



Inflammation and infection

## Kidney transplantation from COVID-19 deceased donor

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## ABSTRACT

We present first known case of kidney transplantation from deceased donor who was retrospectively diagnosed with COVID-19.

The recipient hadn't febrile and no other symptoms of acute respiratory disease during all hospital stay. No serum anti-SARS-CoV-2 IgM, IgG were detected before and during 6 weeks after surgery.

Repeated nasopharyngeal swabs rRT-PCR were negative during all the period. The patient was discharged with normal serum creatinine and doing well with no clinical or laboratory signs of COVID-19 after 8 months.

The presented clinical cases demonstrate the possibility of non-transmission of SARS-Cov-2 with renal graft.

## Introduction

In recent months, with the spread of COVID-19, the number of kidney transplants from deceased donors has declined significantly in most countries. One of the reasons is the risk of transmission of COVID-19 to the recipient during transplantation is unknown today.<sup>1</sup>

Determining the risk of transmission of COVID-19 with a donor organ is very important during a pandemic. We present a first known report of kidney transplantation from a COVID-19 positive deceased donor.

## Case presentation

The deceased donor, a 45 year old male with diabetes, had a major hemorrhagic insult in the right vertebral-basilar zone resulting in brain death. He had a normal urine output and a serum creatinine level for the past 24 hours prior to kidney procurement. A few hours after organ harvesting, the donor was diagnosed with COVID-19 (retrospective nasopharyngeal swab rRT-PCR which was confirmed by morphological examination (Fig. 1 a, b) and RNA-PCR of specimens from the trachea and bronchus).

The recipient is a 45 year old male with polycystic kidney disease who is on continuous ambulatory peritoneal dialysis (CAPD). He was registered on the urgency waiting list because of a low transport capacity of peritoneum. The kidney transplantation from the same deceased donor was done with a cold ischemia time of 21 hours. Graft function was immediate with a decrease in serum creatinine to 92.5  $\mu\text{mol/L}$  at discharge. No deviations from the usual course were seen

during hospital stay. The main biochemical parameters of the recipient are shown in Table 1.

In the case we completely abandoned any antilymphocytic agents for induction. For the starting of immunosuppression we used 500 mg of methylprednisolone during surgery and 500 mg for the next two days. Then the patient received triple therapy including tacrolimus 0.2 mg/kg/day, mycophenolic acid 720 g/day and methylprednisolone 0.3 mg/kg/day with rapid tapering to 12 mg/day. Tacrolimus dose adjustments were made to maintain a trough level of 12.5–8.1 ng/mL.

The patient had no febrile and no other symptoms of acute respiratory disease during their entire hospital stay. No abnormalities on chest X-ray were seen. No serum anti-SARS-CoV-2 IgM and IgG were detected before or during 6 weeks after surgery. Repeated nasopharyngeal swabs rRT-PCR were negative during this entire period. The recipient was discharged 5 weeks after surgery to prevent out-of-hospital contamination of COVID-19 which would be difficult to differentiate from transmission infection. After 8 months the patient is doing well with no clinical or laboratory signs of COVID-19.

## Discussion

The recent published sources contain data on about 400 kidney transplant recipients with confirmed COVID-19 and less than a quarter of them were transplanted no more than one year ago.<sup>2–4</sup> Determining the probability of transmission of COVID-19 during a graft is essential to continuation of the deceased transplantation program during a pandemic. Even a total examination of all potential deceased donors for COVID-19 does not guarantee that they are not infected, because the

