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Evaluate Humoral And Cellular Immunological Parameters In Covid 19 Patients At Iraq

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Abstract

This study was aimed to isolate and identify the viral load and positive virus infection in patients with COVID19, evaluate humoral and cellular immunological parameters against those viral infections, and studying the effect of some antibiotics on viral isolates in COVID19, patients admitted to COVID19 center in Al Hussain hospital from first Jan 2021 to end of Mars 2021. A total of 200 individuals were subjected to this study with the age range (28-55 years). SARS-CoV-2 patients with signs and symptoms of infections were 92 individuals and the rest (58) from SARS-CoV-2 patients apparently not infected symptoms and pathological signals. it also contains 50 normal individuals as a control group at the same age range. viral load was the main predominant that constitute 23:58 (39.65%) of another group were the main predominant third group isolate 7:17 (41.17%). followed by the rate of infected 5:17 (29.4%). The immunological parameters showing that there is a significantly increased ($p<0.05$) in the level of IgG in infected patients (17753) compared with control and significantly increased ($p<0.05$) non-infected (14653) and normal persons (10380) mg/L, IgM insignificantly increased ($p>0.05$) in the same patient groups and normal persons (1370,1296,1275) mg/L, C3 level is a significantly increased ($p<0.05$) in the same patients' group and normal persons (1620,1243,1220)mg/L, C4 level insignificantly increased ($p>0.05$) in the same patient group and normal persons (375,357,325)mg/L, serum ferritin concentration is a significantly increased ($p<0.05$) in the same patient group and normal persons (350, 295, 87) ng/ml.

Keywords:C ovid 19,SARS-CoV-2, complements, IgM, IgG, C4, C3.

1. Introduction

About one year ago, The epidemic of COVID19 occurred because of the two type Coronaviridae that are is beta coronaviruses, ''severe acute respiratory syndrome coronavirus (SARS-CoV)'' and ''Middle East respiratory syndrome coronavirus (MERS-CoV)'' offer ascent to further than 40 million recorded cases in the overall world, The initiation of this disease was in the Huanan City Market for seafood and birds in Wahan, Hubei domain, Chine, The disease immediately spread, locally, to various pieces of China, and afterward around the world, to various countries across 6 continents [1,2] in Iraq confirmed cases were (1400) while the new cases were (22), the total death was (78) every one of the new cases was reported by contact transmission [3] . The present study was applied to assess the implementation and determine the innate immune response in acute phase inflammation of the against coronavirus at Al-Nasiriya city at Thi-Qar governorate southern Iraq.

Adaptive immunity in COVID 19 has been intensively studied while it has been only recently that we have gained some understanding of innate immunity [4] . The dynamics of the interactions between a pathogen and its host's immune response consist of two different equations, one is for pathogen load while the other one is for an index of specific immunity [5] . According to the hosts' or pathogen's parameter values, or the initial infection size, a rich repertoire of behaviors: can be mentioned immediate clearing of the pathogen through specific immune response; or acute infection followed by a clearing of the pathogen through specific immune response; or uncontrolled infections; or acute infection followed by convergence to a stable state of chronic infection mimic some features of immune response after vaccination [6] . The immunologic abnormalities in Severe acute respiratory by COVID19 major patients show significantly increased absolute lymphocyte counts compared with the control group. The increased number of activated T cells suggests chronic stimulation of the immune system [7,8] involving T and B lymphocytes, immunoglobulin production, neutrophils and macrophages, chemotaxis, and phagocytosis, as well as the complement system [9]. Pulmonary ventilation, For patients with persistent hypoxemia despite increasing supplemental oxygen requirements associated with treatment the patient vitamin D and plasam [10,11] taking into account the storage of quantities of hemoglobin in the blood cells corpecsles like macrophage and re-pumping them again after the acute infection case. Regarding pathogenesis, iron overload, a primary complication of both COVID19 itself and transfusion therapy, is thought to be the main precipitating mechanism, due to the important immunoregulatory properties of iron

and its binding proteins; iron variables may derange the immune balance in favor of the growth of infectious viruses [12-16]. Other factors include multiple transfusions, associated with the transmission of immunosuppressive viruses; splenectomy, resulting in increased susceptibility to infections by encapsulated SARS-COV 2 virus and immune system modifications [17,18]. Low levels of zinc, (another immune regulator) [19,20]. Iron chelation therapy, which predisposes to serious infections by yersinia species; and the circulation of abnormal native SRAS-COV2 erythrocytes, forming another permanent immune stimulus [21] . Thus surveillance for infections in patients with COVID19 respiratory syndrome is crucial, while further studies are warranted on immune function abnormalities and the implicated mechanisms.

