European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 09, Issue 06, 2022

Title-" A cross-sectional observational Study to assess the severity of coronavirus disease 2019 according to Clinical value of immune inflammatory markers"

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Title-" A cross-sectional observational Study to assess the severity of coronavirus disease 2019 according to Clinical value of immune inflammatory markers"

Background: In Wuhan, China, since December 2019, a new strain of pneumonia has appeared and spread quickly over the world. The World Health Organization determined that a separate strain of coronavirus, designated COVID-19, caused this pneumonia (WHO). This unique coronavirus was identified as acute respiratory syndrome coronavirus 2 based on phylogeny, taxonomy, and accepted practise (SARS-COV2).

Objective: a cross-sectional observational study to show the co-relation between inflammatory markers and the severity of disease

Materials and Methods: a total of 250 patients were selected who are microbiologically covid positive and ready to give consent were included in the study. There basic test will be done.

Result- There is preponderance of male gender among the patients 147 were male 103 were female. The mean age of participant is 43 ±2.825 (±6.57%)65 patient were immediately required the either oxygen or mechanical ventilation,among all this 26 patient were died. Among this entire 65 patient, 21 patients have raise CRP level,14 have raised IL -6 Level among them all 26 were have raised D-Dimer .

Conclusion- Our study showed that high level of D-Dimer, IL-6 and CRP was independent risk factors for assessing the severity of COVID-19. IL-6 played a determiningrole in the severity of SARS-COV2 and had a potential value for monitoring the process of severe cases.

KEY WORDS- COVID-19, Inflammatory Markers, Severity,Outcome.

Introduction- A pneumonia epidemic from China has been sweeping the globe since December 2019]1, 2]. The World Health Organization designated this pneumonia as coronavirus illness 2019 (COVID-19) after concluding that it was caused by a specific coronavirus variant (WHO). The Coronavirus Study Group (CSG) designated this unique coronavirus variation as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) based on speciation, categorization, and set up procedure [3]. Similar to the two previous deadly coronaviruses, the coronavirus responsible for severe acute respiratory syndrome (SARS-CoV) Introduction: A pneumonia outbreak from China started in December 2019 and soon spread to the rest of the world [1, 2]. With the assistance of the World Health Organization, the coronavirus illness 2019 (COVID-19) was identified as the coronavirus that caused this pneumonia and was confirmed to be a unique version of that virus (WHO). The extreme acute respiratory syndrome corona virus two (SARS-CoV-2) was designated by the Coronavirus Study Group (CSG) based on speciation, categorization, and set up procedure [3]. Similar to the previous two pathogenic coronaviruses that were prevalent in the first decade of this century, Middle East respiratory syndrome coronavirus (MERS-CoV) and severe acute respiratory syndrome coronavirus (SARS-CoV), SARS-CoV-2 is likely to have originated from bats [5], is capable of being transmitted from person to person [6], can cause pneumonia and other respiratory diseases [7], and has a glass appearance on imaging [8]. The existence and health of humans are now threatened by COVID-19. 509299 persons have been infected with SARS-CoV-2 as of March 27, 2020, with 23338 cases of fatality [9]. Even while the majority of COVID-19 patients only experience minor symptoms, those who experience severe symptoms run the risk of developing multiple organ dysfunction (MOD), acute respiratory distress syndrome (ARDS), and even death [10]. Therefore, determining the most likely causes of COVID-19's severity is crucial for slowing or stopping the spread of the illness. Numerous studies have shown that patients with advanced age and co-morbidity are more likely to have a severe illness [11,12], and cytokine storms and rogue immune-inflammatory responses may also play a role in the evolution of the illness[13]. In order to compare the clinical characteristics, immune-inflammatory markers, and cytokines between the severe and non-severe groups, research was conducted.

