ORIGINAL RESEARCH

Bagcilar Med Bull 2022;7(4):302-310
DOI: 10.4274/BMB.galenos.2022.2022-08-067

Evaluation of Anesthesia Administrations in Electroconvulsive Therapy in the COVID-19 Pandemic Process

COVID-19 Pandemi Sürecinde Elektrokonvülsif Tedavilerde Anestezi Uygulamalarının Değerlendirilmesi

Asiye Demirel, Ayşe Neslihan Balkaya, Tuğba Onur, Şeyda Efsun Özgünay

University of Health Sciences Turkey, Bursa High Specialization Training and Research Hospital, Clinic of Anesthesiology and Reanimation, Bursa, Turkey

Abstract

Objective: The aim of this study is to evaluate the approach of anesthesiology physicians to electroconvulsive therapy (ECT) in the Coronavirus disease-2019 (COVID-19) pandemic process, the protective safety measures taken before and during ECT, and their approach to the use of personal protective equipment (PPE).

Method: A questionnaire form including questions about changes in ECT treatments, use of PPE, employee and patient safety during the pandemic process was prepared. Anesthesiology lecturers, specialist doctors and research assistants throughout Turkey were invited to participate in the research by sending the link of the questionnaire form via either the online social network application WhatsApp, or emails through the Turkish Society of Anesthesiology and Reanimation.

Results: The forms of 130 participants who responded were analyzed. Of the participants, 43.8% (n=25) were specialist physician, 36.9% (n=57) were research assistant, and 19.2% (n=48) were lecturers. The distribution of the institutions where the participants worked was university hospitals at the rate of 43.8% (n=57), training and research hospitals at the rate of 47.7% (n=67), and private and public hospitals at the rate of 8.5% (n=11). Among the participants, 63.8% (n=83) stated that they continued to perform ECT, while 76.9% (n=100) stated that the number of ECT performed in their hospital decreased. The number of people in the room during ECT was four or less in 73.8% (n=96) of the participants, the rate of the participants who practiced more than 30 min waiting interval between ECTs was 9.2% (n=12). It was found that the rate of high-efficiency particulate air filter application to the anesthesia device was 93.8%, the rate of preoxygenation application was 85.4%, and

Öz

Amaç: Koronavirüs hastalığı-2019 (COVID-19) pandemisi sürecinde anesteziyoloji hekimlerinin elektrokonvülsif tedavi (EKT) uygulamasına yaklaşımı, EKT sırasında alınan koruyucu güvenlik önlemleri, kişisel koruyucu ekipman (KKE) kullanımı, anestezi uygulamaları ile ilgili durum ve yaklaşımlarını değerlendirmektir.

Yöntem: Türkiye genelindeki anestezi öğretim görevlisi, uzman doktor ve araştırma görevlileri, pandemi sürecinde EKT uygulamalarındaki değişiklikler, KKE kullanımı, çalışan ve hasta güvenliği ile ilgili soruları içeren anket formu online ve Türk Anesteziyoloji ve Reanimasyon Derneği aracılığıyla gönderilerek araştırmaya katılmaya davet edildi.

Bulgular: Çalışmaya 130 kişi yanıt verdi, yanıt verenlerin sonuçları analiz edildi. Katılımcıların %43,8'ü (n=25) uzman hekim, %36,9'u (n=57) araştırma görevlisi, %19,2'si (n=48) öğretim görevlisiydi. Hastane dağılımı %43,8 (n=57) üniversite, %47,7 (n=67) eğitim araştırma, %8,5 (n=11) özel ve devlet hastanesi idi. Pandemide EKT uygulamaya devam ettiğini belirtenlerin oranı %63,8 (n=83) iken %76,9'u (n=100) hastanelerinde EKT uygulama sayılarında azalma olduğunu söylemişlerdir. EKT sırasında odada bulunan kişi sayısı katılımcıların %73,8'inde (n=96) 4 ve altında, EKT arası 30 dakika üzerinde bekleme süresi uygulayan katılımcıların oranı %9,2 (n=12) idi. Anestezi cihazı ekshalasyon valfine hepafiltre uygulama oranı %93,8; preoksijenizasyon uygulama oranı %85,4; balon maske ventilasyon uygulama oranı %77,7 olarak bulundu. EKT uygulaması sırasında katılımcıların %45'i her zaman KKE kullandığını, %10'u hiçbir uygulamada KKE kullanmadığını belirtti. KKE kullanım oranlarına bakıldığında sırasıyla %93,1'inde N95 (FFP2/FFP3), %50,8'inde tek kat eldiven, %50,8'inde boks gömleği ve %49'unda cerrahi maske kullanıldığı

Address for Correspondence: Asiye Demirel, University of Health Sciences Turkey, Bursa High Specialization Training and Research Hospital, Clinic of Anesthesiology and Reanimation, Bursa, Turkey
E-mail: dr.asiyedemirel@hotmail.com **ORCID:** orcid.org/0000-0003-1694-2265 **Received:** 04.08.2022 **Accepted:** 27.09.2022

