


Prognosis of coronavirus disease 2019 (COVID-19) in patients with HIV infection in New York City

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Research letter

Since coronavirus disease 2019 (COVID-19) emerged in China in late 2019, New York City has become an epicentre of the infection, experiencing 148 158 cases as of 1 May 2020 [1]. The impact of COVID-19 in patients with HIV infection is currently under active investigation in many countries; for example, Blanco *et al.* reported a clinical case series of patients with a

coinfection of COVID-19 and HIV in Barcelona [2]. Herein, we sought to examine the prognosis of COVID-19 in patients with HIV infection in New York City, where the prevalence of HIV infection is 1.3% of the population [3]. We analysed the electronic medical records of the Mount Sinai Health System, a medical network covering a wide area of New York City, comprised of eight hospitals and more than 400 ambulatory care units, using EPIC SLICER DICER software (Epic,

Table 1 (a) Baseline characteristics of patients with coronavirus disease 2019 (COVID-19) with and without HIV infection; (b) risk of intensive care unit (ICU) admission, intubation and death in patients with COVID-19

(a)									
	With HIV infection (<i>n</i> = 161)			Without HIV infection (<i>n</i> = 8751)			<i>P</i> -value		
Male	125 (78)			4797 (55)			< 0.001		
Age							< 0.001		
≤ 50 years	38 (24)			2981 (34)					
51–65 years	82 (51)			2450 (28)					
≥ 66 years	41 (25)			3320 (38)					
Hypertension	74 (46)			2610 (30)			< 0.001		
Diabetes mellitus	46 (29)			1721 (20)			0.005		
Dyslipidaemia	55 (34)			1639 (19)			< 0.001		
Heart failure	15 (9)			664 (8)			0.41		
Chronic kidney disease	39 (24)			881 (10)			< 0.001		

Age group (years)	ICU admission (<i>n</i> = 1982)			Intubation (<i>n</i> = 752)			Death (<i>n</i> = 1258)		
	With HIV infection [<i>n</i> (%)]	Without HIV infection [<i>n</i> (%)]	RR (95% CI)	With HIV infection [<i>n</i> (%)]	Without HIV infection [<i>n</i> (%)]	RR (95% CI)	With HIV infection [<i>n</i> (%)]	Without HIV infection [<i>n</i> (%)]	RR (95% CI)
All	36 (22)	1946 (22)	1.01 (0.75–1.34)	19 (12)	733 (8)	1.41 (0.92–2.16)	23 (14)	1235 (14)	1.01 (0.69–1.48)
≤ 50	7 (18)	344 (12)	1.60 (0.81–3.14)	5 (13)	132 (4)	2.97 (1.29–6.84)	3 (8)	54 (2)	4.36 (1.43–13.3)
51–65	23 (28)	637 (26)	1.08 (0.76–1.54)	10 (12)	224 (9)	1.33 (0.74–2.42)	12 (15)	257 (10)	1.40 (0.82–2.38)
≥ 66	6 (15)	965 (29)	0.50 (0.24–1.06)	4 (10)	377 (11)	0.86 (0.34–2.19)	8 (20)	924 (28)	0.70 (0.38–1.31)

Values are *n* (%). Bold means 95% CI does not include 1.00.

Patients with HIV infection: *n* = 161; patients without HIV infection: *n* = 8751.

CI, confidence interval; RR, relative risk.

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Verona, WI, USA) on 1 May 2020. We extracted data including age, sex and comorbidities for patients who were positive for the COVID-19 reverse transcriptase–polymerase chain reaction test from 1 March to 30 April 2020, regardless of the location of diagnosis, such as an ambulatory care unit, emergency department or hospital ward. We investigated the association between HIV infection and outcomes, including mortality rate as of 1 May 2020, and the risk of intubation or intensive care unit (ICU) admission. The comparison was conducted using a two-tailed χ^2 test after stratifying the patients into three age groups, as age is one of the most significant risk factors for severe COVID-19 [4]. This research used only deidentified, aggregate-level data.

A total of 8912 patients with COVID-19 were identified, of whom 161 patients (1.8%) had HIV infection. The proportion of male individuals was higher in patients with HIV infection. Compared to COVID-19 patients without HIV infection, patients with HIV infection had higher prevalences of hypertension, diabetes mellitus, dyslipidaemia, heart failure, and chronic kidney disease (Table 1a). In the age group younger than 50 years, patients with HIV infection had higher risks of intubation and death [relative risk (95% confidence interval) 2.97 (1.29–6.84) and 4.36 (1.43–13.3), respectively]. In contrast, no significant difference between those with and without HIV infection was detected in the other age groups or for the risk of ICU admission (Table 1b).

Male sex and the presence of comorbid conditions, including hypertension, diabetes mellitus and cardiovascular diseases, are known risk factors for severe COVID-19 [5]. Therefore, the higher risk of intubation and death in younger COVID-19 patients with HIV infection, compared with those without HIV infection, observed in this analysis may have been caused by the higher percentage of male patients and the higher prevalence of comorbidities in those with HIV infection. However, older patients with HIV infection did not demonstrate a worse prognosis, despite baseline characteristics suggesting that they might have been at a higher risk of a worse prognosis, which is of

interest. This study only used aggregated data, which did not allow adjustment of potential prognostic factors, including the status or treatment of HIV infection, ethnicity or drug abuse. Further studies incorporating individual patients' data are warranted to investigate the association between COVID-19 and HIV infection.

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Author contributions

HM and TK were responsible for the study concept and design and the statistical analysis. HM had full access to all the data in the study and takes responsibility for the integrity of the data and accuracy of the data analysis, and was responsible for acquisition, analysis, and interpretation of data, administrative, technical and material support, and drafting of the manuscript. TK was responsible for study supervision and critical revision of the manuscript for important intellectual content.

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