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Epidemiological, Clinical, Paraclinical and Evolutionary Aspects of SARS-CoV-2 Infection in 22 HIV-Infected Patients Followed at the Fann Outpatient Treatment Center

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Abstract: Introduction: Appearig at the end of 2019, an acute respiratory disease caused by a new coronavirus (SARS-CoV-2) quickly spread from China to all parts of the world. Cardiovascular disease, hypertension, diabetes, respiratory tract diseases, and cancer, among others, are poor predictive factors for SARS-CoV-2 infection. However, it is not yet well established to date that the human immunodeficiency virus type 1 (HIV-1) increases mortality from COVID-19. We decided to describe aspectsof COVID-19 in HIV infected patients, followed up at the Outpatient Treatment Centre (CTA) in Dakar-Fann. Methodology: This was a retrospective descriptive and analytical study of PLHIV over 15 years of age followed at the Outpatient Treatment Centre in Fann in whom the diagnosis of COVID-19 was made between July 2020 and September March 2021 by the polymerase chain reaction method in time real (RT-PCR). Results: A total of 22 PLWHA had COVID-19 with a predominance of women (15/22 or 68%). The median age was 47 years (33-85). The majority (91%) were infected with HIV-1. The mean last LTCD4 count in patients before COVID-19 diagnosis was 582 cells/mm^3 [51-1415]. The last viral load before SARS-CoV2 infection was undetectable in 19 patients or 86%. One patient was in virological rebound with 353.158copies/ml. Two had no available viral load, one was profile 2 (HIV-2) and one double profile (HIV1+2). One among the patients was an active smoker. Comorbidities were found in 14 patients (64%) dominated by hypertension (7/14) and obesity/overweight (6/14). One case of hepatic cytolysis due to auto-immune disease was noted. The most frequent symptoms were headache, severe asthenia, fever, anosmia, breath shortness and cough. Anti-COVID-19 therapy was initiated following to the national protocol in addition to ART (8 on ATRIPLA, 4 TLD and 2 on ATZ/r and LPV/r). Half of the patients were treated in hospital (11/22, i.e., 50%), including one in intensive care, namely the one with a virological rebound. The case lethality rate was 9% (02/22). The two deaths involved patients over 65 years of age who did not receive any vaccine, one of whom suffered from an auto-immune disease with poor treatment observance. Conclusion: Most patients were virologically controlled with a good LTCD4 level > 582 cells/mm^3. The comorbidities found were identical to those already described, proving once again that HIV is probably not a separate factor. However, good monitoring of co-morbidities, support for therapeutic compliance and vaccination should enable effective control of this pandemic in HIV patients.

Keywords: SARS-CoV2, HIV, Dakar, Senegal

1. Introduction

According to health data from WHO, the COVID-19 pandemic affects vulnerable people more. The elderly and or suffering with comorbidities (diabetes, hypertension, respiratory infections, cardiovascular diseases, and auto-immune diseases) are at more at risk of developing severe forms of COVID-19 [1, 2].

A total of 7,370,902,499 doses of vaccines were administered. [4]. As of 4 December 2021, there have been nearly 265 million confirmed cases worldwide, including 5.25 million deaths [3-6]. Africa has, on the same date, recorded 6,193,037 cases and 151,927 deaths. [3-6]. A total of 7,370,902,499 doses of vaccine were administered. Although Africa remains relatively unaffected by COVID-19, the potential for spread "in countries with weaker health systems" remains a serious issue of concern. Even if Africa remains relatively spared from COVID 19, the potential for spread remains high. The United States CDC (Center for Disease and Control) warned in March 2020 that people living with HIV could face multiple morbidities s that could increase the risk of serious health consequences relating to COVID-19 [4]. However, it is not established that human immunodeficiency virus-1 (HIV-1) infection increase severity and mortality associated with COVID-19. This new virus is of interest in the field of research and its optimal clinical management Patients living with HIV coinfected with COVID-19 present the same aspects as those not infected [7, 8]. The risk of occurrence of a serious form of COVID-19 in controlled seropositive people seems comparable to that of the general population [7-11]. Indeed, patients with a controlled HIV infection have the same risk of contracting an infection by SARS-CoV-2 developing a than people not infected with HIV [8]. COVID- However, we do not have a lot of data on COVID-19 HIV coinfection.

Senegal had its first reported case of COVID-19 on 2nd March 2020. As of 30 September 2021, the country had officially recorded 19,364 COVID-19 cases including 410 deaths [12]. In Senegal, estimated number of PLHIV, the was at 40,153, of which 30,431 were on ARV treatment [13]. The prevalence is 0.5% in the general population and concentrated in key populations. The outpatient Treatment Centre base in Fann University Hospital is the largest treatment centre for PLHIV in Senegal with a current number of 1,500 patients. [14-17]. Given the limited knowledge on HIV/SARS-CoV-2 co-, we are willing to share our outpatient and inpatient clinical experience to describe the cases of PLHIV followed at the CTA and infected with COVID-19 between July 2020 and September 2021.

