

Solid non-lung organs from COVID-19 donors in seropositive or naive recipients: Where do we stand?

To the Editor

We read with great interest the Eichenberger et al.'s editorial¹ and as suggested by the authors, we would like to share the data from our liver transplant (LT) center in Turin, Italy.

In our view, an accurate definition of coronavirus disease-19 (COVID-19) donor, as recently updated by organ procurement and transplantation network (OPTN)² is deemed to be crucial in order to standardize the worldwide experience and to balance the risk of SARS-CoV-2 donor transmission with the threat of dying from the underlying chronic disease.

According to the literature, individuals who are convalescent from COVID-19 have a significantly lower risk of infection because they are very likely to be protected by natural immunity.³ Therefore, non-lung organs from COVID-19 donors can be transplanted into informed recipients with ongoing or resolved SARS-CoV-2 infection,^{1,3} who might otherwise have limited opportunities for transplant due to disease acuity.

Nevertheless, transplant community must keep on thinking outside the box to face the increased shortage of donor organs. For this reason, between November 2020 and April 2021, before the beginning of our anti-SARS-CoV-2 vaccination program, all patients on our LT waiting list, were screened for immunoglobulin G (IgG) anti-SARS-CoV-2 (LIAISON SARS-CoV-2 S1/S2 IgG test, Saluggia, Italy; positive value ≥ 15 AU/ml). Thirty-six out of 124 (29%) patients tested IgG positive (median value, 34 AU/ml; interquartile range 25th–75th, 22–92 AU/ml): 10 out of 36 (28%) had a previous history of COVID-19, whereas 26 out of 36 (72%) had a previous asymptomatic COVID-19. Four of our 26 IgG positive recipients with previous asymptomatic COVID-19 received a liver graft from four brain-dead donors affected by COVID-19: one donor with severe COVID-19 characterized by pneumonia and oxygen requirement, one donor with resolved COVID-19, and the other two donors with SARS-CoV-2 RNA positive in bronchoalveolar lavage at procurement, without evidence of infection or history of COVID-19. None of the recipients were treated with peritransplant antiviral drugs or monoclonal antibody and none of them developed COVID-19 after LT, as detailed in Table 1.

In the same table, we reported the 45 published cases of transplants which were performed from 21 COVID-19 donors (classification according to OPTN: two mild, seven resolved, four severe, and eight not classifiable) into 10 vaccinated recipients (eight kidneys and two liv-

ers) and 35 naive/asymptomatic recipients (19 kidneys, seven hearts, and nine livers). None of these 45 subjects developed COVID-19 after transplant. One heart recipient⁴ was preemptively treated with remdesivir (once in the preoperative period followed by two additional doses) plus Casirivimab-Imdevimab and two patients (one naive heart recipient and one vaccinated liver recipient)⁵ were treated with Casirivimab-Imdevimab on day 1 after transplant.

In conclusion, even though more solid data are needed, we agree with Eichenberger that the use of non-lung grafts from well-categorized COVID-19 donors might represent a precious source not only in previous symptomatic COVID-19, but also in patients with documented evidence of humoral immunity resulting either from asymptomatic infection, from vaccination or from long-acting monoclonal antibody infusion.

FUNDING INFORMATION

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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KEYWORDS

donation, SARS-CoV-2 IgG, vaccination

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List of abbreviations: COVID-19, coronavirus disease-19; IgG, immunoglobulin G; LT, liver transplant; OPTN, organ procurement and transplantation network

TABLE 1 Coronavirus disease-19 (COVID-19) donors allocated to naïve or previous asymptomatic COVID-19 or anti-SARS-CoV-2 vaccinated recipients

References	Donors' characteristics				Recipients' characteristics											
	SARS-CoV-2 RNA at transplant	IgG anti-SARS-CoV-2 at transplant	COVID-19 onset	OPTN COVID-19 classification	SARS-CoV-2 RNA on graft biopsy	COVID-19 therapy at transplant	Graft	COVID-19 vaccination	Previous asymptomatic COVID-19	IgG anti-SARS-CoV-2	COVID-19 therapy	COVID-19 after transplant				
Turin Center, Italy	Positive	Negative	Unknown	Severe	Negative	None	Liver	No	Yes	Positive	None	No				
	Negative	Positive	2 months before donation	Resolved	Negative	None	Liver	No	Yes	Positive	None	No				
	Positive	Unknown	Unknown	Not applicable	Negative	None	Liver	No	Yes	Positive	None	No				
	Positive	Negative	Unknown	Not applicable	Negative	None	Liver	No	Yes	Positive	None	No				
Sigler et al. ⁴	Positive	Unknown	34 days before donation	Resolved	Unknown	None	Heart	No	Unknown	Negative	Remdesivir + Casirivimab-Imdevimab	No				
Dhand et al. ⁵	Positive	Unknown	1 day before donation	Mild	Unknown	None	Kidney	No	Unknown	Negative	None	No				
													Unknown	Unknown	Unknown	Unknown
													Unknown	Unknown	Unknown	Unknown
													Unknown	Unknown	Unknown	Unknown
Frattaroli et al. ⁶	Positive	Unknown	Unknown	Not applicable	Unknown	None	Kidney	No	Unknown	Unknown	None	No				
													Unknown	Unknown	Unknown	Unknown
													Unknown	Unknown	Unknown	Unknown
													Unknown	Unknown	Unknown	Unknown

