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Evaluation of early thyroidectomy complications

Thyroidectomy complications

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Abstract
Aim: Our aim in this study is to reveal the relationships between patient findings, surgical methods and early thyroidectomy complications.
Material and Methods: The files and operative notes of 308 patients who underwent thyroidectomy within 10 years were reviewed retrospectively. Gender, age, preoperative diagnosis, primary or reoperated cases, the type of thyroidectomy [bilateral subtotal (BST), bilateral total (BTT), unilateral subtotal (UST) and unilateral total (UTT)] and early postoperative complications (hypocalcemia, bleeding, nervus laryngeus recurrens (NLR) injury, infection and seroma) were recorded. The peculiarity of this study is that NLR neuromonitoring was not used in thyroidectomy operations.
Results: Of the 308 patients who underwent thyroidectomy, 287 were females and 21 were males. Two hundred eighty three cases of multinodular goiter, 18 cases of nodular goiter and 7 thyroid cancers were operated; 180 BTT, 100 BST, 17 UTT + UST, 7 UST and 4 UTT were applied. Complications were seen in a total of 20 (6.49%) patients who underwent 19 BTT and 1 BST. The only complication in BST was bleeding. There were 10 (3.24%) hypocalcemia, 4 (1.29%) bleeding, 2 (0.649%) NLR injury, 2 (0.649%) infections and 2 (0.649%) seromas. In terms of the frequency of early thyroidectomy complications, hypocalcemia was the first (P=0.0047). In addition, the rates of hypocalcemia and NLR injury were higher in reoperated patients than in primary patients (P<0.05).
Discussion: The most common complication was hypocalcemia. NLR injury and hypocalcemia rates were higher in reoperated cases who underwent BTT.

Keywords
Goiter, Thyroid Surgery, Thyroidectomy, Complication

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Introduction

Thyroid diseases are one of the most common endocrine diseases [1]. Thyroid gland surgery is performed for malignant diseases of the thyroid, multinodular or nodular goiter, thyroiditis, graves disease, compression findings and cosmetic reasons [2,3].

Thyroid surgery in the hands of experienced surgeons is one of the safest procedures currently performed. Although complications after surgical removal of the thyroid gland are rare, the consequences can be life-threatening [4].

Nowadays, total thyroidectomy is frequently performed in the surgical treatment of the thyroid. Although the rate of complications after thyroidectomy is low, hypoparathyroidism, nervus laryngeus recurrens (NLR) injury, respiratory tract obstruction, hyperthyroidism crisis, wound infection and hematoma have been reported as the most important postoperative complications [3,4].

In this study, we aimed to determine the relationship between early complications of thyroidectomy and gender, age, preoperative diagnosis, primary – reoperated cases and thyroidectomy procedures.

Material and Methods

Files and surgical notes of 308 patients who underwent thyroidectomy for 10 years without neuromonitorization in the general surgery clinic were reviewed retrospectively. Gender, age, preoperative diagnosis [multinodular goiter (mng), nodular goiter (ng) and thyroid cancer (thyroid ca)], primary – reoperated patients, thyroidectomy procedure [bilateral total thyroidectomy (BTT), bilateral subtotal thyroidectomy (BST), unilateral total thyroidectomy (UTT) and unilateral subtotal thyroidectomy (UST)] and early postoperative complications [hypocalcemia, hematoma, nervus laryngeus recurrens (NLR) injury, infection and seroma] were recorded.

The relationship between early complications after thyroidectomy and gender, age, diagnosis, primary – reoperated patients and thyroidectomy procedure was investigated.

Statistical analysis: Data were summarized by number (percentage), mean ± standard deviation and median (min-max) by variable type. The suitability of numerical variables to normal distribution was examined using the Shapiro-Wilk test. Pearson's chi-square and Yates exact tests were used to determine whether there was a statistically significant relationship between qualitative variables. The Mann-Whitney U test was used to determine whether there was a statistically significant difference between the subcategories in terms of quantitative variables. P<0.05 was considered statistically significant. IBM SPSS Statistics 22.0 software was used for analysis.

Results

Of the 308 patients who underwent thyroidectomy, 287 (93.18%) were females and 21 (6.81%) were males. The age range was 16-75 years. The mean age was 41±12 years. The age range of the males was 25-56 years and the mean age was 41±10 years. The female age range was 16-75 years and the mean age was 41±12 years.