Materials and Methods- This cross-sectional study involved 250 consecutively admitted patients at a tertiary care hospital in central India. All patients were identified in accordance with the diagnosis and care recommendations made by the MoHFW India and the WHO. All confirmed instances who were prepared to provide written authorization were sought out. Depending on the severity of the symptoms, patients were classified as mild, moderate, severe, or critical. Patients with severe conditions must fit at least one of the following criteria: First, breathlessness with a respiratory rate (RR) greater than 30 times per minute. Second, at rest, oxygen saturation was 93%. Microsoft Excel and a free online resource were used for the statistical analysis.

Result - A total of 250 affected people participated in the study, of whom 65 fell into the severe category and 185 into the non-severe category based on our criteria. Both the study's general population and the severe group were disproportionately male, with 185 patients falling into the non-severe category. The average age of all patients was 43 2.8; in the severe (S) group, it was higher at 51 5.8; in the non-severe (NS) group, it was lower at 40 3.0. The average BMI for all patients was 24 3.53; in the S-group, it was higher at 26 5.63. Anorexia is

the most prevalent symptom in 94% of cases, followed by headaches in 88.4% of cases, bitter/loss of taste in 87.2%, fatigue in 86% of cases, sore throats in 80.4% of cases, dizziness and nighttime sweating in 79.2% of cases, anxiety in 78.4% of cases, cough in 77.6% of cases, and dyspnea in 71.2% of cases. Myalgia symptoms are present in 66.4% of cases with fever. Other digestive-related symptoms are significantly less frequently noticed.

D-Dimer and other immune-inflammatory markers were found in the NS-Group (366.2162–33.583) and S-Group (629.507–177.167) groups. The mean C-reactive protein among NS-Group 16.0445 4.747 and S-Group 60.2797 23.546, the observed p value of.001, and the mean value of Interleukin-6 (pg/ml) and the observed p value of.001 S-Group 97.6515 96.032 and NS-Group 17.6792 27.08 The observed p value is.005. 39 patients from a total of 65 patients in the S-Group were released. While 26 sad patients passed away following therapy, 21 had higher CRP levels, 14 had higher IL-6 levels, and all 26 had higher D-Dimer levels. The NS group doesn't experience any mortality.

Table 1

Demographic and clinical characteristics in patients with COVID-19

Variables		**All patients(n=250)**		**Non-severe group(n=185)**		**Severe group (n=65)**	
Gender	**Male**	**147**		**106**		**41**	
	Female	**103**		**79**		**24**	
Age (years)		**43 ±2.8**		**40.02 ±3.0**		**51.47 ±5.8**	
Body mass index		**24.01±3.53**		**23.71±3.04**		**26.04±5.63**	
		No.	**Percentage**	**No.**	**Percentage**	**No.**	**Percentage**
Symptomps	**Fever**	170	68	105	56.75	65	100
	Rhinorrhea	143	57.2	100	54.05	43	66.15
	Nasal congestion	107	42.8	85	45.94	22	33.84
	Sorethroat	201	80.4	149	80.54	52	80
	Headache	221	88.4	164	88.64	57	87.69
	Dizziness	198	79.2	130	70.27	58	89.23
	Chill	103	41.2	73	39.45	30	46.15
	Drymouth	101	40.4	60	32.43	41	63.07
	Bittertaste/loss of taste	218	87.2	175	94.59	43	66.15
	Fatigue	215	86	173	93.51	42	64.61
	Anorexia	235	94	175	94.59	60	92.30

	Nightsweat	198	79.2	145	78.37	53	81.53
	Myalgia	166	66.4	124	67.02	42	64.61
	Chestpain	70	28	29	15.67	41	63.07
	Chestdistress	60	24	32	17.29	28	43.07
	Shortnesof breath	160	64	97	52.43	63	96.92
	Cough	194	77.6	141	76.21	53	81.53
	Expectoration	63	25.2	41	22.16	22	33.84
	Nausea	87	34.8	63	34.05	24	36.92
	Diarrhea	30	12	18	9.72	12	18.46
	Abdominalpain	44	17.6	39	21.08	5	7.69
	Anxiety	196	78.4	148	80	48	73.84
	Deliriu m	5	2	1	0.54	4	6.15

