



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Letter to the Editor

Decision making – Should we perform kidney transplantation on a patient with a positive RT-PCR test for SARS-CoV-2?

Toma de decisiones - ¿Debería realizarse un trasplante de riñón a un paciente con una prueba RT-PCR positiva para SARS-CoV-2?

Dear Editor:

The COVID-19 pandemic brought new challenges to daily decision-making in Kidney Transplant (KT) Centers. Excluding infection with SARS-CoV-2 virus before patients undergo KT became a routine due to the significant prevalence of asymptomatic infection. According to the Centers for Disease Control and Prevention (CDC), people who recovered from COVID-19 may have prolonged detection of SARS-CoV-2 RNA, without being at risk of disease transmission. Studies have indicated that patients who were hospitalized and recovered may have detectable SARS-CoV-2 RNA in the upper respiratory tract up to 3 months after symptom onset.¹ In some cases, a KT was already performed after recovery but within this timeframe.² Although some cases of intermittent viral shedding have been described up to 4 months after COVID-19,³ most series report a median duration of positive test of around 30 days; intermittent shedding after 2 months of symptom onset remains unlikely.³⁻⁵ Reinfection risk seems to be low,^{6,7} although reinfection with new variants must be considered.

The role of immunosuppression in COVID-19 severity is not yet fully understood. An active acute infection is generally a contraindication to KT. In a Brazilian KT center, four patients were screened for SARS-CoV-2 infection before KT and a positive result came after surgery.⁸ None of these patients developed symptoms.

We present the case of a 35-year-old patient who was admitted at our unit for a second deceased-donor (DD) KT. She had chronic kidney disease of unknown etiology diagnosed in childhood and started hemodialysis in 2005. Her first KT complicated with sepsis, primary graft dysfunction and subsequent graft nephrectomy. She maintained good adherence to hemodialysis with no major complications.

In May 2021 – after 16 years under hemodialysis – she was selected for a second DD-KT, with whom she shared the same blood type and had only 2 Human Leucocyte Antigen incompatibilities (B and DR). She was already highly immunized – Panel of Reactive Antibodies (PRA) of 44% and virtual PRA based on single antigen specificities of 99.73%. No donor specific antibodies were detected.

On admission she was asymptomatic and there was no clinical, laboratorial or radiographic sign of infection. She presented no contraindication to KT. However, she tested positive for SARS-CoV-2 on a RT-PCR test (GeneXpert[®] Ct gene E 39,2, gene N 38,9). The patient's previous history revealed a mild COVID-19 disease four months before. She was unvaccinated due to this recent infection. Antibodies to SARS-CoV-2 virus were positive, consistent with previous infection – anti-nucleocapsid 78 U/ml and anti-Spike 97 U/ml.

After discussion between the KT team and both clinical pathology and infectious disease experts the RT-PCR test was considered a false-positive due to intermittent viral shedding and the patient was accepted for KT. High-risk immunosuppression protocol with thymoglobulin 1.25 mg/kg daily for 7 days, mycophenolate mofetil 2 g daily and high dose steroids were necessary due to her increased allosensitization. Mycophenolate mofetil dose was reduced due to cytopenias, no dose reduction was made to other immunosuppressants. Maintenance immunosuppression included tacrolimus, mycophenolate mofetil and prednisolone.

There were no signs of respiratory infection in the post-operative period. Subsequent RT-PCR tests for SARS-CoV-2 were performed at day 8, 13 and 18 after surgery and all came negative. Antibodies titers were not repeated subsequently. The patients has currently 9 months of KT.

The risks and benefits of KT in this case were thoroughly balanced. A false-positive result was suspected due to

recent infection and elevated number of PCR cycles needed to amplify viral RNA. In a young highly immunized patient under hemodialysis for 16 years it could take long before she was again selected for transplantation. However, fragile patient under immunosuppression and mild symptoms from previous COVID-19 could have been unable to build robust immune protection for a second infection with SARS-CoV-2 and the risks of inducing immunosuppression on a patient with active COVID-19 infection could be catastrophic.

High Ct values have been frequently associated with viral shedding conditions and when interpreted with caution and integrated with other clinical signs may help some decision making, as in the present case.⁹

Urgent liver transplantation has been performed in a patient with acute liver failure, a positive RT-PCR test for SARS-CoV-2 but no respiratory symptoms.¹⁰

To our present knowledge, there is no report of a KT team deciding to perform kidney transplantation on a patient knowing he has positive RT-PCR test for SARS-CoV-2 more than 3 months after diagnosis of COVID-19. This is also the first KT on a patient with positive RT-PCR test for SARS-CoV-2 in a Portuguese transplant center.

