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Variation of certain immunological parameters in recovered COVID-19 patients

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ABSTRACT

Covid-19 was a pandemic infection all over the world. 200 subjects were included in the present study, 150 of them were recovered covid19 patients and the other 50 were a healthy control. The aim was to evaluate some immunological parameters (IL-6, IL24, CD4, and CD8) using the CUSBIO protocol for procedures. The study included 200 subjects, 150 recovered patients, and 50 healthy controls at age range (15-65 years), were conducted in Baghdad teaching hospital/ Baghdad- Iraq from July to September 2021, all patients had recovered from covid19. The following parameter was evaluated using a different protocol (IL6, IL24, CD2, CD8), IL6 and IL24 were measured, and also CD4 and CD8 were measured by the method obtained with CUSBIO. The results revealed an increased level of both IL-6 and IL-24 in recovered patients in comparison with healthy control. Although the CD8 showed increasing in recovered patients compared with healthy control, there is no sign of CD4 of both recovered patients and healthy control. We conclude that the attack by COVID-19 leads to abnormal changes in immunological parameters. The recovered COVID19 patients have had a specific variation in the level of some immunological parameter that may reflect affect some origin in the blood.

1. INTRODUCTION

At the end of 2019, a series of pneumonia cases of unknown cause emerged in Wuhan China [1], On January 30, 2020, the World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern (PHEIC) and on March 11, 2020, it was declared to be a pandemic [1]. Generally, the COVID-19 is less severe and less fatal than the SARS, however, some patients, especially those who are elderly with co-morbidities are prone to develop more severe symptoms and require emergent medical interventions [2].

Most people don't require special treatment when infected with COVID-19. However, people with underlying medical problems develop serious illnesses such as diabetes, chronic respiratory disease, and cardiovascular disease [3]. Today most reporting focuses on the actual cases of infection, recovery, and death, which mainly

lead to taking action such as lockdown the city with many infections [4].

Some pro-inflammatory markers such as Interleukin 6 (IL-6) is the center point of the current COVID-19 pandemic [5]. Interleukin IL-24 functions as a cytokine and plays a role in autoimmune and infectious diseases and wound healing [6]. CD4T and CD8T play a vital role in maintaining immune function and viral clearance in the body, As Wang et al. reported, after 1 week of COVID-19 treatment, CD8+T counts increased only in patients with attenuated symptoms or improved radiological abnormalities, while no similar change of CD4+T counts was found [7].

The current study was based on the investigation of Immunological biomarkers (IL6, IL24, CD4, and CD8). Its measurement and concentrations in the clinical sample serum by the ELISA method.

2. Patients and Methods

The study included 200 subjects, 150 recovered patients, and 50 healthy controls at age range (15-65 years), were conducted in Baghdad teaching hospital/ Baghdad- Iraq from July to September 2021, all patients had recovered from covid19.

About 5 ml of blood were withdrawn from all the subjects and the serum was obtained. The following parameter was evaluated using a different protocol (IL6, IL24, CD2, CD8), IL6 and IL24 were measured and also CD4 and CD8 were measured by the method obtained with CUSBIO.

2.1 Statistical analysis

Statistical analysis was done according to percentages to compare between samples using SPSS V.25 computer software.

3. Results and Discussion

The 200 samples were included in the present study, 150 recovered COVID19 patients and other 50 a healthy control.

The result in figure (1) revealed a high significance difference (P=0.0001) in comparison between recovered patients and healthy control.

As we show in figure (1), the IL6 of recovered patients (23.12%) in comparison with healthy control (7. 56%)

