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THE INVISIBLE PART OF THE ICEBERG IN COVID-19 PANDEMIC: ASYMPTOMATIC CASES AND ANESTHESIOLOGISTS' PROTECTIVE APPROACHES-KNOWLEDGE LEVELS

COVID19 PANDEMİSİNDE BUZDAĞININ BİLİNMEYEN TARAFI: ASEMPTOMATİK VAKALAR VE ANESTEZİSTLERİN KORUYUCU YAKLAŞIMLARI-BİLGİ DÜZEYLERİ

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Abstract

Introduction: According to studies asymptomatic COVID-19 cases are thought to be quite high in the community. Their exact number is unknown. Considering that there are false negative results in PCR tests, it should always be considered that all asymptomatic patients may also be COVID-19 positive. We aimed to evaluate the protective and preventive approaches, knowledge levels and technical facilities of anesthesiologists in the perioperative process, after recognizing the COVID-19 alarm symptoms as much as possible and isolating the suspected cases during the pandemic.

Methods: A survey form was prepared to evaluate the awareness of anesthesiologists about asymptomatic cases, their protective-preventive approaches, knowledge levels and technical facilities. The form was created online, with the aim of reaching more participants. The survey form was sent to the participants via e-mail and WhatsApp. Those who did not fill more than 90% of the survey questions were excluded from the study.

Results: According to our study within 100 participants, 95 participants indicated that they question their patients regarding presence of COVID-19-related symptoms and contact history; 86 participants indicated that they evaluate presence of lymphopenia; 78 participants indicated they evaluate CRP levels; 76 participants indicated that they evaluate chest radiography findings; 75 participants indicated evaluation of D-Dimer levels; 74 participants indicated evaluation of ferritin values and 73 participants indicated evaluation of thorax CT findings for a correlation with COVID-19.

Conclusion: The current tests for SARS-CoV-2 are not sensitive enough to rule out the possibility of asymptomatic carriers entering the operating room. It is important to keep in mind the steps that include detecting the patients with high risk of infection even if their PCR tests are negative.

Key Words: SARS-Cov-2, asymptomatic, carrier, COVID-19, anesthesia

Öz

Giriş: Çalışmalara göre, toplumda asemptomatik COVID-19 vakalarının oldukça yaygın olduğu düşünülmektedir. Kesin sayıları bilinmemektedir. PCR testlerinde yanlış negatif sonuçlar olduğu göz önüne alındığında, tüm asemptomatik hastaların da pozitif olabileceği dikkate alınmalıdır. Bu çalışmada, COVID-19 alarm semptomlarını mümkün olduğunca tanıdıktan ve pandemi sırasında şüpheli vakaları izole ettikten sonra, perioperatif süreçte anestezistlerin koruyucu ve önleyici yaklaşımlarını, bilgi seviyelerini ve teknik olanaklarını değerlendirmeyi amaçladık.

Materyal ve Metot: Bu çalışma vaka: COVID-19 pandemisinde anestezistlerin asemptomatik vakalara dair farkındalığını, pandemide koruyucu-önleyici yaklaşımları, bilgi düzeylerini ve teknik olanaklarını değerlendiren anket formu hazırlandı. Anket formu online olarak düzenlenip daha fazla katılımcıya ulaşmak hedeflendi. Anket formunun linki internet ortamında mail aracılığıyla ve WhatsApp üzerinden katılımcılara gönderildi. Anket sorularının %90'dan fazlasını doldurmayanlar çalışma dışı bırakıldı.

Bulgular: Çalışmamız sonucunda 100 katılımcının 95'i (%95) hastalarında COVID-19 ilişkili semptom varlığı ve temas öyküsünü, 86'sı (%86) lenfopeni varlığını, 78'i (%78) CRP düzeylerini, 76'sı (%76) akciğer grafisi bulgularını, 75'i (%75) D-Dimer düzeylerini, 74'ü (%74) ferritin değerlerini ve 73'ü de (%73) toraks BT bulgularını preoperatif dönemde COVID-19 ile ilişki açısından değerlendirmektedir.

Sonuç: SARS-CoV-2 için yapılan mevcut testler, asemptomatik taşıyıcıların ameliyathaneye girme olasılığını dışlayacak kadar hassas değildir. PCR testleri negatif olsa bile, yüksek enfeksiyon riski olan hastaları tespit etmeyi içeren adımları akılda tutmak önemlidir.

