

Evaluation Liver Function Test Abnormalities in Covid-19 Patient in Tertiary Care Hospital, A Cross Sectional Study

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ABSTRACT

Since late December 2019, a novel coronavirus illness (COVID-19) outbreak has been detected in Wuhan, China, affecting 215 nations so far. Although respiratory symptoms are the most common symptom in COVID-19 patients, several extra pulmonary organ dysfunctions have also been observed. Previous investigations have found that individuals with COVID-19 had a high incidence of aberrant liver function parameters. The objective of current study will be to evaluate the effect of effects of covid-19 severity on liver function test and hypocalcaemia.

Material and Methods: A cross-sectional study conducted at Corona Isolation Wards of Sir Ganga Ram Hospital Lahore from April to June 2019. Total 110 RT PCR Positive Covid-19 patients were enrolled in current study by consecutive sampling technique. The Demographic details, Disease severity, Laboratory Findings of Liver Function Test (LFTs) and outcome of every patient was recorded from on a predesigned proforma. Data was analyzed using SPSS-26. ANOVA was applied to find out the difference between disease severity LFTs level. P-value less than 0.05 considered as significant.

Results: The patients' average age was 30.03+15.03. The average length of stay in the hospital was 14.76+2.77 days. There was predominance of Male in current study male [M=60(54.5%) vs. F=50(45.5%)]. There are 48 (43.6%) patients with mild disease, 28 (25.5%) patients with moderate disease, and 34 (30.9%) patients with severe disease. Only 2(1.8%) patients died, while 102(92.7%) patients recovered. The most common symptom experience by patients was Fever, followed by Cough (32), Fatigue (29), Diarrhea (17), sore throat (18). A significant increase was observed in ALT, AST, ALP, Serum Bilirubin, Total Protein, Albumin and Globulin according to disease severity (p-value<0.05)

Conclusions: The abnormal liver function test was shown to be more common in moderate to severe cases. The severity of COVID-19 has a major impact on the liver's functional outcome.

Keywords: COVID-19, Liver Function Test, Disease severity, Liver injury

INTRODUCTION

Since late December 2019, a novel coronavirus illness (COVID-19) outbreak has been detected in Wuhan, China, affecting 215 nations so far. ⁽¹⁾ According to epidemiological investigations, the incident was linked to a seafood market in Wuhan. ⁽²⁾ COVID-19 is a rapidly resolving condition, but it can also be lethal, with a 2% case fatality rate. Due to significant respiratory injury and progressive respiratory failure, severe illness onset may result in mortality. ⁽³⁾ While most coronavirus infections are moderate, epidemics of two beta coronaviruses, severe acute respiratory syndrome (SARS-COV) and mild east respiratory syndrome (MERS-COV), have resulted in over 10,000 cases in the last two decades, with fatality rates of 10% for SARS-COV and 37% for MERS-COV. ⁽⁴⁾ Despite the fact that various research have documented the clinical features of patients infected with VCOVID-19, no reports of hypocalcemia in Covid-19 patients have been published. Hypocalcemia is a common occurrence in critically ill patients, with prevalence rates ranging from 15% to 80% in adults. Hypocalcemia is also linked to a worsening of the condition and a higher risk of death. Hypocalcemia was found to be a

laboratory abnormality in a variety of viral infections in previous research. ⁽⁵⁾ Although respiratory symptoms are the most common symptom in COVID-19 patients, several extrapulmonary organ dysfunctions have also been observed.⁽⁶⁾ Previous investigations have found that individuals with COVID-19 had a high incidence of aberrant liver function parameters, particularly alanine aminotransferase (ALT) (12.9–41.6%) and aspartate aminotransferase (AST) (18.2–66.9%).⁽⁷⁻⁹⁾ Moreover, some investigations have found that impaired liver function indicators are linked to the clinical outcomes like prolonged hospital stay ⁽⁹⁾, disease severity ^(8,10) and mortality.⁽¹¹⁾

The objective of current study will be to evaluate the effect of effects of covid-19 severity on liver function test and hypocalcaemia.

