

The Relation Ship Between ABO Blood Group Type and the Covid-19 Infection Susceptibility in PAF Hospital Mushaf, Sargodha

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ABSTRACT

Objective: To study the relationship of ABO blood group type and COVID -19 infection susceptibility in PAF hospital Mushaf, Sargodha

Introduction: The novel corona virus disease COVID-19 has spread around the world rapidly and declared as a pandemic by WHO, which still continues to outrage. Virus is contagious and spreads and in severe cases can lead to acute respiratory distress syndrome, septic shock, and even death. Viral infection and ABO blood groups are found to be associated from previous literature, as ABO blood group serve as receptor or co receptor for many viral and bacterial organisms.

Methodology: Retrospective observational study in which 390 individuals including serving personnel, their dependents, retired and the civilians of all age groups and both genders residing in the premises of PAF Air Base Mushaf, Sargodha” who were tested positive for COVID screenings were included. Blood group was identified by laboratory testing. Data was analyzed using SPSS.

Results: Initially screened 690 patients showed 390 were tested positive for COVID-19, blood group A+Ve, A–Ve and B+Ve were associated with higher risk for acquiring COVID-19 infection (P-value of <0.05), whereas blood group B-Ve, O+Ve, O-Ve, AB+Ve and AB-Ve has no association with COVID- 19 infection (Pvalue of >0.05).

Conclusion: Our findings suggest that among COVID-19 confirmed patients, patients with B+ blood group had high susceptibility while patients with AB- blood group has minimal susceptibility to COVID-19 patients. The application of these relationships in clinical practice requires more exploratory studies.

Key words: ABO group, COVID-19, SARS-CoV-2

INTRODUCTION

The Novel Corona virus, which causes COVID-19, has quickly spread to the entire planet (1, 2). Due to the rapid dissemination of COVID-19, the number of cases has increased dramatically (3). The COVID positive person is used as a spreading virus contagion, until now the main transmission routes are the seven recognized forms of coronaviruses, including SARS-CoV-1, SARS-CoV-2 infecting and propagating human beings through respiratory goutlets and near contacts. Current clinical evidence indicates that patients' blood groups, age, gender, and co-morbidities are key risk factors predicting COVID-19 infection extent and susceptibility (4).

Various strains and features of the virus are not well known. However, research shows that different COVID-19 variants transmit faster. COVID-19 is characterized clinically by fever, tiredness which dry cough, and may often be asymptomatic. In extreme cases, people affected can experience acute respiratory distress syndrome, septic shock or even death (2, 5). Vaccines for corona virus are however available, but rolling out of the vaccine will take months firstly because of an increasing demand, and secondly the underdeveloped countries would have to handle the cost efficiency of easy access to the vaccine. (6) This situation shows that in the coming months, new varieties will begin to grow and transmit more quickly, which will also cause more serious symptoms, adding additional burdens to health workers who have already been working under high pressure to fight new coronaviruses. (6) (7). Measures like all SOPs should be pursued and molecular monitoring should take place in order to

avoid the dissemination of existing variants and the importation of new variants of virus. Test, trace, insulate, help and enforce compulsive isolation and preventive quarantine of suspected cases people with confirmed infections (8). Prevention can be achieved by preventively monitoring and testing, providing free tests in schools and workplaces for the early detection and protection of outbreaks, increasing demand-friendly test capability, using waste water surveillance to track local spikes, enhancing genetic sequencing and PCR detection. Any further spread at this stage must be postponed or avoided in order to prevent new cases and reduce the current number of cases (9). Reducing national and cross-border travel and requiring cross-border checks and quarantine; tests should be required 24h before travel and 7–10 days after travel so as to avoid high local COVID-19 transmission and/or suspicious variants. Ensure the availability, supply and allocation of vaccines and track possible re-infections (10). Improving the safety of seniors and disadvantaged groups needs effective policies and actions to accelerate progress (11).

