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Original Research Article

A Cross Sectional Study on Biochemical Parameters of HBV Positive Individuals Suffering from Covid 19 & its Effect on their Final Outcome

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Abstract

Background: On March 11, 2020, the World Health Organization (WHO) proclaimed Corona-virus Infection 2019 (COVID-19) to be a pandemic. Older subjects and those with underlying medical disorders such hypertension, asthma, diabetes mellitus, chronic lung infection, cardiovascular infections, obesity, and chronic kidney infection have been shown to have a more serious infection course and a greater fatality risk.

Aims and Objectives: A study on biochemical parameters of HBV positive individuals suffering from Covid 19 & its effect on their final outcome

Material and Methods: The research was conducted in the Department of Biochemistry L.N. Medical College, Bhopal. 200 subjects who are Covid positive will be included in the research. Category-1 - 60 corona positive subjects who are Hepatitis B virus positive. Category-2 - 140 corona positive subjects.

Results: Out of total 200 covid positive cases, 60 individuals were also HBV positive & rest were only having Covid positive status. When we compared for the pathological/ laboratory diagnostic parameters of all the covid cases, Mean White blood cell Count was more in HBV positive individuals. Lymphocyte count was grossly decreased in HBV positive individuals. Neutrophil count, Platelet count, Alanine aminotransferase, Aspartate aminotransferase, Total bilirubin, Gamma-glutamyltransferase, Alkaline phosphatase, Albumin all these were comparatively on higher side in HBV positive individuals.

Conclusion: Cholangiocytes have a role in various immune response-related activities of the hepatic, and when their function is disturbed, it can cause hepatobiliary damage due to a cytopathic effect. The hypothesis that cholangiocytes express more ACE2 receptors than other cell types could help to explain why hepatic function is dysregulated.

Keywords: Covid 19, Hepatitis B, Cholangiocytes, ACE2 receptors

Introduction

On March 11, 2020, the World Health Organization (WHO) proclaimed Corona-virus Infection 2019 (COVID-19) to be a pandemic [1]. Older subjects and those with underlying medical disorders such hypertension, asthma, diabetes mellitus, chronic lung infection, cardiovascular infections, obesity, and chronic kidney infection have been shown to have a more serious infection course and a greater fatality risk. Clinical signs of COVID-19 can be very diverse, although they frequently involve respiratory, gastrointestinal, renal, and neurological clinical features [2].

In some COVID-19 cases, recent research have also noted that hepatitis clinical features first appeared before respiratory clinical features. While research into the pathogenesis of SARS-CoV 2 is ongoing, early findings indicate that the virus may damage the hepatic primarily via attaching to hepatocyte ACE2 receptors or by inducing an immune-mediated hepatic injury through the activation of cytokine storms [3]. According to several studies, COVID-19 may cause hepatic damage and high proportions of alanine aminotransferase (ALT), aspartate aminotransferase (AST), and total bilirubin, especially in serious instances (such those who are admitted to the intensive care unit [ICU]).

A greater infection severity and mortality risk have also been linked to abnormal hepatic functions in COVID-19 subjects [4]. The prevalence of pre-existing chronic hepatic infection was estimated to be 1.9 percent, that of pre-existing hepatic cirrhosis to be 0.4 percent, that of HBV to be 0.9 percent, and that of HCV to be 0.3 percent in a recent meta-analysis of a few studies on the hepatic clinical features of COVID-19. Despite being enlightening, these outcomes are constrained by research with small sample sizes that were carried out in China and the USA in the early stages of the pandemic (i.e., as late as April 2020) [5]. These outcomes also conflict with past research that claimed that COVID-19 subjects in China had a considerably greater prevalence of hepatic problems, with 2–11% of COVID–19 subjects experiencing these issues and up to 54% having raised AST and ALT proportions [6]. Concern of COVID-19-related hepatic consequences is especially high in those who have HCV, HBV, or HBV/HCV co-infection and pre-existing hepatic issues (e.g., cirrhosis, hepatic failure, hepato-cellular carcinoma).

The number of subjects with SARS-CoV-2 and HBV and/or HCV co-infections is projected to rise given that approximately 290 million and 71 million individual, respectively, are living with HBV and HCV [7]. Therefore, it is crucial to increase our knowledge of the hepatic clinical features and comorbidities experienced by COVID-19 individuals who have HBV, HCV, or both in order to improve the care given to this sizable at-risk population [8]. The goal of this research was to examine and synthesise the literature on COVID-19 subjects with HBV infections. The outcomes of our review may offer guidance on clinical care and available managements for COVID-19 individuals who have these infections [9].