Cite this article as: Demirel A, Balkaya AN, Onur T, Özgünay ŞE. Evaluation of Anesthesia Administrations in Electroconvulsive Therapy in the COVID-19 Pandemic Process. Bagcilar Med Bull 2022;7(4):302-310

the rate of applying bag mask ventilation was 77.7%. Forty-five percent of the participants indicated that they always used PPE, 10% stated not to use PPE in any treatment. It was determined that the most commonly used PPEs were N95 (FFP2 or higher) (93.1%), single-layer glove (50.8%), box apron (50.8%), and surgical mask (49%), respectively. The rate of participants who stated that they experienced no difficulty in procuring PPE was 53.8%, whereas 29.2% indicated that they had difficulty in procuring N95 (FFP2 or higher). Of the participants, 66.9% reported that a COVID-19 polymerase chain reaction (PCR) test was performed within 24-48 hours before ECT, 8.5% stated that patients did not undergo COVID-19 PCR testing. It was detected that 14.6% of the participants performed ECT to COVID-19 positive patients and 9.2% had COVID-19 infection after the treatment.

Conclusion: ECT treatments have decreased to a great extent during the pandemic process. We wanted to draw attention to procedures that would cause aerosolization in ECT, the importance of PPE use and the differences in practice with questions toward the level of knowledge in line with the recommendations of the guidelines on this subject. We are of the opinion that it will be important to know and implement the guidelines in terms of employee and patient safety in the presence of a possible pandemic.

Keywords: Anesthesia, approach, COVID-19, electroconvulsive therapy, personal protective equipment, treatment

görüldü. Katılımcıların %53,8'i KKE temininde zorluk çekmediğini belirtirken, %29,2'si N95 (FFP2/FFP3) temininde zorluk yaşadıklarını belirtmişlerdir. EKT öncesi 24-48 saat içinde COVID polimereaz zincir reaksiyon (PCR) testine bakılma oranı %66,9 olarak bulunurken; katılımcıların %8,5'i hastalara COVID PCR testi yapılmadığını belirtmiştir. Katılımcıların %14,6'sı ise COVID-19 pozitif hastalara EKT uyguladığını söylemiştir. Uygulama sonrası hekimlerden %9,2'sinin COVID-19 enfeksiyonu geçirdiği saptanmıştır.

Sonuç: Pandemi sürecinde EKT uygulamaları büyük oranda azalmıştır. EKT'de aerosol oluşumuna sebep olacak uygulamalara, KKE kullanımının önemine ve bu konuda kılavuzların önerileri doğrultusunda bilgi düzeylerine yönelik sorular ile uygulama farklılıklarına dikkat çekmek istedik. Olası bir pandemi varlığında çalışan ve hasta güvenliği açısından, kılavuzların bilinmesi ve uygulanmasının önemli olacağı kanısındayız.

Anahtar kelimeler: Anestezi, COVID-19, elektrokonvülsif tedavi, kişisel koruyucu ekipman, yaklaşım

Introduction

Healthcare workers (HCWs) may be exposed to many adverse conditions such as infection, radiation, and chemical and physical risks while providing diagnostic and therapeutic healthcare services in hospitals (1). Among these, the most common cause of morbidity and mortality is constituted by infection based on the margin of exposure. Protective measures, including vaccination, if possible, change the risk of infection, depending on the extent to which they are implemented in the working environment. Among the protective measures to be taken during the pandemic process, complying with national and international guidelines and using personal protective equipment (PPE) have an important place. HCWs should use special clothes and additional protective equipment determined with regard to the unit where they work in addition to gloves and masks to protect themselves and patients while providing healthcare services (2).

The novel Coronavirus disease-2019 (COVID-19), which emerged in December 2019 in Wuhan, China, was recognized as a pandemic in January 2020 by the World Health Organization (WHO). This virus, which transmits through close contact and droplets and causes COVID-19, has caused serious changes in the global economy and health systems all over the world (3). In anesthesia administrations during the COVID-19 pandemic, many difficulties may be encountered due to infection transmission, such as aerosol exposure in the first place. Along with the patient's respiratory activity, some medical interventions may also produce aerosols. These aerosols include particles that can travel longer distances and remain in the air longer; however, their potential to infect is unclear (4).

Anesthesiologists and intensive care physicians are among the highest risk group with a high probability of encountering patients diagnosed and suspected with COVID-19 since they provide consultation services in many areas of hospitals such as operating room, intensive care unit, code blue, magnetic resonance imaging, electroconvulsive therapy (ECT), and endoscopy unit (5,6).

ECT is an urgent and life-saving treatment for patients diagnosed with depression and other serious psychiatric illnesses that require a rapid therapeutic response such as suicidality and catatonia. The meeting of the increasing intensive care needs during COVID-19 has been hindered all over the world because the risk of transmission during the COVID-19 pandemic, the inadequacy of information about COVID-19, and the unavailability of vaccination measures for a period have restricted the working areas of anesthesiologists (7).

In the present study, we aimed to have an idea about the approach to ECT, the protective safety precautions taken during ECT, working conditions, and anesthesia applications in hospitals throughout Turkey during the COVID-19 pandemic.

