

Comparison of thyroid surgery experiences of “East” and “West” regions in Turkiye

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ABSTRACT

OBJECTIVE: This study aimed to evaluate the differences between the types of thyroidectomy surgeries and surgical treatment approaches according to thyroid pathology results, in Turkiye’s two non-endemic regions.

METHODS: Two different centers of the country, which differ in many respects and are non-endemic for thyroidal diseases were included in the study. Data on patients from both sexes, who underwent thyroidectomy in the western (1st center) and the eastern (2nd center) regions between 2011 and 2017 have been reviewed.

RESULTS: Two hundred and forty patients from Istanbul (1st center) and 992 patients from Van (2nd center); a total of 1232 patients were included in the study. According to the pre-operative ultrasonography and laboratory results, toxic nodular goiter and multinodular goiter were the most common diseases in the first and second centers, respectively. There was a significant statistical difference between the radiological diagnostic findings between the two centers ($p < 0.001$). The rate of bilateral total thyroidectomy in the first center was 82.5% (198 patients), whereas this rate was 58.5% (555 patients) in the second center. The type of surgery may change from center to center, ($p < 0.001$). The most common early post-thyroidectomy complication was hypocalcemia in both centers.

CONCLUSION: The results from only two centers from the western and eastern Turkiye show that there is a difference between the thyroidectomy preferences. Future similar national studies will contribute to the provision of a consensus in surgical treatment of thyroid diseases.

Keywords: Regional differences; thyroid diseases; thyroid surgery.

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Surgical interventions for thyroid gland diseases have increased in the last decades. Radiological imaging techniques are thought to be effective on the progressive increase of thyroid surgery [1]. According to the data of the World Health Organization (WHO), thyroid cancers have a 6.7% rate of cancer diseases worldwide in 2018. It is thought that the number of patients will double in the next 10 years [2]. In Turkiye, this ratio is 14% and is rela-

tively high compared to the EU and is seen worldwide [3]. Although different thyroidectomy surgical techniques of both malignant and benign diseases of thyroidal diseases are defined, total thyroidectomy continues to be a more preferred and recommended surgical option over time [4, 5]. Considering the long-known endemic feature of some of the thyroid diseases, it is thought that there may be differences between the types and rates of thyroid surgeries



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performed in different regions [6, 7]. A study investigating the treatment of thyroid nodules in Türkiye reported that surgical treatment varied by center [8]. Few studies have been performed on this subject. Such studies often present isolated centers or data representing a particular region. Therefore, studies that will compare different regional data within the same country and reveal the differences in thyroid surgery are needed. In a study conducted in the U.S.A., it was emphasized that the same surgical intervention and treatment option may differ across regions throughout the country and this may be due to many factors, and a consensus cannot be provided across the country in terms of surgical treatment [9].

The aim of this study is to shed light in the surgical treatment of thyroid diseases in two non-endemic regions (Istanbul-Van) in Türkiye and to investigate the regional (east-west) possible differences of thyroidectomy causes, applied surgical techniques and post-operative results.

MATERIALS AND METHODS

This is a retrospective and observational report. The protocol was approved by the Clinical Research Ethics Committee dated March 13, 2018 and no: 012. The report followed the Declaration of Helsinki. After the approval of the ethics committee, two university hospitals from different regions were included in the present study. One of these university hospitals was in Istanbul which is an industrially advanced metropolitan settled at the western Türkiye, and the other was in the city of Van, which is located at Eastern Türkiye with a patient population generally from rural areas. Both centers are considered non-endemic regions in terms of thyroid disease, in Türkiye. Patients aged 18 years and over from both sexes who underwent thyroidectomy between 2011 and 2017 were included in the study. Patients with missing data were excluded from the study. Epicrisis, surgery, and pathology reports were reviewed retrospectively. Parameters such as age, gender, pre-operative diagnoses, FNAB results, operation methods, pathological diagnoses, length of stay (days), and early complications were recorded and statistical differences between two groups were examined.

