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LETTER TO THE EDITOR

Kidney transplantation from SARS-CoV-2-positive deceased donor

To the Editor:

To expand the available donor pool, many organ procurement organizations and transplant programs have begun to consider severe acute respiratory syndrome coronavirus (SARS-CoV-2) nucleic acid test positive candidates.¹ It is becoming increasingly clear that not all donors with a positive nucleic acid amplification test for SARS-CoV-2 are contagious, and some of these organs can be transplanted with careful selection.^{2,3} Data from 31 kidney transplants from living donors with resolved COVID-19 in India showed the safety of this approach.⁴ However, it is unknown whether kidneys from donors with active COVID-19 can also be safely transplanted.^{3,5} Beyond the "active" infection designation, it is clinically possible to risk stratify donors with COVID-19 based on additional parameters such as clinical history and radiologic or laboratory findings. Here we present a case and 210-day outcome of a successful kidney transplantation from otherwise medically suitable SARS-CoV-2 PCR-positive deceased donors.

The donor was a 48-year-old man who had been admitted to the intensive care unit (ICU) with worsening SARS-CoV-2 pneumonia. Urinalyses showed minimal or no proteinuria. On hospital days 20 and 28, he tested negative for COVID-19 by nasopharyngeal (NP) swab PCR; however, PCR testing was again positive on day 29 with a cycle threshold (Ct) of 38. The donor received remdesivir treatment during the hospital stay. The donor primary cause of death was COVID-19 pneumonia secondary to severe worsening hypoxemic respiratory failure. Only kidneys were recovered for transplantation. The mate kidney of this offer was not placed.

The recipient was a 48-year-old Hispanic man with a history of end-stage kidney disease (ESKD) from presumed hypertensive nephrosclerosis (Table 1). He had no personal history of COVID-19 and had received a second shot of COVID-19 vaccination (BNT162b2 vaccine) 14 days before this preemptive kidney transplantation. Despite a long cold ischemia time, he never required dialysis after transplantation but had slow graft function and was discharged on post-operative day (POD) 4 on belatacept, mycophenolate mofetil, and prednisone for maintenance immunosuppression. He reported a low-grade fever (#POD7) but denied any cough, shortness of breath, or gastrointestinal symptoms. He tested negative for SARS-CoV-2 via nasal swab PCR. He underwent a kidney graft biopsy for prolonged slow graft function. The biopsy showed moderate acute tubular injury, glomerular basement membrane thickening, and mesangial

TABLE 1 Donor, recipient, and transplant characteristics

	Case
Donor characteristics	
History of COVID before admission	No
Reason for hospital/ICU admission	COVID pneumonia
SARS-CoV-2 PCR result #1	Positive
Time since symptoms (days)	0 day
Time before transplantation (days)	31 days
Source	NP swab
Cycle threshold	No data
SARS-CoV-2 PCR result #2	Negative
Time since symptoms (days)	20 days
Time before transplantation (days)	11 days
Source	NP swab
Cycle threshold	No data
SARS-CoV-2 PCR result #3	Negative
Time since symptoms (days)	28 days
Time before transplantation (days)	3 days
Source	NP swab
Cycle threshold	No data
SARS-CoV-2 result #4	Positive
Time since symptoms (days)	29 days
Time before transplantation (days)	2 days
Source	NP swab
Cycle threshold	38
Age, years	48
Gender	Male
Race/Ethnicity	White/Hispanic
KDPI	65%
DCD	Yes
Kidney side	Left
Cause of death	Anoxia
History of hypertension	No
History of diabetes	Yes, >10 years
Peak serum creatinine	1.38 mg/dl
Terminal serum creatinine	0.25 mg/dl

TABLE 1 (Continued)

	Case
Biopsy	Left kidney biopsy revealed 75 glomeruli, minimal inflammation, no arterial sclerosis, no interstitial fibrosis/tubular atrophy
Recipient characteristics	
Anti-spike IgG index before transplant (reference range; ≥ 1.1 is considered positive)	>20
SARS-CoV-2 PCR before transplantation	Negative
Time since vaccination completed	14 days
History of COVID infection	No
Age	50 years
Gender	Male
Race/Ethnicity	White/Hispanic
Cause of ESKD	Hypertensive Nephrosclerosis (not biopsy proven)
Dialysis vintage	Preemptive transplant
cPRA	0%
Transplantation related data	
Cold ischemia time	37 hours 37 minutes
Delayed Graft Function	No
HLA mismatches	2/6 (0 DR)
Crossmatch	B and T cell negative
Type and dose of induction	rATG 4.5 mg/kg
Transplantation outcome	
Length of hospital stay	4 days
Serum creatinine at POD#7	11.5 mg/dl
Serum creatinine at POD#14	7.22 mg/dl
Serum creatinine at POD#30	2.28 mg/dl
Serum creatinine at POD#45	1.66 mg/dl
Serum creatinine at POD#90	1.63 mg/dl
Serum creatinine at POD#210	1.39 mg/dl
SARS-Cov-2 PCR after transplantation	Negative (POD#11)
Anti-spike IgG index after transplant (reference range; ≥ 1.1 is considered positive)	>20 (at POD#19)
Post-transplant hospitalizations in the first month	None

expansion, no rejection. Serum creatinine continued to trend down, and by POD#210, he had excellent stable graft function with a serum creatinine of 1.39 mg/dl and no proteinuria (Table 1).

We report a successful kidney transplant from SARS-CoV-2 nucleic acid test positive deceased donors who were admitted with

COVID pneumonia and tested PCR positive 29 days after admission and 2 days before donation. This case demonstrates these transplants can be performed safely without viral transmission to the recipient. Currently, there is a lack of bigger cohort data of these transplants which would be able to assess long-term outcome and potential unexpected complication of these transplants such as the potential higher risk of thromboembolic complication and worse graft function in long-term as described after SARS-CoV-2 infection. The development of registry of organ transplantation from SARS-CoV-2 NAT positivity donors is highly warranted to answer these questions.

KEYWORDS

clinical research/practice, donors and donation: donation after circulatory death (DCD), donors and donation: extended criteria, infectious disease, kidney transplantation/nephrology, organ procurement and allocation, Organ Procurement and Transplantation Network (OPTN)


DISCLOSURE


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