

Organ Transplant Center Management and Patient Monitoring During Severe Acute Respiratory Syndrome Coronavirus Type 2 (SARS-CoV-2/COVID-19) Pandemia

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Introduction: COVID-19 is a viral infectious disease that affects more than 200 countries in the world and has been declared a pandemic by the World Health Organization. This article provides some strategies for the management of the organ transplant unit in the COVID-19 outbreak or other respiratory infections.

Materials and Methods: Organ transplantation clinics, services or intensive care units are potential sources of transmission during this pandemic. Therefore, it is imperative for hospitals and organ transplant centers to organize management strategies for organ transplant patients during the COVID-19 outbreak. The study shared our special precautions and protocols created by a clinic that conducts over 1300 liver and 1500 kidney transplants.

Results: Five live donor liver transplants were performed in our clinic. A total of 8 patients are in our service and in the intensive care unit. Two patients who underwent live donor liver transplantation stay in the intensive care unit, and 2 patients with Post-op 2 donor and transplant preparation. COVID-19 infection was not detected in patients who underwent live donor solid organ transplantation and were followed up in our service.

Conclusion: It is important to have an arrangement to prevent and control the transmission of COVID-19 and to manage the organ transplant clinic during this period. A method that can protect both the hospital staff and the medical team and patients should be determined. Liver transplantation with live donors increases donor risk; on the other hand, it also provides important advantages such as planning the operation time, insulating the transmitter and providing sufficient and repeated tests. We think that we performed liver transplantation in the safest possible environment by following the guidelines adopted in our clinic.

Keywords: Organ transplant, acute respiratory syndrome, coronavirus, pandemia

Introduction

Coronavirus disease 2019 (COVID-19) is a viral infectious disease mainly transmitted by the respiratory system; it is highly infectious and has been declared an epidemic and a global public health emergency by the World Health Organization (WHO)(1). Turkey, in terms of absolute numbers, is one of the world's most

affected countries (2). Worldwide research is ongoing to better understand the transmission dynamics and clinical disease spectrum. Due to the associated immunosuppression, solid organ transplant patients are included in the high-risk group for their follow-up and treatment; also, due to the co-morbidity present, their follow-

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up, diagnosis and treatments differ slightly from the healthy population (3). Given the early pandemic, information and case reports on COVID-19 and its effect on solid organ transplant patients are very limited to expert discussions (3-4). There is still an insufficient information about the natural history of COVID-19 regarding live donors and recipients, given the current diagnostic tests and the lack of a common approach plan in treatment (5).

Previous experience with SARS-CoV and MERS-CoV has shown that the solid organ transplant recipients may be exposed to long-term viral transmission and potentially increase infectiousness, morbidity and mortality (6,7).

There are several ways organ transplant centers can approach the COVID-19 outbreak to reduce risk for solid organ transplant live donors, prospective candidates and recipients. In particular, the centers can restrict access based on urgency and donor transplant can limit depending on the exposure risk. COVID-19 transplant centers can change the evaluation and monitoring practices of solid organ transplant patients may develop treatment protocols for screening algorithm for suspected cases and confirmed cases. However, there is currently no evidence-based guide to inform these practices (8).

A cadaveric or live donor with an unidentified COVID-19 infection can also spread the virus to recipient patients. In live donor transplants, the close monitoring and isolation of the donor in quarantine during COVID-19 incubation is predicted to eliminate this risk (9, 10). In this study, it was aimed to share the pre-operative preparation and postoperative follow-up of solid organ transplant patients with live donors during the COVID-19 pandemic by the way applied in our own clinic.

Materials and Methods

Ethical Statement

Ethics committee approval was obtained from the Local Ethical Committee of Sisli Memorial Hospital. The study was conducted according to the criteria of the Declaration of Helsinki and the Declaration of Istanbul. The study was performed as a retrospective study with anonymized data analyses.

Live Donor Liver Transplantation Preparation and Planning

Between 2004-2020, 1300 liver transplants with live donors were performed at the Şişli Memorial Hospital Organ Transplantation Center. This is a clinical study that shows how to prepare staff training, recipient and donor surgery, and follow-up of outpatient clinic patients during the COVID-19 pandemic period in our center with live donor and cadaveric solid organ transplantation.

