

Seroprevalence of SARS-CoV-2 infection and evolution of humoral immune response in patients living with HIV in the Ile-de-France area

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❖ Background

- Certain risk factors contribute to acquisition or a more severe course of the COVID-19
- Data on COVID-19 infection in patients living with HIV (PLWHIV) still poorly understood and there is no longitudinal studies conducted in PLWHIV

❖ Objectives

- Determine the seroprevalence of COVID-19 infection in PLWHIV followed at the Pitié-Salpêtrière hospital, Paris, FRANCE
- Identify the risk factors potentially associated with SARS-CoV-2 infection
- Evaluate the kinetics of anti-SARS-CoV-2 antibodies during one year

❖ Methods

- ✓ Longitudinal prospective cohort conducted in non vaccinated HIV-1 patients followed at the Pitié Salpêtrière hospital (Paris, FRANCE) between April 2020 and September 2021
- ✓ Measure of anti-SARS-CoV-2 antibodies: All patients → At inclusion: **IgG anti-N**
 : Positive IgG anti-N patients → Follow up at 6 and 12 months: **IgG anti-N, IgG anti-S and IgA anti-S**
- ✓ Assessment of factors associated with the risk of a positive serology at baseline (positive IgG anti-N) with univariable and multivariable logistic regression models

❖ Results (1)

- ✓ **1,901 PLWHIV** were enrolled. At inclusion: **254 patients** had positives IgG anti-N
- ✓ → **Seroprevalence rate in PLWHIV of 13.4% (95 IC 11,9-15)**

Patient's characteristics		n	Positive IgG anti-N	Univariate OR (95 CI)	p value	Multivariate OR (95 CI)	p value
Age (years)	<50	714	125 (17.5)	1	<0.0001	1	0.6492
	≥50	1187	129 (10.9)	0.57 (0.44, 0.75)		0.93 (0.67, 1.29)	
Sex	Male	1224	136 (11.1)	1	<0.0001	1	0.0666
	Female	677	118 (17.4)	1.69 (1.29, 2.21)		0.74 (0.54, 1.02)	
Country of origin	Others	1175	70 (5.9)	1	<0.0001	1	<0.0001
	Sub Saharan Africa	726	184 (25.3)	5.36 (3.99, 7.19)		4.78 (3.39, 6.73)	
BMI (Kg/m ²)	<30	1559	182 (11.7)	1	<0.0001	1	0.2024
	≥30	342	71 (20.9)	2.00 (1.47, 2.73)		1.25 (0.89, 1.75)	
Smoking	No	1395	220 (15.8)	1	<0.0001	1	0.0176
	Yes	506	34 (6.7)	0.38 (0.25, 0.59)		0.57 (0.36, 0.90)	
Duration of HIV infection (years)			14.6 (7.9 – 19.7)	0.97 (0.96, 0.98)	<0.0001	0.99 (0.95, 1.02)	0.4424
Duration of ARV treatment (years)			11.5 (6.6 – 18.8)	0.97 (0.96, 0.99)	0.0003	1.01 (0.95, 1.07)	0.7988
Time on ongoing ARV therapy (years)			1.5 (0.8 – 2.4)	0.94 (0.89, 1.01)	0.0757	1.01 (0.94, 1.08)	0.8653
CD4 (cells/mm ³)	<350	290	53 (18.3)	1	0.0127	1	0.2357
	≥350	1611	201 (12.5)	0.64 (0.45, 0.91)		0.79 (0.53, 1.17)	
HIV-1 RNA viral load (cp/ml)	<50	1698	219 (12.9)	1	0.1371	1	0.6097

Table1: Risk factors associated with positive serology at baseline

Factors associated with positive IgG anti-N at inclusion:

Country of origin (Sub-Saharan Africa) and active Smoking

❖ Results (2)

