

**Background and Aims:** We aimed to compare the dynamics of humoral and cellular immunity caused by natural COVID-19 or vaccination against of SARS-CoV-2 with Gam-COVID-Vac (Sputnik V) vaccine in patients, receiving maintenance hemodialysis (HD).

**Method:** Data were extracted from two prospective cohort studies which had investigated the long-term immune responses after SARS-CoV-2 infection (NCT 04633915) or vaccination (NCT 04805632) in patients receiving HD compared with those in healthy individuals. The group of patients after natural COVID-19 (n = 24) had confirmed history of disease, nobody of them received vaccination before and during the study period. Levels of specific IgG and T-cells were quantified in them at 2.5 and 6 months from disease onset. The group of vaccinated patients (n = 23) had been vaccinated twice with Gam-COVID-Vac vaccine and had no prior history of confirmed COVID-19. Levels of anti-SARS-CoV-2-specific IgG and T-cells were quantified at 1 month and 6 months from the second vaccine shot. IgG levels were determined using a semi-quantitative ELISA (Euroimmun, Germany) and converted to Binding Antibody Units (BAU/ml) according to the WHO International Standard. Specific T-cell responses (CD4+ and CD8+ cytotoxic T-lymphocytes) were evaluated using the TIGRA-test® (Generium, Russia). Only spike-specific T-spots were used for the analyses.

**Results:** Seropositivity rate declined over the course of the study among vaccinated patients (from 91% to 51%), however, all patients after natural COVID-19 remained seropositive over the study period. Thus, seropositivity rate at 6 months was greater in disease group: RR = 1.91 [95%CI: 1.4–3.1] (reciprocal of RR = 0.52 [95% CI: 0.32–0.72]), P = 0.0004. In both groups, IgG levels decreased over time, but antibodies disappeared more rapidly in vaccinated HD patients (analysis of variance p = 0.0374 for the “time × group” interaction) – Figure 1 (left). T-test reached positivity in 73% of vaccinated patients and 93% of patients after natural COVID-19 at the first timepoint. At the end of the study, T-test remained positive in 67% and 91% of the patients in both groups, respectively. Risk of T-test positivity rate at 6 months did not differ between groups (P = 0.133). T-spot counts remained stable over time in vaccinated patients, while tended to increase in patients after COVID-19 to the end of the follow-up. Differences in dynamics in these two groups were statistically significant (analysis of variance p = 0.0293 for the “time × group” interaction) – Fig.1 (right).

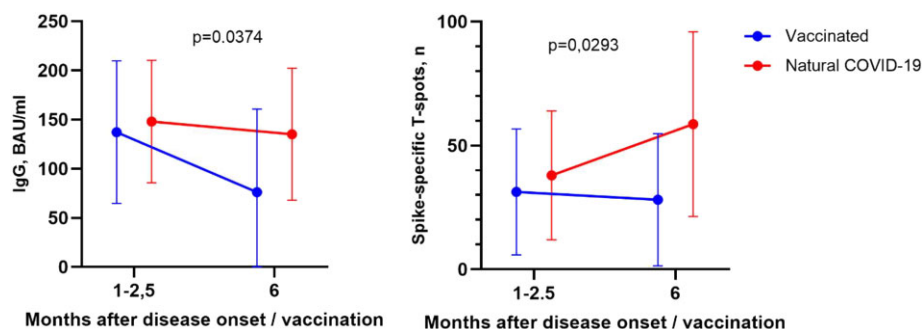
**Conclusion:** Patients receiving HD maintain more sustainable humoral immune responses after natural COVID-19 disease than after complete vaccination with Gam-COVID-Vac vaccine. Specific SARS-CoV-2 IgG antibodies declines faster in vaccinated patients than in patients after COVID-19 over 6-month period. Cellular immunity remains stable in both groups increasing by the 6-months period among those who had natural COVID-19.

## #4938

### PATIENTS RECEIVING HEMODIALYSIS MAINTAIN STRONGER SARS-COV-2 IMMUNITY AFTER DISEASE RATHER THAN VACCINATION

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**Figure 1:** Kinetics of SARS-CoV-2 IgG S1/S2 antibodies (left) and T-spot responses to SARS-CoV-2 structural peptides S (right) after diagnosis of COVID-19 or vaccination with Gam-COVID-Vac in patients receiving maintenance hemodialysis.