

CASE REPORT

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Geliş tarihi / Received : September 25, 2023

Kabul Tarihi / Accepted : January 24, 2024

E-Yayın Tarihi / E-Published : September 01, 2024

Cite this article as

Bu makalede yapılacak atıf

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Hemothorax

Akd Med J 2024;10(3): 564-567

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Thoracic Surgery Procedures in COVID-19 Pandemic: A Case Report of Traumatic Hemothorax

COVID-19 Pandemisi Döneminde Göğüs Cerrahisi Uygulamaları: Travmatik Hemotoraks Olgu Sunumu

ABSTRACT

During the coronavirus pandemic period, many urgent surgical procedures continued to be performed. Protecting health workers and minimizing contagiousness during surgical procedures and during the follow-up of patients played a key role in the fight against the pandemic. In this study, it is aimed to share the thoracic surgical procedures applied to hemothorax in a patient with a positive polymerase chain reaction test who had thoracic trauma.

Key Words:

COVID-19, Hemothorax, Thoracic surgery, HEPA filter

ÖZ

Koronavirüs pandemisi döneminde birçok acil cerrahi işlem yapılmaya devam etti. Cerrahi işlemler sırasında ve hastaların takibi sırasında sağlık çalışanlarının korunması ve bulaşıcılığın en aza indirilmesi pandemi ile mücadelede kilit rol oynamıştır. Bu çalışmada, toraks travması geçiren ve polimeraz zincir reaksiyonu testi pozitif olan bir hastada hemotoraksa uygulanan torasik cerrahi prosedürlerin paylaşılması amaçlanmıştır.

Anahtar Kelimeler:

COVID-19, Hemotoraks, Göğüs cerrahisi, HEPA filtre

INTRODUCTION

Since 2020, the whole world has been struggling with the new coronavirus strain (COVID-19). In order to minimize the contagiousness during the pandemic period, new procedures regarding the indications, contraindications and application methods of surgical procedures have been determined.

Case

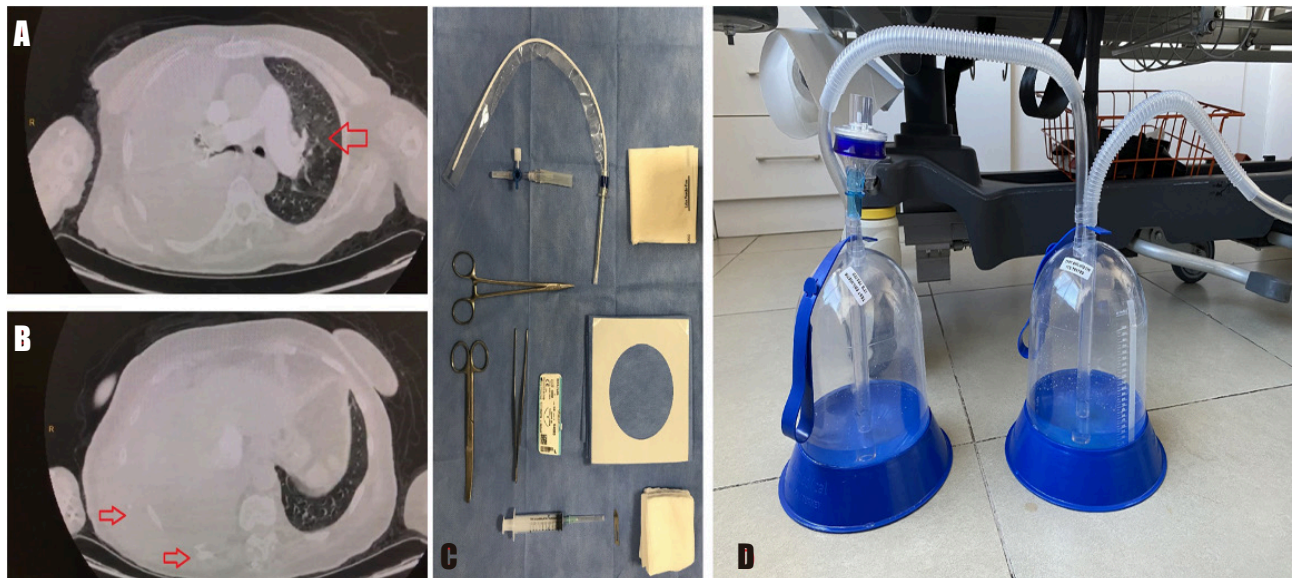
An 82-year-old female patient presented to the emergency department with the complaint of dyspnoea. The patient had fallen down the stairs the day before and had no injury other than thoracic trauma. The patient had aortic valve replacement (AVR), pacemaker application and cerebrovascular incident (CVO). She was using Warfarin because of these diseases.

