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Evaluation the Role of IL-6 as Immunological Markers in Corona Virus-19 Infection in Sample of Iraqi Patients

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Abstract: Background: Interleukin 6 (IL-6), promptly and transiently produced in response to infections and tissue injuries, contributes to host defense through the stimulation of acute phase responses, hematopoiesis, and immune reactions. Although its expression is strictly controlled by transcriptional and posttranscriptional mechanisms, dysregulated continual synthesis of IL-6 plays a pathological effect on chronic inflammation and autoimmunity. Objectives Due to the impact of IL-6 as immunological markers in (COVID-19) infection which could be used as a promising diagnostic factors for COVID-19 infections, and evaluation their association with infection progression. Materials and Methods. In this study, 40 patients suffered from coronavirus (Patient group). The blood sample was collected from the patients, who attended Al-Zafaraniyah General Hospital, Fatima-Alzahra Hospital and Al-Yarmook Teaching Hospital in Baghdad City. Nasopharyngeal and oropharyngeal swabs for each patients were taken at the same time then add immediately into viral transport media (VTM) .The Interleukin-6 antibodies in serum of coronavirus Patients were detected by an enzyme linked immune sorbent assay (ELISA) method . Conclusion This repot exhibit remarkable association between patients suffered Covid-19 Infection as Immunological Markers patients.The results showed that Interleukin-6 antibodies in serum of Covid-19 was highly associated with incidence of Covid-19 results of the this study explain that the highest Interleukin-6 antibodies concentrations were higer in 40 Covid-19 patients.

Keywords: IL-6, COV-19, ELISA.

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Introduction

At the end of December 2019, a novel coronavirus was recognized as the reason of a group of pneumonia cases of unidentified etiology in Wuhan Coronavirus belongs to the *Coronaviridae* family, *Nidovirales* order. Coronaviruses are separated into four genera as follows: α-, β-, γ-, and δ-CoV . α- and β- CoVs only infect mammals, but γ- and δ- CoVs mostly infects birds. Human CoVs consists of α- CoVs (229E and NL63), β- CoVs (OC43 and HKU1), the Middle East respiratory syndrome-related coronavirus (MERS-CoV), and SARS-CoV. The genomic and phylogenic analysis showed that the CoV causing COVID-19 is a β- CoV in the identical subgenus as the SARS virus, but in a different clade resemblance with the SARS CoV (1,15).

The international committee on taxonomy of viruses has suggested that this virus be named SARSCoV-2 (2). The constitution of the receptor-binding gene region is very like to that of the SARS-CoV, and the virus has been

demonstrated to utilize the same receptor, the angiotensin-converting enzyme 2 (ACE2), for entrance into respiratory cells (3,14).Huanan seafood whole sale market, the preliminary site to which cases of coronavirus disease 2019 (COVID-19) were related, a city in the Hubei Province of China (1).

The use of specific biomarkers in the management of COVID-19 patients may be useful to attenuate or prevent complications from the disease (4). Much is already known of the role of Interleukin is a prototype cytokine with pleiotropic activity and functional redundancy that is necessary for host defense (6). Due to infection and tissue damage, Interleukin is produced rapidly by a variety of cells, including immune-mediated cells, mesenchymal cells, endothelial cells, fibroblasts and cancer cells, and even many other cells, which promotes host defense by stimulating acute phase reactions, hematopoiesis, and immune responses (6).

IL-6 in COVID-19, and its involvement with the pathogenesis of cytokine storm, and disease severity. This has led to the repurposing of Tocilizumab, an anti-IL-6 receptor monoclonal antibody, in critical COVID-19 patients. However, there is a strong correlation of various other chemokines with severity of illness in critical COVID-19, and others factors such as IL-6, IL-8, TNF-α have been demonstrated to be associated with severe COVID-19, including the presence of organ system failure (5). Because the importance of coronavirus disease (COVID-19) that associated with different medical fields and safety of human being Evaluation the association of IL-6 as immunological markers with infection progression.

