

Proper Planning of Thyroid Surgery in Covid-19 Pandemic: A Single-Center Experience

Covid-19 Pandemisinde Tiroid Cerrahisinin Doğru Planlaması Tek Merkez Deneyimi

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ÖZET

AMAÇ: SARS-CoV-2 virüsünün neden olduğu Covid-19 salgını tüm dünyayı etkiledi. Bu çalışma, Türkiye'de Covid-19 vakasının ilk görüldüğü 11 Mart tarihi itibarıyla çeşitli tiroid hastalıkları nedeniyle ameliyat olan hastalarımızın verilerini sunmayı amaçlamaktadır.

GEREÇ VE YÖNTEM: 11.03.2020-31.12.2020 tarihleri arasında tiroid cerrahisi geçiren hastalar retrospektif olarak incelendi. Veriler, geçen yılın aynı döneminde (GYAD) tiroid cerrahisi geçiren hastaların verileriyle karşılaştırıldı.

BULGULAR: Toplam 47 hasta dahil edildi. GYAD'de toplam 79 hasta ameliyat edilmişti ve %40,5'lik bir azalma mevcuttu. Hastaların 33'ü (%70,2) diferansiye tiroid kanseri nedeniyle ameliyat edildi. Geçen yıl bu oran %41,8 idi ve aralarındaki orantısız fark anlamlıdır ($p=0,003$). Covid-19 döneminde ameliyat edilen 47 hastanın sadece 1'inde (%2,1) Covid-19 pozitifliği gelişti.

SONUÇ: Pandeminin başlangıcında yayınlanan kılavuzlar, geçici bir çözüm olarak acil durumlar dışındaki ameliyatların ertelenmesini önermektedir. Bu nedenle gelecekte pandemi ile mücadelede pandemi dışı hastaneler önceden belirlenmelidir.

Anahtar Kelimeler: Covid-19, tiroid kanseri, tiroid cerrahisi, endokrin cerrahi, pandemi

ABSTRACT

OBJECTIVE: The Covid-19 outbreak caused by the SARS-CoV-2 virus affected the whole world. This study aims to present the data of our patients who were operated on for various thyroid diseases as of March 11, when the Covid-19 case was first seen in Turkey.

MATERIALS AND METHODS: Patients who underwent thyroid surgery between 11.03.2020 and 31.12.2020 were analyzed retrospectively. The data were compared with those of patients who underwent thyroid surgery during the same period last year (DSPLY).

RESULTS: A total of 47 patients were included. A total of 79 patients were operated on in DSPLY and there was a 40.5% reduction. Thirty-three (70.2%) of the patients were operated on for differentiated thyroid cancer. Last year, this rate was 41.8%, and the proportional difference between them is significant ($p = 0.003$). Covid-19 positivity developed in only 1 (2.1%) of 47 patients who were operated on during the Covid-19 period.

CONCLUSION: Guidelines published at the beginning of the pandemic suggest postponing surgeries other than emergency conditions as a temporary solution. Therefore, in the fight against the pandemic in the future, non-pandemic hospitals should be predetermined.

Keywords: covid-19, thyroid cancer, thyroid surgery, endocrine surgery, pandemic

INTRODUCTION

The Covid-19 pandemic caused by the SARS-CoV-2 virus affected the whole world and was declared to be a pandemic by the World Health Organization (WHO) on March 11, 2020 (1). The current pandemic led to radical changes in routine health practices created in the light of current guidelines, and disruptions occurred in practical practices in the shadow of the pandemic (2). As resources

were allocated to patients treated for the Covid-19 pandemic, various guidelines have begun to be published to manage the crisis in general surgery as well. (3,4). Many elective and cancer surgeries have been canceled to use hospital resources more effectively in light of the guidelines (5). These disruptions in cancer treatment created a serious public health problem because the possibility of complications due to Covid-19 was found to be higher,

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especially in cancer patients in the data published at the first stage (6).

Despite all these data, the effect of the Covid-19 pandemic on the outcomes of untreated patients or patients who had a delay in getting a diagnosis of thyroid cancer is unknown (7). It is considered that patients with Graves' disease may be more prone to experience symptomatic Covid-19 infection and uncontrolled hyperthyroidism that does not respond to medical treatment may be a cause of Covid-19-related mortality (8).

