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December 2022

Association between biochemical markers and adverse outcome of COVID-19 patients without comorbidity

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This is to certify that we have examined the above Master's thesis andhave found that is complete and satisfactory in all respects, and that all revisions required by the thesis examination committee have been made.

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List of Abbreviations

CRP	C Reactive Protein
SGPT	Serum Glutamic Pyruvic Transaminase
SGOT	Serum Glutamic Oxaloacetic Transaminase
CBC	Complete Blood Count
RBS	Random Blood Sugar
PT	Prothrombin Time
NT Pro BNP	N terminal Pro B Type Natriuretic Peptide
Hs Trop I	High Sensitive Troponin I
ESR	Erythrocyte Sedimentation Rate
WBC	White Blood Cell
IL 6	Interleukin 6
RT PCR	Reverse Transcription Polymerase Chain Reaction
COVID 19	Corona Virus Disease 19
SARS CoV-2	Severe Acute Respiratory Syndrome Corona Virus 2
MERS CoV	Middle East Respiratory Syndrome Corona Virus
DNA	Deoxyribonucleic Acid
ss RNA	Single Stranded Ribonucleic Acid
ACE-2	Angiotensin Converting Enzyme 2
TNF	Tumor Necrosis Factor
LDH	Lactate Dehydrogenase

Abstract

COVID-19 is an infectious disease caused by the novel coronavirus named severe acute respiratory syndrome coronavirus (SARS-CoV-2). Cases vary from asymptomatic carriers to severe cases leading to death of the patient. Studies have reported changes in biochemical parameters among patients afflicted with COVID-19. Hence, it is essential to find out which biochemical parameters are associated with disease severity so that earlier interventions can help prevent inevitable death. The aim of this study was to identify biochemical parameters among survivors and non-survivors of COVID-19.

This was a cross sectional study conducted at four non-government hospitals between January 2021 and December 2021. A total of 103 RT PCR positive COVID 19 patient's data were collected from the admission record sheet of the hospitals. The most common age group was 55 to 64 years age group (n= 29; 28.15%) and there were 86.41% males and 11.59% females. A significant association (p=0.001) was found between elderly age and mortality of patients. The most common symptoms were fever (100%), cough (94.2%), headache (62.1%), dyspnea (55.3%), anosmia (47.6%) and diarrhea (11.7%). A significant association was found between the symptom dyspnea and patient mortality (p= 0.001). On comparing hematological profile of survivors and non survivors no significant difference has been observed among the parameters for Hemoglobin, ESR, and total WBC Count, Differential Count of Neutrophil and Lymphocyte, and Platelet Count. As for biochemical parameters, CRP (p=0.012), D-dimer (p=0.000), Serum Ferritin (p=0.000), SGOT (p=0.021), NT Pro BNP (p=0.000) and High Sensitive Troponin I (p=0.004), PT (p=0.010) were significantly raised among the patients who expired. Additionally, Serum Sodium (P= 0.001) and Serum Potassium (P=0.004) were significantly reduced among the patients who expired. Rest of the parameters have shown no significant difference in relation to outcome. The overall mortality was 18.45% in our study. Among many factors significantly affecting the outcome of COVID 19 patients, multiple regression studies shows that NT Pro BNP was significantly associated [-0.486(-0.001∼0.000);p=0.026] with disease outcome after controlling the factors such as CRP, D dimer, SGOT, High sensitive Troponin I, Na+, K+. If we eliminate NT Pro BNP then High Sensitive Troponin I becomes the most significant factor [-0.382; (-0.003∼0.000); p=0.009] effecting disease outcome. In summary, we can say that the cause of death is associated with raised NT Pro BNP

owing to heart failure or fluid overload. More over the second most significant factor is High sensitive Troponin I which may rise due to Myocardial Infarction or Viral myocarditis and thus aggravating the heart failure which is evident by the rise in NT Pro BNP levels. It also shows that dyspnea to be the most significant symptom associated with adverse disease outcome. Hence these biochemical markers are recommended for use by clinicians to segregate cases as severe or non-severe.