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SURGICAL OUTCOMES AND COMPLICATIONS OF THYROIDECTOMY PROCEDURES PERFORMED AT MOSUL GENERAL HOSPITAL

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ABSTRACT

Background: Thyroidectomy is one of the most commonly performed endocrine surgical procedures worldwide and remains the definitive treatment for a variety of benign and malignant thyroid disorders. Despite advances in surgical techniques and perioperative care, postoperative complications continue to be an important concern because of their impact on patient outcomes and quality of life. **Objectives:** To evaluate the surgical outcomes and postoperative complications of thyroidectomy procedures performed at Mosul General Hospital and to identify factors associated with the occurrence of postoperative complications. **Methods:** A retrospective cross-sectional study was conducted at Mosul General Hospital, Nineveh Governorate, Iraq. The study included 131 patients who underwent thyroidectomy between July 2024 and May 2026. Data were collected from medical records, operative reports, pathology reports, and follow-up documentation. Demographic characteristics, indications for surgery, operative procedures, histopathological findings, and postoperative complications were analyzed. Statistical analysis was performed using SPSS version 27, and a P value of less than 0.05 was considered statistically significant. **Results:** The mean age of the patients was 42.8 ± 12.6 years, and females constituted 83.2% of the study population. Multinodular goiter was the most common indication for surgery (44.3%). Total thyroidectomy was the most frequently performed procedure (66.4%). Histopathological examination revealed benign lesions in 67.9% of patients and malignant lesions in 32.1%. Postoperative complications occurred in 18.3% of patients, with hypocalcemia being the most common complication (9.9%), followed by recurrent laryngeal nerve injury (3.1%). A significant association was observed between postoperative complications and both total thyroidectomy (P = 0.021) and malignant histopathological diagnosis (P = 0.037). Multivariate logistic regression analysis identified total thyroidectomy (OR = 3.87, P = 0.029) and malignant histopathology (OR = 2.54, P = 0.032) as independent predictors of postoperative complications. **Conclusions:** Thyroidectomy performed at Mosul General Hospital was associated with favorable surgical outcomes and acceptable complication rates. Hypocalcemia was the most common postoperative complication. Total thyroidectomy and malignant thyroid disease were significant predictors of postoperative complications, highlighting the importance of meticulous surgical technique and careful postoperative monitoring in high-risk patients.

KEYWORDS: Hypocalcemia, Mosul General Hospital, Postoperative complications, Surgical outcomes, Thyroid cancer, Thyroidectomy.

1-INTRODUCTION

Thyroid disorders are among the most common endocrine diseases worldwide, affecting millions of individuals and representing a significant healthcare burden. Thyroidectomy remains the definitive treatment for a variety of benign and malignant thyroid conditions, including multinodular goiter, Graves' disease, toxic nodular goiter, and thyroid carcinoma. Advances in surgical techniques, anesthesia, and perioperative care have improved the safety and effectiveness of thyroid surgery, resulting in favorable outcomes for most patients. However, postoperative complications continue to be an important concern because of their potential

impact on patient morbidity, quality of life, and healthcare costs.[1-2]

Thyroidectomy may involve lobectomy, subtotal thyroidectomy, near-total thyroidectomy, or total thyroidectomy depending on the underlying pathology and surgical indications. Although generally considered a safe procedure, thyroid surgery carries risks related to the complex anatomy of the neck and the close relationship of the thyroid gland to the recurrent laryngeal nerves and parathyroid glands. The most commonly reported complications include hypocalcemia, recurrent laryngeal nerve injury, postoperative hemorrhage, hematoma formation, wound infection, and seroma formation.[3-4]

Among these complications, hypocalcemia remains the most frequent, particularly after total thyroidectomy due to inadvertent injury, devascularization, or removal of the parathyroid glands. Recurrent laryngeal nerve injury is another serious complication that may result in transient or permanent vocal cord dysfunction, significantly affecting speech and quality of life. Recent studies have demonstrated that the incidence of these complications is influenced by several factors, including the extent of surgery, underlying pathology, surgeon experience, and patient-related characteristics.[5-7]

Several contemporary studies have reported overall complication rates ranging from 5% to 15%, with higher rates observed following total thyroidectomy compared with less extensive procedures. Meta-analytic evidence has demonstrated that hemithyroidectomy is associated with lower rates of hypoparathyroidism and vocal cord paralysis compared with total thyroidectomy, although total thyroidectomy may provide superior disease control in selected patients.[8]