Materials and methods

Samples collection

During the period between the beginning of November 2021 and the end of January 2022. The age of patients ranged from 20-75 years. 50 patients suffered from coronavirus (SARS CoV) (Patient group). The blood sample was collected from the patients, Who attended Al-Zafaraniyah General Hospital, Fatima-Alzahra Hospital and Al-Yarmook Teaching Hospital in Baghdad City. nasopharyngeal and oropharyngeal swabs for each patients were taken at the same time then add immediately into viral transport media (VTM). The Interleukin-6 antibodies in serum of coronavirus (SARS CoV) Patients were detected by an enzyme linked immune sorbent assay (ELISA) method using Interleukin -6 Screen kit (Demeditec/China).

Statistical analysis

The Statistical Package for the Social Sciences (SPSS) for Windows, version 22, from IBM Inc., was used to conduct the statistical analyses—the analysis of differences in patient blood samples before and after a body CT scan. We used pairwise and unpaired t-tests for statistical analysis to represent the sample size. We provided the mean and the standard error mean, with the p-value of significance being less than or equal to 0.05 [9].

Results and discussion

Molecular detection of coronavirus by RT- PCR

The coronavirus was detected in the nasopharyngeal and oropharyngeal swabs for each patients were selected and tested for corona virus using RT-PCR. corona virus was detected in 50 samples, selected samples were assayed to determine the coronar virus(13). RT-PCR was a complementary assay performed Figure (1).

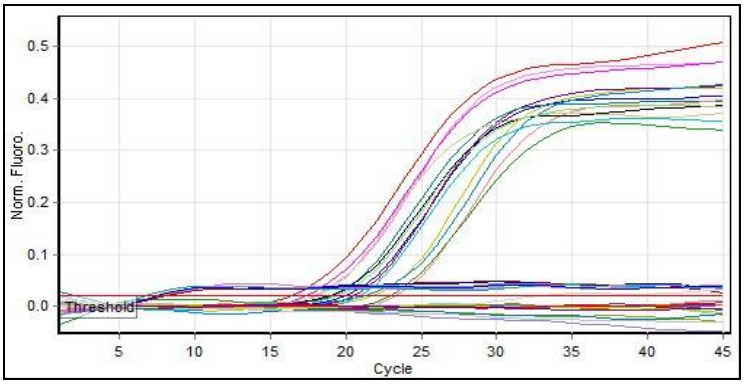

Figure (1): RT- PCR curve of coronavirus detection.

Table (1): Results of Immunological Marker (Interleukin-6 antibodies) in coronavirus patients.

Sample	Age	Gender	Vacine		SARS	IL-6
1	29	Female	2		positive	96
2	26	Female	-		positive	120
3	64	Male	2		positive	74
4	35	Male	1		positive	53
5	38	Female	2		positive	102
6	32	Male	2		positive	98
7	26	Male	-		positive	139
8	43	Male	2		positive	129
9	35	Female	2		positive	172
10	40	Male	-		positive	215
11	55	Male	1		positive	258
12	30	Male	2		positive	65
13	60	Female	2		positive	86
14	28	Male	-		positive	64
15	47	Male	-		positive	102
16	34	Male	1		positive	301
17	35	Female	-		positive	76
18	45	Male	-		positive	121
19	36	Male	1		positive	63
20	30	Female	1		positive	258
21	35	Male	-		positive	129
22	45	Male	2		positive	98
23	40	Male	2		positive	139
24	42	Female	1		positive	86
25	39	Female	1		positive	102
26	33	Male	1		positive	79
27	45	Male	1		positive	48
28	32	Male	2		positive	219
29	45	Male	-		positive	96
30	36	Female	2		positive	139
31	33	Male	1		positive	173
32	25	Male	1		positive	92
33	55	Male	2		positive	87
34	50	Male	2		positive	215
35	37	Male	1		positive	102
36	33	Male	2		positive	86
37	37	Male	2		positive	139
38	41	Female	1		positive	78
39	38	Male	1		positive	98
40	29	Male	-		positive	260

Table (2): Level of IL 6, in patients suffered from coronavirus (SARS CoV).

