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A Physiological Study to Evaluate Liver Function in Male and Female Patients Infected with COVID-19 Virus in Najaf City

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Abstract

BACKGROUND: COVID-19 infection usually causes respiratory distress syndrome. Liver impairment has been reported, there is no clear mechanism for liver damage. Liver damage may be due to other factors, such as a viral infection or inflammations in the liver. Lack of information among the residents of the city of Najaf about the differences between males and females infected with the "Corona Virus" disease ("COVID-19").

AIM: In this study, we focus on the effects of "COVID-19" on liver physiology in 60 ("COVID-19") patients (20–70 years old).

METHODS: Examinations, considering demographic information and clinical findings, show that the patient has liver abnormalities.

RESULTS: The result showed an increase in liver enzymes alanine aminotransferase (ALT), aspartate aminotransferase (AST), ALP, and TBiL levels in patients with COVID-19 Corona Virus. Male patients had a higher risk of liver enzymes level elevation than females. "TBiL" concentrations were highly increased when compared with control. In critical patients, severe liver cells abnormalities result from "COVID-19", which requires follow-up and immediate therapeutic intervention.

CONCLUSION: Due to its strong relationship with the severity of the injury in "COVID-19", ALT, AST, ALP, and TBiL, it is expected to be of great importance in the future prediction and diagnosis of infection.

Introduction

Acute lung infection in Wuhan has increased since 2019. Lack of distance and respiratory droplets can lead to the spread of pneumonia among people, according to epidemiological studies, resulting in increased risks among people [1], [2].

This is called atypical pneumonia "COVID-19" as classified by "WHO". The characteristic symptoms of infection with this virus are high temperature, persistent severe cough, and general weakness in the body [3], [4].

In the initial stages of the infection, chest radiographs showed small spots with clear intracellular differences, which continued over time to progress to include large parts of the lower respiratory system. As the disease progresses, patients may develop abdominal pain, nausea, and diarrhea, and GI involvement can begin before respiratory symptoms appear [5].

A high percentage of patients, particularly those with diabetes, have liver dysfunction, which is linked to a more serious illness [6].

Alanine aminotransferase ("ALT") and aspartate aminotransferase ("AST") levels were significantly increased in elderly patients, with few cases of liver failure [7], [8].

COVID-19 does not have a specific treatment. To avoid being serious problems, patients are provided suggested and continuous care while in the hospital. Clinical reports claim that certain coronavirus patients' liver enzymes have increased to varying degrees [9], [10].

As a result, the exact source of COVID-19's liver injury remains unknown. Confounding tasks such as liver biopsy and ultrasonography are more difficult to come by in clinical activities than serum biochemical testing. "ALT" and "AST" were shown to be the most common abnormal liver capacity limitations in ("COVID-19") individuals in previous studies [3].

Acute hepatitis due to "COVID-19" is complex. Direct hepatic association as a result of infection, drug-initiated liver injury as a result of various helpful specialists, low blood pressure, and other liver diseases for various reasons such as liver cirrhosis and liver fibrosis all contribute to the aggravation and deterioration of liver functions in people with COVID-19 [11].

In critical patients, COVID-19 can cause substantial hepatic dysfunction, necessitating immediate monitoring and treatment. ALP, AST, ALT, and TBL are blood tests that can be used to follow-up and diagnose ("COVID-19") infections that are correlated with the severity of the condition [12].

Although the processes causing COVID-19 liver damage are unknown, they could be activated directly by the virus or indirectly through other mechanisms (e.g., inflammation, hypoxia, and medicines) [13].

Parameters of liver function tests were raised to varying degrees in some ("COVID-19") patients, according to clinical data [14], [15], [16].

SARS-CoV-2 patients exhibit abnormal enzymes, even though COVID-19 is the most common kind of liver infection. The number of aminotransferases is at an all-time high. Because AST and ALT values are frequently 1–2 times the upper limit of normal, the predictive importance of abnormal liver biochemistry is debated [17].

In this study, perception points were determined based on blood biochemical markers linked to liver capacity. In serum, liver enzymes stimulate an increase in hepatic capacity, and this is a major factor in the destruction of liver cells. All the results presented by researchers regarding changes in liver function in people with the COVID virus are theories understudy and in-depth [18].

