



Microbiological and Immunological Studies on COVID-19 Patients

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Abstract: The coronavirus disease-2019 (COVID-19) epidemic has triggered a worldwide epidemic. Critical breathing pain disease (ARDS) and multiorgan failure are two of the most common reasons of passing in COVID-19-infected disapprovingly sick patients. The increased seditious cytokines propose that a cytokines storm, also known as cytokine release syndromes (CRS), may be complicated in COVID-19 pathogenesis. However, the effectiveness of corticosteroids, which are routinely used anti-inflammatory drugs, in treating COVID-19-induced CRS is debatable. Novel treatments for COVID-19-induced CRS are desperately needed. we describe the pathophysiology of SARS-induced CRS, compare COVID-19 CRS to SARS and Middle East living sickness (MERS), and review current CRS therapeutics. We propose using interleukin-6 (IL-6) inhibition to treat COVID-19-induced CRS.

keywords: Microbiological, Immunological, Study On Covid-19 patients

1.Introduction

The World Health Organization (WHO) has confidential Coronavirus Disease 2019 (COVID-19), which is triggered by infection with the spartan severe breathing syndrome coronavirus 2 (SARS-CoV-2), as a community health spare of universal implication. [1–3]. As of April 12, 2020, the WHO had received reports of over 1 600 000 cases of COVID-19 worldwide, with over 99 000 deaths [4–6]. The clinical symptoms of the two disorders, however, are distinct. COVID-19 patients may experience mild, moderate, or severe symptoms after infection. Asymptomatic patients with modest illnesses are possible.. Some patients, on the other hand, may suffer severe pneumonia, acute respiratory distress syndrome, or multiorgan failure. [7-10] SARS-CoV-2 infection is also related to an provocative cytokine storm in critically ill patients [11, 12], which is distinct by higher plasma attentions of interleukin 6. (IL-6). IL-6

levels in the severe group were greater than those in the moderate group in several recent COVID-19 clinical investigations. [11, 13–15] IL-6 may be useful as a biomarker for determining the severity of a disease. However, it is still unclear how to objectively connect IL-6 levels with severely ill individuals. to diagnose COVID-19 patients.. In 15% of COVID-19 patients, serum SARS-CoV-2 viral RNA (dubbed RNA emitted by the authors in a previous study) was identified. [8]

2. Materials and methods

Collection of Blood Sample

90 blood samples of adult COVID 19 patients were random, selected from MUHI. Blood samples was divided into three groups. moderate, severe, and critical. for people with moderate COVID 19 infection, this group included a total of 30 people with oxygen ratio <90% and did not need assisted ventilation, people with severe COVID 19 infection, this group included a total

of 30 people with oxygen ratio >90% and needed mask reservoir and/or high flow nasal cannula intake, people with critical COVID 19 infection, this group included a total of 30 people with oxygen ratio >90% and needed invasive

mechanical ventilation, The sera were divided into three aliquots in Eppendorf tubes to test IL-6. The sera were stored in a deep freezer (- 20 °C).

Table (1): Hematological findings of studied Covid 19 patients

CBCAnalysis	Moderate (n=18)	Severe (n=52)	Critically ill patients(n=17)	PValue
WBC count Median(min-max)	10.04.6-22.9	10.02.7-29.8	9.91.3-17.4	0.8
Lymphocyte countMedian(min-max)	1.050.2-4.4	1.170.1-3.2	0.760.2-3.6	0.1
#Lymphocyte percentage Median(min-max)	8.000.3-50.3	12.10.06-48.1	10.12.3-36.6	0.3
#Neutrophil %Mean(s)	76.7(14.06)	78.3(10.1)	81.03(12.2)	0.5
HemoglobinMean(s)	10.5(2.7)	11.3(2.4)	11.1(1.3)	0.5
#Platelet countMedian(min-max)	221.0113.0-375.0	199.575-570	237.560.0-351.0	0.9

Detection of interleukin 6 in the sample

After the blood samples were collected in a test tube and after almost half an hour, the serum was separated by a centrifuge, then the serum was withdrawn by a pipette and stored in an Eppendorf tube in the refrigerator freezer. After all samples were collected, immunological tests were performed on all blood samples using the ELISA device in the immunology laboratory In the Immunology and Microbiology Unit at the Faculty of Medicine, Mansoura University.