PATIENTS AND METHODS

A cross-sectional study conducted at corona isolation wards of Sir Ganga Ram Hospital Lahore from April to June 2019. Total 110 RT PCR Positive Covid-19 patients were enrolled in current study by consecutive sampling technique. All RT-PCR positive patients from the record of corona isolation wards of Sir Ganga Ram hospital Lahore included in current study. Ethical approval was obtained. Ethical considerations were followed by Declaration of Helsinki. Patients were divided according to disease severity based on symptoms, clinical findings and chest examination. ¹² The Demographic details (age, gender), Disease severity (Mild, Moderate, Severe), Laboratory Findings Bilirubin, Aspartate Aminotransferase (AST), Alanine Transaminase (ALT), Phosphomonoesterases (alkp4), Gamma-glutamyl transferase (GGT), Protein, Albumin, and outcome (Recovered and Recovered With ICU or Ventilation) of every patient was recorded from on a predesigned proforma. Data was analyzed using SPSS-26. Quantitative variables like age, Bilirubin, Aspartate Aminotransferase (AST), Alanine Transaminase (ALT), Phosphomonoesterases (alkp4), Gamma-glutamyl transferase (GGT), Protein and Albumin presented as mean ± standard deviation. Qualitative variables like gender, disease Severity, and outcome were represented by as frequency and percentages. ANOVA was applied to find out the difference between disease severity LFTs level. P-value less than 0.05 considered as significant.

RESULTS

The current study enrolled 110 COVID-19 patients in total. The patients' average age was 30.03+15.03. The average length of stay in the hospital was 14.76+2.77 days. There were 60 males (54.5%) and 60 females (45.5%) in the study. There are 48 (43.6%) patients with mild disease, 28 (25.5%) patients with moderate disease, and 34 (30.9%) patients with severe disease. Only 2(1.8%) patients died, while 102(92.7%) patients recovered, 6(5.5%) patients recovered with ventilator support. (Table 1)

Table 1: Patients Demographic and Disease Status

Variable		
Age (Mean+ SD)	30.03+15.03	
Hospital Stay in days (Mean+ SD)	14.76+2.77	
Gender	Frequency	Percentages
Male	60	54.5
Female	50	45.5
Disease Severity	Frequency	Percentages
Mild	48	43.6
Moderate	28	25.5
Severe	34	30.9
Outcome	Frequency	Percentages
Recovered	102	92.7
Recovered with Ventilator Support	6	5.5
Death	2	1.8

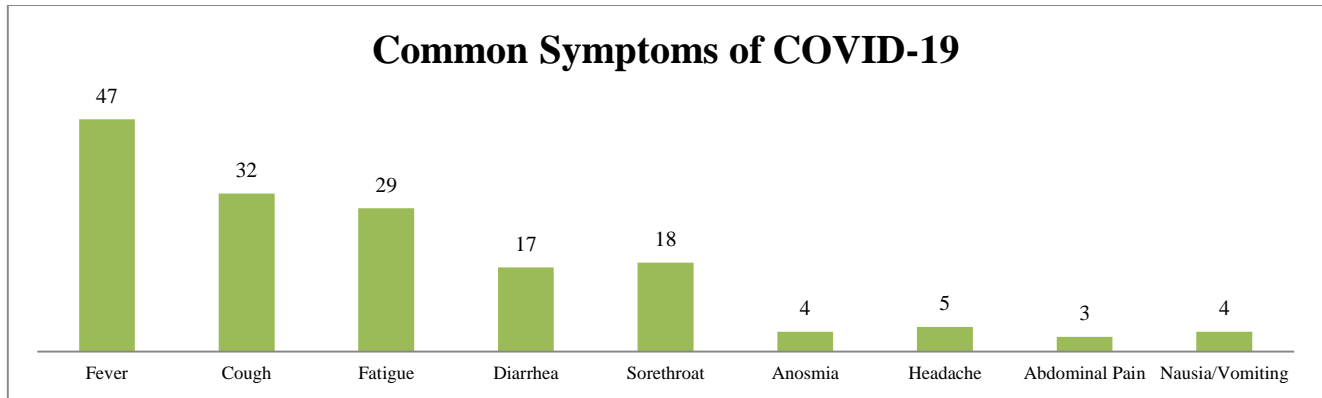


Figure 1: Common Symptoms of COVID-19 Patients

According to figure 1, the most common symptom experience by patients were Fever(47), followed by Cough (32), Fatigue (29), Diarrhea (17), sore throat (18), Anosmia (4), Headache (5), Abdominal Pain (3) and nausea/vomiting (4).

