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Dr. Augustine KM
Assistant Professor, Department of Emergency Medicine, Kanachur Institute of Medical Sciences, Mangalore, Karnataka, India

Corresponding Author:
Dr. Augustine KM
Assistant Professor, Department of Emergency Medicine, Kanachur Institute of Medical Sciences, Mangalore, Karnataka, India

A study of association of the first biochemical parameters taken in the emergency department in COVID-19 patients with the outcome

Dr. Augustine KM

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Abstract
The accumulated evidence has shown that many biochemical parameters become altered in COVID-19 patients, and this has been correlated with the severity of the disease and in some cases associated with the prognosis of the patients. The laboratory parameters together with other demographic and clinical data of patients could allow them to be categorized in the initial stages, thus identifying people who will become critically ill and making it possible to improve their clinical care and seek adequate therapeutic strategies. This study puts in an effort to find the association of the first biochemical parameters taken in the Emergency Department in Covid-19 patients with the outcome.

Keywords: Association, survivors, non-survivors, biochemical markers

Introduction
It all started in the province of Wuhan, China where a number of atypical pneumonia cases had been reported [1]. First the world did not anticipate the depth of the disease but as days passes on, it was realised that it was highly contagious and the mortality was also reported [2]. The patients presented with a plethora of signs and symptoms including raised body temperature, cough, headache, nausea, vomiting, anorexia, diarrhea, dyspnea, multiple organ dysfunctions [3]. Majority of the patients reported only mild infections and were all right after a week or two [4]. But in a minor number of cases patients progressively develop serious complications, including sepsis, acute respiratory failure, metabolic acidosis, heart failure, kidney injury, hypoxic encephalopathy, and eventually die of the illness [5]. The study retrospectively reviewed the Case files of patients with COVID-19 and compared the hematological and biochemical characteristics between survivors and non-survivors. Considering high transmission and infectivity patterns, World Health Organisation announces it as an emergency of public health concern on March 31, 2020 [6]. In the initial phase of the disease outbreak, the mortality ranges from 2 to 5%, much higher in the elderly [3]. The mortality in coronavirus cases admitted in Wuhan city reached 7% in the outbreak's initial days [7]. This study puts in an effort to find the association of the first biochemical parameters taken in the Emergency Department in Covid-19 patients with the outcome.

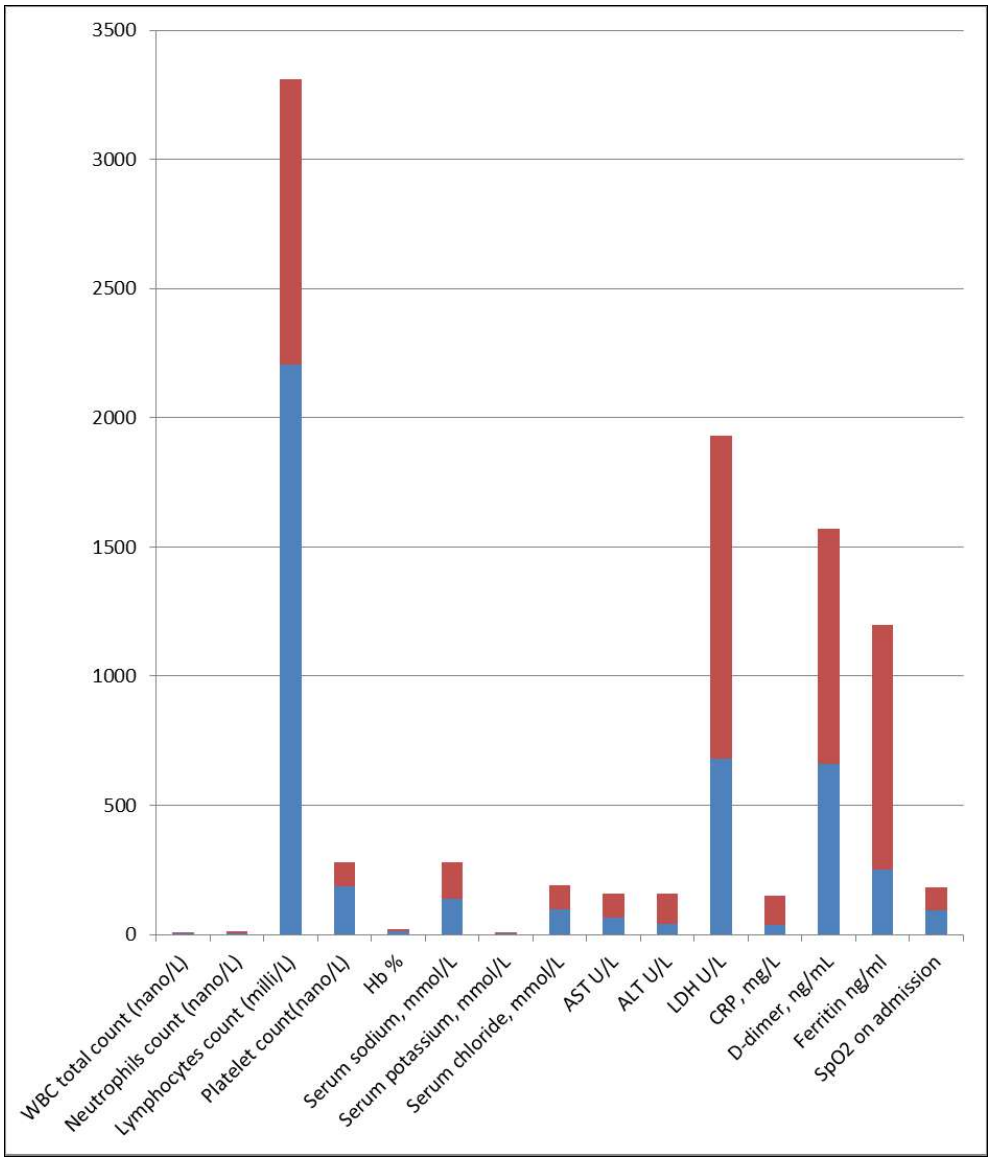
Aims and Objectives
To study the association of the first biochemical parameters taken in the Emergency Department in Covid-19 patients with the outcome.