Materials and Methods

The study was carried out in accordance with the principles of the Declaration of Helsinki after obtaining approvals from the Local Ethics Committee of University of Health Sciences Turkey, Bursa High Specialization Training and Research Hospital (2011-KAEK-25 2020/11-11) and the Ministry of Health Scientific Research Platform (2020-11-02T21_10_33). A cross-sectional online survey was conducted with anesthesiologists working throughout Turkey. For this purpose, using Google forms, a questionnaire consisting of a total of 27 questions was created, two of the questions were open-ended and twenty-five were close-ended. The participants were invited to the study by sending a form link by means of the social network application WhatsApp and e-mail through the Turkish Society of Anesthesiology and Reanimation.

The participants were physicians who worked in university, public, and private hospitals throughout Turkey as anesthesiology and reanimation lecturers, specialists, and research assistants. Physicians working or receiving education abroad and those who did not actively work were excluded from the study. The questionnaire was prepared within a certain system using the multiple-choice question technique. The principles of impartiality and not directing the answers of the participants were followed in the question choices. Following the informed consent, the participants were asked to fill out the questionnaire form without providing identifiable information such as name, surname and the name of the institution where they worked. The information script about the purpose of the survey was presented to the participants in the introduction section. The questions in the questionnaire were about demographic characteristics, clinical and anesthesia approach in performing ECT, changes occurred in the pandemic process, use of PPE, employee and patient safety, and catching COVID-19 disease.

Statistical Analysis

In the study, the descriptive data were presented as numbers. In the comparison of categorical data, the chi-square and Fisher tests were used where appropriate. $p<0.05$ was accepted for statistical significance. Bonferroni correction was applied for the p-values in post-hoc analyses. All statistical analyses were performed using the IBM SPSS 20 software package.

Results

The forms of 130 participants who were agreed to participate in our study were statistically evaluated. Of the participants, 74 (56.9%) were female, 56 (43.1%) were male, and the majority (n=59, 45.4%) were in the 26-35 year age group. Among the participants enrolled in the study, 43.8% were specialist physicians, 36.9% were research assistants, and 19.2% were lecturers. Those with a working experience of less than 5 years (n=42, 32.3%) based on their years in the profession and those working in a training and research hospital (n=62, 47.7%) were in the majority. The demographic characteristics of the participants are shown in Table 1.

While the rate of participants who performed ECT to less than 50 patients per month was 82.3% before the pandemic period, it reached 92.3% during the pandemic. Of the participants, 63.8% continued to perform ECT during the pandemic process, whereas 76.9% indicated that there was a decrease in the number of patients who underwent ECT in their hospitals (Table 2).

When examining the data regarding the preparations for the ECT during the pandemic process according to the health institutions where the physicians worked, it was found that there were significant differences between the hospitals where the participants worked in terms of the number of people present in the ECT room and whether the ECT room was within the operating room. According to the post-hoc analysis results, performing ECT in the room with the presence of five or more people was determined

Table 1. Demographic characteristics of the participants

		n	(%)
Age (years)	26-35	59	(45.4)
	36-45	43	(33.1)
	46-55	28	(21.5)
Gender	Female	74	(56.9)
	Male	56	(43.1)
Title	Lecturer	25	(19.2)
	Specialist	57	(43.8)
	Research assistant	48	(36.9)
Year in the profession	<5	42	(32.3)
	5-10	34	(26.2)
	11-15	22	(16.9)
	16-20	14	(10.8)
	>20	18	(13.8)
Institution	University hospital	57	(43.8)
	Training and research hospital	62	(47.7)
	Other (state hospital, private hospital)	11	(8.5)

to be significantly higher in training and research hospitals than in university hospitals and other hospitals (state and private hospitals) (p<0.001). The rate of the presence of ECT room within the operating room in university hospitals was statistically significantly higher than in the training and research hospitals and other hospitals (p<0.001). No statistically significant differences could be detected between the institutions they worked in terms of applying COVID-19 PCR test before ECT, the status of performing ECT to COVID-19 PCR positive patients, and other ECT precautions during the pandemic process (Table 3).

During the pandemic process, the number of people in the ECT room was four or less in 73.8% of the participants. The waiting interval for the next patient to be admitted for ECT was 30 minutes or more in 9.2% of the hospitals, whereas 12.3% of the participants stated that they continued the application without any waiting interval. Soda lime replacement following anesthesia application was daily in 36.9% of the hospitals, and once a week in 32.3%. While 36.9% of the participants stated that they changed the anesthesia breathing circuit after each patient, the rate of high-efficiency particulate air (HEPA) filter between the reservoir bag-anesthesia circuit and between mask-anesthesia circuit was 93.8%. It was found that the rate of preoxygenation before anesthesia induction was 86.9%, and the rate of bag mask ventilation (BMV) was 77.7%.

The rate of box apron use in the participants working in university hospitals was found to be statistically significantly lower than in those working in training and research hospitals and other hospitals (p=0.005). There was no statistically significant difference between the institutions worked in terms of preferring surgical mask, N95 (FFP2/FFP3), eye goggles, face shields, overalls, box apron, single-layer gloves, double-layer gloves, overshoe covers, bonnet and boots as PPEs or not preferring to use any PPE (Table 4). When asked about difficulty experienced in procuring PPE, 53.8% of the participants indicated that they had no difficulty at all, and 29.2% stated that they had difficulty in obtaining N95 (FFP2/FFP3).