Aims and Objectives

A study on biochemical parameters of HBV positive individuals suffering from Covid 19 & its effect on their final outcome

Material and Methods

The research was conducted in the Department of Biochemistry L.N. Medical College, Bhopal. 200 subjects who are Covid positive will be included in the research. Category-1 - 60 corona positive subjects who are Hepatitis B virus positive. Category-2 - 140 corona positive subjects.

Inclusion criteria

Corona positive willing participants, all age categories, Hepatitis-B positive individuals &

Individuals with no physical sign & metabolic syndrome.

Exclusion Criteria

Unwilling participants, Individuals with physical sign & hepatic cirrhosis or any metabolic syndrome, Alcoholic consumption, cigarette smokers or drugs abusers & Hepatitis-B negative subjects.

Biochemical Investigations

Parameters will be assessed immediately using following method

Plain Vials Will Be Used For The Estimation

(ALT)- Alanine aminotransferase. (Fully Autoanalyser).

(AST)- Aspartate aminotransferase. (Fully Autoanalyser).

(GGT) Gamman glutamyl transferase. (Fully Autoanalyser).

Total bilirubin. (Fully Autoanalyser).

Hepatitis-B antigen. (Rapid card chromatography method).

Statistical Analysis

Data collected will be entered into Microsoft Excel Worksheet & statistically analyzed by using SPSS (Statistical package for social sciences) Version 20.

Results

Out of total 200 covid positive cases, 60 individuals were also HBV positive & rest were only having Covid positive status. Out of 200 cases, 106 were males and 94 were females. But when we specifically look for HBV positive cases then it shows male preponderance with 41 male cases & 19 female cases.

Table 1: Gender wise distribution of overall cases

Gender	HBV+Covid	Covid	Total	p - value
Male	41	53	94	<0.051
Female	19	87	106	
Total	60	140	200	

When we look for the average age of the cases, it is 54.6 years for covid cases suffering from HBV infection & it is 52.7 years for individuals who are only covid positive. With standard deviation for both in the range of 7.8 to 8.4.

Table 2: Age wise distribution of overall cases

Age	HBV+Covid	Covid	p - value
Mean	54.6	52.7	0.12
SD	8.4	7.8	

Table 3: Pathological findings

Pathological findings	HBV+Covid		Covid		p-value
	Mean	SD	Mean	SD	
WBC	4.4	0.31	4.3	0.51	0.16
LC	0.6	0.06	0.9	0.3	<0.01
NC	3.4	0.37	2.5	0.31	<0.01
PC	190.1	25.91	181.4	41.2	0.13
ALT	26.4	3.48	21.4	2.89	<0.01
AST	29.3	2.85	25.4	3.48	<0.01

TB	13.3	1	9.4	0.71	<0.01
GGT	19.7	3.7	22.2	2.66	<0.01
ALP	74.4	8.06	64.5	3.81	<0.01
Albumin	30.5	2.7	38.6	1.39	<0.01
PT	13	0.31	12.7	0.35	<0.01
Activated Partial TT	30.7	1.24	30.9	0.87	0.19
D-Dimer	262.2	57.17	212.2	36.89	<0.01
Creatinine	66.5	2.51	62.2	3.24	<0.01

When we compared for the pathological/ laboratory diagnostic parameters of all the covid cases, there were some significant findings. Mean White blood cell Count was more in HBV positive individuals. Lymphocyte count was grossly decreased in HBV positive individuals. Neutrophil count, Platelet count, Alanine aminotransferase, Aspartate aminotransferase, Total bilirubin, Gamma-glutamyltransferase, Alkaline phosphatase, Albumin all these were comparatively on higher side in HBV positive individuals. Prothrombin time & Activated Partial Thromboplastin time was slightly lesser in HBV positive individuals. D-Dimer & creatinine levels were significantly on higher side in HBV positive individuals.

Table 4: Treatment wise distribution of overall cases

Treatment	HBV+Covid	%	Covid	%	p - value
Oxygen support	33	55	93	66	0.13
Antiviral threapy	33	55	104	74	0.007
Antibiotic therapy	60	100	140	100	<0.01
Use of corticosteroid	21	35	73	52	0.025

When we compared for the treatment received or required for both the groups, it was found that there was no significant difference.

