Received: 1 June 2021 | Revised: 5 June 2021 | Accepted: 15 June 2021

DOI: 10.1111/tid.13685

LETTER TO THE EDITOR

WILEY

Convalescent plasma treatment for early post-kidney transplant acquired COVID-19

Dear Editor,

Currently, there are no established treatment protocols for COVID-19 that is immediately acquired after kidney transplantation (KTx). To date, the extent and direction of immunosuppression (IS) modifications, as well as addition of anti-SARS-CoV-2 therapeutic agents, is unknown. Here, we describe the successful treatment of three patients with convalescent donor plasma (CP) who developed severe COVID-19 directly after receiving KTx.

1 | CASE 1

A 69-year-old diabetic patient developed severe COVID-19-associated pneumonia 6 days after KTx (DBD, ESP). IS consisted of induction with Basiliximab and IV steroids, and maintenance with tacrolimus (TAC), mycophenolic-acid (MPA) and rapidly weaned steroids. TAC/MPA were reduced, followed by three doses of convalescent plasma (blood group compatible CP with titers > 400 IU [Euroimmun SARSCov2 Elisa, Lübeck, Germany] 4 weeks after clearance of COVID-19) on day 14, 16, and 18 after transplantation.[1] The patient completely recovered after ICU management. A surveillance biopsy showed no signs of rejection, and interstitial fibrosis/tubular atrophy remained stable. SARS-CoV-2 PCR in the kidney biopsy did not reveal viral replication.[2] Pharyngeal SARS-CoV-2 replication cleared after 21 days (Table 1), and kidney function improved.

2 | CASE 2

A 47-year-old patient developed COVID-19-related pneumonia 13 days after receiving an AB0i living KTx after desensibilization using Rituximab and immunoadsorption as well as standard induction and maintenance IS (Basiliximab/TAC/MPA/steroids). Early humoral rejection, due to anti-ATIIR1 and anti-ETA antibodies was treated with immunoglobulins, plasma separation, and bolus glucocorticoids. During rejection-treatment, the patient developed severe COVID-19 and received two courses of CP after antimetabolite-withdrawal and steroid-elevation. Although initial SARS-CoV-2-viraemia rapidly cleared, the patient remained PCR-positive in nasopharyngeal swabs for 99 days and never developed endogenous SARS-CoV-2-antibodies (Table 1), presumably reflecting failing development of endogenous B-cell immunity after B-cell-depleting treatment.

3 | CASE 3

A 50-year-old patient, who received an AB0-compatible living-related kidney donation (LD) (IS: Basiliximab/TAC/MPA/steroids), developed COVID-19 14 days after KTx. He received two doses of convalescent plasma following cessation of MPA and slightly increased steroids. The patient was swab-negative for SARS-CoV-2 14 days after infection and 4 days after CP-application. He was discharged with excellent graft-function. SARS-CoV-2-antibodies were still increasing >120 days later (Table 1).

In this study, we describe a case series of three patients infected with SARS-CoV-2 immediately after KTx. All carried multiple risk factors for severe courses of COVID-19. We aimed to ameliorate the clinical course of COVID-19 while maintaining tolerance to- and function of the grafts, considering the renal tropism and complications of SARS-CoV-2.[2,3] Based on available evidence (ERACODA registry), we reduced TAC trough levels to 7–8 μg/l and halved or discontinued MPA. Due to impaired renal function as well as cardiovascular history, antiviral agents were not a suitable option.

Accumulating evidence suggests beneficial effects of CP in long-term kidney transplant patients.[4,5] To our knowledge, there is no evidence related to CP for patients directly after KTx in whom reduction of IS would typically trigger severe early rejections. We speculated that CP might support immunotolerance in an IVIG-like manner, given the immunosuppressive/immunomodulatory effects of intravenous immunoglobulins known from routine-rejection treatment. This case series of successful CP administration at first signs of pulmonary deterioration in patients immediately after Ktx strengthens this hypothesis. Monoclonal antibodies directed against SARS-CoV-2 might be a similarly effective option.

Taken together, the outcome of these three patients supports further studies of antibody-based therapies in the acute transplant setting.

ACKNOWLEDGMENT

We would like to thank all nurses, physiotherapists, and physicians who have contributed to the overall favorable outcome of our patients. The individual healing attempts were granted under RKP-COVID-19-V

Abbreviations: AKI, acute kidney injury; anti-ATIIR1, anti-angiotensin2 –receptor-1 antibody; anti-ETA, anti-endothelin antibody; CP, convalescent donor plasma; DBD, donation after brain death; DSA, donor-specific HLA-antibodies; ESP, European Senior Programme; ICU, intensive care unit; IS, Immunosuppression; KTx, kidney transplantation; LD, living donation; MPA, mycophenolic acid; TAC, tacrolimus

TABLE 1 Recipient characteristics and COVID-19 disease course after CP treatment

	ESP	AB0i	Living donation
Age (years)	69	47	50
Gender	M	M	M
ESRD cause	Nephrosclerosis	Nephrosclerosis	MGN (PLA_2R+)
Comorbidities (n)	3	1	1
Dialysis vintage (years)	2	2.5	1
Induction	Basiliximab, steroids	Rituximab, basiliximab, steroids, immunoabsorption	Basiliximab, steroids
Immunosuppression	Tacrolimus, MPA	Tacrolimus, MPA, steroids	Tacrolimus, MMF, steroids
Mismatches (HLA)	0-1-1	1-1-1	1-1-1
AB0 incompatible	No	Yes	No
Follow-up after NTx	11 months	6 months	6 months
Time NTx → infection	6 days	13 days	14 days
Time Infection → negative swab	21 days	99 days	10 days
Cr at diagnosis	3.74 mg/dl	2.64 mg/dl	1.52 mg/dl
Cr peak	5.67 mg/dl	3.22 mg/dl	1.64 mg/dl
Therapy	Convalescent plasma	Convalescent plasma	Convalescent plasma
Viremia	Yes	Yes	No
Kidney SARS CoV-2+ (PCR)	No	Unconclusive result	Not tested
Anti-SARS CoV-2 IgG (Peak)	1 month	–	1 month
Anti-SARS CoV-2 IgG (Detectable until)	3 months	–	All follow-up
DSA development	No	Yes (non-HLA)	No

§79Abs. 5 AMG from the Behörde für Gesundheits-und Verbraucherschutz Freie und Hansestadt Hamburg/Germany on 24.04.2020. This work was supported by the DFG, CRC 1192 (to Tobias B. Huber, Victor G. Puelles, Samuel Huber and Florian Grahammer).

CONFLICT OF INTEREST

The authors of this manuscript have no conflict of interest to disclose.

AUTHOR CONTRIBUTIONS

All authors treated the patients, wrote the manuscript, and approved the final version.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study

FUNDING INFORMATION

DFG, CRC 1192.

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