Two hundred eighty three (91.88 %) patients had multinodular goiter (mng), 18 (5.84%) had a single nodule (ng) and 7 (2.27%) had thyroid cancer. Mng was detected in 20 (95.2%) males, 263 (91.6%) females, Ng 1 (4.8%) male, 17 (5.9%) females, and thyroid cancer in 7 (2.4%) females, respectively. There was no significant difference between males and females in terms of diagnoses (P>0.05).

Three hundred and one patients (97.72%) were primary and 7 (2.28%) were reoperated cases. As a thyroidectomy procedure, 180 patients (58.44%) were treated with BTT, 100 patients (32.46%) with BST, 17 patients (5.5) with UTT + UST, 7 patients (2.27%) with UST and 4 patients (1.29%) with UTT.

Early postoperative complications were observed in 20 patients (6.49%). Hypocalcemia in 10 patients (3.24%), hematoma in 4 patients (1.29%), nervus laryngeus recurrens (NLR) injury in 2 patients (0.649%), wound infection in 2 patients (0.649%) and seroma in 2 patients (0649%) were observed. Among the complications, hypocalcemia was significantly higher than other complications (P=0.0047).

The relationship between complications and gender, age, diagnosis, primary - reoperated patients and thyroidectomy procedures were investigated.

Only hematoma was seen in one male patient (4.76%), and no other complications were observed. Complications such as 10 (3.5%) hypocalcemia, 3 (1.04%) hematomas, 2 (0.7%) NLR injuries, 2 (0.7%) wound infections and 2 (0.7%) seromas occurred in female patients. There was no significant difference

Table 1. Distribution of complications in primary and reoperated patients

	Hypocalcemia (n/%)	Hematoma (n/%)	NLR injury (n/%)	Wound infection (n/%)	Seroma (n/%)
Primary patients	8/2.7	4/1.32	1/0.3	2/0.7	2/0.7
Reoperated patients	2/28.6	0/0	1/14.3	0/0	0/0
P value	0.018	1.000	0.045	1.000	1.000

(n: number, %: percentage, NLR: Nervus Laryngeus Recurrens)

Table 2. Distribution of complications by thyroidectomy procedures

	Hypocalcemia (n/%)	Hematoma (n/%)	NLR injury (n/%)	Wound infection (n/%)	Seroma (n/%)
BTT	10/5.6	3/1.66	2/1.1	2/1.1	2/1.1
BST	0/0	1/1	0/0	0/0	0/0
UTT	0/0	0/0	0/0	0/0	0/0
UST	0/0	0/0	0/0	0/0	0/0
P value	0.119	0.960	0.839	0.839	0.839

(n: number, %: percentage, BTT: Bilateral total thyroidectomy, BST: Bilateral subtotal thyroidectomy, UTT: Unilateral total thyroidectomy, UST: Unilateral Subtotal thyroidectomy, NLR: Nervus Laryngeus Recurrens)

Table 3. The distribution of complications in BTT and BST procedures

	Hypocalcemia (n/%)	Hematoma (n/%)	NLR injury (n/%)	Wound infection (n/%)	Seroma (n/%)
BTT	10/5.55	3/1.66	2/1.1	2/1.1	2/1.1
BST	0/0	1/1	0/0	0/0	0/0
P value	0.016	0.999	0.539	0.539	0.539

(n: number, %: percentage, BTT: Bilateral total thyroidectomy, BST: Bilateral subtotal thyroidectomy, NLR: Nervus Laryngeus Recurrens)

between male and female patients in terms of complications (P>0.05). In addition, there was no significant correlation between age and complications in statistical analysis (P>0.05). No complications were observed in the patients with Ng. Hypocalcemia was observed in 1 patient (14.3%) with thyroid cancer patients, other complications were not observed. Hypocalcemia in 9 (3.2%), hematoma in 4 (1.41%), NLR injury in 2 (0.7%), wound infection in 2 (0.7%) and seroma in 2 (0.7%) patients with Mng were observed. There was no significant difference between diagnoses in terms of complications (P>0.05).

Complications of early thyroidectomy in primary and reoperated patients are given in Table 1. Hypocalcemia and NLR injury rates in reoperated patients were significantly higher than in primary patients (P=0.018, P=0.045), (Table 1). In one reoperated patient, bilateral NLR injury occurred and the patient underwent urgent tracheostomy. In a primary patient, unilateral NLR injury occurred.

Complications in thyroidectomy procedures are given in Table 2. There was no significant difference among all thyroidectomy procedures in terms of the complications (P>0.05), (Table 2).