Table 2. Data on ECT application before and during the pandemic

		n	(%)
Number of ECT BP (per month)	<50	107	(82.3)
	50-100	18	(13.8)
	>100	5	(3.9)
Number of ECT DP (per month)	<50	120	(92.3)
	50-100	9	(6.9)
	>100	1	(0.8)
Continuing to perform ECT (DP)	Yes	83	(63.8)
	No	47	(36.2)
ECT application DP	Decrease	100	(76.9)
	Same	21	(16.2)
	Increase	9	(6.9)

Median (minimum-maximum) values are presented. BP: Before the pandemic, DP: During the pandemic, ECT: Electroconvulsive therapy

Discussion

As a result of our study, it was observed that ECT treatment continued in most of the hospitals throughout Turkey, but the number of monthly ECT performed decreased by more than half during pandemic process. The number of people in the room during ECT was four or less in 73.8% of the participants. The rate of the participants who waited more than 30 min between ECTs was quite low. It was determined that about one-third of the participants changed their breathing circuit after each patient, the rate of HEPA filter application to the anesthesia device was 93.8%. The rate of preoxygenation application before anesthesia induction was found to be 85.4%, whereas the rate of applying BMV was 77.7%. Forty-five percent of the participants stated that they used PPE during performing ECT. When the PPE use of the participants examined that there was no significant difference between the hospitals in terms of PPEs used except for box apron. It was detected that 73.8% of the participants changed only their gloves before each ECT.

ECT therapy is lifesaving for many patients with psychosis and/or major depression (8,9). Adopting the view that ECT is not an elective procedure (9,10), the American Psychiatric Association recommends its use to be continued during the pandemic in the treatment of critically ill patients who cannot be managed medically (11). The decision to continue/suspend/terminate ECT treatment should be taken after considering the potential risks and benefits in the current pandemic situation (11,12). The studies in the literature show that many health centers have limited the number of patients to be admitted per day during the pandemic between three and six (11,13), and have also recommended that the frequency of sessions for a patient be twice a week (13-16). However, the determination of the seizure threshold with respect to age to reduce the number of ECT sessions can be one of the substantial factors (17). In studies conducted, it has been reported that some centers terminated performing ECT treatments due to fear of spreading COVID-19 during the pandemic and major hurdles in the provision of ECT services that include

the lack of anesthetists and the assignment of COVID-19 patients to intensive care units for their treatment. Unlike these centers, it was determined in our study that 63.8% of the participants continued ECT treatments by taking the necessary precautions.

Considering the measures taken in the literature before ECT in patients hospitalized in the clinic during pandemic, symptom monitoring for each patient, intranasal cleaning with povidone-iodine wipes and mouth wash with hydrogen peroxide to reduce viral load, wearing a surgical mask before the procedure and ensuring hand hygiene of patients before the procedure are seen to be performed (18). In our study, when the protective measures applied while bringing patients from the clinic were questioned, 89.2% of the participants stated that patients came to the room where ECT would be applied wearing surgical masks, 52.3% stated that daily symptom monitoring was conducted and 40% stated that patients' fever was measured. On the other hand, it was seen that povidone-iodine nasal wipes and hydrogen peroxide mouthwash were applied in none of the hospitals where the participants worked.

Since ECT treatment is a procedure that creates aerosols, it is advised to minimize the number of personnel in the room to prevent cross-infection risk (19). This is of importance for both the safety of HCWs and the continuity of the procedure. In studies conducted, ECT treatment, which was performed with seven people in the pre-pandemic period, has been proposed to be performed with a maximum of four people in the pandemic (7,19). Considering studies in the literature regarding this issue, the presence of less than five personnel in the ECT room during the pandemic period is important for the safety of the patient and HCWs (7). In our study,

