

# Thoracic Surgery during Covid-19 Pandemic; Single Center Experience

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## ABSTRACT

**Objective:** After the world health organization declared the COVID-19 epidemic as a pandemic, serious changes were made in the functioning of health institutions along with restrictions in social life.

The aim of this study is investigating the operations and clinical procedures performed in a thoracic surgery clinic during covid pandemic.

**Material and Methods:** In this study, the surgical procedures performed in the thoracic surgery clinic between March 2020 and June 2020 which is accepted as the first wave dates for COVID-19 in our country are presented.

**Results:** Totally, nineteen patients are operated during this period. Average age was 44 (12-68) years old. Forty-three covid PCR tests were performed for a total of 19 patients. Three of them were positive results for COVID-19. After operations one patient died due to septic shock during postoperative period.

**Conclusion:** Malignancy and emergency surgeries can be performed by following precautions in the outbreak of COVID-19.

**Keywords:** COVID-19, thoracic surgery, management

## INTRODUCTION

On 30 January 2020, World Health Organization (WHO) officially declared the COVID-19 epidemic as a public health emergency of international concern [1]. In the next period, the first case reports were made in our country in the first week of March. To date, more than 150 thousand cases and 4 thousand deaths have been reported. [2]. Although the disease seems to be under control today, the pandemic still continues.

The functioning of health institutions, together with other state institutions, could not return to normal order.

This study aims to evaluate the functioning of the operated patients of Yıldırım Beyazıt University Faculty of Medicine, Ankara City Hospital Chest Surgery Clinic between March 2020 and June 2020, which is the most intense period in our country.

## MATERIALS and METHODS

Emergency surgery and cancer surgery procedures were performed only in thoracic surgery clinics with the recommendations of the Ministry of Health scientific committee. This study was done

by examining the file records of patients who were operated in thoracic surgery clinic during the pandemic.

Approval was obtained from the Ministry of Health, Ankara Provincial Health Directorate and Ankara City Hospital Local Ethics Committee.

Clinical Operation and Inpatient Care

\* With the decision of the chief physician of Ankara City Hospital, the mobility of employees and patients in all clinics was reduced.

\* All healthcare professionals were informed about the COVID-19 pandemic by the chief physician training coordination center. Online seminars were organized for all healthcare professionals by the infection control committee

\* The work order of research assistants and specialist physicians was planned as a duty system. Similarly, restrictions were made on the number of nurses and assistant health personnel.

\* The patients were hospitalized as one person in the clinical rooms. From hospitalization to discharge, only one person was allowed to remain as companion. In addition, patient visitors were not allowed. Along with the patients, their companions were followed up with fever and symptoms.

\* All healthcare workers performed patient follow-up and interventions with personal protective equipment. (PPE)

Preoperative Evaluation

\* In the preoperative period, all patients and their companions were informed about the use of masks, hand disinfection and COVID-19 related hospital rules.

\* COVID-19 PCR test was performed in all patients planned to be operated in the preoperative period. Samples from the nasopharynx and throat region were studied with rapid test.

\* Patients with negative results were evaluated with non-contrast thorax tomography before operation. Patients with no signs of viral pneumonia and no appearance of ground glass in their parenchyma were operated

\* The erythrocyte suspension, which was prepared 3 units in thoracic surgery in the preoperative period, was planned as one or two units due to

the low blood supply in the blood centers during the pandemic.

\* Patients who received positive COVID-19 PCR tests during the preoperative period were hospitalized in covid clinics. Hydroxychloroquine, oseltamivir, azithromycin, clexane and vitamin c supportive therapy were given for 5 days. Favipiravir treatment was added to those without clinical improvement. Afterwards, the patients who remained in quarantine for a further 2 weeks were put on the operation list when COVID-19 PCR tests were negative twice in a row

Intraoperative Management

\* The operations were carried out in the operating rooms with negative pressure ventilation systems.

\* Operating room staff and surgical team worked with PPE. Glasses, surgical overalls, N95 surgical mask were routinely used in all procedures.

\* Procedures in lung surgery were performed primarily by specialist surgeons, since shorter surgery times are aimed. During this period, no assistant training cases were made.