In addition, only BTT and BST procedures were compared in terms of complications. There was no significant difference between BTT and BST in terms of hematoma, NLR injury, wound infection and seroma rates. However, a significant difference was found between BTT and BST in terms of hypocalcemia (P=0.016), (Table 3).

Discussion

The incidence of thyroid disease in the general population is very high. The thyroid is a small endocrine gland that produces hormones that regulate the body's various metabolic activities. Thyroid diseases can be grouped into benign and malignant types [5].

Thyroid diseases are are common in women. In a study, among 2266 patients who underwent thyroidectomy, 16.2% were males, 83.8% were females and the mean age was 44.6 (17-78) (M: 47.9 F: 44) [3]. In our study, 93.18% of the patients were female and 6.81% were male. The mean age was 41 ± 12 years. The mean age of males was 41±10 years, and the mean age of females was 41±12 years.

Thyroidectomy is a common operation in general surgery clinics. Surgical procedures are performed in malignant thyroid diseases, multinodular and nodular goiter, chronic thyroiditis, compression findings and cosmetic reasons [2]. The majority of our patients who underwent thyroidectomy (91.88%) consisted of patients with multinodular goiter. In both female and male patients who underwent surgery, the diagnosis was often multinodular goiter. There was no significant difference between males and females in terms of diagnoses (P>0.05).

Mortality after thyroidectomy is negligible, and its complications are less than 3%. Complications associated with thyroidectomy are related to the type of disease, the extent of the disease, surgical procedures, training and experience of the surgeon [6,1]. Postoperative complications such as hypoparathyroidism, vocal cord paralysis, infection, hemorrhage and hematoma may occur. Vocal cord paralysis is one of the frequent and serious complications of one or two NLR injuries. Hypocalcemia and postoperative bleeding are also important complications [2]. In our study, postoperative complications were observed in 20 (6.49%) patients, and these values were higher than the values in the literature, and we had no mortality.

The most common early complication of thyroid surgery is hypocalcemia (20-30%) [7]. We observed hypocalcemia in 10 patients (3.24%), and hypocalcemia was significantly higher than other complications (P<0.05). Our hypocalcemia value was lower than the literature.

There is a significant relationship between gender and surgical procedure and the development of early hypocalcemia. Hypocalcemia is found in 42% of the female and 21.4% in the male. In addition, the incidence of hypocalcemia is 38.8% in patients who underwent total thyroidectomy and 13.8% in patients underwent lobectomy [8]. In the present study, there was no significant difference between male and female gender, and among all surgical procedures in terms of incidence of hypocalcemia (P>0.05). However, hypocalcemia rates in the reoperated patients were significantly higher than in primary patients (P<0.05). When BTT and BST procedures were compared in terms of incidence of hypocalcemia, hypocalcemia was found to be significantly more common in the BTT procedure (P<0.05).

One of the most common early complications of thyroid surgery is the injury of NLR (5-11%). Injury of bilateral NLR is a rare life-threatening complication (conditions requiring immediate treatment occur in less than 0.1% of cases) [7]. NLR injury was observed in two patients (0.649%), and this rate was lower than the literature values. One of these patients was primary and the other was reoperated patient. Bilateral NLR injury occurred in the reoperated patient, and unilateral NLR injury occurred in the primary patient.

In the literature, it is reported that NLR injury is mostly in total thyroidectomies [4]. In addition, it is reported that the probability of complications is 10.6 times higher in patients who underwent complementary thyroidectomy [9]. In our study, there was no significant difference among all surgical procedures in terms of NLR injury (P>0.05). However, a significant difference was found between reoperated and primary patients in terms of NLR injury (P<0.05). NLR injury was significantly higher in the reoperated patients. We found that reoperation is the most important factor that increases the risk of NLR injury.

In the study of Doran et al, it was reported that wound exploration was performed at a rate of 1.2% due to bleeding in the postoperative period [10]. Our postoperative bleeding rate was found to be 1.29% and this rate was close to the literature values.

The overall incidence of seroma in patients undergoing thyroidectomy has been reported as 2.2%, and wound infection as 0.36% [11,12]. The incidence of seroma (0.649%) in our study was found to be below the values in the literature, but wound infection incidence (0.649%) was high.

Conclusion

Early postoperative thyroidectomy complications (hypocalcemia and NLR injury) were found to be significantly higher in patients who underwent reoperation. For this reason, we think that the patients who will be reoperated should be paid maximum attention in their operations.

Scientific Responsibility Statement
The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement
All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest
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