



# COVID-19 Pandemia Processing and Single Surgery Experience in Surgical Applications in the Chest Surgery Clinic of Tekirdağ Namık Kemal University Research Hospital with Pandemia Hospital

Pandemi Hastanesi Olan Tekirdağ Namık Kemal Üniversitesi Araştırma Hastanesi Göğüs Cerrahisi Kliniği'nde COVID-19 Pandemi İşleyişi ve Cerrahi Uygulamalarda Tek Cerrah Deneyimi

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## ABSTRACT

**Aim:** During the Coronavirus disease-2019 (COVID-19) pandemic period, elective surgical procedures could not be performed in many centers. In order to prevent possible patient grievances in the Marmara region, elective surgical procedures were continued with the correct planning in our hospital. This study was planned to document the retrospective analysis of surgical procedures performed by a single surgeon in the thoracic surgery clinic.

**Materials and Methods:** A total of 72 patients who underwent surgical intervention by a single surgeon in Tekirdağ Namık Kemal University Thoracic Surgery Clinic during the COVID-19 pandemic period (15.03.2020-15.07.2020) were retrospectively evaluated. The procedures performed before the surgical procedure, the surgical procedures performed and the follow-up after the procedure were examined.

**Results:** The patients who applied to our clinic were performed a polymerase chain reaction test for COVID-19 infection after clinical, radiological and laboratory evaluations before the procedure. No evidence in favor of COVID-19 infection was detected in any patient. Thereupon, 25 (34%) patients underwent surgery under general anesthesia, and 47 (66%) patients underwent local anesthesia. A risk situation and disease related to COVID-19 infection did not develop in the clinical follow-ups of the patients both during and after the surgical procedure.

**Conclusion:** It has been concluded that safe surgery can be performed by minimizing the risks with the right methods by evaluating the appropriate protective measures of the team that will perform the surgical procedure during the pandemic period and the patients in terms of COVID-19 infection before and after the procedure.

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

## ÖZ

**Amaç:** Koronavirüs hastalığı-2019 (COVID-19) pandemi döneminde birçok merkezde elektif cerrahi işlemler yapılamadı. Marmara bölgesinde olası hasta mağduriyetlerinin önüne geçilmesi için hastanemizde yapılan doğru planlama ile elektif cerrahi işlemlere devam edildi. Göğüs cerrahisi kliniğinde tek cerrah tarafından yapılan cerrahi girişimlerin retrospektif analizi ile yapılan cerrahi uygulamaları dökümanete etmek amacıyla bu araştırma planlandı.

**Gereç ve Yöntem:** COVID-19 pandemi döneminde (15.03.2020-15.07.2020) Tekirdağ Namık Kemal Üniversitesi Göğüs Cerrahisi Kliniği'nde tek cerrah tarafından cerrahi girişim uygulanan toplam 72 hasta retrospektif olarak değerlendirildi. Hastaların cerrahi işlem öncesi uygulanan prosedürler, yapılan cerrahi işlemler ve işlem sonrası takipleri incelendi.

**Bulgular:** Kliniğimize başvuran hastalar işlem öncesinde klinik, radyolojik, laboratuvar değerlendirmeleri yapıldıktan sonra COVID-19 enfeksiyonu açısından polimeraz zincir reaksiyonu testi uygulandı. Hiçbir hastada COVID-19 enfeksiyonu lehine bir bulgu tespit edilmedi. Bunun üzerine 72 olgu opere edildi. Yirmi beş (%34) hastaya genel anestezi altında, 47 (%66) hastaya lokal anestezi ile cerrahi işlem uygulandı. Hastaların hem cerrahi işlem sırasında hem de işlem sonrasında yapılan klinik takiplerinde COVID-19 enfeksiyonu ile ilgili bir risk durumu ve hastalık gelişmedi.

**Sonuç:** Pandemi döneminde cerrahi işlem uygulayacak ekibin uygun korunma tedbirleri ve hastaların işlem öncesinde ve sonrasında COVID-19 enfeksiyonu açısından değerlendirilerek doğru yöntemlerle risklerin en aza indirilerek güvenli cerrahi uygulanabileceği sonucuna varılmıştır.

