



# Anesthesia Evaluation of Non-COVID-19 Oncological - Non-Oncological Operations in Our Operating Room in the First Year of the COVID-19 Pandemic: A Retrospective Study

COVID-19 Pandemisinin İlk Yılında Ameliyathanemizin Non-COVID-19 Onkolojik - Onkolojik Tanı Alabilecek Ameliyatlarının Anestezi Değerlendirilmesi: Retrospektif Çalışma

Ahmet GÜLTEKİN, Ayhan ŞAHİN, İlker YILDIRIM, Onur BARAN, Cavidan ARAR

Tekirdağ Namık Kemal University Faculty of Medicine, Department of Anesthesiology and Reanimation, Tekirdağ, Turkey

## ABSTRACT

**Aim:** The Coronavirus disease-2019 (COVID-19) pandemic has caused serious changes in health services in our country as well as all over the world. The most affected group includes those who will undergo surgery with an oncological diagnosis or who can be diagnosed with an oncological diagnosis. It is aimed to observe the changes in the operations with oncological diagnoses, which will require pathological examination in the operating room of our tertiary university hospital, in terms of demographics, surgical branch, duration of the operation and type of anesthesia in the first year of the pandemic.

**Materials and Methods:** The retrospective scanning method was used to scan the surgical patient files of the patients who met the criteria (Retrospective cross-sectional study).

**Results:** While the first 3 branches of our operating room with the highest number of cases did not change, there was a difference in the American Society of Anesthesiology (ASA) II-III scoring ( $p<0.05$ ), neuraxial and trunk blocks ( $p<0.05$ ) in which general anesthesia was applied alone as an anesthesia type or it was added. In addition, a change was observed in 13.3% of cases with oncological diagnosis and 32% in elective surgeries requiring pathological examination.

**Conclusion:** In the COVID-19 pandemic, more expected cancellation rates did not occur by adapting to the "new normal", but there were differences in ASA scores and anesthesia type during this period.

**Keywords:** COVID-19, oncological surgery, ASA score, type of anesthesia

## ÖZ

**Amaç:** Koronavirüs hastalığı-2019 (COVID-19) pandemisi tüm dünyada olduğu gibi ülkemizde de sağlık hizmetlerinde ciddi değişimlere neden olmuştur. En çok etkilenen grup, onkolojik bir tanı ile ameliyat olacak veya onkolojik bir tanı ile teşhis edilebilecek olanlardır. Çalışmanın amacı pandeminin ilk yılında üçüncü basamak üniversite hastanemizin ameliyathanesinde patolojik inceleme gerektirecek veya onkolojik tanıli ameliyatlarda demografik, cerrahi branş, ameliyat süresi ve anestezi tipi açısından değişiklikleri gözlemlemektir.

**Gereç ve Yöntem:** Kriterleri sağlayan hastaların ameliyat hasta dosyaları retrospektif tarama yöntemiyle incelendi (retrospektif kesitsel çalışma).

**Bulgular:** Ameliyathanemizin olgu sayısının en fazla olduğu ilk 3 cerrahi branş değişmezken, Amerikan Anesteziyoloji Derneği (ASA) II-III skorlamasında ( $p<0,05$ ) anestezi türünde tek başına uygulanan genel anestezi veya genel anestezi eklenen nöroaksiyel ve gövde bloklarında ( $p<0,05$ ) farklılık mevcuttur. Ayrıca onkolojik tanıli olgularda %13,3 ve patolojik inceleme gerektiren elektif ameliyatlarda %32 oranında değişim gözlenmiştir.

**Sonuç:** COVID-19 pandemisinde "yeni normal"e uyum sağlanarak daha fazla beklenen iptal oranları oluşmamış ancak bu dönemde ASA skorlarında ve anestezi tipinde farklılıklar olmuştur.