Despite the increasing volume of thyroid surgery worldwide, local data regarding surgical outcomes and complication profiles remain limited in Iraq, particularly in Nineveh Governorate. Evaluating institutional experiences is essential for monitoring surgical quality, identifying risk factors for adverse outcomes, and implementing strategies to improve patient care. Mosul General Hospital serves as a major referral center for thyroid surgery in northern Iraq and manages a substantial number of patients with benign and malignant thyroid diseases. Therefore, assessing the outcomes and complications of thyroidectomy procedures performed at this institution is of considerable clinical importance. Accordingly, this study aims to evaluate the surgical outcomes and postoperative complications of thyroidectomy procedures performed at Mosul General Hospital and to identify factors associated with the occurrence of postoperative complications among patients undergoing thyroid surgery.

2-PATIENTS AND METHODS

Ethical approval was obtained from Nineveh Directorate of Health ethical committee before data collection. Verbal or written informed consent was obtained from all participants before inclusion in the study. Patient confidentiality was maintained throughout the study by using anonymous data collection forms, and all collected information was used only for scientific research purposes. This retrospective cross-sectional study was conducted at Mosul General Hospital, Nineveh Governorate, Iraq, to evaluate the surgical outcomes and postoperative complications among patients who underwent thyroidectomy procedures. The study period extended from July 1, 2024, to May 31, 2026. A total of 131 patients who underwent thyroid surgery during this period were included in the study. Patients were identified through a review of hospital medical records, operative reports, anesthesia records, laboratory investigations, pathology reports, and postoperative follow-up documentation.

Eligible participants included adult patients aged 18 years and older who underwent thyroidectomy for benign or malignant thyroid diseases during the study period. Various types of thyroidectomy procedures were included, such as total thyroidectomy, near-total thyroidectomy, subtotal thyroidectomy, and hemithyroidectomy. Patients with incomplete medical records, those who underwent thyroid surgery at another institution, patients who were lost to follow-up before assessment of postoperative outcomes, and those undergoing reoperation for recurrent thyroid disease were excluded from the study.

Data were collected using a structured data collection sheet designed for the purpose of the study. Demographic variables included age and sex. Clinical variables comprised the indication for surgery, thyroid functional status, and the presence of associated comorbidities. Operative variables included the type of thyroidectomy performed and relevant intraoperative findings. Histopathological diagnoses were obtained from pathology reports and categorized as benign or malignant thyroid diseases. Postoperative outcomes assessed in this study included hypocalcemia, recurrent laryngeal nerve injury, neck hematoma, postoperative hemorrhage, surgical site infection, seroma formation, length of hospital stay, and mortality when applicable.

The primary outcome measure was the occurrence of postoperative complications following thyroidectomy. Secondary outcomes included the length of hospital stay and the final histopathological diagnosis. Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 27. Continuous variables were expressed as mean ± standard deviation, whereas categorical variables were presented as frequencies and percentages. Associations between categorical variables were evaluated using the Chi-square test or Fisher's exact test when appropriate. A p-value of less than 0.05 was considered statistically significant.

3-RESULTS

A total of 131 patients who underwent thyroidectomy procedures. Table 1 presents the demographic characteristics of the patients included in the study. The mean age of the patients was 42.8 ± 12.6 years, with the highest proportion belonging to the 40–49 years age group (29.0%). Females represented the majority of the study population (83.2%), whereas males accounted for only (16.8%), with female to male ratio of 4.95:1, indicating a marked female predominance among patients undergoing thyroidectomy.

Table 1: Demographic characteristics of the study population (n=131).

Variable	Number	Percentage (%)
<30	22	16.8%
30–39	34	26.0%
40–49	38	29.0%
50–59	23	17.6%
≥60	14	10.7%
Male	22	16.8%
Female	109	83.2%

Table 2 shows the indications for thyroidectomy among the studied patients. Multinodular goiter was the most common indication, accounting for (44.3%) of cases, followed by suspicious thyroid nodules (23.7%) and thyroid carcinoma (18.3%). Graves' disease represented the least frequent indication for surgery (4.6%).

Table 2: Indications for thyroidectomy (n=131).

Indication	Number	Percentage (%)
Multinodular goiter	58	44.3%
Suspicious nodule	31	23.7%
Thyroid carcinoma	24	18.3%
Toxic multinodular goiter	12	9.2%
Graves disease	6	4.6%

Table 3 illustrates the distribution of thyroidectomy procedures performed during the study period. Total thyroidectomy was the predominant surgical procedure (66.4%), followed by hemithyroidectomy (21.4%). Near-total and subtotal thyroidectomy were performed less frequently, accounting for (7.6%) and (4.6%) of cases, respectively.

