² in the hemithyroidectomy group, showing no significant difference ($p = 0.29$). However, a statistically significant difference was observed in the indication for surgery, with malignant cases being more common in the total thyroidectomy group (52.0%) compared to the hemithyroidectomy group (28.0%) ($p = 0.04$) (Table 1).

Table 1: Baseline Characteristics of Study Participants

Variable		Total Thyroidectomy (n=25)	Hemithyroidectomy (n=25)	p-value
Age (years)	Mean ± SD	44.8 ± 11.2	42.6 ± 10.5	0.48
Gender	Male	6 (24.0%)	7 (28.0%)	0.75
	Female	19 (76.0%)	18 (72.0%)	
BMI (kg/m²)	Mean ± SD	25.9 ± 3.8	24.8 ± 3.5	0.29
Indication	Benign	12 (48.0%)	18 (72.0%)	0.04
	Malignant	13 (52.0%)	7 (28.0%)	

The overall rate of postoperative complications was significantly higher in patients undergoing total thyroidectomy compared to hemithyroidectomy. Complications were observed in 44.0% of patients in the total thyroidectomy group, whereas only 20.0% of patients in the hemithyroidectomy group experienced complications. This difference was statistically significant ($p = 0.04$), indicating a higher complication burden associated with total thyroidectomy (Table 2).

Table 2: Overall Postoperative Complications

Postoperative Complications	Total Thyroidectomy (n=25)	Hemithyroidectomy (n=25)	p-value
Present	11 (44.0%)	5 (20.0%)	0.04
Absent	14 (56.0%)	20 (80.0%)	

Analysis of specific postoperative complications revealed that transient hypocalcaemia was significantly more frequent in the total thyroidectomy group (32.0%) compared to the hemithyroidectomy group (4.0%) ($p = 0.01$).
Although permanent hypocalcaemia was observed only in the total thyroidectomy group (8.0%), this difference was not statistically significant ($p = 0.15$). The incidence of recurrent laryngeal nerve injury was comparable between the two groups (8.0% vs. 4.0%, $p = 0.55$).

Similarly, no significant differences were noted in the rates of postoperative haemorrhage and wound infection, both of which were equal between the groups ($p = 1.00$) (Table 3).

Table 3: Specific Postoperative Complications

Complication	Total Thyroidectomy (n=25)	Hemithyroidectomy (n=25)	p-value
Transient hypocalcaemia	8 (32.0%)	1 (4.0%)	0.01
Permanent hypocalcaemia	2 (8.0%)	0 (0.0%)	0.15
Recurrent laryngeal nerve injury	2 (8.0%)	1 (4.0%)	0.55
Postoperative haemorrhage	1 (4.0%)	1 (4.0%)	1.00
Wound infection	2 (8.0%)	2 (8.0%)	1.00

Operative and postoperative parameters showed significant differences between the two groups. The mean duration of surgery was significantly longer in the total thyroidectomy group (112.5 ± 18.6 minutes) compared to the hemithyroidectomy group (78.4 ± 15.2 minutes) ($p < 0.001$). Likewise, the duration of hospital stay was significantly higher in the total thyroidectomy group (4.6 ± 1.2 days) compared to the hemithyroidectomy group (3.2 ± 0.9 days) ($p < 0.001$), indicating increased resource utilization and recovery time associated with total thyroidectomy (Table 4).

Table 4: Operative and Postoperative Parameters

Variable	Total Thyroidectomy (n=25)	Hemithyroidectomy (n=25)	p-value
Duration of surgery (minutes)	112.5 ± 18.6	78.4 ± 15.2	<0.001
Duration of hospital stay (days)	4.6 ± 1.2	3.2 ± 0.9	<0.001

Discussion

The present study demonstrated that total thyroidectomy is associated with a significantly higher overall complication rate compared to hemithyroidectomy. This finding is consistent with existing literature, which suggests that more extensive surgical procedures inherently carry a greater risk of postoperative morbidity. A recent study reported that total thyroidectomy is generally associated with a higher risk of early complications compared to less extensive procedures, primarily due to greater tissue dissection and increased risk of injury to surrounding structures [8].

Similarly, pooled analyses have shown that the overall complication rate following thyroidectomy can be as high as 26.6%, with increased rates observed in more extensive surgeries [12]. The higher complication rate observed in the present study (44% in total thyroidectomy vs. 20% in hemithyroidectomy) is therefore in agreement with

the trend reported in previous studies. In the present study, transient hypocalcaemia was the most common complication and was significantly higher in the total thyroidectomy group. This aligns with multiple studies identifying hypocalcaemia as the most frequent complication following thyroid surgery, particularly after total thyroidectomy due to inadvertent damage or devascularization of the parathyroid glands [1,13]. Reported incidence rates of transient hypocalcaemia vary widely, ranging from 1.2% to 40%, and can be even higher in some series [14]. Other studies have reported rates as high as 20–30% following total thyroidectomy [15]. The significantly higher rate observed in the total thyroidectomy group in the present study is therefore consistent with the established understanding that the extent of surgery is a major determinant of postoperative hypocalcaemia

Recurrent laryngeal nerve (RLN) injury is another critical complication evaluated in this study. Although a higher incidence was observed in the total thyroidectomy group, the difference was not statistically significant. This finding is comparable to previous studies reporting relatively low and comparable rates of RLN injury across different types of thyroidectomy when performed by experienced surgeons. Literature suggests that the incidence of RLN injury ranges from 0.2% to 7%, with permanent injury rates typically below 3% [16,17]. Additionally, some studies have reported no significant difference in RLN injury rates between total and less extensive thyroid procedures, supporting the findings of the present study [18]. This indicates that surgical expertise and meticulous dissection may play a more important role than the extent of surgery in determining RLN injury.

Other complications such as postoperative haemorrhage and wound infection were comparable between the two groups in the present study, with no statistically significant difference. This is in agreement with published data indicating that these complications are relatively infrequent and not strongly influenced by the extent of thyroid resection. The reported incidence of postoperative hematoma ranges between 0.7% and 4.7%, while wound infection remains uncommon due to the clean nature of thyroid surgery [19]. Furthermore, the present study demonstrated significantly longer operative duration and hospital stay in the total thyroidectomy group, which is expected given the increased complexity and extent of the procedure. Similar observations have been reported in previous studies, highlighting increased operative time and resource utilization associated with total thyroidectomy. Overall, the findings of the present study corroborate existing literature, emphasizing that while total thyroidectomy offers definitive management, it is associated with a higher risk of certain complications compared to hemithyroidectomy.

Conclusion

The present study demonstrates that total thyroidectomy is associated with a significantly higher rate of postoperative complications compared to hemithyroidectomy, particularly with respect to transient hypocalcaemia, along with longer operative duration and hospital stay. While rates of recurrent laryngeal nerve injury, postoperative hemorrhage, and wound infection were comparable between the two procedures, the overall complication burden remains greater with total thyroidectomy. These findings highlight the importance of careful patient selection and surgical planning, balancing the need for complete disease management against the risk of complications, to optimize clinical outcomes in patients undergoing thyroid surgery.

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