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Evaluation of lipid profile in Yong adult patients with SARS-COVID-2

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Abstract

The study was conducted on 80 samples, 50 samples from patients with Coronaviruses and 30 samples from the healthy control . The ages of the two groups ranged between (20-35) years, as the samples were collected from the Samarra City Hospital / Sanitary Isolation Unit in Salah Al-Din Governorate. The parameter were estimation , involve (CRP, cholesterol-T.C , Triglyceride- T.G , High density lipoprotein HDL-C, Low density lipoprotein LDL-C , Very low density lipoprotein-VLDL).

The results of the current research showed a significant rise in (CRP, T.G, LDL-C, VLDL) also the result appear a significant reduce in (HDL-C) in the patients compared with a healthy subject .

Key words :- :- COVID-19, CRP , lipid profile

Introduction

COVID-19 By the end of 2019, unusual cases of pneumonia had been reported in Wahan City in central China's Hubei Province, as the World Health Organization reported on January 12, 2020 that the disease was caused by a new virus of the systemic syndrome SARS-CoV), which belongs to the group B-Coronavirus, which also includes severe acute respiratory syndrome (1). This disease moved from the Chinese city of Wuhan to affect more than 40 million people worldwide in 2020 (2). The clinical symptoms of COVID-19 are distinguished by the fact that (80%) of the cases are similar to mild flu, but in 20% of the cases there were other complications such as pneumonia with varying degrees of respiratory failure, as well as blood clots, stroke and coronary artery syndrome. Acute and heart attack (3). COVID-19 patients are affected by one or more comorbidities, including diabetes, cardiovascular disease, chronic lung disease, chronic kidney disease, immune disease, severe obesity, and liver disease (4). Most of the patients also showed an inflammatory and blood clotting state with elevated levels of C-reactive protein (5). A great effort was made to understand the risk factors responsible for the main causes of COVID-19, as the Italian Health Institute indicated that (1) of the deceased patients did not suffer from any diseases, while (26) they were suffering from only one disease and (26) They suffer from two diseases and (47) suffer from 3 medical conditions, and the most chronic diseases previously found in the deceased patients are: arterial , diabetes mellitus, chronic kidney disease, chronic obstructive pulmonary disease, cancer, heart disease, and obesity(6).

Lipids are composed of many molecules that are insoluble in water and are mainly classified as fatty acids, triglycerides, or cholesterol. Lipids are widely distributed in cellular organelles and serve as the building blocks for all membranes. lipids play an important role as energy sources in particle signaling and secondary messengers (7). The lipid molecules are mainly derived from three sources, including ingested fats from food, lipoproteins produced by the liver, and unesterified fatty acids that are produced by

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the liver. It is released by white adipose tissue. Triglycerides and cholesterol esters are broken down in the intestinal lumen by cholesterol esterases, pancreatic lipases, and bile salts (8).

Material and Methods

Study Samples: The study was conducted on (80) blood samples, which were divided into: - patient group It contains (50) blood samples for patients infected with SARS COVID-2. and control group It contains (30) samples of healthy people. The ages of the two groups ranged between (20-35) years, as the samples were collected from the Samarra City Hospital / Sanitary Isolation Unit in Salah Al-Din Governorate.

Estimation of C-reactive protein concertation in all groups

The C-reactive protein level was estimation using the method (9).

Estimation of lipid profile in all group

The T.C Concentration was estimated by according method [10]. also the T.G Concentration was estimated by according method [11]. Also A colorimetric enzymatic method was used to account HDL-C. [12] as well as the LDL-C and VLDL-C level was account according to the following equation [13].

The Con.of LDL-C (mg / dl)= Con.cholesterol- (HDL+VLDL). The Con. of VLDL(mg/dl) = TG/ 5.

Statistical analysis:

The statistical program (SPSS) was used to analyze Mean ±SD was used for the data under study, and the T-test was used to simile the variables between all group at $P \leq 0.05$.