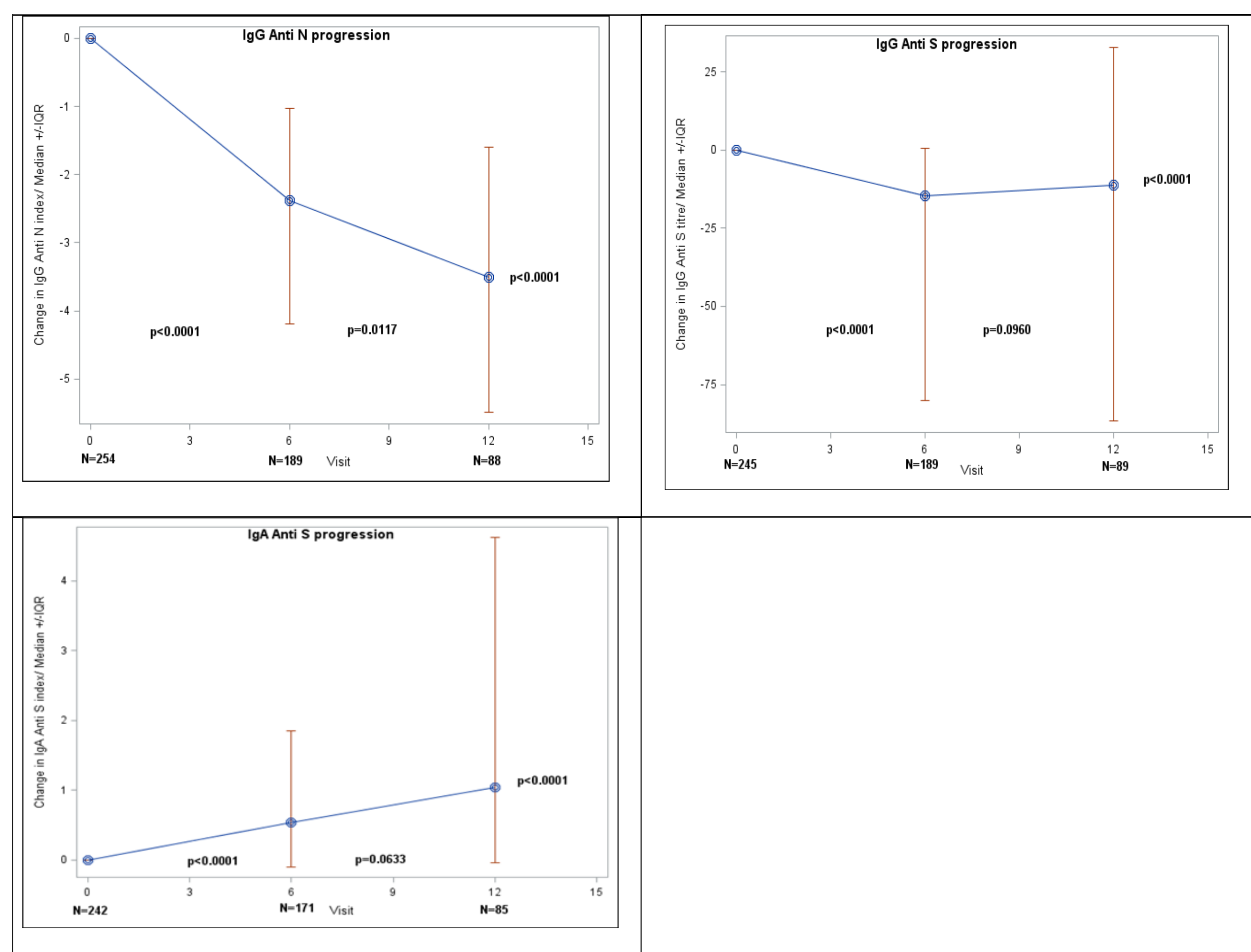


Figure n°1 Kinetics of SARS-CoV-2 antibodies levels during one year

Over the one-year study period:

- levels of IgG anti-N and anti-S decreased significantly
- IgA anti-S level increased significantly

❖ Conclusions

- Higher seroprevalence of SARS-CoV-2 in PLWHIV in comparison to:
 - ✓ General population in the Ile-de-France area in the same period (5.7%) 1 and other countries: Italy, Germany, USA (0.72%-7.40%) 2,3,4
 - Less respect to national restrictions or adherence to infection control measures and social distancing?
- higher seroprevalence of SARS-CoV-2 in African Sub-Saharan patients:
 - Inequalities in health and healthcare for people of sub-Saharan African origin
 - Socioeconomic status 5
- Active smoking was associated with a lower rate of IgG anti-N antibodies (protective role of the nicotine)
 - The nicotine regulation of angiotensin-converting enzyme-2 receptor expression which is involve in SARS-CoV-2 entry^{5,6,7}
- Levels of IgG anti-N and IgG anti-S decreased significantly while levels of IgA anti-S increased significantly over one year of study
 - Previous studies showed the decrease of antibody levels over time^{8,9,10}: Titers of IgG antibodies against the RBD of the spike protein decreased significantly over six months^{8,9}
 - Titers of IgA decreased in a less proportion compared to the anti-RDB IgG levels over a time period of 6 to 9 months^{8,9}

1: Carrat F et al. Int J Epidemiol 2021; 2: Noe et al. Infection 2021; 3: Lombardi et al. Diagn Basel Switz 2021; 4: Spinelli et al. Lancet HIV 2021; 5: Farsalinos K et al. Intern Emerg Med 2020; 6: Gonzalez-Rubio J et al. Front Immunol 2020; 7: Smith JC et al. Dev Cell 2020; 8: Gaebler C et al. Nature 2021; 9: Dan JM et al. Science 2021; 10: Gallais F et al. EBioMedicine 2021