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INTRODUCTION

The cardiovascular surgery team in the hospital team performs surgical procedures that pose a high risk to patient health. Cardiovascular surgeons, anesthesiologists, anesthesia technicians, perfusionists and nurses are the employees in this environment. Each employee has different roles and responsibilities (1,2). The application of cardiopulmonary bypass (CPB) to the patient in the realization of open heart surgery is considered one of the most important steps in the history of medicine (3). With the development of techniques and methods applied in the history of cardiac surgery, the heart-lung machine (LM) has taken its place in the market and the perfusionist

profession has emerged (4). The perfusionist is a healthcare worker responsible for intervening in the physiological values of the patient and using LM in CPB operations (5). Perfusionists have an important place in cardiac surgery due to their responsibilities. Cardiopulmonary bypass support applied in open heart surgeries is one of the criteria that affect the success of the surgery and the patient's recovery process (6). In December 2019, a new coronavirus strain, SARS-CoV-2, emerged in Wuhan Province of the People's Republic of China. The SARS-CoV-2 epidemic spread rapidly around the world and was declared a pandemic by the World Health Organization (WHO) on 11 March 2020 (7-9). In cardiac surgery operations in the COVID-19 pandemic, it is important to postpone elective operations and evaluate which

Attitudes of perfusionists in Türkiye during open heart operations in the Corona period

Abstract

Aim: The aim of this study is to determine the attitudes of perfusionists in Türkiye during open heart operations in the Corona period.

Material and Methods: This quantitative study is a descriptive research model. Within the scope of the study, data were obtained from a total of 175 perfusionists. Questionnaire method was used for data collection. The questionnaire was created by the researcher.

Results: Among the perfusionists, 84% stated that there is a protocol in place for each patient in their clinic. On the other hand, 50.9% of perfusionists reported that their clinics did not have a protocol related to the COVID-19 process. Among the perfusionists, 82.3% stated that patients were tested for COVID-19 before open heart surgery. The majority of perfusionists (59.4%) stated that the measures taken in their clinics regarding COVID-19 were adequate. 19.4% of the participants reported that the most tangible problem experienced during the COVID-19 period was the risk, fear and anxiety of transmission of the COVID-19 virus. As a result of our study, 53.6% of perfusionists working in university hospitals, 44.6% of those working in state hospitals, and 35.2% of those working in private hospitals reported that the number of COVID-19 cases in 2020 was 151 or more, and a significant relationship was found between the institution and the number of COVID-19 cases.

Conclusion: In the light of the results obtained from our study, it was observed that there was a lack of protocols regarding the COVID-19 process in the clinics of perfusionists, and the most important problem experienced by perfusionists during the COVID-19 period was the risk, fear and anxiety of transmission of the COVID-19 virus. In conclusion, although it was observed that the pandemic period affected the attitudes of perfusionists, more studies on the subject are needed.

Keywords: Perfusionist, open heart surgery, coronavirus

cases should be taken as emergency or priority in order to reduce the burden of the healthcare system and the spread of the disease. Whether the patient is diagnosed or suspected with COVID-19 is important for patient safety and healthcare professionals in the preoperative, intraoperative and especially postoperative operating room and ICU.

This study is aimed to learn how perfusionists approach during the use of extracorporeal circulatory system during the pandemic period, to determine whether they create an extra protocol in such cases and to determine the differences in the extracorporeal circulatory system use practices of perfusionists and to establish a protocol in line with quality standards in the next pandemic periods.

MATERIAL AND METHODS

Research Group

This quantitative study is a descriptive research model. In Türkiye, there are 687 perfusionists registered to the Perfusionists Association in 2023 (Perfusionists Association, 2023). Therefore, the basis of this study is all perfusionists in Türkiye registered with the association. Through the contact information obtained from the association, 687 perfusionists were tried to be reached by completing the questionnaire through the links sent to their e-mail addresses. Within the scope of the study, data were obtained from a total of 175 perfusionists. Perfusionists were informed about the purpose of the study before starting the study. Prior to the study, approval was obtained from Gaziantep University Clinical Research Ethics Committee (Protocol Number: 2023/397 Date: 29.12.2023).