While almost all publications suggest postponing non-urgent thyroid surgeries in the first place, these postponements are open-ended and the process as to when the pandemic will end is unclear. This study aimed to present the data of patients who underwent thyroid surgery with various diagnoses in our center from March 11, 2020, the date of the first occurrence of the Covid-19 case in Turkey.

MATERIAL & METHODS

Patients who underwent thyroid surgery with various diagnoses between March 11 and December 31, 2020 (pandemic period) were included in the study. The comparison group included the patients who underwent thyroid surgery in our clinic in the same period (non-pandemic period) last year. The patients were operated on in two separate units within our hospital. The data were scanned through the hospital's digital recording system. The demographics, diagnosis, surgery times, postoperative complications, mortality, mean hospitalization time (MHT), the time elapsed from diagnosis to surgery, and malignancy stages (TNM 2017) of the patients, pre- and post-operative Covid-19 data of the patients were reviewed retrospectively. The patients' perioperative 30-day Covid-19 positivity data were scanned over the electronic system. Patients with missing data in the electronic recording system and under 18 years of age were excluded.

Hypocalcemia was defined as a postoperative serum calcium level lower than 8.0 mg/dl. Those lasting less than six months were defined as transient and those lasting more than 6 months as permanent. The diagnosis of recurrent nerve palsy was made by indirect laryngoscopy. The indirect laryngoscopic examination was performed in patients with postoperative dysphonia, dyspnea, and dysphagia. Recurrent nerve palsy lasting less than six

months was defined as transient, and lasting longer than 6 months as permanent.

Statistical Analysis

The data analysis was performed using SPSS Statistics software, version 25.0. The continuous variables with normal distribution were presented as mean and standard deviation (SD) whereas variables without a normal distribution were presented as the median and interquartile range (IQR). Normally distributed continuous variables were compared using the X² test, and non-normally distributed variables using the Mann-Whitney U test. A p-value of <0.05 was considered statistically significant.

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Planning of Surgeries and Covid-19 Precautions

The first Covid-19 case in our country was announced by the Ministry of Health on March 11, 2020. From this date, many measures have been taken on a national and local scale in our country as well as in the whole world. Accordingly, non-oncological elective surgeries were postponed by our general surgery clinic, and emergency and oncological surgeries were continued. The Oncology Hospital, which has been also under the management of our institution for a long time before the pandemic in a different district, was isolated from the treatment of patients diagnosed with Covid. The majority of the oncological cases were carried out in this unit. Emergency room service was not provided in this unit.

As most of the wards are reserved for pandemic patients within the central unit, areas that can be used by all surgical clinics isolated from pandemic wards were also created here for emergency cases and elective oncological surgeries. Nurses, technicians, and other allied health personnel working in both units continued to work in the same ward throughout the pandemic. After the decrease in the number of Covid 19 cases, the "new normalization period" was declared by the state on June 1, 2020. From this date on, surgery has started to be performed on patients with benign diagnoses. In this whole process, the multidisciplinary endocrinology council was held on online platforms without interruption.

Detailed anamnesis was obtained from all patients for Covid-19, and the consultation of the department of

infectious diseases was requested for patients with suspicious symptoms. Polymerase chain reaction (PCR) test for Covid-19, which is routinely taken with Oronasopharyngeal swabs, was not performed for patients with no suspicious contact history and symptoms. Direct chest X-ray (PACXR) was performed on all patients during the preoperative period. Patients for whom surgery was planned were called and home isolation was recommended for them and they were admitted to the hospital 1 day before the surgery.

RESULTS

A total of 126 patients, 47 in the pandemic period and 79 in the non-pandemic period, were included in the study. Comparing the patients of both periods, there was no statistically significant difference between the two groups in terms of gender. The mean age of the patients in the pandemic period was 47.8 (\pm 13.62) years and the mean age of the patients in the non-pandemic period was 48.2 (\pm 14.01) years and there was no statistically significant difference between the two groups.

