

Study of Some immunological Changes Associated with Patients who recovered from Covid-19

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Abstract

This study was conducted in all areas of Al-Hilla during the period from 12/10/2020 to 27/12/2020 on patients recovering from Covid-19. This study included collecting blood samples from 90 patients who recovered from Covid-19 and from 50 healthy people as a control group in different age groups. are.

The results of the demographic study of the control groups and the group of patients recovering from Covid-19 showed a relationship between infection with Covid-19 virus and age groups from 21-30, where the percentage was (54.4%). As for gender, the percentage of males was higher than females, where the percentage included 56.7% As for housing, the percentage of urban areas was higher than rural areas, as the proportions for urban areas included (city) 81.1%). As for the job, the percentage of employees (82.2) was higher than non-employees. As for blood types, the highest percentage was blood group A + (48.9%) compared with the rest of the other groups. As for smokers, the percentage of smokers was higher than non-smokers (60.6%).

1- Introduction.

Recent pandemic disease Coronavirus disease 2019 (COVID-19), is caused by a novel coronavirus, SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) (1). COVID-19 is initially diagnosed as “pneumonia of unknown etiology” first emerged in December 2019 at Wuhan, Hubei Province, China. The pathogen was proclaimed by the Chinese Center for Disease Control and Prevention (China CDC) on Jan 08, 2020, to be an unusual coronavirus. Later on the virus was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). COVID-19 in few weeks the contagious virus covid-19 show a wide spread to the whole Hubei Province, the rest of China and abroad . (2)

The virus can infect both humans and animal (zoonotic) SARS- CoV-2 is transmitted primarily via respiratory droplets. On infection, the median incubation period is approximately 4–5 days before the onset of the symptom About 97.5% of symptomatic patients developing symptoms within 11 days. At hospital admission, patients with COVID-19 typically present with a dry cough; fever , muscle and/or joint pain, headache/dizziness, diarrhea, nausea and the coughing up of blood some people suffer from breathing difficulty. Viral load reaches its peak within about 10 days after the first signs of symptoms . Some severe COVID-19 cases progress to acute respiratory distress syndrome (ARDS) after about two weeks from the disease onset (3).

The host immune response to SARS-CoV-2 appears to play a critical role in disease pathogenesis and clinical manifestations. SARS-CoV-2 not only activates antiviral immune responses, but can also cause uncontrolled inflammatory responses characterized by marked pro-inflammatory cytokine release in patients with severe COVID-19, leading to lymphopenia, lymphocyte dysfunction, and granulocyte and monocyte abnormalities. These

SARS-CoV-2-induced immune abnormalities result in other microbial infection, septic shock, and severe multiple organ dysfunction. Therefore, mechanisms underlying immune abnormalities in patients with COVID-19 must be elucidated to guide clinical management of the disease. (4)

Increasing evidence shows that immune patterns are closely associated with disease progression of patients infected with viruses. A decrease in peripheral T cell subsets is a unique characteristic in patients with severe acute respiratory syndrome (SARS) 5. In recovered patients, a rapid restoration of peripheral T cell subsets is detected; thus, peripheral T cell number can serve as an accurate diagnostic tool for SARS (4).

2- MATERIALS AND METHODS

The study was done during the period from 12\10\2020 to 27\12\2020 on patients recovering from Covid-19 in all areas of the city of Hila. This study included the collection of blood from 90 Patients recovering from Covid-19 aged 15-60 and from 25 healthy people as control aged 21-30 years; This study gathered five (5) ml of venous blood from each patient. The blood was placed in gel tube for thirty(30) minutes, then samples are placed in centrifuge to separate the blood into a serum within 3000rpm for 15 min; after that the serum collected and kept in the freezer (-20 c) Until it was used for the immune and viral assay (5). Covid-19 (IgG-IgM),tests were carried out in the hospital for each participant as baseline diagnostic test:

Results and Discussion

The demographics and clinical data of the study groups are summarized in table :1. In this study, 140 subjects (90 patients and 50 controls) were included.

