Clinical Schizophrenia & Related Psychoses

Estimation of Anti-COVID-19 IgM and Anti-COVID-19 IgG in Patients with Heart Diseases

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Abstract

In the current study, blood samples were obtained from (83) heart disease patients who were suffering from COVID-19 and from 83 healthy individuals as a control group. The patients attended Al-Karama hospital in Baghdad/Iraq during the period from 15th January to 15th September 2020. The prevalence of corona virus IgG antibodies in females were shown to be 23 (51.1%) in comparison with males 22 (48.9%), P=0.706.While the prevalence of corona virus IgM antibodies in females was 13 (54.2%) when compared with males was 11 (45.8%), P=0.93. The prevalence of anti-COVID-19 IgM antibodies and anti-COVID-19 IgG antibodies according to age group elevated that anti-COVID-19 IgM in the age group (<20) years was 6 (10.2%), while in the age group (20-39) years was 9 (37.5%),whereas in the age group (40-59) years was the highest 11 (45.8%), while in the age group (>60) years was the lowest 3 (12.5%), P=0.741. However, the results showed that the prevalence of anti-COVID-19 IgG in the age group (<20) years was 4 (8.9%), and in the age group (20-39) years was the highest 19 (42.2%), while in the age group (40-59) years was 17 (45.8%), whereas in the age group (>60) years was 5 (11.1%), P=0.912. The prevalence of anti COVID-19 IgG in rural areas was 24 (53.3%) compared to its prevalence in urban areas 21 (46.7%). Results of our study showed an elevated mean Troponin levels 51 (61.4%), and the mean CRP level was 76 (91.6%), while the mean LDH level was 2((2.4%), in the level<160, and 11 (13.3%) in the levels between 160-320, a highest levels in >320 concentration were 70 (84.3%). Correlation of CRP and COVID-19 with heart disease patients showed that the Pearson Correlation of D dimer with CRP was .684, the Pearson Correlation of Troponin with CRP was.425, and the Pearson Correlation of LDH was .544.

Keywords: Blood samples • Patients • Protein •Vaccines

Introduction

Corona Virus is still claiming the lives of people because of the genetic change that is taking place and its progress [1]. A relationship was found between COVID-19 infections and cardiovascular diseases. The pre-existing cardiovascular diseases seem to be associated with the highly death risks and worse consequences in COVID-19 patients, while COVID-19 itself may also induce arrhythmias, myocardial injuries, venous thromboembolisms and acute coronary syndromes [2]. In addition, potential drug–disease interaction that affects COVID-19 patients and co-morbid cardiovascular disease are becoming serious concerns [3]. In addition to respiratory symptom. Cytokines like tumor necrosis factor-α, IL-6 andIL-1β are overproduced by the immune system, leading to multi-organ damages. Moreover, coagulation abnormalities are caused by COVID-19 in large number of patients, leading to thromboembolic event [4]. Genomic sequences and viral protein structures of SARS-CoV-2 were studied thoroughly from time of their emergence. Study of the viral biological features will enable us to develop vaccines, diagnostic tests and pharmacological therapy and can also increase the knowledge on tissue tropisms. The early clinical information demonstrated that both susceptibility and outcomes of COVID-19 are tightly correlated with Cardiovascular Diseases (CVD) [5]. Among COVID-19 patients, high prevalence of pre-existing CVD were observed, and such comorbidities are related to higher mortalities. Moreover, COVID-19 seems to enhance cardiovascular disease development, like myocardial injuries, arrhythmia, Acute Coronary Syndromes (ACS) and venous thromboembolisms [6]. Children infected with COVID-19 were also shown to develop hyper-inflammatory shocks with features close to Kawasaki disease, such as cardiac dysfunctions and coronary vessel abnormality [7]. Together, this information reveals the existence of bidirectional interactions between cardiovascular system and COVID-19, however, the mechanism that underlies this interaction remain sun known [8].

Materials and Methods

From all the studied groups (83 COVID-19 patients with heart diseases and 83 healthy controls), 5 ml of venous blood was collected, and these samples were centrifuged at 3000 rpm for 5 minutes to obtain serum. The serum samples were stored at -20ºC until use. The patients in this study attended Al-Karama hospital during the period from 15th January to 15th September 2020.Anti-COVID IgM antibodies and Anti COVIO-19 IgG antibodies were measured by vides technique, with normal value ≤ 9, and Troponin, D. dimer, LDH, and CRP concentration were measured by vides technique too. The normal value of Troponin; <500 ug/ml, CRP; less than 10, LDH; 160 – 320.

Statistical analysis

A statistical analysis of the present study was done using the SPSS statistical package for Social Sciences (version 21 for windows, SPSS).

