Medical and Clinical Case Reports

Association Between COVID -19 Infection and ABO Blood Groups

Razan Bashir Osman Abdalhadi¹, Mishkat Abalazeem Abdo Alryah¹, Malaz Murtada Mustafa Ahmed¹, Mowda Mhjoub Ali Mohmmed¹, Ali Hafeez¹ and Emad Aldin Ibrahim Osman^{2*}

¹ Eaculty of Medical Laboratory Sciences Elrazi University	*Correspondence:
Khartoum, Sudan.	Emad Aldin Ibrahim Osman, Department of Pathology, Delta
	College of Science and Technology and ELDaein University,
² Department of Pathology, Delta College of Science and	Sudan.
Technology and ELDaein University, Sudan.	Received: 09 Apr 2025; Accepted: 11 May 2025; Published: 21 May 2025

Citation: Razan Bashir Osman Abdalhadi, Mishkat Abalazeem Abdo Alryah, Malaz Murtada Mustafa Ahmed, et al. Association Between COVID -19 Infection and ABO Blood Groups. Med Clin Case Rep. 2025; 5(1): 1-3.

ABSTRACT

Background: The coronavirus disease(COVID-19) is a highly transmittable and pathogenic viral infection cause severe acute respiratory syndrome and caused high morbidity and mortality among patients with different blood groups. This study aimed to determine the association between ABO blood groups and susceptibility to Covid-19 infection.

Material and Method: this was case control study, done on 100 of confirmed covid-19 patients and 100 control in Khartoum state, Sudan in the period between August to October 2020. Three ml of venous blood sample had been collected from each participant in the study, ABO blood groups were tested by monoclonal antisera.

Result: when compared ABO blood group between cases and control there was no association between blood groups and COVID-19 status, p-value 0.242 also There was no significant association between gender and ABO and Rhesus blood group, p-value 0.103, there is no significant association between presence of chronic illness and ABO and Rhesus blood group, p-value 0.558, There is no significant association between how they acquire the disease and ABO and Rhesus blood group, p-value 0.287.

Conclusion: The study revealed that ABO and RH blood groups, age, gender, chronic illnesses and source of infection had no association with susceptibility to infection with COVID -19 virus.

Keywords

COVID-19, ABO, RH, Monoclonal, Antisera.

Introduction

Coronaviruses are a genus that belongs to coronaviridae family, it is an enveloped RNA virus with single stranded non-segmented positive sense genome. It is classified into three groups two of them is known to cause disease in humans. Though common cold is the most type of diseases they cause but they have been found to causes a serious type of pneumonia that may be fatal and it can cause outbreaks with great mortality. In 2002 a new species of this genus known as SARS-CoV-1 caused a severe type of pneumonia known as Severe Acute Respiratory Syndrome (SARS) which caused (9%) mortality. in 2012 again a new species appeared in

Med Clin Case Rep; 2024

Saudi Arabia Middle East Respiratory Syndrome Coronavirus (MERS-CoV-1) [1-3].

An update by WHO on 2019, revealed that more than 53 million cases were confirmed and more than 1.3 million died due to COVID-19 worldwide [4]. In the same year in Sudan more than 14 thousand had been confirmed to have the disease and 1116 died [5].

The virus spreads by two main routes, either close contact or community spread. In close contact setting which is the main route of transmission, virus mainly spread via respiratory droplets that may go directly from infected person to others airways and can travel for a distance of 6 feet or more in some areas, or it may settle in surfaces and when someone touch it and the touch his face (nose, eyes or mouth). The other method of spread which called community spread occur when people get the infection from an area but they don't know where and how the get infected.

Being in community settings make the person at greater risk of contracting the disease these settings include (crowded places, close-contact setting and confined and enclosed spaces) and the highest risk is in the place where all above settings occur together [6,7].

COVID-19 has a wide range of symptomatology that range from mild to severe. This symptoms and signs start to appear after incubation period that usually last from 2 -14 days from exposure.

The most common reported symptoms include: Fever, Dry cough, Fatigue. There are many severe symptoms that need special attention and seeking emergency care, which includes: Trouble breathing, Persistent pain or pressure in the chest. New confusion Inability to wake or stay awake, Bluish lips or face [8,9].