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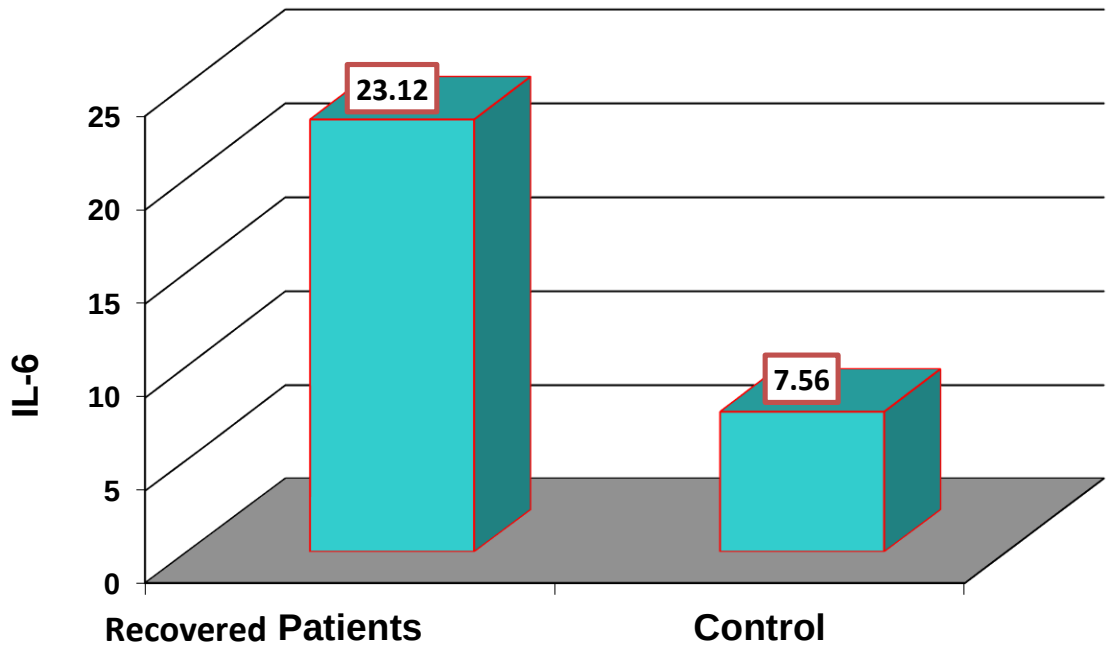

Figure (1): Comparison between patients and control in IL-6

One of the hallmarks of COVID-19 is an imbalanced immune response including pro-inflammatory cytokines like interleukin (IL)-6 IL-6 could serve as a predictive marker for the severity of COVID-19, (IL)-6 key cytokine located upstream of the inflammatory [1], IL-6 appears to be the most important driver of immune dysregulation, so the evidence has shown that IL-6 levels in COVID-19 patients needing critical care continues to increase over time and are relatively more elevated in non-survivors than in survivors [8], [9].

In relation to the different types of coronavirus, elevated IL-6 levels have been observed in SARS cases and related to the severity of symptom [10] and in SARS-CoV-2, being implicated in possible T-cell dysfunctionality. It has been observed that SARS-CoV-2 induced cytokines may damage the capacity of T cells in relation to dendritic cells, compromising the viability of these cells and macrophages to eliminate the pathogen, similar observations have been made in relation to MERS [11].

On the other hand the IL24, The result in figure (2) revealed a high significance difference (P=0.0001) between recovered patients and healthy control.

As we show in figure (2), the IL24 of recovered patients (335.12) in comparison with healthy control (215.54)

