Print ISSN: 2321-6379
Online ISSN: 2321-595X

Original Article

Evaluation of Hepatic Function among Critically Ill Coronavirus-Infected Patients in a Tertiary Care Hospital of Tripura

Parimal Sarkar[1], Subhadip Paul[2], Moumana Das[3]

[1]Associate Professor, Department of General Medicine, Agartala Government Medical College and Govind Ballabh Pant Hospital, Agartala, Tripura, India, [2]MD General Medicine, Department of General Medicine, Agartala Government Medical College and Govind Ballabh Pant Hospital, Agartala, Tripura, India, [3]Post Graduate Resident, Department of General Medicine, Agartala Government Medical College and Govind Ballabh Pant Hospital, Agartala, Tripura, India

Abstract

Introduction: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been posing significant threats to public health since December 2019. Angiotensin-converting enzyme 2 (ACE2), the host cell receptor, has been demonstrated in mediating 2019-nCoV infection. Hepatic impairment was reported in majority of critically ill patients along with other system involvement. The median age of 40 enrolled patients was 53.6 years and 28 patients (70%) were men. The most common symptoms were fever, dry cough, headache, body ache, breathing difficulty, diarrhea, and fatigue. The present study also showed elevated aspartate transaminase (AST) in 85% intensive care unit (ICU) admitted patients and elevated alanine aminotransferase (ALT) in 90% of ICU patients. This paper provides an overview of hepatic function among critically ill coronavirus-infected patients.

Aims and Objectives: The study of evaluation of hepatic function among critically ill coronavirus-infected patients is important for various reasons. Studies on pandemic impact on liver are lacking. To estimate liver function, abnormality has great importance regarding treatment aspect among critically ill coronavirus disease (COVID) patients admitted in Agartala Government Medical College and GBP Hospital.

Materials and Methods: A cross-sectional hospital-based evaluation of hepatic function of critically ill COVID-19 patients admitted in ICU at AGMC & GBP Hospital.

Results: The median age of 40 enrolled patients was 53.6 years and 28 patients (70%) were men. The most common symptoms were fever, dry cough, headache, body ache, breathing difficulty, diarrhea, and fatigue. The present study also showed elevated AST in 85% ICU admitted patients and among them 50% had more than 2 times raised AST. Elevated ALT in 90% of ICU patients and among them 35% had more than 2 times raised ALT and 25% had more than 5 times raised ALT. Majority of patients had normal serum bilirubin and alkaline phosphatase.

Conclusion: Hepatic injury among coronavirus-infected critically ill patients might be directly caused by the SARS-COV-2 through binding to ACE2. ALT, AST, and diagnostic biomarker for hepatic injury have been elevated in this existing COVID-19 study. Liver damage in severe COVID-19 is transient or permanent needs a follow-up. Increased mortality had been observed in COVID-19 infected person with pre-existing liver disease. Immune dysfunction – including lymphopenia, reduce cluster differentiation4+ T-cell levels, and abnormal cytokine levels, might be a critical factor associated with disease severity and mortality. This study has shown us that special care of liver dysfunction should be installed in treating 2019-nCoV patients during the hospitalization. Further research should focus on the severity of liver injury and progression toward chronic liver disease in COVID-19.

Key words: Hepatic, Patient, Virus

Access this article online

www.ijss-sn.com

Month of Submission : 03-2021
Month of Peer Review : 04-2021
Month of Acceptance : 04-2021
Month of Publishing : 05-2021

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is the illness caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Older adults and people with chronic liver disease, including hepatitis B and hepatitis C, and those have serious underlying medical conditions might be at

Corresponding Author: Dr. Subhadip Paul, Department of General Medicine, Agartala Government Medical College and Govind Ballabh Pant Hospital, Agartala, Tripura, India.

higher risk for severe illness from COVID-19. Genomic sequence shown that both SARS-CoV and SARS-CoV-2 infect cells through the angiotensin-converting enzyme 2 (ACE2) receptor.[1-4] ACE2 was abundantly expressed on the surface of the lungs and the small intestine epithelium, and occasionally on the bile ducts.[5] About 59.7% of cholangiocytes and 2.6% hepatocytes expressed ACE2.[6] One study (2004) showed that 43 cases of COVID-19 had higher alanine aminotransferase (ALT) or aspartate aminotransferase (AST) level.[7] Wang *et al.* found that 23 had elevated ALT (33%) and 19 had elevated AST (28%).[8] A recent autopsy case also found moderate microvesicular steatosis and mild lobular activity in the liver, indicating either SARS-CoV-2 infection or drug-induced liver injury.[9] In this study, we evaluated hepatic function of critically ill coronavirus affected patients.