**Anahtar Kelimeler:** COVID-19, onkolojik cerrahi, ASA skoru, anestezi türü

**Address for Correspondence:** Ahmet GÜLTEKİN MD, Tekirdağ Namık Kemal University Faculty of Medicine, Department of Anesthesiology and Reanimation, Tekirdağ, Turkey

**Phone:** +90 506 273 24 82 **E-mail:** ahmetgultekin82@yahoo.com **ORCID ID:** orcid.org/0000-0003-4570-8339

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## INTRODUCTION

Coronavirus disease-2019 (COVID-19), which started in Wuhan in December 2019, was declared as a pandemic by the World Health Organization (WHO) on March 11, 2020, as a result of its rapid spread to the world after China<sup>1</sup>. The COVID-19 pandemic, as it is known all over the world, has led to interruptions in general health services. During the intense periods of the COVID-19 pandemic, priority was given to emergency and cancer surgeries, and the cancellation of elective surgeries was prioritized<sup>2</sup>. Elective surgeries were suspended when necessary in hospitals selected as pandemic hospitals (COVID-19 treatment centers) in our country, whereas, in hospitals that did not operate as pandemic hospitals (COVID-19-free centers)<sup>3</sup> (our hospital is in this group), priority was given to COVID-19 patients, emergency and oncological surgeries during the peak periods of the pandemic. In the rest of the year, surgical procedures that needed to be evaluated in terms of pathology were allowed by the pandemic commission of the hospital.

Towards the end of the first year of the COVID-19 pandemic, vaccination for the pandemic started in the world, and studies were carried out on the application strategies and changes in oncological surgeries for certain periods of this period (especially the peak periods)<sup>2,4-11</sup>. We aimed to evaluate the change in demographics, surgical branch, duration of operation and anesthesia type of patients who were operated in our operating room with a non-COVID-19 oncological diagnosis in the first year of COVID-19 in our hospital, which is a tertiary hospital, and without oncological diagnosis, which needed to be evaluated (elective) by pathology.

## MATERIALS AND METHODS

This is a retrospective observational single-center study conducted between January 1, 2019 and December 31, 2020 in the operating room of our hospital. In our study, the case data (anesthesia file data) of 11 surgical branches [Departments of General Surgery, Obstetrics and Gynecology (OG), Orthopedics and Traumatology (Orthopedics), Urology, Thoracic Surgery, Ophthalmology, Brain and Nerve Surgery (BNS), Otorhinolaryngology, Plastic Reconstructive and Aesthetic Surgery, Cardiovascular Surgery and Pediatric Surgery] using our operating room were scanned and used. Cardiovascular Surgery, Pediatric Surgery and Plastic Reconstructive and Aesthetic Surgery were excluded from the study due to the high number of changes in faculty members during this period. Anesthesia files in the archive were used while collecting our data. Emergency surgeries, surgeries with COVID-19 disease, and surgical procedures that did not require pathological necessity were excluded from the study. With the WHO's declaration of the pandemic, the number of rooms used for elective surgery in the operating room was

reduced due to the density in the COVID-19 units in some periods. Nasopharyngeal swab samples were taken from each patient to be operated within 72 hours before the operation, and hospitalization was ensured if there were no preoperative symptoms. Between the cases, 20 minutes were awaited for operating rooms after sterilization. The rooms of COVID-19 patients and the operating rooms of non-COVID-19 patients were kept separate. COVID-19 and non-COVID-19 intensive care units were separated.

In this period, the data of our patients such as date of operation, age, gender, American Society of Anesthesiology (ASA) score, oncological diagnosis, surgical branch, duration of operation (time considered as the sum of anesthesia and surgical duration), type of anesthesia and the condition or surgical procedure that caused the operation were recorded.

## Statistical Analysis

Descriptive statistics were presented as mean, standard deviation, median (minimum-maximum), frequency and percentage. The distribution of the variables was measured using the Kolmogorov-Smirnov test. Quantitative independent data were analyzed using the Mann-Whitney U test. The chi-square test was used in the analysis of qualitative independent data whereas the Fisher's exact test was used when the chi-square test requirements were not met. The Statistical Package for the Social Sciences 27.0 program was used for analyses. The level of significance was taken as  $p < 0.05$ .

## RESULTS

When the cases not included in the study in 2019-2020 were excluded, the files of 2,559 patients were scanned. Of these, 1,055 patients (41.2%) had an operation with a definite oncological diagnosis, while the remaining 1,504 patients (58.8%) were examined pathologically (can be diagnosed). The first 3 clinics that received the most patients in the surgical branch were General Surgery (33.4%), OG (23%), and Urology (21.8%) clinics. The most preferred type of anesthesia was general anesthesia (with 77%). Demographic, surgical branch, anesthesia type and operation time data of all patients are shown in Table 1.

