Is it safe to undergo living donor kidney transplant within 2 weeks following COVID-19?

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India is heavily reliant on living donor kidney transplantation (LDKT). There has been a significant focus on transplanting persons who have recovered from severe acute respiratory syndrome novel coronavirus (SARS-CoV-2) infection in response to the backlog of waitlisted patients accumulating during the coronavirus disease (COVID-19) pandemic. The Indian Society of Organ Transplantation has recommended[1] a waiting time of more than 4 weeks prior to proceeding with LDKT after the recovery from SARS-CoV-2 infection. However, this guideline has been formulated at the end of the first wave of the pandemic (March 2021). We have previously reported on the largest cohort[2,3] of LDKT following the recovery from COVID-19. In this report, the median duration between infection and surgery exceeded 4 weeks.[2,3] Guidelines by The Transplantation Society have recently suggested a waiting time of 2 weeks following a mild infection.[4] However, this guideline is based on limited experience. With recent data, waiting thresholds for LDKT of patients who have recovered from COVID-19, can now be better defined (Table 1).

Here, we attempt considering LDKT at 2 week period subsequent to a COVID-19 infection. We analysed data from multi-center (n = 11), retrospective, cohort of LDKT (n = 52) in recipients of acquired asymptomatic (n = 24) to mild SARS-CoV-2 infections (n = 28) within two weeks prior to surgery (detailed Methods are listed in Appendix 1). ABO incompatible LDKT was performed in 11.5% (n = 6) of recipients. The waiting time to surgery from the onset of symptoms/positive RT-PCR result for asymptomatic cases was 11 (10–12) days. All recipients and donors were asymptomatic with normal creatinine after surgery in the absence of major surgical or medical complications. Patient and graft survival was 100%, respectively, with acute cellular rejection being reported in 1.9% (n = 1) of recipients; serum creatinine was 1.2 mg/dl over at median follow-up of 10 months. The nadir serum creatinine was reached at the post-operative median (IQR) day of 4 (3–4) days. The median (IQR) duration from surgery to discharge was 9 (5–15) days.

With an open-ended survey, we identified four reasons for proceeding to transplant within two weeks of COVID-19: 1) Feeling safe with an improved knowledge of COVID-19 as recipients in addition to being vaccinated and having mild/no symptoms. 2) If the pandemic was to surge again, there may be further delay and cost of continuing dialysis may have a detrimental financial impact. 3) Most recipients had relocated their families to places in proximity to their respective transplant centers in preparation of the procedure, acknowledging the unevenly geographic distribution of transplant centers in India. 4) The perception of declining overall health while being on dialysis. A combination of financial, psychological, psychosocial, and medical factors motivated participants to undergo early transplant surgery.

Graft and patient survival rates were 100% with a median follow-up of 10 months, representing outcomes that are similar to those of a previous cohort of COVID-19-recovered LDKT performed after a 4 weeks interval.[2,3] Recipients in this cohort were younger in age compared to their counterparts in the western countries.[2,3,5] Of

