

Successful transplantation of organs from a deceased donor with early SARS-CoV-2 infection

To the Editor:

Early in the coronavirus disease-2019 (COVID-19) pandemic, organ transplantation from deceased donors with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection was not recommended.^{1,2} This recommendation was based on limited understanding of the possibility of viral transmission with transplanted organ/s, risk of severe infection in recipients, no well-defined treatment, risk to the healthcare teams, and other ethical concerns.^{3,4} We present the clinical considerations, patient characteristics, and 28-day outcomes of successful heart and liver transplantation from an otherwise medically suitable, deceased donor with early SARS-CoV-2 infection. This study was approved by Institutional Review Board of NewYork Medical College # 14258. Both recipients also consented to the use of their data.

The 28-year-old brain dead donor was hospitalized for 2 weeks following a cardiac arrest due to asthma. SARS-CoV-2 polymerase chain reaction (PCR) tests from nasopharyngeal (NP) or tracheal aspirate on days 1, 7, and 14 of hospitalization were negative (various-platforms). He was transferred to our institution for organ

procurement and on the day of surgery, SARS-CoV-2 PCR from NP specimen was positive (cepheid assay, cycle threshold [CT] value—40.5). Follow-up confirmatory PCR from NP specimen on the same day was also positive (cepheid assay, CT value—38.5). Donor had new onset low-grade fever, no increased oxygen requirement, a computerized-tomography of the chest not suggestive of COVID-19, and no evidence of end-organ involvement associated with SARS-CoV-2 infection. Therefore, donor was presumptively diagnosed with very early mild-moderate COVID-19, with possible hospital acquisition based on the previously described criteria.⁵ Heart, liver, and kidneys were allocated for transplantation. We describe the characteristics, hospital course, and outcomes of heart and liver recipients from Westchester Medical Center, NY, which are summarized in Figure 1.

The heart recipient was a 67-year-old male with severe cardiogenic shock, dependent on veno-arterial extracorporeal membrane oxygenation (ECMO) support, had acute kidney/liver injury, a large thrombus in the left ventricle, and was listed status 1A for heart transplantation. The liver recipient was a 54-year-old male