**Anahtar Kelimeler:** COVID-19, pandemi, göğüs cerrahisi

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## INTRODUCTION

In December 2019, cases of pneumonia of unknown origin began to appear in Wuhan, China. As a result of research by Chinese scientists, it was revealed that the cause of pneumonia in these patients was 'Severe acute respiratory syndrome-Coronavirus-2' (previously known as 2019-nCoV). In February 2020, this disease was referred to the literature as Coronavirus disease-2019 (COVID-19)<sup>1</sup>. Due to the rapid spread of the disease to many countries outside of China, a pandemic was declared by the World Health Organization on March 11, 2020<sup>2</sup>.

In many countries where adequate measures are not taken, the number of patients far above the modern medical resources and intensive care capacities has necessitated changes in the diagnosis and treatment of other diseases<sup>2</sup>. If not intervened in a short time, diagnosis and treatment of diseases that will not pose a serious threat to life and that only affect the quality of life have been postponed to an appropriate time in places where the pandemic is seen<sup>1</sup>. However, it should not be ignored that other diseases can cause serious problems that can threaten life, and guidelines and practices should be arranged accordingly.

Thoracic surgery clinic is a branch with its own surgical emergencies that cannot be postponed, and it also performs cancer surgery intensively under elective conditions. Proper management of patients with indications for surgical treatment during the pandemic is important both to prevent mortality due to emergencies and to manage cancer patients correctly in the process. It should not be forgotten that changes in the current surgical indications in malignant patients during the pandemic period will lead to ethical and legal responsibilities in the future<sup>2</sup>. In addition to surgical indications, emergencies and the management of cancer patients, the precautions to be taken before the surgery, in the operating room and in the postoperative follow-up should be determined in patients with COVID-19 or suspected infection<sup>3</sup>.

Although studies on preoperative, intraoperative and postoperative follow-ups of elective cases or patients requiring emergency surgical intervention have been presented in pandemic hospitals in our country, there are not enough studies yet in terms of thoracic surgery practices and follow-ups, procedures and follow-ups that should be done and postponed during the epidemic period. In this study, it was aimed to present the surgical applications performed by a single surgeon in our clinic and the clinical experiences obtained during the pandemic period by examining the studies and recommendations about the approaches in surgical interventions during the pandemic period.

## MATERIALS AND METHODS

### Surgical Procedures Performed with Local Anesthesia

During the pandemic period (15.03.2020-15.06.2020), the following surgical procedures were performed under local anesthesia in a total of 47 (66%) cases in our clinic. Before the procedure, all patients were informed about the procedure and their consent was obtained with an informed consent form.

Tube thoracostomy was performed as an emergency surgical intervention in 10 cases due to pneumothorax (Table 1). These cases were clinically examined and evaluated after admission to the emergency department of our hospital. And after the COVID-19 infection was excluded clinically and radiologically, appropriate protection was provided with personal protection equipment (PPE) in the intervention room, and tube thoracostomy + closed underwater drainage was performed under local anesthesia. The mean age of the patients was 35 years (21-64). After the procedure, the patients were hospitalized under appropriate conditions and their treatment was arranged. The mean hospital stay was 3 days (2-5). The cases were followed up in outpatient clinic after clinical and radiological improvement.

Thirty patients were hospitalized in our clinic due to malignant pleural effusion. After excluding COVID-19 clinically and radiologically, PPE was provided and drainage was performed with tube thoracostomy under local anesthesia (Table 1). The mean age was 58 years (42-74). The mean hospital stay was 2 days (1-3). After clinical and radiological improvement, they were followed up in the outpatient clinic (Table 1). Three cases were hospitalized with the diagnosis of para-pneumonic effusion/empyema, and after COVID-19 was excluded clinically and radiologically, drainage was provided by performing tube thoracostomy with PPE under local anesthesia (Table 1). The mean age of the patients was 44 years (28-52). The mean length of stay was 2 days (1-3). After clinical and radiological improvement, the patients were followed up in the outpatient clinic. The chemotherapy port required for oncological treatment was inserted with PPE under local anesthesia in four cases and they were discharged on the same day (Table 1).