Statistical Analysis

The data were evaluated with SPSS version 22. Compliance of continuous data to normal distribution conditions was tested with Kolmogorov–Simirnov. The average and standard deviation values of the normally distributed

Highlight key points

- Surgical approach may differ between centers in thyroid pathologies.
- This difference was seen to be valid for the same thyroid pathologies.
- Comprehensive studies are needed to achieve a national consensus on the surgical treatment of the thyroid.

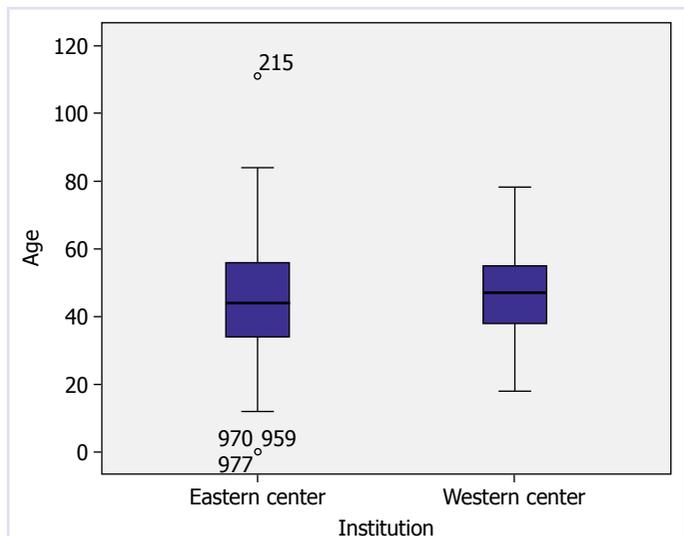
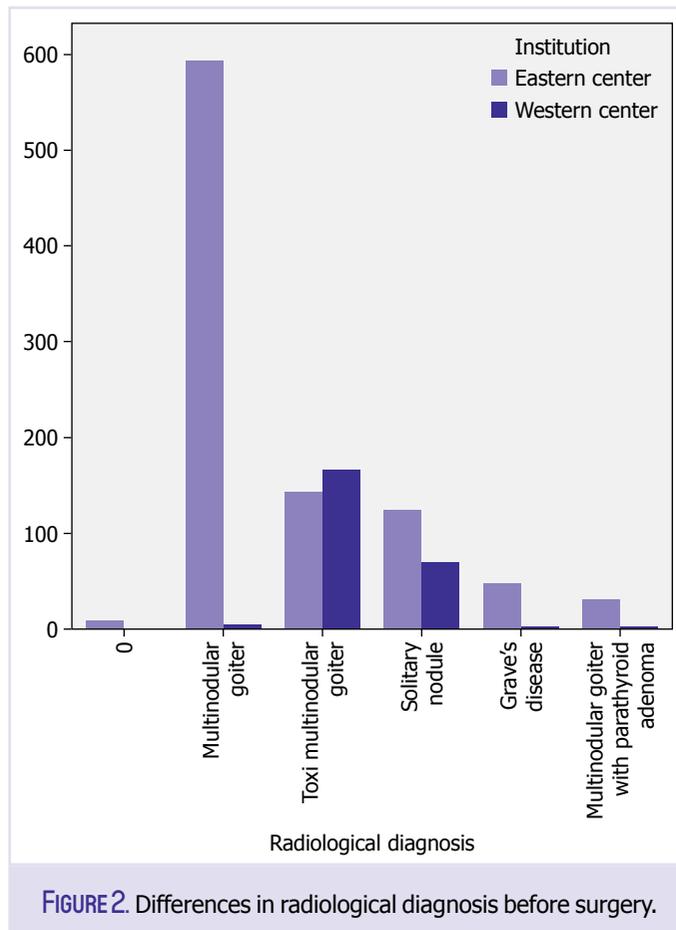


FIGURE 1. Age difference between patient groups by center.

