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Short Communication

SARS-COV2 infection in 30 HIV-infected patients followed-up in a French University Hospital

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A B S T R A C T

Introduction: An acute respiratory disease caused by a novel coronavirus (SARS-COV2) is spreading from China since January 2020. Surprisingly, few cases of Covid-19 have been reported in people living with HIV (PLWHIV).

Methods: Here we present a series of 30 PLWHIV diagnosed for SARS-COV2 infection. The principal outcome was to describe clinical characteristics of this population.

Results: Eighteen (60%) patients were men, 10/30 (33.3%) women and 2/30 (6.7%) transgender women. Median age was 53.7 years (range 30–80 years) and 23/30 patients (76.7%) were born in a foreign country (out of France). The most common comorbidities were cardiovascular disease (11/30, 36.7%), hypertension (11/30, 36.7%), diabetes (9/30, 30%) obesity (7/30, 23%) and chronic renal disease (5/30, 16.7%). Twenty (66.7%) patients presented overweight. Five patients (16.7%) had a Charlson comorbidity (Quan et al., 2011) score ≥3. Twenty-seven (90%) patients were virologically suppressed. CD4 count was >500 cell/mm3 in 23/30 (76.6%) patients. An antiviral treatment for SARS-COV2 was administered, in addition to HIV treatment, in 5/30 patients (16.3%). Twenty-four patients (80%) recovered from covid-19, 3/30 (10%) required invasive mechanical ventilation, 2/30 (6.7%) patients died and 4/30 (13.3%) patients were still hospitalized.

Conclusions: Most of the patients were virologically suppressed with CD4>500 mm3. Risk factors were the same as those described in other SARS-COV2 series, suggesting that HIV infection is probably not an independent risk factor for covid-19.

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Short communication

An acute respiratory and potentially fatal disease caused by a novel coronavirus (SARS-COV2) has been spreading from China since January 2020.

Surprisingly, few cases of Covid-19 have been reported in people living with HIV (PLWHIV).

As of April 27th 2020, with a total of 5327 PLWHIV followed-up at Bichat University Hospital in Paris, 30/5327 (0.5%) patients have been diagnosed with Covid-19, of whom 21/30 (70%) were inpatients and 9/30 (30%) were outpatients, assessed in telemedicine clinics set up during the outbreak lock down. Most SARS-COV2 infected outpatients with mild symptoms were probably not diagnosed or not referred to the hospital.

A total of 390 patients have been admitted to the Infectious Diseases department with a diagnosis of SARS-COV2, of whom 21 (5.4%) were PLWHIV.

All participants gave their written consent to have their medical chart recorded in the electronic medical record system Nadis®, from which we extracted anonymized data.

Clinical characteristics and outcomes of the study population are reported in Table 1.

Eighteen (60%) patients were men, 10/30 (33.3%) were women and 2/30 (6.7%) were transgender women. Median age was 537 years (range 30–80 years) and 23/30 patients (76.7%) were born in a foreign country (out of France). The most common comorbidities were cardiovascular disease (11/30, 36.7%), hypertension (11/30, 36.7%), diabetes (9/30, 30%) obesity (7/30, 23%) and chronic renal disease (5/30, 167%). Twenty (66.7%) patients presented

