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A CROSS SECTIONAL ANALYSIS OF CORRELATION BETWEEN COVID-19 HOSPITALISED PATIENTS AND BLOOD GROUP

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ABSTRACT:
Since the first outbreak of COVID-19 in Wuhan several researchers investigated the host susceptibility linked to the blood group or anti-histo-blood group antibodies for Coronaviridae viruses (e.g. SARS-CoV). Susceptibility of certain viral infections has been linked to antigenic determinants of ABO blood groups. Cheng et al. showed linkage of SARS coronavirus infection with ABO blood groups, where individuals with blood group O were less likely to become infected, compared to non-O blood group individuals. However, whether a specific blood group is associated with an increased risk of SARS-CoV- 2 infection, and the strength of this association, remains preliminary and controversial. Therefore, the primary **objective** of this study is to explore the relation between covid-19 and blood group in the patients admitted in the hospital and to explore the various blood parameters in them. **Methodology-** It was a cross sectional study conducted in the tertiary care hospital for 6 months with total study participants were included 100 covid 19 patients. **Results and discussion-**Out of 14 patients who were put on invasive ventilator and died after giving treatment, 50% were from blood group A+ followed by 35.7% of B+ and 14.2% of AB+ patients. No death was recorded from blood group O+ patients. Comorbidities such as diabetes and hypertension were associated with the output of patients. **Conclusion:** We have found higher prevalence of covid 19 risk in blood group A+ followed by B+ and the risk is least in O+ blood group. Mortality increases as age increases but no association of sex and mortality was found.

KEYWORDS: Covid-19, blood group, SARS-CoV.

I. INTRODUCTION

Since the first outbreak of COVID-19 in Wuhan, China, researchers have extensively analysed the characteristics, clinical presentation, and risk factors of individuals with SARS-CoV-2 infection. [1-4] Several researchers investigated the host susceptibility linked to the blood group or anti-histo-blood group antibodies for Coronaviridae viruses (e.g. SARS-CoV). In 2005, Cheng et al.[5] reported that SARS-CoV infection susceptibility in a group of health care workers in Hong Kong, exposed to an index SARS patient, was influenced by the ABO blood group systems; in particular, compared with non-O blood group hospital staff, blood group O hospital staff had a lower chance of getting infected.

Susceptibility of certain viral infections has been linked to antigenic determinants of ABO blood groups. Cheng et al. [5] showed linkage of SARS coronavirus infection with ABO blood groups, where individuals with blood group O were less likely to become infected, compared to non-O blood group individuals.

However, whether a specific blood group is associated with an increased risk of SARS-CoV-2 infection, and the strength of this association, remains preliminary and controversial. Therefore, the primary objective of this study is to verify the presence and strength of the ABO blood group type association with SARS-CoV-2 infection

II. REVIEW OF LITERATURE:

Study conducted by Zhao et al [6] shows ABO blood group linkage with COVID-19 infections. Zhao et al. compared ABO blood groups of controls from the general population with 2173 COVID-19 patients from three hospitals in Wuhan region. Across all three hospitals, blood group A was associated with a higher risk for COVID-19 (OR 1·21; P = 0·027) compared with non-A blood

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groups, whereas blood group O was associated with a significantly lower risk for the infection (OR 0·67; P<0·001) compared with non-O blood groups.

Another observational study on data from New York Presbyterian hospital system, on 1559 individuals tested for SARS-CoV-2 with known blood type, also showed similar results. In SARS-CoV-2 positive cases, there was a high proportion of blood group A, with a low proportion of blood group O. [7]

III. OBJECTIVES:

Primary Objective- To explore the relation between covid-19 and blood group in the patients admitted in the hospital

Secondary objective- To explore the various blood parameters in them

IV. MATERIAL & METHODOLOGY:

1. Study type- cross sectional study
2. Study period- 6 month
3. Sample size- 100
4. Inclusion criterion-Only covid positive patients admitted into medicine ward of D Y Patil Hospital who consented to participate in the study were included.
5. Exclusion criterion-

- Non covid patients will be excluded from the study
- Covid -19 patients who refused to participate in the study and those with incomplete blood parameter require for study were excluded

Methodology- All important data was analysed with the help of excel and SPSS software. To assess the relationship between COVID-19 infection and mortality with blood group, the required data were extracted in binary tables.

V. RESULTS:

Table no 1- Age and gender of study participants compared with outcome of patients

	Output		
Age group	Discharge/survive	Death	Total
20 to 30	20 (23.2%)	0 (0%)	20 (20%)
31 to 40	14 (16.2%)	0 (0%)	14 (14%)
41 to 50	13 (15.1%)	2 (14.2%)	15 (15%)
51 to 60	22 (25.5%)	1 (7.1%)	23 (23%)
61 to 70	8 (9.3%)	4 (28.5%)	12 (12%)
71 to 80	7 (8.1%)	4 (28.5%)	11 (11%)
More than 80	2 (2.3%)	3 (21.4%)	5 (5%)
Gender			
Male	49 (56.9%)	9 (64.2%)	58 (58%)
Female	37 (43.1%)	5 (35.7%)	42 (42%)
Total	86 (100%)	14 (100%)	100 (100%)