Aims and Objectives

The study of evaluation of hepatic function among critically ill coronavirus-infected patients is important for various reasons. Studies on pandemic impact on liver are lacking. To estimate liver function, abnormalities have great importance regarding treatment aspect among critically ill COVID patients admitted in intensive care unit (ICU) at AGMC and GBP Hospital.

MATERIALS AND METHODS

A cross-sectional hospital-based evaluation of hepatic function of critically ill COVID-19 patients admitted in ICU at AGMC and GBP Hospital.

Study Population

Patients, both male and female, having SARS-COV-2 positive on RT-PCR or rapid antigen test admitted in ICU at AGMC and GBP Hospital following inclusion and exclusion criteria will be included in the study.

Sampling Technique

Census sampling. As it is decided to include all the COVID-19 patients who will be admitted in ICU at AGMC and GBP Hospital.

Sample Size

All the COVID-19-infected patients admitted in ICU at AGMC and GBP Hospital following inclusion and exclusion criteria will be included in the study.

Inclusion Criteria

All the COVID-19-infected patients admitted in ICU at AGMC and GBP Hospital were included in the study.

Exclusion Criteria

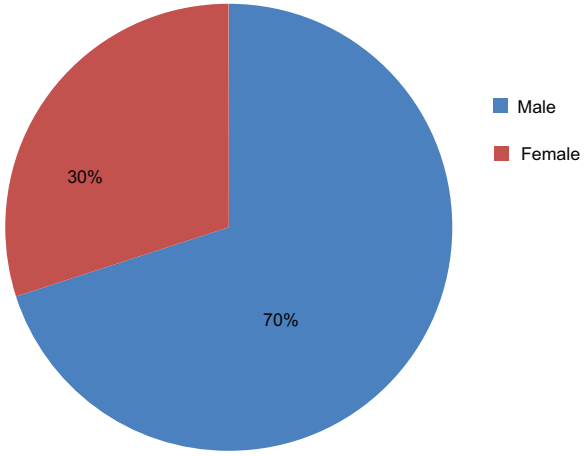
The following criteria were excluded from the study:

- Viral hepatitis
- Alcoholic liver disease
- Diagnosed with non-alcoholic fatty liver disease
- Presently taking hepatotoxic drugs.

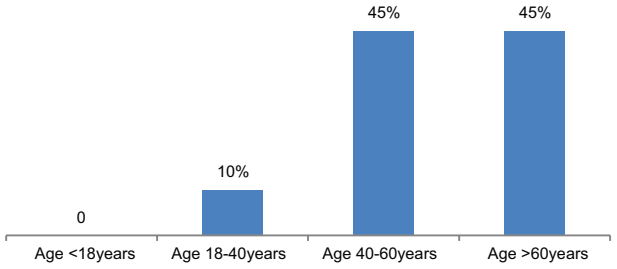
Data were analyzed by SPSS software ver. 15 using appropriate statistical tests.

RESULTS

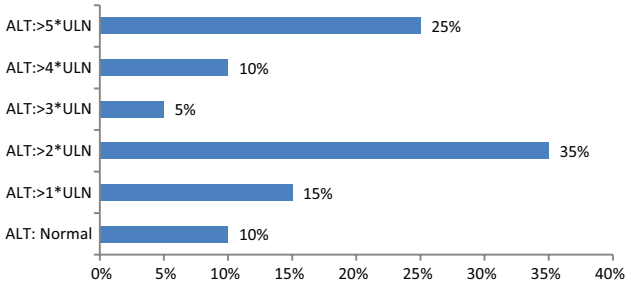
Sex-Wise Distribution



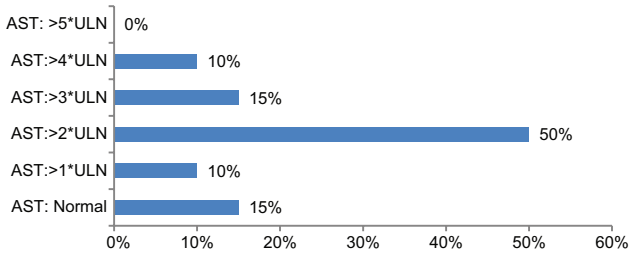
Age-Wise Distribution



ALT: Normal ALT for males: 29–33I U/L, normal ALT for females: 19–25 IU/L.



AST: Normal AST for both males and females: 5–35 IU/L.