2. Materials and Methods

In recent decades, many emerging infectious diseases have been occurring at an increasing scale and frequency. e. Ebola virus disease, severe acute respiratory syndrome (SARS), avian and pandemic influenza, Middle-East respiratory syndrome (MERS), and the recently emerged coronavirus disease 2019 (COVID-19). The outbreaks of these diseases resulted in wide-ranging socioeconomic consequences, including loss of lives and disruption to trade and travel. COVID19 is a pandemic disease in the world. There is no information about pathophysiological and immunological profile about Severe acute respiratory syndrome coronavirus 2(SARS-CoV-2) in patients in Iraq, so it is the first study which evaluates some immunological parameters such as IgM, IgG, C3 and C4 concentration by single radial immunodiffusion (SRID) test of these patients and discusses their susceptibility to infections. Thus this study aims to:

A- identifying immunological reactions cascades and or facultative Severe acute respiratory disorder from the infected patients with (SARS-CoV-2).

B- Studying the aspects of humoral and cellular immunological parameters (SARS-CoV-2) patients.

C- C- suggestion the effect of some medicines and antibiotics on treatment strategies.

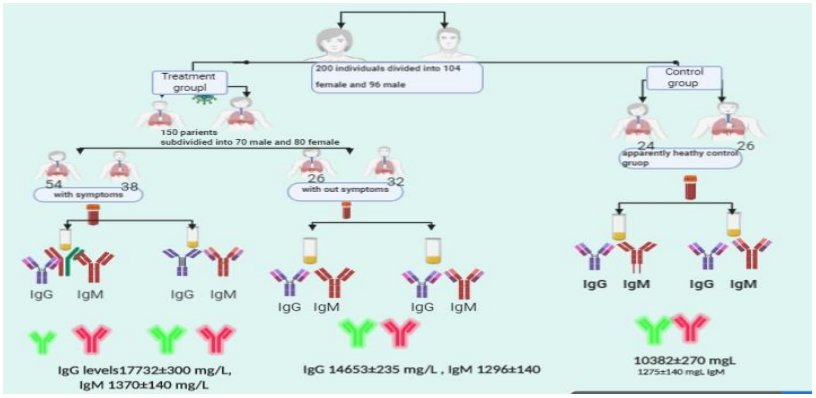


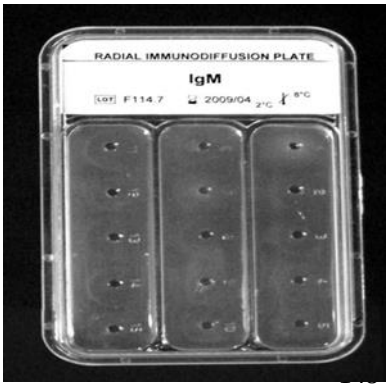
Figure 1. Shown the digram of the study to determine the concentration of IgM,IgG, according the studied groups

This study was performed in COVID19 patients admitted to in Al-Hussein hospital for Pulmonarydepartments and Intensive care unit from first Jan 2021 to end of Mars 2021.

A total of 200 individuals were subjected for this study with age range (28-55 years).

patients with signs and symptoms of infections were 92 individuals and the rest (58) from SRAS COV2 respiratory syndrome patients apparently not infected. it also contain 50 normal individuals as control group at the same age range.

Samples (ear swabs,throat swabs ,blood and urine) were taken aseptically from each patients with any clinical sign of infections . The collected samples were processed for viral isolation and determination of virulence factors (coagulase, hemolysin ,. Antibiotic sensitivity tests were assessed for each isolate. Blood samples were collected from both patients and controls to estimate IgM, IgG, C3, and C4 concentration by single radial immunodiffusion (SRID) test, tumor necrosis factor-alpha (TNF-α), gamma interferon (IFN-γ) by ELISA (Enzyme-linked immunosorbent assay) method, and concentration of serum ferritin. Blood samples were collected from both patients and controls to estimate IgM , IgG , concentration by single radial immunodiffusion (SRID) test



