

How to Cite:

Kondhalkar, A., Jha, R. K., Bhatt, N., & Jha, R. K. (2022). Impact of liver test abnormalities and chronic liver disease on the clinical outcomes of patients hospitalized with COVID-19. *International Journal of Health Sciences*, 6(S2), 436–442. <https://doi.org/10.53730/ijhs.v6nS2.5022>

Impact of Liver Test Abnormalities and Chronic Liver Disease on the Clinical Outcomes of Patients Hospitalized with COVID-19

Ankita Kondhalkar

Tutor (PhD Scholar) Dept. of Biochemistry Datta Meghe Medical College, Nagpur, India

Rakesh Kumar Jha

Tutor Dept. of Biochemistry Datta Meghe Medical College, Shalinitai Meghe Hospital and Research Centre Nagpur, India (Datta Meghe Institute of Medical Sciences)

Neha Bhatt

Assistant Professor Dept. of Pathology Datta Meghe Medical College, Shalinitai Meghe Hospital and Research Centre Nagpur, India (Datta Meghe Institute of Medical Sciences)

Roshan Kumar Jha

Tutor Dept. of Biochemistry Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences Sawangi (Meghe), Wardha, India

Abstract--Introduction: The severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) or novel corona virus disease (COVID-19) pandemic is sweeping the globe. Latest information on the outbreak of the corona virus epidemic in 2019, which was caused by the extreme acute respiratory syndrome corona virus 2 strains, has begun to shed light on the disease's effects on the liver. However, no studies have systematically to date, there have been no impaired liver tests in COVID-19 patients. In patients with irregular liver test results, we looked at the clinical features of COVID-19. The goal of this research was to explain the clinical outcomes of COVID-19 in patients with irregular liver tests and CLD. AIM: We performed an observational study to see how irregular liver tests and patients' clinical outcomes were influenced by chronic liver disease admitted to SMHRC Nagpur. Material and Methods: The research included 200 people aged 25 to 65 years old who had been diagnosed with corona positive and were admitted to Shalinitai Meghe Hospital in Nagpur. They were split up

into different parties. One group had chronic liver disease, and the other did not, but both groups had patients that were corona positive.

Keywords---acute liver injury, chronic liver disease, COVID-19, SARS-Cov-2.

Introduction

The extreme acute respiratory syndrome corona virus 2 or novel corona virus disease epidemic started in December 2019 in China's Wuhan province and spread around the world by April 2020, affecting 187 of the 192 countries with severity levels ranging from mild to severe (1-4). The World Health Organization (WHO) has declared the corona virus disease (COVID-19) a pandemic, citing thousands of deaths and hospitalizations worldwide. Although the majority of COVID-19 cases are moderate, more severe cases have resulted in multiple organ dysfunctions, respiratory failure, and/or septic shock. If this infectious disease spreads, more clinical and epidemiological features must be discovered in order to better understand the virus's true scope, enhance diagnosis and therapeutic capabilities, and reduce the disease's overall morbidity and mortality (5). A WHO study published on May 19, 2020, found 4,731,458 COVID-19 positive cases in 213 countries, with 1,477,516 cases in the United States, 231,606 cases in Spain, 225,886 cases in Italy, 246,410 cases in the United Kingdom, 84,500 cases in China (the pandemic's source), and 101,139 incidents in India. These figures show that the disease is rapidly spreading around the world, with a doubling time of 7.2 days on average (6).

It's fascinating to learn more about COVID-19's hepatic damage pattern. Hepatic enrollment of COVID-19 may be due to the virus's direct cytotoxic influence, an unregulated immune response, sepsis, or drug-induced liver injury. Due to the higher expression of ACE2 proteins in cholangiocytes, the liver could be a potential host for SARS-CoV-2. The corona virus, causes SARS, uses ACE2 as a receptor on host cells. Furthermore, COVID-19 can exacerbate associated with chronic liver disease, which can lead to hepatic decompensation and acute-on chronic liver failure, both of which are linked to an increased risk of death. COVID-19 patients with underlying chronic liver disease made up 2–11% of the total, and 14–53% of COVID-19 patients developed hepatic dysfunction (2, 7) especially those who have a serious case of COVID-19. Hepatic dysfunction was discovered to be significantly more common in critically ill patients and was associated with a poor prognosis.

