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Original Research Article

Evaluation of Post Operative Complications in Thyroid Surgeries, a Single Centre Experience

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Abstract

Introduction: Thyroid disorders, particularly multinodular goitre and thyroid malignancies, are common indications for surgical intervention. Thyroidectomy, while generally safe, is associated with a range of postoperative complications, including hypothyroidism, hypocalcemia, and voice changes. Understanding the incidence and spectrum of these complications is essential for optimizing patient care and surgical outcomes.

Aims: To evaluate the demographic profile, clinical characteristics, surgical procedures, histopathological patterns, and postoperative complications in patients undergoing thyroidectomy at a tertiary care centre.

Materials and Methods: The present study was a retrospective observational (cohort) study conducted over a period of 12 months (January 2023 to December 2023) at the Department of General Surgery, Al-azhar Medical College and Super Speciality Hospital, Ezhalloor, Thodupuzha, Idukki District, Kerala, India. The study population comprised 150 patients who underwent thyroidectomy during the study period.

Result: The mean age was 51.05 ± 9.36 years, with most patients (61.3%) aged 41–60 years. The cohort was predominantly female (93.3%). Multinodular goitre (65.3%) was the most common diagnosis, followed by papillary carcinoma (5.3%). Total thyroidectomy was the most frequent procedure (72%). Histopathology showed benign nodular goitre in 83.3% and malignancies in 13.3%, mostly papillary carcinoma. Postoperative complications included hypothyroidism (39.3%), hypocalcemia (17.3%), hyperthyroidism (9.3%), vocal cord palsy (2.0%), and minor surgical site issues (≤3.3%), while 7.3% had no complications.

Conclusion: Thyroidectomy is a safe and effective surgical intervention for thyroid disorders. Hypothyroidism and hypocalcemia were the most common postoperative complications, whereas serious events such as hematoma, infection, and nerve injury were rare. Careful surgical technique and perioperative management remain crucial to minimizing complications.

Keywords: Thyroidectomy, Multinodular Goitre, Postoperative Complications, Hypothyroidism, Hypocalcemia.

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Introduction

Thyroidectomy stands as one of the most frequently performed procedures in endocrine surgery, primarily indicated for benign nodular disease, hyperthyroidism, and thyroid malignancies.[1,2]

The evolution of this surgery, pioneered by figures like Theodor Kocher, Theodor Billroth, and William S. Halstead, is a remarkable narrative of medical progress. [3,4,5] From the harrowing mortality rates of 40% in the 1800s, primarily due to sepsis and hemorrhage, modern refinements in technique, sterile practice, and anaesthesia have rendered thyroidectomy a safe procedure with exceptionally low mortality.[6]

However, this safety profile should not be conflated with an absence of risk. Post-operative complications remain a matter of profound clinical concern, as they can significantly impede recovery,

diminish quality of life, and lead to long-term functional and biochemical sequelae [7, 8, 9]

The spectrum of these complications is broad, varying from transient, self-limiting conditions to potentially life-threatening emergencies. The contemporary surgeon must navigate a landscape of potential adverse outcomes, often conceptualized as a "triangle" of major complications:

1. Haemorrhage,

2. Recurrent laryngeal nerve (RLN) injury

3. Hypoparathyroidism

[10] Haemorrhage, though occurring in less than 1% of cases, can lead to a rapidly expanding haematoma causing acute airway obstruction and asphyxia.[11] Injury to the RLN or the external branch of the superior laryngeal nerve (EBSLN) can result in vocal cord paralysis, manifesting as hoarseness, loss of vocal projection, or in bilateral cases, severe respiratory distress requiring emergency intervention. Similarly, hypoparathyroidism, leading to hypocalcaemia, ranges from a transient biochemical abnormality to a permanent condition requiring lifelong calcium and vitamin D supplementation.