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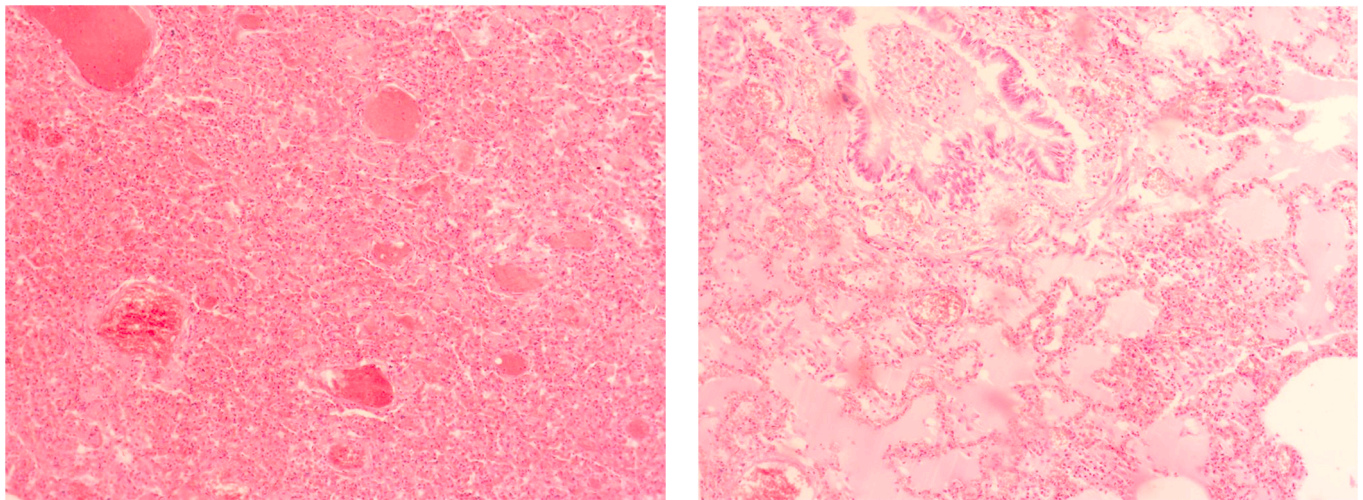
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**Fig. 1.** Pathological changes in lung of deceased donor:

A: Red blood clots in microvasculature, lymphocytic infiltration, focal hemorrhages (x 80);

B: Intraalveolar edema, foci of emphysema, neutrophilic and eosinophilic leukocytes in the lumen of the alveoli (x 100).

**Table 1**

Basic laboratory parameters of recipient.

Parameters		Range during hospital stay
Hemoglobin	g/L	116–138
Erythrocytes	$\times 10^{12}/L$	3.98–4.64
Leucocytes	$\times 10^9/L$	16.5–8.9
Lymphocytes	$\times 10^9/L$	5.5–3.8
Platelets	$\times 10^9/L$	182–246
Fibrinogen	g/L	1.80–2.75
D-dimer	FEU/mL	0.2–0.3
C - reactive protein	mg/mL	0.7–2.2
Procalcitonin	ng/mL	0.22–0.32
Ferritin	ng/mL	223–305

SARS-CoV-2 rRT-PCR test using throat swab specimens can often result in false negatives due to sampling techniques, viral load of the upper respiratory tract and mutations of the virus gene.<sup>5</sup> Pathological examination of a deceased donor is hardly possible before organ transplantation has already been done.

We can confidently state that there was no infection with SARS-CoV-2 in our patient at the time of the operation and in the postoperative period. This is also confirmed by the absence of any clinical manifestations and immune response to COVID-19 (IgM, IgG) during further follow-up.

Perhaps a certain minimization of immunosuppression, especially the exclusion of the use of anti-lymphocyte antibodies in the initial therapy, can reduce the probability of developing SARS-CoV-2 after transplantation, both as a result of transmission, reactivation of an existing asymptomatic disease or infection in the postoperative period.

## Conclusion

We present the first known case of kidney transplantation from a

COVID-19 positive deceased donor which indicate the possibility of non-transmission of SARS-Cov-2 with kidney graft.

A careful collection and analysis of such data is necessary to determine the risk of transmission of COVID-19 with kidney graft and which factors can reduce the risk of a recipient to be infected.

## Data availability statement

Dates that support the findings of this study are available on request from the corresponding author and with permission from Volgograd Regional Center of Urology and Nephrology, 404,120, Karbysheva st. 86, Volzhsky, Russia.

## Declaration of competing interest

None.

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