Table no 2-Chief complaints and output of patient

Chief complaints	Yes/No	Output		Total	p
		Discharge/survive	Death		
Fever	Yes	54	10	64	0.532
	No	32	4	36	
Cough	Yes	33	10	43	0.078
	No	53	4	57	
Breathlessness	Yes	23	9	32	0.005
	No	63	5	68	
GIT complaints	Yes	15	1	16	0.330
	No	71	13	84	
Comorbidities					

DM	Yes	24	9	33	0.007
	No	62	5	67	
HTN	Yes	15	8	23	0.0001
	No	71	6	77	

Table no 3- Blood group and out-put of patients

Blood group	Discharge/survive	Death	Total
A+	30	7	37
B+	24	5	29
AB+	16	2	18
O+	16	0	16
Total	86	14	100

Table no 4- Treatment given to the patients

Blood group	Treatment required (multiple option)			
	O2 support	HFNC	NIV	Invasive ventilator
A+ (n-37)	21 (36.8%)	20 (40.8%)	11 (39.2%)	7 (50%)
B+ (n-29)	19 (33.3%)	15 (30.6%)	11 (39.2%)	5 (35.7%)
AB+ (n-18)	9 (15.7%)	9 (18.3%)	2 (7.1%)	2 (14.2%)
O+ (n-16)	8 (14%)	5 (10.2%)	4 (21.4%)	0 (0%)
Total (n-100)	57 (57%)	49 (49%)	28 (28%)	14 (14%)

*multiple option

VI. DISCUSSION:

In our study out of 100 patients, 20 (23.2%) were between 20 to 30 years of age group, 14 (16.2%) were between 31 to 40 years of age group, 13 (15.1%) were 41 to 50 years of age group, 22 (25.5%) were from 51 to 60 years of age group, 8 (9.3%) were from 61 to 70 years of age group, 7 (8.1%) were from 71 to 80 years of age group and 2 were more than 80 years of age. Total number of male patients included in our study were 58 and female patients were 42. Out of 100 patients, 37, 29, 18 and 16 were A+, B+, AB+ and O+ respectively. No Rh negative covid 19 patient was present in the ward during the study period, so only Rh-positive patients were included in the study.

When asked about chief complaints, Fever was the most common complaint present in 64% patients followed by cough in 43%, breathlessness in 32% patients and gastrointestinal complaints in 16% patients.

Out of 100 Covid -19 positive patients, 86% got discharge and 14% were died. Out of 14 death, 2 (14.2%) occurs in 41 to 50 years of age, 1 (7.1%) in 51 to 60 years of age, 4 (28.5%) death occurs in 61 to 70 years of age, 4 (28.5%) in 71 to 80 years of age and 3 (21.4%) in more than 80 years of age. Out of 14 patients who died, 9 (64.2%) were males and 5 (35.7%) were female. Out of 64 patients who had history of fever, 54 survive and 10 died ($p<0.397$). 43 patients who had cough, 10 died and 33 survived. ($p<0.078$). 32 had history of breathlessness and out of them, 9 died and 23 survived. ($p<0.005$). 16 had Gastrointestinal complaints, from these 1 died and 15 survived ($p<0.330$). When complaints were compared with output (discharge or death), breathlessness was found to be associated significantly with output of patients.

Comorbidities such as diabetes and hypertension were also associated with the output of patients. 33 had history of diabetes and out of them 9 died and 24 survived. ($p<0.007$). 23 had history of hypertension and from these 15 survived and 8 died. ($p<0.0001$) (Table no 2)

Table no 4 shows the treatment given to the patients and compared with blood group. In our study, 14 patients were on invasive ventilator, out of which 7 were A+, 5 were B+ and 2 were AB+.

Total 28 patients were put on Non-invasive ventilator, out of them, 11 were A+, 11 were B+, 2 from AB+ and 4 were O+. Total 49 patients required HFNC from which 20 were A+, 15 were B+, 9 were B+ and 5 were O+. 57 patients required O2 support, out of which 21, 19, 9 and 8 were from A+, B+, AB+ and O + respectively. Out of 14 patients who were put on invasive ventilator and died after giving treatment, 50% were from blood group A+ followed by 35.7% of B+ and 14.2% of AB+ patients. No death was recorded from blood group O+ patients.

Study conducted by Hoiland et al [8] reported that critically ill COVID-19 patients with blood groups A and AB were more likely to require mechanical ventilation and prolonged intensive care compared with patients with B/O. However, a genome wide association study of severe COVID-19 patients showed that those with blood group A had a higher risk of severe disease, while blood group O had a protective effect. [9] Our study results also show high death rate (50%) in blood group A+ as compared to blood group O+ where no death occurred out of 100 sample.

Bhattacharjee S et al [10] found no significant differences in the unadjusted mortality and/or severity outcomes (defined by intubation or dyspnoea) related to COVID-19 in patients with blood groups A/AB (with no anti-A antibodies) as compared with B/O groups (with anti-A antibodies).

VII. CONCLUSION:

In our study, we have found higher risk prevalence of covid 19 in blood group A+ followed by B+. Least risk prevalence was present in O+ blood group. We have also found higher prevalence of mortality in patients having A+ blood group followed by B+ and no mortality in O+ blood group patients. With the shortage of vaccines, we recommend further study on this subject which could help us in prioritizing the Vaccination candidates based on blood group.

VIII. LIMITATION

Our Study sample size was limited to 100, as most of the patients panic, with the new decease which doesn't have any known medication, and were not willing to participate in the study. Further, during the study period, no RH-negative patients were available for the study and hence, we could not include them as part of study.

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