### Surgical Procedures Performed with General Anesthesia

Prior to the procedure, the patients who would undergo general anesthesia were informed about the procedure and their consent was obtained with an informed consent form. Pre-

**Table 1. Surgical procedures performed with local anesthesia**

Tube thoracostomy (pneumothorax)	10 cases
Tube thoracostomy (malignant pleural effusion)	30 cases
Tube thoracostomy (parapneumonic effusion/empyema)	3 cases
Chemotherapy port	4 cases
<b>Total</b>	<b>47 cases</b>

operative preparations were made as outpatients. For the patients hospitalized in the clinic, after ruling out COVID-19 clinically and radiologically, a swab sample from the throat and nose was taken and sent for polymerase chain reaction testing. The patients were operated 1 day after the result was found to be negative. All of the procedures were made with PPE on separate days.

During the COVID-19 pandemic period (15.03.2020-15.06.2020), the following surgical procedures were performed under general anesthesia for 25 (34%) cases in our clinic;

- Bullectomy with axillary mini-thoracotomy was performed in 12 cases (Table 2). All surgical procedures performed on the left side in eight patients and on the right side in four patients were performed on male patients. Ten of the cases were operated for recurrent pneumothorax, and two for pneumothorax + bullous lung disease. The mean age was 38 years (24-56). The mean hospital stay was 4 days (3-6).

- Lung resection by thoracotomy was performed in five cases with the diagnosis of lung cancer, and segmentectomy was performed in one case due to bronchiectasis (Table 2). Four cases underwent lobectomy and two cases underwent segmentectomy. All cases were male, the mean age was 58 years (44-72), the mean hospital stay was 6 days (4-9). In the post-operative period, one patient was kept in the internal intensive care unit in isolation for 1 day.

- Six cases underwent diagnostic video-assisted thoracoscopic surgery (VATS) with pleural effusion drainage and pleural biopsy (Table 2). The mean age of the cases was 48 years (42-98), and the mean length of hospitalization was 2 (1-3) days.

- Maximal thymectomy was performed with the trans-sternal approach in one case having the diagnosis of myasthenia gravis + thymoma (Table 2). The 52-year-old patient was hospitalized for 7 days.

**Statistical Analysis**

Since the study included the surgical procedures performed in the COVID-19 pandemic period and their results, it does not include any statistical methods.

Table 2. Surgical procedures performed with general anesthesia	
Lung resection	6 cases
Bullectomy	12 cases
Video assisted thoracic surgery procedure	6 cases
Sternotomy	1 cases
<b>Total</b>	<b>25 cases</b>

**DISCUSSION**

**Preoperative Period and Determination of Indications**

The main patient group that the field of thoracic surgery deal with involves those with a wide range of diseases such as blunt-penetrating thoracic traumas, spontaneous pneumothorax, pleural effusions, and lung malignancies. In addition to the surgeries performed in these cases, close outpatient follow-up is also required.

In studies conducted during the pandemic in China, it has been revealed that hospitals are the places where the treatment of COVID-19 is carried out, as well as the places that constitute the most important source for the spread of this disease<sup>4</sup>. For this reason, for preventing the spread of the disease, it will be an important step to take a break from elective surgical procedures and to reduce the frequency of outpatient follow-ups during the pandemic period. However, surgical indications for emergency surgical procedures and cancer diseases that will threaten life in case of delay should be carefully set and surgical treatments should be continued without interruption. In this period, changing the working order of surgical teams and re-creation of teams may come to the fore because it should not be forgotten that healthcare workers can be infected like the patients admitted to the hospital during the pandemic, and regulations on the issue should be introduced<sup>4</sup>. In the study conducted by Nassar et al.<sup>5</sup>, the surgical teams that normally worked in five groups were divided into three large groups in order to isolate them, to reduce contact, and to maintain the functionality and working power of the groups in case of the presence of patients in the group, and a 7-day working principle was adopted. In this way, other groups were isolated from the hospital for 2 weeks. In addition, the visits were not performed as a group. Instead, a clinician entered each room, and these clinicians met and held virtual visits at the end. In addition, the transfers between the groups and the duty team were made in the virtual environment, the groups did not come into physical contact and cross contact was avoided<sup>5</sup>.

**Diseases Requiring Emergency Surgical Intervention**

Although nothing will replace the surgeon's clinical evaluation and indication in cases requiring urgent surgical intervention, the American College of Surgeons has recommended to follow the following route in the published triage guideline during the COVID-19 pandemic:

Medical treatment is preferred, if possible, for patients known to be COVID-19 positive or have a high clinical suspicion for COVID-19 infection. If surgery is required in these patients, appropriate protective equipment should be used and necessary precautions should be taken to protect the healthcare team<sup>6</sup>.

