

The Role of Blood Group in COVID-19 Infection: More Information Is Needed

Dear Editor,

The number of confirmed cases of the 2019 novel coronavirus (COVID-19) reported to the World Health Organization continues to rise worldwide.^[1] As of March 21, 2020, the total number of confirmed cases was 292,142 globally, with 12,784 deaths, and the number of infected nations increased to 187 countries. The mortality rate of this novel virus is 3%–4% (dividing the total death numbers by the total recorded cases) [Table 1].^[2]

The most common complicated persons with COVID-19 were men with chronic pulmonary or cardiovascular disorders, hypertension, and diabetes. Infected individuals have a fever, cough with sputum, headache, and diarrhea. Renal failure may be one of the viral complications.^[3]

Zhao *et al.*^[4] reported that individuals with blood group Type A are under a higher risk of getting COVID-19 compared with other blood groups, whereas people with blood group Type O have a lower risk for acquiring infection compared to others.^[4]

This new finding is based on comparing the blood groups of 2173 confirmed cases with COVID-19 in China, with that of normal people from a similar area.

The ABO blood group from 3694 healthy controls was tested, with a distribution of A, B, AB, and O being 32.16%, 24.90%, 9.10%, and 33.84%, respectively. In addition, blood groups of a total of 1775 persons infected with COVID-19 showed a distribution of 25.80%, 10.03%, 26.42%, and 37.75% for O, AB, B, and A, respectively. The proportion of blood group A in patients with COVID-19 was significantly higher than that in healthy individuals, being 37.75% in the former versus 32.16% in the latter ($P < 0.001$). While blood group O in

patients with COVID-19 was clearly lower than that in healthy individuals (25.80% vs. 33.84%, respectively [$P < 0.001$]). While the risk for blood group A individuals to acquire COVID-19 infection was higher with an odds ratio (OR) of 1.279, the corresponding risk for blood group O individuals was lower with an OR of 0.680.

The same findings were observed in the blood groups of 206 dead individuals infected with COVID-19. Individuals with blood group A had a higher risk of infection compared with those of blood group O. The distribution of blood groups in patients who died due to COVID-19 disease was 25.24%, 9.22%, 24.27%, and 41.26%, for Groups O, AB, B, and A, respectively.

Blood group O was associated with a lower risk of death compared with non-O groups, with an OR of 0.660. On the contrary, blood group A was associated with a higher

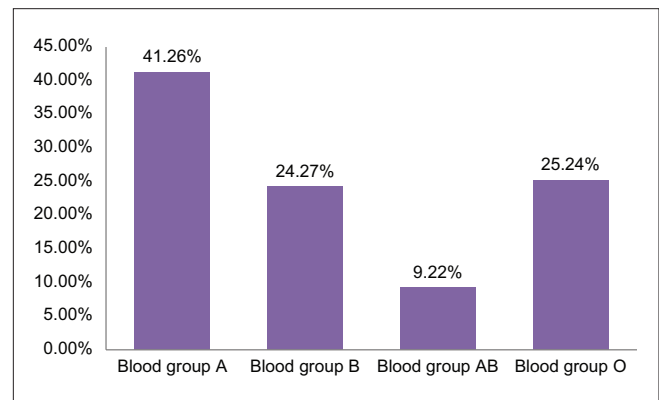


Figure 1: Distribution of ABO blood group in 206 dead patients with COVID-19

Table 1: 2019 novel coronavirus outbreak

Duration	Total confirmed	In China	Out of China	Total death	Number of countries
3 January	44	44	0	0	1
20 January	282	278	4	6	4
31 January	9826	9780	106	213	20
1 February	11,953	11,821	132	259	24
5 February	24,554	24,363	191	292	24
12 February	45,171	44,730	441	1115	25
19 February	75,204	74,280	924	2009	26
26 February	81,109	78,191	2918	2761	37
10 March	113,702	80,924	32,778	4012	109
15 March	153,517	81,048	72,469	5735	144
17 March	179,111	81,116	97,995	7426	158
21 March	292,142	81,498	210,644	12,784	187

risk of dying compared with non-A groups, with an OR of 1.482 [Figure 1].

As already known, there are 34 recognized human blood group systems and hundreds of individual blood group antigens and alleles. Differences in blood group antigen expression can increase or decrease host susceptibility to many infections. ABO antibodies can be considered part of the innate immune system against some bacterial pathogens and enveloped viruses that may play a crucial role in the pathogenesis and personal susceptibility to certain diseases;^[5] COVID-19 may be one among these diseases. However, in this study, differences between various blood group systems, blood group antigens, or alleles, which may give more accurate results with in-depth knowledge of the susceptibility of this new viral infection, are not mentioned.

Only a few agents, such as malarial parasites and parvovirus B19, infect red blood cells (RBCs) and precursors. Most other agents use RBCs as carriers to the target tissue as Lewis antigen.^[6]

In a Hong Kong outbreak, there was an apparent association between disease transmission and ABO type. An epidemiology study of 34/45 hospital workers who contracted severe acute respiratory syndrome after exposure to a single-index patient showed that most of the infected individuals (23/34) were non-group O individuals (groups A, B, and AB). Group O individuals were relatively resistant to infection, with an OR of 0.18; this finding is in agreement with this study.^[7]

Like HIV, coronavirus is an enveloped virus that targets host cells via a viral adhesion glycoprotein. Among the 389 HIV donors (0.01%) found upon screening, 14% were group B individuals, a rate which was slightly higher than that in the general population (9%; OR, 1.5).^[5]

To conclude, the ABO blood groups displayed different association risks for infection with COVID-19. Blood group A was significantly associated with an increased risk. In contrast, blood group O was associated with a decreased risk, thus demonstrating that the ABO blood type is a biomarker for the differential susceptibility of COVID-19. People with blood group A might require particularly enriched personal protection to diminish the chance of infection and to receive more vigilant surveillance and aggressive management. More studies, including the subgroups of ABO, are needed for more information about this correlation between COVID-19 and ABO types.

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Conflicts of interest

There are no conflicts of interest.

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