Beyond this critical triangle, the complication profile includes other significant issues such as wound infection, seroma formation, permanent hypothyroidism—an expected outcome after total thyroidectomy—and the rare but perilous thyrotoxic storm. The incidence and severity of these complications are not random but are influenced by a confluence of critical factors. These include the extent of surgery, with total thyroidectomy and procedures involving lymph node dissection carrying a higher risk; the underlying pathology, as malignancy and Graves' disease pose greater challenges; patient-specific comorbidities such as age and cardiovascular status; and, perhaps most critically, the surgeon's expertise and experience. Given that complication rates continue to vary across regions and institutions, continuous local audit and evaluation are paramount. It is with this understanding that the present study was undertaken: to assess the incidence and pattern of post-thyroidectomy complications within a specific patient cohort at a tertiary care institution.[12] By systematically identifying the most common post-operative challenges, the aim is to critically evaluate and refine local management protocols, surgical techniques, and preventive strategies, ultimately contributing to the overarching goal of enhancing patient safety and improving long-term surgical outcomes.

Aims of the study: is to identify the most common post-thyroidectomy complication in our patient cohort to improve management protocols.

Materials and Methods

Type of study: A retrospective observational (cohort) study.

Place of study: Department of General Surgery, Al-Azhar Medical College and Super Speciality Hospital, Ezhalloor, Thodupuzha, Idukki District, Kerala, India.

Study Duration: A period of 12 months (e.g., January 2023 to December 2023).

Sample Size: 150 patients who underwent thyroidectomy during the study period.

Inclusion Criteria

1. All adult patients (aged 18 years and above) of both sexes.
2. Patients who underwent any type of thyroidectomy (hemithyroidectomy, total thyroidectomy, near-total thyroidectomy) for benign or malignant disease.
3. Patients with complete medical records and follow-up data for at least 30 days post-operatively.

Exclusion Criteria

1. Patients undergoing concurrent major head and neck procedures (e.g., parathyroidectomy, laryngectomy).
2. Patients with a history of previous neck surgery.
3. Patients with pre-existing vocal cord palsy or hypocalcemia documented before surgery.
4. Patients with incomplete medical records or lost to follow-up.

Study Parameter

1. Patient demographics (age, sex, comorbidities).
2. Type of thyroid disease (benign vs. malignant, Graves' disease).
3. Extent of surgery (lobectomy vs. total thyroidectomy vs. with neck dissection).
4. Surgeon's experience and operative time.
5. To track the rates of hypocalcemia, RLN injury, hemorrhage, infection, thyrotoxic storm, and permanent hypothyroidism following thyroidectomy.

Methodology

After obtaining ethical clearance, patient data will be collected from hospital records, operation theatre registers, and discharge summaries using a standardized proforma. All patients will be monitored during their hospital stay and at scheduled follow-up visits for 30 days to identify and record any complications. Data will be entered into a spread sheet and analyzed using appropriate statistical software to determine incidence rates and correlations.

Statistical Analysis: Data were entered into Excel and analyzed using SPSS and Graph Pad 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 ≤ 0.05 were considered statistically significant.

Results

Table 1: Demographic Characteristics of the Study Population (n=150)

Characteristic	Category	Frequency	Percent
Age (Years)	< 40	17	11.30%
	41 - 50	55	36.70%
	51 - 60	53	35.30%
	61 - 70	23	15.30%
	> 71	2	1.30%
	Total	150	100.00%
	Mean ± SD	51.05 ± 9.36	
Sex	Female	140	93.30%
	Male	10	6.70%
	Total	150	100.00%

Table 2: Distribution of Diagnosis

Diagnosis	Frequency	Percent
Ectopic Thyroid	1	0.7
Follicular Neoplasm Of Thyroid	1	0.7
Left Solitary Nodulal Goitre	1	0.7
Left Solitary Thyroid Nodule	2	1.3
MNG	30	20
Multinodular Goitre	98	65.3
Multinodular Goitre With Right Lobe Agenesis And Retrosternal Extension	1	0.7
Multinodular Goitre With Thyroglossal Cyst	2	1.3
Non Toxic Recurrent Multinodular Involving Right Lobe & Isthmus	1	0.7
Papillary Carcinoma Thyroid	8	5.3
Recurrent Thyroid Swelling of Both Sides	1	0.7
Right Solitary Nodular Thyroid	2	1.3
Thyroglossal Cyst	1	0.7
Toxic Nodular Goitre	1	0.7
Total	150	100

