

## Profile of Inflammatory markers in Covid-19 patients

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### ABSTRACT:

**Background:-** COVID-19 being now a global pandemic with millions of confirmed cases worldwide, with numbers still rising.<sup>1</sup>Most cases are asymptomatic or mild in severity at presentation although a substantial percentage of patients developing severe illness requiring medical care at hospital level. Early identification of the patients of covid-19 who are at risk of critical illness is a challenging endeavor. The present study aimed to establish routine laboratory markers in combination with clinical information, may allow in identifying such high risk patients.

**Materials and methods:-**We performed a cross sectional observational study among 86 patients who were admitted with the diagnosis of covid-19 through RT-PCR to GHCCD, Visakhapatnam from September 2020 to October 2020. Data regarding symptoms of presentation, comorbidities, vitals, trop-I, serum LDH, ferritin, IL-6, CRP, D-Dimer collected.

**Results:** Among 86 covid-19 patients, 48 (55.81%) were males and 38 (44.18%) were females. The predominant age group was between 51 to 60 years. Fever (58.13%) was the most common symptom followed by cough (55.81%) while asymptomatic constituted 9.3%. Among all, no cases of HIV were found indicating the role of immunosuppression against cytokine storm. CRP was the most sensitive marker overall.

**Conclusion:** CRP and D-Dimer in severe cases and CRP in moderate cases can help to discern patients based on severity and to stratify them for early ICU transfer. Immunological and inflammatory markers suggested aberrant activation of CD8+T cells in severe covid-19 that may play a role in pathogenesis of disease. Early recognition of severity is much more crucial in reducing the life threatening complications.

**Keywords:** RT-PCR, Trop-I, CRP, LDH, Ferritin, D-dimer

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### I. Introduction

Covid-19 is potentially fatal infection caused by novel corona virus 2 (SARS-COV-2), that was detected in December 2019 in Wuhan, China<sup>2</sup>. Pulmonary disease can rapidly progress to severe illness with extensive lung disease leads to fatal outcomes. Higher mortality rates occur in the elderly age group and in individuals with comorbidities. Inflammatory and immune responses of the individual are crucial in eliminating the infection, but may have a remarkable impact on SARS-COV-2 pathogenesis and clinical manifestation of disease<sup>6</sup>. CRP, D-DIMER and FERRITIN have been described as hyperinflammatory state and disease severity markers early in pandemic.<sup>3,4</sup>

In this study, we performed a cross-sectional observational study of inflammatory in 86 COVID-19 Patients (50 with mild disease, 20 moderate disease and 16 patients with severe disease). We found that COVID-19 patients in severe group being characterized by profound lymphopenia. Inflammatory markers are a disparate set of biomarkers that are used for presence/absence of inflammatory disease process and to monitor the activity of disease process and these inflammatory markers tend to get elevated by many diseases including infections, auto immune conditions and cancers<sup>5</sup>.

### II. Materials And Methods

**Study design:** Cross sectional observational study

**Study setting:** Government Hospital for Chest and Communicable Diseases, Visakhapatnam

**Study period:** September 2020 to October 2020.

**Sample size:** 86 Patients

**Procedure methodology:** After obtaining informed written consent, demographic details, history of presenting illness, comorbidities, vitals, complete blood picture, inflammatory markers were collected from all patients and

analyzed. In addition, outcomes of disease like duration of hospital stay, need of ICU monitoring , NIV requirement and mortality data were acquired.

**Statistical analysis:** Data analyzed using Microsoft EXCEL Sheet.

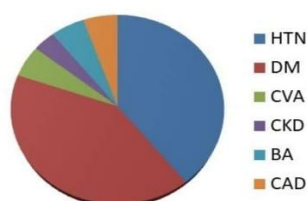
### III. Results

**Age and gender distribution:-** Out of the total 86 number of patients,48 were males and 38 were females.

Age group(years)	Males(number &percentage)	Females(number & percentage)	Total(number& percentage)
21-30	4 (66.6%)	2(33.3%)	6(6.97%)
31-40	6(50%)	6(50%)	12(13.95%)
41-50	14(87.5%)	2(12.5%)	16(18.60%)
51-60	12(42.85%)	16(57.14%)	28(32.55%)
61-70	10(50%)	10(50%)	20(23.25%)
71-80	2 (50%)	2(50%)	4(4.65%)

**Comorbidities:** only 26 patients were without comorbidities and diabetes ,the predominant comorbidity in present study.

COMORBIDITIES PERCENTAGE



Details of Comorbidities	Number and percentage of patients
Hypertension	44(51.16%)
Diabetes mellitus	46(53.48%)
Cerebrovascular accident	6(6.97%)
Chronic kidney disease	4(4.65%)
Bronchial asthma	4(4.65%)
Coronary artery disease	6(6.97%)
Hypothyroidism	4(4.65%)
No comorbidities	26(30.23%)

**Symptomatology:** Asymptomatic constituted 9.3% of total patients. Fever being the most common symptom followed by cough.