Data Collection

In the study, a questionnaire method was used to determine the attitudes of perfusionists towards open heart surgeries during the Coronavirus pandemic. The questionnaire was created by the researcher. The questionnaire form included questions about sociodemographic characteristics, whether they received training on COVID-19, the number of COVID-19 cases and the status of testing patients, whether an appropriate protocol on COVID-19 was prepared for patients, opinions on the adequacy of the measures taken by the institution, perfusionists' application of any variation on the gas line during perfusion and distribution of COVID-19 diagnosis status of perfusionists.

Within the scope of the study, the answers of perfusionists working in private, state and university hospitals were compared for the following variables:

- Number of COVID-19 cases in 2020,
- Whether they received training on COVID-19 or not,
- Whether patients are tested for COVID-19 before open heart surgery,
- Whether there is a protocol for each patient in their clinic,
- Whether there is a protocol prepared for COVID-19 in their

clinics,

- Whether they find the measures taken in their clinics regarding COVID-19 sufficient or not,
- Whether or not to apply gas line variation during perfusion.

Data Analysis

SPSS Windows version 23.0 program was used in the evaluation of the data. In the evaluation of the data obtained in the study, descriptive statistics such as percentage, frequency, mean, standard deviation, minimum, maximum values were calculated and chi-square (χ^2) was used in comparisons. The significance level was accepted as $p < 0.05$.

RESULTS

This study was conducted to determine the approaches of perfusionists working in Türkiye during open heart surgery in the corona period and the differences in perfusion practices of perfusionists. Among the perfusionists included in the study, 57.1% were male, 37.1% were between 41-50 years of age, 65.7% were married, and 48% were college/university graduates. It was determined that 37.1% of the perfusionists worked in a state hospital affiliated to the Ministry of Health and 25.7% of them had been working for 11-15 years. (Table 1). It was observed that 66.3% of the perfusionists included in the study did not receive any training on COVID-19 and 74.6% of those who received training received information on this subject through in-service trainings in the institution where they work (Table 2). Of the perfusionists included in the study, 44.6% stated that they intervened in ≥ 151 cases in 2020 and 82.3% stated that COVID-19 test was requested in patients before open heart surgery (Table 3). Among the perfusionists included in the study, 84.0% stated that there was a protocol applied for each patient in the clinic where they worked, while 50.9% stated that a protocol was not established in the clinic where they worked for the COVID-19 process (Table 4).

59.4% of perfusionists stated that they found the measures taken for COVID-19 in the clinic where they work sufficient, and only 14.7% stated that they did not experience any problems in this process. It was determined that the most tangible problem experienced during the COVID-19 process was the risk, fear and anxiety of transmission of the COVID-19 virus. (Table 5).

It was determined that 10.9% of the perfusionists included in the study applied variation on the gas line during perfusion and 5.1% used a vacuum system by extending the gas outlet line of the variation with the help of a luer connector (Table 6).

It was stated that 33.7% of the perfusionists included in the study had a positive COVID-19 test in their environment or social life, and 9.1% of those who had a positive COVID-19 test stated that it occurred in the work environment (Table 7).

When private, state and university hospitals were compared in terms of the number of COVID-19 cases, it was observed that 53.6% of perfusionists working in university hospitals, 44.6%

of those working in state hospitals and 35.2% of those working in private hospitals reported that the number of cases was 151 or more, and it was determined that there was a significant difference between health institutions in terms of the number of COVID-19 cases for 2020 (Table 8).

There was no statistically significant difference ($p>0.05$) between perfusionists' receiving training on COVID-19, COVID-19

testing of the patient before open heart surgery, the availability of a protocol applied for each patient in the clinic where they work, the establishment of a protocol in the clinic where you work for the COVID-19 process, finding the measures taken for COVID-19 in the clinic where you work sufficient, and applying any variation on the gas line during perfusion and the institution where they work (Table 8).