Table 3. Measures taken in ECTs during the pandemic process by the institutions

		University		Training and research		Other		Total		p
		n	(%)	n	(%)	n	(%)	n	(%)	
Number of people in the room where ECT was applied	2-4 people	49	(86.0)	36	(58.1)	11	(100.0)	96	(73.8)	<0.001[C]
	>5 people	8	(14.0)	26	(41.9)	0	(0.0)	34	(26.2)	
Waiting interval between ECTs	None or waiting under 30 min	50	(87.7)	58	(93.5)	10	(90.9)	118	(90.8)	0.548[C]
	>30	7	(12.3)	4	(6.5)	1	(9.1)	12	(9.2)	
Soda lime replacement interval between ECTs	End of day or more frequent	24	(42.1)	26	(41.9)	6	(54.5)	56	(43.1)	0.724[C]
	Less frequent	33	(57.9)	36	(58.1)	5	(45.5)	74	(56.9)	
Breathing circuit change between ECTs	Yes	19	(33.3)	22	(35.5)	7	(63.6)	48	(36.9)	0.154[C]
	No	38	(66.7)	40	(64.5)	4	(36.4)	82	(63.1)	
HEPA filter application to the anesthesia device	Yes	56	(98.2)	56	(90.3)	10	(90.9)	122	(93.8)	0.119[F]
	No	1	(1.8)	6	(9.7)	1	(9.1)	8	(6.2)	
Application of bag mask ventilation (BMV)	Yes	47	(82.5)	46	(74.2)	8	(72.7)	101	(77.7)	0.512[C]
	No	10	(17.5)	16	(25.8)	3	(27.3)	29	(22.3)	
Preoxygenation application	Yes	47	(82.5)	54	(87.1)	10	(90.9)	111	(85.4)	0.668[C]
	No	10	(17.5)	8	(12.9)	1	(9.1)	19	(14.6)	
Presence of ECT room within the operating room	Yes	39	(68.4)	11	(17.7)	3	(27.3)	53	(40.8)	<0.001[C]
	No	18	(31.6)	51	(82.3)	8	(72.7)	77	(59.2)	
Availability of negative pressure system in the room where ECT is performed	Yes	6	(10.5)	6	(9.7)	2	(18.2)	14	(10.8)	0.760[F]
	No	46	(80.7)	47	(75.8)	8	(72.7)	101	(77.7)	
	Participant did not know	5	(8.8)	9	(14.5)	1	(9.1)	15	(11.5)	
Chest X-ray before ECT	Yes	33	(57.9)	30	(48.4)	5	(45.5)	68	(52.3)	0.521[C]
	No	24	(42.1)	32	(51.6)	6	(54.5)	62	(47.7)	
Performing ECT to COVID PCR positive patients	Yes	10	(17.5)	8	(12.9)	1	(9.1)	19	(14.6)	0.668[C]
	No	47	(82.5)	54	(87.1)	10	(90.9)	111	(85.4)	
Applying COVID PCR test before ECT	Yes	50	(87.7)	58	(93.5)	11	(100.0)	119	(91.5)	0.438[F]
	No	7	(12.3)	4	(6.5)	0	(0.0)	11	(8.5)	

[C]: Chi-square test, [F]: Fisher's test, COVID: Coronavirus, PCR: Polymerase chain reaction, ECT: Electroconvulsive therapy, HEPA: High-efficiency particulate air

similar to other studies, 73.8% of the participants indicated that the number of people in the room was four or less. On the other hand, it was detected that there were five or more people in the room in training and research hospitals. In line with the literature, most of the participants performed the treatment with five or less personnel.

During the pandemic, it is emphasized that the room should be thoroughly disinfected at the end of each ECT treatment and that there should be an interval of at least 30 minutes between patients, depending on the room air exchange rate (20). In similar studies, it is recommended to increase the interval between ECTs from 10 minutes to 30 minutes (7), or to close the doors and windows during ECT and to open them for 15 minutes after the patient is taken to the recovery room, or to use two rooms alternately. In our study, this interval was 30 min or longer in 9.2% of the hospitals, whereas 12.3% of the participants stated that they continued to perform ECT without waiting. We attribute the fact that ECT is performed without giving any interval to not investigating conducted studies and lack of information.

In routine anesthesia practice, it is proposed that the carbon dioxide absorber (soda lime) is generally replaced if it turns to violet color. An alternative to decide when to replace the absorber is to monitor the end-tidal CO_2, and it is recommended it be replaced when its level reaches approximately 5 torr or 0.05% (21). Other studies (22,23) suggest the replacement of the soda lime after each patient in cases with possible/definite COVID-19 diagnosis during the pandemic process. Of the participants in our study,

Table 4. Analysis of the use and preferences of PPE during ECT in the pandemic period by the institution worked