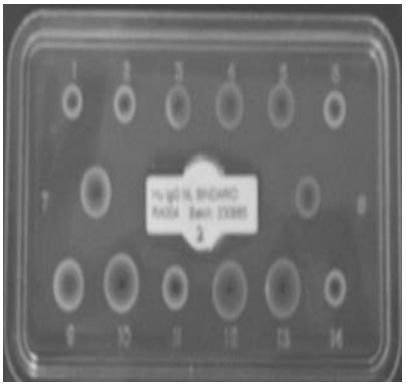


Figure 2. Single radial immunodiffusion test for estimating of IgG concentration, Single radial immunodiffusion test for estimating of IgM concentration

3. Results and Discussion

Table 1. The Concentration of Immunoglobulin's IgM and IgG (mg/L) in studied groups.

Studied groups		IgM	IgG
A-A- ICU patients	M*± SD**	1370±140	17753±3000
B- acute respiratory syndrome patients	M*± SD**	1296±140	14653±3250
	Significance between A,B	Not significant (P >0.05)	Not significant (P >0.05)
C- Normal persons and not infected)	M*± SD**	1275±140	10380±2700
	Significance between A,C	Not significant (P >0.05)	Significant (P<0.05)
	Significance between B,C	Not significant (P >0.05)	Significant (P<0.05)

The immunological parameters showing that there is a significantly increased (p<0.05) in the level of IgG in infected SARS-CoV-2 patients (17753) compared with control and significantly increased (p<0.05) non-infected (14653) and normal persons (10380) mg/L, IgM insignificantly increased (p>0.05) in the same patient groups and normal persons (1370,1296,1275) mg/L, C3 level is a significantly increased (p<0.05) in the same patients' group and normal persons (1620,1243,1220)mg/L, C4 level insignificantly increased (p>0.05) in the same patient group and normal persons (375,357,325)mg/L, group a level is a significantly increased (p<0.05) in the same patient group and normal persons (67,50.6, 15.25)Pg/L,table 3 demonstated ferritin level significantly reduced (p<0.05) in the same patient group and normal persons (1.2, 0.6, 1.8)IU/L and serum ferritin concentration is a significantly increased (p<0.05) in the same patient group and normal persons (350, 295, 87) ng/ml. this resutscorrespondace with each (Center,

1999;Cappellini et al.,2000; MOGENSEN, 2013; Bellmann-Weiler et al.,2020; Zhao et al.,2020), This study associated with comparative studies demonstrated thats variations of firrtin and iron concentrations effected by teens of viral loads.

There is only a significant increase in IgM levels in sera of patients with bacteremia ($P<0.05$) while the IgG, C4, C3, levels showing an insignificant difference between them($P>0.05$) as table 2 display. There is a significant increase in IgM, C4 levels in sera of patients with group b ($P<0.05$) and a significantly increased in C3, levels in sera of patients with group A ($P<0.05$). this results goes with Du, & Yuan, 2020. Thiats mean in stimuating of the innate immune and complements response may allow the innate immunity to more efficiently clear the coronavirus.

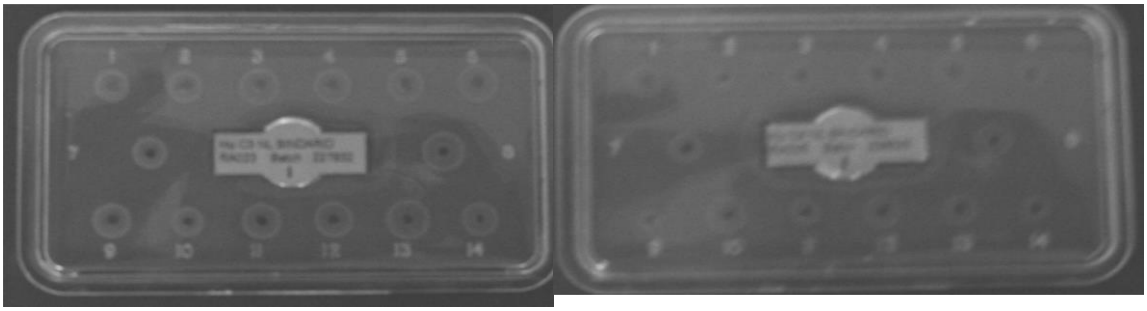


Figure 3. Single radial immunodiffusion test for estimating of C3concentration
Single radial immunodiffusion test for estimating of C4 concentration

Table 2.The Concentration of Complement components C4 and C3 (mg/L) in Studied groups.

