Coronavirus Disease of 2019 in Patients With Well-Controlled Human Immunodeficiency Virus on Antiretroviral Therapy

To the Editors:

The first case of a novel coronavirus, SARS-CoV-2 was reported in December 2019 in Wuhan, China[1] and since then it has evolved to become a pandemic. Almost 5 million confirmed cases are reported worldwide and the United States alone now has more than one-fourth of cases with more than 92,000 deaths as of April 5th, 2020.[2] The HIV affects 37.9 million people globally.[3] There is minimal information regarding the incidence and prevalence of COVID-19 in people living with HIV (PLWH), and even less information is available detailing the clinical course. Only 2 centers have published their experience. Among the 5700 patients hospitalized with COVID-19 in New York City, 43 (0.8%) were co-infected with HIV.[4] In a survey of 1178 PLWH in Wuhan, China, 8 had confirmed SARS-CoV-2 infection.[5] Here, we present a case series of 5 patients who were seen at our tertiary care Academic Institute with HIV and Corona Virus 2019 infection (COVID-19).

A retrospective chart review of 125 patients seen at the University of New Mexico Health Sciences Center between February 1 and April 29, 2020, was done. Patient charts were reviewed by 2 independent physicians. Patients diagnosed with COVID-19 via reverse transcription polymerase chain reaction from the nasal swab were reviewed for HIV infection. We characterized patients by demographics, comorbid conditions, the severity of illness, laboratory tests, chest films, intensive care unit stay, and treatment given. In-hospital mortality estimates were calculated for patients with discharge dispositions. The University of New Mexico Health Sciences Center institutional review board approved the project with a waiver of consent.

Of 125 patients, only 5 (4%) have HIV. The demographics of the patients are summarized in Table 1 (see case description—supplementary appendix, Supplemental Digital Content, http://links.lww.com/QAI/B491). Four of them were male. All presented with usual Coronavirus of 2019 (COVID-19) symptoms of cough, subjective fever, shortness of breath except one, who had an atypical presentation of abdominal pain and a negative chest X-ray. Three were admitted to the hospital, and 2 were seen in an outpatient setting only. None of the patients were febrile or hypotensive (all had mean arterial pressure >70) on presentation. Two patients required oxygen on initial admission and only one required intubation. The patient who required intubation was older (61 years) and had diabetes, chronic kidney disease, and peripheral arterial disease. During the clinical course, none of the patients developed any secondary coinfections. Two of the 3 admitted patients were given treatment for community-acquired pneumonia due to chest X-ray finding of multifocal pneumonia. Two patients had thromboembolic events, one arterial, which required thrombectomy for critical limb ischemia, and one had a venous event in mesenteric veins, both requiring anticoagulation. One patient developed acute kidney injury requiring continuous renal replacement therapy, who recovered and was not requiring it on discharge. The other 2 patients were seen in an outpatient setting and were not hypoxemic, they were managed at home with self-isolation and symptomatic management. Both of them were asymptomatic at the end of one-week follow-up. One patient was discharged to a skilled nursing facility, 2 were discharged home. The length of hospital stay was 4–17 days. All patients were continued on their home antiretroviral therapy (ART): 3 on bicetegravir, emtricitabine, enofovir; 1 on elvitegravir, cobicistat, and emtricitabine; and 1 on emtricitabine/tenofovir, alafenamide, and raltegravir.

There is minimal information regarding the incidence and prevalence of COVID-19 in PLWH, and even less information is available detailing the clinical course.[6–8] It is unknown whether PLWH are at increased risk for COVID-19 infection or have higher mortality, but certain comorbidities and demographics that may affect PLWH, particularly those on ART, such as heart disease, diabetes, and hypertension, increase the risk of severe COVID-19.[8,9] In addition, PLWH who have low CD4 counts, or who are not on ART, may be at an increased risk of COVID-19.[8] However, despite the increased risk of acquisition of SARS-CoV-2 infection, PLWH without viral suppression and with lymphopenia may have a decreased risk of severe clinical syndrome.[5,10] Case reports from China did show that PLWH, with or without ART, may have delayed development of antibodies to SARS-CoV-2 and may have delayed recovery.[11,12] Whether these patients are prone to reinfection due to delayed antibody response needs further studies. All of our patients were taking ART, their HIV was well controlled and all five-patient survived. These findings are more or less similar to findings in a case series from Spain[13] suggesting these patients may have milder disease than the general population who acquires COVID-19.