The blood group types (ABO blood group system) are the largest blood group system in humans, and involve four genetically-inherited blood types, namely A, AB, B and O, which may affect the theories about the next generation of ABO blood group type (12). Viral infections have been shown to be related to the ABO blood group. The ABO blood group antigen may affect the susceptibility to viral infections, ABO blood group may function for several viral and bacterial species as receptor or co-receptor (13). A study also found that the blood group O has a lower risk for

viral conditions such as Hepatitis B, C, HIV, syphilis and malaria because the interaction between SARS-CoV-1 and the Angiotensin Converting Enzyme 2 (ACE2 receptor) that is expressed in host cells seems to be antagonized by anti-A antibody in blood group O or b. A blood group type is more common in patients who are infected with extreme COVID-19 since non-O blood groups have unique ABO genes that are positive in ACE function, mediating viral infections. Cheng et al had predicted that the ABO blood group system would be susceptible to SARS-CoV infection in HONG KONG. The authors find that O Blood Group healthcare workers had a lower risk of infection than non O blood groups (15). Here, we investigated the relationship between the ABO blood group type and the susceptibility to COVID- 19 in patients who were admitted in PAF Hospital Mushaf, Sargodha.

MATERIAL & METHODS

A hospital based, retrospective observational study was designed to evaluate ABO blood group phenotypes and susceptibility to COVID-19 infection. The study was conducted for eight months, in the period between 25th March and 30th december,2020. Real time RT-PCR positive cases of COVID-19 and SARS-CoV-2 variant were enrolled in the study from PAF Hospital Mushaf, Sargodha. ABO blood groups type was identified through laboratory testing of PAF Hospital Mushaf. This study included data of serving personnel, their dependents, retired and the civilians of all age groups and both genders residing in the premises of PAF Air Base Mushaf, Sargodha.

Study Design: Retrospective observational study

Duration of Study: 8 months

Setting: Department of Medicine, PAF Hospital Mushaf, Sargodha

Inclusion criteria: All individuals with COVID positive test from both genders and from all age groups were included.

Exclusion criteria: Patients with COVID negative tests.

Data collection: The confirmed COVID-19 patients medical records were reviewed.COVID-19 was diagnosed based on provisional guidelines from the WHO.A confirmed case of COVID-19 was identified as a positive result for nasal and pharyngeal swab specimens in real time reverse transcriptase-polymerase chain reaction(RTPCR).

Statistical analysis: Mean age was calculated and frequencies in terms of number and percentages were calculated for observed frequency of ABO blood groups, viz A, AB, B,O, blood group were compared against the expected population frequency using chi square test. SPSS software was used for the analysis. P value < 0.05 was considered statistically significant.

RESULTS

Six hundred fifty patients were tested for COVID, out of which total 390(40%) corona positive participants were found, among which 150(39%)were males and 240(62%) were females. Out of 390 patients, Mean age of participants was found to be 36.6 with standard deviation of 1.8 102 (26.15%) were A +ve, 139(35.6%) were having blood group A-ve, 97(24.87%) were having B+ve blood group and 32(8.21%) had Bve blood group, 7(1.79%) had O+ve blood group and 9 (2.3%) had O-ve blood group, 7(1.8%) corona positive population had AB+ve and 7(1.8%)

corona positive population had AB-ve blood group as shown in table 1. Chi square test for association of blood group and COVID shows it to be significantly correlated with A+ve, A-ve and B+ve blood group with P- value of 0.01. 0.03 and 0.01 respectively, whereas B-ve ,O+ve, O-ve, AB +ve and Ab -ve were not found to be correlated with blood group with p- value of 0.1,0.06,0.09,0.06 and 0.06 respectively.

