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A Study of Hematological Profile and Biochemical Markers of COVID-19 in Survivors and the Non-Survivors

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Abstract
Background: In the October of 2010 a disease cluster which presented with atypical pneumonia was reported in China. The disease was found to be primarily contagious and was transmitted through droplet infection. The patients presented with a plethora of signs and symptoms including raised body temperature, cough, headache, nausea, vomiting, anorexia, diarrhoea, dyspnoea, multiple organ dysfunctions. Majority of the patients reported only mild infections and were all right after a week or two. 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. The study retrospectively reviewed the Case files of patients with COVID-19 and compared the haematological and biochemical characteristics between survivors and non-survivors. **Aims and Objectives:** To study the haematological and biochemical profile of survivors and non-survivors infected with covid 19. **Materials and Methods:** Seventy survivors and thirty-four non - survivors haematological and biochemical markers are studied and have been reported. This is a descriptive study and the comparison between the two are analysed accordingly. **Results & Conclusion:** The haematological and biochemical markers may be used as prognostic markers in covid 19.
Keywords: COVID, Non-Survivors, Survivors, Haematological, Biochemical, Markers.

Introduction

In the oct of 2010 a disease cluster which presented with atypical pneumonia was reported in China[1]. The disease was found to be primarily contagious and was transmitted through droplet infection[2]. The patients presented with a plethora of signs and symptoms including raised body temperature, cough, headache, nausea, vomiting, anorexia, diarrhoea, dyspnoea, 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 haematological 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 and compare the haematological and biochemical markers in survivors and non survivors.

Aims and objectives

To study the haematological and biochemical profile of survivors and non-survivors infected with covid 19.

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Materials and methods

The study was done in the Department of Biochemistry, JNUIMSRC, Jaipur. Seventy survivors and thirty-four non - survivors haematological and biochemical markers are studied and have been reported. This is a descriptive study and the comparison between the two are analysed accordingly. The study was done from March 2021 to July 2021.
The MRD was visited, and the files were asked. The haematological and biochemical profile has been reported.

Results
Table 1: Haematological and biochemical profile in survivors and non-survivors

Markers	Survivor	Non-Survivor	Sig
WBC total count (10^9/L)	4.8 ± 3.7	8.9 ± 6.0	Not Sig
Neutrophil's count (10^9/L)	5.9 ± 1.5	8.4 ± 2.1	<0.001 Sig
Lymphocyte's count (10^9/L)	2.4 ± 1.4	1.3 ± 0.5	Not Sig
Platelet count(10^9/L)	184.07 ± 38.15	101.58 ± 70.27	<0.001 Sig
Hb %	12.81 ± 1.72	10.27 ± 1.29	Not Sig
Serum sodium, mmol/L	138.21 ± 2.38	140.35 ± 7.39	Not Sig
Serum potassium, mmol/L	4.12 ± 0.13	4.41 ± 0.92	Not Sig
Serum chloride, mmol/L	96.71 ± 6.18	94.49 ± 7.8	Not Sig
AST U/L	68.38 ± 34.29	90.8 ± 114.98	Not Sig