Table 3: Comparison of LFTs with respect to Disease Severity

Variable	Disease Severity			
	Mild	Moderate	Severe	P-value
ALT (U/L) (normal range: 9–40 U/L)	25.375+6.38	43.85+20.2	52.147+12.6	0.000
AST (U/L) (normal range: 13–40 U/L)	27.313+ 6.65	41.250 +8.85	66.0 +23.03	0.000
ALP (U/L) (normal range: 38–126 U/L)	65.60+15.7	103.46+22.4	112.41+22.6	0.000
Serum bilirubin (mg/dL) (normal range: 0.2–1.3 mg/dL)	0.475 + 0.34	0.796+0.22	1.097+0.21	0.000
Total protein (g/dL)	6.937+0.4231	6.779+0.4717	5.529+0.5957	0.000
Albumin (g/dL)	1.423+0.19	1.007+0.18	0.818+0.21	0.000
Globulin (GGT) (g/dL)	27.46+9.57	58.79+23.57	53.68+13.8	0.000

Table 3, shows the difference between the LFTs according to disease severity. All the LFTs parameters were significantly higher in moderate to severe cases. A significant increase was observed in ALT, AST, ALP, Serum Bilirubin, Total Protein, Albumin and Globulin according to disease severity (p-value<0.05).

DISCUSSION

Several hospital-based studies completed throughout the world have shown the potential significance of severe liver injury in COVID-19 patients' mortality risk.¹³⁻¹⁵ therefore the current study aims to find out the effect of disease severity on Liver Function test.

In this study total number of patients was 110. The patients' average age was 30.03+15.03. The average length of stay in the hospital was 14.76+2.77 days. There was predominance of Male in current study [M=60(54.5%) vs. F=50(45.5%)]. Majority of the patients have mild disease 48 (43.6%) , 28 (25.5%) patients with moderate disease, and 34 (30.9%) patients with severe disease. Only 2(1.8%) patients died, while 102(92.7%) patients recovered.

A study conducted in 2020 on the prevalence of abnormal Liver function test reported that male have more dysfunctional

LFTs than females. The mean age of patients was 33 years. It was also reported that patients with abnormal LFTs have longer hospital stay up to 15 days. The findings of the study was in accordance to current study.¹⁶ A study reported that liver disease have significant impact on the disease severity and mortality of patients which also leads to multiple organ failure.¹⁷

The results of this study showed that the LFTs parameters were significantly higher in moderate to severe cases. A significant increase was observed in ALT, AST, ALP, Serum Bilirubin, Total Protein, Albumin and Globulin according to disease severity (p-value<0.05).

A study conducted by Guan at el., showed the higher incidence of elevated levels ALT and AST in severe cases which is similar to current study.¹⁸ Another study conducted on the clinical features of 138 hospitalized patients showed that the common symptom of COVID-19 was fever, cough and fatigue. It was also reported that the patients and higher levels of AST and ALT who were admitted to ICU.¹⁹

Another study conducted by Fan Z at el, reported that patients who have abnormal liver function were males. 48.8% patients develop abnormal liver function test at 7th day of admission. the patients also have elevates levels of Serum Bilirubin. The abnormal liver functioning leads to longer hospital

stay.²⁰ A study conducted in Shenzhen, China also reveals that the onset of abnormal liver function test become more elevated within 2 weeks. Most of the patients have ALT, AST, ALP, total Bilirubin and gamma-glutamyl transferase levels have upper limit of normal levels. The patients with elevated levels have higher progression of disease severity.²¹

CONCLUSION

Overall, findings reveal that abnormal liver function was more common in patients with moderate to severe COVID-19 cases. The severity of COVID-19 has a major impact on the liver's functional outcome. It was concluded that abnormal liver function test leads to severity of COVID-19.

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