

# Durability of Humoral and Cellular Immunity after an Extended Primary Series with Heterologous Inactivated SARS-CoV-2 Prime-Boost and ChAdOx1 nCoV-19 in Dialysis Patients

Sarinya Boongird<sup>1</sup>, Chavachol Setthaudom<sup>2</sup>, Rungthiwa Kitpermkiat<sup>1</sup>, Somsak Prasongtanakij<sup>3</sup>, Supanart Srisala<sup>3</sup>, Piyatida Chuengsamarn<sup>4</sup>, Arkom Nongnuch<sup>1</sup>, Montira Assanatham<sup>1</sup>, Sasisopin Kiertiburanakul<sup>5</sup>, Kumthorn Malathum<sup>5</sup>, Angsana Phuphuakrat<sup>5</sup>, Jackrapong Bruminhent<sup>\*5</sup>

<sup>1</sup>Division of Nephrology, Department of Medicine, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

<sup>2</sup>Immunology Laboratory, Department of Pathology, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

<sup>3</sup>Office of Research, Academic Affairs and Innovation, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

<sup>4</sup>Banphaeo-Charoenkrung Peritoneal Dialysis Center, Banphaeo Dialysis Group, Banphaeo Hospital, Bangkok, Thailand

<sup>5</sup>Division of Infectious Diseases, Department of Medicine, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

## Abstract

**Background:** The durability of a three-dose extended primary series of COVID-9 vaccine in dialysis patients remains unknown.

**Methods:** We prospectively assessed dynamic changes in SARS-CoV-2-specific humoral and cell-mediated immunity at baseline, 3 months, and 6 months after the extended primary series in 29 hemodialyzed (HD) and 28 peritoneal dialyzed (PD) patients and 14 healthy controls. Participants received two doses of inactivated SARS-CoV-2 vaccine followed by a dose of ChAdOx1 nCoV-19 vaccine, 4 weeks apart. Predictors of loss of humoral seroprotection against SARS-CoV-2 alpha variant (anti-spike receptor binding domain [anti-RBD] IgG titers of <506 BAU/ml) at 3 months were identified.

**Corresponding author:** Sarinya Boongird

**Email:** boongird@gmail.com

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**Results:** At 3 months, 59% of HD patients and 32% of PD patients were seroprotected. At 6 months, median anti-RBD IgG titers (IQR) significantly declined from baseline in the HD [1741 (1136–3083) BAU/ml vs. 373 (188–607) BAU/ml] and PD [1093 (617–1911) BAU/ml vs. 180 (126–320) BAU/ml] groups, as did the mean percent inhibition of neutralizing antibodies (HD: 96% vs. 81%; PD: 95% vs. 73%) (all  $P < 0.01$ ). Age and post-vaccination serological response intensity were predictors of early humoral seroprotection loss. In contrast, cell-mediated immunity remained unchanged at 6 months.

**Conclusions:** Humoral immunity declined substantially in dialysis patients, while cell-mediated immunity remained stable 6 months after the extended heterologous primary series of two inactivated SARS-CoV-2/ChAdOx1 nCoV-19 vaccine. A booster dose could be considered in dialysis patients 3 months after this unique regimen, particularly in the elderly or those with a modest initial humoral response.

**Keywords:** COVID-19; dialysis; vaccine; immune; inactivated SARS-CoV-2 vaccine; neutralizing antibody; SARS-CoV-2; viral vector vaccine

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