Table 1: Shows that more than half of patient group age 49(54.4%) were between (21-30) year while all the sample 50 (100%) of control group were between (21-30) year, in relation to gender more than half of patient group 51(56.7%) were male while more than half of control group 26(52%) were female and about three quarters of both groups were resident of urban area; on the other hand, more than two third of both groups were employee, concerned to Blood group revealed that 44 (48.9 %) of patient group were A+ while less than one third of patient group 15 (30 %) were O+. Finally, in relation to chronic disease this table showed that all the sample of both groups have no disease.

The risk for severe illness with COVID-19 increases with age, the virus is highly contagious for elderly individuals, not only due to a higher rate of mortality (6) , but also due a higher proportion of cases. In essence, aging populations may be at increased risk from a two-fold effect. If a population has a higher proportion of elderly, the proportion of confirmed COVID-19 cases would be higher, accentuated further if no normal tests are made. This is substantially different than what is typically reported for influenza or other pandemics which tend to have higher morbidity for younger individuals. (7,8). Older age and history of coronary vascular disease were reported to increase the risk of death from COVID-19 (9). some studies evaluating the risk factors of mortality in patients with COVID-19 reported higher death rates with increasing age (10,11)

(12) reported that individuals with blood group Type A are under a higher risk of getting COVID-19 compared with other blood groups, whereas people with blood group Type O have a lower risk for acquiring infection compared to others. Blood group A was significantly associated with an increased risk. In contrast, blood group O was associated with a decreased risk, thus demonstrating that the ABO blood type is a biomarker for the differential susceptibility of COVID-19. People with blood group A might require particularly enriched personal protection to diminish the chance of infection and to receive

more vigilant surveillance and aggressive management (13). It was found that blood type A was correlated with a higher odds of testing positive for disease (14).

Tobacco smoking is a major known risk factor for severe illness and even death from many respiratory infections. The effects of smoking on COVID-19 are currently controversial. Early evidence shows that in patients who have a history of smoking, the risk of adverse health outcomes for patients with COVID-19 increases dramatically compared to non-smokers, and is associated with higher rates of admission to intensive care units (ICU), use of ventilators, and leading to death(s) (15,16). Since smoking is a major risk factor for respiratory infections due to suppressive effect of the immune response, thus a hypothetical link between smoking and worsening COVID-19 can be made (17,18). As well as the smoking was known to be risk factors for more severe illness in COVID-19 patients (19).

Table 4-1: Demographic features of the study subjects.

Characteristics	Ranking And Intervals	Patients (n=90)		Control (n=50)	
		Frequenc y	Percentage %	Frequenc y	Percentage %
Age /year	15-20	4	4.4	0	0
	21-30	49	54.4	50	100
	31-40	27	30.0	0	0
	41-50	8	8.9	0	0
	51-60	2	2.2	0	0
	Total	90	100	50	100
Gender	Male	51	56.7	24	48
	Female	39	43.3	26	52
	Total	90	100	50	100
Residence	Rural	17	18.9	14	28
	Urban	73	81.1	36	72
	Total	90	100	50	100
Occupation	Employee	74	82.2	36	72
	Unemployed	16	17.8	14	28
	Total	90	100	50	100
Blood group	A+	44	48.9	13	26
	B+	13	14.4	12	24
	AB+	5	5.6	8	16
	O+	15	16.7	15	30
	A-	3	3.3	0	0
	B-	5	5.6	0	0
	AB-	0	0	0	0
	O-	5	5.6	2	4
	Total	90	100	50	100
Smoking	No	39	39.4	44	88
	Yes	51	60.6	6	12
	Total	90	100	50	100
Chronic disease	No disease	90	100	90	100

Table4- 2: shows that there is a negative weak correlation between duration from the date of infection to the date of sample drawing and covid anti- body (IgM, IgG) in patient group at $p \leq 0.05$

The figure 1: show that covid anti body (IgG, IgM) concentration decreased gradually over time. During viral infection with SARS-CoV-2, the production of specific antibodies against the virus is consistent in most patients, except for immune deficient patients. IgM can be detected as early as 3 days after infection and provides the first line of humoral immunity defense, after which high-affinity IgG responses are initiated and play a key role in long-term immune memory (20). In study done by (1) found that anti-SARS CoV- 2 antibody levels differ significantly among COVID-19 patients with different illness severities and outcomes. Quantitative IgM and IgG assays could play an important role in the diagnosis and prognosis of COVID-19