The age of the patients did not differ significantly ( $p > 0.05$ ) in the year before the COVID-19 pandemic (2019) and in the first year of the pandemic (2020). The ASA score of the patients in 2020 was found to be significantly higher ( $p < 0.05$ ) than that in 2019. In the first year of the pandemic (2020), there was a statistical difference ( $p = 0.003$ ) with a 13.3% decrease in the number of patients with oncological diagnosis and a 32% decrease in the group requiring pathological examination (can be diagnosed). While the rate of general surgery cases in 2020 was significantly higher ( $p < 0.05$ ) than that in 2019, the rates of otolaryngology, chest diseases and orthopedics were

significantly lower than in 2019 ( $p < 0.05$ ). While the rate of patients in the general surgery department was 30.7% in 2019, this rate increased to 36.9% in 2020. While the rate of patients in the orthopedics department was 3.4% in 2019, this rate was 0.5% in 2020. While the rate of patients in the thoracic surgery department was 4.7% in 2019, this rate became 2.6% in 2020. While the rate of patients in the ENT department was 13.4% in 2019, this rate was 8.5% in 2020. The ratio of OG, urology, neurosurgery, eye branches did not differ significantly ( $p > 0.05$ ) in the years of 2019 and 2020 (Table 2).

In 2020, the rates of general anesthesia + neuraxial block and general anesthesia + trunk block were significantly higher ( $p < 0.05$ ) than in 2019. The rate of general anesthesia type of patients in 2020 was significantly ( $p < 0.05$ ) lower than in 2019. The rates of neuraxial block, sedoanalgesia, and peripheral nerve block did not differ significantly between 2019 and 2020 ( $p > 0.05$ ). The duration of surgery did not differ significantly ( $p > 0.05$ ) between 2019 and 2020 (Table 2).

When we compared the number of operations in the operating room monthly during the year, there was a statistical difference in the rates of oncological operations in April ( $p < 0.001$ ) and December ( $p = 0.004$ ) compared to the previous year (although there was a decrease in the number of operations in April and an increase in the interval) (Table 3).

## DISCUSSION

As it is known, the COVID-19 pandemic has caused interruptions in health services all over the world. During the intense periods of the COVID-19 pandemic, priority was given to emergency and cancer surgeries, and cancellation of elective surgeries was prioritized<sup>2</sup>. We aimed to examine cancer surgeries that were not diagnosed with COVID-19 in the first year of the pandemic, and elective surgeries that required pathological examination (which can be diagnosed) in the first year of the pandemic, in which we served as a tertiary university and hospital that did not function as an active pandemic hospital (except during the peak periods of the pandemic). Three surgical branches out of

**Table 1. Demographic, surgical branch, anesthesia type and operation time data of all patients**

		Min.-Max.			Median	Mean±SD/n-%		
Age		1.0	-	94.0	55.0	53.7	±	14.5
Gender	Male					999		39.0%
	Female					1,560		61.0%
ASA Score	I					182		7.1%
	II					1,777		69.4%
	III					589		23.0%
	IV					11		0.4%
Diagnosis	With oncological diagnosis					1,055		41.2%
	Can be diagnosed					1,504		58.8%
<b>Surgical Branch</b>								
General Surgery						854		33.4%
Obstetrics and Gynecology						588		23.0%
Urology						559		21.8%
Otorhinolaryngology						288		11.3%
Brain and Nerve Surgery						106		4.1%
Thoracic Surgery						98		3.8%
Orthopedics						55		2.1%
Eye Diseases						11		0.4%
<b>Type of Anesthesia</b>								
General Anesthesia						1,971		77.0%
Neuraxial Block						259		10.1%
General Anesthesia + Neuraxial Block						169		6.6%
General Anesthesia + Trunk Block						95		3.7%
Sedoanalgesia						54		2.1%
Peripheral Nerve Block						11		0.4%
Duration of operation (min)		5.0	-	760.0	75.0	97.7	±	84.5

SD: Standard deviation, ASA: American Society of Anesthesiology, min: Minute, Min.: Minimum, Max.: Maximum

11 surgical branches in our operating room did not meet the study criteria, so they were excluded from the study (Pediatric Surgery, Cardiovascular Surgery and Plastic Reconstructive and Aesthetic Surgery).