Table 3: Distribution of Procedure

Procedure	Frequency	Percent
Left Hemi Thyroidectomy Under General Anesthesia	2	1.3
Near Total Thyroidectomy	1	0.7
Near Total Thyroidectomy Under GA	1	0.7
Near Total Thyroidectomy Under General Anesthesia	1	0.7
Right Hemi thyroidectomy Under General Anesthesia	5	3.3
Subtotal Thyroidectomy Under General Anesthesia	2	1.3
Thyroglossal Cyst Excision Under General Anesthesia	1	0.7
Total Thyroidectomy	2	1.3
Total Thyroidectomy & Cystrunk Operation Under GA	1	0.7
Total Thyroidectomy Under General Anesthesia	108	72
Total Thyroidectomy With Central Node Dissection Under GA	1	0.7
Total Thyroidectomy With Cystrunk Operation Under General Anesthesia	1	0.7
TT	22	14.7
TT With Central Neck Node Dissection Under GA	1	0.7
TT with central, level 3 and 4 neck node dissection under GA	1	0.7
Total	150	100

Table 4: Distribution of HPE Findings

HPE Findings	Frequency	Percent
Follicular Adenoma	1	0.7
Follicular Carcinoma	1	0.7
Follicular Tumour of Malignant Potential	1	0.7
Lymphocytic Thyroiditis	3	2
Medullary Carcinoma	1	0.7
NIFTP	1	0.7
Nodular Goitre	125	83.3
Oncocytic Carcinoma	2	1.3
Other Malignancy	1	0.7
Papillary Carcinoma	13	8.7
Thyroglossal Cyst	1	0.7
Total	150	100

Table 5: Distribution of Complication

Complication	Frequency	Percent
Chest Pain, Hypothyroidism	1	0.7
Cough, Surgical Site Infection, Seroma	1	0.7
DVT	1	0.7
DVT, Vocal Cord Palsy, Hypothyroidism	1	0.7
Dysphagia, Hypothyroidism	1	0.7
Headache, Anemia	1	0.7
Headache, Hypothyroidism, Vocal Cord Palsy	1	0.7
Headache, Pain, Cough	1	0.7
Hematoma	1	0.7
Hypertension, Hypothyroidism	1	0.7
Hypertension, Hypothyroidism, Pain, Headache, Dysphagia	1	0.7
Hypertension, Pain, Hypothyroidism	1	0.7
Hyperthyroidism	6	4
Hyperthyroidism, Hypocalcemia	1	0.7
Hyperthyroidism, Pain	1	0.7
Hyperthyroidism, Palpitation, Sleepiness	1	0.7
Hyperthyroidism, Twitching	2	1.3
Hypocalcemia	6	4
Hypocalcemia, Fever, Cough	1	0.7
Hypocalcemia, Hyperthyroidism	1	0.7
Hypocalcemia, Hypoparathyroidism	1	0.7
Hypocalcemia, Hypothyroidism	15	10
Hypocalcemia, Hypothyroidism, Voice Changes, Facial Edema	1	0.7
Hypocalcemic Tetany	1	0.7
Hypothyroidism	59	39.3
Hypothyroidism, Cough	1	0.7
Hypothyroidism, Hyperthyroidism	4	2.7
Hypothyroidism, Hypocalcemia	4	2.7
Hypothyroidism, Pain	1	0.7
Hypothyroidism, Pain, Headache, Hypocalcemia	1	0.7
Hypothyroidism, Vitamin D Deficiency	1	0.7
Hypothyroidism, Voice Changes, Breathing Difficulty	1	0.7
Keloid/Scar	4	2.7
Keloid/Scar, Pain, Cough, Hypothyroidism	1	0.7
Lost to Follow-up	1	0.7
LRTI	1	0.7
No Complications	11	7.3
Numbness	1	0.7
Pain	1	0.7
Pain, Cough, LRTI	1	0.7
Pain, Hypocalcemia, Cough, Voice Changes	1	0.7

Surgical Site Infection	1	0.7
Surgical Site Infection, Hypothyroidism	1	0.7
Vocal Cord Palsy	1	0.7
Vocal Cord Palsy, Hypothyroidism	1	0.7
Voice Changes	2	1.3
Voice Changes, Hypothyroidism	1	0.7
Total	150	100