Results and discussion:

Table (1): shows the Mean ± S.D of the parameters of Patients and control

Parameter	Mean ± SD		P value
	Control	Patients	
Crp mg/L	7.582±2.794	51.101±18.145	0.05
Cholesterol mg/dl	201.280±53.025	138.702±51.103	0.05
TG mg/dl	134.568±83.936	105.480±49.617	0.05
HDL mg/dl	85.594±32.569	63.058±14.131	0.05
LDLmg/dl	114.113±20.390	151.601±36.253	0.05
VLDL mg/dl	19.363±8.780	18.465±8.449	0.05

$P \leq 0.05$

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The results appear rise at $p \leq 0.05$ in (CRP, , triglycerides, LDL, and VLDL) level in serum of patients among to healthy people , also the result appear a significant reduce in (cholesterol, HDL-C) level in sera of patients among healthy people. as figure (1,2,3,4,5,6) respectively.

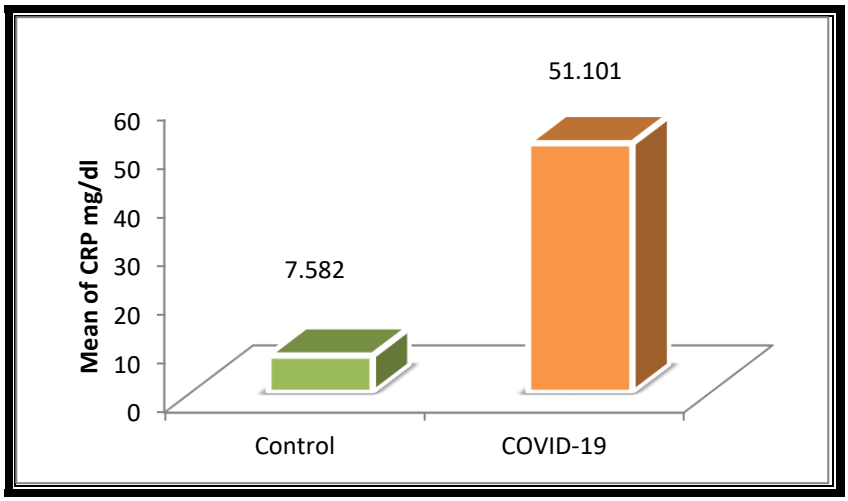

Figure (1): CRP level in study group

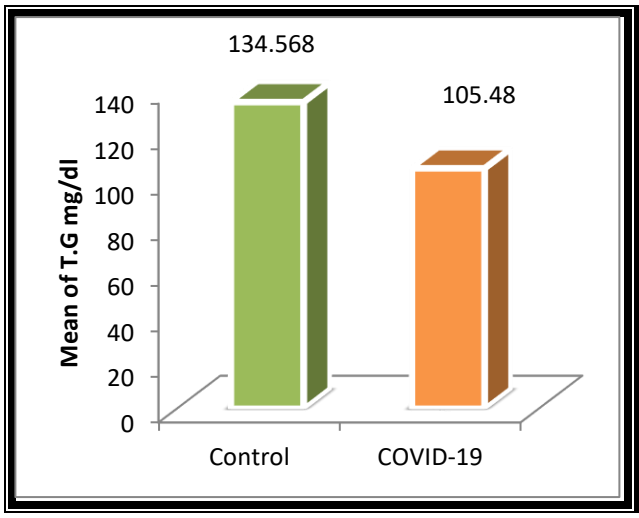

Figure (3):T.G level in study group

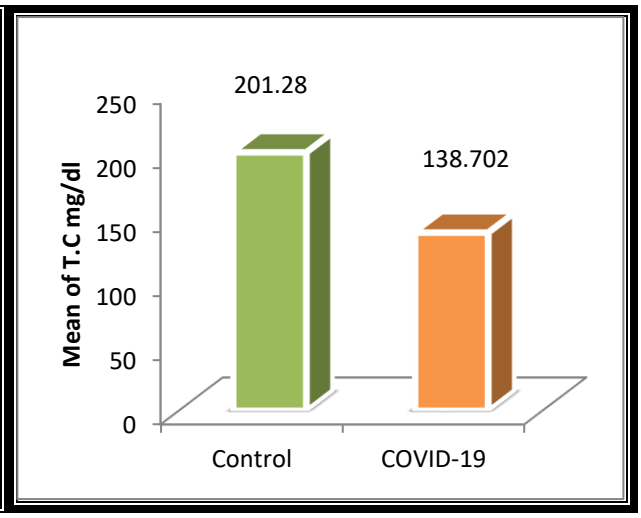

Figure (2): Cholesterol level in study group

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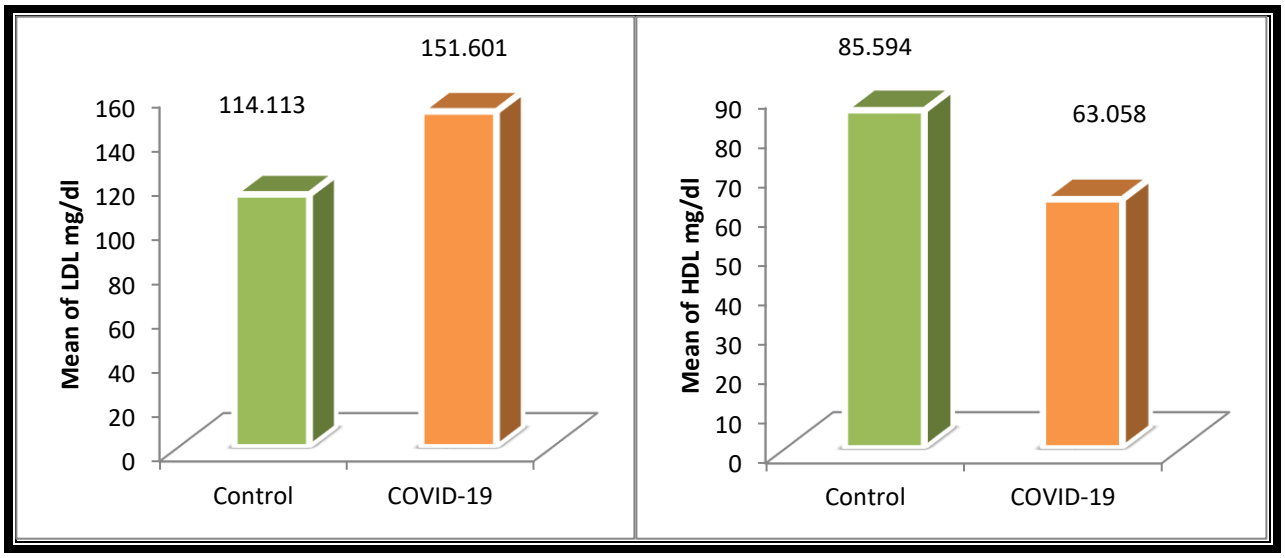

