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Estimation of C–reactive protein levels in COVID-19 patients: A laboratory based observational study

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***Abstract*---**COVID-19 is a health emergency due to its high infectiousness and high case fatality in critically ill patients. The pathological and physiological processes and diagnostic methods of COVID-19 are still in the exploratory stage. Clinical monitoring and appropriate treatment strategies are essential to improve case fatality. Aim of study was to detect the level of C- reactive protein in COVID-19 patients, prospective study was conducted in the Department of Microbiology, blood samples of the patient confirmed as COVID -19 positive patients were processed according to the standard laboratory Procedures. CRP was done by the commercially available kit (Rhelax CRP) based on the principle of latex agglutination. There were 13 males and 8 females within the young age group. They had CRP level 2.7524±3.69427 whereas 36 males and 7 females were in moderate grade of Covid 19 infection having CRP values 8.3140±23.01511 and at old age group had males 20 and females 14 with CRP values 6.5729±16.82460. CRP levels increased with disease progression. Conclusion- Higher levels of CRP indicate more severe disease course-linked to lung injury and worse prognosis.

***Keywords*---**C-reactive protein, COVID-19, observational study.

Introduction

COVID-19 is a new infectious disease, for which there is currently no treatment. It is therefore necessary to explore biomarkers to determine the extent of lung lesions and disease severity. CRP is an important prognostic marker for pneumonia. higher levels of CRP indicate more severe disease course-linked to lung injury and worse prognosis. COVID-19 is a health emergency due to its high infectiousness and high case fatality in critically ill patients [1]. The pathological and physiological processes and diagnostic methods of COVID-19 are still in the exploratory stage. Clinical monitoring and appropriate treatment strategies are essential to improve case fatality [2].

The number of patients with COVID-19 is currently rapidly increasing globally. C-reactive protein (CRP) is an acute phase protein that increases with infectious and inflammatory conditions and is measured routinely in clinical care. In blood, the normal concentration of CRP is less than 10 mg/L; however, it rises rapidly within 6 to 8 hours and gives the highest peak in 48 hours from the disease onset [3]. Its half-life is about 19 hours [4] and its concentration decreases when the inflammatory stages end and the patient is healing. CRP levels are correlated with the level of inflammation. Its concentration level is not affected by factors such as age, sex, and physical condition [5]. CRP levels can activate the complement and enhance phagocytosis, thus clearing the pathogenic microorganisms invading the body. CRP levels can be used for early diagnosis of pneumonia. Patients with severe pneumonia have high CRP levels. It is an important index for the diagnosis and assessment of severe pulmonary infectious diseases. In the early stage of COVID-19, CRP levels could reflect lung lesions and disease severity. Thus it is an important biomarker to assess the prognosis of the Covid 19 infection.

Severe patients with COVID-19 are generally treated in the intensive care unit, while mild or non-severe patients treated in the usual isolation ward of the hospital. However, there is an emerging challenge that a small subset of mild or non-severe COVID-19 patients develops into a severe disease course. Therefore, it is important to early identify and give the treatment of this subset of patients to reduce the disease severity and improve the outcomes of COVID-19.Clinical studies demonstrated that altered levels of some blood markers might be linked with the degree of severity and mortality of patients with COVID-19 [6-7]. Of these clinical parameter, serum C-reactive protein (CRP) has been found as an important marker that changes significantly in severe patients with COVID-19 [8]. Furthermore, it has been observed that patients with low oxygen saturation ($SpO2 \leq 90\%$) had significantly higher levels of CRP (median 76.5 mg/L) compared with patients with high oxygen saturation ($SpO2>90\%$) (Median 12.7mg/L) [9], indicating that more severe patients with lung damage have elevated levels of CRP. So, higher levels of CRP indicate more severe disease course-linked to lung injury and worse prognosis. CRP levels are correlated well with the severity of symptoms of patients with COVID-19; therefore, it may be a suitable marker in assessing a patient's conditions together with other clinical findings. COVID-19 is a new threat for populations [10, 11,]. Early monitoring of key indicators was an important basis to guide treatment strategies, and early assessment of the severity of patients' condition is of great value [12].

Aim and Objectives

To detect the level of C- reactive protein in COVID-19 patients.