Procedures and surgeries should be performed if delaying the procedure or operation will prolong hospital stay, increase the likelihood of later hospitalization, or harm the patient. If conservative management of a surgical condition fails, surgery should be reconsidered to reduce future resource use. Spontaneous or recurrent pneumothorax can usually be managed without surgery during the pandemic period. Where possible, outpatient treatment with tube thoracostomy + heimlich valve under local anesthesia may be appropriate. Emergency surgical procedures should generally be reserved for significant bleeding, serious illness, or disease unresponsive to non-surgical measures, such as hemo-pneumothorax. In empyemas that cause para-pneumonic effusion or septation, patient should be drained under local anesthesia and hospital stay should be kept short<sup>6</sup>.

### Approach to Malignant Diseases

Since lung cancer is the most common malignancy, thoracic surgery is a branch that monitors and operates a large number of malignant patients. During the pandemic period, decisions should be made in multidisciplinary councils to be held together with the relevant units in cancer cases. With multidisciplinary meetings to be held, it would be appropriate to discuss the situation of cancer cases and COVID-19 in the hospital/region, and to direct cancer cases to surgical or non-surgical treatments. Neo-adjuvant therapy should be preferred for patients at risk of COVID-19 due to the possible delay, and surgery should be preferred at the end of the treatment. Patients and their relatives should be informed about that the decisions regarding non-urgent cancer surgery are made by consensus, about the prevalence of the disease, tumor characteristics, and the consequences that may occur in delays<sup>6</sup>.

In a study by Liang et al.<sup>7</sup>, in which they analyzed 2007 patients with COVID-19 in 507 hospitals, it was revealed that cancer patients had higher rates of hospitalization and mortality in the intensive care unit requiring respiratory support due to COVID-19. In addition, the risk was found to be even higher in patients who received chemotherapy or had surgery in the last 1 month<sup>7</sup>. At the end of this study, it was suggested that the surgery and adjuvant treatment of stable cancer patients should be postponed, and that the personal protection, follow-up and treatments of cancer patients should be carried out more carefully in case of catching COVID-19<sup>7</sup>.

For lung cancer surgery, in hospitals where intensive care unit beds and resources are decreasing due to COVID-19, patients should be operated under elective conditions if there is no other treatment option and the chance of surgery will be lost with postponement. If the hospital conditions are suitable and the facilities are not too narrow yet, patients who do not respond to the treatment after neo-adjuvant chemo-

radiation can also be operated in addition to these indications. Patients with locally advanced stages and patients who will benefit from neoadjuvant therapy can be referred to other treatments. Moreover, during this period, endoscopic VATS can be performed for patients with lung cancer, considering the indication, in cases safe for COVID-19. However, strict precautions must be taken in terms of aerosolization. If there is an urgent indication to operate a case with a suspected or definitive diagnosis of COVID-19, the operation should be performed in an isolated room, the medical instruments to be used should be separated and a negative pressure room should be used. It is also recommended that the team performing the surgery be isolated for 14 days<sup>7</sup>.

If possible, oral regimens should be preferred for patients for whom adjuvant and neo-adjuvant therapy would be considered<sup>8</sup>. Because the procedures to be performed for port placement to the patient during the pandemic period and the frequent admission of the patient to the hospital for treatment will increase the risk of COVID-19. Since immunosuppression will develop in patients receiving chemotherapy, it is obvious that mortality will increase in case of contracting COVID-19. In patients who have completed neoadjuvant oncological treatment, it would be correct to wait for 6-8 weeks in terms of both the safety of the surgery and the saving of time<sup>8</sup>.

### Precautions During Surgery

The operating rooms, which are the places where surgeons spend the most time, and surgical procedures are important foci for the transmission of COVID-19, and it is important to take the necessary precautions in these environments to prevent the transmission to both the healthcare worker and the patients who will be treated there. Patients who have previously tested negative for COVID-19 and also those who do not have any symptoms do not need to take any additional precautions<sup>8</sup>. Precautions apply to patients with suspected COVID-19, whose disease has not been excluded by testing, or whose disease has been confirmed by testing.

