

“Study of D-Dimer and CRP Level in Covid-19 Patients Admitted in a Tertiary Care Hospital in India”

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Abstract:

Introduction: Currently, the novel corona virus disease 2019 (COVID-19) has become one of the deadliest pandemics that has ravaged the world and carries a high mortality rate.

Aim: To study D-dimer and CRP level in Covid-19 patients admitted in a tertiary care center in Kanpur.

Material and Methods: It is a retrospective study that investigated 25 Real Time-Polymerase Chain Reaction (RT-PCR) confirmed COVID-19 patients from June 2020 to August 2020.

Results: A total of 25 lab confirmed adult Covid-19 patient's data admitted were included. The maximum number of patients belonged to the age group of 51-60 years in which male were 88.88% and females were 11. In case of CRP 28% were mildly infected, 36% were moderately infected, 20% were severely infected. In case of D-dimer 28% were mildly infected and 40% were severely infected.

Conclusion: CRP value greater than 100 mg/dl and D-dimer level higher than 500 ng/ml might predict the severity of disease so its values should be taken into consideration while treatment.

Keywords- D-dimer, CRP, Covid-19

Introduction

Corona virus disease-2019 (COVID-19) is an emerging infectious disease that has been declared a global public health emergency by the World Health Organization (WHO). Since its inception in Wuhan, China, over 3,500,000 cases and 243,403 deaths have been recorded world-wide[1] The clinical manifestations of COVID-19 included fever, cough, diarrhea, dyspnea, fatigue and pneumonia[2–4]. C-reactive protein (CRP) is a protein synthesized in the liver as an acute-phase reactant in response to an inflammation; and it plays a significant role in the patho-physiological process of stroke [5]. D-dimer is a small protein fragment produced by fibrinolysis's degradation of the blood clot that might be used to diagnose thrombosis by measuring its concentration [6]. The elevation of circulated D-dimer plasma concentration indicates activation in blood coagulation thrombin formation, particularly in the intra-arterial that is associated with ischemia [7]. There is mounting evidence that in critically ill patients, there are characteristics of hyper inflammation, which consist of elevated serum C-reactive protein (CRP), procalcitonin (PCT), D-dimer, and hyper ferritinemia. These findings suggest a possibly crucial role of a cytokine storm in COVID-19 path physiology [8]. However, a number of patients were observed to present with severe infection on admission with high mortality. Therefore, it is crucial to discriminate accurately among subjects with

COVID-19 who have a high risk of severe infection and guide the use of different therapies at an early stage. Abnormal coagulation function, including elevated D-dimer, has been demonstrated to be more common in deceased patients with COVID-19, and increasing odds of in-hospital death was associated with D-dimer greater than 1 µg/ml [9, 10]

Material and Methods

This study was conducted in Rama Medical College, Hospital & Research Centre, and Kanpur. It is a retrospective study conducted from June 2020 to August 2020 and a suitable statistical was carried out accordingly

Data collection: The data was collected from Microbiology department as well as Medical Record Department of the hospital.

Results

A total of 25 lab confirmed adult Covid-19 patient's data admitted were included. The maximum number of patients belonged to the age group of 51-60 years in which male were 88.88% and females were 11.11. Men were 22 (88%) and women were 3(12%).

Table 1: Age and gender wise distribution

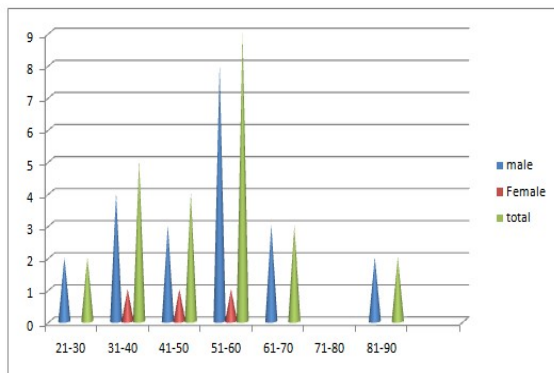
Age	Male	Female	Total
21-30	2	-	2
31-40	4	1	5
41-50	3	1	4
51-60	8	1	9
61-70	3	-	3
71-80	-	-	-
81-90	2	-	2
Total	-	3	25

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In case of CRP 16% patients lie within the normal range, 28% were mildly infected in which all were male, 36% were moderately infected in which 88.88% were male and 11.11% were female and 20% were severely infected in which all were male.

Table 2: Distribution of CRP with Gender

Range (mg/dl)	Male	Female	Total
Less than 10	2	2	4
11-50	7	-	7
51-100	8	1	9
101-150	4	-	4
Total	22	3	25

In case of D-dimer 32% patients were within the normal range, 28% were mildly infected in which all were males and 40% were severely infected in which 90% were male and 10% were female.

Table 3: Distribution of CRP with Gender

Range (ng/ml)	Male	Female	Total
Less than 500	6	2	8
500-2500	7	0	7
2500-5000	9	1	10
Total	22	3	25

Discussion

An elevated serum CRP and D-dimer can be used as laboratory biomarkers for a poor outcome in COVID-19. The cutoff points of elevated CRP (>10mg/dL) and D-dimer (>500 ng/mL) are suggested based on the current evidence, even though higher cutoff values might reflect a poorer outcome. Serum CRP may not only be used as a prognostic marker, but also to monitor disease improvement in COVID-19.

Abnormal coagulation function, including elevated D-dimer, has been demonstrated to be involved

in the disease progression of COVID-19 [11,12]. In this study, we analyzed the association between elevated D-dimer levels and the disease severity of COVID-19. In our retrospective cohort study, the level of D-dimer was markedly increased in patients with severe COVID-19. Elevated levels of D-dimer were also found to be related with higher mortality rate of community-acquired pneumonia [13]. Patients with severe community-acquired pneumonia had significantly higher D-dimer levels, and D-dimer within normal range indicated low risk for complications [14]. Recent studies documenting the laboratory changes of patients with confirmed COVID-19 have noted that elevated D-dimer might be associated with the disease progression of COVID-19. The level of D-dimer in patients with COVID-19 admitted to the ICU was reported significantly increased [15]. Clinical attention to venous thromboembolism risk should particularly be paid to those patients with severe COVID-19, who were often bedridden and presented with abnormal coagulation function [15, 16]. Briefly, our study advocates for the use of CRP and D-Dimer levels at admission and during hospitalization as the severity and prognostic markers. Patients with rising levels of the markers might need higher levels of care and more vigilant monitoring. Compared to CRP, elevated D-Dimer levels (>501 ng/ml) during hospitalization can serve as a more sensitive marker for the severity of COVID-19 infection.

Conclusion

CRP and D-dimer serum levels are prevalent in patients who are positively diagnosed Covid-19. High levels of D-dimer and CRP are associated with a higher risk of severe outcomes of COVID-19, suggesting that they may serve as biomarkers to identify patients at risk of undesirable outcomes. Future studies should look at the suggestion that COVID-19 disease massively increase the level of CRP that could be an excellent candidate to be a biomarker in COVID-19 patients.

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