

Hospitalized patients with COVID-19 and HIV: a case series

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To the Editor,

We read with interest the article by Gervasoni et al which describes a series of 47 patients with HIV (PWH) and confirmed or suspected COVID-19, 45 (96%) of whom made a full recovery [1]. Thirteen (28%) were hospitalised, two required ventilation, and one died. They conclude that the risk of severe COVID-19 in PWH was no greater, and perhaps slightly lower, than that reported in the general population. Of note, and similar to an earlier report (Blanco et al), ethnicity data were not reported [2] although emerging data in the general population suggest that race and ethnicity are associated with clinical outcomes in COVID-19 infection [3].

King's College Hospital in South London, United Kingdom, serves an ethnically diverse population and was affected early and severely by the COVID-19 pandemic [4]. We report the clinical characteristics of 18 PWH who were hospitalised with confirmed COVID-19 (SARS-CoV-2 RNA positive) including the proportion who reached a composite end point of death, requiring mechanical ventilation, or Intensive Treatment Unit (ITU) admission. We also compared the characteristics of those hospitalized with COVID-19 to our general HIV outpatient population.

The median age of our PWH and COVID-19 was 52 years, and most (94%) were black males with longstanding HIV infection and on antiretroviral therapy (ART) with undetectable HIV virus loads (Table). The majority were obese though none were smokers. The median duration of COVID-19 symptoms at admission was 8 (IQR 7, 10) days. Two patients developed COVID-19 as inpatients, likely as a result of nosocomial transmission. The commonest presenting symptoms were fever, shortness of breath and cough. Most (78%) had bilateral chest X-ray changes consistent with viral pneumonitis and required oxygen therapy. Two patients were treated with remdesivir [5], and in two ART was switched to lopinavir/ritonavir [6]. Seven patients (39%) reached the composite endpoint; these patients had similar HIV and demographic characteristics compared to those who did not reach this endpoint. At the time of writing, five patients had died [median time from

admission to death 8 (range 3, 28) days], twelve patients were successfully discharged from hospital [median duration of hospitalization 9 (range 6, 15) days], and one patient remains an inpatient.

Compared to our whole HIV outpatient cohort, those hospitalised with COVID-19 were more likely to be of black ethnicity (OR 12.22 [95%CI 1.62-92.00]) and to have lower median CD4 cell counts (395 vs. 573, $p=0.03$) (Table S1). There was a trend towards more common use of protease inhibitor-containing antiretroviral regimens among those with COVID-19 (OR 2.43 [95% CI 0.94, 6.29]).

Our data indicate that, in contrast to earlier reports [1,2], there may be substantial morbidity and mortality from COVID-19 amongst PWH, even among those on suppressive ART. Black PWH appear to be at substantially increased risk of severe disease and darunavir (or any other class of antiretroviral therapy) does not appear to provide protection against moderate/severe COVID-19. If confirmed, African regions with a high prevalence of HIV infection may be particularly vulnerable to the impact of the COVID-19 pandemic.

Contributions

The study was designed by KC and FAP. KC, CN, ZO, EH, KQ and TJ provided clinical care and data for the analysis. KC, CN and FAP performed the analyses. KC and FAP wrote the first draft of the manuscript. All authors revised and approved the final version of the manuscript.

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Conflict of Interest Statement

FAP reports grants and/or personal fees from Gilead Sciences, ViiV, Janssen, and MSD. All others report no conflicts of interest.

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Table: Clinical characteristics of patients with HIV and COVID-19

		Total	Composite endpoint ^a reached	Composite endpoint ^a not reached
N (%)		18 (100)	7 (39)	11 (61)
Demographics, HIV parameters and medical history				
Age [years]		52 (49, 58)	52 (50, 62)	52 (49, 57)
Male gender		12 (67)	5 (71)	7 (64)
Black race		17 (94) ^b	7 (100)	10 (91)
Time since HIV diagnosis [years]		14.6 (9.7, 23.4)	20.2 (10.0, 24.2)	14.5 (8.8, 23.2)
Risk factor for HIV acquisition	Heterosexual transmission	13 (72)	6 (87)	7 (63)
	Men who have sex with men	3 (17)	0	3 (27)
Previous AIDS-Defining Illness		7 (39)	2 (29)	5 (46)
Pre-admission CD4 count [cells/ μ L] ^c		395 (238, 680)	667 (276, 770)	358 (148, 530)
Nadir CD4 count [cells/ μ L]		97 (45, 143)	69 (30, 104)	119 (52, 216)
HIV RNA <50 [copies/mL]		17 (94)	7 (100)	10 (91)
Antiretroviral therapy	Protease inhibitor ^d	11 (61)	4 (57)	7 (64)
	Integrase strand-transfer inhibitor	3 (17)	2 (29)	1 (9)
	Non-nucleoside reverse-transcriptase inhibitor	4 (22)	1 (14)	3 (27)
	Nucleoside reverse-transcriptase inhibitor	18 (100)	7 (100)	11 (100)
Clinical frailty index ^e	≤ 4	15 (83)	5 (71)	10 (91)
Smoker		0	0	0
BMI > 30 [kg/m ²]		10 (56)	5 (71)	5 (45)
Hypertension		6 (33)	2 (29)	4 (36)
Diabetes mellitus		4 (22)	3 (43)	1 (9)
Chronic kidney disease ^f		5 (28)	3 (43)	2 (18)
On admission				
Symptoms	Cough	13 (72)	6 (86)	7 (64)
	Fever	11 (61)	5 (71)	7 (64)

	Shortness of breath	12 (67)	3 (43)	7 (64)
Time since onset of COVID symptoms [days]		8 (7, 10)	8 (4, 12)	7 (7, 10)
Infiltrates on radiograph		13 (72)	7 (100)	6 (55)
Lymphocytes [$\times 10^9/L$]		1.1 (0.7, 1.9)	1.4 (1.1, 2.3)	0.9 (0.5, 1.8)
C-Reactive Protein [mg/L]		143 (72, 253)	203 (100, 302)	130 (72, 213)
During hospital admission				
Acute Kidney Injury ^g		5 (28)	5 (71)	0
Peak oxygen requirement	FiO ₂ <28%	3 (16)	0	3 (27)
	FiO ₂ 28-60%	5 (28)	0	5 (45)
	FiO ₂ >60% via non-rebreather bag	3 (16)	2 (29)	1 (9)
	Mechanical ventilation	5 (28)	5 (71)	0
Vasopressor support		5 (28)	5 (71)	0
Renal replacement therapy		4 (22)	4 (57)	0

Data are expressed as N (%) [categorical variables] or median (interquartile range) [continuous variables]

^a Composite endpoint: mechanical ventilation, Intensive Treatment Unit (ITU) admission, or death

^b 65% of black patients were born in sub-Saharan Africa

^c Most recent outpatient measurement

^d All were on darunavir boosted with ritonavir or cobicistat

^e Clinical Frailty Scale Canadian Study on Health & Aging, Revised 2008

^f Stage 3/4/5 chronic kidney disease according to KDIGO criteria 2012

^g Stage 2/3 acute kidney injury according to KDIGO criteria 2012