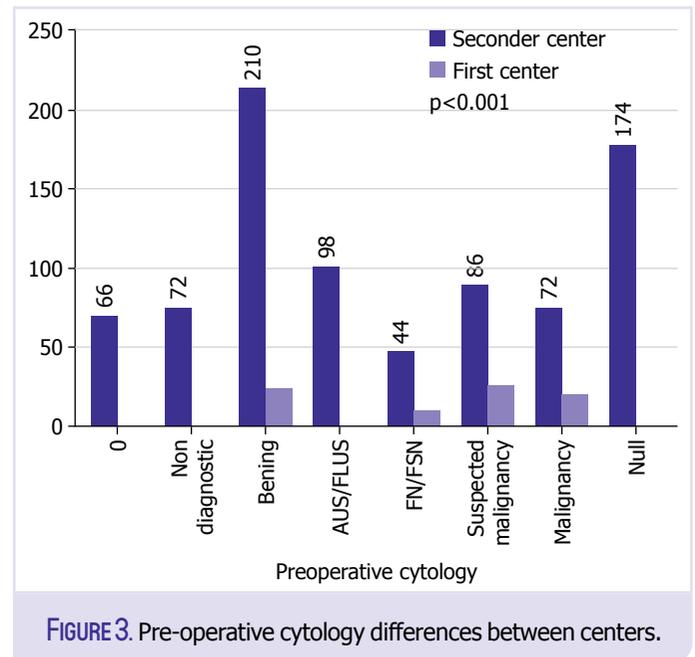
data and the median and minimum-maximum values of the data that do not fit the normal distribution were chosen. Categorical data were analyzed with frequency and percentage values. For the continuous data, the differences between the approaches of the two centers were evaluated using the Mann–Whitney U-test or the Student T-test. Chi-square test was used in categorical and nominal data. 5% was accepted limit for Type-1 error.

RESULTS

The study included a total of 1232 patients. Two hundred and forty patients were from Istanbul (first center) and 992 patients were from Van (second center). The male/female patient ratio for both centers was 19%/81% and 14%/86% (46/194 and 172/801), respectively, and there was no statistically significant difference between the two centers ($p=0.59$). The average patient age in the first center was 47.21 years, whereas it was 44.8 years in the second center. In terms of patient age between two centers, it was observed that there was a relatively older patient population in the first center ($p=0.035$) (Fig. 1). Consid-



ering the diagnostic distribution of the patients according to the pre-operative thyroid USG results, toxic nodular goiter and multinodular goiter were the most common radiological diagnosis in the first and second centers, respectively. There was a significant statistical difference between the radiological diagnostic findings between the two centers ($p < 0.001$) (Fig. 2). The rates of fine needle aspiration cytology (FNAC) were 28.75% (69 patients) in the first group and 82.86% (822 patients) in the second group. There was a statistically significant difference between the two groups in the pre-operative FNAC rates, especially between the non-diagnostic FNAC results (graph 2), ($p < 0.001$). When the final post-operative pathology results were examined, malignancy was detected in 47 patients (19.85%) in the first group, and in 240 patients (24.19%) in the second group. There was a significant statistical difference between the two groups in terms of post-operative malignant diagnosis ($p < 0.001$) (Fig. 3). When thyroidectomy surgeries performed in both centers were examined, it was observed that a total of seven different types of thyroidectomy surgeries were performed (Table 1). As seen on the table, the rate of bi-