While 70.2% (n: 33) of the patients were operated on with the diagnosis of differentiated thyroid cancer during the pandemic period, 41.8% (n: 33) of the patients were operated on with the same diagnosis in the non-pandemic period and this number was found to be statistically high during the pandemic period ($p=0.003$).

The majority of patients diagnosed with differentiated thyroid cancer in both periods were found to be Stage 1 [Pandemic period: n: 39 (100%), non-pandemic period n: 30 (93.8%)].

Comparing both periods in terms of surgery time, while the median surgery time was calculated to be 120 minutes (105-155) during the pandemic period, the median surgery time was 110 minutes (95-140) during the non-pandemic period. Surgery time during the pandemic period was found to be statistically significantly longer ($p:0.037$).

No complications were observed in 95.7% (n: 45) of the patients operated on during the pandemic period and in 82.3% (n: 65) of the patients operated on during the non-pandemic period and this ratio was found to be statistically significant in favor of the pandemic period. ($p=0.028$). Perioperative 30-day Covid-19 positivity developed on in only 1 (2.1%) of 47 patients who were operated during the Covid-19 period.

The median hospitalization period was 1 day (1-2) during the pandemic period whereas the median hospitalization period during the non-pandemic period was calculated to be 2 days (1-2). Having a shorter hospitalization period during the pandemic period was statistically significant ($p<0.001$).

Comparing the time from the time of diagnosis to surgery, while the median value was 114 days (40-182.5) in the pandemic period, it was 30 days (21.25-48.5) in the non-pandemic period and these comparative values were statistically significant ($p=0.001$). Comparative data of the patients are given in table 1 (Table1).

Table 1. Comparative data of the patients.

	Total n=126	Non-covid n=79	Covid n=47	p
Age, year, mean \pm SD	47.8 \pm 13.62	48.2 \pm 14.01	47.26 \pm 13.07	0.707
Gender, n (%)				0.481
Male	46 (36.5)	27 (34.2)	19 (40.4)	
Female	80 (63.5)	52 (65.8)	28 (59.6)	
Diagnosis, n (%)				0.003
Differentiated Thyroid Cancer	66 (52.4)	33 (41.8)	33 (70.2)	
MNG	29 (23.0)	24 (30.4)	5 (10.6)	
Graves	22 (17.5)	14 (17.7)	8 (17.0)	
Toxic MNG	8 (6.3)	8 (10.1)	-	
Lymphoma	1 (0.8)	-	1 (2.1)	
Stage				0.285
Stage 1	69	30 (93.8)	39 (100)	
Stage 2	1	1 (3.1)	-	
Stage 3	1	1 (3.1)	-	
Time of diagnosis to surgery, day, median (Q1-Q3)				
Bening	-	30 (21.25-48.5)	114 (40-182.5)	0.001
Malign	-	28 (13.5-44)	36 (24.75-55.75)	0.089
Surgery time				0.037
minute, median (Q1-Q3)	120 (100-146)	110 (95-140)	120 (105-155)	
Complication, n (%)				0.028
No complication	110 (87.3)	65 (82.3)	45 (95.7)	
Transient Hypocalcemia	12 (9.5)	10 (12.7)	2 (4.3)	
Transient Recurrent nerve paralysis	3 (2.4)	3 (3.8)	-	
Hematoma	1 (0.8)	1 (1.3)	-	
Hospitalization Period				<0.001
Day, median (Q1-Q3)	1 (1-2)	2 (1-2)	1 (1-2)	

MNG: Multinodular goiter

DISCUSSION

It is estimated that more than 28 million surgeries were canceled in March 2020 all over the world due to the Covid-19 pandemic (9). Zhang D et al. reported that during the first wave of the pandemic (phase 1) in China, the center of the pandemic, there was a 93.3% reduction in patients treated in the outpatient clinic for thyroid pathologies and a

99.7% reduction in thyroid fine-needle biopsies and that no new thyroid cancer was diagnosed during this period, and that no surgery was performed (7). Smulever A et al. reported that there is more than a 98% decrease in thyroid surgery compared to last year in Argentina (1).