Thorax computed tomography (CT) showed a dense density filling the right hemithorax from basal to apex, consistent with hemothorax. Near the fragmented fractures on the 11-12th ribs, a hematoma of approximately 11x4 centimetres (cm) located between the intercostal muscles was observed. A ground

glass appearance was observed in the left hemithorax.

It was seen that the value of hemoglobin was 7.6 and the International Normalized Ratio (INR) was 5.31. Polymerase chain reaction test (PCR) was positive. Warfarin use was discontinued after the patient was hospitalized. Thoracic surgery was planned for the patient whose laboratory values were made suitable for an intervention in hemothorax.

After the supply of personal protective equipment (PPE) in the negative pressure room in the pandemic intensive care unit, a doctor and a nurse gave a suitable position to the patient. A hemothorax was detected in the thoracentesis performed from the right hemithorax after surgical site cleaning. Thereupon, a 10 French (F) thoracic catheter was applied. Thoracic catheter was taken into a single chamber underwater drainage system. 300cc of alcohol (80%) was used as liquid in a second underwater drainage system. It was plugged into the output section of the first system. A high efficiency particulate air (HEPA) filter used for the mechanical ventilator was installed in the outlet section of the second system (Figure 1).



A) Ground glass density in the left lung B) Rib fractures, hemothorax C) Thoracic drain D) Underwater drainage system

A total of 2000 millilitres (ml) of defibrinated blood was drained from the patient in a controlled manner. Low molecular weight heparin (LMWH) was started for the patient as the INR value fell below 2 immediately after the procedure. Thoracic catheter was terminated at 72 hours.

DISCUSSION

During the COVID-19 pandemic, surgical procedures were divided into categories as emergency and non-emergency. While non-emergency surgical procedures were tried to be postponed as much as possible, emergency procedures continued (1). Surgical procedures and patient follow-up procedures of thoracic surgery performed during this period make patients potentially contagious (2). There are no definitive guidelines on the pattern of aerosol spread of COVID-19. It is strongly recommended to minimize the contact time in surgical procedures. There are publications reporting that thoracostomy, patient follow-up, and the termination of thoracostomy

should be considered as aerosol generating procedures (3, 4). In this case, it was thought that the application time of 28 French (F) and above chest tube to be applied with standard skin incision and blunt dissection would be longer while applying thoracostomy to the patient. Despite the high density of the pleural fluid, we applied a 10 F thoracic catheter. Since the thoracic catheter has a guide needle, we did not make skin incisions and blunt dissection.

Another recommendation which is as important as shortening the duration of surgical procedures is the necessity of intervention with personal protective equipment (4). The procedure was performed by using a long-sleeved gown, sterile gloves, visor and FFP3 mask. The room in which the intervention was carried out was a negative pressure room. The most experienced surgeon and nurse performed the surgical procedure. The process took an average of 5 minutes. Patient follow-up is as important as the form of thoracostomy applications in terms of preventing aerosol formation (4).

HEPA filters have the feature of filtering 99.97% of particles of 0.3 micrometer. This size corresponds to the size of the viral particle in a standard droplet. There is currently no evidence that these filters filter out COVID-19, but they are known to filter viruses of the same size. It is recommended to apply HEPA filters to mechanical ventilators used in COVID-19 patients (5, 6).

There are no filtering systems in the underwater drainage systems used as standard. We thought that it would be important to filter the chimney of the underwater drainage system during the follow-up of the patient. We placed the HEPA filter in the outlet section of the underwater drainage system.

The use of different fluids within the system has been reported as another measure to reduce contamination by aerosol formation from the underwater drainage system. It has been reported that standard household bleach (5.25%–6.15% sodium hypochlorite) is diluted (1/50) and used. The use of alcohol (80%) for medical use has also been reported. There is no reported study on the superiority of the two options over each other (4, 5). So, we used up to 300 cc of medical-grade alcohol (80%) in a second underwater drainage system. We plugged this system into the output line of the other system. The reason for this choice is that it is easy in terms of accessibility and applicability.

The termination of the thoracostomy was also performed in a negative pressure room. Long-sleeved gown, sterile gloves, visor and FFP3 mask were used. The area where the thoracic catheter came out of the skin was tightened.

CONCLUSION

It is necessary to minimize the spread of the virus by creating special procedures and teams for surgical procedures to be performed on COVID-19 patients. It is important that the procedures to be performed are proven to be reliable, but there are still many unexplored features of COVID-19. We think that large case series are needed to prove the reliability of the procedure that we applied to the patient. Until standard procedures that will be accepted by the whole world are established, it is important for surgeons to protect themselves in the light of general information, as we do, for the fight against all infectious diseases.

Conflict of Interest:

There is no conflict of interest.

Patient Informed Consent:

The patient provided written informed consent for the publishing of this case report and associated pictures. A copy of the written consent is available for review from the Editor-in-Chief of this journal.

Financial Disclosure:

The authors declared that this study has received no financial support.

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