Changes occurrence in biochemical aspect in patients with Corona virus(Covid-19)

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Abstract

 This study was conducted on (83) patients who were suffering from COVID-19 or recovered from this virus and attended Al-Numan Hospital / Baghdad city, as well as (83) healthy individuals as a control group during the period from 1st February to 1st November 2020. The results showed that anti-COVID IgM antibodies were higher in the age group (40-59) years 11(45.8%), followed by the age group (20-39) years 9(37.5%), then the age group (> 60) years 3(12.5%), while these antibodies were lower in the age group <20 years 1(4.2%) (P=0.741). Results of anti-COVID IgG antibodies were shown to be highest in the age group 20-39 19(42.2%), followed by the age group (40-59) years 17(37.8%), then the age group > 60 years 11(13.3%) and then the age group < 20 years 7(8.4%), P=0.741. While the results showed that urea and creatinine were elevated in 60 (72.3%) of the patients in comparison with the control group 0(0.0%), and the level of CRP was elevated in 76(91.6%) of patients, P=0.005. Our study revealed that the levels of GOT and GPT increased in 11(13.3%) and 9 (10.8%) of the patients respectively, while the levels of alkaline phosphatase increased in 50(60.2%) of patients P=0.005. The Pearson correlation of GPT (0.417) was significant with CRP, also the Pearson correlation GOT was (0.017) significant with CRP, also alkaline phosphatase was highly significant with CRP 0.697, the renal function group showed highly significant variation when Pearson correlation method was used as it was 0.534 with urea and 0.343 with creatinine respectively.

Keywords: COVID-19, Elevation, GPT, GOT, alkaline phosphatase, Urea, creatinine, CRP.

E.mail:lezan_md@ntu.edu.iq **Introduction**

 COVID-19 disease is developed by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), and this virus is able to cause damage and severe pneumonia to the kidney heart and liver. The inflammatory cytokine storm was found to be the main cause of deaths [1], which is defined by uncontrolled & excessive pro-inflammatory cytokine release, as was observed in other diseases caused by the pathogenic coronavirus [2]. For example, inflammatory cytokines produced by macrophage (IL6, IL-10 & TNF-α) are elevated in severe COVID-19 patients, causing damages to lungs & other organs [1]. As a result, plasma inflammatory marker measurements could help in predicting the progress of the disease. Some studies performed on COVID-19 patients reported some inflammatory marker levels e.g C-reactive protein, procalcitonin, erythrocyte sedimentation rate (ESR) as well as serum amyloid A. [3]. T o correlate the hyperferritinemia with the cytokine storm development, they have reviewed all the documented published studies regarding serum ferritin levels in severe & non severe COVID-19 disease patients, as well as other inflammatory factors, in addition to studies that reporting cytokine & ferritin levels in COVID-19 survivors and non-survivors [4]. Patients hospitalized with COVID-19 are at high risk of developing AKI, which may result in serious disease, dialysis & even deaths [5]. Different COVID-19-related effects are thought to participate in AKI development including kidney tubular injuries with septic shocks, micro inflammations, elevated blood clots, and potential direct kidney infections [6]. The majority of COVID-19-related AKI patients who recover from the disease still develop low kidney functions after hospital discharge. These adults showed no underlying medical condition [5]. They may have severe lung problems, like pneumonia & ARDS (acute respiratory distress syndrome) [6]. Pneumonia is able to swell airways and fill the lungs with fluids, leading to ARDS, which makes it impossible or hard or impossible for the patient to breath, and some patients may require ventilators [7]. The CDC & other experts have no sufficient data yet to state how much danger COVID-19 poses on individuals with liver

disorders. However, they think that the harmful potential is greater [8]. Researchers stated that given the small sample size of 41 individuals can't say surely if the results apply to the majority of people with liver disorders. In several COVID-19 severe cases, the virus might prevent the liver from perfect functioning [9]. A study in China revealed that up to 1/2 of patients with the new coronavirus, named SARS-CoV-2, develop liver dysfunctions at some points during their course of disease [10].

Materials and methods

This study was conducted on (83) patients who were suffering from COVID-19 or recovered from this virus and attended Al-Numan Hospital / Baghdad city, as well as (83) healthy individuals as a control group during the period from 1st February to 1st November 2020. Anti- COVID-19 antibody IgM and IgG were measured by ELISA technique, with normal value $\geq$ 1 ml/dl. Renal function group urea and creatinine were measured by a spectrophotometer, also Liver function tests were measured by a spectrophotometer, while CRP titration was measured using Vides technique.

Statistical analysis

Statistical analyses of the present study were performed using SPSS statistical package for Social Sciences (version 21.0 for windows, SPSS). Data are introduced as mean ± SD for quantitative variable and number & percentage of qualitative variables. Relations were studied using Chi-square test. Student's t-test was used to test differences between groups.

Results

Table (1) showed that anti-COVID IgM antibodies were higher in the age group (40-59) years 11(45.8%), followed by the age group (20-39) years 9(37.5%), then the age group (> 60) years 3(12.5%), while these antibodies were lower in the age group <20 years 1(4.2%) (P=0.741).

