Prevalence of Abnormal Liver Function Tests in COVID-19 Patients at a Tertiary Care Centre

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Abstract

Background & Aim: Coronavirus disease 2019 (COVID-19) outbreak caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is observed to cause liver dysfunction. We aimed to observe abnormal liver function tests (LFTs) in COVID-19 patients admitted in our hospital.

Methods: It was a cross-sectional study involving 105 COVID-19 patients who were admitted in our Hospital from 03-04-2020 to 02-05-2020. The COVID-19 positivity was defined on basis of real-time PCR. Thorough clinical examination and laboratory investigations including Complete Blood Count, Renal function Tests, Liver Function Tests, Chest X-ray, ECG, etc. were done.

Results: The total number of male and female patients were 64 and 41. Out of total 105 patients, 62 i.e. 59.04% had abnormal LFTs at time of admission. Out of these 62 patients, 44(70.9%) were Male and 18(29.03%) were female. Only 5(4.76%) patients had abnormal LFTs on repeat testing.

Median Age of patients was 33years. Average stay of patients with Abnormal LFTs was 15 days (10-16 days) as compared to 10 days (7-11days) for patients with normal LFTs.

Conclusion: The prevalence of Abnormal Liver function tests in patients of COVID-19 is 59.04%. Abnormal liver functions were more in males. The average stay in hospital for COVID-19 patients with abnormal LFTs was longer than those with normal LFTs.

Introduction

Coronaviruses are a diverse family of enveloped, positive strand RNA viruses that cause a wide spectrum of intestinal and respiratory diseases.1 Although SARS is primarily characterized by the presence of lower respiratory tract infection and subsequent pulmonary compromise, patients often have evidence of other organ dysfunction, including gastrointestinal symptoms and abnormal liver function.2,3

On December 31, 2019, China reported a cluster of cases of pneumonia in people associated with the Huanan Seafood Wholesale Market in Wuhan, Hubei Province.4

SARS-CoV-2 shares 82% genome sequence similarity to SARS-CoV and 50% genome sequence homology to Middle East respiratory syndrome coronavirus (MERS-CoV)—all three coronaviruses are known to cause severe respiratory symptoms.5 Liver impairment has been reported in up to 60% of patients with SARS3.4 Corona Viruses (CoVs) have a high mutation rate.6

Patient’s clinical manifestations included fever, non-productive cough, dyspnoea, myalgia, fatigue, normal or decreased leukocyte counts, and radiographic evidence of pneumonia.7 It cause clinical problems in the human respiratory, gastrointestinal, hepatic and neurologic systems with a wide range of asymptomatic strains that lead to hospitalization of patients in intensive care units (ICUs).8

Angiotensin-converting enzyme 2 (ACE 2), the host cell receptor for severe acute respiratory syndrome coronavirus (SARS), has recently been demonstrated in mediating 2019-nCoV infection.9 Interestingly, besides the respiratory system, substantial proportion of SARS and 2019-nCoV patients showed signs of various degrees of liver damage, the mechanism and implication of which have not yet been determined.9 Nevertheless, pathological analysis of liver tissue from a patient who died from COVID-19 showed that viral inclusions were not observed in the liver.10 Additionally, a pathological study of liver biopsy specimens from a patient who died from COVID-19 showed moderate micro-vesicular steatosis and mild lobular and portal activity, indicating that SARS-CoV-2 may have led to this liver damage.10

Hence in this study we aim to find out prevalence of abnormal liver function tests in COVID-19 patients.

Material and Methods

Study Design: It was a cross-sectional study involving 105 COVID-19 Patients who were admitted in at Sharda Hospital, a tertiary care centre in northern U.P. from 03-04-2020 to 02-05-2020.

Patient Selection

Clinical criteria

Case definition were on basis of WHO Interim guidance 20 March 2020.11 Confirmation of the COVID-19 positivity was defined on basis of real-time PCR for SARS-CoV-2 RNA of nasopharyngeal swabs of patients.

Exclusion criteria: patients with Chronic liver disease, Hepatitis B, Hepatitis C.

Patients receiving hepatotoxic drugs or alcohol intake.

Lab Investigations

Detailed history and through clinical examination was followed by

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As percentages and frequency. The continuous variables were recorded as mean, median and standard deviation. Continuous variables were compared by Student’s t test or Mann-Whitney U test. The categorical variables were compared by Chi-square method and Fisher exact test. If the p value will be <0.05, then the difference between various parameters was considered statistically significant. All data was analysed with software SPSS 26.0.