Table 5: Clinical outcome wise distribution of overall cases

Clinical outcome	HBV+Covid	%	Covid	%	p - value
Remained in hospital	9	15	8	6	0.03
Discharged	42	70	128	91	<0.01
Deceased	9	15	4	3	<0.01
Total	60	100	140	100	

When we compared for the clinical outcome in both the groups, there was a significant rise in hospital stay duration in HBV positive individuals & also the death rate was significantly higher in HBV positive individuals whereas it was extremely less in non HBV positive cases group.

Comorbidities were present in overall 28% of the cases & they were prevalent nearly equally in both HBV positive & other group cases.

Table 6: Comparison of comorbidities in HBV and Non-HBV cases

HBV	Present	%	Absent	%	Total	p - value
YES	16	27%	44	73%	60	0.07
NO	40	29%	100	71%	140	
Total	56	28%	144	72%	200	

Discussion

Despite the fact that many studies to date have small sample sizes of subjects with pre-existing HBV infections, these studies seemed to indicate that, in the majority of cases, HBV coinfection did not worsen prognosis or increase the risk of disease severity in COVID-19. However, there were few subjects with HBV coinfection in several published trials, perhaps as a result of the lower number of subjects receiving antiviral medications, which could have affected the findings [10]. The incidence of SARS-CoV-2 infection in CHB treated with tenofovir was reported to have decreased (0.4 percent) in a recent large-scale cohort research conducted in Spain, which indirectly reflects tenofovir's beneficial effect on SARS-CoV-2 resistance. These results are consistent with those of our investigation [11].

Additionally, reports of comparable clinical results in HIV-positive subjects with other viral illnesses have been made. The study found that HIV subjects receiving combination medications such as tenofovir and emtricitabine (TDF/FTC), among other protocols, had a lower rate of SARS-CoV-2 diagnosis and a better COVID-19 prognosis. Tenofovir, according to the study's author, tended to result in the best overall COVID-19 outcomes.

Nucleos(t)ide reverse transcriptase inhibitors (NRTIs), such as tenofovir, abacavir, and lamivudine, may be effective against SARSCoV- 2 by inhibiting RNAdRNAp, according to experiments that have used molecular docking and extension processes with RNA-dependent RNA polymerase (RNAdRNAp). It's interesting to note that TDF/FTC lowers SARS-CoV-2 titers in ferret infection model nasal washes [12]. In human cell lines, tenofovir, which is advised as a first-line management for CHB, has been shown to have a variety of immunomodulatory effects. Infection with COVID-19 has been linked to raised levels of IL-6, interferon, IL-10, and monocyte chemoattractant protein-1. Notably, research on monocytes and peripheral blood mononuclear cells has indicated that tenofovir reduces the production of these inflammatory cytokines [13]. We were unable to prove, however, that antiviral therapy was beneficial for individuals who both had HBV and SARS-CoV-2 infections. One explanation might be the study's relatively small sample size, which included only 50 subjects (0.6%) who received antiviral management. Therefore, it is important to interpret these findings cautiously and further thorough research is required [14].

Due to a number of this study's shortcomings, the conclusions of this report should be interpreted with caution. First, based on prescriptions for medications, the majority of subjects were included [15]. The electronic health record's medication history may not accurately reflect a patient's actual drug exposure. It was determined how long the antiviral medication would last. Although subjects cannot obtain antiviral medications without a prescription in Korea, most antiviral medications for CHB are administered for prolonged periods of time after initial administration, therefore classifying management as two or more prescriptions is not a problem [16].

We used a significant amount of data from a countrywide cohort sample, but we were unable to confirm that most of the individuals included had been exposed to SARS-CoV-2. Therefore, there may be selection bias in our result [17].

However, enough propensity score matching was included in the design of this study to account for bias. Additionally, this countrywide cohort lacks history-specific laboratory data on the severity of chronic hepatitis B. (e.g., HBV DNA level, hepatic fibrosis stages). The stages in CHB subjects are unclear (poor viral replication or immunological tolerance), so additional research is required to corroborate these

findings [18]. Finally, our findings may have been impacted by the fact that we were unable to control for a number of possible confounders, such as personal cleanliness (such as hand washing), social distance, and mask use. To the best of our knowledge, despite its limitations, this is the first extensive study to look into the relationship between COVID-19 risk and both the underlying CHB and the use of antiviral medicines. Our findings imply that subjects with CHB have a lower risk of SARS-CoV-2 infection than the general population, and that COVID-19 risk was decreased by antiviral therapy [19,20].