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| Comorbidities (Charlson score) | BMI kg/m² | CD4 cells/µL | HIV viral load Copies/mL | ART-regimen before admission | SARS-COV2 PCR | Clinical status* | Outcomes |
|-------------------------------|-----------|--------------|--------------------------|------------------------------|---------------|-----------------|----------|
| **Patient 1** Hypertension, dyslipidemia, hypertensive cardiomyopathy, chronic renal failure (1) | 36.2 | 350 | <20 | abacavir + lamivudine + raltegravir + darunavir + ritonavir | yes | 1 | Cured |
| **Patient 2** None (0) | 34.9 | 1010 | <20 | tenofovir alafenamide + emtricitabine + elvitegravir + cobicistat | yes | 1 | Cured |
| **Patient 3** None (0) | 23.9 | 720 | <20 | tenofovir alafenamide + emtricitabine + elvitegravir + cobicistat dolugravir | yes | 1 | Cured |
| **Patient 4** None (0) | 24.8 | 620 | <20 | tenofovir alafenamide + emtricitabine + elvitegravir + cobicistat | yes | 1 | Cured |
| **Patient 5** 37 weeks pregnancy, recurrent herpetic infection (0) | 26.6 | 640 | <20 | tenofovir alafenamide + emtricitabine + nevirapine | yes | 1 | Cured |
| **Patient 6** Hypertension, diabetes, disseminated Cryptococcus (4) | 21.1 | 40 | 14,164 | tenofovir disoproxil + raltegravir + darunavir + ritonavir | yes | 1 | Cured |
| **Patient 8** Hypertension, diabetes, stroke (1) | 22.3 | 460 | <20 | bictegravir + emtricitabine + tenofovir alafenamide | yes | 1 | Cured |
| **Patient 9** Hypertension, hypertrophic cardiomyopathy, kidney transplantation (1) | 26.6 | 220 | <20 | bictegravir + emtricitabine + tenofovir alafenamide | yes | 1 | Cured |
| **Patient 10** Kidney transplantation, stroke, pulmonary embolism (5) | 24.6 | 140 | <20 | abacavir + lamivudine + raltegravir | yes | 1 | Cured |
| **Patient 11** None (0) | 29.5 | 460 | <20 | abacavir + lamivudine + raltegravir | yes | 1 | Cured |
| **Patient 12** Hypertension (0) | 39.8 | 910 | <20 | rilpivirine + emtricitabine + tenofovir alafenamide | yes | 1 | Cured |
| **Patient 13** None (0) | 29.0 | 900 | <20 | tenofovir alafenamide + emtricitabine + elvitegravir + cobicistat | yes | 1 | Cured |
| **Patient 14** Diabetes, hypertension, chronic renal failure, dialysis (2) | 40.0 | 870 | <20 | tenofovir alafenamide + emtricitabine + elvitegravir + cobicistat | yes | 1 | Cured |
| **Patient 15** Pulmonary tuberculosis (0) | 23.1 | 980 | <20 | abacavir + lamivudine + raltegravir | yes | 1 | Cured |
| **Patient 16** Hypertension, diabetes, atrial fibrillation, ischemic stroke, prostatic adenocarcinoma (1) | 32.8 | 390 | <20 | abacavir + lamivudine + raltegravir | yes | 1 | Cured |
| **Patient 17** Diabetes with microangiopathic complications, dementia (3) | 31.6 | 620 | <20 | abacavir + lamivudine + raltegravir | yes | 1 | Cured |
| **Patient 18** None (0) | 29.8 | 910 | <20 | abacavir + lamivudine + nevirapine | yes | 1 | Cured |
| **Patient 19** Hypertension, diabetes, ischemic stroke, chronic renal failure, COPD, pulmonary embolism (3) | 28.1 | 570 | <20 | abacavir + lamivudine + raltegravir | yes | 1 | Cured |
| **Patient 20** Dilated cardiomyopathy (1) | 29.3 | 810 | <20 | rilpivirine + emtricitabine + tenofovir alafenamide | neg | 1 | Cured |
| **Patient 21** Severe cervical dysplasia, esophageal ulcer (0) | 28.7 | 1109 | <20 | tenofovir alafenamide + doravirine + lamivudine | ND | 1 | Cured |
| **Patient 22** Diabetes, ischemic stroke (1) | 29.7 | 240 | <20 | rilpivirine + emtricitabine + tenofovir alafenamide | neg | 3 | Hosp |
| **Patient 23** Hypertension (0) | 24.6 | 830 | <20 | tenofovir alafenamide + emtricitabine + elvitegravir + cobicistat | ND | 1 | Cured |
| **Patient 24** Bipolar disorder (0) | 28.4 | 770 | <20 | rilpivirine + emtricitabine + tenofovir alafenamide | ND | 1 | Cured |
| **Patient 25** None (0) | 28.7 | 1190 | 39 | tenofovir alafenamide + emtricitabine + elvitegravir + cobicistat | yes | 1 | Cured |
| **Patient 26** Alcoholism, delirium tremens, dilated cardiomyopathy (1) | 31.6 | 200 | 65 | nevirapine + doravirine + lamivudine | ND | 3 | Hosp |
| **Patient 27** Depressive disorder (0) | 24.1 | 650 | <20 | maraviroc + darunavir + ritonavir + dolutegravir | yes | 3 | Hosp |
| **Patient 28** None (0) | 21.0 | 585 | <20 | rilpivirine + emtricitabine + tenofovir alafenamide | ND | 1 | Cured |
| **Patient 29** Hypertension, diabetes, stroke, aphasia, ischemic heart disease (1) | 21.2 | 630 | <20 | lamivudine + dolutegravir | yes | 1 | Cured |

* Charlson score: *Hosp* = Hospitalized, *NA* = Not applicable

**Table 1** Clinical characteristics and outcomes of HIV patients diagnosed with covid-19.

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overweight. Five patients (167%) had a Charlson comorbidity [Quan et al., 2011] score ≥3.

Twenty-seven (90%) patients were virologically suppressed, 2/30 patients (6.7%) had a low level plasma HIV–RNA viral load (>20 and <70 copies/mL) and only 1/30 patients had a viral load > 10,000 copies/mL. CD4 count was >500 cell/mm³ in 23/30 (76%) patients.

Positive SARS–COV2 protein chain reaction (PCR) was confirmed in 24/30 (80%) patients, 2/30 (6.7%) patients had negative SARS–COV2 PCR and typical covid-19 chest CT findings, while diagnosis was based on typical clinical presentation (anosmia and/or ageusia) in 3/30 (10%) patients (nasopharyngeal swab not done).

Median delay between symptoms onset and diagnosis was 7 days (range 1–16 days).

Antiretroviral treatment was modified during hospitalization in only one patient (switch from a TDF to a TAF–containing regimen in order to prevent renal failure in a critical patient).

