DR DEEPALI KUMAR (Orcid ID : 0000-0003-1961-0477)

DR MARCELO CYPEL (Orcid ID : 0000-0001-5652-1938)

Article type : Letter to the Editor

TITLE:

A call to routinely test lower respiratory tract samples for SARS-CoV-2 in lung donors

AUTHORS:

Deepali Kumar[1], Atul Humar[1], Shaf Keshavjee[1], Marcelo Cypel[1]

AFFILIATION:

[1]Toronto Lung Transplant Program, Ajmera Transplant Centre, University Health Network, University of Toronto, Toronto, ON, Canada

CORRESPONDENCE:

Deepali Kumar

Email: Deepali.kumar@uhn.ca

To the Editor:

SARS-CoV-2 may be transmissible from organ donor to recipient, although only a single lung transplant case has been reported (1). The American Society of Transplantation (AST) has recommended deceased donor screening for SARS-CoV-2 with upper respiratory tract sampling for nucleic acid testing (NAT) within 72 hours of procurement (2, 3). Lower respiratory tract samples are recommended when feasible, although this practice is not consistent across OPOs. This is likely because current NAT assays are not validated for lower respiratory tract samples.

In February 2021, we (Toronto, Canada) accepted a lung offer from Pennsylvania. The donor suffered anoxic brain injury secondary to drug overdose. He was screened with two nasopharyngeal swabs (NPS) and had a normal CT chest. Since available information suggested that the likelihood of SARS-CoV-2 was low, a clinical decision was made to proceed.

The transplant recipient was a 70-year-old male with pulmonary fibrosis. An admission clinical screen and NPS were negative. During the transplant surgery, the pre-implantation bronchial wash (BW) was negative for SARS-CoV-2 NAT. However, a post-implantation BW (performed during the transplant surgery immediately after implantation of the first lung) returned positive for SARS-CoV-2 (Table 1) highly suggesting donor-derived infection. Repeated endotracheal aspirate sampling was also positive. The patient was started on intravenous remdesivir for 5 days. Repeated post-operative testing showed a persistent positive PCR from lower tract samples and a negative NPS. The patient remains on mechanical ventilation on day 25 with evidence of bilateral airspace disease. No transmission occurred to the surgical team who wore N95 masks and face shields during transplant. No transmission occurred to two kidney recipients (one had previous COVID-19 vaccine, and one had previous COVID-19 infection) and one liver recipient. However, one of the kidney recipients died due to a myocardial infarction with no evidence of COVID-19. The remaining two recipients remain well.

One week later, we accepted a lung offer from Oklahoma. The donor was a 40-year-old male with stroke and seizure activity but no symptoms suggestive of COVID-19. He had been screened for SARS-CoV-2 with two negative NP swabs and CT chest had shown mild multifocal consolidation. A BW sample was transported with the lungs and immediately processed for SARS-CoV-2 PCR, while the lungs were kept in cold storage. The BW testing performed at our hospital returned positive for SARS-CoV-2 (confirmed on repeat testing of sample) and therefore, the lungs were deemed unsuitable for transplant. A kidney transplant was also performed from the same donor but this recipient had no post-transplant COVID.

These two cases illustrate the high risk of SARS-CoV-2 transmission from lung donors. Although there are no validated SARS-CoV-2 NAT tests for BW, these cases might have been avoided by sending a lower respiratory tract sample for COVID at the time of donor assessment. In Canada, national guidance states that all deceased donors undergo an upper *and* lower respiratory NAT for SARS-CoV-2 (4). Given our experience with U.S. lung donors, we believe there is a significant possibility that COVID+ donors are missed and potential transmissions are occurring. We recommend that lower respiratory testing for SARS-CoV-2 be performed routinely on all deceased lung donors in order to prevent such transmissions and avoid putting patients and hospital staff at risk.

DATA AVAILABILITY STATEMENT:

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

DISCLOSURES:

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

REFERENCES:

1. Kaul DR, Valesano AL, Petrie JG, Sagana R, Lyu D, Lin J, et al. Donor To Recipient Transmission Of SARS-CoV-2 By Lung Transplantation Despite Negative Donor Upper Respiratory Tract Testing. Am J Transplant. 2021.
2. Recommendations and Guidance for Organ Donor Testing: American Society of Transplantation; 2021 [Available from: https://www.myast.org/covid-19-information.
3. Guidance from the ISHLT Regarding the SARS CoV-2 pandemic International Society for Heart and Lung Transplantation; 2021 [Available from: https://ishlt.org/covid-19-information.
4. Consensus guidance for organ donation and transplantation services during COVID-19 pandemic: Canadian Blood Services; 2021 [Available from: https://profedu.blood.ca/en/organs-and-tissues/covid-19-update-organ-donation-and-transplantation-services.

Table 1: SARS-CoV-2 NAT* results for Lung Transplant Recipient.

Day	Nasopharyngeal swab	Endotracheal Aspirate	Bronchial Wash	Clinical Features
-1 (Pre-transplant)	Negative			
0 (Day of Transplant)	Negative (post-transplant)		Recipient native lung Negative Post-implantation Positive Ct values: E gene 26.4 R gene 28.8 N gene 28.3	Remdesivir x 5 days started Pulse methylprednisolone
Post-transplant day 1		Positive Ct values: E gene 10.7 R gene 13.1 N gene 13.0		
Post-transplant day 4			Positive Ct values: E gene 20.4 R gene 23.7 N gene 19.4	
Post-transplant day 7	Negative			
Post-			Positive	Second course of

transplant day 14			Ct values: E gene 23.9 R gene 27.4 N gene 22.9	Remdesivir x 5 days Pulse methylprednisolone

*NAT testing performed using the Seegene Allplex 2019 nCoV assay

Cycle threshold (Ct) represents the number of PCR cycles needed for detection and is a rough surrogate marker for viral load with an inverse correlation (lower Ct values represent higher viral loads); Ct values in the range reported above represent a relatively strong positive PCR result and a moderate to high viral load, E gene is the envelope gene, R gene is the RNA-dependent RNA polymerase (RdRp) gene, N gene is the nucleocapsid gene. Ct values are provided for overall interpretation but are not required as part of donor screening.