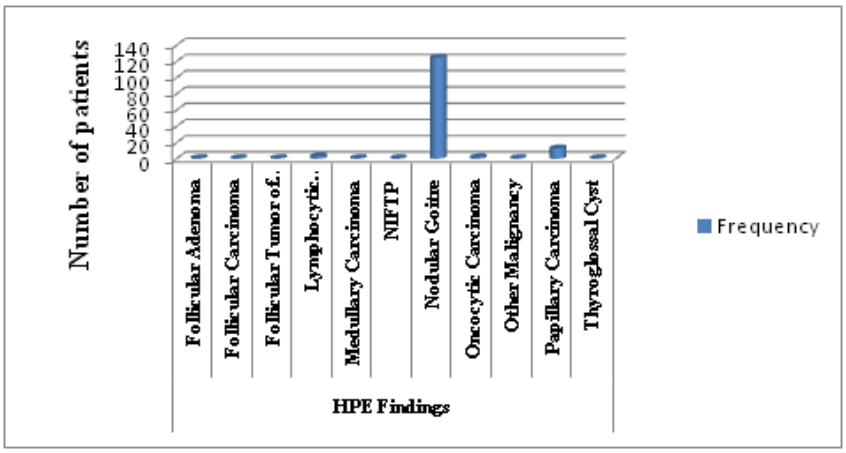

Figure 1: Distribution of HPE Findings

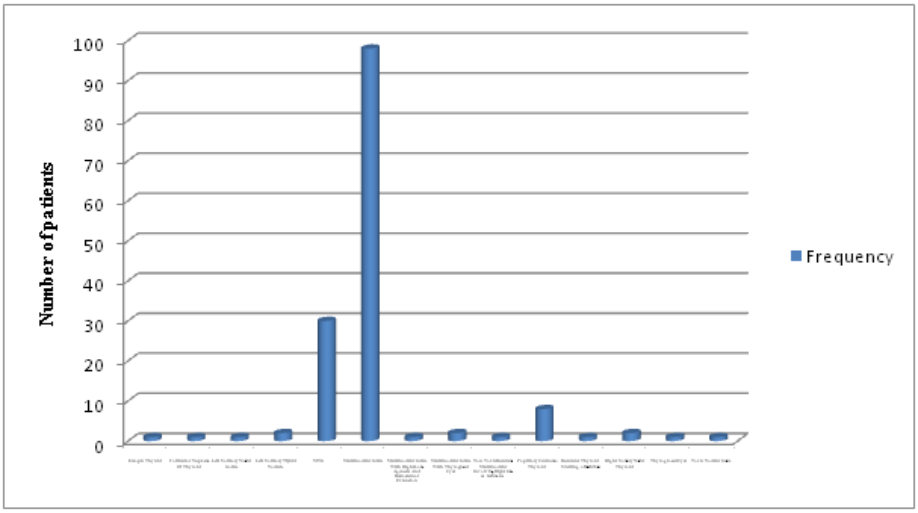

Figure 2: Distribution of Diagnosis

The mean age of participants was 51.05 ± 9.36 years. The majority were aged 41–60 years (92/150; 61.3%), with 41–50 years accounting for 36.7% and 51–60 years accounting for 35.3%. Participants below 40 years were 11.3%, 61–70 years were 15.3%, and those above 71 years were the least at 1.3%. The study population was predominantly female (140/150; 93.3%), with males representing only 6.7% (10/150).

The most common diagnosis in the study population was multinodular goitre (MNG), observed in 98 cases (65.3%), with an additional 30 cases (20.0%) classified as MNG without further specification. Papillary carcinoma of the thyroid was seen in 8 patients (5.3%), representing a smaller but clinically significant proportion. Other diagnoses were rare, each accounting for 0.7–1.3% of cases, and included ectopic thyroid (1 case, 0.7%), follicular neoplasm of thyroid (1 case, 0.7%), left solitary nodular goitre (1 case, 0.7%), left solitary thyroid nodule (2 cases, 1.3%), multinodular goitre with right lobe agenesis and retrosternal extension (1 case, 0.7%), multinodular goitre with thyroglossal cyst (2 cases, 1.3%), non-toxic recurrent multinodular involving right lobe and isthmus (1 case, 0.7%), recurrent thyroid swelling of both sides (1 case, 0.7%), right solitary nodular thyroid (2 cases, 1.3%), thyroglossal cyst (1 case, 0.7%), and toxic nodular goitre (1 case, 0.7%).