Anahtar Kelimeler: SARS-Cov-2, asemptomatik, taşıyıcı, COVID-19, anestezi

Introduction

At the end of December 2019, a new type of coronavirus, "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)", was identified as the etiology of pneumonia cases reported from Wuhan, China[1]. "Coronavirus disease 2019 (COVID-19)" has since spread worldwide, leading to an ongoing pandemic. Globally, as of 10 January 2021, there have been 88,383,771 confirmed cases of COVID-19, including 1,919,126 deaths, reported to the World Health Organization (WHO)[2]. In Turkey, as of 10 January 2021, the total number of patients is 2,326,256, including 22,807 deaths, according to the Turkish Ministry of Health data[3]. The clinical staging of SARS-Cov-2 infection, when it is done, appears within a wide range as asymptomatic infection stage, mildly symptomatic infection stage and severe respiratory failure[4].

Although the incubation period for COVID-19 is 5.2 days on average, it is known that there are large variations (1-14 days) between individuals and that the viral spreading can occur in the asymptomatic stage before clinical findings begin[5]. The exact number of asymptomatic cases is unknown; however, it is thought to be quite high in the population according to studies[6]. Considering that there are false negative results in PCR tests, it should always be considered that all asymptomatic patients may also be COVID-19 positive[7].

The virus is primarily transmitted through close contact and droplet spread[8]. During this pandemic, the anesthesiologists are exposed to procedures generating high-density aerosols in many duties they are responsible for (such as oxygen mask, laryngoscopy, aspiration, extubation, cardiopulmonary resuscitation)[9]. Thus, it is the primary duty of anesthesiologists to protect both the anesthesia team and their patients.

In the operations of patients who are tested positive, the procedures are carried out within the framework of protective rules that have already become routine, but the group that needs to be considered more is the invisible part of the iceberg, that is, the patients who come to the operating room with a false negative PCR result.

In this survey study, we evaluated the preventive and protective approaches, knowledge levels and technical means of anesthesiologists during the pandemic, after being able to notice the COVID-19 alarm findings as much as possible and isolate the suspicious group. We aimed to contribute to the existing guidelines on the approach to patients who are suspicious of COVID-19 during the peroperative period of anesthesia.

Materials and Methods

After obtaining consents from the local ethics committee (2020/19-359) and the COVID-19 Scientific Research Platform (2020-09-28T12_36_25), we commenced our study in accordance with the principles of the Declaration of Helsinki. The physicians working in the anesthesia departments in Turkey were included in the study. A survey form was prepared to evaluate the awareness of anesthesiologists about asymptomatic cases, their protective-preventive approaches, knowledge levels and technical facilities. The form was created online with the aim of reaching larger number of participants. There was no incentive to participate in this survey. Individuals were able to decline to participate in the survey or withdraw at any time. The link of the form was sent to the participants via e-mail and WhatsApp. Those who did not fill more than 90% of the survey questions were excluded from the study.

https://docs.google.com/forms/d/e/1FAIpQLSe3E7DvSdPmtmx5wQ0UGhxgXapKPyrWIBvwD0oJv097W3ykSw/viewform?usp=sf_link

Statistical Analysis

IBM SPSS Statistics 25.0 (IBM SPSS Statistics for IOS, IBM Corporation, Armonk, NY) was used for all statistical evaluations. The descriptive statistics were expressed as mean±standard deviation for numerical variables, and as numbers and percentages for categorical data. Since it was calculated that approximately 6500 physicians are working as anesthesiologists in Turkey, the sample size included in the study was determined as 363 people.

Results

The survey form was sent to 365 participants who accepted to participate in the study via e-mail and WhatsApp. After 265 people who left more than 90% of the form blank were excluded from the study, the forms from remaining 100 participants were statistically evaluated. Our survey consists of 5 types of questions. Table I presents the demographic data; Table II presents the effects of pandemic on the participants; Table III presents the symptoms, laboratory and imaging methods evaluated in COVID-19; Table IV presents the usage of personal protective equipment; and Table V presents the protective technical facilities and anesthetic approaches that reduce the viral spread and transmission.