Table 1: Frequency and percentages of blood group and Cases

Blood Groups	Positive Cases		Negative Cases	
	Frequency	Percent	Frequency	Percent
A+	102	26.2	4	1.5
A-	131	33.6	8	3.1
B+	95	24.4	87	33.5
B-	32	8.2	137	52.7
O+	7	1.8	5	1.9
O-	9	2.3	5	1.9
AB+	7	1.8	6	2.3
AB-	7	1.8	8	3
Total	390	100.0	260	100.0

Table 2: chi square analysis of association between blood group and COVID

Blood Groups	P-value
A+	0.01
A-	0.03
B+	0.01
B-	0.1
O+	0.06
O-	0.09
AB+	0.06
AB-	0.06

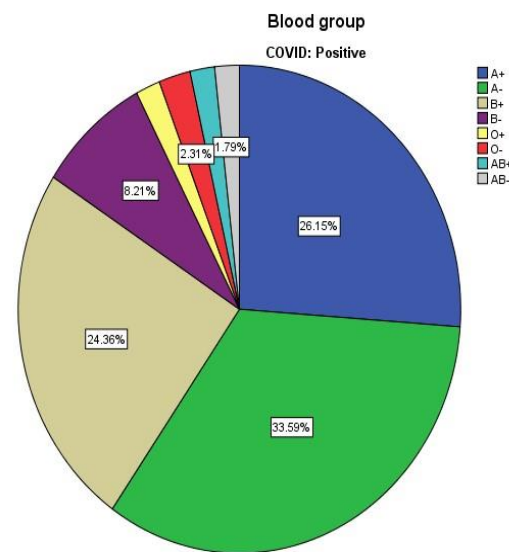


Figure 1 distribution of blood group in COVID

DISCUSSION

Several studies examined the association between the blood group ABO and various viral infections. This is the first research in Pakistan to demonstrate the link between the ABO and COVID-19 infections, to the best of our knowledge. The ABO blood group was studied in 186 patients in Goker (2020) and found blood group A (57 percent) to be the most commonly detected blood groups among COVID-19 patients, followed by blood group O. (24.8 percent). No association has been identified between the blood group and the clinical outcome. The number of people suffering with COVID-19 was substantially higher compared to the controls in blood group A (57% vs 38%), $p < 0.001$; OR 2:1). Whereas in COVID-19 patients blood group O was substantially lower than in control group (24.8% vs 37.2%), $p: 0.001$; OR:1,8) (16).

Also a retrospective cohort study with 265 patients from Wuhan Central Hospital revealed that SARS CoV2 patients had a greater proportion of blood group A patients than those in the healthy control (39,3% vs 32,3% $p = 0,017$), while the proportion of blood group O was significantly lower in patients infected with SARS COV 2 than that in healthy controls (25,7 perceived) (17).

The average lymphocyte count was the lowest of blood type A in patients; however, there was still no substantial statistical difference compared with other blood types. Study concluded that blood type A individuals are prone to COVID-19 (18).

Study of 397 patients with higher COVID-19 infection associations with the blood group AB. Wuhan, China data, the first COVID-19 epicenter shows ABO blood group connectivity to COVID-19 infection (12). Zhao et al. compared ABO blood control groups from 2173 COVID-19 patients in three WUHAN hospitals. Over all the three hospital blood group A the risk of COVID was higher -19 than non-A blood groups, while blood group O was significantly lower than non-O blood groups, for infection was associated (19).

A similar research was performed in comparison with ABO blood groups in our COVID-19 patients; we found that the risk of COVID-19 was considerably increased in patients with B+ blood groups and significantly lower in patients with AB blood group (20).

Whilst a number of unproven hypotheses exist including anti-blood group antibodies, the mechanism underlying some blood groups' susceptibility to corona virus infection is not clear. Our sample association between ABO blood group and the COVID-19 infection shows that further research can be conducted between the seriousness of symptoms, blood group and COVID.

CONCLUSION

Our results indicate that B+ blood patients were highly susceptible among COVID-20 patients, whereas AB- blood group patients were lowly susceptible to COVID-19. More exploratory studies are necessary to apply these relationships in clinical practice.

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