lateral total thyroidectomy (BTT) in the first center was 82.5% (198 patients). In the second center, this rate was 65.6% (622 patients). Detailed examination of the type of surgery performed and some of the post-operative pathological diagnoses is shown in Table 2. As can be seen from the table, BTT and its types were preferred in the first center for papillary carcinoma, papillary microcarcinoma, and benign thyroid diseases. In the second center, although BTT and its derivatives were observed, TLE and its derivatives were seen to be preferred more common than the first center. As a result of the Chi-square analysis, it was determined that the type of surgery may differ from center to center ($p < 0.001$). In both centers, a total of 85 patients underwent secondary surgical intervention. The most common surgery performed in both centers is BTT and was performed in the first and second centers at a rate of 85.7% (6 patients) and 70.5% (55 patients), respectively. There was no statistically significant difference between the centers in terms of secondary surgical methods ($p = 0.712$). Since reliable data for late complications could not be reached, late post-thyroidectomy complications were not evaluated in the present study. Early complications were examined in 1108 patients and were observed in 139 (12.5%) patients (Table 3). The most common early post-thyroidectomy complication was hypocalcemia in both centers. The hypocalcemia ratio was 3.9% (38 patients) and 15.5% (21 patients) at the 1st and 2nd centers, respectively. When the total complication rates are examined, there was a statistically significant difference between the two centers ($p < 0.001$).

TABLE 1. Thyroid surgery types and rates

Surgery performed	Center		Total (%)
	First center (%)	Second center (%)	
Bilateral total thyroidectomy (BTT)	82.5	65.60	69.00
BTT+Central lymph node dissection (CND)	1.30	6.20	5.20
BTT+Unilateral lymph node dissection (ULND)	0.00	1.7	1.30
BTT+CND+ Bilateral lymph node dissection (BLND)	0.00	0.10	0.10
Thyroid lobectomy (TL)	11.30	16.60	15.50
TL+Parathyroid adenom (PTA)	0.0	4.60	3.70
TL+PTA+CND	0.00	0.60	0.50
Another center	1.70	4.00	3.50
Unusual	0.00	0.30	0.30
Bilateral subtotal thyroidectomy	3.30	0.20	0.80
Total	240	948	1188
	100.00	100.00	100.00

TABLE 2. Preferred rates of thyroidectomy type according to the center in thyroid diseases

Preferred thyroidectomy	Center	Papillary carcinoma		Micropapillary carcinoma		Benign	
		%	n	%	n	%	n
BTT and derivatives	Western (first)	81.48	22	94.44	17	83.24	154
	Eastern (second)	70.21	99	82.5	66	71.22	292
LE and derivatives	Western (first)	14.81	4	0	0	11.89	22
	Eastern (second)	23.4	33	6.25	5	22.44	92

BTT: Bilateral total thyroidectomy; LB: Lobectomy.

DISCUSSION

This study is the first study that compared the results of patients who underwent thyroidectomy in different regions of Türkiye. The male/female ratios seen in thyroid diseases in the centers participating in the present study are similar to those published in other regions in our country [10]. On the other hand, studies showing that thyroidectomy surgery is performed more frequently in female patients are also reported [11, 12]. Patient age groups in both centers correlated with the results of the previous studies from the same geographical region [10, 13]. As a result of thyroid USG and laboratory tests performed before thyroidectomy in both centers, toxic nodular goiter was frequently observed in the western

region and MNG in the eastern region. As a matter of fact, considering that both regions are not endemic for any toroidal disease, there is no study explaining the reason for this difference between the centers. There are also studies demonstrating that there are more MNGs in the western region [14]. In a multicenter study conducted in our country and attended by 400 clinicians, it was reported that only 38.5% of clinicians care about FNAB in patients with thyroid pathology [8]. We think that this may have an effect on the difference in pre-operative FNAB rates and results between the two centers.

Prevailing logic states that the incidence of thyroid diseases and treatment options historically increase depending on the development of diagnostic methods and the technological progress. During this period, various