Organ Transplant Service Management Strategy

Since the beginning of COVID-19 pandemic, the process has been closely monitored by our clinic, and a protocol has been established with the opinion of the Ministry of Health on the subject (2), the Turkish Surgical Association (10) and the pandemic board views of our hospital. In the execution of this protocol, the organ transplant center manager, infectious diseases specialist and infection control nurse take over the task of control.

To train the staff in our organ transplant center, relevant information and basic methods were determined in the prevention and control of COVID-19. Each was given theoretical and practical basic training. Clinical skills such as hand hygiene, masking and the use of goggles and protective face screens were taught repeatedly online through the video.

Organ Transplant Service Management

With the decision of the Ministry of Health and the hospital pandemic board, access control management was strengthened, and visiting hours were suspended. The patients will not be accompanied in the preoperative period. In the postoperative period, an adjustment was made to accompany each patient. Basically, companions were not allowed to leave their rooms, where they had been waiting outside in certain special circumstances. In this case, trainees were given training to leave their rooms, to inform the nurses and to conduct hand hygiene and face hygiene when they return to their rooms. No visitors were allowed during the epidemic. Our clinic offers visitors remote video access to reduce emotional impact and to minimize the risk of potential infections among family members.

In our hospital, 6 beds in the intensive care unit and 20 beds in the service were reserved for organ transplant patients. During COVID-19 pandemic, patients can be presented with many symptoms, and it is reported that the majority of patients can asymptotically progress (2). Therefore, donors and recipients who applied for live donor transplantation were accepted as COVID-19 and hospitalized in isolated rooms. Doctors and other healthcare professionals dealing with the treatment of patients acted in accordance with approach determined by the Ministry of Health (2).

Epidemiologically, travel history and virus exposure were examined and recorded. Live donors and patients were evaluated for coronavirus symptoms, and a PCR test was performed for COVID-19. Detailed blood and radiological examinations were performed to eliminate asymptomatic patients. Recognizing that the symptoms of the disease may appear

within 14 days on average (2), the PCR test was repeated before surgery. The two tests, consecutively negative, and the donors were operated on, assuming that COVID-19 was not. In this process, plans were made to direct suspicious patients to the COVID-19 service.

Outdoor Patients Management

For patients who were followed-up after the transplant, the time of control was contacted through the e-doctor application of Memorial Hospital. Predicting that the COVID-19 clinic may be different in immunosuppressive patient (12), the control of patients without complaints and the need for medical support was delayed to a later date (13). Psychological support was provided to patients in need. Four patients in need of medical support were hospitalized in our service with the protocol applied to donors and recipients before the surgery, and their treatments were arranged.

Personnel Management

It was recommended for personnel to use public transport as much as possible. Everyone was guided to monitor and report health status daily, including fever, cough, shortness of breath and other abnormal conditions. If there are any signs or symptoms related to COVID-19, this information should be reported to the outbreak prevention and control team as soon as possible. The service personnel were tested and recorded their body temperature twice each day with contactless detector. Meanwhile, the detail of the transportation between the personnel's home was recorded. In addition, according to the condition of the patients in the service, flexible work planning was made for the personnel who need to work in the service in order to minimize the risk of contamination. Meanwhile, emergency arrangements have been strengthened for the transplant clinic.

Operating Room and Intensive Care Standards

Novel studies have shown that endotracheal intubation, tracheostomy, ventilation and fiber optic bronchoscopy increase the risk of SARS- and MERS-CoV transmission (13, 14). According to the "health institutions for the prevention of suspicious new coronavirus infection and control of temporary guidelines" announced by WHO (14), healthcare personnel performing tracheal intubation, tracheostomy intubation, airway lavage and bronchoscopy microscopic lavage should act with a double preventive (e.g., standards such as hand hygiene, use of personal protective equipment, respiratory health, injuries of injuries, cleaning of medical equipment and medical waste treatment). Also, suspected or approved cases of COVID-19 should undergo droplet isolation and contact isolation. Isolation is also required for air used for aerosol-producing medical operations. It consisted of a room equipped with a negative pressure in the operating room as well as interconnected rooms where only the entrance section and anesthesia induction chambers had negative pressure. A special transport ventilator was used for patients coming from the intensive care unit (10).