In our practice, from the first wave of the pandemic, a rapid organization was provided, the surgeries were ensured to be mainly shifted to the isolated unit, and during the whole process, there was only a 40% reduction in all surgeries. When the literature is reviewed, this rate is at an acceptable level compared to the sites reporting a decrease of more than 90%. Since the start of the normalization period in our clinic in June, there has been a rapid increase in the number of thyroid surgeries performed for benign and malignant diseases.

There are little data on the impact of Covid-19 infection on patients with thyroid cancer, and there is no evidence to suggest that patients with a history of thyroid surgery are at greater risk of infection (1). Guidelines recommend active follow-up as first-line therapy in selected patients with suspected low-risk papillary thyroid carcinoma (10), while recommending that surgery be performed without delay in patients with aggressive progressive tumors, suspected anaplastic thyroid cancer, or poorly differentiated carcinoma (11). In Graves' disease, the most common cause of hyperthyroidism, the primary treatment is antithyroid drugs (12). However, due to frequent relapses, thyroidectomy or radioactive iodine (RAI) as permanent treatment are the final treatment methods. Shaha et al. recommend that the surgeries of patients with thyroid cancer may be delayed for up to 4-6 months in the first stage during the Covid-19 pandemic (13). It is advised that thyroid surgery other than emergency surgeries such as severe symptomatic Graves' disease and thyroid cancers with a short doubling time, aggressive nature, or sudden life-threatening thyroid cancer may also be postponed for 2-3 months (2). The European Society for Endocrinology's recommendations for endocrine diseases during the pandemic period include close glycemic control for diabetic patients, close clinical monitoring, and replacement therapy if clinically indicated for pituitary and adrenal gland pathologies. However, no special emphasis has been laid on patients with thyroid pathology (14). In our practice, in accordance with the current literature, we postponed the surgeries of patients who will undergo thyroid surgery due

to benign diagnosis in the first period, and we performed these surgeries in an increasing number with the control of the pandemic, but unlike the literature, the number of patients operated on with a diagnosis or suspicion of thyroid cancer was the same compared to the previous year. These patients were operated on at the end of similar waiting times compared to last year.

Lombardi et al. performed a total of 18 thyroid surgeries, 14 of which were related to malignancy in a 4-week period during the pandemic period, no patient required postoperative ventilation support, and the mean hospital stay was reported to be 3 days (5).

In Vietnam, similar to our country, after the pandemic was brought under control, the Ministry of Health recommended that all planned elective surgeries could be continued. Hereupon, elective thyroid surgeries continued, most Vietnamese with thyroid disease were operated on without being affected by the Covid-19 pandemic (2). Examining our results in this process, it is seen that the surgery time was prolonged compared to the previous year, but the complication rates have decreased. It was considered that the duration was prolonged due to the pre-operative preparations made for protection from Covid-19. It was thought that the reason for the decrease in the rate of complications was that the cases in this period were performed more frequently by general surgeons who were interested in endocrine surgery and experienced in the field compared to the previous year.

It was advised to scan patients with high-resolution CT at the beginning of the pandemic for Covid-19 screening during the preoperative period, and to use a swab test to detect Covid19 instead of CT scanning in the later period (7,15,16). In our clinical practice, we directed patients with suspicious symptoms and contact them to pandemic outpatient clinics, instead of performing pre-operative tests on each patient as per the cost-benefit policy of the hospital management. In patients without suspicious contact and symptoms, only PACXR was performed in the preoperative period instead of a routine CT scan and swab test. No patient who has been operated on developed symptoms related to Covid-19 infection. The primary reasons for this include factors such as the effect of the non-pandemic hospital where Covid-19 positive patients are not followed up, the effective isolation of the surgical wards in the pandemic hospital, and the strict compliance of the patients

with the precautions. In light of all these results, the most important factors in effectively treating thyroid diseases are successful control of the Covid-19 pandemic and ensuring a strong health system organization (2).

