Letter to the Editor

Prognostic Factors for Mortality in Maintenance Hemodialysis Patients Infected with SARS-CoV-2

To the Editor:

I read with great interest the article by Yamada et al.[1], "Prognostic Factors for Mortality in Maintenance Hemodialysis Patients Infected with SARS-CoV-2" (J Nippon Med Sch. 2024; 91: 520–6). As an infectious disease specialist, I commend the authors for exploring clinical outcomes in maintenance hemodialysis patients, who are particularly vulnerable to COVID-19. Identifying prognostic factors in this population is essential for improving care strategies and minimizing mortality.

In their retrospective study of 36 hospitalized patients undergoing maintenance hemodialysis, the authors found that advanced age and the requirement for continuous hemodiafiltration (CHDF) were significantly associated with in-hospital mortality[1]. In contrast, COVID-19 severity, steroid use, and elevated serum lactate dehydrogenase (LDH) levels on admission were predictive of CHDF initiation. Notably, a higher number of COVID-19 vaccine doses was associated with a lower risk of requiring CHDF[1]. These findings provide valuable insights into clinical risk assessment and raise several important considerations regarding vaccination and intensive care decision-making for dialysis patients.

One key observation was the inverse association between vaccine dose count and the need for CHDF. This finding reinforces the protective effect of COVID-19 vaccination, even in immunocompromised individuals such as dialysis patients. For instance, during the Omicron wave in Italy, unvaccinated dialysis patients had more than a threefold increased risk of mortality compared to vaccinated patients[2]. They also experienced higher rates of infection and hospitalization. Although dialysis patients tend to have reduced immunogenicity in response to vaccines, with lower antibody titers and weaker seroconversion rates compared to healthy individuals[3], vaccination still offers meaningful clinical benefits. Yamada et al.'s data[1] support this notion: each additional vaccine dose corresponded with a lower likelihood of requiring CHDF. This highlights the importance of ensuring timely and complete vaccination among dialysis patients. The study also reflects the temporal dynamic of vaccine availability—early enrollees likely had fewer vaccine doses than those infected in later stages of the pandemic, possibly influencing outcomes[1]. Still, the overall trend remains clear: vaccination reduces the risk of progression to severe disease in this high-risk group.

Another important contribution of the study is its identification of LDH as a predictive marker for CHDF initiation. LDH is a nonspecific enzyme elevated in tissue damage and hypoxia, and it has been linked to COVID-19 severity and mortality in general populations[4]. In the present study, patients with elevated LDH levels at admission were more likely to require CHDF[1]. This finding is clinically useful: measuring LDH upon hospital admission can help flag patients at risk for deterioration and facilitate early intervention, such as closer monitoring or preparation for intensive care support. While LDH proved significant, traditional inflammatory markers like C-reactive protein (CRP) and D-dimer did not correlate with CHDF initiation or mortality in this cohort[1]. This is in contrast to several reports in non-dialysis patients, where these markers predicted disease severity[5]. The discrepancy may reflect the distinct baseline physiology of end-stage renal disease, where CRP and D-dimer levels are often elevated chronically, limiting their specificity in the acute setting. By contrast, LDH may better capture acute-phase injury and emerging multiorgan stress in dialysis patients with COVID-19.

From a clinical standpoint, this study emphasizes three core implications. First, COVID-19 vaccination remains a cornerstone of mortality prevention in dialysis patients. Despite attenuated vaccine responsiveness[3], each additional dose appears to

reduce risk. This supports not only ensuring initial vaccination but also timely boosters. Dialysis units should maintain high vaccine coverage and consider personalized schedules based on waning immunity or patient comorbidities. Second, LDH serves as a simple, accessible marker for triaging patients. Hospitals may consider including LDH thresholds in admission protocols for COVID-19-positive dialysis patients. Elevated LDH might indicate the need for ICU-level care or early CHDF consideration, especially when interpreted alongside oxygen saturation and radiologic findings. Third, the cohort was relatively small (n=36) and spanned nearly four years during which treatment strategies and viral variants evolved. Despite these factors, the associations between vaccination, LDH, and CHDF remained consistent, underscoring their clinical relevance.

In conclusion, Yamada et al.[1] offer a timely contribution to the understanding of COVID-19 outcomes in dialysis patients. Their work confirms the protective role of vaccination and highlights LDH as a potentially valuable marker for anticipating deterioration. These insights can help guide triage, monitoring, and intervention strategies in a population that remains at elevated risk. Continued research with larger, multicenter cohorts will be essential to validate and expand upon these findings.

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