MO169

THREE DOSES OF SARS–COV–2 BNT162B2 MRNA VACCINE RESULTS IN AN ENHANCED IMMUNOLOGIC B- AND T-CELL RESPONSE IN HAEMODIALYSIS PATIENTS

Jan Melin[1], Maria Eriksson Svensson[1], Bo Albinsson[2], Ola Winqvist[3] and Karlis Pauksens[4]

[1]Department of Medical Sciences, Renal Medicine, Uppsala University, Uppsala, Sweden, [2]Department of Medical Biochemistry and Microbiology, Zoonosis Science Centre, Uppsala University, Uppsala, Sweden, [3]Department of Clinical Immunology, Karolinska University Hospital, Solna, Sweden, and [4]Department of Medical Sciences, Infectious Medicine, Uppsala University, Uppsala, Sweden

BACKGROUND AND AIMS: The immune system is affected by uremia. Haemodialysis (HD) patients have an increased risk of acquiring infections due to many healthcare contacts and have a suboptimal response to vaccination and a high mortality from COVID-19 infection. Accumulating data indicate that two doses of vaccines are not enough, and most HD-patients have now received a third dose. The aim of the study was to describe the antibody and T-cell response to three doses of SARS–CoV–2 BNT162b2 mRNA vaccination and change over time.
METHOD: Initially, 50 patients (mean age 69.4 years and 62% men) with end-stage kidney disease (ESKD) and haemodialysis treatment, at the dialysis outpatient clinic, Uppsala Academic Hospital, Sweden were enrolled into the study. Administration of SARS–CoV–2 BNT162b2 mRNA vaccine began on 28 Decemeber 2020. In September 2021, the patients received their third vaccine dose. During the study four patients died, four received a kidney transplant and two did not receive the third vaccine dose. A total of 41 (82%) patients received three doses of vaccine and were followed up until 3 months after the third dose. The antibody response was measured at four timepoints; 7–15 weeks and 6–8 months after the second dose, 3 weeks and 3 months after the third dose, and the T-cell response at three timepoints; 7–15 weeks after the second dose, 3 weeks and 3 months after the third dose. SARS-CoV-2 IgG antibody test (Abbott Architect) was performed against Spike antigen (anti-S) positive both after COVID-19 infection and vaccination (quantitative method used in routine diagnostics at Laboratory of Clinical Microbiology, Uppsala) and T-cell reactivity testing against the Spike protein using ELISPOT technology measuring interferon-gamma activity was performed at ABC-labs, Solna.
RESULTS: After two doses, IgG antibodies (IgG abs) to anti-S were detected in 37 (74%) of 50 patients, 5 (10%) had a borderline response and 8 (16%) were negative. T-cell response were detected in 29 (58%) of 50 patients and in 21 (42%) no response was detected. Before the third dose IgG abs to anti-S were detected in 24 (52%) of 46 patients, 3 (7%) had a borderline response and 19 (41%) were negative. Three weeks after the third dose IgG abs to anti-S were detected in 39 (95%) of 41 patients, and 2 (5%) were negative. T-cell responses were detected in 35 (85%) of 41 patients and in 6 (15%) no response. Three months after the third dose IgG ab to anti-S were still detected in 38 (95%) of 40 patients, and 2 (5%) were negative. Changes in IgG ab to anti-S and T-cell response over time in patients who received all three doses of vaccine and were followed up until 3 months after the latest dose (n = 40 and 37) are displayed in Figures 1 and 2 (preliminary data).
CONCLUSION: These results highlight the need for at least three doses of the SARS–CoV–2 BNT162b2 mRNA vaccine. It also indicates that the effect of the vaccine decreases slower after dose 3 than after dose 2 since almost all patients had a measurable immune response 3 months after dose 3. However, not all patients develop an immunological response. In a clinical setting, it is justified to measure the antibody response after vaccination to identify patients that are not protected and where one needs to take other measures to protect them from infection and/or to give early treatment in case of symptoms.

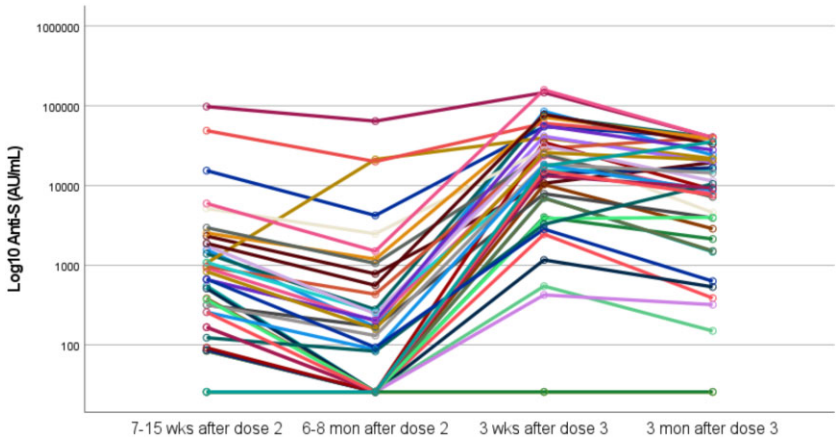

FIGURE 1: Changes in IgG antibodies to anti-S in patients who received three doses of SARS-CoV-2 BNT162b2 mRNA vaccine and were followed up until 3 months after the latest dose (n = 40).

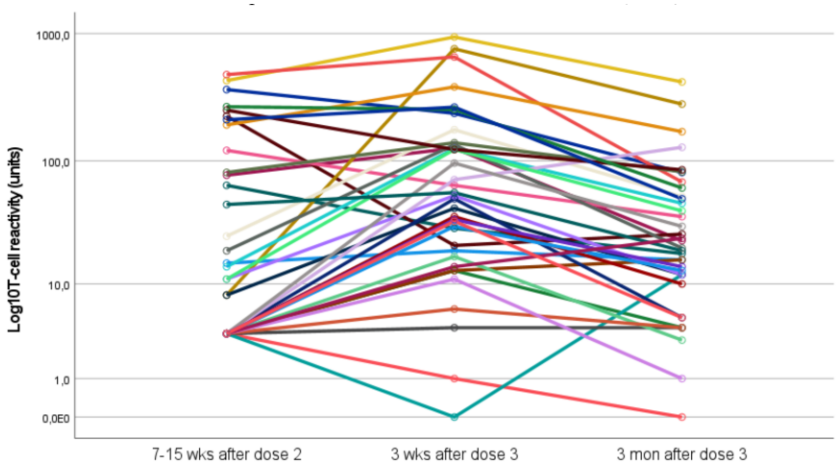

FIGURE 2: Changes T-cell response patients who received three doses of SARS-CoV-2 BNT162b2 mRNA vaccine and were followed up until 3 months after the latest dose (n = 37).