



Management of an Organ Donation Process in COVID-19 Pandemic: First Case of Turkey

Mehmet Nuri Yakar¹ , Pakize İstan¹ , Mehmet Çağatay Gürkök¹ , Diren Yıldız¹ , Erdem Yaka² , Ali Necati Gökmen¹ 

¹Department of Anaesthesiology and Reanimation, Division of Intensive Care, Dokuz Eylül University School of Medicine, İzmir, Turkey

²Department of Neurology, Dokuz Eylül University School of Medicine, İzmir, Turkey

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Abstract

The first case of coronavirus disease 2019 (COVID-19) was defined as unexplained pneumonia on December 8, 2019, and then it rapidly caused a pandemic and affected transplantation rates negatively. Organ donation processes got more complex because the exclusion of the disease in a short period became more difficult than normal. The exclusion of the disease is vital not only for recipients but also for the medical staff, transplantation teams, and intensive care professionals to reduce the transmission risk. The main steps for diagnosis of COVID-19 are investigation of symptoms, recollection of travel and physical contact history, and testing using the real time polymerase chain reaction (RT-PCR) test. Although it has limitations such as false negative results, RT-PCR is the most accurate method to detect COVID-19, and it is mandatory before donation processes in many countries. In this case report, we aim to share our experience about the first organ donation during the COVID-19 pandemic in Turkey.

Keywords: Brain death, COVID-19, organ donation, pandemic

Introduction

The first case of coronavirus disease 2019 (COVID-19), defined as unexplained pneumonia, was reported on December 8, 2019, in China, Wuhan, Hubei Province (1). It then rapidly spread and caused a pandemic. By April 20, 2020, the COVID-19 outbreak had reached over 2.6 million confirmed cases, involving 213 countries around the world. To date, over 100 thousand cases have been confirmed in Turkey (2, 3). The COVID-19 outbreak has affected the organ transplant programs negatively in many ways. Recipients are at increased risk owing to immunosuppressant medications, prolonged hospital stay, and also possible transmission from asymptomatic infected donors. In addition, there is also a transmission risk for medical staff working for the organ transplantation process (4, 5). Moreover, the limited literature regarding COVID-19 collected over the past few months revealed a decrease in organ transplantation rates (6). In the era of the COVID-19 pandemic, to manage a successful donation process in a safe environment has become critical for recipients, coordinators, transplantation teams, and intensive care professionals. For these reasons, we aim to share our experiences about the first organ donation during the COVID-19 pandemic in Turkey.

Case Presentation

A 61-year-old woman with hypertension was admitted to the emergency service of a public hospital with a complaint of severe headache and dizziness. After first examination, the patient was transported by ambulance to our hospital for further examination and treatment, with a pre-diagnosis of acute cerebrovascular disease. The patient had a history of embolization and stent placement in 2017 owing to a cerebral aneurysm, and the medications prescribed to her were acetylsalicylic acid and clopidogrel. In the emergency service, first examination showed that the patient was unconscious, there was no response to painful stimuli, and Glasgow Coma Scale (GCS) was 3. In the detailed neurological examination, fixed and dilated pupils with no light reflex were observed, and gag, oculoccephalic, and corneal reflexes were negative. Vital signs were normal, except Cushing's sign, but the patient was intubated for respiratory

tract safety. Subsequently, the patient was transferred to the radiology unit for cerebral computed tomography (CT). The CT scan showed hemorrhage in both the 3rd and 4th ventricles and compression on basal cistern of the 4th ventricle. There was hydrocephalus with no midline shift. Cranial bones were intact, and there were also signs of the past embolization and stent placement. After consultation, the neurosurgery team decided to perform external ventricular drainage operation. The patient's family was informed, and informed consent was obtained for both the operation and anesthetic administration. The blood center of the hospital was informed with a cross-match sample for a possible transfusion. After optimal preparation of the patient for the operation, she was taken to the operation theater. The operation ended successfully with no complication, and the patient was taken to the intensive care unit. During the intensive care follow-up, the patient was treated with supportive therapy with the aim of reducing intracranial pressure, and the patient was closely monitored for sedation requirement, but there was no sign of sedation need. During the 12th postoperative hour, a detailed neurological examination revealed that brainstem reflexes were still negative. For these reasons, the patient was accepted as potentially brain dead, and deep tracheal aspirate sample was sent for real time polymerase chain reaction (RT-PCR) test to exclude COVID-19 in accordance with the recommendations of the Ministry of Health. At the 48th postoperative hour, we invited a neurologist to the intensive care unit owing to legal obligations for diagnosis of brain death and decided to perform an apnea test. First, we checked preconditions of the test (metabolic and electrolyte balance, normovolemia, normotension, normothermia, normoglycemia, sedatives, neuromuscular blockers, and other drugs that may cause hypnosis or respiratory depression). Second, brainstem reflexes were checked again, and they were in accordance with brain death. Finally, the apnea test was performed, and carbon dioxide levels increased to more than 20 mm Hg over the baseline and reached 64.3 mm Hg in 8 minutes without any respiratory effort. We also decided to perform brain and neck CT angiography scan; it showed no blood flow in the internal carotid artery and its branches, which was reported to be in accordance with brain death by a radiologist. The patient was diagnosed as brain dead, and intensive care follow-up was performed