COVID-19 has been found to be correlated with many cardiovascular problems and increase the risk of injury specially for those who are already at increased risk, these cardiovascular manifestations include: Heart failure, Cardiogenic shock, Arrythmias, myocarditis. Moreover, increase in levels of cardiac bio-markers (Troponin and NT-proBNP) have been linked with poor outcome and increased mortality and morbidity [10].

Several literature showed the association between ABO blood groups and susceptibility to diseases [11]. ABO blood group has been known to be linked with and affect many diseases, for example cardiovascular [12,13], gastric [14], periodontal disease [15] among others.

Moreover, many studies investigated susceptibility to Covid-19 infection found that blood group A is more susceptible to infection than other groups [16,17], also group A has been linked to some clinical manifestation [18] and found to be linked to critical outcome, while blood group O is found to be a protective factor [19]. In this study a case control was conducted to test the hypothesis that certain ABO blood groups has linked to different susceptibility to COVID-19 infection.

Material and Method

This is a case control study carried out in a COVID-19 patients in Khartoum state, Sudan during the period of August to October 2020.

Inclusion Criteria

Patients with confirmed COVID-19 patients a total of 100

Control

A representative healthy adults were included with a total of 100qà.

Inclusion

Patients' relatives whose were apparently healthy adult.

Approximately 3ml venous blood was taken from each patient by stansrd technique after signed confirmed and blood analyzed by ABO antisera (monoclonal according to the manufacturing structure) by slide method and confirmed by tube method du method for negative. Rhesus blood groping Age, gender, chronic diseases, ABO blood group, method of disease acquisition, preventive methods used. The data was analyzed using SPSS version 26. Inferential statistics (mean, standard deviation, frequency and percentage) was used to describe data. Chi-squire test was used to find association and p-value was regarded significant when it is </= 0.5 Blood sample was collected after taking informed consent from each participant. Samples and data were taken anonymously and kept confidential. All information was used only for research purposes.

Result

In this study the a total of 200 participants were included 100 of them with COVID-19, with mean age of 31.4 ± 13.8 years. Most of participants were male 56 (56%). 18 (18%) had chronic illnesses which include (Asthma, diabetes, Hypertension, sinusitis, thyroid and rheumatoid). Direct contact was the commonest mentioned source of infection 81 (81%) and most of them mention that they were abide to health guidelines. The study also found no relationship between ABO blood group and COVID-19 with p value less than 0.05 significant.

Discussion

This study aimed to determine the most prevalent type of blood group among patients with COVID-19. Most of participants in this study were of young age group. Males and females were almost equally presented in this study with males being slightly higher. When patients were questioned about chronic illness and Comorbid conditions, they suffer from the vast majority mentioned they don't suffer any illness and this is reasonable knowing the aforementioned fact that most of our participants were of young age group and these types of illnesses are more prevalent in older ages. With regard to COVID-19 the higest percentage mentioned they contract the disease from direct contact, and this is relevant as this is the main way of disease spread [10,11].

This study revealed that O+ and A+ were the most prevalent blood groups among cases and control which are also the most prevalent blood group type in Sudan [22]. This study also found that there is no significant association between blood grouping and COVID-19 status and when we compare this to other studies we found that some studies found an association and mentioned that blood group A were also more susceptible to infection. [15,16] and blood group O was regarded as being protective and reduce the risk of susceptibility [21], One another aspect that was not searched in our study is the association between severity of infection and blood grouping as some studies discuses that blood group O tend to have low risk of having severe disease and deterioration [20]. It is important to note that gender was found to have no association with blood group in our participants but this in converse with a previous study which mentioned that female patients with blood group O were at the lowest risk of infection [20]. This study also revealed no association between ABO and Rhesus blood grouping and chronic illness and the method of aquisition of infection.

Conclusion

ABO and Rhesus blood groups, Q had no association with susceptibility to infect with COVID -19 virus. More studies on larger sample size and different population is recommended.