		University		Training and research		Other		Total		p
		n	(%)	n	(%)	n	(%)	n	(%)	
PPE use during ECT	Always	39	(68.4)	47	(75.8)	9	(81.8)	95	(73.1)	0.871[F]
	Sometimes	12	(21.1)	9	(14.5)	1	(9.1)	22	(16.9)	
	Never	6	(10.5)	6	(9.7)	1	(9.1)	13	(10.0)	
PPE preference: Surgical mask	Yes	29	(50.9)	26	(41.9)	3	(27.3)	58	(44.6)	0.298[C]
	No	28	(49.1)	36	(58.1)	8	(72.7)	72	(55.4)	
PPE preference: N95 (FFP2/FFP3)	Yes	52	(91.2)	57	(91.9)	11	(100.0)	120	(92.3)	0.894[F]
	No	5	(8.8)	5	(8.1)	0	(0.0)	10	(7.7)	
PPE preference: Goggles	Yes	13	(22.8)	18	(29.0)	3	(27.3)	34	(26.2)	0.739[C]
	No	44	(77.2)	44	(71.0)	8	(72.7)	96	(73.8)	
PPE preference: Face shields	Yes	18	(31.6)	28	(45.2)	3	(27.3)	49	(37.7)	0.236[C]
	No	39	(68.4)	34	(54.8)	8	(72.7)	81	(62.3)	
PPE preference: Overalls	Yes	5	(8.8)	7	(11.3)	0	(0.0)	12	(9.2)	0.485[C]
	No	52	(91.2)	55	(88.7)	11	(100.0)	118	(90.8)	
PPE preference: Box apron	Yes	20	(35.1)	38	(61.3)	8	(72.7)	66	(50.8)	0.005[C]
	No	37	(64.9)	24	(38.7)	3	(27.3)	64	(49.2)	
PPE preference: Single-layer glove	Yes	26	(45.6)	31	(50.0)	6	(54.5)	63	(48.5)	0.816[C]
	No	31	(54.4)	31	(50.0)	5	(45.5)	67	(51.5)	
PPE preference: Double-layer glove	Yes	12	(21.1)	20	(32.3)	2	(18.2)	34	(26.2)	0.313[C]
	No	45	(78.9)	42	(67.7)	9	(81.8)	96	(73.8)	
PPE preference: Overshoe cover	Yes	6	(10.5)	12	(19.4)	1	(9.1)	19	(14.6)	0.342[C]
	No	51	(89.5)	50	(80.6)	10	(90.9)	111	(85.4)	
PPE preference: Bonnet	Yes	29	(50.9)	33	(53.2)	3	(27.3)	65	(50.0)	0.280[C]
	No	28	(49.1)	29	(46.8)	8	(72.7)	65	(50.0)	
PPE preference: Boot	Yes	0	(0.0)	1	(1.6)	0	(0.0)	1	(0.8)	>0.999[F]
	No	57	(100.0)	61	(98.4)	11	(100.0)	129	(99.2)	
PPE preference: None	Yes	1	(1.8)	0	(0.0)	0	(0.0)	1	(0.8)	0.523[F]
	No	56	(98.2)	62	(100.0	11	(100.0)	129	(99.2)	

ECT: Electroconvulsive therapy, [C]: Chi-square test, [F]: Fisher's test, PPE: Personal protective equipment

36.9% stated that they replaced the soda lime every day, while the rate of those stating that they performed soda lime replacement after each patient was 6.2%. It has been indicated that the anesthesia procedure should be adjusted in a way that prevents contamination of patients and HCWs, following published consensus guidelines (24). As with most respiratory viruses, the disease is most contagious when the patient is symptomatic, but there are studies in the literature demonstrating that severe acute respiratory syndrome-coronavirus-2 is transmitted also by asymptomatic individuals (25). It can be usually difficult to identify and isolate infected patients; for this reason, it is recommended that measures be taken during the airway management of all patients (26), and that disposable airway equipment be used as much as possible (23). It was stated by 93.8% of the physicians participated in our study that they applied HEPA filter between the anesthesia device and the exhalation valve and between the mask and breathing circuit. The rate of the participants who changed the breathing circuit after each patient was found to be 36.9%. Although the HEPA filter application rate was determined to be high as suggested in the literature, we consider less replacement of the breathing circuit to be associated with cost.

Because some patients may carry the virus asymptomatically (27), it is proposed to avoid aerosol-forming procedures such as high flow nasal oxygen, mechanical ventilation, tracheal aspiration and BMV and to perform preoxygenation with oxygen flow below 5 L/min via closed circuit (28). Similarly, in our study, the rate of performing pre-oxygenation to the patients before anesthesia induction was 85.4%, whereas 77.7% of the participants used the BMV that might create aerosols. The reason for this may be the inability to go out of routine practice during ECT procedures and the lack of command over the guidelines' recommendations on this subject. Many studies have emphasized that ideally patients are needed to be treated in negative pressure rooms, if available (20,26,28,29). In our study, the rate of the participants stating that ECT treatment was performed in a negative pressure room was 10.8%. We think that this low rate may be linked to the fact that the ECT rooms were outside the operating room in 59.2% of the participants and/or the absence of negative pressure systems. It has been proposed in a study that a routine chest radiography should be taken along with the PCR test for each patient who will undergo ECT. Half of the participants in our study indicated that a routine chest radiography of the patient was taken before ECT.

Although the WHO recommends the use of surgical masks, gloves, long sleeved box aprons, eye protections (goggles or face shields) as a choice of PPE in aerosol-generating procedures in non-COVID patients (30), during the pandemic period, all ECT centers worldwide have adopted a policy of universal safety precautions, regardless of PCR test results, due to possible false negative test results and asymptomatic carriers (7). N95/FFP2 (or higher) masks, face shields, eye goggles, liquid resistant long sleeve aprons and double-layer gloves are recommended to be used as full PPE for all members actively involved in ECT treatment (11-15,17,20). In addition, it is advised that after each patient, outer layer gloves should be changed and eye goggles/face shields should be cleaned against the possible secretion contact (7). Of the participants in our study, 45.4% stated that they always used PPE during ECT procedure, while 10% stated that they never used PPE in any ECT procedure. The most commonly used PPEs were observed to be N95 (FFP2/FFP3) (93.1%), single-layer glove (50.8%), box apron (50.8%) and surgical mask (49%), respectively. After each patient, 15.4% of the participants changed all PPEs, whereas as suggested in the literature (7), 73.8% changed only gloves. It was determined that the recommended full personal protection was not always implemented by all participants. We can relate this situation to the fact that the participants felt safer themselves with the administration of both inactivated and mRNA vaccines to HCWs during the 3-month period when the study was carried out. The rate of the participants who did not experience difficulty in procuring PPE was 53.8%, on the other hand, 29.2% of the participants stated to have difficulty in obtaining N95. We are of the opinion that the low rate of PPE use is mostly associated with the hospitals with difficulty in procurement. These data draw attention to the importance of correct and effective use of PPE.

