SARS-CoV-2 Infection After Full Vaccination in Kidney Transplant Recipients

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Since the beginning of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), several vaccines have been developed and approved for human use in the United States and Europe.[1] In our center, coronavirus disease 2019 (COVID-19) vaccination of kidney transplant recipients (KTRs) started in February 2021, with about 800 KTRs fully vaccinated in May 2021. Among the different vaccines, mRNA vaccines BNT162b2 (Pfizer/BioNTech) and mRNA-1273 (Moderna) have demonstrated an effectiveness of up to 95% in preventing COVID-19 in immunocompetent population. However, the effectiveness in KTRs to induce an immunological response has been reported to be significantly lower (up to 65%), and information about the risk and severity of a postvaccination COVID-19 is scarce in these patients.[1-6] Herein, we describe 21 cases of KTRs (20 KTRs and 1 simultaneous pancreas-kidney recipient) who developed a polymerase chain reaction–proven COVID-19 after a full vaccination course. The study was approved by the ethics committee from our center.

TABLE 1.

Demographic, transplantation, and COVID-19 characteristics of the analyzed patients

	Kidney transplant recipients (n = 21)
Gender, male	9 (43)
Age at COVID-19 diagnosis, y	57.61 ± 11.96
Transplant type	
Kidney transplant	20 (95)
Simultaneous pancreas-kidney transplant	1 (5)
Time from transplant to COVID-19 diagnosis, y	3.79 (1.83–13.12)
Induction immunosuppression	
No induction	6 (29)
Basiliximab	6 (29)
Thymoglobulin	9 (42)
Maintenance immunosuppression	
Tacrolimus	21 (100)
Mycophenolate	15 (71)
Everolimus	6 (29)
Prednisone	21 (100)
SARS-CoV-2 vaccine	
BNT162b2, Pfizer/BioNTech	2 (9)
mRNA-1273, Moderna	19 (91)
SARS-CoV-2 IgG antibodies after vaccination, yes	1 (5)
Time from second vaccine dose to COVID-19 diagnosis, d	84.71 ± 27.43
SARS-CoV-2 variant	
Alpha	2 (9)
Delta	3 (14)
Symptoms at COVID-19 diagnosis	
Asymptomatic	2 (9)
Fever	16 (76)
Cough	11 (52)
Dyspnea	8 (38)
Diarrhea	4 (19)
Patient hospital admission, yes	11 (52)
ICU admission with MV, yes	6 (29)
COVID-19 treatment	
Dexamethasone	6 (29)
Remdesivir	5 (24)
Remdesivir plus baricitinib	1 (5)
Remdesivir plus anakinra	1 (5)
Tocilizumab	3 (14)
≥1 immunosuppressant withdrawn, yes	16 (76)
Patient outcomes	
Discharged	13 (62)
Dead	1 (5)
Hospital stay, d	11 (7–20)

Data are presented as mean ± SD, median (IQR), or n (%), unless otherwise specified.
COVID-19, coronavirus disease 2019; ICU, intensive care unit; IgG, immunoglobulin G; IQR, interquartile range; MV, mechanical ventilation; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

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E.M.-M. analyzed the data, interpreted the data, and wrote the manuscript. D.C., E.C.-P., F.C., J.-V.T., P.V.-A., I.R., M.B., G.J.P., N.E., J.M.C., F.O., B.B., and A.M. interpreted the data and critically revised the manuscript. M.A.M. determined the COVID-19 variant, interpreted the data, and critically revised the manuscript. F.D. analyzed the data, interpreted the data, and critically revised the manuscript.

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From the 21 KTRs, 2 patients (9%) received a 2-dose regimen of the BNT162b2 vaccine and 19 (91%) the mRNA-1273 vaccine. Only 1 patient (5%) developed SARS-CoV-2 immunoglobulin G antibodies after vaccination (which were assessed >15 d after the second dose). All patients were diagnosed with COVID-19 through a nasopharyngeal swab after a mean time of 84.71 ± 27.43 d from the second vaccine dose (52% with pneumonia). SARS-CoV-2 variants could be determined in 5 patients: 2 patients were infected with the Alpha variant and 3 with the Delta one. Table 1 summarizes demographic, transplantation immunosuppression, and COVID-19 characteristics of the analyzed patients. Two patients (9%) were asymptomatic.

Regarding patient management, 11 patients (52%) required hospital admission, and 7 (33%) required intensive care unit (ICU) admission with the need for mechanical ventilation in 6. Ten (48%) were managed as outpatients (Table 1). Of the 21 patients, 1 (5%) died, 7 (33%) are still admitted (5 of them in the ICU), and 13 (62%) have been already discharged. Current median hospital stay is 11 (7–20) d.

With this letter, we would like to provide preliminary information about a single-center kidney transplant population in Spain after a full COVID-19 vaccination regimen and reinforce the apparently less efficient immunization effect that COVID-19 vaccines provide in KTRs and the need to vaccinate their close relatives, as well as to still maintain precautions against COVID-19 in this population (especially against the Delta variant), even after full vaccination course. Nevertheless, actual hospital and ICU admission rates are lower compared with a non-vaccinated cohort of KTRs (79% and 52% for hospital and ICU admission, respectively) from our center. Larger studies are needed to provide robust information on the prognosis and management of KTRs with COVID-19 after vaccination, as well as the potential need for a third dose to increase the immunization rate.

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