DISCUSSION

The median age of 40 enrolled patients was 53.6 years (IQR 30.0–84.0), and 28 patients (70%) were men. The most common symptoms were fever, dry cough, headache, body ache, breathing difficulty, diarrhea, and fatigue.

Study conducted by Guan *et al.* among 1099 corona-infected patients revealed that elevated AST in 56 (39.4%) of 142 patients with severe disease. Elevated levels of ALT were observed in 38 (28.1%) of 135 patients with severe disease[10] and male preponderance was seen.

The present study also showed elevated AST in 85% ICU admitted patients and elevated ALT in 90% of ICU patients. Among them 35% had more than 2 times raised ALT and 25% had more than 5 times raised ALT. Male preponderance also observed in this study.

Huang *et al.* observed that elevated AST in 62% ICU admitted severe COVID-19 patients.[11] Here our study showed elevated AST in 85% icu patients. Among them, 50% had more than 2 times raised AST.

Majority of the patients had normal range of serum bilirubin, alkaline phosphatase, gamma-glutamyltransferase, and prothrombin time. Few elderly patients had low total protein and low albumin.

CONCLUSION

Hepatic injury among coronavirus-infected critically ill patients might be directly caused by the SARS-COV-2 through binding to ACE2.[12] However, few study shows virus might directly bind to ACE2-positive cholangiocytes and cause damage or might be due to systemic inflammatory response induced liver injury.[7] ALT, AST, and diagnostic biomarker for hepatic injury have been elevated in this existing COVID-19 study. Liver damage in severe COVID-19 is transient or permanent needs a follow-up. Chronic liver disease, an immunocompromised state, represents a major burden globally. Increased mortality had been observed in COVID-19 patients with pre-existing liver disease. Immune dysfunction – including lymphopenia, reduce cluster differentiation 4+ T-cell levels, and abnormal cytokine level, might be a critical factor associated with disease severity and mortality. This study has shown us that special care of liver dysfunction should be installed in treating 2019-nCoV patients during the hospitalization. Further research should focus on the severity of liver injury and progression toward chronic liver disease in COVID-19 patients.

REFERENCES

1. Chan JF, Kok KH, Zhu Z, Chu H, To KK, Yuan S, *et al*. Genomic characterization of the 2019 novel human-pathogenic coronavirus isolated from a patient with atypical pneumonia after visiting Wuhan. Emerg Microbes Infect 2020;9:221-36.
2. Xu X, Chen P, Wang J, Feng J, Zhou H, Li X, *et al*. Evolution of the novel coronavirus from the ongoing Wuhan outbreak and modeling of its spike protein for risk of human transmission. Sci China Life Sci 2020;63:457-60.
3. Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, *et al*. Genomic characterisation and epidemiology of 2019 novel coronavirus: Implications for virus origins and receptor binding. Lancet 2020;395:565-74.
4. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, *et al*. Clinical characteristics of 138 hospitalised patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA 2020;323:1061-9.
5. Hamming I, Timens W, Bulthuis ML, Lely AT, Navis GJ, van Goor H. Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis. J Pathol 2004;203:631-7.
6. Chai X, Hu L, Zhang Y, Han W, Lu Z, Ke A, *et al*. Specific ACE2 expression in cholangiocytes may cause liver damage after 2019-nCoV infection. BioRxiv 2020;2020:931766.
7. Chau TN, Lee KC, Yao H, Tsang TY, Chow TC, Yeung YC, *et al*. SARS-associated viral hepatitis caused by a novel coronavirus: report of three cases. Hepatology 2004;39:302-10.
8. Wang Z, Yang B, Li Q, Wen L, Zhang R. Clinical features of 69 cases with coronavirus disease 2019 in Wuhan, China. Clin Infect Dis 2020;71:769-77.
9. 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;8:420-2.
10. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, *et al*. Clinical characteristics of 2019 novel coronavirus infection in China. N Engl J Med 2020;2020:20020974.
11. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, *et al*. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020;395:497-506.
12. Yeo C, Kaushal S, Yeo D. Enteric involvement of coronaviruses: Is faecal-oral transmission of SARS-CoV-2 possible? Lancet Gastroenterol Hepatol 2020;5:335-7.

How to cite this article: Sarkar P, Paul S, Das M. Evaluation of Hepatic Function among Critically Ill Coronavirus-Infected Patients in a Tertiary Care Hospital of Tripura. Int J Sci Stud 2021;9(2):30-32.

Source of Support: Nil, **Conflicts of Interest:** None declared.