COVID-PCR test has been recommended to be applied within 24-48 hours before performing ECT procedure in pandemic process, and the recommendations in the guidelines published in Turkey are also in this direction (18,31). In our study, 66.9% of the participants indicated that COVID-PCR test was performed within 24-48 hours before ECT, 8.5% stated that no PCR test was applied to patients. Moreover, 14.6% of the participants specified that they applied ECT to COVID-19 positive patients. A study conducted in Italy found the rate of HCWs who had COVID-19 infection to be 9% (32). Similarly, it was detected that 9.2% of the physicians participated in our study had COVID-19 infection; however, it was not questioned whether the cause of the infection was the patient, work environment, or society.

Study Limitations

The limitations of our study include the facts that the study covered a short period (July-September 2021) during the pandemic period when vaccine administrations were also performed, that the vaccination status of the participants was not questioned, and that the number of people who participated in the survey of this study was low due to the large number of survey studies conducted in this period.

Conclusion

During the pandemic process, ECT applications and frequency have undergone a change according to the patient's condition. When applying anesthesia in ECT, we wanted to draw attention to procedures that would cause aerosolization, the importance of PPE use and the differences in practice with questions toward the level of knowledge about the use of guidelines in this issue. We are of the opinion that the appropriate and correct implementation of the recommendations given in the guidelines should be attached importance and known in terms of employee and patient safety in the presence of a possible pandemic.

Ethics

Ethics Committee Approval: The study was carried out in accordance with the principles of the Declaration of Helsinki after obtaining approvals from the Local Ethics Committee of University of Health Sciences Turkey, Bursa High Specialization Training and Research Hospital (2011-KAEK-25 2020/11-11) and the Ministry of Health Scientific Research Platform (2020-11-02T21_10_33).

Informed Consent: Before answering the questions in the questionnaire made via google forms, the consent of the participants to participate in the study was obtained online.

Peer-review: Internally and externally peer-reviewed.

Authorship Contributions

Concept: A.D., T.O., Design: A.D., T.O., Data Collection or Processing: A.D., A.N.B., Analysis or Interpretation: A.N.B., Drafting Manuscript: T.O., A.D., Critical Revision of Manuscript: Ş.E.Ö., A.D., Final Approval and Accountability: Ş.E.Ö., T.O., Technical or Material Support: A.N.B., T.O., Supervision: Ş.E.Ö., Writing: A.D., A.N.B., Ş.E.Ö., T.O.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Baran İ. Anesthesiologists' Attitude and Approach Regarding Personal Usage of Protective Equipment During the Covid-19 Pandemic. JARSS 2020;28(4):239-246.
2. Zenciroğlu D. Protective Clothing and Equipments in Hospitals. ANKEM Derg 2011;25(Ek 2):176-183.
3. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. Can J Anesth 2020;67(5):568-576.
4. Thiruvenkatarajan V, Wong DT, Kothandan H, Sekhar V, Adhikary SD, Currie J, et al. Airway Management in the Operating Room and Interventional Suites in Known or Suspected COVID-19 Adult Patients: A Practical Review. Anesth Analg 2020;131(3):677-689.
5. Wujtewicz M, Dylczyk-Sommer A, Aszkiełowicz A, Zdanowski S, Piwowarczyk S, Owczuk R. COVID-19 - what should anaethesiologists and intensivists know about it? Anaesthesiol Intensive Ther 2020;52(1):34-41.
6. Chen Q, Liang M, Li Y, Guo J, Fei D, Wang L, et al. Mental health care for medical staff in China during the COVID-19 outbreak. Lancet Psychiatry 2020;7(4):e15-e16.
7. Surve RM, Sinha P, Baliga SP, M R, Karan N, Jl A, et al. Electroconvulsive therapy services during COVID-19 pandemic. Asian J Psychiatr 2021;59:102653.
8. Fink M, Kellner CH, McCall WV. The role of ECT in suicide prevention. J ECT 2014;30(1):5-9.
9. Espinoza RT, Kellner CH, McCall WV. Electroconvulsive Therapy During COVID-19: An Essential Medical Procedure-Maintaining Service Viability and Accessibility. J ECT 2020;36(2):78-79.
10. Practice Guidance for COVID-19, April 10th, 2020 (APA website). Available at: https://www.psychiatry.org/psychiatrists/covid-19-coronavirus/practice-guidance-for-covid19
11. Bryson EO, Aloysi AS. A Strategy for Management of Electroconvulsive Therapy Patients During the COVID-19 Pandemic. J ECT 2020;36(3):149-151.
12. Sienaert P, Lambrichts S, Popleu L, Van Gerven E, Buggenhout S, Bouckaert F. Electroconvulsive Therapy During COVID-19-Times: Our Patients Cannot Wait. Am J Geriatr Psychiatry 2020;28(7):772-775.
13. Gil-Badenes J, Valero R, Valentí M, Macau E, Bertran MJ, Claver G, et al. Electroconvulsive therapy protocol adaptation during the COVID-19 pandemic. J Affect Disord 2020;276:241-248.
14. Bellini H, Cretaz E, Rigonatti LF, Conto CDR, Melzer-Ribeiro DL, Busatto-Filho G, et al. Electroconvulsive therapy practice during the COVID-19 pandemic. Clinics (Sao Paulo) 2020;75:e2056.
15. Tor PC, Phu AHH, Koh DSH, Mok YM. Electroconvulsive Therapy in a Time of Coronavirus Disease. J ECT 2020;36(2):80-85.
16. Tor PC, Tan J, Loo C. Model for ethical triaging of electroconvulsive therapy patients during the COVID-19 pandemic. BJPsych Bull 2021;45(3):175-178.
17. Lapid MI, Seiner S, Heintz H, Hermida AP, Nykamp L, Sanghani SN, et al. Electroconvulsive Therapy Practice Changes in Older Individuals Due to COVID-19: Expert Consensus Statement. Am J Geriatr Psychiatry 2020;28(11):1133-1145.
18. Limoncelli J, Marino T, Smetana R, Sanchez-Barranco P, Brous M, Cantwell K, et al. General Anesthesia Recommendations for

