مجلة

كلية التـــراث الجامعة

مجلة علمية محكمة

متعددة التخصصات نصف سنوية

العدد التاسع والثلاثون

عدد خاص بوقائع المؤتمر العلمي السنوي السادس عشر (الدولي الخامس)

18 نيسان 2024

ISSN 2074-5621

رقم الايداع في دار الكتب والوثائق 719 لسنة 2011

مجلة كلية التراث الجامعة معترف بها من قبل وزارة التعليم العالي والبحث العلمي بكتابها المرقم (ب 3059/4) والمؤرخ في (2014/ 4/7)

Prevalence Study of the Correlation Between ABO Blood Groups and COVID-19 with Iraqi Pat

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Summary

COVID-19 is the infection cause by a corona virus called SARS – CoV -2. The WHO documented first infection on 31 December 2019, in city of Wuhan in Hubei Province, China. This disease affected a large number of people around the world. A lot of researchers study the correlation among COVID-19 and many factors have been conduct since the start of the corona including ABO blood groups.

This study included affected people with COVID-19 recorded in Baghdad to know the relationships between COVID-19 infection and types of ABO groups. **Methods**, the presented study collected (250) patient documented with COVID-19 in Al-Forat Hospital in Baghdad / Iraq. The methods of Covid-19 testing done by using CT scans and RT-PCR, after that detecting the type of ABO groups by making ABO test, also recorded the result of Rh factor. **Conclusion**, Several groups taking in this study according to the type of ABO groups and recorded a highest percentage of corona virus infection in type (A) blood groups and the minimum percentages recorded in type (AB) of ABO groups. Also the ABO group's types (B) and (O) showed variations in our investigations.

Keywords: corona virus, COVID-19, SARS - CoV-2, types of ABO groups, COVID-19 and ABO blood groups.

Introduction

SARS - COV-2 is a causal agent of COVID-19 disease and the 7th structure of corona virus, the first recorded at Wuhan, Hubei region of China at the end of 2019. Corona viruses are large, roughly circular particle with lone projection in the surface, it is a groups of associated RNA viruses which the source of infection in the respiratory system in the individual and the variety risk of the infections from moderate to deadly (1, 2).

COVID-19 can reach to peoples by the droplet of the respiratory and the contaminated area. In the majority situation which infected with COVID-19, appears moderates symptom as fever, weakness, sore throat and cough. Other symptoms which affected some people and considered less common like muscle aches, runny or closed nose, head pain, painful eyes, pain in the chest and difficulties in the breath (3).

The ABO blood group and Rh factor represented since 1901 & 1941 by Landsteiner (4) also consist of a carbohydrate antigen A, B and H and the antibodies in opposition to these antigens (5). The antigens A, B and D blood are originated on the outside of the (RBCs) red blood corpuscles and the determination of Rh+ and Rh- depended on the absence or presence these antigens (6).

Many studies recorded abnormality formations of blood clot in a few people with COVID-19. This clot can be form in different regions of the body as well as in the lungs. This abnormal formation of blood clot leads to difficulty problems like damage of the organ or hear attack (7).

Aim of study

The presented study aimed to Know if there any relations between COVID-19 infection and the types of blood groups.

Methods

In this study we collected (250) patient diagnosed with COVID-19 in Al- Forat Hospitals in Baghdad/ Iraq and taking the permissions from the patients to do this study. The procedure of tested COVID-19 by taking a swab from nasal cavity from the suspected patients to analyses by using RT-Polymerase Chain Reactions through qualitative kite in order to recognition a target gene-E and a target gene-N corona virus RNA and CT scans are used for screening by specialized doctor.

After that we take a blood sample from the each patient which already diagnosed with COVID-19 (250) in order to test the types of blood group as we show in the Schedule (1).

The type of blood groups	Antigens	Antibodies
AB	A and B	Not present
O	Not present	Anti_A and Anti_B
B	B	Anti_A
A	A	Anti_B

Schedule (1) the antigen and related the antibodies of the ABO blood groups type

According to analyses the types of blood group and COVID-19 infections the data we are collecting (250) separated into groups and send for statistical analyses.

Statistical Analysis

We used statistical analyses in order to understand the relationships between COVID-19 and blood groups by using program SAS_ Statistical Analyses System (2018). This design applied to know the cause of variation factor in this presented parameter. To compare between the results we used Chi-square analysis for significant comparing between percentages (0.05 and 0.01) possibility (8).

Results:

According to the types of blood group and the statistical analyses study we divided the 250 patients into groups

The recorded result demonstration association between corona virus disease risk infectivity and the types of ABO blood group, type (A) blood group register the peak percentage of infection with COVID-19 (52.00%) while the type (AB) blood group register the minimum percentage of risk infection by COVID-19 only (12.00%).

Also in this study we recorded (18.40%) type (B) blood group, while type (O) blood group recorded only (17.60%) percentages of risk infection with COVID-19. as the Schedule (2) show.

