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Original research article

A comparative study of inflammatory markers between cases of severe and non-severe COVID-19 infection at admission

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Abstract

A "cytokine storm" is characterized by an increase in the release of many cytokines that cause lung tissue fibrosis and long-term damage. This disorder is distinguished by a rise in the total quantity of cytokines that are discharged into the bloodstream. It is not quite obvious if these changes occurred as a consequence of the immunomodulation that the medication provided or of the disease process itself. In addition, additional study is necessary to shed light on the possible connection that exists between these inflammatory markers and the development and severity of COVID-19. The current analysis was to report changes in the inflammatory markers in symptomatic COVID-19 patients and to link such changes with severity and prognosis.

Keywords: Inflammatory markers, severe, non - severe, COVID-19

Introduction

The disease that was later given the name COVID-19 and was found in December 2019 in Wuhan, China, was associated with an approximately 2% increase in the probability of passing away. [1]. The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which has only recently been discovered, is the agent responsible for causing this illness [2]. The coronavirus illness known as SARS-CoV was discovered for the first time in China in 2002, and the coronavirus infection known as Middle East Respiratory Syndrome (MERS-CoV) was discovered for the first time in Saudi Arabia in 2012 [3, 4]. These coronaviruses are all encapsulated positive-strand RNA viruses that are infectious between people, animals, and humans [5]. They were first detected in bats and were found to have been spread by bats. Recent investigations have revealed particular differences between the two, despite the fact that they share certain clinical symptoms [5]. The initial phase of the sickness is driven by viral replication, and it may be followed by a second phase that is driven by an inflammatory host response [6]. The illness is characterized by both phases. The hyperimmune response that is associated with acute respiratory distress syndrome can be deduced from the radiological signs that are typical of a SARS-CoV-2 infection [7]. A condition known as a "cytokine storm," which is characterized by an increase in the release of many cytokines that cause lung tissue fibrosis and long-term damage, may occur in the most seriously ill individuals [8]. A "cytokine storm" is characterized by an increase in the release of many cytokines that cause lung tissue fibrosis and long-term damage. This disorder is distinguished by a rise in the total quantity of cytokines that are discharged into the bloodstream. It is not quite obvious if these changes occurred as a consequence of the immunomodulation that the medication provided or of the disease process itself. In addition, additional study is necessary to shed light on the possible connection that exists between these inflammatory markers and the development and severity of COVID-19. The current analysis was to report changes in the inflammatory markers in symptomatic COVID-19 patients and to link such changes with severity and prognosis. The purpose of the investigation was also to record variations in the levels of inflammatory markers.

Aims and Objectives

To compare and contrast the level of inflammatory markers between cases of severe and non-severe Covid-19 infection at admission.

Materials and Methods

The Institutional Ethics Committee of our institute first gave its assent to the study. Moreover, permission was received from the medical superintendents of the relevant hospitals as well as the District