Table (1): Estimation of anti- COVID 19 IgM antibodies according to age groups

Age Group				COVID IgM		Total
				Normal	Elevated	
Patient	Age	<20	Count	6	1	7
			%	10.2%	4.2%	8.4 %
		20-39	Count	24	9	33
			%	40.7%	37.5%	39.8 %
		40-59	Count	21	11	32
			%	35.6%	45.8%	38.6 %
		60+	Count	8	3	11
			%	13.6%	12.5%	13.3 %
		Total	Count	59	24	83
			%	100.0%	100.0%	100.0 %
P=0.741						

Results of anti-COVID IgG antibodies were shown to be highest in the age group 20-39 19(42.2%), followed by the age group (40-59) years 17(37.8%), then the age group > 60 years 11(13.3%) and then the age group < 20 years 7(8.4%), P=0.741 as shown in table (2).

Table (2): Estimation of anti- COVID 19 IgG antibodies according to age group

Group			COVID IgG		Total
			Normal	Elevated	
Patient	Age	<20	Count 3	4	7
			7.9% %	8.9%	8.4 %
		20-39	Count 14	19	33
			36.8% %	42.2%	39.8 %
		40-59	15	17	32
			Count 39.5% %	37.8%	38.6 %
		60+	Count		11
			615.8% %	511.1%	13.3 %
		Total	Count 38	45	83
			100.0% %	100.0%	100.0 %
		P=0.912			

Table (3) illustrated that urea and creatinine levels were elevated in 60 (72.3%) of patients in comparison to control group 0(0.0%), and CRP levels were elevated in 76(91.6%) of patients, P=0.005*.

Table (3): Relationship of Renal function group and CRP elevation in patients with COVID-19

Parameters		Group			
		Patient		Control	
		Count	%	Count	%
Urea	Normal	23	27.7%	83	100.0 %
P=0.005*	Elevated	60	72.3%	0	0.0 %
Creatinine	Normal	23	27.7%	83	100.0%
P=0.005*	Elevated	60	72.3%	0	0.0%
CRP	Normal	7	8.4%	83	100.0%

P=0.005*	Elevated	76	91.6%	0	0.0%

The association of liver function was observed in table (4). The levels of GOT and GPT increased in 11(13.3%) and 9 (10.8%) of the patients respectively, while the levels of alkaline phosphatase increased in 50(60.2%) of patients P=0.005*.

Table (4): Association of Liver function group and GRP with COVID-19

Parameters		Group			
		Patient		Control	
		Count	%	Count	%
GPT P=0.005*	Normal	74	89.2%	83	100.0%
	Elevated	9	10.8%	0	0.0%
GOT P=0.005*	Normal	72	86.7%	83	100.0%
	Elevated	11	13.3%	0	0.0%
Alk. Phos. P=0.005*	Normal	33	39.8%	83	100.0%
	Elevated	50	60.2%	0	0.0%
CRP P=0.005*	Normal	7	8.4%	83 0	100.0%
	Elevated	76	91.6%		0.0%

Table (5) revealed that the Pearson Correlation of GPT (0.417) was significant with CRP, also the Pearson Correlation GOT was (0.017) significant with CRP, also alkaline phosphatase was highly significant with CRP 0.697, the renal function group showed highly significant variation when Pearson Correlation method was used as it was 0.534 with urea and 0.343 with creatinine respectively.

Table (5): Correlation between Liver function group and Renal function group with CRP in COVID-19 patients

Parameters	Correlations	CRP
GP T	Pearson Correlation	.417
	Sig. (2-tailed)	.000
	N	83
GOT	Pearson Correlation	.262
	Sig. (2-tailed)	.017
	N	83
Alk. Phos.	Pearson Correlation	.697
	Sig. (2-tailed)	.000
	N	83
Urea	Pearson Correlation	.534
	Sig. (2-tailed)	.000
	N	83

Creatinine	**Pearson Correlation**	.343
	Sig. (2-tailed)	.002
	N	83

Discussion

Corona virus (COVID-19) is the most dangerous virus, the most deadly known virus that affects humans at the present time. Results explained the anti-COVID antibodies IgM are a highest in ages 4059 than other ages, and these finding agreed with [11] who found that the most vulnerable ages for Covid-19 are between 40 and 60 years because these people have a fluctuating immune system, as well as these ages that are most in contact with the labor market [11]. Also COVID-19 antibodies IgG are a highest in ages 20-39 years than other ages. This finding matched with [12] who reported that the ages between 20 to 39 are the ages which are the most similar to those recovering from COVID-19 infection because their immune system is so strong that it fights the virus and produces antibodies that qualify them to recover quickly and their symptoms may be less than moderate to mild [12]. There are relationship of renal function group and CRP elevation of renal levels in patients with COVID-19, and these results were in a harmony with [13] who found a direct relationship between the renal function group and the CRP due to the occurrence of major damage to the kidneys, which may lead to an increase in the levels of urea and creatinine, which corresponds to an increase in CRP, which is the evidence of damage occurring in one of the body's organs, namely the kidneys [13]. The elevated GOT, GPT and Alk. Phos. levels with high level of CRP in COVID-19 infected patients were similar to what was found by [14] who reported that CRP could be a valuable marker to expect the probability of aggravation of non-severe COVID-19 adult patients. Most of the body's organs are damaged by corona virus, which gives a high indication of an elevated level of CRP in the serum of people with Covid-19 [14]. According to the Pearson correlation, GPT (0.417) showed significant increase in CRP, also the Pearson Correlation GOT was (0.017) significant with CRP, also Alk. Phos. showed a highly significant result with CRP 0.697, and the renal function tests showed a highly significant difference with Pearson Correlation where urea was 0.534 and Creatinine was 0.343. The results agreed with [15] who proved that the high titer of CRP gives an indication of corresponding elevations in the measurement levels of vital body organs such as the kidneys, liver and other parts of the body determined by the height of this protein [15].

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