The IgM antibody concentration reached a peak 10 days earlier than the IgG antibody concentration. The SARS-CoV-2 IgG antibodies maintained an upward trend after 20 days. (21) reported that IgM antibody levels peaked at 10–12 days and significantly declined after 18 days (22) which was similar to our study. IgG against COVID-19 has been reported to persist over seven weeks (23) Some studies showed that COVID-19 patients with high IgG titers might produce neutralizing antibody activity, clearing the virus (24,25) Wang et al. reported a moderate correlation between anti-SARS-CoV-2 spike protein IgG levels and neutralization titers in COVID-19 patient plasma (26) . In contrast, some studies observed higher levels of anti-RBD IgG antibodies from COVID-19 patients that did not contribute to neutralization. Some studies suggest that anti-RBD IgM and IgA also contribute to neutralization (27,28). Since the virus-neutralizing antibody titer was determined by the virus infection inhibition rate, the content of neutralizing antibodies in the serum was found to be complex and is being recognized gradually (29) .

The detection antibodies in commercial reagents usually target spike and/or nucleocapsid proteins and may not distinguish among different immunogenic regions of the spike protein of SARS-CoV-2 (30)

Therefore, predicting whether serum with positive antibodies is protective or therapeutic should be approached with caution. The study of seroprevalence of SARS-CoV-2 IgM and IgG antibody and antibody titer alterations in COVID-19 patients, which could help in better interpreting the antibody testing results during COVID-19 progression

Table 4.2: The relationship between duration from the date of infection to the date of sample drawing and Covid anti- body in patient group (N=90)

Parametrs		The duration from the date of infection to the date of sample drawing				Person r correlation
		1 month	2 months	3 months	4 months	
Covid 19 IgM	Negative	0%	6.5%	12.9%	0%	- 0.141
	Positive	22.6%	22.5%	22.6%	12.9%	
Total		22.6%	29%	35.5%	12.9%	100%
Covid 19 IgG	Negative	9.7%	19.4%	25.8%	9.7%	-0.226
	Positive	12.9%	9.7%	9.7%	3.2%	
Total		22.6%	29.0%	35.5%	12.9%	100%

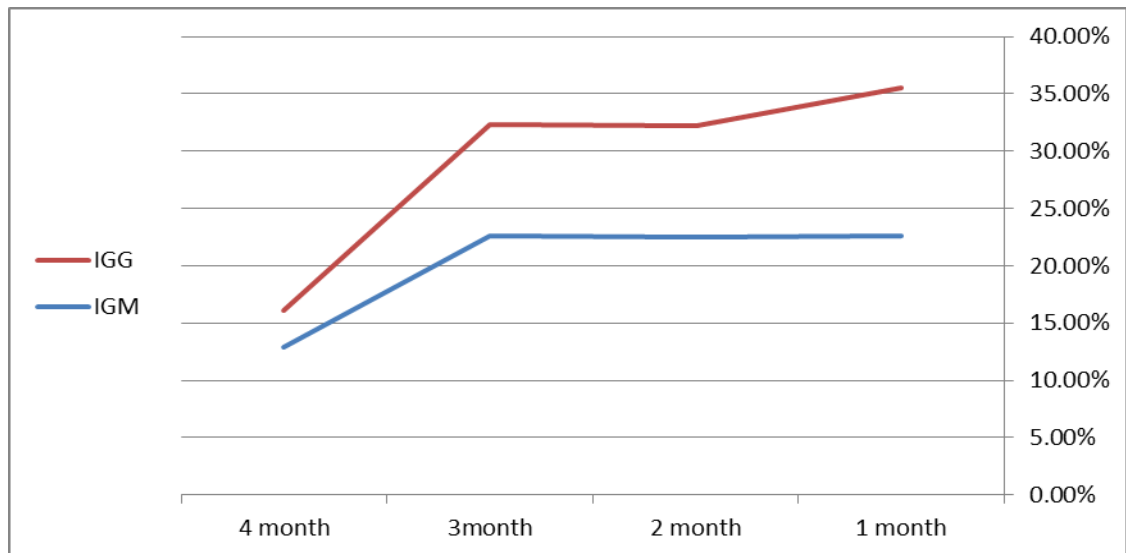


Figure 1: The relationship between time and covid-19 anti- body (IgG, IgM) in patient group.

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