Table 1. Socio-demographic characteristics of perfusionists

		n	%
Gender	Female	75	42.9
	Male	100	57.1
Age	20-25	14	8.0
	26-30	20	11.4
	31-35	24	13.7
	36-40	36	20.6
	41-50	65	37.1
	≥ 51	16	9.1
Marital status	Married	115	65.7
	Single	60	34.3
Education level	High school	10	5.7
	University	84	48.0
	Postgraduate	81	46.3
Institution	Private hospital	54	30.9
	State hospital	65	37.1
	University hospital	56	32.0
Experience in perfusionist profession	1-5 year	32	18.3
	6-10 year	26	14.9
	11-15 year	45	25.7
	16-20 year	29	16.6
	≥21 year	43	24.6

Table 2. Status of perfusionists receiving relevant training on COVID-19

		n	%
Receiving training on COVID-19	Yes	59	33.7
	No	116	66.3
Training resources related to COVID-19	In-service trainings	44	74.6
	Perfusionist association	15	25.4

Table 3. Number of COVID-19 cases of perfusionists and COVID-19 test status of the patient before open heart surgery

		n	%
Number of COVID-19 cases (2020)	1-50	29	16.6
	51-100	40	22.9
	101-150	28	16.0
	≥151	78	44.6
Whether the patient is tested for COVID-19 before open heart surgery	Yes	114	82.3
	No	18	10.3
	Not known	13	7.4

Table 4. Distribution of the protocol applied for patients during the COVID-19 process in the clinic where pefusionists work

		n	%
Availability of the protocol applied for each patient in the clinic	Yes	147	84.0
	No	28	16.0
Has a protocol been established for the COVID-19 process in the clinic where you work?	Yes	86	49.1
	No	89	50.9

Table 5. Distribution of the measures taken for COVID-19 in the clinic where pefusionists work and the distribution of the most concrete problems experienced during this period

		n	%
Finding the measures taken for COVID-19 in the clinic adequate	Yes	104	59.4
	No	71	40.6
The most tangible distress experienced during the COVID-19 process	Stoppage of surgeries	9	5.1
	No tests for emergency patients	32	18.3
	Risk, fear, anxiety of transmission of COVID-19 virus	34	19.4
	Release of waste gases into the environment	12	6.9
	Being sent to a head clinic for support	10	5.7
	Overtime work	26	14.9
	Inadequate equipment	26	14.9
	I didn't have any problems	26	14.7
Total		175	100.0

Table 6. Pefusionists' application of any variation on the gas line during perfusion

		n	%
Application of any variation on the gas line during perfusion	Yes	19	10.9
	Hayır	156	89.1
Applied variation	A vacuum system was used by extending the gas outlet line with a luer connector	9	5.1
	Waste gases were discharged with the line connected to the central waste gas system	6	3.4
	Sevorane	4	2.3
	No variation	156	89.1
Total		175	100.0

Table 7. Distribution of COVID-19 diagnosis status of pefusionists

		n	%
COVID-19 test positivity status	Yes	59	33.7
	No	116	66.3
Covid 19 positivity environment	Social environment	43	24.6
	Work environment	16	9.1
	None	116	66.3
Total		175	100.0

Table 8. Comparison of some characteristics of perfusionists with the institution they work in

		Private hospital	State hospital	University hospital	Statistics
		n (%)	n (%)	n (%)	
Number of COVID-19 cases (2020)	1-50	10 (18.5)	15 (23.1)	4 (7.1)	* $\chi^2=13.807$ $p=0.032$
	51-100	18 (33.3)	8 (12.3)	14 (25.0)	
	101-150	7 (13.0)	13 (20.0)	8 (14.3)	
	≥151	19 (35.2)	29 (44.6)	30 (53.6)	
Receiving training on COVID-19	Yes	12 (22.2)	25 (38.5)	22 (39.3)	$\chi^2=4.625$ $p=0.099$
	No	42 (77.8)	40 (61.5)	34 (60.7)	
Whether the patient is tested for COVID-19 before open heart surgery	Yes	46 (85.2)	54 (83.1)	44 (78.6)	* $\chi^2=3.444$ $p=0.486$
	No	4 (7.4)	5 (7.7)	9 (16.1)	
	Not known	4 (7.4)	6 (9.29)	3 (5.4)	
Availability of the protocol applied for each patient in the clinic	Yes	47 (87.0)	56 (86.2)	44 (78.69)	$\chi^2=1.823$ $p=0.402$
	No	7 (13.0)	9 (13.8)	12 (21.4)	
Has a protocol been established for the COVID-19 process in the clinic where you work?	Yes	29 (53.7)	29 (44.6)	28 (50.09)	$\chi^2=0.999$ $p=0.607$
	No	25 (46.3)	36 (55.4)	28 (50.0)	
Finding the measures taken for COVID-19 in the clinic adequate	Yes	37 (68.5)	39 (60.0)	28 (50.09)	$\chi^2=3.924$ $p=0.141$
	No	17 (31.5)	26 (40.09)	28 (50.0)	
Application of any variation on the gas line during perfusion	Yes	5 (9.3)	6 (9.2)	8 (14.3)	$\chi^2=1.000$ $p=0.606$
	No	49 (90.7)	59 (90.8)	48 (85.7)	

