

HUMORAL IMMUNE RESPONSE AFTER COVID-19 VACCINATION IN PEOPLE LIVING WITH HIV

ANRS0001S COV-POPART COHORT STUDY



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BACKGROUND

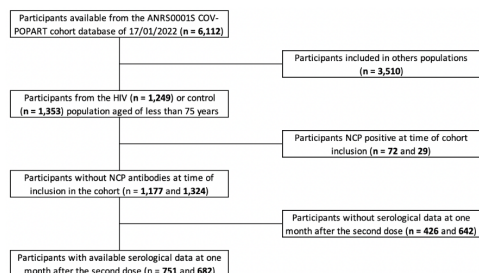
High effectiveness of COVID-19 vaccines was demonstrated. In people living with HIV (PLWHIV), immunogenicity and efficacy of COVID-19 vaccines might be lower compared to HIV- people. We evaluated humoral immune response to COVID-19 vaccines in PLWHIV and controls after the first and second vaccine dose.

METHODS

- The ANRS0001S COV-POPART cohort study is a French nationwide multicenter prospective COVID-19 vaccine cohort including immunocompromised participants and those at high risk for severe COVID-19 disease and a control group.
- Inclusions started on 25 March 2021 and ended on 31 December 2021.
- PLWHIV and controls from the ANRS0001S COV-POPART were included in this analysis if they had received at least two vaccine doses and if results at one month after the second dose were available.
- Participants with history of SARS CoV-2 infection or pre-vaccination positive SARS CoV-2 anti-nucleocapsid (NCP) antibodies were excluded.
- Percentage (95% confidence interval (CI)) of responders, geometric means (95% CI) of anti-Spike SARS-CoV-2 IgG antibodies (ELISA) and specific neutralizing antibodies (*in vitro* neutralization assay) were estimated.
- We categorized participants in weak responders if the anti-Spike SARS-CoV-2 IgG titer was < 264 BAU/mL, moderate responders if IgG was between 264 and 1315 BAU/mL and strong responders if IgG was > 1315 BAU/mL.
- The samples analyzed as part of the study were managed and stored within the "Biobanque ANRS".
- Serological tests with test limits (ELISA Euroimmun) and seroneutralization for the original SARS-CoV-2 strain were performed centrally.

RESULTS

Figure 1: Flowchart



In a French nationwide multicenter COVID-19 vaccine cohort study, proportions of PLWHIV and controls who developed IgG anti-Spike (97.1% [95.6; 98.2] vs. 99.7% [99.0; 100.0], $p < 0.01$) and neutralizing antibodies (95.4% [93.6; 96.7] vs. 98.9 [97.8; 99.5], $p < 0.01$) were significantly lower in PLWHIV compared to controls. IgG anti-Spike titers below 264 BAU/mL were observed in 8.4% [6.5; 10.6] of PLWHIV compared to 6.0% [4.4; 8.0] of controls ($p = 0.10$). Of the 22 non responders in PLWHIV, 14 were in CDC stage C.

RESULTS

- 754 PLWHIV and 720 controls were included. PLWHIV were older than controls: 56 years, (50-61) vs. 50 years (39-60) and more frequently male (76.3% vs. 52.4%). All PLWHIV were under antiretroviral therapy, 78% had an undetectable viral load and 70% had CD4 counts above 500 cells/mm³.
- Participants had primarily received two doses of BNT162b2 (93% in PLWHIV vs. 87% in controls) followed by mRNA-1273 (6.0% vs. 7.7%), ChAdOx1-S/nCoV-19 (0.7% vs. 3.6%). Three PLWHIV and 15 controls received heterologous prime-boost vaccination.

Figure 2. Anti-Spike SARS-CoV-2 IgG response up to 6 months after second injection

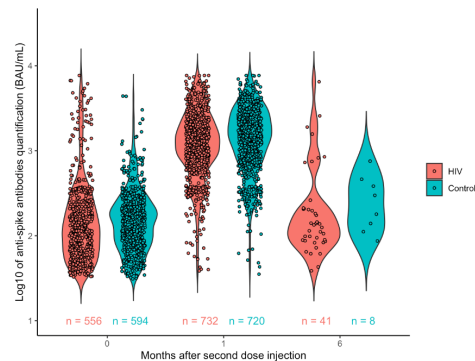
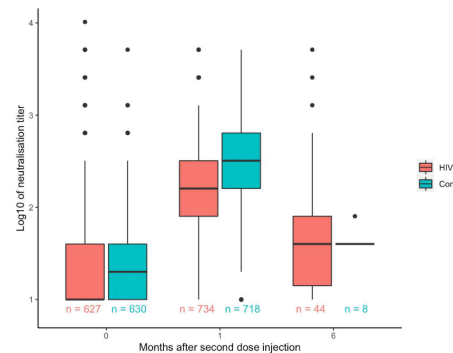


Figure 3. Seroneutralization response up to 6 months after second injection



- Geometric mean IgG anti-Spike titers were 1151 BAU/mL [1076; 1232] and 1337 BAU/mL [1251; 1428] at one month after the second dose in PLWHIV and controls, respectively ($p < 0.01$).
- Geometric mean seroneutralization titers were 159.3 [145.9; 173.9] and 271.8 [250.2; 295.4] at one month after the second dose in PLWHIV and controls, respectively ($p < 0.01$).
- Among PLWHIV, 1.5% [0.7; 2.6] developed NCP antibodies until one month after the second dose versus 1.0% [0.3; 1.9] in controls.

RESULTS

Table 1. Characteristics of PLWHIV non-responders to anti-COVID-19 vaccine at one month after the second dose.

Age (years)	Sex	BMI (kg/m ²)	Others comorbidi classificati ties	HIV comorbidi classificati on	CD4 (cells/mm ³)	HIV viral load (cop/mL)
46.4	Woman	23.9	-	C	< 200	239
56.4	Man	22.1	Diabetic	C	< 200	0
53.1	Man	25.5	-	C	< 200	20
61.4	Man	22.0	-	C	< 200	20
68.6	Man	20.1	-	C	[200; 500]	0
66.2	Man	31.9	Diabetic, Obese	C	[200; 500]	0
55.8	Man	19.8	-	C	≥ 500	0
42.4	Woman	32.4	Obese	C	≥ 500	0
53.8	Man	20.1	Cancer	C	[200; 500]	20
51.6	Man	20.4	-	C	< 200	20
50.4	Woman	50.4	Obese	C	< 200	2283
57.4	Man	20.5	-	C	< 200	0
65.3	Man	31.3	Obese	C	≥ 500	0
59.3	Man	24.2	-	C	< 200	20
57.6	Man	20.3	-	B	[200; 500]	20
62.2	Man	22.8	-	B	≥ 500	0
36.3	Man	22.8	Diabetic	B	[200; 500]	0
22.3	Man	20.3	-	A	≥ 500	0
38.8	Man	26.3	-	A	≥ 500	0
59.0	Man	18.0	-	A	≥ 500	0
67.4	Woman	24.3	-	A	≥ 500	0
69.0	Man	21.5	-	A	≥ 500	0

CONCLUSIONS

- PLWHIV under ARV treatment had high response rates one month after two doses of COVID-19 vaccination. **Nonetheless, IgG anti-Spike and seroneutralization titers were lower.**
- Non-responders in PLWHIV had a more advanced disease stage.
- Longer follow-up is needed to gain a better insight into the humoral response after COVID-19 vaccination in PLWHIV.

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