Types of blood group	Patients	Percentage (%)
A	130	52.00
B	46	18.40
O	44	17.60
AB	30	12.00
Total	250	100%

Chi-square	\	99.632 °°
value (P)	\	0.0001
°° (P≤0.01).		

Schedules (2) demonstrate the division of corona virus disease patient depended on the types of blood group.

Rh positive register in (210) patient, while the Rh negative registers in this study only (40) patient.

Otherwise the Rh positive enrolled the maximum percentage of risk infection with COVID-19 (84%) and the Rh negative recorded the minimum infection (16%) as we show in Schedule (3).

Rh	Rh factor in Patients	Percentage (%)
Rh +	210	84.00
Rh -	40	16.00
Total	250	100%
Chi-squareS	---	115.60 **
P-value	---	0.0001
** (P≤0.01).		

Schedule (3) the Rh factor percentage of blood groups

The Discussion:

There are many research have inspected the relationship between corona virus infections and the types of blood group susceptibility and acuteness. These researches recommend the types of blood group may affect on acuteness of corona virus disease. Collected data of the presented paper show the type AB of blood group could reduce the capability aligned with the SARS-CoV-2 disease and infection acuteness. Otherwise, the patient with type A blood group recorded the larger risk for the SARS - CoV-2 virus; most studies suggest that type A of ABO group related with acuteness of infection (9).

The Mechanism Of Relationship Between Corona Virus Risk Infection And Types Of Blood Groups

Some mechanism suggest the explanation of relationship connecting types of ABO groups and corona virus infection capability and involve the presence of anti_A antibody, produce the glycan antigen via SARS - CoV-2, impact of coagulation and genetically variation in the gene of ABO. Types A and B Blood group glycosyl transferases in the variable cell types have affected glycosylation, include the epithelial cell of the respiratory tract. The bond explain the relations between receptor ACE2 which present on the membrane and the SARS - CoV-2 S protein may be blocked by antibody blood group of anti-A which found normally in the type B and type O of blood groups people (10).

ABO blood group system considers the main system which dividing the blood into four groups: O, AB, A and B (11). The determination of the types of ABO groups depending on the presence of carbohydrates on the outside of red blood corpuscles (RBCs) (12). The relation between corona virus disease and the types of blood group notify at first via Zhao et al. (13), in this paper we study the statistical analyses for the types of blood group after that dividing the data into four groups according to the ABO blood group and depending on P value we recorded ahigh significant correlation between the four groups (schedule 2), the maximum percentage

recorded in A blood group (52.00%) many similar articles notify the ABO groups type A show the maximum risk of COVID-19 infection with mortality (14, 15).
Otherwise in the presented work the minimum risk infection of covid-19 register in AB type of blood group only (12.00%) that's results approved by many paper (16).
The Rhesus agent (Rh) consider another red blood corpuscles outside protein is contribute in the infection with corona virus (17), the presented work show that the maximum infection with corona virus (84.00%) in Rh positive and the negative Rh recorded (16.00%) of COVID-19 infection only and these results supported by (18, 19).

Conclusion

The findings result suggest that there is a correlation between COVID19 risk of infections and types of blood group especially in blood group type (A) with a variations in the other types of ABO blood groups.

Recommendation

We recommended studying the correlation between COVID-19 and other factor including D-dimer, Ferritin and CRP it's considered important factors need more study and investigations.

الملخص

. وثقت منظمة الصحة العالمية أول إصابة 2- CoVمرض كوفيد-19 هو عدوى يسببها فيروس كورونا المسمى سارس – في 31 ديسمبر 2019، في مدينة ووهان بمقاطعة هوبي، الصين. وقد أصاب هذا المرض عدداً كبيراً من الأشخاص حول العالم. يدرس الكثير من الباحثين العلاقة بين كوفيد-19 وقد حدثت العديد من العوامل منذ بداية كورونا بما في ذلك فصائل الدمABO.

شملت هذه الدراسة الأشخاص المصابين بـCOVID-19 المسجلين في بغداد لمعرفة العلاقات بين الإصابة بـCOVID-19 وأنواع مجموعات الدم ABO. **طرق البحث**: جمعت الدراسة الحالية (250) مريضاً مصاباً بفيروس كورونا (COVID-19) في مستشفى الفرات في بغداد / العراق. وتتم طرق اختبار كوفيد-19 باستخدام الأشعة المقطعية وRT-PCR، وبعد ذلك الكشف عن نوع مجموعات ABO عن طريق إجراء اختبار ABO، كما يتم تسجيل نتيجة عامل Rh. **الاستنتاج،** أخذت عدة مجموعات في هذه الدراسة حسب نوع مجموعات ABO وسجلت أعلى نسبة إصابة بفيروس كورونا في فصائل الدم (A) وأقل النسب المسجلة في فصيلة (AB) لمجموعات الدم ABO. كما أظهرت أنواع مجموعة (B) و (O) اختلافات في تحقيقاتنا.

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