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BRIEF COMMUNICATION

AJT

Strategies to halt 2019 novel coronavirus (SARS-CoV-2) spread for organ transplantation programs at the Sichuan Academy of Medical Science and Sichuan Provincial People's Hospital, China

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During the 2019 novel coronavirus (SARS-CoV-2) outbreak in China (from January 24 to March 11, 2020), our center performed 16 organ transplants (10 kidney, 4 liver, and 2 lung transplants) harvested from deceased donors. Regarding the strategies to prevent infections of SARS-CoV-2, we implemented specific measures for the donor and recipient management, as well as prevention of hospital-acquired infections. All 16 organ recipients had a favorable outcome without SARS-CoV-2 infection. Our approaches aiming to interrupt the spread of SARS-CoV-2 within the transplantation wards were successful, and allowed us to maintain the transplantation program for deceased liver, kidney, and lung organ recipients.

KEYWORDS
clinical research/practice, infection and infectious agents, infection and infectious agents—viral, infectious disease, organ transplantation in general

1 | INTRODUCTION

Originated from Wuhan and expanded throughout China and the world, the 2019 novel coronavirus (SARS-CoV-2), has caused worldwide attention.[1-3] As of March 21, the overall confirmed cases reached to 0.2 million in 172 countries. In all Chinese Medical Centers, elective surgery and the living donor transplantation have been suspended due to the rapid spread of the SARS-CoV-2. In contrast, the cadaveric donor transplantations were mostly performed. Therefore, strategies to interrupt transmission within transplantation wards were essential. To date, we have performed at our center 10 cases of kidney, 4 liver, and 2 lung transplants (from deceased organ donors, from January 24 to March 11, 2020) during the SARS-CoV-2 outbreak in China. Based on our experience in combating the SARS-CoV-2 while performing these organ transplants, we comprehensively address here the strategies for the prevention of the SARS-CoV-2 spread within the transplantation wards.

2 | DONOR MANAGEMENT

We strictly adhere to the Istanbul declaration and currently no executed prisoner can be an organ donor in China. The potential organ donors were cleared for epidemiology history and should not have traveled from or have contact with people from epidemic areas. To guarantee that the potential organ donors were not SARS-CoV-2 carriers, the SARS-CoV-2 nucleic acid from pharyngeal swab specimens was determined (supplement) and chest CT was performed.[4] Only when they were confirmed negative for SARS-CoV-2, related laboratory tests as HLA typing of donor, antibody detection of the receptor, and complement dependent cytotoxicity test could be performed. The SARS-CoV-2 nucleic acid test needs 6 hours and the

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other tests will take 4 hours. In total, the screening period is about 10 hours.

3 | RECIPIENT MANAGEMENT

The potential recipients were screened for SARS-CoV-2 (nucleic acid determination and chest CT scanning) on admission day. Furthermore, additional information was collected from the recipient such as travel history, close contacts, daily body temperature, and respiratory symptoms. During the hospitalization period, recipients received COVID-19–related education, including the source of infection, transmission routes, susceptible population, and personal protective procedures. Meanwhile, they were given new surgical masks every 6 hours. Due to the low immunoreactivity of the recipients after transplantation, organ transplant recipients were aware of the importance of face masks and hand hygiene. In order to prevent potential panic and anxiety regarding COVID-19 for recipients, we collaborated with psychologists to provide consultations before each operation. Posttransplant immunosuppression was maintained at usual dosage. For kidney, liver, and lung transplant recipients, tacrolimus (or CsA) combined with mycophenolate mofetil/myfortic and prednisone was given to the recipients. Tacrolimus (or CsA) combined with mycophenolate mofetil and prednisone was given to the liver recipients. For specific cases, we also applied polyclonal antibodies as ATG. The immunosuppression protocols were not changed during the outbreak of SARS-CoV-2. All recipients were required for follow-ups. For patients who received a transplant before the outbreak of SARS-CoV-2, the forms of their follow-up were flexible and they could consult the transplant surgeons online. For the recipients who received a transplant during the outbreak of SARS-CoV-2, they were required to have a follow-up visit at the outpatient clinics every week. Meanwhile, they were suggested for in-home isolation (14 days after discharge). Before discharge, all their family members, who were living with the recipient, had to undergo a SARS-CoV-2 nucleic acid test.