Among the 150 patients, the most commonly performed procedure was total thyroidectomy under general anesthesia, carried out in 108 cases (72.0%). TT (abbreviated total thyroidectomy) was performed in 22 cases (14.7%). Less frequently

performed procedures included right hemithyroidectomy under general anesthesia in 5 patients (3.3%), left hemithyroidectomy under general anesthesia in 2 patients (1.3%), subtotal thyroidectomy under general anesthesia in 2 patients (1.3%), and total thyroidectomy without further specification in 2 cases (1.3%). Rare procedures (each 0.7–0.7%) included near total thyroidectomy (1 case, 0.7%), near total thyroidectomy under GA (1 case, 0.7%), thyroglossal cyst excision under GA (1 case, 0.7%), total thyroidectomy with Sistrunk operation under GA (1 case, 0.7%), total thyroidectomy with central node dissection under GA (1 case, 0.7%), total thyroidectomy with Sistrunk operation under GA (1 case, 0.7%), TT with central neck node dissection under GA (1 case, 0.7%), and TT with central, level 3 and 4 neck node dissection under GA (1 case, 0.7%).

The histopathological examination of 150 thyroid specimens showed that the overwhelming majority were Nodular Goitre (125 cases, 83.3%), indicating that benign nodular thyroid disease predominates in this cohort. Malignant or potentially malignant lesions accounted for 20 cases (13.3%), with Papillary Carcinoma being the most frequent malignancy (13 cases, 8.7%), followed by Oncocytic Carcinoma (2 cases, 1.3%), and single cases (0.7% each) of Follicular Carcinoma, Follicular Tumor of Malignant Potential, Medullary Carcinoma, Other Malignancy, and NIFTP (Non-invasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features, a borderline/low-risk neoplasm). Inflammatory and cystic lesions were uncommon, comprising Lymphocytic Thyroiditis (3 cases, 2.0%) and a Thyroglossal Cyst (1 case, 0.7%).

Post-operative complications following thyroid surgery were predominantly hypothyroidism, observed either alone (59 cases, 39.3%) or in combination with hypocalcemia, pain, voice changes, or hyperthyroidism. Hypocalcemia occurred in 26 cases (17.3%), either alone (6 cases, 4.0%) or with other associated conditions such as hypothyroidism, hyperthyroidism, hypoparathyroidism, or tetany. Hyperthyroidism was noted in 14 cases (9.3%), alone or with symptoms like pain, palpitations, sleepiness, or hypocalcemia. Voice and nerve-related complications included vocal cord palsy (3 cases, 2.0%) and voice changes (3 cases, 2.0%), occasionally associated with hypothyroidism. Surgical site and wound-related issues included keloid/scar formation (5 cases, 3.3%), surgical site infections (2 cases, 1.3%), and hematoma (1 case, 0.7%). Other minor complications such as chest pain, cough, dysphagia, headache, pain, anemia, fever, LRTI, DVT, and lost-to-follow-up were rare (0.7% each). A total of 11 patients (7.3%) experienced no post-operative complications.

Discussion

The present study was a retrospective observational (cohort) study conducted over a period of 12 months (January 2023 to December 2023) at the Department of General Surgery, Al-azhar Medical College and Super Speciality Hospital, Ezhalloor, Thodupuzha, Idukki District, Kerala, India. The study population comprised 150 patients who underwent thyroidectomy during the study period.

In our study comprising 150 patients who underwent thyroid surgery, the mean age was 51.05 ± 9.36 years, with most participants (61.3%) between 41–60 years of age. This age distribution corresponds with findings from Berhanu et al. (2024) [6] and Daba et al. (2023) [11], who also reported that thyroid disorders predominantly affect middle-aged individuals. Jin and Sugitani (2021) [1] similarly noted that the majority of thyroid surgical cases occur in patients aged 40–60 years, reflecting the increased incidence of both benign and malignant thyroid disease in this group. The present study showed a striking female predominance (93.3%), with males constituting only 6.7% of the cases. This is consistent with observations by Christou and Mathonnet (2013) [10] and Bhattacharyya and Fried (2002) [9], who reported that thyroid disorders are significantly more common among women. The higher prevalence among females has been attributed to hormonal factors and autoimmune susceptibility [1,6,9]. Multinodular goitre (MNG) was the most frequent diagnosis in our study, seen in 65.3% of cases, with an additional 20% unspecified MNG. Similar findings were documented by Berhanu et al. (2024) [6] and Wondwosen et al. (2022) [12], where multinodular goitre represented the majority of thyroidectomy indications. Historically, the refinement of thyroid surgery for goitre management was pioneered by Theodor Kocher and William Halsted, whose meticulous surgical principles significantly reduced operative morbidity and mortality [3–5].