DISCUSSION

In this study, it was aimed to learn and analyze the approaches of perfusionists working in Türkiye during open heart surgery during the COVID-19 pandemic period and to determine the differences in perfusion practices of perfusionists. In addition, it was aimed to determine whether there are different procedures during the corona pandemic period other than the standard protocols applied in clinics, and if not, to establish common protocols.

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is the pathogen responsible for Coronavirus Disease 2019 (COVID-19) (10). In 2019, this disease initially appeared in Wuhan, China. Since then, it has spread around the world, resulting in the coronavirus pandemic of 2019–2020 (11). Following the confirmation of the first COVID-19 case by the Minister of Health on March 10, 2020, there was a noticeable surge in the number of tests conducted in our nation, and the essential isolation measures for prevention were progressively enhanced and initiated from the very first day. Administrators, medical experts, and researchers in the impacted nations attempted to devise policies and procedures to offer proper treatment while also preventing rapid recurrence in waves as the COVID-19 pandemic expanded quickly over the world.

In light of the COVID-19 pandemic, hospitals rank among the highest-risk establishments and require careful management. The operating rooms in the hospital are another area that requires specific consideration and management, particularly in the intensive care units. The typical length of hospital stay and symptom duration for COVID-19-infected patients ranges from 12 to 13 days. In order to lower the dangers to patients and medical personnel, it is stressed in this procedure that individuals infected with COVID-19 should postpone elective procedures and only undergo emergency surgery (trauma, cancer, heart surgery, etc.) (12).

After all public and private hospitals in Türkiye were designated as pandemic hospitals, elective surgeries were discontinued, and the majority of operating rooms were converted into critical care units equipped with the necessary equipment to handle the growing number of patients. Patients should be regarded as potentially infected during all surgeries as of the pandemic's start. This is why all hospitals should include a small operating room complex specifically designed for COVID-19 patients in their emergency action plans. The operating room is where the surgeon, nurse, anesthesiologist, perfusionist, and other members of the surgical team should immediately begin using coordinated intervention procedures. These steps are intended to lessen the risk of viral transmission to medical personnel and other patients

during surgery for COVID-19 patients with probable or definite diagnoses who require care (13).

This study was done to find out how perfusionists worked during open heart surgery in Türkiye during the Corona period, as well as how perfusionists' techniques varied from one another. Only 33.7% of the perfusionists included in our study stated that they received training on COVID-19. It was observed that in-service training was the source of training for 74.6% of perfusionists who stated that they received training on COVID-19. Among the perfusionists who participated in our study, 84% stated that there is a protocol in place for each patient in their clinic. On the other hand, 50.9% of perfusionists reported that their clinics did not have a protocol related to the COVID-19 process. Perfusionists are healthcare professionals who manage blood circulation in cardiac surgery and cardiovascular surgical procedures. During the COVID-19 pandemic, the protocols perfusionists follow are usually based on the general COVID-19 protocols set by the hospital or healthcare organization. However, there are certain precautions that perfusionists must take into account during specialized procedures such as cardiovascular surgery or ECMO (extracorporeal membrane oxygenation). These protocols may include specific requirements in terms of infection control, staff safety and patient care (14,15). In the COVID-19 pandemic, institutions providing health care services should be prepared for every problem/problems that arise/may arise with the pandemic while maintaining their routine service flow. In this direction, a multi-stakeholder holistic management plan covering before, during and after the pandemic is of great importance. In an effective management plan, the concept of "education/in-service training" emerges as an important indicator among the common activities of each stakeholder (14,15). In this direction, the sustainability of health care services is made possible by the continuous training of health professionals. In the "Regulation on In-Service Training" of the Ministry of Health, it is aimed to train the relevant employees in accordance with the conditions of the day and to ensure that they have the knowledge, skills and behaviors required by the duty; to increase their productivity by raising them with the awareness of efficiency and frugality and to prepare them for higher duties (16). In-service training, which is an important part of continuous education, is organized with different methods due to reasons such as rapid decisions taken during the pandemic process, increased workload, assignments, risk of transmission among employees and infection control measures. In this process, the distance education system, which has been on the rise with COVID-19, is becoming an important learning method for healthcare institutions (17). In the Pandemic Influenza National Preparedness Plan prepared to prevent or reduce the effects of the pandemic for our country, it is stated that the behavioral models necessary for the control of respiratory infections are not sufficiently established in the society and among health professionals. In this context, the responsibilities of "Training Units of Second and Third Level Healthcare Institutions" are explained as "planning, implementing, evaluating, analyzing and analyzing the trainings for healthcare