As per a latest report of Wang and colleagues from Wuhan, ^{4,8} COVID-19 patients (2.9 percent) had chronic hepatitis disease as a complication. Additional study from China found that (2, 9), 23 (2.1%) of patients tested positive for HBsAg, with only one of them having extreme COVID-19. Based on the available data, increased hepatic enzymes are clearly shown very frequently in severe and critical COVID-19 cases. The purpose of this research was to see how much hepatic function imbalance there was affected COVID-19 and how that affected disease severity and prognosis. The tests we were most interested in were alanine aminotransferase (ALT) (reference range: 0-35 units/L), alkaline phosphates (ALP)

(reference range: 36-92 units/L), and total bilirubin (reference range: 5.1-20.5 mol/L). Aspartate aminotransferase (AST) (reference range: 0-35 units/L) and gamma-glutamyl transferase (GGT) (reference range: 0-30 units/L) were also included in the study in the event that they were accessible.

Material and Methods

From June to December 2020, we conducted research at DMMC&SMHRC Nagpur's Biochemistry Department. The Institutional Ethics Committee approved the research, and Prior to publication, informed written consent was obtained. This work enrolled 200 people between the ages of 25 and 65. In the study group, there were 100 corona positive patients, and in the control group, there were 100 corona positive patients. The current study included 200 patients, both sexes, between the ages of 25 and 65, who were COVID-19 positive and hospitalized at Nagpur's Shalinitai Meghe hospital.

- Inclusion criteria
Individuals with liver failure, liver damage, chronic or acute liver problems are eligible to participate in this research. Many of the patients signed informed consent papers. Involving patients or the general public in the design, conduct, or reporting of our study was not necessary or practicable.
- Exclusion criteria
Pregnant women, those with other anomalies, underweight patients, any bacterial infection, metabolic disorders, corona positive infants, or newborns were excluded from the sample.

Data collection

Medical records were used to collect all of the patients' information, including epidemiological, demographic, clinical, laboratory, care, and outcome data. On admission, all patients had liver biochemistry tests, which included alanine aminotransferase (ALT), aspartate transaminase (AST), total bilirubin (TBIL), alkaline phosphates (ALP), and -glutamyl transferase (GGT). These tests were repeated at least twice weekly until the last follow-up. According to WHO guidelines, a beneficial reverse transcription polymerase chain reaction (RT-PCR) result in nasopharyngeal swab specimens was used to diagnose SARS-CoV-2 infection. A hepatic test irregularity was defined as any serum concentration of the following measures that were higher than the upper limit of normal (women/men). Total bilirubin >1.00 mg/dL, SGOT (AST) >30/34 U/L, SGPT (ALT) >36/44 U/L, Alkaline phosphates (ALP) >104/129 U/L, gamma-glutamyl transferase (GGT) >39/66 U/L.

Study outcomes

Disease period, the length of stay in the hospital, the severity of COVID-19, admission to an intensive care unit (ICU), and death were all investigated as outcomes. The outcomes were determined by the presence of abnormal hepatic tests, chronic hepatic infection, or hepatic cirrhosis.

Statistical analysis

In this study, the general characteristics of the subjects were interpreted as mean standard deviation, and the following tests were carried out: All of the tests were carried out using SPSS 20.0 for Windows is a statistical programme that can be used to analyses data. For all of the analyses below with bilateral $P < 0.05$ values, the significance level was set at $P < 0.05$.