according to the donor management protocol. We informed the organ transplant coordinator about the case. Then the patient's family was informed. The organ transplant coordinator presented the patient's data to the National Coordination Center and interviewed the patient's family about organ donation. The patient's family agreed to donate her organs, and legal documents were prepared by the organ transplant coordinator. In addition, the family was asked whether the patient had fever, dry cough, sore throat, diarrhea, vomiting, myalgia, headache, and shortness of breath in the 14 days prior to hospital admission. In addition, we asked whether the patient had traveled or been in contact with confirmed or suspected COVID-19 patients, and performed a thorax CT. The RT-PCR test of the patient resulted negative, but after discussion with the National Coordination Center and considering the recommendations of the Scientific Advisory Board, we decided to repeat the test because of the incubation period of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Deep tracheal aspirate sample for the second RT-PCR test and blood sample for other viruses (HAV, HBV, HCV, HIV, CMV, Toxoplasma, Rubella, etc.) were sent on the 5th day of the patient's admission. The tests about other viral pathogens showed that there was no active or inactive viral infection. The result of the second PCR test that we sent to eliminate the risk of SARS-CoV-2 infection was also negative. Later, we consulted with the department of infectious diseases and clinical microbiology, and chest diseases for the exclusion of COVID-19. SARS-CoV-2 infection was not considered as a result of consultations between the departments. After the patient's family approved to donate all her organs, echocardiography, electrocardiography, and abdominal ultrasound were requested by the National Coordination Center. We sent a blood sample for human leucocyte antigen (HLA) tissue typing test. All units associated the donation process were consulted with the imaging results as to whether the organs were suitable for donation. All data about the patient were presented to the National Coordination Center. Although heart, liver, and kidney donations were approved by the National Coordination Center, the patient was not found suitable for heart donation by the heart transplant centers owing to the COVID-19 pandemic in our country. The donor's liver and kidneys have been successfully transplanted to patients enrolled in the National Organ Waiting List.

Main Points:

- In the COVID-19 pandemic, it is vital to ascertain whether patients who are neurologically deceased are infected with the SARS-CoV-2 in a short period prior to the transplantation process.
- RT-PCR test is the gold standard for diagnosing COVID-19, but it can be false negative in early period of the disease.
- The use of donor screening tools, which include evaluation of patients' symptoms, travel and contact history, laboratory tests, radiological findings, and repeated RT-PCR tests, may effectively exclude COVID-19.

Discussion

In the COVID-19 pandemic, it is important to ascertain whether patients who are neurologically deceased are infected with the SARS-CoV-2 prior to the transplantation process. In this case, we followed 3 steps to exclude COVID-19. First, we searched the symptoms and contact history, then we evaluated the laboratory test results and a thorax CT scan, and finally, we sent samples for RT-PCR tests.

In our case, the patient did not have any symptoms of the disease and contact history with suspected or confirmed COVID-19 patients, but He et al. (7) showed that 44% (95% confidence interval, 25-69%) of secondary cases were infected in the pre-symptomatic stage of primary infectious cases. According to this, absence of typical or atypical symptoms of COVID-19, and no contact history with confirmed or suspected patients does not exclude the infection. The donors could also be in the asymptomatic period (8).

We also evaluated the thorax CT scan and laboratory tests. There was no evidence in the laboratory tests to confirm the disease, and the thorax CT was normal except for bilateral minimal pleural effusions. Shi et al. (9) determined the existence of specific abnormal findings in some of the thorax CT scans of asymptomatic confirmed cases, but they found out that the imaging features of COVID-19 are in a wide range in accordance with severity of the disease from normal appearance to diffuse changes. Similarly, Bernheim et al. (10) evaluated thoracic CT scans of 121 confirmed and symptomatic COVID-19 patients and showed that there were no lung opacities in more than half of the CT scans performed in the first 2 days after the symptoms appeared. Based on these facts, we can conclude that a thorax CT scan alone is not enough to exclude COVID-19.

In Turkey, the Department of Tissue, Organ Transplantation and Dialysis Services published an instruction to exclude COVID-19 for potential donors on March 20, 2020. According to this instruction, it was offered to investigate travel and contact history of the patients and the symptoms of COVID-19. In addition, the authority stipulated RT-PCR test for every potential donor with GCS score of 6 and below for not delaying the donation process (11). Despite questions about false negative results that may be due to samples collected inappropriately or in the first days of the incubation period, real time donor screening is mandatory for all donors in many countries such as Canada, Spain, Italy, and South Korea (5).

Conclusion

In the case we presented in this paper, we performed the RT-PCR test twice. Deep tracheal aspirate samples were collected on the 2nd and 5th days after patient admission. In addition, we investigated the symptoms of COVID-19, contact and travel history of the donor, and laboratory tests and conducted a thorax CT scan. We also consulted with the departments of chest and infectious diseases and clinical microbiology with the radiologic reports of thorax CT and all the laboratory results. The donation process was supervised by National Coordination Center and Scientific Advisory Board. Finally, the

patient was considered eligible for organ donation. Kumar et al. (5) defined a COVID-19 donor-screening tool that includes almost all the points that we have described in our report. Similarly, we suggest a systematic screening process for organ donation from neurologically deceased patients during the COVID-19 pandemic.

Informed Consent: Written informed consent was obtained from the patient's family to share this case report.

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