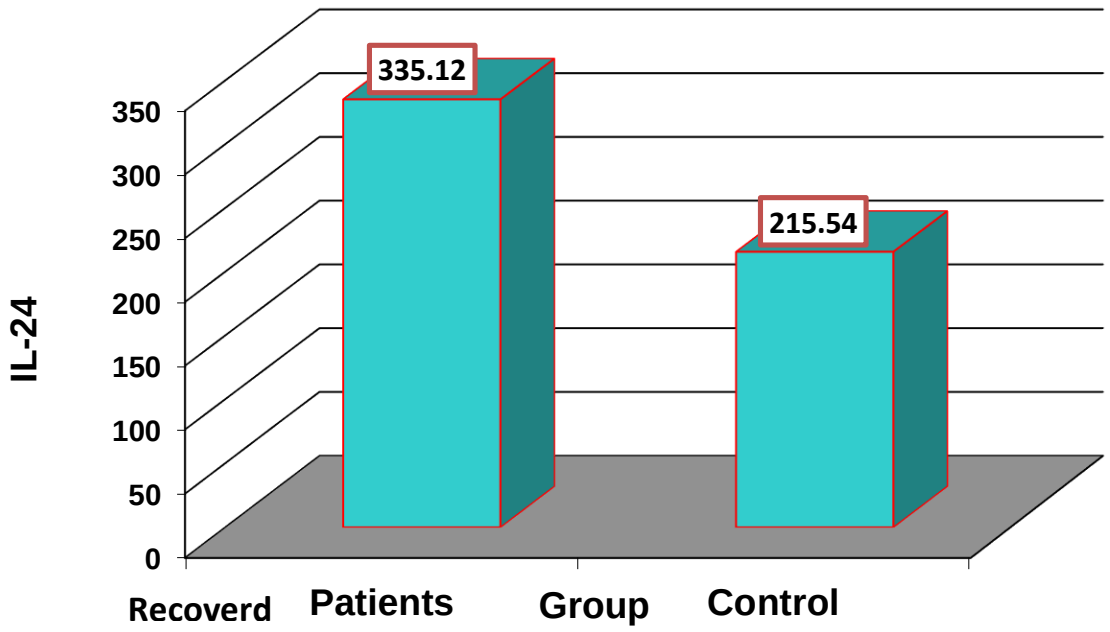

Figure (2): Comparison between patients and control in IL-24

Senescence of the immune system in the elderly has been termed "inflammaging", which refers to increased levels of tissue and circulating pro-inflammatory cytokines in the absence of an immunological threat [12].

The compositional changes of immune cells in recovery status may be associate with age [13].

Il-24 mechanisms of immune dysregulation, strong up regulation of IL-24 in lungs post-infection, human lung epithelial cells induce IL-24 production [14].

SARS-CoV-2 RNA is present in diverse epithelial and immune cells, Interleukin (IL)-24 is a member of the IL-20 family of cytokines and is produced by various types of cells such as CD4 T cells [15], Which reflect increase IL-24.

IL-24 plays an essential role in the pathogenesis of pro-inflammatory autoimmune disorders involved in the pathogenesis of allergic lung because IL-24 produce from bronchial epithelial cells [15].

The CD4 the result in the figure (3) revealed non highly significance (P=0.154) recovered patients as healthy control.

As we shown in the figure (3), the CD4 of recovered patients (3.35) in compare with healthy control (2.975)

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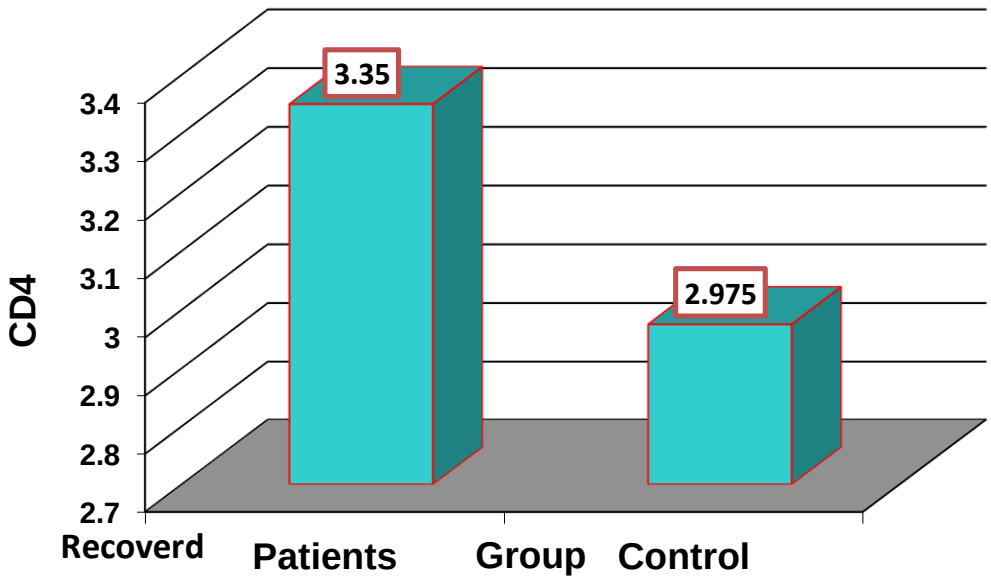

Figure (3): Comparison between patients and control in CD4

CD4 cells were markedly higher in COVID-19 recovered patients who increased after stimulation with one or more of the viral antigens, Immune activation can linger after recovery, and evidence of prolonged inflammation was found dynamic changes of lymphocytes. CD4-activated T-cells remaining high at 6-9 months recovered COVID-19 may be a response to high circulating IL-6 or other promoters of T-cell activation [16- 18].

