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KEY WORDS:

ASSOCIATION OF ABO BLOOD GROUP WITH COVID-19 INFECTION AND ITS SEVERITY

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INTRODUCTION:

COVID-19 has ushered one of most devastating pandemics of the 21st century, affecting nearly every country across the globe, shattering economies and pushing people to poverty. The causative agent SARS COV-2 is a betacorona virus[1]. It was preceded by two other coronaviruses namely, Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) in 2002 and 2012 respectively. The origin of this virus is presumed to be zoonotic and spread from the Wuhan city(china) wet food market.[2] The viral transmission is mainly airborne, through micro and macro droplets produced during coughing and sneezing.[3]

The incubation period of the disease is around 14 days. It internalizes by binding to the ACE-2 receptors present on the cell surface. The virus affects nearly every organ of the body but mainly causes lethality by affecting the lungs and the cardio-vascular system. The initial symptoms of the disease can be variable, ranging from merely asymptomatic to dry cough, fever, generalized body ache, anorexia, anosmia, diarrhea. These symptoms may progress to more sinister conditions of bilateral pneumonitis, generalized vascular hypercoagubility, congestive cardiac failure depending on the pre-existing comorbidities such as old age, diabetes, hypertension, Ischemic Heart Disease, COPD, metabolic syndrome, chronic kidney disease etc. Given the significant morbidity and mortality there has been increasing interest in elucidating factors which affects patient susceptibility and disease severity.

Correlation between Landsteiner's ABO blood groups and cardiovascular disease, cancers, susceptibility to certain infections (Norwalk virus, *Helicobacter Pylori*) has been elucidated in past. Such an attempt is made by us to investigate the association between ABO/Rh blood group and susceptibility and severity of infection.

MATERIALS AND METHOD:

This is a retrospective descriptive study done in 3 months duration between 1st, May,2020 to 31st, July,2020. The study was done on 150 randomly selected cases who were admitted in New Medical College, Kota, Rajasthan, the dedicated COVID tertiary care hospital in Hadoti region after prior clearance from Institute Ethical Committee (IEC).

Case diagnosis:

Patients who had symptoms suggestive of the disease were admitted to the hospital. Throat swabs and nasal swabs were taken by appropriately trained staff after taking all biosafety precautions. The samples were placed in Viral Transport Medium tubes and were processed to perform RT-PCR using U.S FDA approved testing kits as per recommendations of ICMR.[4]

Data collection:

After selecting the cases, their data was accessed from the Medical Records Department. The demographic details of the patients were recorded including age, sex and comorbidities. Further the cases were classified into mild, moderate and severe based on the guidelines of MOHFW[5]. The cases in mild and moderate category were clubbed together as non-severe for comparison purpose.

Statistical analysis:

All categorical variables were presented as proportions and were compared using chi square test. All continuous variables were presented as means and were compared using unpaired t test.

Results:

Table 1: Demographic profile of patients

Age			
	All	Non-severe	Severe
<18	3 (2%)	3 (2%)	0
18-44	86 (57.3%)	78 (52%)	8 (5.3%)
45-64	40 (26.6%)	31 (20.6%)	9 (6%)
>65	21 (14%)	18 (12%)	3 (2%)
Sex			
Male	109 (72.6%)	95 (63.3%)	14 (9.3%)
Female	41 (27.3%)	36 (24%)	5 (3.3%)

Table 2: Cases according to blood group

Blood group	All	Non-severe	Severe
A	45(30%)	41(91.1%)	4(8.9%)
B	56(37.3%)	46(82.1%)	10(17.9%)
AB	15(10%)	14(93.3%)	1(6.7%)
O	29(19.3%)	24(82.7%)	5(17.3%)

Table 3: Cases according to Rh

Group	All	Non-severe	Severe
Rh+	136 (90.6%)	116 (85.2%)	20 (14.8%)
Rh-	14 (9.4%)	14 (100%)	0

DISCUSSION:

Since ABO blood groups are associated with differing susceptibility to some infections, an attempt was made in 2005 by Cheng et al to find association between SARS Cov-1 virus and ABO blood groups. in this study he found that Group O had lower susceptibility as compared to non-o blood groups.[6] SARS Cov-2 bears 79% similarity with SARS Cov-1 so it is probable that there maybe a similar association in this disease too. The average age of study participants was 43.7 years. The age group of 18-44 years i.e young adults were maximum in number (57.3%). The proportion of severe cases in the older adults and geriatric population was more (19.6%

vs 8.9%), which was consistent with other studies.

Males were way more than females (72.6% vs 27.3%), which may be due to the fact that males had more occupation related exposures. The proportion of severe cases in males and females was nearly equal (12.8% vs 12.1%) which suggests that there is no effect of sex on severity.

Zhao et al found that there were more cases of blood group A as compared to O (37.8% vs 25.8%) in his study group of 1775 patients.[7] Zietz et al also found in their metanalysis that O blood group had significantly reduced susceptibility than others.[8] In our study study also we found that maximum patients were of A(30%) and B(37%) blood group but least number of patients were of AB blood group as opposed to O blood group in other studies. The proportion of severe cases was highest in B and O blood groups (both 17.9%) as opposed to A blood group in other studies.[9] This is probably due to smaller sample size of our study.

Though, there are not much studies regarding association between Rh factor and COVID-19 but zietz et al found that there was significant association between ABO/Rh, Rh and intubation and death following infection.[8] In our study, majority of cases were Rh positive i.e 90.6%. This correlates with the general population distribution of Rh factor. There was no case of severe disease in Rh negative group as compared to 14% in Rh positive group. This may signify that absence of Rh factor has protective effect in disease severity.

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