Table I. Demographic data

Age distribution, n (%)	
• Aged 25 and below	11 (11%)
• 26-45	71 (71%)
• 46-65	17 (17%)
• Aged 65 and over	1 (1%)
Gender, n (%)	
• Female	46 (46%)
• Male	54 (54%)
Title, n (%)	
• Research assistant physician	39 (39%)
• Specialist physician	46 (46%)
• Lecturer physician	15 (15%)
Institution of employment, n (%)	
• University Hospital	41 (41%)
• Training and Research Hospital	16 (16%)
• Public Hospital	28 (28%)
• Private Hospital	14 (14%)
• Other	1 (1%)

n: number of patients, %: percentage value

Table II. The effects of pandemic on the participants

Did you have a COVID-19 screening test? n (%)	
• Yes, COVID-19 PCR test	81 (81%)
• Yes, COVID-19 antibody test	10 (10%)
• No	9 (9%)
Did you get tested for COVID-19? n (%)	
• Yes	32 (32%)
• No	68 (68%)
Working in the operating room during the pandemic process has increased my stress, n (%)	
• Never	47 (47%)
• Slightly	45 (45%)
• Completely	8 (8%)

n: number of patients, %: percentage value

In this study, 71 of the participants were aged 26-45 years. 54 participants were male. 46 of them were experts, 39 were research assistants and 15 were lecturers. 41 participants were working in university hospitals (Table I).

It is shown that, 91 participants had got screening test, 81 of them had got COVID-19 PCR and 10 of them had got antibody screening test. 32 participants had COVID-19 infection. The pandemic had completely increased the stress level of 47 participants (Table II).

According to our study, within a total of 100 participants, 95 participants indicated that they question their patients regarding presence of COVID-19-related symptoms and contact history; 86 participants indicated that they evaluate presence of lymphopenia; 78 participants indicated they evaluate CRP levels; 76 participants indicated that they evaluate chest radiography findings; 75 participants indicated evaluation of D-Dimer levels; 74 participants indicated evaluation of ferritin values and 73 participants indicated evaluation of thorax CT findings for a correlation with COVID-19. 23 (23.2%) participants revealed that they request PCR test before each elective case. 63 (63.6%) participants, on the other hand, stated that they request test for the cases recommended in the Ministry of Health guidelines, and for the patients who were not included in the guidelines and had results other than normal reference values in the laboratory. During the pandemic, 85 participants accepted the cases that tested positive, only if cases were asymptomatic and their laboratory values were within normal limits (Table III).

Although their patients do not have a positive PCR test, 91 participants reported used of FFP2/FFP3 masks, 84 participants reported used of surgical masks, 79 participants reported used of goggles/face shields, and 49 participants reported used of protective gowns as personal protective equipment regardless of the PCR test results in their patients.

Table III. Questions and answers on symptoms, laboratory and imaging methods evaluated during the pandemic.

In addition to standard anesthesia preparation, the parameter/parameters that I evaluated in the preoperative preparation of each patient to be operated during COVID-19 pandemic; (You can select more than one option), n (%)	
• Lymphopenia	86 (86%)
• D-Dimer	75 (75%)
• CRP	78 (78%)
• Ferritin	74 (74%)
• Chest X-ray	76 (76%)
• Thorax CT	73 (73%)
• Symptom Questioning	95 (95%)
• Contact history with positive patient or previous positive PCR	95 (95%)
• None	1 (1%)
In which asymptomatic and elective cases do you request the COVID-19 PCR test in the preoperative period? (You can select more than one option), n (%)	
• I request a routine PCR test for all elective cases	23 (23.2%)
• I only request a PCR test for the cases recommended in the Ministry of Health guidelines	65 (65.7%)
• I request a PCR test for the cases recommended in the Ministry of Health guidelines and for the patients who were out of the guideline and had results other than normal reference values in the laboratory.	63 (63.7%)
During the pandemic, did you stipulate patients being asymptomatic and/or have laboratory values within normal limits to be operated?, n (%)	
• Yes	85 (85.9%)
• No	14 (14.1%)

n: number of patients, %: percentage value

95 participants stated that their patients came to operation room with surgical mask. While 43 of the participants stated that the time allocated for cleaning between two cases in the operating room was between 31 and 45 minutes, 3 participants reported that there was no break (Table IV).