References

- 1. Medical Microbiology, A Guide To Microbial Infections: Pathogenesis, Immunity, Laboratory Diagnosis And Control Eighteenth Edition.
- 2. Sixth edition sherris medical microbiology editors kenneth j. Ryan, md c. George ray md.
- 3. Ali M Zaki, Sander van Boheemen, Theo M Bestebroer, et al. Isolation of a Novel Coronavirus from a Man with Pneumonia in Saudi Arabia. N Engl J Med. 2012; 367: 1814-1820.
- 4. WHO, Coronavirus disease (COVID-19).
- 5. Ministry of health, Republic of Sudan. <u>http://fmoh.gov.sd/</u> <u>index.php?fbclid=IwAR194rYe_Qie572dN1OolA1eguTSwN</u> <u>dqVqWQfZ0RcWl4cuXRFtrZ-HEb0E</u>
- 6. WHO, Coronavirus disease (COVID-19): How is it transmitted? <u>https://www.who.int/emergencies/diseases/</u><u>novel-coronavirus-2019/question-andanswers-hub/q-a-detail/</u><u>coronavirus-disease-covid-19-how-is-it-transmitted</u>
- CDC, CORONA VIRUS DISEASE 2019 (COVID-19), Spread, how does the virus spread? <u>https://www.cdc.gov/</u> <u>coronavirus/2019-ncov/faq.html#Spread</u>
- CDC, Corona virus disease (COVID-19), Symptoms of coronavirus, <u>https://www.cdc.gov/coronavirus/2019-ncov/</u> symptomstesting/symptoms.html
- WHO, Coronavirus disease (COVID-19), Q&A, What are the symptoms of COVID-19?, <u>https://www.who.int/emergencies/ diseases/novel-coronavirus2019/question-and-answers-hub/ q-a-detail/coronavirus-disease-covid-19</u>
- Ahmed MA Shafi, Safwan A Shaikh, Manasi M Shirke, et al. Cardiac manifestations in COVID-19 patients-A systematic review. J Card Surg. 2020; 35: 1988-2008.

- 11. Kim E Barrett, Scott Boitano, Susan M. Barman, et al. Ganong's Review of Medical Physiology, 25th edition.
- 12. Hanrui Zhang, Ciarán J Mooney, Muredach P Reilly. ABO Blood Groups and Cardiovascular Diseases. International Journal of Vascular Medicine. 2012.
- 13. Reilly MP, Li M, He J, et al. Identification of ADAMTS7 as a novel locus for coronary atherosclerosis and association of ABO with myocardial infarction in the presence of coronary atherosclerosis: two genome-wide association studies. The Lancet. 2009; 377: 383-392.
- 14. El Hajj II, Hashash JG, Baz EMK, et al. ABO blood group and gastric cancer: rekindling an old fire?" Southern Medical Journal. 2012; 100: 726-727.
- 15. Demir T, Tezel A, Orbak R, et al. The effect of ABO blood types on periodontal status. European Journal of Dentistry. 2015; 1: 139-143.
- Qian Fan, Wei Zhang, Bo Li, et al. Association Between ABO Blood Group System and COVID-19 Susceptibility in Wuhan. Front Cell Infect Microbiol. 2020; 10: 404.
- 17. Jiao Zhao, Yan Yang, Hanping Huang, et al. Relationship between the ABO Blood Group and the COVID-19 Susceptibility. Clin Infect Dis. 2021; 73: 328-331.
- YuqinWua, ZhicaiFengb, Peng Lia, et al. Relationship between ABO blood group distribution and clinical characteristics in patients with COVID-19. Clin Chim Acta. 2020; 509: 220-223.
- 19. Rebecca K Leaf, Hanny Al- Leaf, Samantha K. Brenner, et al. ABO phenotype and death in critically ill patients with COVID-19. Br J Haematol. 2020; 190: e204-e208.
- 20. Maider Munoz-Culla, Andres Roncancio-Clavijo, Bruno Martinez, et al. O Group is a protective factor for COVID-19 in Basque population. PLoS One. 2021; 16: e0249494.
- Minfei Peng, Shigao Huang, Shitu Zhu, et al. Distribution of ABO blood groups and association to low risk of COVID-19 infection in patients. 2020.
- 22. <u>https://en.m.wikipedia.org/wiki/Blood_type_distribution_</u> <u>by_country</u>

© 2025 Razan Bashir OA, et al. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License