Distribution of symptoms	Number and percentage
Fever	50(58.13%)
Cough	48(55.81%)
Shortness of breath	38(44.18%)
Cold	12(13.95%)
Sorethroat	10(11.62%)
Headache	6 (6.93%)
Body pains/fatigue	20(23.28%)
Other complaints	4(9.3%)

Tachycardia observed in 52 (60.4%) patients while bradycardia in only 2 patients(2.3%).

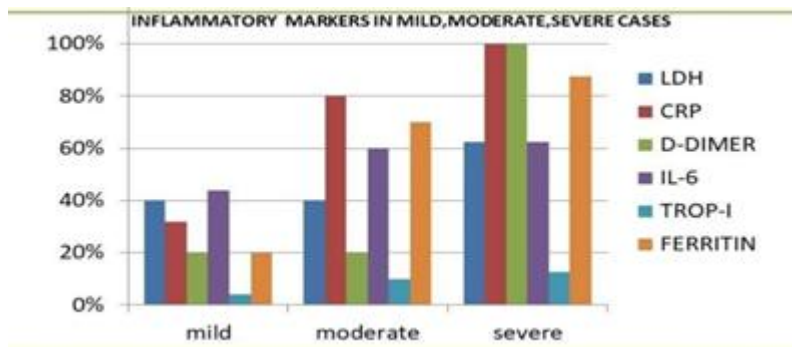
Covid-19 patients were divided into mild ,moderate and severe category based on their oxygen saturation and respiratory rate.

MILD	MODERATE	SEVERE
50 cases(58.13%)	20 cases(23.25%)	16 cases(18.62%)

**ELEVATED INFLAMMATORY MARKERS IN COVID-19 PATIENTS:** Serum LDH, Interleukin -6, C Reactive Protein, Ferritin, trop-I, D-dimer were observed as follows:

Elevated inflammatory markers	Number of patients	Percentage
Serum LDH	40	46.51%
Interleukin-6	44	51.16%
CRP	48	55.81%

Ferritin	38	44.18%
Trop-I	6	6.97%
D-dimer	30	34.88%



C-Reactive Protein ,being the most sensitive of all markers ,elevated in 55.81% patients followed by Interleukin-6(51.16%).Serum LDH elevated in 46.51% patients and serum ferritin elevated in 44.18% patients.D-dimer elevated only in 34.88% patients while Trop-I being the least sensitive got elevated only in 6.97% patients.

CRP and D-Dimer raised in all severe cases, being the most sensitive markers. CRP had 80% sensitivity in moderate cases while IL-6 has sensitivity of 44% in mild cases. Among all,Trop-I has a less significance in all categories of disease.

Inflammatory markers	Mild cases(50)	Moderate cases(20)	Severe cases(16)
LDH	20(40%)	8(40%)	12(75%)
CRP	16(32%)	16(80%)	16(100%)
D-dimer	10(20%)	4(20%)	16(100%)
Il-6	22(44%)	12(60%)	10(62.5%)
Trop-I	2(4%)	2(10%)	2(12.5%)
Ferritin	10(20%)	14(70%)	14(87.5%)

**Outcomes:-**

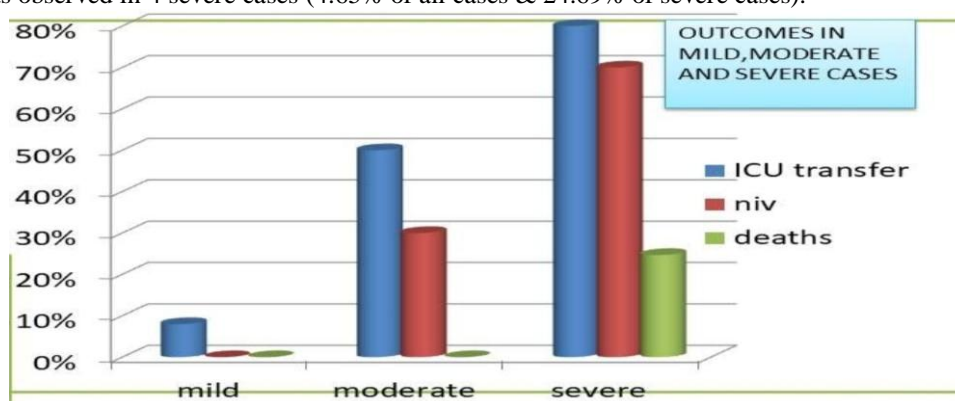
Out of 20 moderate cases,6(30%)patients were shifted to ICU and 14(87.5%) patients out of 16 severe cases needed ICU monitoring.

**Need of NIV requirement** was for 3 (15%) patients of moderate severity and 7(87.5%) patients of severe category.

**Duration of hospital stay:**

Category of disease	Mild	Moderate	Severe
Duration of hospital stay	8 days	11 days	18 days

**Mortality** was observed in 4 severe cases (4.65% of all cases & 24.69% of severe cases).



**IV. Discussion**

Covid-19 disease trend can be monitored by inflammatory markers that can represent the progression of disease activity in body. Identifying the most sensitive and cost effective inflammatory marker that can predict the severity and mortality of disease is the need of the hour in developing countries especially in

countries like India. CRP and D-Dimer in severe cases and CRP in moderate severity can help to discern patients based on severity and to stratify them for early ICU transfer.

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