Monoclonal Antibody Therapy for SARS-CoV-2 Infection in Kidney Transplant Recipients: A Case Series From Belgium

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Kidney transplant recipients (KTRs) are particularly vulnerable to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and may remain at risk after complete vaccination because of poor response rate.[1,2] Neutralizing monoclonal antibodies (Abs) have been shown to be safe and efficient in reducing viral load in immunocompetent outpatients with coronavirus disease 2019 (COVID-19).[3] In immunocompromised patients, including solid organ transplant recipients, few reports have reported similar results.[4,5]

In this article, we report the efficacy and safety of monoclonal Ab therapy (intravenous casirivimab 1200 mg and imdevimab 1200 mg, Regeneron Pharmaceuticals, Terrytown, NY) in 12 KTRs infected by SARS-CoV-2 who were treated in our center between June and September 2021. The study received institutional review board approval.

The mean age was 47 (range, 21–78) y and 6 patients (50%) were male (Table 1). The mean time from transplantation was 112 mo (range, 2–264). Eight patients (75%) were treated with an association of tacrolimus (Tac), mycophenolate (MPA), and steroids, and 4 patients (25%) were treated with dual therapy (Tac/MPA n = 2; Tac/steroids n = 1; Tac/azathioprine n = 1). Ten patients had received 2 doses of the mRNA BNT162b2 (Pfizer-BioNTech), with a mean time of 111 (range, 39–200) d before SARS-CoV-2 infection. Two of the vaccinated patients had a prior history of COVID-19.

TABLE 1.

Characteristics of patients at SARS-CoV-2 infection

Patients	Age (y)	Gender Male/ Female	Delay from KT (mo)	IS at diagnosis	Prior vaccine (Y/N)	Last dose to infection delay (d)	Anti-RBD titer before diagnosis (BAU/mL)	Last titer to infection delay (d)	Symptoms	Viral load (×10^6 copies/mL)	Genotype
1	64	Male	264	Tac-MPA-St	Yes	57	0	13	F	10	Gamma
2	43	Female	60	Tac-MPA-St	Yes	85	10.6	49	C	28	Delta
3	52	Male	2	Tac-MPA-St	Yes	116	0	42	M	–	–
4	23	Male	55	Tac-MPA-St	Yes	99	257.22	45	C-R	36	Delta
5	31	Female	22	Tac-MPA-St	Yes	39	0	0	M	0.17	Delta
6	65	Female	133	Tac-MPA	No	–	–	0	F-H	6	Delta
7	43	Male	196	Tac-MPA-St	No	–	–	0	F-C	0.43	–
8	35	Female	190	Tac-AZA	Yes	200	257.22	75	F-C-H	–	–
9	78	Female	262	Tac-MPA	Yes	139	159.77	0	F-R	85	–
10	52	Female	69	Tac-St	Yes	119	5.35	0	F-C-H	9	–
11	21	Male	28	Tac-MPA-St	Yes	117	239.71	4	F	5.7	–
12	60	Male	61	Tac-MPA-St	Yes	139	1.31	34	F-C-D	18.8	–

AZA, azathioprine; BAU, binding antibody units; C, cough; D, diarrhea; F, fever; H, headache; IS, immunosuppressive drugs; KT, kidney transplantation; M, myalgia; MPA, mycophenolate; R, rhinorrhea; RBD, receptor-binding domain; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; St, steroids; Tac, tacrolimus.

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Out of the 7 patients who mounted a humoral response after vaccination, the mean anti–receptor-binding domain Ab titer (Elecsys anti–SARS-CoV-2, Roche Diagnostics GmbH, Mannheim, Germany; positive threshold ≥0.8 BAU/mL) was 133.03 (range, 1.31–257.22) BAU/mL, which was assessed a mean time of 22 (range, 0–75) d before infection.

Patients presented with mild symptoms (fever n = 8; cough n = 6; headache n = 3; myalgia n = 3; rhinorrhea n = 2; diarrhea n = 1) and tested positive for SARS-CoV-2 using polymerase chain reaction on nasopharyngeal swab. The mean time between the beginning of symptoms and diagnosis was 3.75 (range, 2–7) d. The mean viral load at diagnosis was 3.62×10^6 (range, 171×10^3–85×10^6) copies/mL. Viral genotyping (available for 5 patients) revealed the Delta variant (n = 4) and the Gamma variant (n = 1) according to World Health Organization nomenclature.

MPA was discontinued for 10 d in all patients. Nine patients were discharged the day of the diagnosis after receiving the Ab therapy. Three patients were hospitalized, and interestingly, the 2 unvaccinated KTRs required oxygen supplementation for 24 h. All were discharged the day after.

One patient experienced a mild allergic reaction during Ab infusion that required a brief interruption of the perfusion. No other side effect was reported.

The follow-up consisted of a repeated polymerase chain reaction on nasopharyngeal swab 7 d after treatment administration. The viral load was <1000 copies/mL in all patients. All KTRs reported a rapid resolution of symptoms and none necessitated a new hospitalization.

Our results show that monoclonal Ab therapy is safe and associated with favorable outcomes in SARS-CoV-2–infected KTRs. Additional studies are required to assess the efficacy of this treatment in larger cohorts and in more severe forms of COVID-19 infection.

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