CONCLUSION

In conclusion, one of the most affected areas in the name of general surgery during the Covid-19 pandemic has been endocrine surgery, especially thyroid surgery. Guidelines published at the beginning of the pandemic suggest postponing surgeries other than emergency conditions as a temporary solution, but this postponement is open-ended because it is difficult to predict the end time of the pandemic. Therefore, in the fight against the pandemic in the future, non-pandemic hospitals should be predetermined, after the necessary optimum conditions are provided, oncological and elective surgeries should be performed in a planned manner and patient victimization should be prevented. This organization has been ensured in our clinic and our institution and successful outcomes have been achieved.

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REFERENCES

1. Smulever A, Abelleira E, Bueno F, Pitoia F. Thyroid cancer in the Era of COVID-19. *Endocrine*. 2020;70(1):1-5. doi:10.1007/s12020-020-02439-6.
2. Van Le Q, Ngo DQ, Tran TD, Ngo QX. The impact of COVID-19 pandemic on thyroid surgery in Vietnam. *Eur J Surg Oncol*.

2020;46(11):2164-2165. doi:10.1016/j.ejso.2020.07.022.

3. Updated Intercollegiate General Surgery Guidance on COVID-19. <https://www.rcseng.ac.uk/coronavirus/joint-guidance-for-surgeons-v2/>

4. COVID 19: Elective Case Triage Guidelines for Surgical Care Cancer Surgery. <https://www.facs.org/covid-19/clinical-guidance/elective-case/cancer-surgery>

5. Lombardi CP, D'Amore A, Grani G, et al. Endocrine surgery during COVID-19 pandemic: do we need an update of indications in Italy? *Endocrine*. 2020;68(3):485-488. doi:10.1007/s12020-020-02357-7

6. Elanko Afsana, Khan Jim, Hamady Zaed ZR., Hassan Malik. Cancer surgery sustainability in the light of COVID-19 pandemic. *Eur J Surg Oncol*. 2020 Jun;46(6):1174-1175.

7. Zhang D, Fu Y, Zhou L, et al. Thyroid surgery during coronavirus-19 pandemic phases I, II and III: lessons learned in China, South Korea, Iran and Italy [published online ahead of print, 2020 Sep 2]. *J Endocrinol Invest*. 2020;1-9. doi:10.1007/s40618-020-01407-1

8. Bartalena L, Chiovato L, Marcocci C, Vitti P, Piantanida E, Tanda ML. Management of Graves' hyperthyroidism and orbitopathy in time of COVID-19 pandemic. *J Endocrinol Invest*. 2020;43(8):1149-1151. doi:10.1007/s40618-020-01293-7

9. COVIDSurg Collaborative. Elective surgery cancellations due to the COVID-19 pandemic: global predictive modelling to inform surgical recovery plans. *Br J Surg*. 2020;107(11):1440-1449. doi:10.1002/bjs.11746

10. Haugen BR, Alexander EK, Bible KC, et al. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer: The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer. *Thyroid*. 2016;26(1):1-133. doi:10.1089/thy.2015.0020

11. Smulever A, Abelleira E, Bueno F, Pitoia F. Thyroid cancer in the Era of COVID-19. *Endocrine*. 2020;70(1):1-5. doi:10.1007/s12020-020-02439-6

12. Smith TJ, Hegedüs L. Graves' Disease. *N Engl J Med*. 2016 Oct 20;375(16):1552-1565. doi: 10.1056/NEJMra1510030. PMID: 27797318.

13. Shaha AR. Thyroid surgery during COVID-19 pandemic: Principles and philosophies. *Head Neck*. 2020;42(6):1322-1324. doi:10.1002/hed.26198

14. Puig-Domingo M, Marazuela M, Giustina A. COVID-19 and endocrine diseases. A statement from the European Society of Endocrinology. *Endocrine*. 2020;68(1):2-5. doi:10.1007/s12020-020-02294-5.

15. Li Q, Guan X, Wu P, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. *N Engl J Med*. 2020;382(13):1199-1207. doi:10.1056/NEJMoa2001316

16. Zhu N, Zhang D, Wang W, et al. A Novel Coronavirus from Patients with Pneumonia in China, 2019. *N Engl J Med*. 2020;382(8):727-733. doi:10.1056/NEJMoa2001017