Papillary carcinoma of the thyroid was identified in 5.3% of our patients, representing the most common malignant pathology. This aligns with global data presented by Grogan et al. (2012) [7], who observed papillary carcinoma as the predominant thyroid malignancy, followed by follicular and medullary variants. The histopathological evaluation in our study revealed that 83.3% of lesions were benign and 13.3% were malignant, comparable to the 10–15% malignancy rate reported in other surgical series [7,8,10]. Regarding the surgical procedures, total thyroidectomy was performed in the majority of cases (72%), followed by abbreviated total thyroidectomy (14.7%) and hemithyroidectomy (4.6%). This pattern mirrors findings from Daba et al. (2023) [11] and Jin and Sugitani (2021) [1], who reported that total thyroidectomy has become the preferred surgical approach for bilateral benign and

malignant thyroid disease due to its lower recurrence rates, despite a slightly higher risk of postoperative complications. Postoperative complications in our study were dominated by hypothyroidism (39.3%), either in isolation or associated with other conditions. This high incidence is expected given the large proportion of patients undergoing total thyroidectomy. Christou and Mathonnet (2013) [10] and Jin and Sugitani (2021) [1] also emphasized hypothyroidism as one of the most frequent sequelae following total thyroidectomy, necessitating long-term hormone replacement therapy. Hypocalcemia occurred in 17.3% of our cases, which is comparable to the 10–30% range reported in previous studies [9–11]. The cause is often transient, resulting from manipulation or temporary devascularization of the parathyroid glands during surgery. With meticulous identification and preservation of the parathyroids, the incidence of permanent hypocalcemia can be minimized [1,9]. Voice-related complications, such as vocal cord palsy (2.0%) and voice change (2.0%), were within acceptable limits when compared to international data. Ryu et al. (2020) [2] and Grogan et al. (2012) [7] reported rates ranging from 1% to 5% for unilateral vocal fold paralysis following thyroid surgery. Early recognition and appropriate voice therapy are vital for optimal recovery [2]. Minor complications, including wound infection (1.3%), keloid/scar formation (3.3%), and hematoma (0.7%), were infrequent in our study, consistent with findings by Herranz-González et al. (1991) [8] and Bhattacharyya and Fried (2002) [9]. The low rates in our series may be attributed to adherence to aseptic precautions and meticulous hemostasis. A total of 11 patients (7.3%) had no postoperative complications, indicating that thyroidectomy is generally safe when performed with sound surgical technique and perioperative care. Similar conclusions were drawn by Berhanu et al. (2024) [6] and Daba et al. (2023) [11], who found that most postoperative events were transient and preventable. Overall, the demographic pattern, diagnostic spectrum, and postoperative outcomes in our study closely resemble those reported in contemporary literature. The predominance of multinodular goitre, female preponderance, and middle-aged presentation remain consistent global features. Although transient hypothyroidism and hypocalcemia are the most frequent complications, the incidence of severe morbidity, such as nerve injury or hemorrhage, remains low. The continuous refinement of thyroid surgical techniques, originating from the pioneering efforts of Kocher and Halsted [3–5], coupled with modern perioperative monitoring, continues to enhance safety and outcomes in thyroid surgery [1,6,9–11]

Conclusion

In conclusion, this single-centre study evaluating postoperative complications in thyroid surgeries demonstrated that thyroid disorders predominantly affect middle-aged females, with multinodular goitre being the most common indication for surgery. Total thyroidectomy was the primary surgical procedure performed, reflecting its preference for managing both benign and malignant thyroid diseases. Histopathological evaluation confirmed that benign nodular goitre constituted the majority of thyroid lesions, while papillary carcinoma was the most frequent malignancy. The most common postoperative complication was hypothyroidism, followed by hypocalcemia and transient voice-related changes, whereas serious complications such as hematoma, surgical site infection, and recurrent laryngeal nerve palsy were infrequent. Overall, the findings indicate that thyroid surgery is a safe and effective intervention when performed with meticulous surgical technique and careful perioperative management, with most complications being transient and manageable.

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