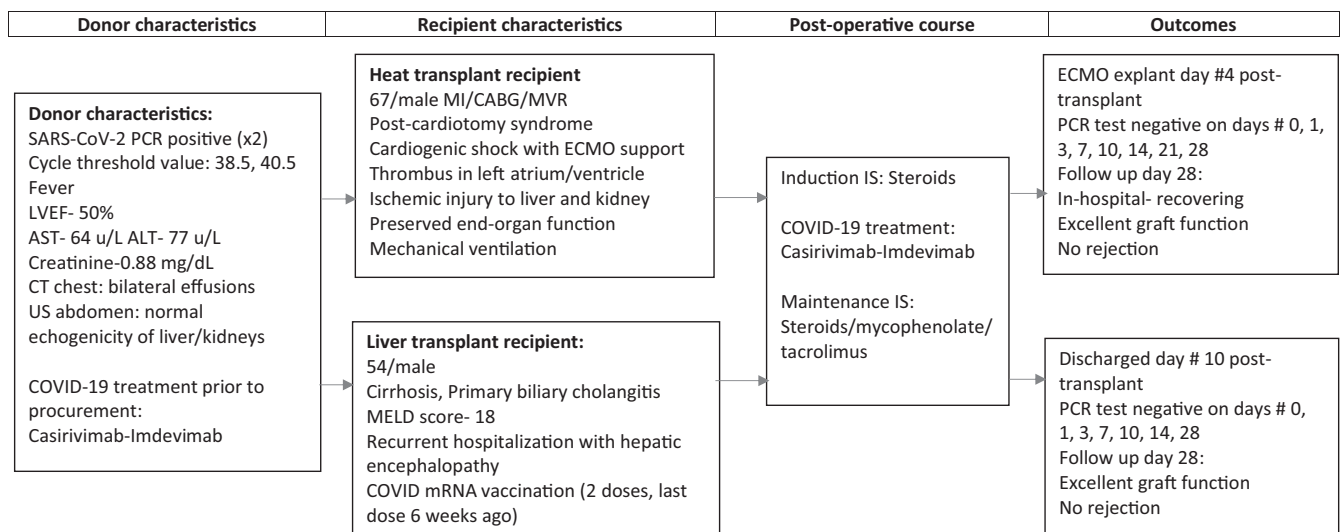


FIGURE 1 Patient characteristics and outcomes of transplantation from SARS-CoV-2 infected donor. ALT, alanine aminotransferase; AST, aspartate aminotransferase; CABG, coronary artery bypass; COVID-19, coronavirus disease-2019; CT, computerized tomography; ECMO, extracorporeal membrane oxygenation; IS, immune-suppression; LVEF, left ventricular ejection fraction; MELD, model for end-stage liver disease; mg/dl, milligrams/deciliter; MI, myocardial infarction; mRNA, messenger ribonucleic acid; MVR, mitral valve repair; PCR, polymerase chain reaction; SARS-CoV-2, severe acute respiratory syndrome coronavirus-2; u/L, units/liter; US, ultrasound

with cirrhosis, primary biliary cholangitis, Model for End-Stage Liver Disease Score (MELD) score-18, recurrent hepatic encephalopathy, and poor quality of life with a long-anticipated wait-time. He had received two doses of COVID-19 messenger ribonucleic acid vaccine: last dose was 6-week pretransplant. Both recipients were negative for SARS-CoV-2 infection immediately pretransplant. Patients/surrogates were counseled and accepted the unknown risks of morbidity and mortality associated with potential viral transmission. Immediately before organ procurement, the donor received Casirivimab-Imdevimab. The heart and liver recipients received Casirivimab-Imdevimab on postoperative day 1 under the Food and Drug Administration's emergency investigational new drug use authorization. Both recipients are alive with no clinical, laboratory, or PCR evidence of SARS-CoV-2 infection 28 days after transplantation.

Standards of infection prevention, diagnosis, treatment options (antiviral agents, monoclonal antibodies), and vaccination now exist that were unavailable early in the pandemic. These facilitate an improved assessment of risk/benefit and allow for shared decision making when considering organs from SARS-CoV-2 infected donors. Any potential risk of transmission was further decreased by early treatment of the donor and the recipients with COVID-19 monoclonal antibodies. In conclusion, transplantation of select organs from otherwise medically suitable SARS-CoV-2 infected deceased donors can be considered in carefully selected donors and recipients.

KEYWORDS

clinical research/practice, donors and donation: deceased, donors and donation: donor-derived infections, infection and infectious agents – viral, infectious disease, organ acceptance, organ allocation, organ procurement and allocation

DISCLOSURE

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REFERENCES

- Galvan NTN, Moreno NF, Garza JE, et al. Donor and transplant candidate selection for solid organ transplantation during the COVID-19 pandemic. *Am J Transplant*. 2020;20(11):3113-3122.
- Association of Organ Procurement Organizations. COVID-19 (Coronavirus) Bulletin. <http://www.aopo.org>. Updated on March 26 2020. Accessed April 1, 2021.
- Kates OS, Fisher CE, Rakita RM, Reyes JD, Limaye AP. Emerging evidence to support not always “just saying no” to SARS-CoV-2 positive donors. *Am J Transplant*. 2020;20(11):3261-3262.
- Shah MB, Lynch RJ, El-Haddad H, et al. Utilization of deceased donors during a pandemic: argument against using SARS-CoV-2-positive donors. *Am J Transplant*. 2020;20(7):1795-1799.
- Rhee C, Baker M, Vaidya V, et al. Incidence of nosocomial COVID-19 in patients hospitalized at a large US academic medical center. *JAMA Netw Open*. 2020;3(9):e2020498.