There were 35 (35%) participants with an isolated negative pressure COVID-19 operating room, and 44 (44%) participants with only an isolated room without negative pressure, and 21 (21%) participants without an isolated COVID-19 room. The most common method (90%) used as preventive approaches regarding general anesthesia in the operating room is to place HME-viral-bacterial respiratory filter between the breathing circuit and the face mask or endotracheal tube. The lidocaine-dexmedetomidine-opioid assisted extubation method was frequently preferred during rapid sequence intubation and/or under deep anesthesia (65%). While the mask ventilation with the two-handed technique, which is safer, was less preferred (15%), the mask ventilation with the one-handed C-E technique was mostly used (57%). The frequency of use of the videolaryngoscopy (VL) in intubation is 39%. For COVID-19, there is no specific preference in needles used in spinal anesthesia; 64 (64%) participants answered as "I do not have a specific preference, I use both". Except for 7 of them (7%), the participants prefer to use ultrasound at certain frequencies in invasive procedures such as peripheral nerve blocks and central venous catheters. The knowledge level regarding both "supraglottic airway devices increasing aerosol dispersion" and "high incidence of asymptomatic positive cases among children" were high among participants (%93,9 and %88, respectively). The endotracheal intubation, which is the least aerosol-generating method in pediatric patients, was the least preferred airway device (30%). It was seen that the surgeons preferred general anesthesia even in cases suitable for local anesthesia (21%). It was observed that the anesthesiologists preferred the peripheral nerve blocks more frequently than the general anesthesia in cases eligible for peripheral nerve blocks (59%) (Table V).

Table IV. Questions and answers on the usage of personal protective equipment.

My routine measures in the anesthesia of patients who do not require preoperative asymptomatic COVID-19 PCR test or who have negative PCR; (You can select more than one option), n (%)	
• I use surgical masks	84 (84%)
• Patients always wear surgical masks, except during transfer to the operating room and during general anesthesia	95 (95%)
• I use FFP2/FFP3 or an equivalent mask	95 (95%)
• I use goggles and/or face shields	79 (79%)
• I use protective gowns	49 (49%)
Average time allocated for room cleaning between two cases in the operating room, n (%)	
• No break	3 (3%)
• 1-15 mins	22 (22%)
• 16-30 mins	26 (26%)
• 31-45 mins	43 (43%)
• 46 mins-2 hours	6 (6%)

n: number of patients, %: percentage value

Table V. Questions and answers on the protective technical facilities and anesthetic approaches that reduce viral spread and transmission.

In the hospital you work, n (%)	
• There is not any isolated COVID-19 room	21 (21%)
• There is an isolated negative pressure COVID-19 operating room	35 (35%)
• There is an isolated positive pressure COVID-19 operating room	44 (44%)
Approaches for general anesthesia (You can select more than one option), n (%)	
• Your equipment such as anesthesia device monitors, videolaryngoscopy, fiberoptic bronchoscope and ultrasound surfaces-probes are covered with transparent nylon	51 (51%)
• HME-viral-bacterial respiratory filter is placed between the breathing circuit and the face mask or endotracheal tube.	90 (90%)
• Mask ventilation with the one-handed C-E technique is applied	57 (57%)
• Mask ventilation with the two-handed technique is applied	15 (15%)
• Rapid sequence intubation is applied	65 (65%)
• Intubation is applied with videolaryngoscopy	39 (39%)
• Lidocaine-dexmedetomidine-opioid assisted extubation method is applied under deep anesthesia to minimize cough	65 (65%)
My preference for spinal needle in spinal anesthesia during COVID-19, n (%)	
• Quincke needle	21 (21%)
• Pencil-point needle	15 (15%)
• I don't have any specific preference; I use both	64 (64%)
I prefer to use ultrasound in invasive procedures such as peripheral nerve blocks and central venous catheters, n (%)	
• Never	7 (7%)
• Sometimes	26 (26%)
• Mostly	48 (48%)
• Always	19 (19%)
Supraglottic airway devices increase the aerosol dispersion, n (%)	
• Yes	92 (93.9%)
• No	6 (6.1%)
The number of asymptomatic and COVID-19 positive cases in pediatric patients is quite high, n (%)	
• Yes	88 (88%)
• No	12 (12%)
The airway vehicle I use most frequently for pediatric patients; (You can select more than one option, n (%)	
• Ventilation with mask	59 (59%)
• Laringeal mask airway	88 (88%)
• Endotracheal tube	30 (30%)
Considering COVID-19 period, surgical departments in our operating room mostly prefer general anesthesia in cases suitable for local anesthesia, n (%)	
• Yes	21 (21%)
• No	79 (79%)
Peripheral nerve blocks are preferred more frequently than general anesthesia in eligible cases, n (%)	
• Yes	59 (59%)
• No	41 (41%)

n: number of patients, %: percentage value

Discussion

In this survey study, we evaluated the knowledge level of anesthesiologists about recognizing the asymptomatic COVID-19 patients and protective-preventive approaches to patients to be anesthetized during the COVID-19 pandemic. It was seen that most of the participants were careful about the preoperative recognition of COVID-19 and the use of personal protective equipment, but technical facilities were insufficient and their level of knowledge in approaches to reduce viral spread was not up-to-date. In addition, we think that the reason for the lack of targeted number of participation in the survey was the fatigue and burnout triggered by the increased workloads of anesthesiologists during the pandemic process.