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Characteristics	Overall (n = 52)
Demographics of recipients	
Age in years	38 (32.2–46)
Male sex	44 (84.6%)
Body mass index, kg/m^2	23 (21–25)
Blood group distribution: A, B, AB, O	16 (30.8%), 21 (40.3%), 3 (5.8%), 12 (23.1%)
Native kidney disease	
CKD of unknown etiology	11 (21.2%)
Chronic interstitial nephritis	2 (3.8%)
Chronic glomerulonephritis	14 (26.9%)
Lupus nephritis	2 (3.8%)
Focal segmental glomerulosclerosis	2 (3.8%)
Ig A nephropathy	6 (11.5%)
Obstructive uropathy	7 (13.5%)
Diabetic kidney disease	6 (11.5%)
Hypertensive nephropathy	2 (3.8%)
Access for dialysis	
Arterio-venous fistula	35 (68.6%)
Temporary dialysis uncuffed catheter	3 (5.8%)
Cuffed tunnelled catheter	11 (21.2%)
Pre-emptive transplantation	3 (5.8%)
Co-morbid conditions	
Diabetes, hypertension	12 (23.1%), 48 (92.3%)
Anti-SARS-CoV-2 vaccine status	
Single, two, three dose	7 (13.5%), 29 (55.8%), 16 (30.8%)
Laboratory parameters (pre-operative)	
Serum albumin, g/dl	3.4 (3.1–3.79)
Intact parathormone, pg/ml	135 (112–292.5)
Hemoglobulin, g/dl	8.9 (7.9–9.77)
Whole blood counts, in thousands	6.8 (5.45–10.12)
Neutrophils percentage	75.5 (69–80.5)
Lymphocyte percentage	19 (15.25–21)
Neutrophil lymphocyte ratio	4.05 (3.29–4.98)
Platelet counts, in lakhs	1.5 (1.24–1.83)
C- reactive protein, mg/L	5 (4.9–7.62)
Induction regimen	
Rabbit anti-human-thymocyte immunoglobulin (Thymoglobulin)	38 (73.07%)
Interleukin-2 receptor blocker (Simulect)	6 (11.5%)
No induction	5 (9.6%)
Anti-human-T-lymphocyte immunoglobulin (Grafalon)	3 (5.8%)
Cumulative symptoms of COVID-19 related illness	
Asymptomatic	24 (46.15%)
Febrile episode	18 (34.6%)
Expectoration	22 (42.3%)
Dyspnea	4 (7.7%)
Anosmia/Ageusia	1 (1.9%)
Gastro-intestinal symptoms	7 (13.5%)
Laboratory parameters during illness	
Hemoglobulin, g/dl	9.6 (8.02–10.65)
Total leucocyte count, × 10^3 mm^3	4.3 (3.7–6.25)
Neutrophil percentage	62.75 (58.9–74.1)
Lymphocyte percentage	25 (12–33.52)
Neutrophil lymphocyte ratio	2.35 (1.63–6.67)
C-reactive protein, mg/L	12 (6–16)

(Table 1 continues on next page)

Characteristics	Overall (n = 52)
(Continued from previous page)	
Chronology of COVID-19 & transplant course	
Days from onset of COVID-19 symptoms to first RT-PCR positive	1 (0–2)
Days from first RT-PCR positive to first negative	6 (5–7)
Cycle threshold value of RT-PCR	26 (16–28)
Days from RTP-CR first negative to surgery	3 (2–4)
Days from first symptom/detection of RT-PCR to surgery	11 (10–12)
Days from transplant surgery to hospital discharge	9 (7.25–10.75)
Nadir day of serum creatinine	4 (3–4)
Length of stay, days	9 (7.25–10.75)
Serum creatinine, mg/dl	
Nadir	1 (0.91–1.22)
Discharge	1.2 (1–1.41)
1-month	1.15 (1.07–1.26)
3-month	1.1 (1–1.33)
6-month	1.2 (1–1.47)
9-month	1.2 (1.1–1.49)

Abbreviations: RT-PCR: real time polymerase chain reaction test, Continuous data was reported as median (interquartile range). Categorical data are reported as numbers with percentage in bracket.

Table 1: **Summary of the baseline details and results of cohort.**

note, there were no reports of post-COVID-19 infections in the presence of a standard immunosuppression supporting that an adjustment of immunosuppression after a short-term interval post COVID infection is not necessary. Most of our patients had received 2 doses of the vaccine (n = 45, 86%). The median (IQR) waiting time from the last dose of vaccine to infection was 6 (5–10) months. A study with a larger sample size and a control group is required to provide more robust evidence for confirming a 2 week LDKT. Future studies will need to analyze if this approach can also be applied in patients who recovered after severely symptomatic COVID infections.

Contributors

All authors contributed equally to the design and implementation of the research, analysis of the results, writing of the manuscript, critical revision for important intellectual content, final approval of the version to be published, agreement to be accountable for all aspects of the work, and conceived the original and supervised the project.

Data sharing statement

Data will be available from the corresponding author upon reasonable request.

Ethics committee approval

The present study was approved by the Institute Ethics Committee (Ref no. ECRl143/Inst/GJ/20 13/RR-19). We abided by the declaration of Istanbul, the declaration of Helsinki, and good clinical practices.

Declaration of interests

We declare no competing interests.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lansea.2023.100254.

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