Conclusion

The outcomes of this research imply that individuals with COVID-19 who also have co-infections with HBV may be at greater risk for morbidity and mortality. It indicates that hepatic enzyme abnormalities and acute hepatic damage may be widespread in COVID-19 subjects with HBV and HCV co-infections, despite the limitations of the available evidence. Therefore, during clinical visits, these Para clinical profiles should be tracked and analysed. While additional research is necessary to fully understand the pathophysiology of SARS-CoV-2, meticulous evaluation of hepatic clinical features upon admission may prevent multi-morbidity in HBV or HCV subjects and improve COVID-19 subjects' health outcomes. Cholangiocytes have a role in various immune response-related activities of the hepatic, and when their function is disturbed, it can cause hepatobiliary damage due to a cytopathic effect. The hypothesis that cholangiocytes express more ACE2 receptors than other cell types could help to explain why hepatic function is dysregulated.

References

1. Wu C, Chen X, Cai Y, *et al*. Risk factors associated with acute respiratory distress syndrome and death in patients with coronavirus disease 2019 pneumonia in Wuhan, China. JAMA Intern Med. 2020. https://doi.org/10.1001/jamai ntern med.2020.0994.
2. Liu M, He P, Liu HG, *et al*. Clinical characteristics of 30 medical workers infected with new coronavirus pneumonia. Zhonghua Jie He He Hu Xi Za Zhi. 2020;43:E016.
3. Zhao D, Yao F, Wang L, *et al*. A comparative study on the clinical features of COVID-19 pneumonia to other pneumonias. Clin Infect Dis. 2020.
4. Chen H, Guo J, Wang C, *et al*. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. Lancet. 2020;395:809-815.
5. Hu Z, Song CI, Xu C, *et al*. Clinical characteristics of 24 asymptomatic infections with COVID-19 screened among close contacts in Nanjing, China. Sci China Life Sci. 2020;63:706-711.
6. Wang L, Gao YH, Lou LL, Zhang GJ. The clinical dynamics of 18 cases of COVID-19 outside of Wuhan, China. Eur Respir J. 2020;55:2000398.
7. Guan W-J, Ni Z-Y, Hu YU, *et al*. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020;382:1708-1720.
8. Yang W, Cao Q, Qin LE, *et al*. Clinical characteristics and imaging manifestations of the 2019 novel coronavirus disease (COVID-19): a multi-center study in Wenzhou city, Zhejiang, China. J Infect. 2020;80:388-393.
9. Chen N, Zhou M, Dong X, *et al*. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet. 2020;395:507-513.
10. Liu Y, Yang Y, Zhang C, *et al*. Clinical and biochemical indexes from 2019-nCoV infected patients linked to viral loads and

lung injury. Sci China Life Sci. 2020;63:364-374.
11. Huang Y, Tu M, Wang S, *et al*. Clinical characteristics of laboratory confirmed positive cases of SARS-CoV-2 infection in Wuhan, China: a retrospective single center analysis. Travel Med Infect Dis. 2020:101606.
12. Wu J, Liu J, Zhao X, *et al*. Clinical characteristics of imported cases of coronavirus disease 2019 (COVID-19) in Jiangsu province: a multicenter descriptive study. Clin Infect Dis. 2020. https://doi.org/10.1093/cid/ciaa199
13. Xu X-W, Wu X-X, Jiang X-G, *et al*. Clinical findings in a group of patients infected with the 2019 novel coronavirus (SARSCov-2) outside of Wuhan, China: retrospective case series. BMJ. 2020;368:m606.
14. Wang Z, Yang B, Li Q, Wen L, Zhang R. Clinical features of 69 cases with coronavirus disease 2019 in Wuhan, China [published online ahead of print, 2020 Mar 16]. Clin Infect Dis. https://doi.org/10.1093/cid/ciaa272
15. Yang X, Yu Y, Xu J, *et al*. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single- centered, retrospective, observational study. Lancet Respir Med. 2020;8:475-481.
16. Wang D, Hu BO, Hu C, *et al*. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA. 2020;323:1061-1069.
17. Chan J-W, Yuan S, Kok K-H, *et al*. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet. 2020;395:514-523.
18. Liu F, Xu A, Zhang Y, *et al*. Patients of COVID-19 may benefit from sustained lopinavir-combined regimen and the increase of eosinophil may predict the outcome of COVID-19 progression. Int J Infect Dis. 2020;95:183-191.
19. Mo P, Xing Y, Xiao YU, *et al*. Clinical characteristics of refractory COVID-19 pneumonia in Wuhan, China. Clin Infect Dis. 2020. https://doi.org/10.1093/cid/ciaa270
20. Chen J, Qi T, Liu LI, *et al*. Clinical progression of patients with COVID-19 in Shanghai, China. J Infect. 2020;80:e1-e6.