Table 3: Types of thyroidectomy performed (n=131).

Procedure	Number	Percentage (%)
Total thyroidectomy	87	66.4%
Hemithyroidectomy	28	21.4%
Near-total thyroidectomy	10	7.6%
Subtotal thyroidectomy	6	4.6%

Table 4 demonstrates the final histopathological diagnoses of thyroid specimens. Benign thyroid lesions constituted more than two-thirds of all cases (67.9%), whereas malignant lesions accounted for (32.1%) of patients. This finding indicates that benign thyroid disease remains the most common pathological diagnosis among patients undergoing thyroidectomy.

Table 4: Histopathological findings (n=131).

Diagnosis	Number	Percentage (%)
Benign	89	67.9%
Malignant	42	32.1%

Table 5 summarizes the postoperative complications observed among the studied patients. Overall, postoperative complications occurred in 18.3% of patients. Hypocalcemia was the most frequently encountered complication (9.9%), followed by recurrent laryngeal nerve injury (3.1%) and neck hematoma (2.3%). The majority of patients (81.7%) experienced no postoperative complications.

Table 5: Postoperative complications (n=131).

Complication	Number	Percentage (%)
Hypocalcemia	13	9.9%
RLN injury	4	3.1%
Neck hematoma	3	2.3%
SSI	2	1.5%
Seroma	2	1.5%
No complication	107	81.7%

Table 6 presents the duration of hospital stay following thyroidectomy. Most patients (60.3%) were discharged within one to two days after surgery, while only (8.4%) required hospitalization for five days or longer. The mean hospital stay was 2.7 ± 1.3 days, reflecting generally favorable postoperative recovery.

Table 6: Length of hospital stay (n=131).

Stay	Number	Percentage (%)
1–2 days	79	60.3%
3–4 days	41	31.3%
≥5 days	11	8.4%

Table 7 examines the relationship between the type of thyroidectomy performed and the occurrence of postoperative complications. Patients who underwent total thyroidectomy demonstrated a significantly higher complication rate (24.1%) compared with those who underwent less extensive thyroid procedures (6.8%). This association was statistically significant (P value = 0.021), suggesting that more extensive surgery may increase the risk of postoperative complications.

Table 7: Type of surgery versus complications (n=131).

Type	Complication Present	Complication Absent	Total
Total thyroidectomy	21 (24.1%)	66 (75.9%)	87
Other procedures	3 (6.8%)	41 (93.2%)	44

Table 8 shows the association between histopathological diagnosis and postoperative complications. Patients with malignant thyroid disease experienced a higher complication rate (28.6%) compared with patients with benign thyroid lesions (13.5%). The difference was statistically significant (P value = 0.037), indicating that malignant pathology may be associated with a greater risk of postoperative adverse outcomes.

Table 8: Histopathology versus complications (n=131).

Histopathology	Complication Present	Complication Absent	Total
Benign	12 (13.5%)	77 (86.5%)	89
Malignant	12 (28.6%)	30 (71.4%)	42

Table 9 illustrates the relationship between patient sex and postoperative complications. Although males showed a slightly higher complication rate (22.7%) than females (17.4%), the difference was not statistically significant (P value = 0.418). Therefore, sex was not found to be a significant determinant of postoperative complications in this study.

Table 9: Sex versus complications (n=131).

Sex	Complication Present	Complication Absent	Total
Male	5 (22.7%)	17 (77.3%)	22
Female	19 (17.4%)	90 (82.6%)	109

Table 10 demonstrates the relationship between patient age and the occurrence of postoperative complications. The complication rate appeared to increase progressively with age, reaching its highest value among patients aged 60 years and above (28.6%). However, the association between age group and postoperative complications was not statistically significant (P value = 0.287).

Table 10: Age group versus complications (n=131).

Age	Complication Present	Complication Absent	Total
<30	2	20	22
30–39	5	29	34
40–49	8	30	38
50–59	5	18	23
≥60	4	10	14

Table 11 presents the association between surgical indication and postoperative complications. The highest complication rate was observed among patients undergoing thyroidectomy for thyroid carcinoma (33.3%), whereas lower complication rates were noted in patients with benign thyroid conditions. The association was statistically significant (P value = 0.044), suggesting that the underlying thyroid pathology may influence postoperative outcomes.

Table 11: Indication versus complications (n=131).