Treatment with COVID-19 proposed increased the total number of lymphocytes significantly [19]. The CD8 the result in the figure (4) revealed highly significance (P=0.0001) recovered patients as healthy control.

As we shown in the figure (4), the CD4 of recovered patients (692.91) in compare with healthy control (329.04)

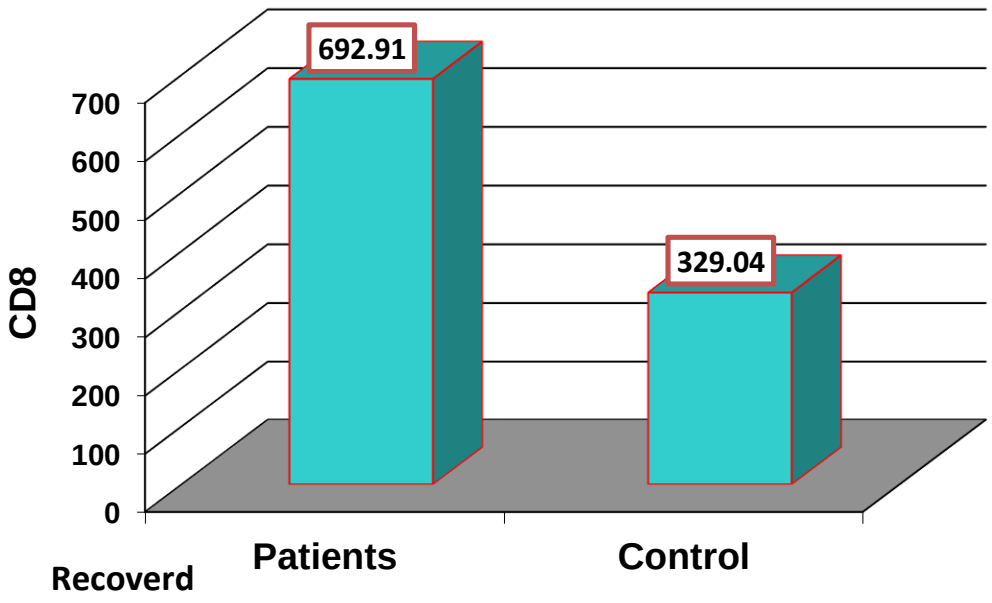

Figure (4): Comparison between patients and control in CD8

The COVID-19 virus cause of aberrant immune response [20]. The delayed or suboptimal immune responses would make chances for COVID19 to escape from the immune responses, leading a further delay of the viral clearance [21], However, in patients with COVID-19, a low count of lymphocytes, CD4+ T cells, CD8+ T cells, B cells, and NK cells has been shown. Likewise, severe cases have presented lower levels of these cells compared to mild cases.

The long-term protection against reinfection with SARS-CoV-2 [22] it proposed increase level CD8. Which is postulated to be related to both an overactive immune response and viral-induced pathology, The role of T cell immune responses in disease pathogenesis and longer-term protective immunity [23].

The dynamic of lymphocyte subset CD4 and CD8 T cells, play a significant antiviral role in balancing the combat against COVID-19 infections [24]. In the peripheral blood and their roles during the viral clearance. Also, age can play an important role during the viral clearance viral were older [24].

4. Conclusion

The recovered COVID19 patients have had a specific variation in the level of some immunological parameter that may reflect affect some origin in the blood.

Conflict of Interest

The author hereby declares no conflict of interest.

Consent for publication

The author declares that the work has consent for publication.

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Ethical Considerations
The study was approved by the institutional ethical committee.

