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Brief Communication
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Immunogenicity of SARS-CoV-2 Vaccine in Kidney Transplant Recipients: A Cross-Sectional Study in Korea

Seung Hwan Song,[1] **Ku Yong Chung**,[1] **Yongho Jee**,[2] **Hae-Sun Chung**,[3] **Kina Kim**,[4] **Dohsik Minn**,[4] **and Soo-Kyung Kim** [3]

[1]Department of Surgery, Ewha Womans University College of Medicine, Seoul, Korea
[2]Advanced Biomedical Research Institute, Ewha Womans University Seoul Hospital, Seoul, Korea
[3]Department of Laboratory Medicine, Ewha Womans University College of Medicine, Seoul, Korea
[4]Department of Diagnostic Immunology, Seegene Medical Foundation, Seoul, Korea

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Address for Correspondence:
Soo-Kyung Kim, MD, PhD
Department of Laboratory Medicine, Ewha Womans University College of Medicine, 1071 Anyangcheon-ro, Yangcheon-gu, Seoul 07985, Korea.
Email: skkim1@ewha.ac.kr

ORCID iDs
Seung Hwan Song
https://orcid.org/0000-0003-3247-3817
Ku Yong Chung
https://orcid.org/0000-0001-7836-2325
Yongho Jee
https://orcid.org/0000-0003-0365-8302
Hae-Sun Chung
https://orcid.org/0000-0001-6382-4099
Kina Kim
https://orcid.org/0000-0002-9496-5940
Dohsik Minn
https://orcid.org/0000-0002-5794-9714
Soo-Kyung Kim
https://orcid.org/0000-0001-9406-8628

ABSTRACT

Eighty-five Korean kidney transplant recipients who received three doses of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccine were tested with anti-receptor binding domain (RBD) antibody and neutralizing antibody. High anti-RBD antibody (≥ 100 U/mL) and neutralizing antibody responses (≥ 30%) were detected in 51/85 (60.0%) patients. When we divided the patients with the time from transplantation to vaccination (< 1, 1–2.4, 2.5–4.9, and ≥ 5-year), anti-RBD antibody titers were 3.2 U/mL, 27.8 U/mL, 370.2 U/mL, and 5,094.2 U/mL (P < 0.001) and anti-neutralizing antibody levels were 2.2%, 11.6%, 45.6%, and 93.0% (P < 0.001), respectively. Multivariate analysis revealed increased antibody responses when the time from transplantation to vaccination was five years or longer (odds ratio, 12.0; confidence interval, 2.7–52.8). Korean kidney transplant recipients had suboptimal antibody responses after the third dose of SARS-CoV-2 vaccine. A shorter time from transplantation to vaccination was a risk factor for a low antibody response.

Keywords: COVID-19; Kidney Transplantation; SARS-CoV-2; Vaccine

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) antibody responses after the vaccination of kidney transplant recipients are significantly lower than in the normal population. Healthy individuals reach a seroconversion rate of over 99% after the second dose of SARS-CoV-2 vaccination, whereas kidney transplant recipients' seroconversion rate was reported to be 17–58% after a second dose, and 55–69% after a third dose.[1-4] In addition, transplant recipients have a poor prognosis following SARS-CoV-2 infection. Solid organ transplant recipients have a 30% or greater risk of ventilation or death when infected with SARS-CoV-2 compared to a transplant naïve population, with a hospital admission rate over 50–80% and intensive care unit admission rate of 30%.[5-8]

Although immunocompromised patients comprise a small proportion of the general population, they account for more than 40% of hospitalized breakthrough cases,[9] with prolonged shedding of the virus resulting in persistent unintended exposure to others, as well as a potential source of new viral mutations.[10,11] Therefore, antibody responses in transplant