Results

In Table 1, it is observed that the prevalence of corona virus IgG antibodies according in females was 23 (51.1%) which was higher than males 22 (48.9%), P=0.706, while the prevalence of IgM COVID-19 in females was 13 (54.2%) and in males was 11 (45.8%), P=0.93.

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The prevalence of anti-COVID-19 IgM antibodies and anti-COVID-19 IgG antibodies according age group shown in Table 2 revealed that elevated prevalence of anti-COVID-19 IgM was in the age group (<20) years 6 (10.2%), while in the age group (20-39) years was 9 (37.5%), and in the age group (40-59) years was the highest 11 (45.8%), while in the age group (>60) years was 3 (12.5%), P=0.741. However, the elevated anti-COVID-19 IgG was in the age group (<20) years 4 (8.9%), and in the age group (20-39) was higher than other age groups 19 (42.2%), followed by the age group (40-59) years 17 (45.8%), while in the age group (>60) years was 5(11.1%), P=0.912.

Table 3 showed that the prevalence of anti COVID-19 IgGin the rural areas was 24 (53.3%), while the anti COVID-19 IgG was lowest in urban areas was 21 (46.7%). But the prevalence of anti COVID-19 IgMin the rural areas was 16 (66.7%), while the anti COVID-19 IgM was lowest in urban areas 8 (33.3%).

Results of our study showed an elevated mean Troponin levels 51 (61.4%), and the mean CRP level was 76 (91.6%), while the mean LDH level was 2 (2.4%), in the level<160, and 11 (13.3%) in the levels between 160-320, a highest levels in >320 concentration were 70 (84.3%)as shown in Table 4.

Correlation of CRP and COVID-19 with Heart diseases patients illustrated in Table 5, the Pearson Correlation of D. dimer with CRP was .684, the Pearson Correlation of Troponin with CRP was.425 and the Pearson Correlation of LDH was.544.

Genders	COVIDIgG		Total	COVIDIgM		Total
	Normal	Elevated		Normal	Elevated	
Male	1744.7%	2248.9%	3947.0%	2847.5%	11 45.8%	3947.0%
Female	2155.3%	2351.1%	44 53.0%	3152.5%	1354.2%	4453.0%
	38100.0%	45100.0%	83100.0%	55.3%100.0%	24100.0%	83100.0%
	P=0.706			P=0.893		

Table 1. Prevalence of corona virus IgM and IgG antibodies according to gender.

Age groups	COVID IgM		Total	COVID IgG		Total
	Normal	Elevated		Normal	Elevated	
<20	6	1	7	3	4	7
	10.2%	4.2%	8.4%	7.9%	8.9%	8.4%
20-39	24	9	33	14	19	33
	40.7%	37.5%	39.8%	36.8%	42.2%	39.8%
40-59	21	11	32	15	17	32
	35.6%	45.8%	38.6%	39.5%	37.8%	38.6%
60+	8	3	11	6	5	11
	13.6%	12.5%	13.3%	15.8%	11.1%	13.3%
Total	59	24	83	38	83	83
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	P=0.741			P=0.912		

Table 2. Prevalence of corona virus IgM and IgG anti bodies according to the age groups.

Residence	COVID IgG		Total	COVID IgM		Total
	Normal	Elevated		Normal	Elevated	
Urban	17	24	41	33	8	41
	44.7%	53.3%	49.4%	55.9%	33.3%	49.4%
Rural	21	21	42	26	16	42
	55.3%	46.7%	50.6%	44.1%	66.7%	50.6%
Total	38	45	83	59	24	83
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	P=0.435			Normal		

Table 3. Prevalence of corona IgM and IgG antibodies according to the residency.

Parameters		Group			
		Patient		Control	
		Count	%	Count	%
Troponin	Normal	32	38.6%	83	100.0%
P=0.005	Elevated	51	61.4%	0	0.0%
CRP	Normal	7	8.4%	76	91.6%
P=0.005	Elevated	76	91.6%	7	8.4%
LDH	<160	2	2.4%	55	66.3%
	160-320	11	13.3%	28	33.7%
P=0.005	>320	70	84.3%	0	0.0%

Table 4. Estimation of Troponin, D. dimer and LDH levels in patients with COVID-19 infections

Parameters		CRP
D Dimer	Pearson Correlation	.684
	Sig. (2-tailed)	.000
	N	83
Troponin	Pearson Correlation	.425
	Sig. (2-tailed)	.000
	N	83
LDH	Pearson Correlation	.544
	Sig. (2-tailed)	.000
	N	83

Table 5. Correlation of CRP and COVID-19 with Heart diseases.

