

A Rare Case of Persistent SARS-CoV-2 For 9 Months in an HIV Patient

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Abstract

Severe acute respiratory coronavirus virus 2 (SARS-CoV-2) RNA can be detected in the upper-respiratory specimens of patients with coronavirus disease 2019 (COVID-19) for prolonged periods, although the likelihood of recovering replication-competent virus beyond day 10 of illness is very low [1]. Much greater variability, however, has been observed with severely immunocompromised individuals, making it challenging to determine the potential for prolonged transmission risk and raising questions around the role of ongoing viral replication in the generation of SARS-CoV-2 variants [1]. There are reports of much longer RNA viral shedding (including recurrences of viremia) in respiratory samples (from 60 to 268 days) in some particular cases, mainly in immunocompromised patients [2].

In this paper, we present a case study of a 36-year-old male with Human Immunodeficiency Virus (HIV), non-compliant with medications, unvaccinated against COVID-19, presenting with blood-tinged sputum associated with weight loss. The patient had a CD4+ count of 5 cells/mm³, a high HIV viral load, and tested positive for COVID-19 via RT-PCR. Despite counseling, the patient refused HIV treatment throughout the duration of care and upon discharge. The patient first tested positive for COVID-19 during his initial admission in January 2022 and continued to test positive throughout his second admission in August 2022.

The significance of this paper is to evaluate a case of COVID-19 with concomitant untreated Acquired Immunodeficiency Syndrome displaying prolonged RT-PCR positivity for RNA SARS-CoV-2. Limited evidence exists regarding the implications of persistent COVID-19 infection in immunosuppressed individuals on further viral shedding, periods of quarantine, clinical practice, and healthcare costs. Further study will be necessary to uncover the effects of persistent COVID-19 in individuals with HIV/Acquired Immunodeficiency Syndrome.

Introduction

SARS-CoV-2 primarily affects the respiratory system, though other organ systems can also be involved. Lower respiratory tract infection-related symptoms may include fever, dry cough, and dyspnea [3]. Symptoms of patients infected with SARS-CoV-2 range from minimal to severe respiratory failure with multiple organ failure. Characteristic pulmonary ground-glass opacification can be observed on Computerized Tomography (CT) scans, even in asymptomatic patients [3].

In 2019, a disease caused by this virus emerged, named Coronavirus Disease 2019 (COVID-19), and the World Health Organization (WHO) declared it a pandemic [3]. Quarantining individuals with a high risk of recent infection is one of the pillars of non-pharmaceutical interventions to control the ongoing SARS-CoV-2 pandemic [4]. In most cases, patients infected with COVID-19 will obtain a negative PCR test a few days

after infection. However, some tests, especially PCR tests, may continue to show a positive result for up to 90 days for some patients. Reinfections can occur within 90 days, complicating the interpretation of positive tests [5].

Currently, there is evidence showing the persistence of COVID-19 in HIV-infected, severely immunosuppressed patients, likely due to the absence of an adequate host defense [2]. The longest duration of persistent COVID-19 in HIV patients from the first positive RT-PCR until the negative test was 190 days [2].

This research aims to shed light on the implications of persistent SARS-CoV-2 in an immunocompromised HIV patient. We present the case of a male with HIV who had recurrent positive RT-PCR tests over a span of 9 months. We delve into understanding the real cause behind this phenomenon and discuss how this case, among others, poses greater risks for mutations and the emergence of new variants of the disease.

Case Presentation

A 36-year-old male with a history of HIV infection, non-compliant with antiretroviral therapy, and unvaccinated against COVID-19, presented with a two-month history of exertional dyspnea, productive cough with blood-tinged sputum, associated with a 30-pound weight loss.

Additionally, the patient reported generalized weakness but denied fever, chills, night sweats, headache, dizziness, focal weakness, abdominal pain, nausea, vomiting, diarrhea, dysuria, or hematuria. He had previously been hospitalized at another facility a month prior and was found to have cavitary lung lesions, which were not further evaluated due to patient refusal for bronchoscopy.