It is well-documented that COVID-19 is associated with an increased risk of venous thromboembolism,[14] HIV itself is a hyper-thrombotic state.[15,16] It is interesting to note that in our study, 2 of 3 hospitalized patients had acute thromboembolic events. One patient had severe peripheral vascular disease, which might have further increased his risk of thromboembolism and have critical limb ischemia requiring thrombectomy. This patient also had

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TABLE 1. Demographics of the Patients With HIV Diagnosed With Covid-19 at UNM

Demographics	Case 1	Case 2	Case 3	Case 4	Case 5
Age (Yrs)/Gender	61/M	37/M	49/M	45/F	50/M
Race/Ethnicity	White/Hispanic	American Indian/ Not Hispanic	American Indian/ Not Hispanic	African American/Not Hispanic	African American/ Not Hispanic
Comorbidities	Diabetes, CKD, PAD	HIV	HIV, depression Alcohol abuse	Diabetes depression	Hyperlipidemia
Admission symptoms, vitals, and labs					
Symptoms	Chills, fatigue, fever, diarrhea, shortness of breath	Cough, chest discomfort, Anosmia, Hypogeusia	Abdominal pain, bloody diarrhea for 1 wk	Cough for 1 wk	Subjective fever, chills, cough, myalgias for 2 d
Blood pressure	142/78	150/92	118/80	107/70	108/71
O_2 Saturation on room Air	56%	92%	98%	96%	95%
Temperature° Celsius	35.9	37.2	36.3	36.5	36.6
Heart rate	111	125	57	104	90
Respiratory rate	26	20	15	16	18
Laboratory values [normal range]					
WBC [4.0–11.0 × 10E3/uL]	12.2	8.1	6.6		
Neutrophils [1.8–7 × 10E3/uL]	10.8	5.4	3.8		
Lymphocytes [1–3.4 × 10E3/uL]	0.6	2.1	2		
Hemoglobin [12.0–16.0 g/dL]	11.8	16.7	16.1		
Platelets [150–400 E3/UL]	197	249	237		
INR [0.8–1.3 ratio]		1.17	1.01		
D-dimer [0–500 ng/mL FEU]		486			
Ferritin [18–340 ng/mL]	1470	172			
CRP [<0.3 mg/dL]	26				
LDH [117–224 unit/L]	1733	230			
Lactate [0.4–2.0 mmol/L]		1.1	1.1		
A1C [4.4–5.6]	13				
Sodium [134–144 mmol/L]	134	139	138	137	142
Potassium [3.5–5.1 mmol/L]	4.5	3.6	3.5	4.2	4.3
Chloride [98–111 mmol/L]	99	108	110	102	110
Bicarbonate	19	26	24	28	23
Blood urea nitrogen	43	10	10	10	16
Creatinine [0.50–1.40 mg/dL]	1.7	1.06	0.86	1.02	1.04
AST	63	19	15	43	56
ALT		43	2	61	79
Alkaline phosphatase	156	98	94	94	69
Total bilirubin	1.5	0.9	0.8	0.7	0.5
RSPAN	Negative	N/A	Negative	Negative	Negative
Chest radiograph	Multifocal pneumonia	Multifocal pneumonia	Negative	N/A	N/A
$CD4^+$ T-cell count	333, stage 2	800, stage 1	Unknown	883, stage 1	394, stage 2

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TABLE 1. (*Continued*) Demographics of the Patients With HIV Diagnosed With Covid-19 at UNM

Demographics	Case 1	Case 2	Case 3	Case 4	Case 5
HIV Log	Not detected	N/A	N/A	Not detected	N/A
MRSA nasal swab	Negative	Negative	Positive	N/A	N/A
Blood culture	Negative	Negative	Negative	N/A	N/A
Admission to ICU	Yes	No	No	N/A	N/A
Mechanical ventilation	Yes (10 days)	No	No	N/A	N/A
Hypotension/ Vasopressors	Yes	No	No	N/A	N/A
Complications	Atrial fibrillation, RVR, bilateral lower extremity arterial thrombus, AKI requiring CRRT, PE	None	Mesenteric venous thrombosis, nonocclusive thrombus, bloody diarrhea	None	None
Median LOS in days	17 d	7 d	4 d	Outpatient visit	Outpatient visit
Disposition	Nursing home	Home no oxygen	Home, no oxygen	Outpatient	Outpatient
HIV Medications	Emtricitabine	Bicetegravir	Bicetegravir	Bicetegravir	Elvitegavir
	Tenofovir	Emtricitabine	Emtricitabine	Emtricitabine	Cobicistat
	Raltegravir	Tenofovir	Tenofovir	Tenofovir	Emtriitabine
					Tenofovir

