COVID-19 in people with HIV

Lancet HIV 2020
Published Online
May 28, 2020
https://doi.org/10.1016/S2352-3018(20)30163-6
See Online/Articles
https://doi.org/10.1016/S2352-3018(20)30164-8

For the **Johns Hopkins Coronavirus Resource Center** see https://coronavirus.jhu.edu/map.html

For the **COVID-19 HIV co-infection dashboard** see https://neat-id.knack.com/neat-id-covid-19#home

In the ongoing pandemic of COVID-19, nearly 5 million people have been diagnosed with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and more than 320 000 people have died. SARS-CoV-2 infection causes lymphopenia and immune-mediated cytokine storm syndrome, resulting in pathological changes in lungs, heart, liver, and other organs.[1] People living with HIV-1 infection often have suppressed immune function and it is unknown how this might affect patients with SARS-CoV-2 coinfection. Recent data have shown at least 490 patients with HIV-1 co-infected with SARS-CoV-2, of whom 287 were admitted to hospital and 50 died. However, epidemiology, clinical characteristics, and outcomes for patients with HIV–SARS-CoV-2 co-infection are not well understood.

Studies of SARS-CoV in 2003[2] and Middle East respiratory syndrome-CoV in 2015,[3] suggest that patients with HIV often have lower risks of infection and progress to severe disease, which might be because of suppression of coronavirus replication by antiretroviral therapy (ART), but longer duration of disease, which might be because of their status of immune suppression. People with HIV might be at an increased risk of SARS-CoV-2 infection or severe COVID-19, especially those with comorbidity, lower CD4 count, or high HIV RNA load.[4] By contrast, the immunosuppression and low CD4 count might protect HIV-1-infected individuals from developing the cytokine storm observed in patients with COVID-19.[5]

In *The Lancet HIV*, Pilar Vizcarra and colleagues[6] present the infection rate and clinical characteristics of COVID-19 among 2873 HIV-infected individuals in Madrid, in whom there were 35 confirmed (with SARS-CoV-2 RT-PCR testing) and 16 clinically diagnosed cases of COVID-19.[6] The authors compared the characteristics of patients with HIV with or without SARS-CoV-2 infection. Among people with HIV, body-mass index was higher in those with COVID-19 (median 25·5 kg/m² [IQR 22·1–28·0]) than in those without (23·7 kg/m² [21·5–26·0]; p=0·021). Chronic comorbidities were also more common in those with COVID-19: 32 (63%) of 51 compared with 495 (38%; p=0·0006), including hypertension (p<0·0001) and diabetes (p=0·0011).

Of the 51 HIV-infected individuals with COVID-19, the median most recent CD4 count was 565 cells per µL (IQR 296–782). All of them had received ART, and plasma HIV-RNA was fully suppressed (<50 copies per mL) in 50 patients (98%). Notably, previous administration of ART, nadir CD4 count, CD4/CD8 ratio, or pre-existing comorbidities were not significantly different in recovered versus still-admitted individuals. The rate of PCR-confirmed SARS-CoV-2 infection was 1·2% (95% CI 0·8–1·7) in the cohort of HIV-1-infected individuals, which is higher than the rate of 0·92% (0·91–0·93) in the Madrid general population. Furthermore, the rate of infection was similar or slightly higher than that in an HIV-1-infected cohort in Wuhan (0·68% [0·29-1·34]).[5] Vizcarra and colleagues[6] did not identify an association of the comorbidities with disease severity or outcomes. Similarly, nadir and recent CD4 count or CD4/CD8 ratio were not associated with disease severity. These results do not support the idea that there is a higher COVID-19 infection rate or more severe disease course in people living with HIV than in HIV-negative people. Indeed, in the study by Vizcarra and colleagues,[6] two of six critically ill individuals died and four survived. It is difficult to conclude that people with HIV with low CD4 counts might have worse outcomes than those with higher CD4 counts as previously speculated because of the small sample size.

Furthermore, controversies still exist regarding the role of some antiretrovirals in preventing or treating COVID-19. The first randomised clinical trial with ritonavir-boosted lopinavir showed no benefit over standard care in 199 adults admitted to hospital with severe COVID-19.[7] In another cohort, eight of 947 individuals taking nucleoside reverse transcriptase inhibitors (NRTIs) plus non-nucleoside reverse transfer inhibitors (NNRTIs) were co-infected with SARS-CoV-2, with a similar rate to the general population in Wuhan, indicating that an NRTI plus NNRTI did not prevent COVID-19.[5] In Vizcarra and colleagues' cohort,[6] there was no difference in previous use of antiretrovirals in individuals with and without COVID-19. Neither nadir CD4 count nor the use of specific antiretroviral drugs affected the SARS-CoV-2 infection rate. Another study found no evidence that pre-exposure prophylaxis is effective against COVID-19.[8]

All the patients with HIV in this study were already on ART and viral replication was well controlled. Therefore, the findings might not be similar in HIV-infected

patients with high viral loads, low CD4 cell count, or those who have not had ART. The effect of HIV-1 coinfection on the clinical course of COVID-19 has yet to be fully understood. More large cohort studies on coinfection with HIV and SARS-CoV-2 are needed to help understand prophylaxis of opportunistic infection for patients with low CD4 counts (<200 per μL); drug-drug interaction in co-infected patients; differences in CD4 declines during COVID-19 infection between HIV-infected patients and those without HIV infection; and the effect of SARS-CoV-2 infection on HIV reservoirs. So far, there is no evidence to support that people living with HIV have a higher COVID-19 infection rate or different disease course than those without HIV-1 infection.

We declare no competing interests.

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