\* All patients received a double lumen intubation tube. Care was taken to avoid air leakage after surgery in lung resections. Tissue supporting products were used in cases of lung parenchyma air leak after surgery.

\* When using the videothoroscopic method for surgical resection, the use of CO2 insufflator was avoided. Direct thoracotomy method was used in cases where we thought that air leak control would be difficult (perforated cyst hydatid, emphysematous lung) Rapid ventilation flow and jet ventilator use were not preferred in patients requiring surgery due to severe tracheal stenosis.

Postoperative Follow-up

\* The postoperative first day follow-up of the patients was performed in single intensive care beds.

\* In the postoperative period, all patients and patient refractors were required to use surgical masks.

\* The ventilation and hygiene conditions of the patient rooms were followed closely by the nurse in charge of the service.

\* Routine antithrombotic therapy was routinely performed in the postoperative period. The patients

were mobilized early.

\* During the pandemic period, pulmonary rehabilitation was performed under the observation of nurses due to the restriction of staff mobility.

\* In the postoperative follow-up, patients with high fever were consulted with the infection department. Rapid PCR test was performed in those with clinical suspicion of COVID-19

## RESULTS

Between March 2020 and June 2020, 19 patients were operated. Average age was 44 (12-68) years old. The female to male ratio was 10/9. All patients had malignancy or were requiring emergency surgery. The patients' characteristics are given in Table 1. Forty-three COVID-19 PCR tests were performed

for a total of 19 patients. There was test positivity in 3 cases and tomography findings in one of these cases. Patients who had positive test results were taken to surgery after 20 days with 2 negative test results after appropriate treatment. In this process, PCR tests were performed on 3 healthcare workers who were in contact with 2 patients who were positive. PCR results were negative.

In the postoperative period, 4 patients had high fever (over 38 C) during follow-up.

These cases were consulted with infectious diseases. In 3 cases, fever was associated with postoperative atelectasis. In one case, PCR test was performed with COVID-19 pre-diagnosis. However, the result was negative. This case was later lost due to septic shock.

Table 1. The patients' characteristics

Patient	Age	Gender	Diagnosis	Preoperative Covid PCR	Postoperative Complication	Result
1	68	F	Hydatid cyst ruptured	Negative	N	Recovery
2	27	F	Pulmonary metastasis	Negative	Fever, Pneumonia	Recovery
3	40	M	Mediastinal mass	Negative	N	Recovery
4	41	F	Pleural mesothelioma	Negative	Fever, Pneumonia	Recovery
5	24	M	Pulmonary metastasis	Negative	N	Recovery
6	52	M	Pleural mesothelioma	Negative	N	Recovery
7	60	M	Lung cancer	Negative	N	Recovery
8	34	F	Tracheal stenosis	Negative	N	Recovery
9	34	F	Tracheal stenosis	Negative	N	Recovery
10	50	M	Pleural mesothelioma	Negative	N	Recovery
11	68	M	Lung cancer	Negative	Fever	Recovery
12	68	M	Lung cancer	Negative	N	Recovery
13	51	F	Tracheal stenosis	Positive	N	Recovery
14	33	F	Mediastinitis	Negative	Setpic Shock	Died
15	64	F	Lung cancer	Positive	N	Recovery
16	12	M	Lung cancer	Negative	N	Recovery
17	44	M	Hydatic cyst ruptured	Negative	N	Recovery
18	45	F	Lung cancer	Negative	N	Recovery
19	17	F	Mediastinal Mass	Positive	N	Recovery

F: Female, M: Male, N: Non

## DISCUSSION

It has been shown in studies that SARS-CoV-2 (COVID-19) main transmission pathway is a droplet. Virus RNA was detected in the ventilation systems and air samples of the rooms where COVID-19 patients were hospitalized [3]. In a study in which breathing was visualized with high-speed imaging techniques, it was observed that droplets that spread to the environment during coughing, speech and sneezing could be transported to more than 2 meters in a gas cloud [4]. All these studies indicate how risky patients who have undergone surgery in thoracic surgery clinics in terms of airway contact.