Table 2

Immune-inflammatory parameters

Variables	**Allpatients(n=250)**	**Non-severegroup(n=185)**	**Severegroup(n=65)**	***P*value**
D-Dimer	427.664 ±50.206	366.2162 ±33.583	629.1071 ±177.167	<0.001
C-reactiveprotein (mg/L)	27.5456 ±7.734	16.0445 ±4.747	60.2797 ±23.546	<0.001
Interleukin-6 (pg/ml)	38.472 ±32.521	17.6792 ±27.08	97.6515 ±96.032	0.005

Discussion- In the current study, 65 patients in the severe category had their data analysed, and 26 (or 40%) of those individuals died. According to a research by Chilimuri et al. in New York, 43% of COVID 19 patients died, which is comparable. [14]. In the current investigation, the mean age of patients in the severe group (51.47 5.8 years) was significantly greater than that of the non-severe group (40.02 3.0). which is analogous to a study by Mahase et al. that found a significantly higher risk of mortality in older people than in younger people. [15] Yang et al. also noted a statistically significant difference in mean age between the severe (64, 6, 11, 2) and non-severe (51, 9, 12, 9). [16]. The primary

pathophysiology of severe ARDS is COVID 19 infection, and elderly adults are at a significant risk of having ARDS. [17] According to the literature, older people who contract SARS-CoV show stronger immune responses than do younger persons.

As a result, this immune response increased the differential expression of genes associated with inflammation and decreased the expression of type I interferon beta, which had previously been suppressed. [18] Additionally, the age-related alterations in T-cell and B-cell activity as well as the excess production of type 2 cytokines may be linked to a lack of control over virus replication and prolonged pro-inflammatory responses, which may have unfavourable consequences. [19] In our study, only the severe group experienced mortality, which can be attributed to severe lung tissue damage that occurs before patients experience dyspnea or low spo2 levels and increases their risk of developing ARDS and dying.

Du RH et al. found that the presence of dyspnea, weariness, and sputum production was substantially linked with an elevated risk of mortality in COVID 19. These findings are similar to those of our study. [20] In our investigation, the severity group's mortality was determined to be 40%, and inflammatory markers like IL6,CRP, and D-Dimer had been markedly elevated. According to earlier research, the severity of COVID-19 is caused by an extreme and abnormal host immunological response. [13] In a subsequent analysis by Liu et al. [21] of Channappanavar and Perlman's study from the year 2017[22], it was shown that cytokine storm may be a factor in the negative effects seen after SARS-COV-2 infection [23]. Due to its pleiotropic nature, Gupta et al. also contend that IL-6 plays a crucial role in cytokine storm [24]. In a study by Chilimuri et al., the levels of D dimer, C reactive protein, and ferritin were substantially related to mortality. [14] Increased D-dimer levels in COVID 19 instances indicate a change in the coagulation cascade, which may also contribute to the emergence of extremely severe microembolic illness. When COVID 19 patients were autopsied, microembolic thrombi were found in the blood arteries of the lung and other vital organs, indicating that the coagulation system was activated in these patients. [25] In their study, Matsumoto et al. also found that the severity of COVID disease was significantly correlated with CRP levels, i.e., the size of lung lesions and severity of the disease. [26]

Conclusion- Our findings showed that high levels of the cytokines IL-6 and CRP in the peripheral blood were independent risk factors for determining the severity of COVID-19. The severity of COVID-19 was greatly influenced by IL-6, and it may be useful to track the progression of severe cases. It serves as a reminder to underline the role of the cytokine storm in the development of COVID-19 and the possibility of using IL-6 blocking therapy to treat patients with severe disease.

Funding: None

Conflict of interest: None declared

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