2. Methods

2.1. Type of Study

This was a retrospective descriptive and analytical study of PLHIV over 15 years of age followed at the Outpatient Treatment Centre in Fann and who were diagnosed with COVID-19 between July 2020 and September 2021. Socio-demographic, clinical and laboratory data were collected from medical records, computerized database and consultation registers An alert system was set up to ensure continuity of care and to obtain information on the patients in the cohort.

2.2. Context of the Study

The study took place at the Fann University Hospital Outpatient Treatment Centre (CTA), As one of the first three facilities to provide treatment within the framework of the Senegalese Initiative for Access to Antiretrovirals (ISAARV), CTA witnessed all the historical periods of access to treatment in the country and offers comprehensive and multidisciplinary care for HIV infection. The centre provides technical support to the Ministry of Health, participates in research, implements capacity building programmes for health care providers and provides supervision conditions for students.

2.3. Diagnostic Criteria

The molecular diagnosis was made on the basis of suspicion of clinical signs of COVID-19, in particular: flu syndrome, dyspnoea, anosmia, cacosmia, fever. by by real-time RT-PCR targeting the N gene regions, following the Senegalese national protocol.

2.4. Data Collection and Processing

Data were extracted from CTA's ESOPE database and supplemented by the questionnaire administered to patients in person or by telephone.

Continuous variables were described as median and interquartile range, categorical variables as percentage to describe the sociodemographic, clinical and biological characteristics of the population. The characteristics of the analysis population were compared using the Chi-2 test (categorical variables) or the Kruskall-Wallis test (continuous variables).

2.5. Ethical Aspects

The analysis involved anonymised data and therefore did not contain the exact identity or address of individuals. The opening of the medical record, follow-up and initiation of ART were done with the consent patients. The protocol was approved by the Senegalese National Ethics Committee.

3. Results

As of 30 September 2021, with a total of 1500 patients followed at the Outpatient Treatment Centre, 22/1500 (1.4%) patients have been diagnosed with COVID-19. 11 were hospitalised in an epidemic treatment centre (ETC). All patients have a record in the ESOPE database from which we extracted anonymised data. The clinical characteristics and outputs of the study population are reported in Table 1.

Table 1. *Characteristics of COVID-19/HIV coinfected patients.*

	Age	Gender	Current LTCD4 rate	Current viral load	Therapeutic protocol
Patient 1	55	F	554	<40	TLD
Patient 2	44	M	467	<40	ATRIPLA
Patient 3	47	F	873		TLD
Patient 4	40	F	51		TLD
Patient 5	48	M	90	<40	(TDF+3TC) +ATZ/r
Patient 6	37	F	617	353158	TLD
Patient 7	36	M	581	<40	ATRIPLA
Patient 8	53	F	484	<40	ATRIPLA*
Patient 9	61	F	370	<40	ATRIPLA
Patient 10	47	F	409	<40	TDF+3TC+LPV/r*
Patient 11	33	M	683	<40	ATRIPLA
Patient 12	42	F	546	<40	ATRIPLA
Patient 13	40	F	715	<40	ATRIPLA
Patient 14	40	F	1415	<40	ATRIPLA
Patient 15	37	F	979	<40	TLD*
Patient 16	52	M	767	<40	TLD
Patient 17	49	F	378		TLD
Patient 18	47	F	187	<40	TLD
Patient 19	85	M	1118	<40	ATRIPLA
Patient 20	74	M		<40	TLD
Patient 21	53	F	521	<40	TLD
Patient 22	57	F	422	<40	TLD

Table 1. *Continued.*

	Date PCR	Comorbidities	Type of JEP COVID	Issue
Patient 1	06/01/21	HTA	HOME	CURED
Patient 2	17/09/20	HTA+ Mixed obesity	HOME	CURED
Patient 3	11/07/20		HOSP	CURED
Patient 4	22/07/20		HOME	CURED
Patient 5	15/01/21	HTA	HOSP	CURED
Patient 6	14/07/20		HOSP+I-CARE	CURED
Patient 7	17/02/21	Asthma + mixed obesity	HOSP	CURED
Patient 8	19/02/21		HOME	CURED
Patient 9	05/03/21	Sickle cell disease	HOSP	CURED
Patient 10	15/02/21	Autoimmune hepatic cytolysis	HOSP	DEAD
Patient 11	19/03/21	Overweight	HOME	CURED
Patient 12	01/10/20	Asthma + hypertension	HOSP	CURED
Patient 13	09/04/21	HTA	HOSP	CURED
Patient 14	03/06/21	Sickle cell disease +Spasmophilia	HOME	CURED
Patient 15	02/08/21		HOME	CURED
Patient 16	28/07/21	Diabetes + COPD	HOSP	CURED
Patient 17		hypertension + mixed obesity	HOME	CURED
Patient 18	03/08/21		HOME	CURED
Patient 19		HTA	HOSP	CURED
Patient 20	05/08/21		HOSP	DEAD
Patient 21	13/07/21	Mixed obesity	HOME	CURED
Patient 22	18/08/21		HOME	CURED