An antiviral treatment for SARS–COV2 was administered, in addition to HIV treatment, in 5/30 patients (163%); 3/30 (10%) patients received lopinavir/ritonavir and 2/30 (6.6%) hydroxychloroquine. Moreover, 5/30 (166%) patients received dexamethasone and 1/30 (3.3%) tocilizumab.

Twenty-four patients (80%) recovered from covid-19, 3/30 (10%) required invasive mechanical ventilation, 2/30 (6.7%) patients died and 4/30 (13.3%) patients are still hospitalized.

Study population reflects the characteristics of the population routinely followed-up at our center, with a high percentage of migrant patients (65, 1% in PLWHIV routinely followed up, 767% in the study population). Main comorbidities were cardiovascular disease, hypertension, diabetes, obesity, and chronic renal disease, all being classic covid-19 risks factors described in others studies [Richardson et al., 2020; Hu et al., 2020; Grasselli et al., 2020; Mehra and Mandeep, 2020; Zheng et al., 2020]

In a recent publication of 57,000 patients hospitalized with SARS–COV2 infection in 12 hospitals in the New York City area, the median score of the Charlson Comorbidity Index was 4. [Richardson et al., 2020]

In our population, only five patients (167%) had a Charlson comorbidity score ≥3, but we also included outpatients and the median age was lower (53 vs 68 years).

In the same study, percentage of patients requiring mechanical ventilation was 12.2%, similar to that observed in our study (10%), but mortality was higher (21% vs 6.7%), in line with a higher comorbidity score.

In our series, the poorest outcomes and death were observed in patients with a high comorbidity score.

Most patients (90%) were virologically suppressed, with a CD4 > 500 (766%), suggesting a role of already described risk factors, rather than immunosuppression, for SARS–COV2 infection.

Compared to other series of PLWHIV SARS–COV2 infected patients [Blanco et al., 2020; Vizcarra et al., 2020], a lower percentage of patients had specific antiviral treatment for Covid-19 (163%). Based on local guidelines, antiviral treatment was indicated only in hospitalized patients with severe disease (oxygen requirement > 3lp).

Five patients in our study population were treated with an antiretroviral combination containing a non lopinavir/ritonavir inhibitor (darunavir).

In conclusion, most of the patients in our study were virologically suppressed with CD4 > 500 mm³. Risk factors were the same as those described in other SARS–COV2 series, suggesting that HIV infection is probably not an independent risk factor for covid-19 infection. Mortality was 6.7%. Poorer outcomes and death were observed in patients with a high comorbidity score. Further studies are needed to investigate risk factors, clinical outcome and treatment options of SARS–COV2 in PLWHIV.

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The participants enrolled in this study gave their written consent to have their medical charts recorded in the medical record system NAdis. The CNIL approved anonymized data extraction from electronic medical records (CNIL number 1171457, 24 May 2006). No further ethical approval is needed for French law on personal data protection.

References

Blanco Jose L, et al. COVID-19 in Patients with HIV: Clinical Case Series. Lancet HIV 2020;,
doi:http://dx.doi.org/10.1016/S2352-3018(20)30111-9 p.
S2352301820301119. DOI.org (Crossref) avrill.
Grasselli Giacomo, et al. Baseline Characteristics and Outcomes of 1591 Patients Infected With SARS-COV-2 Admitted to ICU’s in the Lombardy Region, Italy. JAMA.
DOI.org (Crossref) avrill.
Hu Ling, et al. Risk Factors Associated with Clinical Outcomes in 323 COVID-19 Hospitalized Patients in Wuhan, China. Clin Infect Dis 2020, doi:http://dx.doi.org/10.1093/cid/ciaa539. DOI.org (Crossref) mai.
Mehra MD, Mandeep R, et al. Cardiovascular Disease, Drug Therapy, and Mortality in COVID-19. N Engl J Med 2020.;doi:http://dx.doi.org/10.1056/NEJMoai2007621. DOI.org (Crossref) mai.
Peterson RL, Vock DM, Powers JH, Emery S, Cruz EF, Hunsberger S, et al. Analysis of an ordinal endpoint for use in evaluating treatments for severe influenza requiring hospitalization. Clin Trials 2017;14(3):264–76.
Quan H, Li B, Couris CM, Fushimi K, Graham P, Hider P, Januel JM, Sundararajan V. Updating and validating the Charlson comorbidity index and score for risk adjustment in hospital discharge abstracts using data from 6 countries. Am J Epidemiol 2011;173(6 March 15):676–82.
Richardson Safiya, et al. Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area. JAMA 2020; Apr 22.
Vizcarra P, Pérez-Élias MJ, Quereda C, Moreno A, Vivancos MJ, Dronda F, et al. Description of COVID-19 I.D.n HIV-infected individuals: a single-centre, prospective cohort. Lancet HIV, 2020;5:2352-3018(20 May 28):30164–8, doi: http://dx.doi.org/10.1016/S2352-3018(20)30164-8.
Zheng Zhaohai, et al. Risk Factors of Critical & Mortal COVID-19 Cases: A Systematic Literature Review and Meta-Analysis. J Infect 2020.;doi:http://dx.doi.org/10.1016/j.jinf.2020.04.021 p. S0163445320302346. DOI.org (Crossref) avrill.