中文題目：新冠肺炎疫苗追加劑對於罹患新冠肺炎感染且接受莫納皮拉韋治療之血液透析患者的臨床效益

英文題目：Clinical efficacy of SARS-CoV-2 vaccine booster among hemodialysis patients with COVID-19 receiving Molnupiravir

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Background:

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) vaccine booster is one of the most essential strategies against coronavirus disease 2019 (COVID-19) in the era of emerging variants. Despite the well documented efficacy in the general population, the role of SARS-CoV-2 vaccine booster has less been investigated in the hemodialysis (HD) patients, especially in those with COVID-19 receiving oral antiviral agents. In this multicenter retrospective study, we evaluated the efficacy of SARS-CoV-2 vaccine booster among HD patients with COVID-19 receiving Molnupiravir treatment.

Method:

We recruited adult HD patients ($\geq$ 20 years of age) who had first-ever confirmed COVID-19 with initially mild illness or asymptomatic status and received Molnupiravir treatment in the Kaohsiung Chang Gung Memorial Hospital and Kaohsiung Municipal Feng-Shan Hospital between May 2022 and August 2022. The study population was classified according to the vaccination status to compare baseline characteristics, initial presentations and COVID-19-associated composite events between groups. The composite event was defined as COVID-19-related acute care visit, hospitalization or mortality within 30 days after disease onset. Categorical variables are presented as numbers (n) with percentages and were analyzed using Fisher's exact test. Continuous variables are presented as medians with interquartile ranges (IQRs), and the Mann–Whitney U test was performed for univariate analysis. Multivariate Cox regression analysis was utilized to assess the efficacy of SARS-CoV-2 vaccine booster in reducing composite events in the study population, adjusting for age, sex, body mass index, diabetes, hypertension, vascular disease, heart failure, interval between disease onset to Molnupiravir initiation, and covariates with a p-value of < 0.1 in univariate analyses.

Results:

In this investigation, 202 HD patients were enrolled for analysis. The median age of the cohort was 66 years (IQR, 61－72), and women accounted for 58.91% of the enrolled patients. In the study population, there were 137 (67.82%) and 18 (8.91%) patients receiving the third (i.e., first booster) and fourth (i.e.,

second booster) doses of SARS-CoV-2 vaccine at least 14 days before COVID-19 onset, respectively. On the other hand, 8 (3.96%) and 17 (8.42%) patients received only one dose and two doses of vaccination, respectively, and 22 (10.89%) patients were unvaccinated. The initial presentations were similar between HD patients with different vaccination status. Compared to those unvaccinated or not receiving vaccine booster, there were significantly fewer composite events in the HD patients receiving at least one vaccine booster (unvaccinated vs. one-dose/two-dose vs. three-dose/four-dose, 27.27% vs. 28.00% vs. 3.87%, p < 0.001). The 30-day mortality events (n = 2) all occurred in the unvaccinated HD patients. In the multivariate Cox regression analysis, vaccination ≥ 3 doses was associated with a markedly decreased risk of composite event, with an adjusted hazard ratio (HR) of 0.167 (95% confidence interval (CI), 0.050-0.560, p = 0.004). In addition, use of immunosuppressants and lower serum albumin were independent predictors of the occurrence of composite events (HR (95% CI), 11.408 (2.523−51.581), p = 0.002; 0.182 (0.036−0.924) per g/dL increase of albumin, p = 0.040).

Conclusion:
SARS-CoV-2 vaccine booster improves the clinical outcomes of COVID-19 in HD patients, even in those with initially mild illness or asymptomatic status and receiving Molnupiravir treatment. Additionally, use of immunosuppressants and lower serum albumin are associated with worse clinical outcomes of COVID-19 in this population.