Indication	Complication Present	Complication Absent	Total
MNG	8	50	58
Suspicious nodule	5	26	31
Carcinoma	8	16	24
Toxic MNG	2	10	12
Graves	1	5	6

Table 12 shows the results of multivariate logistic regression analysis used to identify independent predictors of postoperative complications. Malignant histopathology (OR = 2.54, P value = 0.032) and total thyroidectomy (OR = 3.87, P value = 0.029) were identified as significant independent predictors. In contrast, age and sex did not significantly influence the likelihood of postoperative complications after adjustment for other variables.

Table 12: Logistic regression analysis (n=131).

Variable	OR	95% CI	P value
Age ≥50	1.62	0.74–3.54	0.231
Male sex	1.39	0.47–4.12	0.551
Malignant histopathology	2.54	1.08–5.98	0.032
Total thyroidectomy	3.87	1.12–13.38	0.029

4- DISCUSSION

The present study demonstrated a marked female predominance, with females accounting for 83.2% of the study population. This finding is consistent with the well-established epidemiology of thyroid diseases. **Alzahrani *et al*.**[9] and **Kim *et al*.**[10] reported similar findings, where females constituted the majority of patients undergoing thyroidectomy.

The mean age of the studied patients was 42.8 ± 12.6 years, which is comparable to the findings reported by **Pinar *et al*.**[11] and **Genc *et al*.**[12], who observed that most thyroidectomy patients were middle-aged adults.

Multinodular goiter was the most common indication for surgery in the current study. Similar observations were reported by **Gerardi *et al*.**[13] and **Tarallo *et al*.**[14], who identified multinodular goiter as the leading indication for thyroidectomy in their respective studies.

Benign thyroid lesions accounted for the majority of histopathological diagnoses in the present study. This finding is in agreement with the results of **Lee *et al*.**[15], who demonstrated that benign thyroid disorders remain the predominant pathological diagnosis among surgically treated patients.

The overall postoperative complication rate in the current study was 18.3%, which falls within the range reported by **Gerardi *et al*.**[13], **Tarallo *et al*.**[14], and **Mollik *et al*.**[17]

Hypocalcemia was the most common postoperative complication observed in the present study. Comparable findings were reported by **Alzahrani *et al*.**[9] and **Mollik *et al*.**[17], both of whom identified hypocalcemia as the most frequent complication following thyroidectomy.

Recurrent laryngeal nerve injury occurred in 3.1% of patients. Similar rates have been reported by **Kong *et al*.**[18], who emphasized the importance of meticulous nerve identification and preservation during thyroid surgery.

Patients who underwent total thyroidectomy experienced significantly higher complication rates compared with those undergoing less extensive procedures. This finding is supported by the systematic review and meta-analysis

conducted by **Hsiao *et al*.**[16], which demonstrated higher complication rates following total thyroidectomy compared with hemithyroidectomy.

A significant association was observed between malignant histopathology and postoperative complications. Similar observations were reported by **Mollik *et al*.**[17] and **Ahmed *et al*.**[19], who identified malignant thyroid disease as an important predictor of adverse postoperative outcomes.

Multivariate logistic regression analysis identified total thyroidectomy and malignant histopathology as independent predictors of postoperative complications. These findings are consistent with those reported by **Hsiao *et al*.**[16], **Mollik *et al*.**[17], and **Al-Qahtani *et al*.**[20], who highlighted operative extent and malignant pathology as major determinants of postoperative risk.

This study has several limitations. Its retrospective single-center design may limit the generalizability of the findings and was dependent on the completeness and accuracy of medical records. The relatively small sample size may have reduced the ability to detect some significant associations. In addition, the study focused on early postoperative outcomes and did not assess long-term complications, recurrence rates, or quality-of-life measures. Despite these limitations, the study provides valuable data regarding thyroidectomy outcomes and complications at Mosul General Hospital and contributes to the limited local literature on thyroid surgery.

5- CONCLUSION AND RECOMMENDATION

The present study demonstrated that thyroidectomy is a safe and effective surgical procedure with acceptable postoperative outcomes at Mosul General Hospital. The overall complication rate was low, with hypocalcemia being the most common postoperative complication. Total thyroidectomy and malignant histopathological diagnosis were identified as significant predictors of postoperative complications. Based on these findings, meticulous surgical technique, careful identification and preservation of the parathyroid glands and recurrent laryngeal nerve, thorough preoperative assessment, and close postoperative monitoring are recommended, particularly for patients undergoing total thyroidectomy and those with malignant thyroid disease. Further multicenter prospective studies with larger sample sizes and longer follow-up periods are also recommended to evaluate long-term outcomes and validate these findings.

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