Test	Covid-19		T-test	
	Positive	Negative		
	N.mean ± SD	N.mean ± SD	P-value	Sig. (2-tailed)
IL 6	126.43±63.97	20±4.6	0.00**	Sig

Also the results of statistical analysis revealed that effect of SARS on the respondents in relation to the IL6, the results were that all people who responded positive to SARS were higher than those who were negative in all tests. Table (2), shows that the mean of IL6 in the positive is 126.43 with a standard deviation of 63.97, while the mean of the negative cases was 20 with a standard deviation of 4.6, so there was Significant differences between the two groups, where Pvalue = 0.000, which is smaller than sig = 0.05, the results of present study agree with results of other studies (18). showed that the Increased levels of IL-6 were found to be signifcantly associated with adverse clinical COVID-19 outcomes such as ICU admission, acute respiratory distress syndrome (ARDS). In addition, patients with such complicated forms of COVID-19 higher serum IL-6 levels (7) Also, with the results of revealed that increased IL-6 is associated with long COVID-19 (8). Also, with the results of (9) found that the Serum IL-6 as a Vital Predictor of COVID-19 Severity in Patients living in Baghdad Iraq, Also, with the results of (10) found that the IL6 level was highly elevated in most of moderately and severely affected COVID 19 patients living in Baghdad Iraq. Also with result of (17) in Bagdad that showed investigating inflammatory factors in the COVID-19 pandemic is crucial in controlling and treating. (19) Show that IL-6 is one of the main mediators of the inflammatory and immune response resulting from viral infection Therefore, many patients develop a fatal immune reaction with persistent damage by the action of cytokines leading to alveolar infiltration by macrophages.

Table (3): Effect of COVID-19 for males and females ages.

Mean ± SD		T-test	
N.Male	N.Female	P-value	Sig. (2-tailed)
40.6±11.59	41.48±13.96	0.862	Not Sig

The average and deviation of ages were calculated for males and females, Table (3) average age for males was 40.6 years, with a standard deviation of 11.59, while for females it was 41.48 years, with a standard deviation of 13.96. There are no significant differences at the gender level if the pvalue = 0.862, which is greater than sig = 0.05.
Figure (2).

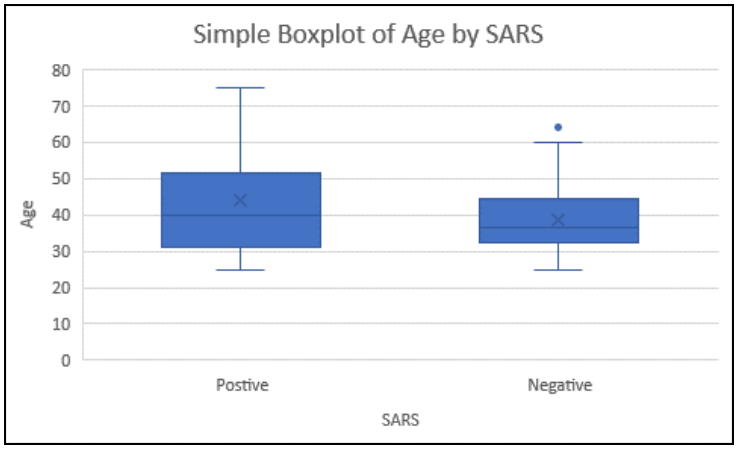

Figure (2): Effect of COVID-19 for males and females ages.

Conclusion

This current study exhibit remarkable association between patients suffered Corona Virus-19 Infection and Immunological Markers patients.The results showed that Interleukin-6 antibodies in serum of Corona Virus-19 was highly associated with incidence of Corona Virus-19 The explain that the highest Interleukin-6 antibodies concentrations were higer in 40 Corona Virus-19 patients.

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