Materials and Methods
This study was done in the Department of Emergency Medicine, Kanachur Institute of Medical Sciences, Mangalore.
This study was done from July 2020 to June 2021.
The study was done in 60 patients.
The patients when landed in the Emergency Department were thoroughly examined and the blood was sent to the Biochemistry lab of initial evaluation. Then the comparison was made between the survivors and the non-survivors. This study would shed the light on the prognostic factors of the biochemical markers on the survival.

Results

Table 1: Mean Values (rounded off to nearest one decimal point)

Markers	Survivor	Non- Survivor
WBC total count (nano/L)	3.6	6.7
Neutrophils count (nano/L)	5.4	8.5
Lymphocytes count (milli/L)	2205	1105
Platelet count(nano/L)	185	95
Hb %	12	10.1
Serum sodium, mmol/L	139	140
Serum potassium, mmol/L	4	4
Serum chloride, mmol/L	97	95
AST U/L	67	91
ALT U/L	39	121
LDH U/L	680	1250
CRP, mg/L	37	115
D-dimer, ng/mL	660	910
Ferritin ng/ml	250	950
SpO2 on admission	95	86
HRCT score	8	16



Graph 1: Mean Values (rounded off to nearest one decimal point)

Discussion

The elevation of serum levels of inflammatory markers is commensurate with the severity of the disease and in some cases increases up to 12 times the reference value, possibly being related to the direct damage to the hepatic tissue or as a secondary effect of the pharmacological treatment used

during the hospitalization of patients that evolve toward liver injury [8]. For this reason, it is recommended at least to determine the levels of ALT, bilirubin and albumin during the treatment of patients with hepatotoxic medication and those with preexisting hepatic conditions [16]. Also, the combination of eosinopenia and increased high-sensitivity C-reactive protein (hs-CRP) can serve to distinguish between patients suspected of presenting COVID-19 (supporting the diagnostic process) from patients with pneumonia or a respiratory infection similar to COVID-19 [10]. Moreover, elevated LDH is one of the most frequently altered biochemical parameters on admission [11] and the increase of certain inflammatory cytokines (IL-2, IL-6, TNFα) during the progression stage [12] can contribute information to the follow-up of the disease. In prior cases of pneumonia caused by SARS-CoV infection (2003), it was found that the serum levels of pro-inflammatory cytokines (IFN-γ, IL-1, IL-6, IL-12, and TGF-dv) and chemokines (CCL2, CXCL9, CXCL10 and IL-8) in patients infected with SARS-CoV were higher than in healthy patients, while the level of the cytokine synthesis inhibitory factor (IL-10) in seriously ill patients was significantly lower than in healthy counterparts [13]. In a meta-analysis of COVID-19, several differences were observed between groups of more severe cases. The non-survivors in comparison with the survivors had significant increases in their leukocyte, total bilirubin, creatine kinase, serum ferritin and interleukin 6 (IL-6) values and more significant decreases in their lymphocyte and platelet counts [14]. Concerning pancreatic function, an elevation of amylase and lipase has been associated with severe cases, which is consistent with pancreatic injury evidenced by computed tomography in seriously ill patients [15].

Conclusion

Biochemical markers can shed some light on the probability of survival in covid patients who land in the Emergency Medicine Department. These are still early days and these kind of studies have to be continued for a long time before a survival regression analysis can be done.

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