Materials and Methods

The results of this study were obtained from hospitals and private laboratories in the city of Najaf. Body mass index and comorbidities were estimated using age, sex, and other demographic data.

Epidemiological histories and clinical outcomes are examples of clinical data. Fully-auto biochemistry-analysis-instruments were used to measure liver function tests including liver enzymes and total bilirubin in the blood of patients.

Between January 20th and October 20th, 2020, a total of 60 COVID-19 patients were retrospectively assessed at a private Health Clinical lab in Najaf, Iraq. Patients are confirmed to have COVID-19 by examining RNA, taking a swab from the nasopharynx, and using the PCR method.

Statistical analysis

The results were statistically analyzed using the SPSS (version 16.0) program with a significant value of $p < 0.05$.

Results

Male patients

There was statistically high levels of liver enzymes in the serum ("ALP, AST, and ALT") and BIL at all COVID-19 male patients in comparison with control. A Moral elevation ($p < 0.05$) in serum ("AST") level was found (234.33)U/L in comparison with control (41) U/L; ALT (180.13) U/L in comparison with control (34.27) U/L, ALP (133.97) U/L in comparison with control (72.6) U/L, and BIL (1.803) mg/dl in comparison with control (0.55) mg/dl (Figure 1).

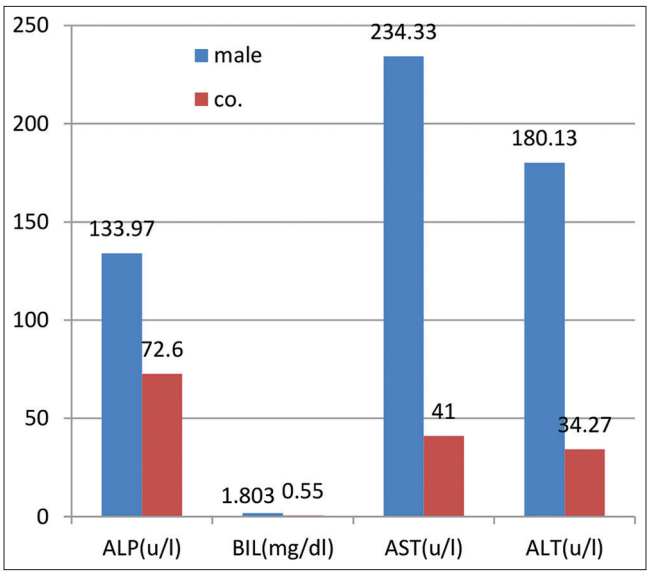

Figure 1: Comparison between ALP, AST, ALT, and BIL serum levels of COVID-19 male patients and control

Female patients

There was a statistically highly arising in the serum levels of "ALP, AST, and ALT" and BIL at all COVID-19 female patients in comparison with control. A Moral elevation ($p < 0.05$) in serum AST level was found (243.53)U/L in comparison with control (22.5) U/L; ALT (191.17) U/L in comparison with control (21.5) "U/L", ALP (112.5)" U/L" in comparison with control(54.5) U/L, and BIL(1.534) mg/dl in comparison with control (0.55) mg/dl (Figure 2).

Comparison between male and female patients

Statistical analysis shows a significant increased ($p < 0.05$) in serum ALP levels in males(133.97) U/L compared with females (112.5) U/L. There were no significant variations in serum levels of "AST and ALT" and BIL between males and females (Figure 3).