In the first year of the pandemic, as before the pandemic, the first 3 departments that performed the most surgical procedures did not change (General Surgery, Gynecology, and Urology). Comparing the two years, it is seen that there is a significant increase in ASA II-III in 2020. It is thought that the decrease in ASA I is due to canceled elective surgeries, the decrease in ASA IV is due to the additional comorbid diseases of this group and the fact that this group also includes the patients in the highest risk group for COVID-19 disease<sup>12</sup>.

Compared to the same period, the decrease rate in oncological cases was 13.3%, and this rate was 32% in the other group that could be considered as elective. While the period we evaluated was one year, in studies comparing shorter periods,

reductions between 20-60%<sup>2,4,13</sup> in oncological surgery and up to 81.7%<sup>2</sup> in elective surgeries were detected. We think that, among the most important reasons why our rate is lower, it covers the wider time interval and periods outside the peak periods of COVID-19, as well as the adaptation process to the "new normal".

The ratios of surgical branches in the number of cases were affected by the pandemic, and since the cancellation rate in the General surgery<sup>2</sup> branch was less, the case rate of some branches (OG, Urology, BNS and Ophthalmology) did not change, while other branches (Orthopedics, Thoracic surgery, Otorhinolaryngology) differed (Table 2).

In this period, regional anesthesia techniques were recommended as a type of anesthesia, especially in order to prevent viral transmission and aerosolization<sup>14-16</sup>. In our study, there was no difference in regional techniques, but there was a difference in the group of blocks applied in addition to general

**Table 2. General comparison of operating room for the years 2019-2020**

	Year 2019		Year 2020		p value				p value			
	Mean±SD /n-%		Median	Mean±SD /n-%		Median						
Age	53.5		±	14.8	55.0		53.9	±	14.2	55.0	0.549	m
Gender	Male	588			40.3%		411		37.4%		0.140	X <sup>2</sup>
	Female	872			59.7%		688		62.6%			
ASA score	I	134			9.2%		48		4.4%		0.000	X <sup>2</sup>
	II	997			68.3%		780		71.0%			
	III	321			22.0%		268		24.4%			
	IV	8			0.5%		3		0.3%			
Diagnosis	Oncological diagnosis	565			38.7%		490		44.6%		0.003	X <sup>2</sup>
	Can be diagnosed	895			61.3%		609		55.4%			
<b>Surgical Branch</b>												
General Surgery	448			30.7%		406		36.9%		0.001	X <sup>2</sup>	
Obstetrics and Gynecology	328			22.5%		260		23.7%		0.478	X <sup>2</sup>	
Urology	308			21.1%		251		22.8%		0.291	X <sup>2</sup>	
Otorhinolaryngology	195			13.4%		93		8.5%		0.000	X <sup>2</sup>	
Brain and Nerve Surgery	57			3.9%		49		4.5%		0.486	X <sup>2</sup>	
Thoracic Surgery	69			4.7%		29		2.6%		0.006	X <sup>2</sup>	
Orthopedics	49			3.4%		6		0.5%		0.000	X <sup>2</sup>	
Eye diseases	6			0.4%		5		0.5%		0.866	X <sup>2</sup>	
<b>Type of Anesthesia</b>												
General Anesthesia	1177			80.6%		794		72.2%		0.000	X <sup>2</sup>	
Neuraxial Block	136			9.3%		123		11.2%		0.119	X <sup>2</sup>	
General Anesthesia + Neuraxial Block	73			5.0%		96		8.7%		0.000	X <sup>2</sup>	
General Anesthesia + Trunk Block	34			2.3%		61		5.6%		0.000	X <sup>2</sup>	
Sedoanalgesia	32			2.2%		22		2.0%		0.741	X <sup>2</sup>	
Peripheral Nerve Block	8			0.5%		3		0.3%		0.293	X <sup>2</sup>	
Duration of operation (min)	93.6		±	78.4	75.0		103.2	±	91.7	75.0	0.075	m

<sup>m</sup>: Mann-Whitney U test, <sup>x<sup>2</sup></sup>: Chi-square test, SD: Standard deviation, ASA: American Society of Anesthesiology, min: Minute

anesthesia for general anesthesia or postoperative analgesia (General anesthesia + neuraxial block and General anesthesia + body blocks).

When we evaluate the effect in the pandemic period as months, it was found that there was a significant decrease in the number of cases (54.8% in the oncological group and 83% in the other group) in the month after the WHO's declaration of the pandemic (March 11, 2021), and there was a difference in the rate of oncological and elective diagnoses. With oncological cases becoming a priority, the number of oncological cases increasing throughout the year also made a difference in December compared to the previous year, proportionally (Table 3).