As the number of hemodialysis patients recovering from COVID-19 grows, it is expected that this situation repeats. Kidney transplant teams should have quick access to infectious disease experts who would guide the interpretation of these screening tests in the future and help the decision to admit patients for transplant and immunosuppression.

Conflict of interest

There is no conflict of interest among all authors of this letter.

REFERENCES

1. CDC. Coronavirus Disease 2019 (COVID-19). Centers for Disease Control and Prevention; 2020 www.cdc.gov/coronavirus/2019-ncov/hcp/duration-isolation.html
2. Murad H, Dubberke E, Mattu M, Parikh B, Wellen J, Alhamad T. Repeat SARS-CoV-2 testing after recovery. Is a pretransplant PCR necessary? *Am J Transpl.* 2021;21:3206–7, <http://dx.doi.org/10.1111/ajt.16506> [accessed 26.02.22].
3. Danzetta ML, Amato L, Cito F, Di Giuseppe A, Morelli D, Savini G, et al. SARS-CoV-2 RNA persistence in naso-pharyngeal swabs. *Microorganisms.* 2020;8:1124, <http://dx.doi.org/10.3390/microorganisms8081124>.
4. Tuan J, Spichler-Moffarah A, Ogbuagu O. A new positive SARS-CoV-2 test months after severe COVID-19 illness: reinfection or intermittent viral shedding? *BMJ Case Rep.* 2021;14:e240531, <http://dx.doi.org/10.1136/bcr-2020-240531>.
5. Sun J, Xiao J, Sun R, Tang X, Liang C, Lin H, et al. Prolonged persistence of SARS-CoV-2 RNA in body fluids. *Emerg Infect Dis.* 2020;26, <http://dx.doi.org/10.3201/eid2608.201097>. www.ncbi.nlm.nih.gov/pmc/articles/PMC741097/
6. Hansen CH, Michlmayr D, Gubbels SM, Mølbak K, Ethelberg S. Assessment of protection against reinfection with SARS-CoV-2 among 4 million PCR-tested individuals in Denmark in 2020: a population-level observational study. *Lancet.* 2021;397:1204–12, [http://dx.doi.org/10.1016/s0140-6736\(21\)00575-4](http://dx.doi.org/10.1016/s0140-6736(21)00575-4).
7. Sheehan MM, Reddy AJ, Rothberg MB. Reinfection rates among patients who previously tested positive for COVID-19: a retrospective cohort study. *Clin Infect Dis.* 2021, <http://dx.doi.org/10.1093/cid/ciab234>.
8. Viana LA, Cristelli MP, Ficher KN, Rezende JT, Villanueva LAA, Santos DWCL, et al. Kidney transplantation in patients with SARS-CoV-2 infection: a case series report. *Transplantation.* 2020;105:e1–3, <http://dx.doi.org/10.1097/tp.0000000000003521> [accessed 26.02.22].
9. Bullard J, Dust K, Funk D, Strong JE, Alexander D, Garnett L, et al. Predicting infectious SARS-CoV-2 from diagnostic samples. *Clin Infect Dis.* 2020, <http://dx.doi.org/10.1093/cid/ciaa638> [accessed 06.06.20].
10. Roupheal C, D'Amico G, Ricci K, Cywinski J, Miranda C, Koval C, et al. Successful orthotopic liver transplantation in a patient with a positive SARS-CoV-2 test and acute liver failure secondary to acetaminophen overdose. *Am J Transpl.* 2020;21:1312–6, <http://dx.doi.org/10.1111/ajt.16330>.

Diogo Francisco^{a,*}, Gonçalo Ávila^a, Cristina Jorge^a, Kamal Mansinho^b, Cristina Toscano^c, André Weigert^a

^a Serviço de Nefrologia do Hospital de Santa Cruz, Portugal

^b Serviço de Infeciologia do Hospital Egas Moniz, Portugal

^c Laboratório de Microbiologia Clínica e Biologia Molecular do Hospital Egas Moniz, Portugal

* Corresponding author.

E-mail address: diogofrbfrancisco@gmail.com (D. Francisco)

0211-6995/© 2022 Sociedad Española de Nefrología. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.nefro.2022.04.007>