TABLE 3. Complications seen in centers after thyroidectomy surgery

Complications	Centre		Total
	Eastern center (%)	Western center (%)	
Neuropexia	20	0	20
	100.0	0.0	100.0
	2.1	0.0	1.8
Unilateral paralysis	0	2	2
	0.0	100.0	100.0
	0.0	1.4	0.2
Bilateral papalysis	0	1	1
	0.0	100.0	100.0
	0.0	0.7	0.1
Tracheostomy	1	0	1
	100.0	0.0	100.0
	0.1	0.0	0.1
Hypocalcemia	38	21	59
	64.4	35.6	100.0
	3.9	15.1	5.3
Hipoparathyroidism	1	3	4
	25.0	75.0	100.0
	0.1	2.2	0.4
Bleeding	4	0	4
	100.0	0.0	100.0
	0.4	0.0	0.4
Non	905	112	1017
	89.0	11.0	100.0
	93.4	80.6	91.8
Total	969	139	1108
	87.5	12.5	100.0
	100.0	100.0	100.0

techniques of thyroidectomy for different thyroid diseases have been defined and started to be applied [15, 16]. Ultimately, American Thyroid Association guidelines are thought to be guiding and generally standardizing the procedures performed in the diagnosis and surgical treatment of thyroid diseases [17]. Nevertheless, BTT is becoming increasingly common and complication rates are as low as other types of thyroidectomies [4, 18–20]. Another study conducted in the U.S.A. Detected more than 6 times difference between thyroidectomy surgery rates in different regions of the country. It has been demonstrated that this is not associated with the incidence of thyroid diseases, demographic data,

health-care center, and regional socioeconomic parameters [21]. Considering that there are different methods of thyroidectomies, it can be concluded that there will be proportional differences across the country among different thyroidectomy surgeries [15]. There is no study from another country showing these differences. The present study demonstrates that 19 different types of thyroidectomy operations were performed on patients who attended two different university hospitals located in the eastern and western regions of Turkiye. While a total of 5 thyroidectomy surgery types were preferred in the western center, all 19 different surgery types were performed in the eastern center. When the change of the operation according to the current diagnosis was examined, the rates of performing only BTT in benign and malignant thyroid diseases were 84.86%/78.72% in the first center, and 59.75%/46.25% in the second center. More detailed examinations show, as seen in Table 2, that the rate of performing BTT and its derivative operations in the surgical treatment of papillary and micropapillary thyroid cancers was 81.48% and 94.44%, respectively, in the first center. In the second center, these rates were 70.21% and 82.5%, respectively. As seen from the results, the rate of performing BTT in papillary cancers in the first center coincides with the accepted rates [16, 20]. In the same group of patients, LE and its derivatives differed between the centers by performing 14.81%/0% in the first center and 23.4%/6.25% in the second center, respectively. Although the most preferred surgical treatment technique for benign thyroidal diseases is BTT in both centers, there was a difference between the centers. In the first center, BTT + derivatives and TLE + derivatives were performed in the rate of 83.24% (154 patients) and 11.89% (22 patients), respectively. In the second center, these rates were 71.22% (292 patients) and 22.44% (92 patients). We assume that the possible reason for the fact that the rates of performing BTT in both centers are higher than the literature data, was to avoid the risks of post-operative random thyroid cancer, recurrent nodular goiter, re-surgery, and to eliminate the risk of malignant changes in the remaining thyroid gland [22, 23]. When examined in general, there are significant statistical differences between the types of surgeries performed between the two regions. It was not possible to find a clear, scientific explanation for this difference. In terms of early complications, although the data of the first center are compatible with the literature, a significantly low rate of hypocalcemia was observed in the second center [24, 25]. High rates of total thyroidectomy may be considered as

a reason for the fact that the early complications of thyroidectomy is higher in the western-centered group. On the other hand, it may be thought that the habit of using thermal instruments in western regions may also have an impact on complication rates [26].

According to the results of this study, we conclude that the difference in thyroidectomy surgery types performed vary across regions throughout the country. There is a need for multicenter studies for the creation of a comprehensive thyroidectomy map in Türkiye. This would allow the formulation of a national consensus pertaining to the surgical treatment of thyroid disorders as well as the establishment of a standard surgical treatment algorithm.

Ethics Committee Approval: The Yeni Yuzyl University Clinical Research Ethics Committee granted approval for this study (date: 13.03.2018, number: 012).

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