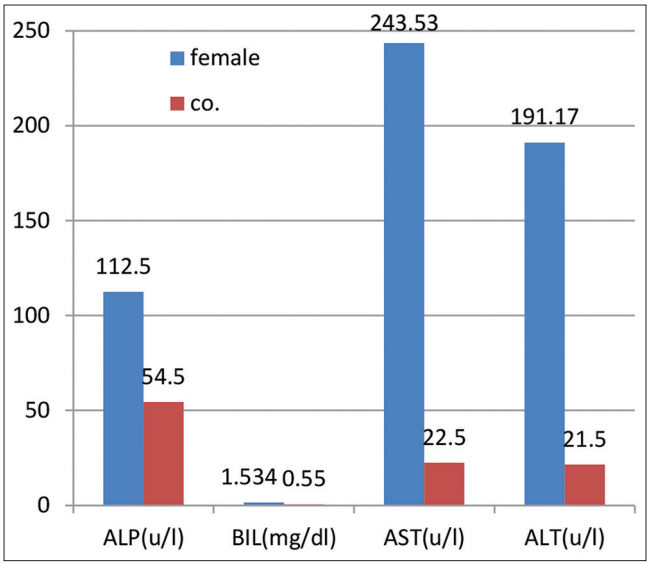

Figure 2: Comparison between ALP, AST, and ALT, BIL serum levels of COVID-19 females patients and control

Discussion

Figures 1-3 demonstrated that abnormal liver enzymes "ALP, AST, and ALT" and "TBiL" levels ($p < 0.05$) in COVID-19 males and females patients compared to controls, with males having higher ALP levels than females and females having higher AST and ALT levels than males. TBiL found no significant differences in males and females.

The higher mortality risk of COVID-19 was linked to increased liver function indicator levels, such as ALT, AST, ALP, and TBiL [19]. Our findings confirm Kulkarni's theory that ALP increases disproportionately to other liver enzymes [20] A substantial increase in "ALP and AST", and ALT in patients with COVID-19 was explained by this finding [21].

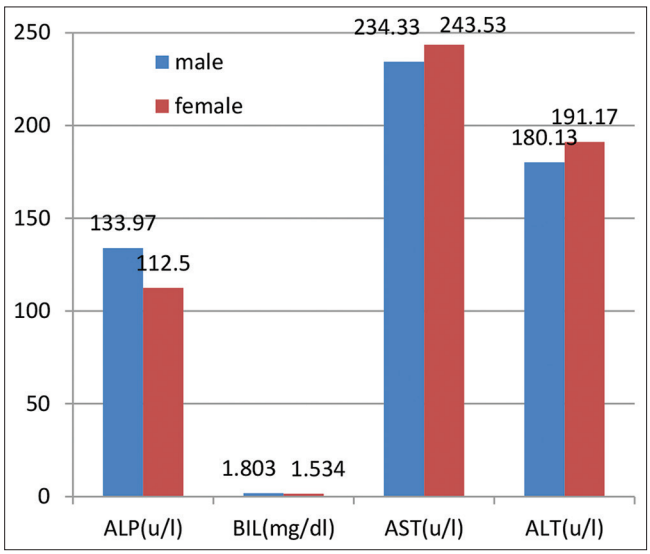

Figure 3: Comparison between ALP, AST, and ALT, BIL serum levels of COVID-19 males and females patients

Few researchers have found fundamental differences in serum "ALP" levels in "COVID-19." This work discovered that male patients had significantly greater levels of ALP, which could show bile duct damage.

The sources showed the gene expression of some enzymes in COVID-19 patients [14] and cellular expression of some degradation enzymes [15] and also found in some antigens on the surface of hepatocytes and bile cells [16]. In addition, some results showed hepatocytes could be the target cells of the coronavirus COVID-19 [17], [22].

Some studies have shown the possibility that the compound ACE2 was the main hope for destroying the cells of the bile ducts more than the cells of the inflamed liver [23]. The current findings revealed a significant increase in bilirubin concentration in males and females with COVID-19 when compared to controls, which is consistent with some investigations that show Radical differences in liver enzymes and functions of COVID-19 patients [14].

SARS-CoV-2, in combination with our finding of much higher "TBiL" in severe cases, is thought to cause bile duct cell injury, which would ultimately disrupt liver function [18]. These enzymes are normally disrupted in all human body tissues, with a higher percentage found in the liver and bone tissues [24]. In the present study, the high levels of these enzymes could be due to anatomical differences between genders or to liver diseases as evidenced by data from meta-analyses [25] and individual research [19], [26], the prevalence of COVID-19 hepatic symptoms varies depending on the area of injury and the physiological and health conditions of the human body [13].

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