Result

Table 1

Shows comparisons the biochemical parameters in hepatic abnormality and non hepatic abnormality in COVID-19 cases

Parameters	COVID-19 positive with hepatic abnormality N= 100 Age- 25-65yrs	COVID-19 positive without hepatic abnormality N= 100 Age- 25-65yrs	significance
Total Billirubin	53.0±14.5	41.9±14.0	<0.05
Alanine Transaminase	107.2±35.2	57.8±10.2	<0.05
Aspartate transaminase	145.7±38.3	60.2±15.1	<0.05
Alkaline phosphates	125.6±25.9	71.1±19.5	<0.05
Albumin	50.4±5.6	55.2±6.3	<0.05
γ-glutamyl transferase	158±47.2	48.2±9.4	<0.05

Table 1 show that the levels of total billirubin, alanine transaminase, aspartate transaminase, alkaline phosphates, and γ-glutamyl transferase were considerably higher in the research group than in the control group. When comparing the experimental group to the control group, the protein levels has decreased or remained the same. As a result, those COVID -19 patients who have liver disease have more liver abnormalities than those who do not have a liver disorder but are corona virus positive.

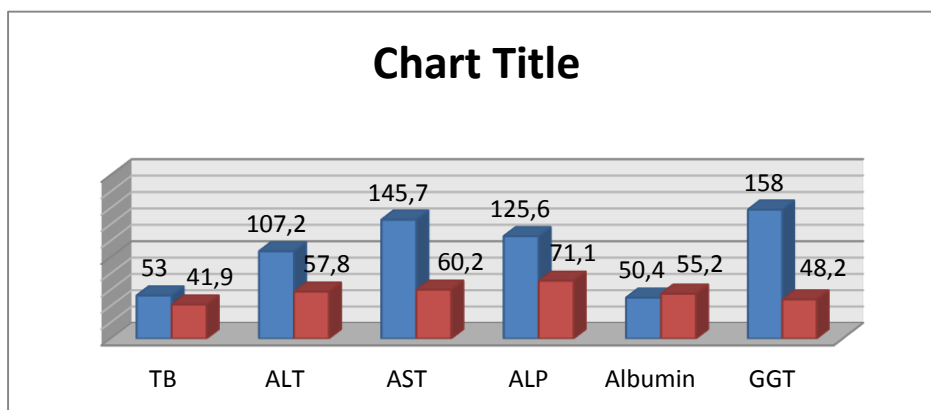


Figure 1. Comparisons the biochemical parameters in hepatic abnormality and non hepatic abnormality in corona patients

Figure 1 reveals that patients suffering from hepatic abnormality have substantially increased levels of total bilirubin, alanine transaminase, aspartate transaminase, alkaline phosphates, and γ -glutamyl transferase than patients without liver disease. When correlate to the non-research class, albumin levels in the study group are either the same or slightly higher.

Discussion

In this observational analysis, we looked at the effect of abnormal liver test parameters like Total bilirubin, ALT, AST, ALP, Albumin, and GGT on corona virus positive cases with abnormal liver test parameters like Total bilirubin, ALT, AST, ALP, Albumin, and GGT. Xu et al. 2020 According to the research, a first post-mortem results of a patient who died of severe COVID-19. Mild inflammatory infiltrates in the hepatic lobule and portal tract, as well as severe micro-vesicular steatosis, were found in his research's liver histology. In four COVID-19 cases, post-mortem hepatic biopsies showed moderate sinusoidal dilatation and focal macro-vesicular steatosis according to Tian S et al. 2020. There was lenient lobular lymphocytic infiltration in portal areas, but it was not relevant. Mantovani et al. 2020 conducted the survey of 11 observational studies involving 2,034 Chinese adults with COVID-19, 62 of whom had a prior history of CLD, and a CLD prevalence of 3% As per this analysis, which is the best to our knowledge about the prevalence of CLD in COVID-19 inpatients, the main a etiology of CLD was viral infections (HBV and HCV), with the majority of patients being young boys.

According to Chen et al. 2020, 13 (5 percent) of corona patients experienced chronic hepatic damage during the course of their disease, with 10 (76.9%) of them dying. Despite the small numbers, this sends a valuable message to patients who have corona and hepatic abnormality. In the United States, Singh et al.¹⁴2020 performed a multi-center research network review on COVID-19 clinical features and outcomes in patients with already had hepatic disease. Using advanced tools, the authors searched and reviewed electronic medical records from 37 health organisations in real time. They discovered 2780 COVID-19 patients over the age of ten and split them into two groups: those with hepatic disease (LD, n=250 patients) and those without (non-LD, n=2530 patients). ALT elevations (>50 U/L) were detected in 46.1% of the HD group and 50.6 percent of the non-HD group. The severity and type of abnormal liver enzymes were not specified. Acute hepatic disease was not observed in any cases. According to Zhang et al 2020, 2 percent -11 percent of COVID-19 patients experienced liver complications.