personnel during the pandemic period and organizing the necessary improvement activities" (18).

Among the perfusionists who participated in our study, 82.3% stated that patients were tested for COVID-19 before open heart surgery. The world and our nation have been severely impacted by the COVID-19 epidemic, which has had a detrimental impact on scheduled surgical operations and caused planned procedures to come to a complete halt. However, taking precautions against infection management is essential for the safety of both patients and staff, as surgical treatments cannot be delayed in cases of trauma or malignancy (19). It is important to identify high-risk individuals in terms of COVID-19 before surgical operations. In emergency cases, all patients should be considered COVID-19 positive until proven otherwise (20-22). Since PCR test and lung X-ray/computed tomography are taken as reference for the diagnosis of Covis-19, PCR test should be performed in all patients 48 hours before surgery (20,23,24).

Among the perfusionists who participated in our study, 59.4% stated that the measures taken in their clinics regarding COVID-19 were adequate. 19.4% of the participants reported that the most tangible problem experienced during the COVID-19 period was the risk, fear and anxiety of transmission of the COVID-19 virus. When the studies on the effects of COVID-19 on healthcare workers are examined, it is seen that the biggest effect is fear and anxiety about the transmission of COVID-19 (25,26).

Among the perfusionists who participated in our study, 33.7% stated that the COVID-19 test was positive. Pandemics are a major hazard to public health since they result in a high death toll as well as physical and psychological issues. One of the occupational categories most vulnerable to pandemics is the healthcare industry. The number of COVID-19 infections among healthcare workers is currently unknown and is estimated to be far greater than the number mentioned in the few publications and national situation reports that exist. Based on preliminary study results, healthcare workers may make up 10% or possibly 20% of patients with COVID-19 (27).

As a result of our study, 53.6% of perfusionists working in university hospitals, 44.6% of those working in state hospitals, and 35.2% of those working in private hospitals reported that the number of COVID-19 cases in 2020 was 151 or more, and a significant relationship was found between the institution and the number of COVID-19 cases. There is no data on the number of COVID-19 cases according to health institutions during the pandemic period. However, we can say that public hospitals, especially university hospitals, were preferred over private hospitals.

CONCLUSION

The pandemic has had a number of consequences for perfusionists and healthcare workers in general. The most important of these include increased workload and stress, increased use of personal protective equipment, working at greater risk, professional

training and development, communication with colleagues, and psychological and emotional challenges. The COVID-19 pandemic, which negatively affected the whole world, increased the workload of healthcare systems and caused many services in the healthcare system to come to a standstill. It has been observed that perfusionists, who have a very important role during emergency and unpostponable surgical interventions such as trauma, oncologic or cardiovascular surgery, have also experienced significant difficulties during the pandemic period. Considering the results obtained from our study, it was observed that perfusionists, one of the most important parts of the surgical team, experienced fear and anxiety in terms of the risk of COVID-19 transmission, especially during the pandemic period. However, it was found that although they generally found the measures taken in their clinics regarding COVID-19 sufficient, the rate of those who thought that they were insufficient was also high. At the same time, it was observed that there was a lack of training on COVID-19.

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Ethics Committee Approval: This is a retrospective study with ethics committee approval being taken from Ethics Committee, Gaziantep University (Protocol Number: 2023/397 Date: 29.12.2023).

Patient Informed Consent: Not necessary for this manuscript.

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