Studied groups		C4	C3
A-ICU ptients	M*± SD**	375±128	1620±300
B- acute respiratory syndrome patients	M*± SD**	357±100	1243±200
	Significance between A,B	Not significant (P >0.05)	significant (P <0.05)
C- Normal persons (not	M*± SD**	325±96	1220±204
	Significance between	Not significant	Significant

symptoms and not infected)	A,C	(P >0.05)	(P<0.05)
	Significance between B,C	Not significant (P >0.05)	Not significant (P >0.05)

Immunoglobulin Concentration

Table (1) shows the levels of IgG estimated by (SRID) Figure (1) in infected SARS-CoV-2 patients, not infected SARS-CoV-2 patients and normal subjects were 17753 mg/L,14653 mg/L, and 10380 mg/L respectively. Also, the levels of IgM in the infected SARS-CoV-2 patients, not infected patients, and normal subjects estimated by(SRID) Figure (3-11) were 1370 mg/L, 1296 mg/L, and 1275 mg/L respectively. These results indicate that the levels of IgG didn't significantly increase in both SARS-CoV-2 Patients (P>0.05) while they significantly increased (p<0.05)in both SARS-CoV-2 Patients as compared with controls. Also, IgM levels did not significantly increase (P>0.05) in both SARS-CoV-2 Patients and didn't significantly increase (p>0.05)in not infected Patients as compared with controls. These findings of a significant increase in IgG level agreed with [22-24]. who mentioned that the changes in total immunoglobulins concentrations were largely affected. They may reflect exposure to infections. Because of recurrent infections to SARS-CoV-2 Patients and continuous exposure to pathogens, the immune system can be activated to defend against the infections [25-28]. Alteration in humoral immune response was less than in cellular immunity during the immunosuppression process therefore the IgG and IgM levels but not at the protective levels of IgG and IgM in normal persons suffering from viral infections without SARS-CoV-2 symptoms. The high level of IgG in infected SARS-CoV-2 Patients estimated in this study may indicate the presence of chronic infection this results goes with [29].

IgM which is the predominant type of immunoglobulins during acute infection didn't elevate in SARS-CoV-2 patients with a viral infection. This may be due to immune defects in those patients at the same time may predispose them to infections [30-33].

Table 3. Concentration of Serum Ferritin ng/ml in studied groups.

Studied groups		Serum ferritin levels
A- ICU patients	$M^{*}\pm SD^{**}$	350 ± 20
B-acute respiratory syndrome patients	$M^{*}\pm SD^{**}$	295± 17
	Significance between	Not significant

	A,B	(P >0.05)
C- Normal persons (not infected)	M*±SD**	87± 8
	Significance between A,C	significant (P <0.05)
	Significance between B,C	significant (P <0.05)

4. Conclusions

The main objectives that were implemented in this study can be summarized as follows:-

IgM level in infected COVID 19 patients wasn't significantly increased but IgG level was significantly increased.C3 level in infected COVID 19 patients was Significantly increased but C4 level wasn't significantly increased.Serum ferritin concentration in infected COVID 19 patients was significantly increased.

Infection by the severe acute respiratory syndrome-associated coronavirus (SARS-CoV) induces a dose-dependent stimulated innate and adaptive immune response from bronchial epithelial cells. COVID-19-associated systemic inflammation and hypoxic respiratory failure can be associated with heightened immunoglobins and complemented release, as indicated by elevated blood levels of IgG IgM, C3, C4, D-dimer, and ferritin. 2-4 It is hypothesized that modulating the levels of humoral immune or its effects may alter the course of the disease. For that, this study Our proposition to apply immunosuppressive medications at a beginning phase to lessen the impedance from versatile resistance so the intrinsic invulnerability and the exhaustion of target cells can together accomplish quick end of the infection is by all accounts flighty. Notwithstanding, it is especially intriguing to take note of that, as we were chipping away at our numerical displaying, the new examination by Schmidt et al., 2020 showed that a beginning phase low-dose and short-term utilization of corticosteroid treatment in patients with extreme COVID-19 pneumonia was useful and basically approved our discoveries and Alsaliha, et al.,2020 suggest immunmoderitybyconterlled the TNF-alpha inhibitors compact on a third-line dealing alternative for COVID19 patients. Alsalih b et al 2020, consider cytokine storm syndromes and immunosuppression in COVID19. We imagine that new experiences from our investigation and displaying will support more work toward this path.

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