However, further research into the connection between the existence of liver damage after corona infection and the presence of preexisting liver disease is required. The main treatment for COVID-19 patients with liver damage is antiviral therapy, logical oxygen therapy, anti-infective agents, and symptomatic help. The limited number of patients with CLD, which limits statistical ability, is one of the study's limitations. Furthermore, since the sample population consisted of patients from a single hospital, the majority of who lived in the participants was from the Porto metropolitan area and was Caucasians, the results cannot be generalized. In addition, data is gathered retrospectively from non-standardized

electronic medical records, resulting in variability and potentially incorrect clinical statements.

Conclusion

Corona is presently an epidemic, with an overall mortality rate of 2–6% in hospitalized individuals, which increases with age and co-morbidities. Corona causes pneumonia, but in some cases, it can also cause hepatic dysfunction, which can lead to death. Ultimately, we found that corona patients had a huge range of hepatic enzyme disorder, the majority of which were mild. Respiratory failure, pneumonia, corona severity, and death were linked to AST but not ALT, indicating that these outcomes were unaffected to hepatic injury.

References

1. WHO Director-General's opening remarks at the media briefing on COVID-19. (2020). <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11>.
2. Vishwa S. P, Ravi P. Effect of COVID 19 Affecting Geriatric Patients. *Int J Cur Res Rev*. Vol 12 Issue 17, September, 2020, 182-187.
3. WHO. Corona virus disease 2019 (COVID-19): situation report,73.(2020). <https://apps.who.int/iris/handle/10665/331686>.
4. Rucha R. Lohi, Nikita Dhahikar, Ranjit Ambad, Dhruba Hari Chandi. Online Teaching in the Time of Covid 19-Effectiveness and Challenges. *Indian Journal of Forensic Medicine & Toxicology*, October-December 2020, Vol. 14, No. 4; 6841-6844.
5. Wu Z, Mc Googan JM. Characteristics of and important lessons from the corona virus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA* 2020
6. World Health Organization. Situation report - 120; Corona virus disease 2019 (COVID-19). Available at, 2020.
7. Zhang C, Shi L, Wang FS. Liver injury in COVID-19: management and challenges. *Lancet Gastroenterol Hepatol* 2020;5(5):428–430
8. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel corona virus-infected pneumonia in Wuhan, China. *JAMA* 2020;323:1061–1069.
9. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. China Medical Treatment Expert Group for Covid-19. Clinical characteristics of corona virus disease 2019 in China. *N Engl J Med* 2020;382:1708–1720.
10. Xu Z, Shi L, Wang Y, Zhang J, Huang L, Zhang C, et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. *Lancet Respir Med* 2020;8(4):420–422.
11. Tian S, Xiong Y, Liu H, Niu H, Guo J, Liao M, et al. Pathological study of the 2019 novel corona virus disease (COVID-19) through postmortem core biopsies. *Mod Pathol* 2020;33(6):1007–1014.
12. Mantovani A, Beatrice G, Dalbeni A. Corona virus disease 2019 and prevalence of chronic liver disease: A meta-analysis. *Liver Int*. 2020;40(6):1316–20.

13. Chen T, Wu D, Chen H, Yan W, Yang D, Chen G, et al. Clinical characteristics of 113 deceased patients with corona virus disease 2019: retrospective study. *BMJ* 2020;368:1091
14. Singh S, Khan A: Clinical characteristics and outcomes of COVID-19 among patients with preexisting liver disease in United States: a multi-center research network study. *Gastroenterology*.2020.04.064
15. Zhang C, Shi L, Wang FS. Liver injury in COVID-19: management and challenges. *Lancet Gastroenterol Hepatol* 2020; 5: 428-430