Discussion

Covid-19 is the most deadly disease and the most risky for patients who suffer from heart disease. The prevalence of corona virus IgG antibodies according to the genders the females were a highest than males. While the prevalence of corona virus IgM antibodies, the elevated of IgM of COVID-19 in females were more than the males. These findings agreed with who found that of the 3 046 participant, 1577 (51.8%) were females and 1 469 (48.2%) were males [9]. The elevated of anti-COVID-19 IgM in ages <20 was a lowest than, the ages between 20-39,but the ages 40-59 was a highest between than others ages, while the ages 60+ was a lowest other all ages [9]. The results were matched with who reported that in accordance with the Centers for Disease Control and prevention (CDC) reports, few children have been admitted to the hospitals and Intensive Care Units (ICUs) (5.7%–20% and 0.58%–2.0% respectively) than the adult in the age group(18–64) years (10%–33% and 1.4%–4.5% respectively). However, infants reported higher hospitalization rate (15%–62%) than older children with ages (1–17) years) (4.1%–14%) and adult [10]. The prevalence of anti COVID-19 IgGin the rural areas was a higher than urban areas, while the anti COVID-19 IgG is lowest in urban areas respectively. But the prevalence of anti COVID-19 IgMin the rural areas, while the anti COVID-19 IgM is lowest in urban areas respectively. This report was in a harmony with who explained that the spread of infections among patients in rural areas is more than urban areas, and this prevalence is due to the lack of health care among the residents of those areas, and it may be that these people do not pay attention to the instructions for avoiding infection with Corona virus or the instructions of the World Health Organization [11]. The elevated of Troponin level was a highest, the CRP level was a highest too, and the measurements' of LDH was a highest in the levels between 160-320, and a highest levels in >320 concentration with COVID-19 infections. These findings were aligned with who alleged that increased cardiac troponins were observed in a large number of patients, indicating myocardial injuries as potential pathogenic mechanisms that participate in serious diseases and mortalities. Therefore, increased levels of troponins are related to higher mortalities in COVID-19 patients. This brief study investigates the available evidence in regard to the correlation between COVID-19 and myocardial injuries [12]. Reported that the levels of CRP are associated with the inflammation levels, and its concentration is not influenced by factors like sex, age, and physical conditions [13]. Levels of CRP may

cause activation of the complement system and promotes phagocytosis, so, it causes clearance of the pathogenic organisms that invade the body. Levels of CRP may be used in early diagnosis of pneumonia, and severe pneumonia patients have increases levels of CRP [13]. Expound there is a relationship between raised LDH level measured at earliest time during hospitalization and disease consequences in COVID-19 patients. Higher levels of LDH are correlated with a ~6-fold elevation in odds of developing severe diseases and a ~16-fold elevation in odds of mortalities in COVID-19 patients. Further large studies are required for the confirmation of these results [14]. Documented that the raised D-dimer reveals highly abnormal blood clotting risks. Increased D-dimer levels were shown to be related with increased mortality rate of community acquired pneumonias. Patients who suffer from severe community-acquired pneumonias have highly significant levels of D-dimer, and normal ranges of D-dimer indicate low risk complication. Augmented activities of urokinase may lead to hyper fibrinolysis [15], through increasing plasminogen cleavage into the active plasmin, and eventually result in diffuse alveolar damages with acute lung injuries, in a mouse model of SARS-CoV infection. It was shown in a study by that the coagulation function parameter levels, including pro thrombin time, fibrinogen, fibrinogen degradation product was well as D-dimer increased in severe COVID-19 patients. Presumably, the COVID-19 severity could be related to coagulation dysfunctions. The laboratory changes in confirmed COVID-19 patients observed that high D-dimer levels could be correlated with the progression of COVID-19 disease. The levels of D-dimer in COVID-19 patients who were admitted to the ICU were shown to be significantly elevated [16].

Conclusion

Corona Virus is still claiming the lives of people because of the genetic change that is taking place and its progress. A relationship was found between COVID-19 infections and cardiovascular diseases. The pre-existing cardiovascular diseases seem to be associated with the highly death risks and worse consequences in COVID-19 patients, while COVID-19 itself may also induce arrhythmias, myocardial injuries, venous thromboembolisms and acute coronary syndromes. In addition, potential drug–disease interaction that affects COVID-19 patients and co-morbid cardiovascular disease are becoming serious concerns. In addition to respiratory symptom. Cytokines like tumor necrosis factor- a, IL-6 and IL-1

are overproduced by the immune system, leading to multi-organ damages. Moreover, coagulation abnormalities are caused by COVID-19 in large number of patients, leading to thromboembolic event. Genomic sequences and viral protein structures of SARS-CoV-2 were studied thoroughly from time of their emergence. Study of the viral biological features will enable us to develop vaccines, diagnostic tests and pharmacological therapy and can also increase the knowledge on tissue tropisms.

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