Efficacy of Casirivimab/Imdevimab in Kidney Transplant Recipients Admitted with Mild-to-Moderate COVID-19: A Case Series

Kidney transplant recipients (KTRs) are at a high risk of developing graft dysfunction and mortality after contracting the coronavirus disease 2019 (COVID-19). Most approved COVID-19 therapies are intended for hospitalized patients with advanced disease. Casirivimab/imdevimab—a monoclonal antibody that targets the SARS-CoV-2 spike protein—has been studied as an outpatient treatment for mild-to-moderate COVID-19.[1,2]

There is little information on the use of these monoclonal antibodies and their side effects in KTRs. This study reports the treatment of seven KTRs having mild-to-moderate COVID-19 with casirivimab/imdevimab.

The clinical characteristics and laboratory data are shown in Table 1. The median (interquartile [IQR]) age of the KTRs was 53 (37–67) years; all were men and the median (IQR) duration from transplant to COVID-19 infection was 4 (2–6) years. All were on triple immunosuppressants consisting of mycophenolate, prednisolone, and either tacrolimus, sirolimus, or cyclosporine.

Two patients were completely vaccinated (one with two doses of Covishield and another with three doses of Pfizer-BioNTech), two had received a single dose of Covaxin, and three were unvaccinated. None had taken booster dose as booster doses were not available at that time. The diagnosis of SARS-CoV-2 infection was confirmed by nasopharyngeal reverse transcription polymerase chain reaction (RT-PCR) test. On the chest high-resolution computed tomography (HRCT), only two KTRs showed moderate CT score, whereas all of the remaining KTRs showed mild involvement. All patients presented with fever. One patient each had breathlessness and cough on presentation. Two patients required supplemental oxygen by face mask.

Table 1: Clinical characteristics of the patients at baseline

Characteristic	Frequency
Age, median (IQR), years	53 (37–67)
Duration of stay, median (IQR), days	10 (5–14)
Time since transplant, median (IQR), years	4 (2–6)
Duration between hospitalization and monoclonal antibodies treatment, median (IQR), days	4 (3–5)
Immunosuppression	
Tacrolimus	4 (57.1%)
Sirolimus	2 (28.6%)
Cyclosporine	1 (14.3%)
Mycophenolate mofetil	7 (100.0%)
Severity of Disease on CT Score	
Mild	5 (71.4%)
Moderate	2 (28.6%)
Clinical Status During First admission	
Oxygen (O_2) required	2 (28.6%)
Clinical Status at Follow-Up	
ICU required	1 (14.3%)
Infection at follow-up (UTI)	1 (14.3%)
Outcome	
Discharge	7 (100.0%)
Death	0 (0.0%)
Rejection	0 (0.0%)

ICU=Intensive care unit, IQR=Interquartile range, O_2=Oxygen, UTI=Urinary tract infection

Treatment was started according to guidelines of the AIIMS/ICMR-COVID-19 National Task Force/Joint Monitoring Group, Government of India, dated May 19, 2021. Mild disease was defined as upper respiratory tract symptoms (and/or fever) without shortness of breath or hypoxia and moderate disease as any one of the following: (1) respiratory rate >24 breaths/min, breathlessness; (2) SpO2 of 90% to <93% on room air. Immunosuppression modification was individualized based on the infection and rejection risk.

As per institutional protocol, five patients underwent tacrolimus dose reduction to maintain trough level close to 5 ng/ml, and their antiproliferative agent was stopped. In the other two patients, only the dose of mycophenolate mofetil was reduced. Two patients received remdesivir, and one patient received intravenous methylprednisolone.

Within five days of their hospitalization, all patients were started on monoclonal antibodies in the dose of half vial of Ronapreve, that is, casirivimab (600 mg) and imdevimab (600 mg), intravenously. Median (IQR) serum creatinine significantly decreased ($P < 0.01$) from 1.78 (1.71–2.88) mg/dl at admission to 1.47 (1.14–2) mg/dl at discharge. There was no evidence of allograft dysfunction after use of Ronapreve. Elevated D-dimer (630 [550–880] ng/ml) levels also significantly decreased (15 [15–23] ng/ml, $P < 0.01$) at discharge.

After a median (IQR) duration of 10 (5–14) days in the hospital, all patients were discharged. All have been followed up for 14 months from discharge. One patient developed urinary tract infection after one month and another needed admission for breathlessness due to post-COVID-19 pulmonary fibrosis one month after discharge.

In this series, we found that casirivimab/imdevimab combined with immunosuppression reduction for the treatment of mild-to-moderate COVID-19 in KTRs was safe and associated with good outcomes. COVID-19 in KTRs may be severe and require intensive care admission.[3]

Immunosuppression imposes a serious challenge in managing KTRs with COVID-19, and treatment options are limited.

In this series, we noticed a rapid and clear improvement following introduction of the antibodies. Elevated D-dimer levels normalized, and serum creatinine reduced at discharge. Only two patients had moderate HRCT score, and all recovered fully. In our study, the median duration of hospitalization was 10 (5–14) days.

The safety data of the study were encouraging—with only one patient experiencing nausea—and were in line with other studies.[1,4,5] We did not encounter any episode of acute rejection, change in tacrolimus level, or increase in creatinine at the 30-day follow-up visit.

To our knowledge, this is the first Indian study on the use of monoclonal antibodies in KTRs with COVID-19 infection. However, this study has a very small sample size, making it impossible to draw any firm conclusions. Additionally, there was no control group, and donor-specific antibodies were not tested.

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Conflicts of interest

There are no conflicts of interest.

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