Upon admission, laboratory investigations revealed leukopenia (WBC 0.7), severely reduced CD4 count (5 cells/mm³), and high HIV viral load (28600 copies/mL). Chest X-ray showed trace left pleural effusion with patchy opacities in the left lower lobe suspicious for pneumonia, and CT Chest additionally revealed right upper lobe cavitation with non-specific patchy opacities. The patient was COVID positive via RT-PCR. Notably, he tested positive for COVID-19 eight months prior to this presentation and continued to test positive on monthly tests. Pneumonia workup was negative for urine Legionella antigen and urine strep pneumo antigen, Acinetobacter Calcoaceticus PCR was positive, and procalcitonin was 0.45.

The patient was started on intravenous antibiotics (Azithromycin, Cefepime) and prophylaxis against Pneumocystis Jirovecii pneumonia (Atovaquone). Bronchoscopy with bronchoalveolar lavage was performed, revealing Aspergillus from the right upper lung cavitation region.

Intravenous Voriconazole was initiated for antifungal coverage, leading to improvement in productive cough over the following few days. Malignancy and tuberculosis were ruled out with appropriate tests.

Infectious disease consultation recommended initiating antiretroviral therapy for HIV; however, the patient refused despite extensive counseling. Given the need for continued Voriconazole treatment and monitoring, the patient was discharged to subacute rehab with instructions to follow up with appropriate specialties; however, he was lost to follow-up.

Discussion

Cases of prolonged viral shedding in immunocompromised patients have been reported; however, this is the longest persistence of SARS-CoV-2, spanning from January 2022 to August 2022, to the best of our knowledge. The implications of persistent positive SARS-CoV-2 PCR results in a patient with HIV are relatively unknown despite prevalent concerns regarding the risk of SARS-CoV-2 and disease complications in people living with HIV. This patient population is at a higher risk of complications that can range from influenza-associated complications [6,7] to bacterial or fungal infections [8,9], as seen in our 36-year-old patient.

A recent cohort study has shown an association between CD4+ counts and SARS-CoV-2 associated hospitalization and morbidity, indicating that a CD4+ cell count less than 200 cells/uL could contribute to disease progression [10]. It has been speculated that the continual loss of CD4+ T cells in HIV patients can inhibit the clearance of SARS-CoV-2 through antibody

production [11], leading to the persistence of the disease and potential for unique mutations. A recent series of case studies conducted in 2022 sought to understand the implications of SARS-CoV-2 on immunocompromised patients and the evolution of its variants. Seven out of eight immunocompromised patients were found to have SARS-CoV-2 RNA in their blood, with one patient showing the virus 90 days after their first infection, further suggesting that a poor immune response can allow for prolonged viral shedding [12,13,14]. This same study recovered SARS-CoV-2 viral genomes of three different variants with the presence of additional mutations, suggesting that immunocompromised patients create a more favorable environment for the virus to continue to mutate [14].

We acknowledge that we were unable to obtain a SARS-CoV-2 antibody count or test for mutational variants in the SARS-CoV-2 genome in our patient to support this claim. However, these observations can help our understanding of the implications of persistent SARS-CoV-2 infection in patients with HIV. In summary, a CD4+ T cell count less than 200 cell/uL can impede the clearance of SARS-CoV-2, prolonging viral shedding, and an immunocompromised host creates a favorable environment for the creation of SARS-CoV-2 variants. Further studies are needed to understand and address the impact of COVID-19 in the HIV/AIDS patient population and the challenges it poses to affected individuals as well as the healthcare system.

Conclusion

Since the emergence of SARS-CoV-2 in 2019, there have been few reported cases of prolonged persistent positive RT-PCR results in patients with HIV and AIDS. The longest documented duration of persistent COVID-19 PCR testing to date has been 190 days [4]. Our research follows a rare case of a 36-year-old male with a past medical history of HIV who consistently tested positive for COVID-19 for nine months. This patient was unvaccinated against COVID-19 and refused to take any antiretroviral therapy. Although the patient's lack of antiretroviral therapy and non-vaccination status may play a role, further research is required to establish a correlation between these factors and persistent positive RT-PCR results. It is also important to consider that given this patient's immunocompromised status, there is a greater risk for mutation and emergence of new COVID-19 variants. Continued research in this area is needed to determine the impact of persistent COVID-19 in patients with HIV/AIDS and its implications on guidelines for patient isolation and care. A study conducted with a larger sample size of HIV patients may provide additional insight into the ramifications of persistent COVID-19 in this population.

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