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The seroprevalence of COVID-19 among people living with HIV in Morocco

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Abstract

The association of COVID-19 and HIV infection would seem deadly in terms of prognosis and the possibilities of viral clearance given the immunodeficiency. However, a lower seroprevalence has been reported in some studies compared to that found in the non-HIV population. The objective of this study is to determine the seroprevalence of COVID-19 among people living with HIV (PLHIV) in Morocco.

This is a prospective study carried out in the infectious diseases department of the Ibn Rochd University Hospital in Casablanca. We included PLHIV who consulted the Infectious Diseases Day-Hospital service between January 18, 2021 and March 10, 2021. After informed consent, patients completed a survey and had blood drawn for SARS-CoV-2 antibody testing. The determination of IgG antibodies against SARS-CoV-2 in blood was carried out using chemiluminescence microparticle immunoassay technology.

We included 418 PLHIV in the study, most patients were male (50.24%), the average age was 40 years, 90.2% of patients were on antiretroviral treatment, 56.7% had a viral load <20 copies/ml, and 47.37% had a CD4 count greater than 500 cells/µL. The IgG test was positive in 53 patients, representing a seroprevalence of 12.68%. None of the patients had clinical signs. Seroprevalence was higher in female patients (58.49%), aged between 30 and 40 years (41.51%), in patients with a negative viral load (64.15%) and a CD4 count greater than 500 cells/mm3 (49.6%).

Our study showed that the seroprevalence of COVID-19 was higher among PLHIV compared to people without HIV infection. All the patients had asymptomatic forms which pushes us to evoke a theory, to demonstrate, of the action of antiretrovirals against SARS-CoV-2.

Keywords: HIV; Seroprevalence; COVID-19; SARS-CoV-2; Antibody

1. Introduction

The association of COVID-19 and HIV infection would seem deadly in terms of prognosis and possibilities of viral clearance given HIV-related immunodeficiency. Several reports have suggested that PLHIV should be considered as a vulnerable group because they may have a higher risk of contracting SARS-CoV-2, compared to the general population [1]. Nevertheless, several studies have found a similar or lower incidence of SARS-CoV-2 in PLHIV compared to the general population [2, 3]. However, incidence estimates from these studies could be biased by different screening rates between populations [4, 5]. Furthermore, available data on SARS-CoV-2 incidence among PLHIV come from positive RT PCR tests, which detect active infections. On the other hand, serological testing for anti-SARS-CoV-2 antibodies has been recognized as a useful tool for diagnosing prior and active infection in symptomatic and asymptomatic individuals. They could be used to better estimate the number of individuals who have been infected [6, 7]. We present here the results of a COVID-19 seroprevalence study carried out after the second wave of COVID 19, and at the start of the anti-COVID 19 vaccination campaign.

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2. Material and methods

This is a prospective descriptive and analytical study carried out in the infectious and tropical diseases department of the Ibn Rochd University Hospital in Casablanca. We included 418 PLHIV who consulted the Infectious Diseases Day-Hospital service between January 18, 2021 and March 10, 2021 and who agreed to participate in the study. All participants signed a written informed consent to participate in the study and gave their written informed consent for publication.

Testing for IgG antibodies to SARS-CoV-2 in blood was performed using chemiluminescence microparticle immunoassay technology with the Abbott Architect instrument using the approved Abbott SARS-CoV-2 IgG test by the FDA. The immunoassay is a chemiluminescent microparticle immunoassay for the qualitative detection of IgG in human serum or plasma against SARS-CoV-2 nucleoprotein (N). The manufacturer reported a sensitivity of 86.4% 7 days after symptom onset and 100% after 14 days, as well as a specificity of 99.6%, using RT-PCR as a reference. A descriptive analysis was performed with percentages for qualitative variables and means ± standard deviation for quantitative variables. A univariate analysis was carried out using the Chi2 test, the significance threshold was set at 0.05. Statistical analysis was carried out using SPSS v 16 software.

3. Results and discussion

We included 418 PLHIV in the study, 50.24% were male, the average age was 40 years, 90.2% of patients were on antiretroviral treatment, 56.7% had a viral load < 20 copies /ml, and 47.37% had a CD4 count greater than 500 cells/µL. The IgG test was positive in 53 patients, representing a seroprevalence of 12.68%. None of the patients had previous clinical signs of COVID-19, none of the patients was vaccinated against COVID-19. Seroprevalence was higher in female patients (58.49%), in patients aged between 30 and 40 years (41.51%), in patients with a negative viral load (64.15%) and a CD4 rate greater than 500 cells/mm3 (49.6%).

Table 1 Comparison of characteristics between SARS-CoV-2 seropositive and seronegative unvaccinated PLHIV

	SARS-CoV-2 seropositive n= 53 (12.68%)	**SARS-CoV-2 Seronegative n= 365 (87.32%)**
Age mean in years	42	39
Sex ratio	1.41 [31 F - 22 H]	1.062 [177F - 188H]
ARV		
Yes	92.45%	89.6%
No	7.55%	10.4%
CD4 T-cell count		
<200 cells/µL	18.87%	24.3%
200-500 cells/µL	32.07%	28.7%
> 500 cells/µL	49.06%	47%
Viral load		
<20 copies/mL	64.15%	55.6%
<1000 copies/mL	16.98%	13.4%
> 1000 copies/mL	18.87%	31%

The average age of PLHIV included in the study was 40 years, which is consistent with the results of the literature and national data concerning PLHIV [1]. More than 90% of patients were on antiretroviral treatment, which is close to the results in the literature [2,3,4]. Surely, because of the new recommendations (screen and treat approach) and free access as well as the availability of ARVs. The median CD4 count was 522 cells/µL, slightly lower than medians reported in other studies [5,6,7]. Only 56.7% had a negative viral load, most likely linked to the fact that 30% of these patients were in the first months after initiation of ARVs and 10% were not yet on ARVs. The seroprevalence of SARS-CoV2 was

12.67%, higher compared to the results of the literature where this prevalence was between 0.72% and 10.3% [8,9,10], which can be explained by the vulnerability of PLHIV to contamination by Sars-cov2 but also to non-compliance with preventive measures against COVID19. None of the patients reported symptoms of COVID19, this result is most likely linked to the young age of the patients or to the action of ARVs on SARS-COV2. Like the general population, older patients of patients with heart or lung problems are potentially at higher risk of contracting the virus and developing more severe symptoms [11,12,13]. The analysis of seroprevalence according to comorbidities cannot be carried out because these variables were not retained, constituting one of the limitations of this study, as well as the fact that we have not carried out COVID-19 PCRs to be able to detect patients who do not produce antibodies or who have lost their antibodies.

A high seroprevalence does not allow us to conclude that protective immunity exists. Further investigations on memory B and T lymphocytes are necessary as well as the measurement of neutralizing antibodies.

4. Conclusion

The seroprevalence of COVID-19 was higher among PLHIV compared to the general population. None of the patients was vaccinated or presented symptoms of COVID, which pushes us to discuss the theory of the action of antiretrovirals on sars-cov2. Other studies are recommended to evaluate the anti-SARS-CoV-2 vaccine response in PLHIV, in order to estimate the protective measures necessary in this population because the epidemic is clearly present and sufficient surveillance and diagnostic efforts are required.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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