Material and Methods

Prospective study was conducted in the department of Microbiology, KIMS Karad. Blood samples of the patient confirmed as COVID -19 positive patients admitted in KH and MRC were subjected for CRP levels assessment. All the blood specimens were processed according to the standard laboratory procedures. CRP was done by the commercially available kit (Rhelax CRP) based on the principle of latex agglutination. CRP levels was analysed in the accompanying group of patients: mild, moderate, severe group.

Statistical analysis -The statistical analysis was performed using the SPSS 20.0 software. Measurement data with normal distribution are expressed as mean ± standard deviation (mean ± SD), and comparisons among the groups were performed using the one-way analysis of variance (Anova). Numeration data was analyzed by chi-square test. Correlation was analyzed by Spearman correlation analysis

Table no 1: Measurement of CRP levels with age and sex

	Sex (MALE/Female)	Age group	CRP
Mild	13/8	25±7	2.7524±3.69427
Moderate	36/7	35±8	8.3140±23.01511
Severe	20/14	48±16	6.5729±16.82460
Mild to Moderate group			
$\chi 2$	−2.292	−1.080	−2.647
P	0.051	0.288	0.007
Moderate to Severe group			
$\chi 2$	-0.931	-0.731	0.693
P	0.539	0.569	0.511

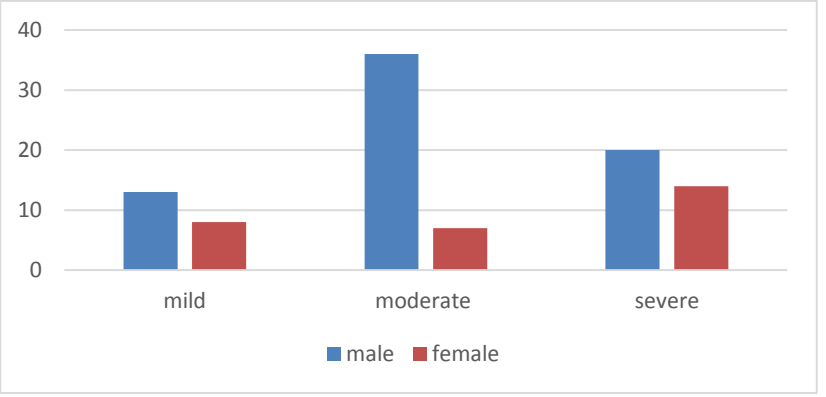

Figure no 1-severity of infections according to gender.

Results and Discussion

Table no 1 shows that there were 13 males and 8 females within the young age group. They had CRP level 2.7524±3.69427 whereas 36 males and 7 females were in moderate grade of Covid 19 infection having CRP values 8.3140±23.01511.and at old age group had males 20 and females 14 with CRP values 6.5729±16.82460. CRP levels increased with disease progression.

Immunologically, CRP and IL-6 are firmly entwined. IL-6 is known to prompt quality articulation and arrival of CRP from the liver [13,14]. and furthermore from insusceptible cells. [15]. A practical association has been displayed in various preliminaries utilizing IL-6 restraint, in which CRP levels quickly standardized in the wake of obstructing of IL-6. [16]. In similarity, we found that IL-6 levels anticipated respiratory disappointment altogether sooner than CRP levels, which is fundamental for a prescient marker. In spite of the fact that hindrance of provocative pathways addresses a promising way to deal with treat hyperinflammatory patients with COVID-19, restraint of IL-6 could be inconvenient in the insusceptible reaction to infection prompted pneumonias. [17,18]. CRP levels are connected with the degree of irritation, and its focus level isn't impacted by elements like age, sex, and state of being [11]. CRP levels can initiate the supplement and upgrade phagocytosis, thus clearing the pathogenic micro-organisms attacking the body. CRP levels can be utilized for early analysis of pneumonia [19], and patients with serious pneumonia had high CRP levels. It is a significant list for the finding and appraisal of serious aspiratory irresistible infections [20]. Matsumoto's concentrate additionally showed the worth of CRP levels in extreme pneumonia [21].

Conclusions

COVID-19 is a new infectious disease, for which there is currently no treatment. It is therefore necessary to explore biomarkers to determine the extent of lung lesions and disease severity. CRP is an important prognostic marker for pneumonia. Higher levels of CRP indicate more severe disease course-linked to lung injury and worse prognosis.

Ethical approval
This study was approved by the institutional ethics committee.

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Disclosure of interest The author declares that he has no competing interest.

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