

## LETTER TO THE EDITOR

# Antibody titers against SARS-CoV-2 spike protein 6 months after a third BNT162b2 vaccine in chronic hemodialysis patients

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SARS-CoV-2 disease is associated with higher morbidity and mortality in patients on maintenance hemodialysis. The magnitude and the quality of humoral responses against SARS-CoV-2 have been associated with clinical outcome. Patients on dialysis tend to have a reduced immune response to infection or vaccination [1]. To date, few reports exploring immune response several months following Covid-19 mRNA 3 vaccine doses in chronic hemodialysis patients have been published [2].

We have vaccinated our patients with three doses as recommended by the French authorities for patients on renal replacement therapy [3]. Therefore, 108 patients on maintenance hemodialysis received three doses of BNT162b2 (Comirnaty® from Pfizer/BioNTech). The first two doses were injected at a 3-week interval as advised by the manufacturer; the third dose was injected at least 4 weeks after the second dose.

Serum samples from all patients currently treated in our center ( $n = 101$ ) were obtained 6 months following their third dose.

Detection and quantitation of SARS-CoV-2 anti-spike antibodies were performed by using the SARS-CoV-2 IgG II Quant assay on an I2000SR analyzer (Abbott Laboratories, Abbott Park, IL, USA). The antibody results of studied sera were evaluated as arbitrary unit/mL (AU/mL). The antibody concentrations obtained in AU/mL were multiplied by the correlation coefficient of 0.142 and converted to the 'binding antibody unit (BAU/mL)' in the WHO's International Standard for anti-SARS-CoV-2 immunoglobulin [4]. Accordingly, 50 AU/mL or 7.1 BAU/mL and above concentrations were considered positive.

Although, the overall seropositivity rate 6 months after the third dose was 90% (91 of 101 patients), only 25 patients (24.7%)

had immunoglobulin G (IgG) level  $>264$  BAU/mL, which is currently considered protective against Covid-19 [5]. It should be noted that the levels of IgG were significantly high in patients who were previously infected with Covid-19 prior to vaccination (Table 1).

In univariate analysis, we did not observe any correlation between antibody titers and age, sex, body mass index, the presence of diabetes mellitus, dialysis vintage, transplantation candidacy status, serum albumin levels, hemoglobin level, ferritin concentration, transferrin saturation, serum 25-hydroxyvitamin D level or lymphocyte count. However, we did find a weak positive correlation between IgG levels and Kt/V ( $r = 0.33$ ,  $P = .0019$ ).

Nevertheless, in multivariate regression model using antibody titers as dependent variable and the all previously mentioned independent variables, no correlation was observed. This might be due to the relatively small number of patients in this study.

In conclusion, 6 months after their third BNT162b2 vaccination, 75.3% of our hemodialysis patients demonstrated lower antibody titers than the established protective level.

At the time of the present report, and according to information currently available, we advised a fourth dose for patients with IgG level  $<264$  BAU/mL. However, the best way to prescribe a booster dose, the timing and the frequency of monitoring of IgG levels in dialysis patients need to be clarified. We hope that the data reported here may help in defining the future strategy for chronic hemodialysis patients.

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Table 1. Characteristics of patients and results

N	101
Age, year	72.1 ± 12.4
Sex, women, n (%)	39 (38.6)
BMI, kg/m <sup>2</sup>	27.8 ± 6.5
Diabetes mellitus, n (%)	32 (31.6)
Dialysis vintage, month	73 ± 98
Kt/V	1.37 ± 0.34
Transplantation candidate (%)	25 (24.7)
Lymphocyte count, 10 e <sup>3</sup> /μL	1.1 ± 0.48
Serum albumin, g/L	35.6 ± 4.5
Hemoglobin, g/dL	11.1 ± 1.2
Ferritin concentration, ng/mL	396 ± 262
Transferrin saturation, %	27.3 ± 14.3
Serum 25-hydroxyvitamin D, μg/L	34.5 ± 13.5
IgG antispikes in all patients, BAU/mL	539 ± 1220
IgG antispikes in patients without previous Covid infection (n = 95), BAU/mL	421 ± 1040
IgG antispikes in patients with previous Covid infection (n = 6), BAU/mL	3345 ± 1947
Number (%) of patients with IgG > 264 BAU/mL	25 (24.7)
Number (%) of seronegative patients	10 (9.9)

## CONFLICT OF INTEREST STATEMENT

None declared.

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