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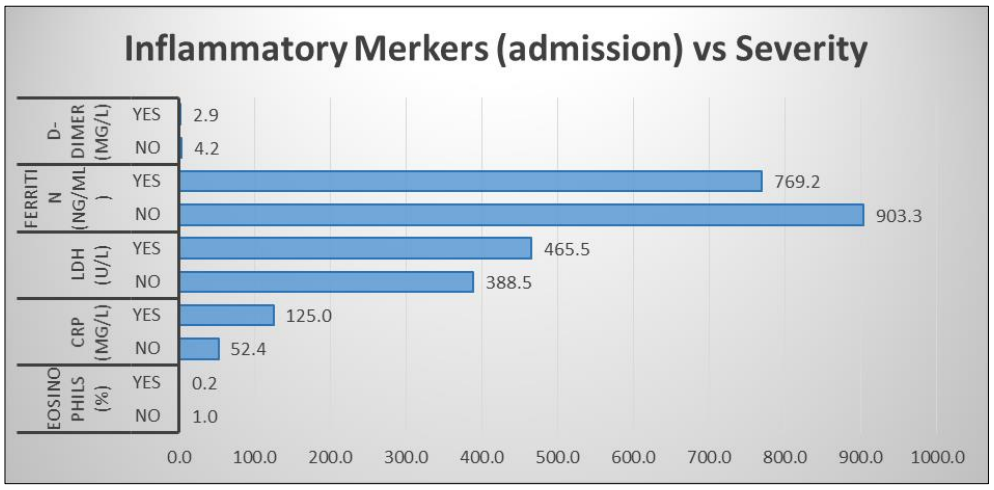
Medical Officer. Patients attending the flu clinic at our hospital who met both the inclusion and exclusion criteria were asked to participate in the study. A discussion regarding the aims of the study was had with the people who participated in the research. The individuals who were willing to take part in the study gave their written informed consent. Following the acquisition of consent, pertinent data was obtained. According to the standards established by the government of India, patients were placed into one of two categories based on the severity of their Covid-19 infection:
category A or category B. Individuals who are asymptomatic or who have just minimal symptoms fall into Group A.
Category B patients have symptoms of mild to moderate pneumonia, but no indicators of severe disease; their respiratory rate is between 25 and 30 cycles per minute, and their SPO2 is between 90 and 94% when measured in room air.
Symptomatic patients with severe pneumonia who have a respiratory rate of more than 30 cycles per minute or a pulmonary oxygen saturation of less than 94% when using oxygen; patients with ARDS and septic shock also fall into this category (Confusion, drowsiness, decrease in urine output, lower blood pressure, tachycardia)
On the day of admission, routine blood examinations such as a complete blood count (CBC), liver function tests (LFT), renal function tests (RFT), and senior electrolytes were taken from each patient.

Results

Table 1: Mean comparison of inflammatory markers between cases of severe and non-severe Covid-19 infection at admission

Variables (admission)	Severe Covid	N	Mean	SD	p- value
Eosinophils (%)	No	87	1.0	1.7	<0.01
	Yes	45	0.21	0.2	
CRP (mg/L)	No	87	51.4	66.8	<0.01
	Yes	45	124.0	105.1	
LDH (U/L)	No	87	386.5	221.8	0.042
	Yes	45	464.5	169.3	
Ferritin (ng/ml)	No	87	910.3	1385.3	0.530
	Yes	45	764.2	605.8	
D-Dimer (mg/L)	No	87	4.23	23.6	0.710
	Yes	45	2.97	2.6	

Mean eosinophil count at admission was significantly lower in cases with severe Covid-19 infections (0.2% vs 1%; $p<0.01$) while CRP levels (125 vs 52.4 mg/L) and LDH levels (465.5 vs 388.5 U/L) were higher significantly ($p<0.05$).



Graph 1: Mean comparison of inflammatory markers between cases of severe and non-severe Covid-19 infection at admission

Discussion

Currently, all of us are enduring a pandemic caused by the coronavirus. The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which has only recently been discovered, is the agent responsible for causing this illness [2]. The initial phase of the sickness is driven by viral replication, and it may be followed by a second phase that is driven by an inflammatory host response [6]. The illness is characterized by both phases. A condition known as a "cytokine storm," which is characterized by an

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increase in the release of many cytokines that cause lung tissue fibrosis and long-term damage, may occur in the most seriously ill individuals [8]. This condition is characterized by an increase in the number of cytokines that are released. There is a substantial risk of morbidity and mortality associated with instances that involve severe infections. For the purpose of prognosis prediction, one therefore requires a diagnostic marker that is straightforward to compute, readily available, and possesses an adequate level of diagnostic accuracy. In this context, recent research have concentrated on severe indications, such as neutrophils, lymphocytes, ESR, CRP, ferritin, LDH levels, D-dimer, and IL-6. These are just some of the indicators that have been examined. It is not quite obvious if these changes occurred as a consequence of the immunomodulation that the medication provided or of the disease process itself. In addition, additional study is required to shed light on the possible connection that exists between the these inflammatory markers and the development and severity of COVID-19. As a result, the purpose of this study was to analyze the precision of the inflammatory markers as a predictive indicator for severity in COVID-19 and compare. Specifically, the participants in the study were COVID-19 patients (CRP, LDH, ferritin and D-dimer).

Conclusion

Additional study is required to shed light on the possible connection that exists between the these inflammatory markers and the development and severity of COVID-19 from different geographical location.

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