(Continues)

TABLE 1 (Continued)

References	Donors' characteristics					Recipients' characteristics						
	SARS-CoV-2 RNA at transplant	IgG anti-SARS-CoV-2 at transplant	COVID-19 onset	OPTN COVID-19 classification	SARS-CoV-2 RNA on graft biopsy	COVID-19 therapy at transplant	Graft	COVID-19 vaccination	Previous asymptomatic COVID-19	IgG anti-SARS-CoV-2	COVID-19 therapy	COVID-19 after transplant
	Negative	Unknown	Unknown	Resolved	Unknown	None	Kidney	No	Unknown	Unknown	None	No
					Unknown	None	Liver	2 doses (Pfizer)	Unknown	Unknown	None	No
de la Villa et al. ⁷	Positive	Positive	2 months before donation	Resolved	Unknown	None	Heart	Unknown	Unknown	Negative	None	No
					Negative	None	Liver	Unknown	Yes	Positive	None	No
Koval et al. ⁸	Positive	Positive	Unknown	Not applicable	Unknown	None	Kidney	No	No	Unknown	None	No
			Exposure to infected relatives the month before		Unknown	None	Kidney	No	No	Unknown	None	No
	Positive	Unknown	Unknown	Not applicable	Unknown	None	Liver	Unknown	Unknown	Unknown	None	Unknown
					Unknown	None	Kidney	No	No	Unknown	None	No
	Positive	Unknown	Unknown	Not applicable	Unknown	None	Liver	Unknown	Unknown	Unknown	None	Unknown
					Unknown	None	Heart	Unknown	Unknown	Unknown	None	Unknown
	Positive	Unknown	Unknown	Not applicable	Unknown	None	Kidney	1 dose	No	Unknown	None	No
					Unknown	None	Kidney	2 doses	No	Unknown	None	No
	Positive	Unknown	Unknown	Not applicable	Unknown	None	Kidney	2 doses	No	Unknown	None	No
					Unknown	None	Kidney	1 dose	No	Unknown	None	No
	Positive	Unknown	Unknown	Not applicable	Unknown	None	Kidney	1 dose	No	Unknown	None	No
					Unknown	Casirivimab Imdevimab	Kidney	1 dose	No	Unknown	None	No
					Unknown	Casirivimab Imdevimab	Kidney	No	No	Unknown	None	No
Perlin et al. ⁹	Positive	Unknown	Unknown	Severe	Unknown	None	Kidney	Unknown	Unknown	Negative	None	No
					Unknown	None	Kidney	Unknown	Unknown	Negative	None	No

(Continues)

TABLE 1 (Continued)

References	Donors' characteristics					Recipients' characteristics						
	SARS-CoV-2 RNA at transplant	IgG anti-SARS-CoV-2 at transplant	COVID-19 onset	OPTN COVID-19 classification	SARS-CoV-2 RNA on graft biopsy	COVID-19 therapy at transplant	Graft	COVID-19 vaccination	Previous asymptomatic COVID-19	IgG anti-SARS-CoV-2	COVID-19 therapy	COVID-19 after transplant
Meshram et al. ¹⁰	Negative	unknown	27 days before donation	Severe	Unknown	None	Kidney	No	No	Negative	None	No
Barros et al. ¹¹	Positive	Unknown	Unknown	Mild	Unknown	None	Liver	No	Yes	Positive	None	No
Neidlinger et al. ¹²	Negative	Positive	14 weeks before donation	Resolved	Unknown	None	Heart	Unknown	Unknown	Unknown	None	No
					Unknown	None	Kidney	Unknown	Unknown	Unknown	None	No
					Unknown	None	Kidney	Unknown	Unknown	Unknown	None	No
					Unknown	None	Liver	Unknown	Unknown	Unknown	None	No
					Unknown	None	Heart	Unknown	Unknown	Unknown	None	No
	Negative	Negative	38 days before donation	Resolved	Unknown	None	Heart	Unknown	Unknown	Unknown	None	No
	Positive	Positive	Unknown	Not applicable	Unknown	None	Liver	Unknown	Unknown	Negative	None	No
					Unknown	None	Liver	Unknown	Unknown	Unknown	None	No (death at 1 month post-transplant)
	Negative	Positive	48 days before donation	Resolved	Unknown	None	Liver	Unknown	Unknown	Negative	None	No
					Unknown	None	Kidney	Unknown	Unknown	Unknown	None	No
	Negative	Positive	4 months before donation	Resolved	Unknown	None	Kidney	Unknown	Unknown	Unknown	None	No
					Unknown	None	Kidney	Unknown	Unknown	Unknown	None	No
	Positive (stool)	Unknown	Unknown	Not applicable	Unknown	None	Heart	Unknown	Unknown	Unknown	None	No
					Unknown	None	Kidney	Unknown	Unknown	Unknown	None	No
					Unknown	None	Kidney	Unknown	Unknown	Unknown	None	No
Kumar et al. ¹³	Positive	Unknown	Unknown	Severe	Unknown	None	Kidney	2 doses	No	Unknown	None	No
					Unknown	None	Liver	No	No	Unknown	None	No
	Positive	Unknown	Unknown	Severe	Unknown	None	Kidney	No	No	Unknown	None	No

Abbreviations: IgG: immunoglobulin G; OPTN: organ procurement and transplantation network.

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