**Treatment**

Patients were managed on symptomatic supportive treatment including Hydroxychloroquine, Vitamin C, Zinc. Broad Spectrum Antibiotics and Ventilatory support were added, if required.

**Results**

**Clinical profile of patients with COVID-19**

A Total of 105 patients were admitted in our Hospital during observation period. Out of these, 64(60.95%) were male and 41(39.04%) were female as described in figure 1. Median age of patients was 33 years. Symptoms mainly included Fever in 62.85% patients and cough in 30.47% patients at admission. There were only 5 patients with Diabetes mellitus in study. Details shown in Table 1.

**Laboratory investigations**

Out of all the patients, 18.09% had Eosinophilia, 12.3% had Neutrophilia, 13.3% had Lymphocytosis, 34.28% had Monocytosis and 20.0% had Thrombocytopenia which were confirmed with peripheral blood films with microscopy.

Out of 105 patients, 62 patients i.e. 59.04% had abnormal Liver function tests at admission. Out of these 64(60.95%) were male and 41(39.04%) were female as described in figure 1. Median age of patients was 33 years. Symptoms mainly included Fever in 62.85% patients and cough in 30.47% patients at admission. There were only 5 patients with Diabetes mellitus in study. Details shown in Table 1.

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<30 years, 34 patients of age between 30-40 years and 1 patient above age of 60 years. There were 3 patients with grade 1 fatty liver changes who had LFTs in range of 2-3UL. LFTs was in range of 1-2UL in 2 of the diabetes mellitus patients which was in normal range after repeat testing.

At end of study, 49 patients were discharged after clinical improvement and 2 consecutive RT-PCR negative reports while 36 patients were still admitted in our hospital. the repeat LFTs was abnormal in 5 patients (4.76%) with AST in range of 1-2UL in 2 patients and 2-3 UL in 1 Patient while ALT in range of 1-2UL in 1 patient and 2-3UL in 1 patient. There was only 1 death in our study out of 105 patients who’s LFT was deranged with AST and ALT >3 upper normal limit. Death was due to acute respiratory distress syndrome (ARDS).

**Correlation of abnormal LFTs with patients’ overall prognosis**

Out of 49 discharged patients, Patients with normal LFTs (n=22) had mean hospital stay of 10 days(7-11days) as compared to patients with abnormal LFTs (n=27) who had prolonged mean hospital stay of 15 days (10-16 days).

**Discussion**

Our study has thrown light on various aspects of COVID-19 infection. The median age group of infected patients was 33 years which is consistent with other reports. The infection was more common in Male(60.95%) than female(39.05%) in our study similar to other studies. Also, the LFTs Derangement was observed more in Males in our study than females i.e. 68.75% to 43.09% respectively.

Clinical evidences have suggested that this virus is transmissible from person to person. Although there is evidence of an asymptomatic carrier transmitting SARS-CoV-2 to five other persons. Mortality in this study was 1 out of 105 patients i.e. 0.095% which is low as compared to 2.3% mortality in other study. There was eosinophilia in 18.09% patients which contradicts other study. We observed Monocytosis in 34.28% of patients which has not been observed yet. Thrombocytopenia was observed in 20% patients which was consistent with other study. There were 59.04% patients with abnormal LFTs which is consistent to other studies. The AST was elevated in 45.71% of patients which was consistent with other study. The ALT was elevated in 25.71% of patients. The elevation of AST and ALT levels were very high than other studies. The ALP was raised in 20% of patients which means there could be collegial cell damage due to SARS-COV-2 . The improvement in abnormal LFTs from 59.04% (n=62) patients to 4.76% (n=5) patients likely indicates a causal relation between COVID-19 and Liver Injury.

ACE2, the host cell receptor for severe acute respiratory syndrome coronavirus (SARS), has recently been demonstrated in mediating 2019-nCoV infection. Virus might directly bind to ACE2 positive cholangiocytes but not necessarily hepatocytes. ACE2 expression in cholangiocytes may suggest a potential mechanism of infection and direct damage of bile ducts by virus using ACE2 as host cell receptors, such as 2019-nCoV and SARS. Although direct evidence of which is still to be researched.

Patients with normal LFTs had mean hospital stay of 10days(7-11days) as compared to patients with abnormal LFTs who had prolonged average hospital stay of 15 days (10-16 days).

**References**