In the preoperative preparation period, certain screening methods, including PCR tests or thorax CT, were used to detect COVID-19 positive patients. However, theoretically, it is possible for patients to be infected immediately after these preoperative screenings. This causes the patient to come to the operating room as an asymptomatic or false PCR negative and to become a source of infection for the healthcare team and other patients[10]. It has been reported that a patient's PCR test with tracheal aspirate sample was positive after three negative PCR tests. In addition, it has been stated that the clinical management of the test from the first negative nasopharyngeal sample should not be changed in patients who show symptoms consistent with COVID-19, and the lower respiratory tract samples should rapidly be obtained if possible[11]. For this reason, the anesthesiologist should have an awareness of the COVID-19 findings for each new case, even if the PCR test is negative. In the elimination of COVID-19, first of all, the anesthesiologist should question the common symptoms such as fever, cough, fatigue, mild dyspnea, sore throat, headache, conjunctivitis, as well as rare symptoms such as diarrhea related to gastrointestinal involvement, nausea and vomiting and contact history[12]. RT-PCR is the gold standard test for diagnosing SARS-CoV-2 from the nasopharynx. However, the sensitivity of the test varies depending on the elapsed time since exposure, the experience of the person collecting the sample, and the airway zone from which it was taken. For example, the lower airway samples such as bronchoalveolar lavage fluid are more sensitive than the upper airway samples. We should be aware that the PCR tests are of low sensitivity and may give false negative test results in up to 30% of positive cases. If the operation of patients with positive PCR is elective, it should be postponed[13,14]. According to the Turkish Ministry of Health COVID-19 guidelines, indicators of poor prognosis are defined as: lymphopenias below 0.8×10^9/L, neutrophils higher than 3.5×10^9/L, neutrophil-lymphocyte ratio ≥ 3.13, and D-Dimer values over 0.4 µg/mL[15]. According to the poor prognosis factors valid in the Turkish Ministry of Health COVID-19 guideline, the values as: blood lymphocyte count <800/µl or CRP > 10 x upper limit of normal value or ferritin> 500ng/ml or D-Dimer>1000 ng/ml[16]. In addition, the thorax CT findings showing massive progression can be seen, regardless of patients' being symptomatic or asymptomatic, in the first or middle periods of the disease. Although the diagnostic value of chest radiographs is low in the early stages before the onset of symptoms, even when the patient's PCR test is negative, thorax CT is an advantageous examination with a very high (98%) sensitivity. In the early period of the disease (days 1–5), the bilateral distribution of subpleural or peribronchovascular, multifocal, patchy or segmental, consolidated or unconsolidated ground-glass opacities in the peripheral

and posterior sections of the lower lobes of the lungs are the typical COVID-19 findings[17]. The thorax CT scan can detect a patient who is asymptomatic with negative result for PCR but who has COVID-19 that may be overlooked in the preoperative period.

According to World Health Organization's recommendation, healthcare professionals should wear N95/FFP2 or equivalent masks, protective goggles-face shields, gloves and gowns especially in aerosol-generating procedures (such as tracheal intubation, non-invasive ventilation, tracheostomy, cardiopulmonary resuscitation, manual ventilation before intubation, bronchoscopy)[18]. The time required for adequate disinfection and air circulation of operating room after cleaning was also recommended as 2 hours between two cases[19]. For suspected or confirmed COVID-19 patients, many guidelines recommend the use of an isolated negative pressure operating room[10]. According to our study, there were some hospitals that do not have an isolated operation room for COVID-19 patients which reveals that small-scale hospitals continue to fight against the pandemic with their limited facilities. Current literature supports the coverage of surfaces such as anesthesia monitors and devices, computers and ultrasound machine with plastic wrap to decrease the risk of contamination and facilitate cleaning however our study showed that the participants pay attention to this stage with a rate of 51%[20]. Additionally, disposable breathing circuit and HEPA filter use as well as use of surgical mask by the patient was recommended; all of which were followed with a high rate by the participants (%90 and %95, respectively)[20,21].