### Operating Room

All patients with a diagnosis of or suspected COVID-19 should be operated in a negative pressure operating room with its own entrance, away from other operating rooms, if surgery is required. In addition, it would be correct to use the same room and anesthesia device during the pandemic process<sup>7</sup>. If possible, there should be an entrance room before the operating room, this room should be connected to the operating room and have negative pressure. Personnel leaving the operating room should remove their gloves and gowns here and provide hand hygiene here. After the operation, it is necessary to decontaminate the room and use chlorinated solutions at the appropriate concentration<sup>7</sup>. It would be appropriate to leave

1-2 hours between cases for decontamination. In addition, all materials taken into the room for surgery during the case should be considered infected and destroyed after the surgery and should not be used for another patient.

### Postoperative Period and Follow-ups in Clinic

After the end of the surgery, patients with COVID-19 or suspected patients who do not require postoperative intensive care should be followed up on the operating table until recovery. Afterwards, these patients should be followed up in isolated rooms in the unit. It is a matter of debate whether to give COVID-19 treatment to patients in the postoperative period. If there is no definite diagnosis and the patient is only suspected of COVID-19, there is no need to give treatment<sup>2</sup>. If there is a confirmed diagnosis of COVID-19, treatment should be given. A multidisciplinary approach would be more appropriate for the treatment of these patients<sup>2</sup>.

There is no different procedure in the postoperative follow-up of COVID-19 negative patients. It should not be forgotten that hospitals are an important source for the spread of infection, patients should wear masks and be discharged as soon as possible.

### Outpatient Clinic Visits and Patient Follow-ups

Outpatient clinics are important for preoperative diagnosis of patients, arrangement of their treatment, preparation for surgery and also control and follow-up in the postoperative period. However, hospitals are very important places for the spread of infection during the pandemic. Therefore, all non-emergency outpatient visits should be postponed unless there is an increase in active symptoms during the pandemic period or any condition related to wound management<sup>8</sup>. Yu et al.<sup>9</sup>, in their study of 1524 cancer patients, they revealed that cancer patients were more likely to contract COVID-19 and there was a correlation between the number of hospital admissions and the risk of contracting the disease. Therefore, outpatient visits should be minimized and patient follow-ups should be made electronically or by telephone<sup>9</sup>.

## CONCLUSION

Considering the rate of spread and mortality of the COVID-19 pandemic, it has become necessary to evaluate not only the disease itself, but also the other clinical applications it affects, and to draw a new roadmap in health practices<sup>2</sup>. During this period, thoracic surgery practices will also differ.

Necessary measures should be taken to adequately protect health workers who are struggling with the epidemic during the pandemic period. Adequate personal protective equipment should be provided, necessary training should be given, and health personnel should be protected. It should not be

overlooked that if healthcare workers are not adequately protected, the disease, which has an average incubation period of 5 days, will cause transmission to other healthy individuals during the asymptomatic period, and it will also cause loss of personnel power, which is the most necessary at the moment. Healthcare workers should wear surgical masks at all times in the hospital.

For the rational use of resources, the situation of hospitals should be evaluated regularly with multidisciplinary councils, resources and personnel should be directed to the necessary units according to the epidemic situation<sup>8</sup>. It would be more accurate to suspend elective procedures for a while, and to effectively assign the personnel and medical resources to be spent in the necessary units.

There are approximately 175,000-180,000 new cancer cases per year in our country<sup>8</sup>. While some of these cases are suitable for adjuvant and neoadjuvant therapy, some require surgery. Failure to perform this surgery may result in a significant increase in cancer-related morbidity and mortality<sup>8</sup>. The fact that patients do not come to hospitals due to fear in a pandemic environment and these cases remain in the background can lead to very important problems. With the arrangements to be made in this environment, it is necessary to create environments where both urgent cases and cancer cases that cannot wait can be treated. Isolated hospitals, which will be left in certain regions per population and where COVID-19 patients will not be accepted, should be employed for these cases<sup>8</sup>.

Patients should be told in detail about delays in elective procedures, emergencies, and changes in the treatment scheme of cancer patients. In addition, while the treatment plans are being made, the decision of the treatment schemes in hospitals by a multidisciplinary council will provide healthier practices in terms of both resource management and disease management.

## Ethics

**Ethics Committee Approval:** The study was approved by the Tekirdağ Namik Kemal University of Ethics Committee (protocol no: 2021.05.01. 05, tarih: 26.01.2021).

**Informed Consent:** Retrospective study.

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

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