4 | ISOLATION MANAGEMENT

Accumulating evidence suggested that fever and diarrhea were the main symptoms of SARS-CoV-2. As liver transplant recipients are prone to have diarrhea after operation, we distinguished these symptoms from SARS-CoV-2–infected patients. Nevertheless, if the recipient had fever, cough, diarrhea, or pulmonary infection manifestations (pulmonary edema or pulmonary patchy shadow by chest CT scanning), the patient was considered as suspected for contamination and was quarantined within an isolation ward. Inside the ward, we set up a buffer area, where the drugs and personal items for each patient were located. One doctor and one nurse would be responsible for the medical care of each isolated patient, and no other healthcare personnel would be allowed to enter this isolation ward. When entering the isolation ward, the doctor and nurse should wear disposable protective gowns, N95 masks, protective goggle, gloves, and shoe covers. Oxygen saturation levels of the patient were measured frequently. For the nucleic acid determination, a pharyngeal swab specimen was collected for nucleic acid determination and once the result was negative, it had to be confirmed again 24 hours later. Chest CT scanning was also performed to confirm the absence of lung infection. Only when the nucleic acid results were negative twice and no lung inflammation was found on CT, the patient was transferred back to the regular transplantation ward.

Accompanying family members of recipients also received SARS-CoV-2–related screening as mentioned above. In addition, regular visits were only allowed at working hours under the permission of the chief nurse. Meanwhile, the body temperatures of visitors were monitored.

5 | PREVENTION OF HOSPITAL-ACQUIRED INFECTIONS

Ever since the state government announced the epidemic infection of SARS-CoV-2 in China, we set up a hospital-acquired infection prevention group dedicated at the Center for Organ Transplantation. Several strategies related to the training of the healthcare personnel (HCP) and patients were carried out. We systematically trained all HCPs by means of meetings, videos, and group discussions. Their body temperatures were monitored daily. Those who had visited Wuhan or Hubei province were isolated at home for 14 days. While working at the Center for Organ Transplantation, HCP should wear surgical masks, protective hair cover, gloves when they need to have close contact with the blood and body fluid from a patient. Hand hygiene was strictly implemented. To prevent hospital-acquired infections, the gap between beds should be larger than 1.2 m, and the HCP should keep the distance greater than 1.5 m when communicating with the patients. The floor was mopped with chlorine-containing disinfectant daily and the window was opened twice a day (30 minutes each time) for ventilation. Before the admission of new patients, the ward was disinfected with H_2O_2 for 30 minutes.

6 | OUTCOME OF THE ORGAN TRANSPLANT RECIPIENTS

With the implementation of the strategies listed above, from January 24 to March 11, we performed 16 organ transplant operations (10 kidney, 4 liver, and 2 lung transplants). After the surgery, 1 liver transplant recipient had pulmonary edema, and 2 kidney transplant recipients had fever and signs for lung infection. All these patients received COVID-19–related examinations (nucleic acid determination and chest CT scanning), and all were finally negative for the novel SARS-CoV-2 infection. With proper treatment, they recovered well. All of the 16 recipients were discharged from the hospital without major complication. Taken together, our approaches aiming

to interrupt the spread of SARS-CoV-2 in transplantation ward were successful, and allowed to maintain the transplantation program for deceased kidney, liver and lung transplant recipients.

7 | DISCUSSION

During the SARS-CoV-2 outbreak, the experience at our center indicated that with careful screening and prevention, organ transplantation programs from deceased donors could be maintained.

Of note, the infection rate in our region was relatively low compared to the province of Wuhan. Our district managed 155 SARS-CoV 2 patients during the period and our institution has the availability of a specific ICU for transplant patients, where each patient is in a single room and no SARS-CoV-2 patients were admitted to this area. In case the number of SARS-CoV-2 patients would be increasing to the level of occupying all the available ICU units, such separation would not be possible and this would prevent the maintenance of the transplant programs.

An additional limiting factor for centers performing organ transplants is the access to rapid diagnostic tests for the SARS-CoV 2. In case such rapid tests would not be available, the screening of the donors would not be in time to allow the maintenance of the transplant programs.

DISCLOSURE

The authors of this manuscript have no conflicts of interest to disclose as described by the *American Journal of Transplantation*.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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