COVID-19 has also been shown to be transmitted from people in an asymptomatic or incubation period so that live virus was detected in cell culture in samples taken from asymptomatic or presymptomatic individuals with PCR positive during the COVID-19 outbreak, up to 5-6 days before the onset of symptoms. [5]. For this reason, we used PCR and thorax tomography examinations for the detection of asymptomatic COVID-19 positive cases in patients with whom we planned surgery.

In a recent study conducted by Dr Nan-Shan Zhong's team in the laboratory, sampling 1099 confirmed cases, common clinical symptoms were fever (88.7%), cough (67.8%), fatigue (38.1%), sputum (33.4%), shortness of breath. (18.6%), sore throat (13.9%) and headache (13.6%) [6,7]. In many studies, the symptoms were not different from similar viral infection symptoms. We made system queries for both the patients to be operated on and the patients' relatives in terms of these symptoms.

Yang Li et al. gathered the patients with COVID-19 in 4 groups in their study [8]; Group 1 had mild clinical symptoms and did not have pneumonia symptoms, Group 2 had patients with fever, respiratory and other system findings and pneumonia radiology. Group 3 were patients with severe symptoms, shortness of breath, more than 30 breaths, oxygen saturation value less than 93%, and PaO<sub>2</sub> / FiO<sub>2</sub> ≤300 mmHg. In these patients, more than 50% infiltration was seen in the lung parenchyma within

24-48 hours. In the fourth group, which was the critical group, it was the group with shock, respiratory failure and other organ failure requiring mechanical ventilator. All of our cases consisted of mild clinical findings or asymptomatic patients that could be considered in the first group.

In the radiological evaluation of COVID-19 patients, frosted glass shadows and interstitial changes in tomography were reported especially in the lung peripheral parenchyma areas [9]. Pneumonic consolidated areas and, although rare, pleural effusion findings can be seen [10]. In the later period, signs of acute lung injury are observed in severe disease. Surgical protocol is not clear in COVID-19 positive cases. The absence of a guideline to be followed for the procedures performed and the lack of high level of evidence caused hesitations in practical applications in all thoracic surgery clinics. However, in many thoracic surgery clinics, a common view has been reached on performing oncological surgeries and emergency surgeries [11,12].

In a study performed in a thoracic surgery clinic, mortality was reported as 5 (38.5%) in 13 COVID-19 positive patients (11 lobectomies and 2 esophagectomies performed) during the pandemic [8]. For this reason, COVID positivity is considered as a serious risk factor especially for thoracic surgeries. Smoking and chronic obstructive pulmonary diseases were the most prominent findings in these patients as risk factors.

Thoracic Surgery Outcomes Research Network, classified the practical applications of thoracic surgery according to the phase of the pandemic [12]. In the case accepted as the first phase, the number of covid positive patients in that hospital is very low, the hospital capacity is very sufficient and it describes the situation in which all kinds of equipment are available. Since we are working in such an environment clinically, we planned our applications in a similar way to these recommendations. We think that our country is affected by pandemics later than many European countries, giving us

the opportunity to make more accurate practices by learning from the experiences of these countries. Clinically, emergency operations and unexpected cancer cases (tumors larger than 2cm, tumors with induction therapy, symptomatic mediastinal tumors and invasive chest wall tumors) were clinically operated during this process. Tumors with a frosted glass area of more than 50%, nodules smaller than 2 cm, carcinoid tumors and slow-progressing tumors, pulmonary oligometastasis and non-emergency bronchoscopy procedures were delayed for up to 3 months. In cases where alternative therapy could be applied SBRT, ablation, endoluminal therapy (in early esophageal tumors), surgery was not considered during this period.

## **CONCLUSIONS**

Malignancy and emergency surgeries can be performed by following precautions in the outbreak of COVID-19. During the pandemic period in thoracic surgery clinics, the operation of the hospital and the practice of thoracic surgery can be different for each center. The process should be tried to be managed by making active plans according to the hospital conditions, the phase of the pandemic, health-care worker and equipment capacity.

## **CONFLICT of INTEREST**

The authors declare that they have no conflict of interest.

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