Results

Blood samples collection and laboratory investigations

Average white blood cell and lymphocytic count were least in critically ill patients. However, platelets count and neutrophil percentage were higher in critically ill patients. In general, there was no statistically significant difference between hematological findings in different groups ($p>0.05$) **Table 1**

Detection of Immunological marker (interleukin 6)

Out of the 90 patients (female and male) with covid-19, Patients was categorized according to the highest severity of respiratory. the study population included that most of the cases were severe cases (61.9%) followed by moderate (19.5%) and critically ill cases (18.5%) **figure 1**

Discussion

COVID-19 is a disease with a extensive variety of symptoms, from asymptomatic to multiorgan failure. Both inflammation and

Autoimmunity have been reported as Contributing factors in its pathogenesis [17] Viral infections cause effects on the immune system and inspecting the etiopathogenesis of viral infection-induced mutilation short and enduring safe coordination effects and revisions after SARS-CoV-2 infection [18] The raised incendiary cytokines recommend that a cytokine squall, also identified as cytokine announcement syndrome (CRS), may drama a chief role in the pathology of COVID-19 [19] In the present study, the level of cytokine in COVID-19 patients with dissimilar harshness. 90. COVID-19 patients were alienated into three groups: moderate, severe, and critical, the serum concentration of IL-6 analyzed showed that the median IL16 level was higher in moderate Covid 19 than in severe and critical critically ill cases. This was higher than that reported in other studies [20] Within However, baseline interleukin-6(IL-6) was significantly increased in severe type [21] In this study, showed that the median IL16 level was higher in moderate Covid 19 than in severe and critically ill cases, this result is in agreement with [22] .

In the present study, Average white blood cell and lymphocytic count were the least in critically ill patients. However, platelets count & neutrophil percentage were higher in critically ill patients, and lower [23]

Patients with plain and mortal diseases had meaningfully improved white blood cell (WBC) count, and diminished lymphocyte and platelet counts compared to non-severe disease and

stickers' hematological results in diverse groups ($p>0.05$). This result is great there were numerous significant changes among severe patients and non-severe patients, counting higher leukocyte and neutrophil, lower lymphocyte eosinophils, monocytes, PLT, and hemoglobin [24]. Average white blood cell and lymphocytic count were least in critically ill patients. However, platelet count & neutrophil percentage were higher in critically ill patients. This is comparable with the study of [25] patients who had neutrophils above the normal range. Lymphocytes and hemoglobin were below the normal range in many patients, Platelets were below the normal range, in this study, the platelets count percentage was higher in critically ill patients with severe (20 [14%] of 145) or moderate (nine [6%] of 149) disease [26]. In this study, platelets count percentage was higher in critically unfriendly patients. the lymphocytic count was least in disapprovingly ill patients This result is in agreement with platelet count in patients with the dangerous disease (42 [49%] of 86) was meaningfully advanced than in those with severe or moderate diseases.

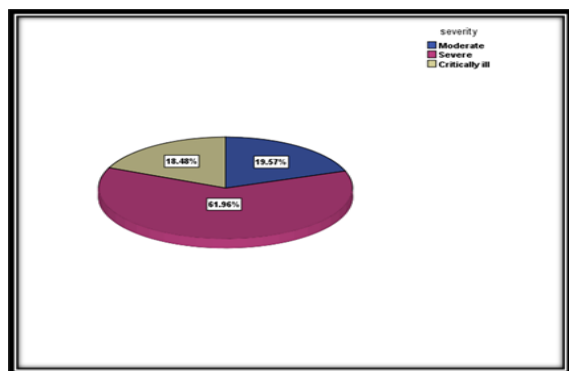


Fig (1): Distribution of study patients according to the severity

showed that the median IL16 level was higher in moderate Covid 19 than in severe and critically ill cases **Table 2. Figure 2**

Table (2): Immunological marker of studied Covid 19 patients

	Moderate (n=17)	Severe (n=45)	Critical (n=14)	P Value
	Median	Median	Median	
IL -6	78.5 20.7-185.8	45.7 18.9-377.2	34.4 18.4-156.2	0.2

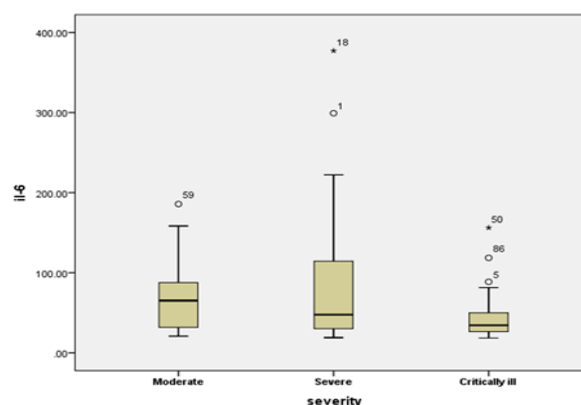


Fig (2): Box plot graph for IL6 levels among studied covid-19 patients

4. Conclusions

In this methodical appraisal and meta-analysis, we validate that serum levels of IL-6 are knowingly higher in the situation of intricate Covid-19 disease, and bigger IL-6 levels are in try pointedly connected with hostile clinical consequences [27] The decision of this training is that provisions the basic for lasting exact medical studies to elucidate the character of immune-modulation, clearly via IL-6 embarrassment, in the therapy of severe Covid-19

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