Patient Selection

We recommend to stop your organ transplant program before the COVID-19 is completely eliminated. Only necessary operations can be performed on suspicious or confirmed patients that may be life-threatening or significantly affect prognosis. In the 6 transplants we performed during this period, the mean PELD score of one pediatric patient was 24.2, and the average of MELD score of other adult patients was 19.2. Considering the etiology of the disease, patients with diseases such as budd-chiari, hbv+hcc, hbv+primary sclerosing

cholangitis and idiopathic decompensated liver failure with esophageal variceal hemorrhage were included in the transplant program during the COVID-19 pandemic period.

For patients who need liver transplantation and donors, firstly, routine blood tests at the outpatient clinic, chest direct radiography or CT scan as well as CRP, hemogram and COVID-19 PCR examinations were performed if necessary. Recipients and donors who did not have COVID-19 suspicion were insulated with 14 days of hospitalization. In 14 days, donors and recipients who had a negative radiological, clinical, and repeat PCR tests underwent operations. Infection specialists should be consulted for the treatment plan of patients suspected or confirmed in the outpatient clinic examination and, if necessary, transferred to the infection department for further treatment.

Isolated patients and donors tend to be alone with fear, anxiety, anger, sleep disturbances and other problems. Therefore, it is necessary to psychologically evaluate the patients correctly. To patient and donor, necessary psychological support should be given according to emotional reactions and behavioral changes. Health personnel should also provide patients with more emotional support and accurate information to reduce mental problems.

Results

After 1 March 2020, five live donor liver transplants were performed in our clinic. A total of 8 patients are in our service and in the intensive care. Two patients who underwent live donor liver transplantation stay in the intensive care unit, and 2 patients with Post-op 2 donor and transplant preparation. One patient was discharged on the post-op 2nd month, one patient post-op on the 45th day, the other patient did not complete the

post-op 30th day and outpatient follow-ups are being performed. COVID-19 infection was not detected in patients who underwent live donor solid organ transplantation and were followed up in our service.

It is important to have an arrangement to prevent and control the transmission of COVID-19 and to manage the organ transplant clinic during this period. A method that can protect both hospital staff and medical team and patients should be determined. Liver transplantation with live donors increases donor risk; on the other hand, it also provides important advantages such as planning the operation time, insulating the transmitter and providing sufficient and repeated tests. We think that we performed liver transplantation in the safest possible environment by following the guidelines adopted in our clinic.

Discussion

The potential COVID-19 outbreak after the flu epidemic of 1918 represents the largest global public health crisis of this generation. The speed and volume of clinical trials initiated to investigate potential treatments for COVID-19 emphasize both the need for production and its ability. No treatment has been shown to be effective to date (11).

During the COVID-19 pandemic, a significant decrease in all elective surgical procedure activity was detected in our country. In addition, successful and evidence-based treatment paradigms have been created as well as the solid organ transplant Covidien-19 diagnostic algorithm, which are likely to improve the reduction in the number of transplants. Due to the lack of consistent and highly reliable testing practices or treatment mechanisms, COVID-19 pandemic should be considered a major threat to solid organ transplant programs. In the

general population, although the reported case fatality rate is low, most fatal cases are patients with advanced age or those with one or more underlying medical co-morbidities. Therefore, careful monitoring of the high-risk population is required. Although it is thought that patients with solid organ transplantation and using immuno suppressants in the first place will be in this risky group, the number of reported cases is limited (12). We think this may be because patients know how to isolate themselves because of the immunosuppressants they use.

In countries where cadaveric donor use is predominant, patients waiting for the cadaveric organ list require high MELD scores. They also suffer from poor clinical availability and transplant when an appropriate organ occurs. Considering the mortality of liver diseases and the appropriate organ, transplantation seems to be a risk that can be taken even in the time of the pandemic. In contrast, in countries where live donor liver transplantation is intense, it also brings the risk of getting infected in a donor who has undergone major surgery as well as the risk of becoming infected. In liver transplantation with live donors, where donor safety is paramount, conducting patient selection in the pandemic environment will decrease both morbidity and mortality from donor and recipient.

Conclusion

In addition to all these risks, the superiority of solid organ transplant with live donors emerged during COVID-19 pandemic period. Removal of organs in cadaveric transplantation and limited time for transplantation may increase the risk of infectious disease and transplantation to the infected recipient, whereas in live donor transplantation, the recipient and donor have the advantage of

being isolated during the incubation of the disease. With the protocol we apply, we see that solid organ transplantation with live donors can be performed safely during the pandemic period.

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