A1C, hemoglobin A1c; ALT, alanine aminotransferase; AST, aspartate aminotransferase; CD4, cluster of differentiation 4; CKD, chronic kidney disease; COVID-19, coronavirus disease 2019; CRP, C-reactive protein; ICU, intensive care unit; INR, international normalized ratio; LDH, lactate dehydrogenase; LOS, length of stay; MRSA, methicillin-resistant *Staphylococcus aureus*; PAD, peripheral arterial disease; PE, pulmonary embolism; RVR, rapid ventricular rate; WBC, white blood cell count.

right ventricle thrombus and possible pulmonary embolism but due to acute kidney injury, a computed tomography scan of chest with contract was not obtained. The other patient presented with symptoms due to a partially occlusive inferior mesenteric vein and splenic vein thrombosis and did not have any COVID-19-related symptoms. There may be a possibility that patients with HIV and COVID-19 coinfection are more prone to have significant thromboembolic events. However larger studies are needed to ascertain this association. Patients who are managed at home should be warned for the development of these events and admitted patients should be treated with appropriate deep venous thrombosis prophylaxis.

In our case series patients were continued on their home ART throughout the course of their illnesses and it seems both safe and prudent to do so. Recent reports about lopinavir/ritonavir did not show that this combination is an effective treatment for COVID-19.[17,18] Whether to start ART, if they are not on it when diagnosed with COVID-19, needs to be studied further. Given the pathology of severe COVID-19 is due to cytokine storm leading to multiorgan failure, it may be prudent to let the virus clear before ART is started because with the initiation of ART immunologic response may do more harm than benefit. PLWH may have a milder course of COVID-19 as seen in our case series even though they may have more comorbidity than the general population, which put them at higher risk of serious COVID-19 infection.[4] This can be partly due to poor immunologic response in PLWH to COVID-19.

PLWH may have a milder course of COVID-19 even though they may have more comorbidities than the general population. They also might have a higher incidence of arterial and venous thrombotic event than the general population infected with COVID-19. ART should be continued during the treatment of COVID-19 as per usual guidelines. Whether to start ART in patients diagnosed with COVID-19 who were not on this at baseline will require further studies. We hope that our early data helps clinicians to better understand the natural history of COVID-19 in PLWH. This study has some limitations. It is a single-center case series of only 5 patients with well-controlled HIV. Only 3 of 5 patients were hospitalized, so it is relatively a small sample size for hospitalized patients. One of the patient's $CD4^+$ T-cell level was not checked, but he claimed to have well-controlled HIV without AIDS-defining illness.

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COVID-19 Pneumonia in Patients With HIV: A Case Series

To the Editors:

As our understanding of the coronavirus disease 2019 (COVID-19)

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TABLE 1. Demographic, Clinical Characteristics, and Outcomes of HIV Patients With COVID-19 (n = 27)

Variable	Distribution
Age, yr (median; IQR)	58 (50–67)
Sex (M/F)	15/12
Body mass index, kg/m^2 (median; IQR)	31.5 (26.3–36.1)
Race (n, %)	
African American	25 (93)
Hispanic	2 (7)
Symptom onset, d	3 (1, 6)
Symptoms at presentation (n, %)	
Cough	18 (67)
Fever	17 (63)
Dyspnea	17 (63)
Fatigue	13 (48)
Myalgias	9 (33)
Diarrhea	4 (15)
Nausea/vomiting	4 (15)
Comorbidities (n, %)	
Hypertension	16 (59)
Diabetes mellitus	9 (33)
Chronic kidney disease	10 (27)
Dialysis	6 (22)
Congestive heart failure	3 (11)
Coronary artery disease	1 (4)
COPD	0 (0)
Laboratory markers (median; IQR)	
White cell count, cells per 10^6/L	
Lymphocytes, %	17 (14–33)
Hemoglobin, g/dL	12.9 (12.3–14.2)
Platelets, cells per 10^6/L	202 (148–243)
D-dimer, ng/mL	1.9 (0.69–11.2)
Albumin, mg/dL	3.1 (2.73–3.92)
Procalcitonin, μ/L	0.26 (0.08–0.41)
Creatinine phosphokinase, μ/L	414 (156–1245)
Immunological profile (median; IQR)	
CD4 count	551 (286–710)
CD4%	29 (20–35)
CD4/CD8	0.9 (0.5–1.0)
Viral load, copies/mL	
<20	11 (41)
20–120	15 (55)
>120	1 (4)
Antiretroviral regimen before presentation (n, %)	
Integrase based	9 (33)
NNRTI	5 (19)
PI + integrase	5 (19)
Not available	4 (15)
NNRTI + integrase	3 (7)
PI based	1 (4)
Management for COVID-19 (n, %)	
Ambulatory	14 (52)
Inpatient	13 (48)
Hydroxychloroquine	7 (26)
Antibiotics*	8 (30)
Remdesivir	0 (0)
Steroids	1 (4)

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