ATRIPLA=TDF+3TC+ EFAVIRENZ; LPV/rt=Lopinavir/ritonavir; TLD=Tenofovir+ 3TC+Dolutegravir.

Fifteen patients were female (68%). The median age was 47 years (33-85). One patient was an active smoker. Comorbidities were found in 14 patients (64%), dominated by hypertension (7/14) and obesity/overweight (6/14). Asthma was found in 2 patients as well as sickle cell disease. Only one patient had diabetes associated with obstructive lung disease. One case of hepatic cytolysis due to auto-immune disease was noted. The majority (91%) were HIV1 infected. The last mean LTCD4 count in patients before COVID-19 diagnosis was 582 cells/mm^3 [51-1415]. Viral load prior to C-19 infection was undetectable in 19 patients or 86%. One patient was in virological rebound with 353.158cp/ml. The two patients had no viral load available due to their HIV profile, one profile 2 (HIV-2) and one double profile (HIV1+2). All patients had already started triple antiretroviral therapy. Eight patients were on ATRIPLA, 4 on TDF/3TC/DG (TLD) and 2 on triple therapy including ATZ/r and LPV/r). One patient was in treatment failure and in virological rebound.

The most frequent symptoms were unusual headaches, intense fatigue, fever, loss of smell, breath shortness and cough. Half of the patients were treated in hospital (11/22 or 50%), including one in intensive care, namely the one in virological rebound. The lethality rate was 9% (02/22). The

two deaths were individuals over 65 years of age who did not receive any vaccine. One of them suffered from an auto-immune disease with poor compliance.

4. Discussion/Comments

The prevalence of co-infection (1.4%) in our series was higher than that found by Isernia et al, 2020 (0.5%) [1], but which corroborates the results of the study by Blanco et al, 2020 (0.92%) [15] in a hospital in Barcelona, Spain. The median age was lower than the results of Richardson et al, 2020 [7]; Isernia et al, 2020 [14] who found 68 and 53 years respectively compared to 47 years. We found a p high percentage of women (68%). In contrast to our results, most studies found a male predominance (Isernia et al., 2020 (60%) [14]; Blanco et al., 2020 (80.9%) [15]; Mazaei et al., 2020 (80%) [17]. Classic risk factors for developing severe forms of COVID-19 reported in Richardson et al, 2020; Grasselli et al, 2020; Hu et al, 2020; Mehra and Zheng et al, 2020; Isernia et al, 2020; Mandeep, 2020 [7, 8, 10, 11, 14, 18] studies were identical to those found in our study.

The proportion of patients with a controlled HIV-1 viral load of 95% found in our series was higher than that found by de Irsenia et al, 2020 (90%) [14]. This result can be explained by the adherence support system put in place by the CTA to maintain the continuum of care (community-based antiretroviral dispensation, home-based care, telephone call). At the same time, the proportion of patients with an average LTCD4 level > 500 cells/mm was similar in the study by Isernia et al, 2020 (23/30=76.6% had more than 500 cells/mm^3) [14].

In patients on controlled treatment with good immunity, the roles of other comorbidities should be considered. (Blanco et al., 2020; Vizcarra et al., 2020) [15].

Mortality was higher in our series compared to Blanco et al, 2020 (9% vs. 6.5%) [15] but lower than the Irsenia et al, 2020 study (9% vs. 21%) [14]. In the systematic review by Mirzaei and all, 2020, [17] the majority of patients who died were at least 50 years old (90.5% vs 100%), with multiple comorbidities (64.3%).

No study on HIV-COVID coinfection has been done in Senegal to date. It is important to conduct other studies with a higher number of patients to draw interesting conclusions on this subject. [14-115, 18-27].

5. Conclusion

Most patients in our study were virologically controlled.

HIV infection does not constitute an increased risk of COVID-19 disease in virologically controlled patients. however, the already known risk factors are found.

Conflicts of Interest

The authors declare that they have no competing interests.

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