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ALT U/L	49.82 ± 38.92	121.38 ± 187.48	Not Sig
LDH U/L	620.28 ± 318.09	1216.16 ± 1129.29	<0.001 Sig
Direct bilirubin, mmol/L	0.61 ± 1.23	0.79 ± 1.12	Not Sig
Indirect bilirubin, mmol/L	0.41 ± 1.17	0.75 ± 1.39	Not Sig
TBIL, mmol/L	1.11 ± 1.22	1.45 ± 1.92	Not Sig
CRP, mg/L	39.29 ± 57.12	116.26 ± 91.9	<0.001 Sig
D-dimer, ng/mL	682.00 ± 114.19	892.13 ± 412.38	<0.001 Sig
Ferritin ng/ml	249.91± 38.15	1006.16 ± 112.39	<0.001 Sig
SpO2 on admission	93.82 ± 6.39	86.28 ± 6.0	Not Sig
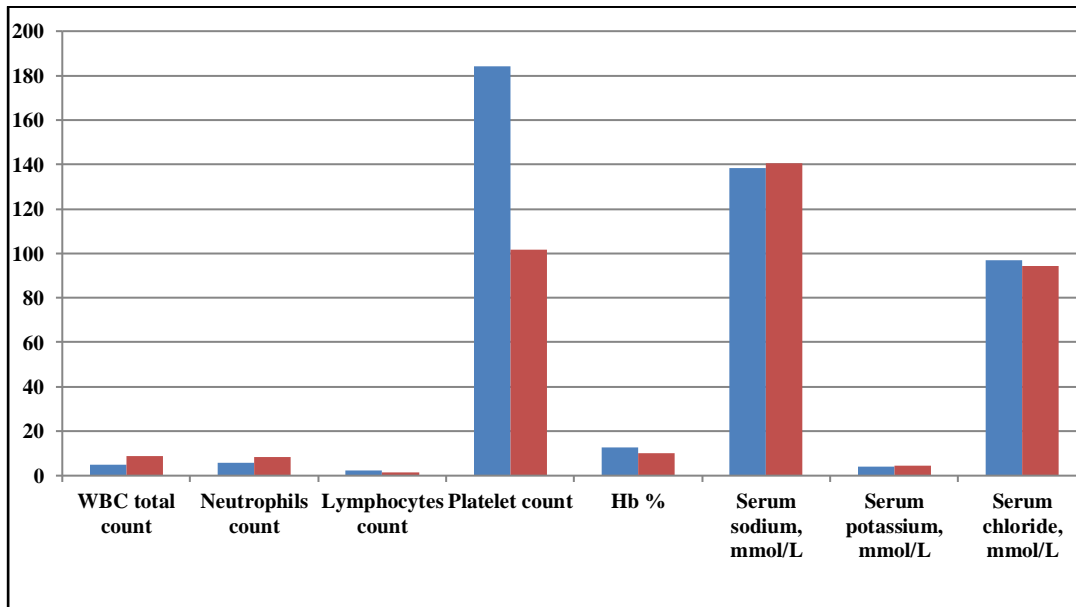
Figure 1: Haematological in survivors and non-survivors
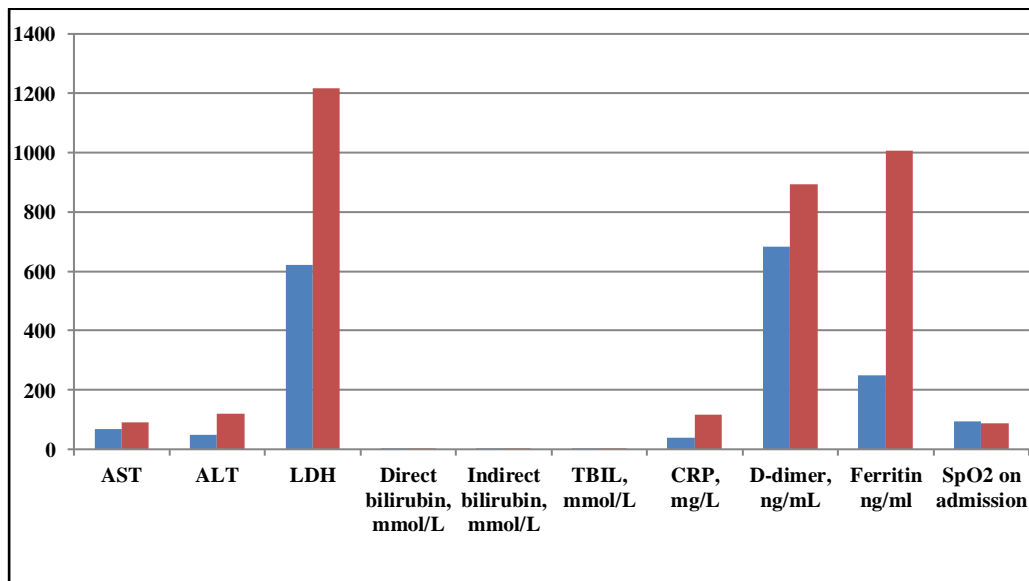
Figure 2: Biochemical markers in survivors and non-survivors

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Discussion

This disease has a peculiar natural course. This starts off with mild symptoms and then suddenly the signs and symptoms blows out of proportion and eventually is very hard to treat. So identification of the stage is very important so that the treating doctor gets a chance to effectively treat the patient[8]. Some of the reports have already marked the importance of the haematological and biochemical markers to identify the prognosis of the disease[4,9]. No such study has been done in the present population and this is one such sincere effort. Some study has also reported the importance of inflammatory markers in the patients. C-reactive protein (CRP) is one such, others like erythrocyte sedimentation rate (ESR), and Interleukin-6 are also extensively studied[3]. Likewise, another work reported lymphocytopenia, high blood sugar, gamma-glutamyl transferase (GGT), high lactate dehydrogenase (LDH) in more COVID-19 patients[10]. Further, laboratory findings of 77 COVID-19 deaths and 852 COVID-19 patients also demonstrated an increase in urea, cardiac troponin, creatine kinase, D-dimer, C-reactive protein (CRP), lactate dehydrogenase (LDH), IL-6, and lower level of lactic acid levels and lymphocytes[11,12]. Analysis of 143 cases of COVID-19 revealed a higher level of C-reactive protein, D-dimer, lactate dehydrogenase, serum amyloid, and lower level of albumin are directly associated with developing a critical illness[9]. The haematological and biochemical markers have been studied and this study successfully proves the difference. This can be used as a prognostic tool. Majority of the study has been done in the east and none of them in this region. The pandemic is still not over and this study is one novel effort to find the difference so as to help the practicing physician to diagnose the severity earlier and be helpful in the treatment of the disease.

Conclusion

The haematological and biochemical markers may be used as prognostic markers in covid 19.

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Conflict of Interest: Nil   Source of support: Nil

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