Electroconvulsive Therapy During the Coronavirus Disease 2019 Pandemic. J ECT 2020;36(3):152-155.

19. Ramakrishnan VS, Kim YK, Yung W, Mayur P. ECT in the time of the COVID-19 pandemic. Australas Psychiatry 2020;28(5):527-529.
20. Flexman AM, Abcejo AS, Avitsian R, De Sloovere V, Highton D, Juul N, et al. Neuroanesthesia Practice During the COVID-19 Pandemic: Recommendations From Society for Neuroscience in Anesthesiology and Critical Care (SNACC). J Neurosurg Anesthesiol 2020;32(3):202-209.
21. Feldman JM, Hendrickx J, Kennedy RR. Carbon Dioxide Absorption During Inhalation Anesthesia: A Modern Practice. Anesth Analg 2021;132(4):993-1002.
22. Alkaya Solmaz F, Özcan MS, Özden ES, Balık O, Kırdemir P. Operating Room Management And Anesthetic Approach in Covid-19 Pandemic. Med J SDU 2021;(Ozelsayi-1):125-131.
23. Karaca AS, Özmen MM, Uçar AD, Yastı AÇ, Demirer S. COVID-19'lu hastalarda genel cerrahi ameliyathane uygulamaları. Turk J Surg 2020;36(1):VI-X.
24. Loureiro Pereira-Soares E, Nascimento AL, da Silva JA, Nardi AE. Anesthesia for electroconvulsive therapy during the COVID-19 pandemic. Expert Rev Neurother 2021;21(1):1-3.
25. Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, et al. Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany. N Engl J Med 2020;382(10):970-971.
26. APSF. Perioperative considerations for the 2019 novel coronavirus (COVID-19) [Internet]. Rochester (MN): Anesthesia Patient Safety Foundation; 2020 February 12 [cited 2020 Apr 16]; [about 9 screens]. Available from: https://www.apsf.org/news-updates/perioperative-considerations-for-the-2019-novel-coronavirus-covid-19/
27. Zhu J, Ji P, Pang J, Zhong Z, Li H, He C, et al. Clinical characteristics of 3062 COVID-19 patients: A meta-analysis. J Med Virol 2020;92(10):1902-1914.
28. ICMANAESTHESIACOVID-19. COVID-19 airway management principles [Internet] London (UK): ICM Anaesthesia COVID-19 Web Site; 2020 March 19 [cited 2020 Apr 18]; [about 45 screens] Available from: https://icmanaesthesiacovid-19.org/covid-19-airway-management-principles
29. ASA. COVID-19 information for health care professionals recommendations [Internet]. Washington (DC): American Society of Anesthesiologists; 2020 [cited 2020 Apr 18]; [about 7 screens] Available from: https://www.asahq.org/about-asa/governance-and-committees/asa-committees/committee-on-occupational-health/coronavirus
30. Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care. WHO Guidelines. World Health Organization; 2014 [cited 04 May 2020], Available from: https://apps.who.int/iris/bitstream/handle/10665/112656/9789241507134_eng.pdf;jsessionid=DC4254A4B70DB22F0F9D8EBB997CBFA8? sequence=1
31. Covid-19 Pandemisinde Sağlık Kurumlarında Çalışma Rehberi ve Enfeksiyon Kontrol Önlemleri. Bilimsel Danışma Kurulu Çalışması. T.C. Sağlık Bakanlığı. 9 Mart 2021. Erişim adresi: https://covid19.saglik.gov.tr/Eklenti/40282/0/covid19saglikkurumlarindacalismarehberiveenfeksiyonkontrolonlemleripdf.pdf
32. Paterlini M. On the front lines of coronavirus: the Italian response to covid-19. BMJ 2020;368:m1065.