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COMPARATIVE STUDY OF BIOCHEMICAL ALTERATION IN COVID-19 AND NON COVID 19 PATIENTS: ASSOCIATION WITH LIVER FUNCTION TESTS ABNORMALITIES.

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ABSTRACT Abnormal liver functions are frequently reported in patients with COVID-19. Liver enzyme abnormalities are common in patients with coronavirus disease 2019 (COVID-19). The aim of the study was the evaluation of liver function test parameters in patients with COVID-19 and non Covid -19 patients and analysis of the relationships between serum level of total Protein, albumin, aspartate amino transferase, alanine amino transferase, alkaline phophatase, total bilirubin, C-Reactive protein and ferritin with COVID-19 and non Covid -19 patients. Significantly deecreased levels of serum total Protein, albumin, and increased level of aspartate amino transferase, alanine amino transferase, alkaline phophatase, total bilirubin, C-Reactive protein and ferritin with COVID-19 compare to non Covid -19 patients.

KEYWORDS : liver function test, COVID-19, AST, ALT, ALP, CRP, Ferritin.

INTRODUCTION

The coronavirus-19 disease (COVID-19) pandemic, caused by the severe acute respiratory syndrome coronavirus, is associated with significant morbidity and mortality attributable to pneumonia, acute respiratory distress syndrome, and multi organ failure. Liver injury has been reported as a non pulmonary manifestation of COVID-19, but characterization of liver test abnormalities and their association with clinical outcomes is incomplete. The impact of liver injury on adverse clinical outcomes in coronavirus disease 2019 (COVID-19) patients remains unclear. The clinical relevance of liver injury related to SARS-CoV-2 infection remains unclear with a need for prospective studies on the impact of liver function test (LFT) abnormalities at baseline.1

Recent data on the coronavirus disease 2019 (COVID-19) outbreak caused by the severe acute respiratory syndrome coronavirus (SARS-CoV-2) has begun to shine light on the impact of the disease on the liver. But no studies data have systematically described liver test abnormalities in patients with COVID-19. 2, 3, 4

Epidemiological data evidenced that COVID-19 patients with altered liver function, COVID-19-associated liver injury is correlated with various liver diseases following a severe acute respiratory syndrome-coronavirus type-2 (SARS-CoV-2) infection that can progress during the treatment of COVID-19 patients with or without pre-existing liver disease. 5, 6

However, the frequency of liver dysfunction in COVID-19 infection has not been well described, and in particular have been difficult to interpret due to co-administration of hepatotoxic agents and varied timing of liver function abnormality in the course of the illness and across age groups. In the study analyze the association between COVID-19 infection, liver function test (LFT) abnormality. 7, 8, 9 Patients with SARS-CoV-2 infection have abnormal liver function.10

Various biochemical parameters that are determine in serum. The aim of the study was the evaluation of liver function test parameters in patients with COVID-19 and non Covid -19 patients and analysis of the relationships between serum level of total Protein, albumin, aspartate amino transferase, alanine amino transferase, alkaline phosphatase, total bilirubin, CRP and ferritin with COVID-19 and non Covid -19 patients.

MATERIALS AND MATHODS

This study was conducted at the department of Biochemistry Clinical Biochemistry Section S.G.M.H., S.S. Medical College Rewa (M.P.) Source of data- The study group compared of 100 patients from 18-60 years of age covid 19 and non covid 19 patients.

Specimen collection and preparation/ collection of samples- Venous blood was collected from all subjects after 12 hours over night fasting. Fasting venous blood were drawn from all 3 ml of venous blood was collected and stored in a sterile vial. Blood was allowed to clot of room temperature. Clot was rimmed, centrifugation serum was separated by low-speed centrifugation and the serum was stored in a sterile vial, hemolyzed and lipemic samples were rejected.

Clinical features, laboratory parameters including LFTs, data were collected and analyzed. LFTs included alanine transaminase, aspartate aminotransferase, alkaline phosphatase, total protein and total bilirubin. Laboratory results were obtained from 100 patients with laboratory-confirmed covid-19 and100 non covid -19 patients. Patients were analyzed for laboratory parameters (including liver function tests).

Biochemical analysis-Serum total protein, AST, ALT and total bilirubin, CRP and ferritin were estimated by fully autoanalyzer BA400. Present work was approved by institutional research and ethical committee. Mean and standard deviation were determined for each variable in all groups. All results were expressed as mean +/-SD. Student "t" test was used to assess statistical significance of the results.