Figure (5): LDL-C level in study group

Figure (4): HDL-C level in study group

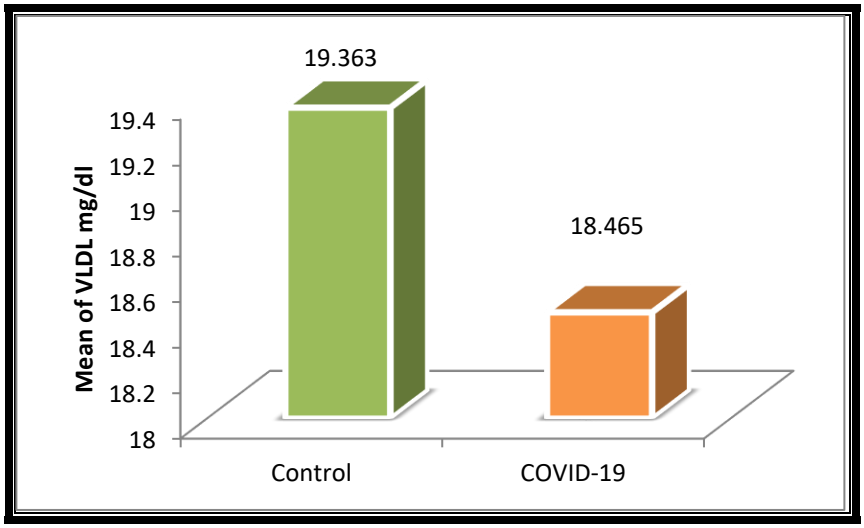

Figure (6): VLDL level in study group

Discussion

The elevated levels of CRP confirm the presence of acute inflammation and a worsening viral infection in patients with corona virus, as the results of the study agree with Getachew Yideg [(14)] , Seyed Ahmad [(15),] as the reason for the rise CRP This reactive reaction leads to the stimulation of inflammatory cytokines and tissue destruction, which head increase in CRP in patients with SARS-COV-2, which in turn drove to several serious diseases, including lung damage and a decrease in oxygen in the body. It can also be considered that the high level of CRP may be An early and useful marker in predicting the possibility of evolution COVID-19 disease and infection with the virus [(16, 17, 18)]. Moreover, elevated levels of pro-inflammatory cytokines and chemokines in SARS-CoV-2 patients play a pathogenic part in MERS-CoV infection and this further enshrines the critical role of CRP in the diagnosis of corona virus [(19)].

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Wang *et al*. (2020) [20] also indicated that the sharp decrease in serum cholesterol concentration may actually indicate cholesterol transport on cell membranes to facilitate virus entry [21] . In a study, it was found that cholesterol metabolism pathways were also significantly affected in patients with coronaviruses, whether in the case of moderate or severe infections, and did not improve during the recovery period [22]. However, the underlying alteration of cholesterol metabolism in COVID-19 infection remains unknown so far, the most extensive investigation of HIV infection and dyslipidemia is that associated with HIV [23]. Therefore, it appears that there is a pattern of dyslipidemia that may be characteristic of SARS-COVID-2 patients. However, it is true that worldwide there is significant variation in blood lipid levels depending on different population groups [24]. On the other hand, T.G show up a significant increase in patients group compared with control group, as the results of our current research agree with [25, 26]. also indicated in his study that the level of triglycerides did not show changes in Covid-19 patients when they were approval to the intensive care unit, and this did not agree with the results of the current research.

Also (LDL-C) appear elevated in sera of SARS-COV2 patients compared with healthy people, as the results agree with [27,28], and the elevated level of (LDL-C) may be attributed to the degradation that occurs in Binding of LDL-C to the receptors present in the liver, which plays role in reducing the transfer of (LDL-C) to the liver tissues and then increasing its concentration in the blood serum, which leads to an increase in harmful cholesterol [29]. In addition, very low-density lipoprotein appear a significant rise in patients among with healthy group , as the results agree with [30]. HDL-C may play a role in modulating the immune system and controlling infectious diseases [31]. Many studies have shown that HDL-C levels in SARS-CoV-2 patients were significantly lower during viral infection, as a result of the immunomodulatory effects of HDL cholesterol, and therefore we can assume that these low levels were due to the involvement of these lipoproteins in regulating cell immunity during infection with COVID-19 [32].

Hyperlipidemia is represented by an increase in one or more plasma lipids represented by triglycerides, total cholesterol, cholesterol esters and phospholipids, or plasma lipoproteins represented by very low-density lipoprotein cholesterol (VLDL-C). and (LDL-C) combined with decreased levels of high-density lipoprotein for (HDL-C) was hypothesized to significantly exacerbate poor outcome by Dysregulation of immunity and promotion of exaggerated systemic and pulmonary inflammatory responses [33].

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