



## Coronavirus Disease 2019 in a Couple Patients Co-Infected with Untreated HIV

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### Abstract

In 2019/2020, the prevalence and pandemic of severe acute respiratory syndrome coronavirus-2 (SARSCoV-2) would challenge global health for the future. This study reports a patient couple with coronavirus disease 2019 (COVID-19) co-infected by human immunodeficiency virus (HIV) with low CD4+ T-cell count, who had not previously taken antiretroviral therapy.

**Keywords:** Covid-19; HIV; Co-Infection; Antiretroviral Therapy; Viral Pneumonia

### Abbreviations

HIV: Human Immunodeficiency Virus; COVID-19: Coronavirus Disease 2019; MERS-CoV: Middle Eastern Respiratory Syndrome Related Coronavirus; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus-2; SPO<sub>2</sub>: Oxygen Saturation; CXR: Chest X-Ray; RBC: Red Blood Cell; CRP: C-Reactive Protein; PLHIV: People Living with HIV

### Introduction

For the first time, a pneumonia with unknown etiology was reported in early December 2019 in Wuhan City. The causative agent was recognized as a novel coronavirus and named severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) [1]. At present, there is no evidence suggesting there is an increased risk of infection and severity of illness for people suffering human immuno-

deficiency virus (HIV). In this regard, during the SARS-CoV-1 and Middle Eastern respiratory syndrome related coronavirus (MERS-CoV) outbreaks, there were only a few case reports of mild disease among people with HIV [2]. This study reports the clinical findings from a patient couple with COVID-19 and co-infected by untreated HIV.

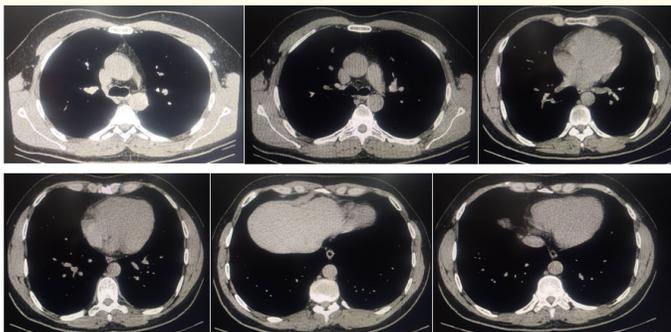
### Case Report

We report COVID-19 in a couple with HIV and no other comorbidities, who had not been treated with anti-HIV drugs. The patients had close contact with a COVID-19-positive person.

The first patient was a previously HIV infected 37-year-old man presented with low CD4+ T cell count (349 cells/ $\mu$ l). The initial physical examination indicated a body temperature of 37°C, blood pressure 120/70 mmHg, oxygen saturation (SPO<sub>2</sub>) 95% under am-

bient air, and pulse rate 78 beats per minute. The laboratory results reflected normal white blood cell count (5.300 cell/ $\mu$ l), RBC (4.66 mil/cumm), platelet (199.000  $\mu$ l), hemoglobin (14.4 g/dl) and C-reactive protein. The real-time PCR test for the SARS-Cov-2 virus was positive. The primary chest X-ray (CXR) did not show any pulmonary infiltration and it was normal.

He was treated with emtricitabine and tenofovir disoproxil fumarate (daily), lopinavir/ritonavir (two tablets every 12 hours) and azithromycin 500 mg/daily. During hospitalization, the patient had occasional headache in the frontal region and a decrease in saturation was shown (91%), which continued for one day but he did not complain of shortness of breath. Next day, the saturation re-elevated to 96%. There were no symptoms of fever, myalgia, cough, sore throat, or shortness of breath. Due to the decrease of saturation and occasional headache, spiral chest CT scans (Figure 1) and brain CT scans were performed. The result of brain CT scan was normal, while there were several peripheral nodules in the spiral chest CT scan, but there was no evidence of conflict in favor of COVID-19. Following the improvement of headache and the normality of chest CT scan, the patient was discharged. Also, treatment with emtricitabine and tenofovir disoproxil fumarate (daily) with 14 days' home quarantine was prescribed.



**Figure 1:** Spiral chest CT scans of patient first. Multiple nodules in right pulmonary with average size 3.5 × 4.5 mm and one nodule with size of 4.5 × 3.5 mm in the apical side of pleur.

The second patient was a previously HIV infected 33-year-old woman with CD4+ T cell count 355 cells/ $\mu$ l. The laboratory data for these patients were normal for white blood cell count (5000

cell/ $\mu$ l), RBC (4.09 mil/cumm), platelet (200000  $\mu$ l), hemoglobin (13.1 g/dl), and CRP. The real-time PCR test was performed for COVID-19, but the negative test result was reported. One week later, the real-time PCR test was repeated, and a positive test result was shown.

This patient had no respiratory symptoms, headache, myalgia, gastrointestinal, fever, and chills. Her clinical parameters revealed a blood pressure 110/70 mmHg, pulse rate 83 beats per minute, body temperatures 36.5°C, and oxygen saturation (SPO<sub>2</sub>) 97% under ambient air. The patient had no clinical symptoms. Treatment with emtricitabine and tenofovir disoproxil fumarate as with the first patient began for the patient. The CXR was normal and there was no pulmonary involvement. After starting the treatment, the patients had no new signs and symptoms or any deterioration in clinical manifestations. A month later, the patients were in stable condition and the couple underwent a real-time PCR test, both of which were negative.

## Discussion

Case series of HIV-patients with COVID-19 have been reported in several countries such as China, Italy, Germany, Spain, and the United States. So far, there is no clear evidence for a higher COVID-19 infection rate or different disease course in with having HIV than in HIV-negative individuals [3]. The progression of COVID-19 was associated with a continuous decrease in lymphocyte count and significant elevation of neutrophils as well as inflammatory markers [4]. The persistent inflammatory status acts as an important trigger for the coagulation cascade and suppresses the fibrinolytic system in severe and critical COVID-19 patients [5]. It is not known either if people with HIV who are clinically and virologically stable (an undetectable viral load and a CD4 count  $\geq$  200 cells/ $\mu$ l) will experience any greater risk for COVID-19 complications than the population without HIV infection. More mortality among reported COVID-19 -HIV co-infected patients is linked to older age and multimorbidity [6].

In both cases, the patients had no history of fever and only one had CT findings of viral pneumonia, which was the suspected case. According to the laboratory test results, the patients had lower CD4+ T cell count, which were consistent with HIV infection [1]. The result of their treatment showed no statistical difference in outcomes of COVID-19 between PLHIV and the general population.

Previous studies suggest that immunosuppression and low CD4 cell counts might protect HIV-infected individuals from developing the cytokine storm observed in patients with COVID-19 [7]. This may be because of increased level of CD8+ T-cell activation despite the reduction in CD8+ T-cell count in COVID-19 patients [8].

The most obvious characteristic of patients was lack of treatment against HIV and after treatment with anti-retroviral therapy, the patients recovered. The reason why an HIV+ patient not receiving antiviral therapies while catching COVID-19 and recovering from it is a big mystery about this virus. There is ongoing discussion around some anti-HIV drugs that may have some inhibitor activity against COVID-19.

### Conclusion

In our study, both patients were treated with four anti-retroviral drugs and none of them was treated with anti-SARS-CoV-2. Possibly, these drugs affected SARS-CoV-2 or the presence of HIV reduces the probability of COVID-19 infection. Further studies are required to prove this hypothesis. However, caution is required when interpreting the incidence of co-infection between SARS-CoV2 and HIV compared with the HIV-negative individuals.

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### Conflict of Interest

No conflicts of interest exist for Hamid Pajavand and other authors.

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