OBSERVATION

Table.1- The level of Serum total protein, albumin AST, ALT, total bilirubin, CRP, ferritin in the Covid 19 and non Covid 19 patients.

Variables	Covid 19 (100 patients)	Non Covid 19 (100 patients)
Total Protein (g/dl)	2.31±24.61	4.35±12.32
Albumin (g/dl)	1.11±2.1	2.3±1.0
Aspartate amino transferase IU/l	93.36±6.55	61.93±55.2
Alanine amino transferase IU/l	90.11± 2.35	59.32±14.71
Alkaline phosphatase U/l	180.2 ± 89.5	150.34±7.1
Total bilirubin (mg/dl)	4.7±9·44	2.97±1·8
C-Reactive Protein mg/l	50.9 ±6.51	30.12 ± 8.51
Ferritin ug/l	595.40±76.95	340.32±68.74

RESULTS

The present study was done with an aim to screen the subjects18-60 years of age in urban region for liver diseases. The serum iron level obtained was then correlated with another parameter with determined. descriptive statics of diagnostic parameters presented in Table I. There was a statistically significant decreased level of the serum total

protein, albumin and increased serum bilirubin, AST, ALT, ALP, CRP and ferritin level in all groups.

DISCUSSION

The incidence of LFTs abnormality in severe COVID-19 cases was significantly higher than non-severe cases. There was no statistical difference in treatment between the patients with or without liver test abnormalities.11 Abnormalities were not associated with survival but with respiratory complications at admission. 12

Study discussed the hepatotropism of SARS-CoV-2, including the differential expression of viral receptors on liver cell types, and described the liver histology features present in patients with COVID-19. Study also provided an overview of the pattern and relevance of abnormal liver biochemistry during COVID-19 and present the possible underlying direct and indirect mechanisms for liver injury. 13 A significant proportion of these patients had abnormal liver tests prehospitalization. 14 Patients with abnormal liver functions were more likely to be male, and had higher levels of procalcitonin and C-reactive protein.15

Liver enzyme abnormalities were associated with disease severity, as well as a series of laboratory tests.16,17 Liver damage may be directly caused by viral infection of liver cells, by medications or by the chronic hypoxia seen in COVID-19 patients. COVID-19-related liver injury presents with a mild elevation of transaminases, although its clinical significance is unclear. 18 Liver involvement is common during COVID-19 and exhibits a spectrum of clinical manifestations from asymptomatic elevations of liver function tests to hepatic decompensation. The presence of abnormal liver tests has been associated with a more severe presentation of COVID-19 disease. Although SARS-CoV-2 RNA has been detected in the liver of COVID-19 patients, it remains unclear whether SARS-CoV-2 productively infects and replicates in liver cells and has a direct liver-pathogenic effect. The cause of liver injury in COVID-19 can be attributed to multiple factors including virus-induced systemic inflammation, hypoxia, hepatic congestion and drug induced liver disease. Among patients with cirrhosis, COVID-19 has been associated with hepatic decompensation and liver-related mortality. Understanding the underlying mechanisms of liver injury during COVID-19 will be important in the management of COVID-19 patients, especially those with advanced liver disease. 19, 20

Study of liver tests in a European COVID-19 population confirms a high prevalence of abnormal liver tests on admission that are predictive of severe disease course and higher in-hospital mortality.21 Data showed that SARS-CoV-2 virus infection leads to mild, but significant changes in serum markers of liver injury. 22

CONCLUSION

Liver enzyme abnormalities are common in patients with coronavirus disease 2019 (COVID-19). We reported the clinical characteristics and liver pathological manifestations of COVID-19 patients with elevated liver enzymes. Our findings suggested that SARS-CoV-2 infection of the liver is a crucial factor contributing to hepatic impairment in patients with COVID-19. ALT/AST elevation was common and independently associated with adverse clinical outcomes in COVID-19 patients.

Liver function tests abnormality was common in COVID-19 patients and was more prevalent in severe cases than in non-severe and noncovid cases. Patients with abnormal liver tests were at higher risk of progressing to severe disease. SARS-CoV-2 infection in the liver directly contributes to hepatic impairment in patients with COVID-19. Hence, a surveillance of viral clearance in liver and long-term outcome of COVID-19 is required.

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