Questioning the association between ABO type and outcomes in patients with COVID-19

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Dear Editor,

Early data on coronavirus disease 2019 (COVID-19) had suggested that ABO type is associated with variation in clinical presentation and patient outcomes. The first study from China indicated that patients of blood group O had a lower risk of death from the infection (OR 0.66; $p = 0.014$) [1]. More recently, genome-wide association analysis found a higher risk of respiratory failure for group A-positive patients (OR = 1.45; $p = 1.48 \times 10^{-4}$) and a protective effect for group O (OR = 0.65; $p = 1.06 \times 10^{-5}$) [2].

In light of these observations, we retrospectively reviewed the records of patients consecutively admitted to our institution for 45 days to evaluate the potential association between ABO type and outcomes. A total of 165 patients were analyzed; their average age was 57 ± 17 years (range: 16–94) and 61% were male. The majority were African-American (54%), followed by Caucasian (40%), Hispanic (3%), Asian (2%), and 1% not documented. The frequency of blood groups was 43% type O, 34% type A, 18% type B, and 5% type AB. Of note, 96% of patients were Rh positive. Ninety-eight (59%) patients required intensive care treatment and 32 (19%) succumbed to the disease. As seen in Table 1, there was no

association between ABO type and admission to an intensive care unit ($p = 0.94$), diagnosis of thrombosis during hospitalization ($p = 0.84$), or death ($p = 0.41$).

Thus, in our patient population, we did not see an association between blood group and severity of COVID-19. Our results are comparable to emerging data from others that also question earlier findings. Zietz et al. as well as Dzik et al. did not find that blood group was significantly associated with patient outcomes at their respective institutions [3, 4]. Most recently, a third group of investigators again did not observe an association between blood group and intubation or death [5].

Given emerging data indicating increased rates of infection and increased severity in Black, Asian, and Minority Ethnic (BAME) populations [6], we compared the expected distribution of blood groups by race in the general population with the observed distribution among patients hospitalized with COVID-19. Acknowledging the limitation of the small sample size of our effort, we did not identify a significant variation between the rates of infection by blood type compared to the expected distribution by race. Observed rates of infection and hospitalization in Black or African-American patients ($n = 91$) by blood type were 46% type O, 27% type A, 21% type B, and 5% type AB, compared to expected blood type frequencies of 49% type O, 27% type A, 20% type B, and 4% type AB. Rates in Caucasian patients also did not vary significantly from expected frequencies. Our population contained insufficient Hispanic, Asian, or other minority patients to reach conclusions.

Although the association between blood group and severity of COVID-19 infection has garnered significant attention in the scientific and lay communities, our data add to the existing literature that questions the clinical significance of the finding and emphasizes the need for further investigation.

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Table 1 Influence of ABO blood type on outcomes of patients with COVID-19

Blood group	Intensive care		Thrombosis		Death	
	<i>n</i> (%) [*]	<i>p</i> value	<i>n</i> (%) [*]	<i>p</i> value	<i>n</i> (%) [*]	<i>p</i> value
O	41 (58)	0.91	10 (14)	0.84	11 (15)	0.41
A	35 (61)		8 (14)		11 (19)	
B	18 (62)		6 (21)		7 (24)	
AB	4 (50)		1 (12)		3 (37)	
Total	98		25		32	

*Percentages based on the total number of patients with each blood group

Data availability All data and materials are available upon request.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethics approval Ethical approval was waived by the local Ethics Committee of the University of Alabama at Birmingham in view of the retrospective nature of the study and all the procedures being performed were part of the routine care.

Consent to participate Not applicable

Consent for publication Not applicable

Code availability Not applicable

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