play a pivotal role in advocating for immigration reform, are warranted (6).

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Findings

Organ Transplant Recipients Show Lasting Immunity after COVID-19

Solid-organ transplant recipients can maintain peripheral immunity for up to 6 months after SARS-CoV-2 infection—especially with greater clinical severity—reports a pre-proof paper in *Kidney International*.

The researchers evaluated serologic and functional T-cell and B-cell immune memory against major immunogenic SARS-CoV-2 antigens. The cross-sectional study included two groups of COVID-19 convalescent patients: 53 solid-organ transplant recipients (38 kidney recipients) and 49 immunocompetent patients.

In both groups, patients were classified as having severe COVID-19, requiring hospitalization and supplemental oxygen; mild COVID-19, not requiring hospitalization; or asymptomatic infection. Immunologic assessments included SARS-CoV-2-specific serologic memory and immunoglobulin G (IgG)-producing memory B cells and SARS-CoV-2-reactive cytokine-producing memory T cells.

At a median follow-up of 199 days, memory responses in different immune compartments were similar for organ transplant recipients and immunocompetent patients. However, responses varied by COVID-19 severity: seroconversion rates for IgG antibodies to spike protein were 97.6% for patients with severe COVID-19, 80.5% for those with mild disease, and 42.1% for those with asymptomatic infection. For nucleoprotein antibodies, seroconversion rates were 92.7%, 75.6%, and 47.4%, respectively.

Similar ranges were found for IgG-producing memory B cells: severe infection, 84.0%; mild infection, 75.0%; and asymptomatic infection, 35.7%; for interferon-γ-producing T cells: 82.5%, 86.9%, and 31.6%, respectively. Regardless of COVID-19 severity, patients with longer times since solid-organ transplantation were more likely to have detectable long-lasting immune memory.

The study provides new data on long-term adaptive immune memory after SARS-CoV-2 infection in solid-organ transplant recipients. The findings show "robust humoral and cellular immune memory" lasting beyond 6 months, similar to that seen in immunocompetent patients.

Responses are driven mainly by the clinical severity of COVID-19, perhaps reflecting the level of viral antigen exposure. The researchers add, "[L]ong-lasting adaptive immunity seems to be challenged to some extent by chronic immunosuppression, especially among those more recently transplanted" [Favà A, et al. A comprehensive assessment of long-term SARS-CoV-2-specific adaptive immune memory in convalescent COVID-19 solid organ transplant recipients. *Kidney Int,* published online ahead of print February 3, 2022. doi: 10.1016/j.kint.2021.12.029; https://www.kidney-international.org/article/S0085-2538(22)00029-1/fulltext].

RAASi Discontinuation for Hyperkalemia May Increase Adverse Outcomes

For patients with chronic kidney disease (CKD), discontinuing renin-angiotensin-aldosterone system inhibitors (RAASi) during episodes of hyperkalemia is associated with increased mortality and cardiovascular events, reports a pre-proof paper in the *American Journal of Kidney Diseases*.

The retrospective study included data on adult CKD patients with new episodes of RAASi-related hyperkalemia with a serum potassium level 5.5 mM or higher. Drawn from Canadian provincial databases, the analysis included 7200 patients in Manitoba and 71,290 patients in Ontario. The mean ages were 72.39 and 79.48 years, respectively. Several types of comorbidity were more frequent in the Manitoba cohort.

In response to hyperkalemia, RAASi therapy was discontinued in 35.08% of patients in the Manitoba cohort versus 14.0% in the Ontario cohort. On Cox proportional hazards analysis, RAASi discontinuation was associated with increased all-cause mortality: hazard ratio (HR) 1.32 in Manitoba and 1.47 in Ontario. Discontinuation was also linked to higher cardiovascular mortality: HR 1.28 in Manitoba and 1.32 in Ontario.

Associations were also noted for fatal and nonfatal cardiovascular events: HR 1.17 in Manitoba and 1.18 in Ontario. An association between RAASi discontinuation and risk of dialysis initiation was significant in the Ontario cohort: HR 1.11. Use of a submaximal RAASi dose was also associated with increased all-cause mortality compared with a maximal dose: HR 1.24 in Manitoba and 1.11 in Ontario.

Although RAASi are recommended as first-line therapy for CKD, they are also associated with increased risk of hyperkalemia. There is no accepted standard of care for chronic hyperkalemia in CKD patients. As shown by these Canadian data, RAASi discontinuation or dose reduction is a common strategy.

The study shows that among CKD patients with hyperkalemia, RAASi discontinuation is associated with increased all-cause mortality and cardiovascular events. "Newer medications for the treatment of hyperkalemia may enable patients to continue their RAASi after an episode of hyperkalemia," the investigators conclude [Leon SJ, et al. Hyperkalemia-related discontinuation of renin-angiotensin-aldosterone system inhibitors and clinical outcomes in CKD: A population-based cohort study. *Am J Kidney Dis*, published online ahead of print January 24, 2022. doi: 10.1053/j.ajkd.2022.01.002; https://www.ajkd.org/article/S0272-6386(22)00034-8/fulltext].

KFRE Is Superior to eGFR Alone for ESKD Risk Prediction

The four-variable kidney failure risk equation (KFRE) is a better predictor of end stage kidney disease (ESKD) risk compared with the estimated glomerular filtration rate (eGFR) alone, with or without adjustment for race, reports a study in the *Annals of Internal Medicine*.

The researchers used data from the Chronic Renal Insufficiency Cohort to evaluate different eGFR equations for prediction of ESKD, defined as dialysis initiation or transplantation. The analysis included data on 3873 participants with chronic kidney disease (CKD), with a total of 13,902 2-year risk periods.

For each participant, eGFR was calculated using the CKD Epidemiology Collaboration (CKD-EPI) equation, based on serum creatinine and cystatin C, with or without adjustment for race.

A 2-year risk of ESKD was estimated using the validated KFRE, which includes age, sex, eGFR, and urinary albumin-creatinine ratio. The old and new eGFR equations, alone and as part of the KFRE, were evaluated as predictors of ESKD risk.

At up to 15 years' follow-up, 856 participants developed ESKD. With or without race-adjusted eGFR, the KFRE was superior in predicting ESKD risk: area under the curve ranged from 0.945 to 0.954 compared with 0.900 to 0.927 with eGFR alone. Although the KFRE had a similar predictive performance with different eGFR equations, the creatinine equation without race adjustment had better calibration among participants of Black race.

A KFRE score greater than 20% had 94%–97% specificity in predicting 2-year ESKD risk, similar to the 95%–98% range with eGFR less than 20 mL/min/1.73 m^2. However, KFRE over 20% had higher specificity: 68%–78% compared with 42%–66% with eGFR under 20 mL/min/1.73 m^2. Prediction was consistently better with KFRE, regardless of the eGFR estimating equation used.

Previous eGFR equations included adjustment for race, reflecting evidence that individuals of Black race have higher average serum creatinine. Newer equations have removed adjustment for race, but the impact on ESKD risk prediction remains unclear. Because the KFRE includes more information than eGFR alone, it may improve risk prediction and clinical decision-making.

The new analysis finds that KFRE scores are a better predictor of 2-year ESKD risk compared with eGFR alone. "[A] KFRE score greater than 20% could be used for preparing for kidney replacement therapy," the researchers write [Bundy JD, et al. Prediction of end-stage kidney disease using estimated glomerular filtration rate with and without race: A prospective cohort study. *Ann Intern Med*, published online ahead of print January 11, 2022. doi: 10.7326/M21-2928; https://www.acpjournals.org/doi/10.7326/M21-2928].