### Study Limitations

The most important limitation of our study is that it is a single-center and retrospective study. A multicenter study could make a difference in terms of interaction from covid according to the population of the regions. In addition, a prospective

study could improve the quality of the study, but all healthcare professionals in the world were working under difficult and uncertain conditions in the follow-up and control of this challenging process.

### CONCLUSION

We presented the report of surgeries with oncological diagnosis and pathological examination (elective) in the operating room of the tertiary university hospital in the COVID-19 pandemic. The effect of the pandemic in our operating room is seen especially in the period after the cases in our country and the WHO's declaration of the pandemic (March 2021). Compared to the same period, an increase in the ASA II-III group rates and an increase in the case rates of surgical branches and anesthesia techniques (in the blocks added for anesthesia and analgesia in addition to general anesthesia and general anesthesia) were observed. Towards the end of the first year of the pandemic, it is seen that the number of cases that underwent surgery (especially with oncological diagnosis) and our hospital and operating room adapted to this "new normal",

**Table 3. Comparison of the change in the number of surgeries by month**

		2019 (n=1.460) (%)	2020 (n=1.099) (%)	Total (n=2.559)	p <sup>x2</sup>
January	With oncological diagnosis	53 (39)	49 (34.5)	102 (36.7)	0.440
	Can be diagnosed	83 (61)	93 (65.5)	176 (63.3)	
February	With oncological diagnosis	53 (34.4)	56 (39.7)	109 (36.9)	0.346
	Can be diagnosed	101 (65.6)	85 (60.3)	186 (63.1)	
March	With oncological diagnosis	51 (40.5)	20 (28.6)	71 (36.2)	0.097
	Can be diagnosed	75 (59.5)	50 (71.4)	125 (63.8)	
April	With oncological diagnosis	42 (36.8)	19 (86.4)	61 (44.9)	<0.001
	Can be diagnosed	72 (63.2)	3 (13.6)	75 (55.1)	
May	With oncological diagnosis	53 (39.6)	9 (47.4)	62 (40.5)	0.516
	Can be diagnosed	81 (60.4)	10 (52.6)	91 (59.5)	
June	With oncological diagnosis	37 (42.5)	36 (43.4)	73 (42.9)	0.911
	Can be diagnosed	50 (57.5)	47 (56.6)	97 (57.1)	
July	With oncological diagnosis	63 (41.4)	42 (47.7)	105 (43.8)	0.345
	Can be diagnosed	89 (58.6)	46 (52.3)	135 (56.3)	
August	With oncological diagnosis	25 (36.8)	43 (43)	68 (40.5)	0.419
	Can be diagnosed	43 (63.2)	57 (57)	100 (59.5)	
September	With oncological diagnosis	44 (38.9)	45 (46.4)	89 (42.4)	0.276
	Can be diagnosed	69 (61.1)	52 (53.6)	121 (57.6)	
October	With oncological diagnosis	44 (35.5)	55 (47.8)	99 (41.4)	0.053
	Can be diagnosed	80 (64.5)	60 (52.2)	140 (58.6)	
November	With oncological diagnosis	51 (39.5)	48 (44.9)	99 (41.9)	0.409
	Can be diagnosed	78 (60.5)	59 (55.1)	137 (58.1)	
December	With oncological diagnosis	49 (39.8)	67 (58.8)	116 (48.9)	0.004
	Can be diagnosed	74 (60.2)	47 (41.2)	121 (51.1)	

x<sup>2</sup>: Chi-square test

reducing the oncological and elective case cancellation rates that are expected to cause more of the pandemic.

## Ethics

**Ethics Committee Approval:** Ethics committee approval was received for this study from the Ethics Committee of Tekirdağ Namık Kemal University Faculty of Medicine (approval no: 2021.206.07.14, date: 27.07.2021).

**Informed Consent:** Retrospective cross-sectional study.

**Peer-review:** Externally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: A.G., A.Ş., İ.Y., O.B., C.A., Concept: A.G., A.Ş., Design: A.G., A.Ş., Data Collection or Processing: A.G., A.Ş., İ.Y., Analysis or Interpretation: A.G., A.Ş., O.B., Literature Search: A.G., A.Ş., Writing: A.G., A.Ş., C.A.

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