During the pandemic, it was supported that the anesthesiologists should make more use of technological methods that accelerate the processes generating aerosol, shorten the contact time and extend the physical distance between the patient and the doctor as much as possible, in line with the facilities of the clinic and the experience of the users. Hall et al. compared VL and direct laryngoscopy (DL) and concluded that the VL significantly extends the "mouth-to-mouth distance" from anesthesiologist to patient by placing the anesthesiologist's above the direct line of sight to the pharynx, and that the procedure time is shorter in VL[22]. In our study we saw that, with a rate of %39, the VL was used less than necessary as a protective approach.

As a common practice, it is preferred not to distribute the aerosols to the room air as much as possible to protect operation room personnel and other patients who would be operated in the operation room during the day. In order to prevent leakage between the mask and the face during ventilation, the two-handed mask, namely V-E ventilation, has been found to be safer than the one-handed C-E ventilation. The rapid sequence intubation and the extubation under deep anesthesia, which minimizes cough at the end of the operation, is recommended[23,24]. According to our results, while the safer two-handed mask ventilation technique and the extubation under deep anesthesia were less preferred, the rapid sequence intubation was applied at a rate of 65%.

The safer anesthesia techniques have been stated in publications during the pandemic. If the surgical procedure is suitable and the patient does not have thrombocytopenia, the anesthesiologists should prefer local anesthesia, regional anesthesia or ultrasound-guided peripheral nerve blocks instead of general anesthesia[7,25]. Thus, as the airway manipulation is avoided, both aerosol distribution and postoperative pulmonary complications will be reduced[26]. As a precaution, the use of pencil point needles in spinal anesthesia has been suggested in

order to reduce the potential risk of introducing infective viral material into the central nervous system[27,28]. There is also a suspected group among pediatric patients, which includes many asymptomatic and carrier patients, and they can usually be operated urgently without PCR testing. A separate operation room should be established where all these suspected patients will be taken. The anesthesia team should use PPE for airway inductions for all pediatric patients[29].

The current tests for SARS-CoV-2 are not sensitive enough to rule out the possibility of asymptomatic carriers entering the operating room. It is important to keep in mind the steps that include detecting the patients with high risk of infection even if their PCR tests are negative; delaying elective surgery if possible; using regional anesthesia instead of general anesthesia techniques when appropriate; using technologies that accelerate procedures and reduce contact time; choosing the most appropriate anesthesia equipment; reducing aerosolization; cleaning the generated aerosols; isolating the operating room where aerosol would generate; and providing appropriate PPE for healthcare professionals.

Table VI. Perioperative control model

1- Preoperative control stage
• PCR test • Lymphopenia • Leukocytosis • Neutrophilia • Thrombocytopenia • CRP • Ferritin • D-dimer • Chest X-ray/Thorax CT • Questioning the suspicious symptoms • Questioning the contact history
2- Usage of protective equipment
• Using protective glasses and visors • Covering anesthesia equipment with a transparent cover • Placing protective filter in the inspiratory and expiratory lines of the anesthesia device • Obeying recommended cleaning-ventilation time of the operating room between cases • Making patients use the surgical masks in operating room transfer processes • Presence of an isolated COVID-19 operating room
3- Safe anesthesia techniques and use of technology
• Two-handed mask technique • Rapid sequence intubation • Extubation under deep anesthesia • Pencil point preference for spinal needle • Peripheral nerve blocks or local anesthesia instead of general anesthesia • ETT instead of supraglottic airway, especially for pediatric patients • Use of ultrasound • Use of videolaryngoscopy

The protective steps we mentioned are listed in which we summarized the protective steps in our "Perioperative Control Model" in table IV. By this three-stage model, it is possible to apply the safe anesthesia techniques by isolating the suspected cases without overlooking them and by reducing the risk of transmission with preventive measures.

As a result, the asymptomatic transmission of SARS-CoV-2 is possible, and some techniques to maximize safety in the operating room are required, since the operating room team is also at risk. We think that keeping the model in mind will make a positive contribution to the pandemic process in terms of providing a safe environment for the patients and the operating room team as well as not overlooking the risky situations that could occur in every patient in the operation room during the perioperative period.

Conflict of interest

The authors declare that they have no conflict of interest.

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Ethical approval

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