5. Reference

[1] Correia, S, S Luck, and E Verner, "Pandemics Depress the Economy, Public Health Interventions Do Not: Evidence from the 1918 Flu", 26 March, 2020.

[2] Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet 2020. Published Online March 9. 40-6736(20)30566-3.

[3] Zheng Z, Peng F, Xu B, Zhao J, Liu H, Peng J, Li Q, Jiang C, Zhou Y, Liu S, Ye C, Zhang P, Xing Y, Guo H, Tang W (2020) Risk factors of critical and mortal COVID-19 cases: A systematic literature review and meta-analysis. J Infect 81: e16-e25

[4] Wong VWY, Cowling BJ, Aiello AE. Hand hygiene and risk of influenza virus infections in the community: a systematic review and meta-analysis. Epidemiol Infect 2014; 142:922–32.

[5] Horby P, Lim WS, Emberson JR, Mafham M, Bell JL, et al. Dexamethasone in hospitalized patients with covid-19 — preliminary report. N Engl J Med. (2020). doi: 10.1056/nejmoa2021436.

[6] Commins S, Steinke JW, Borish L. The extended IL-10 superfamily: IL-10, IL-19, IL-20, IL-22, IL-24, IL-26, IL-28, and IL-29. J Allergy Clin Immunol. 2008; 121:1108–1111.

[7] Wang F., Nie J., Wang H. Characteristics of peripheral lymphocyte subset alteration in COVID-19 pneumonia. J Infect Dis. 2020;221(11):1762–1769. doi: 10.1093/infdis/jiaa150

[8] Gao Y, Li T, Han M, Li X, Wu D, Xu Y, et al. Diagnostic utility of clinical laboratory data determinations for patients with the severe COVID-19. J Med Virol (2020) 92(7):791–6. doi: 10.1002/jmv.25770

[9] Wong R.S., Wu A., To K.F. Haematological manifestations in patients with severe acute respiratory syndrome: retrospective analysis. BMJ (Clinical research ed) 2003;326(7403):1358–1362.

[10] Okabayashi T., Kariwa H., Yokota S., Iki S., Indoh T., Yokosawa N., Takashima I., Tsutsumi H., Fujii N. Cytokine regulation in SARS coronavirus infection compared to other respiratory virus infections. J. Med. Virol. 2006; 78:417–424.

[11] Chu H., Zhou J., Wong B.H.-Y., Li C., Chan J.F.-W., Cheng Z.-S., Yang D., Wang D., Lee A.C.-Y., Li C., Yeung M.-L., Cai J.-P., Chan I.H.-Y., Ho W.-K., To K.K.-W., Zheng B.-J., Yao Y., Qin C., Yuen K.-Y. Middle east respiratory syndrome coronavirus efficiently infects human primary T lymphocytes and activates the extrinsic and intrinsic apoptosis pathways. J. Infect. Dis. 2016; 213:904–914.

[12] Franceschi C., Garagnani P., Parini P., Giuliani C., Santoro A. Inflammaging: a new immune-metabolic viewpoint for age-related diseases. Nat. Rev. Endocrinol. 2018;14(10):576–590.

[13] Yingfeng Z.; Xiuxing L.; Wenqing L.; Lihui X.; He L.; Wen W.;Si W.; Shuai Ma; Zhaohao Huang;

Jinguo Ye; Wen Shi; Yanxia Ye; Zunpeng Liu; Moshi Song; Weiqi Zhang; Jing-Dong J. Han; Juan Carlos Izpisua Belmonte; Chuanle Xiao;Jing Qu.; Hongyang Wang; Guang-Hui Liu; and Wenru Su.A human circulating immune cell landscape in aging and COVID-19. Protein Cell. 2020 ; 11(10): 740–770.

[14] Min C-K, Cheon S, Ha N-Y, Sohn KM, Kim Y, Aigerim A, et al. Comparative and kinetic analysis of viral shedding and immunological responses in MERS patients representing a broad spectrum of disease severity. Sci Rep. 2016;6(1):1–12.

[15] Vu YH, Hashimoto-Hachiya A, Takemura M, Yumine A, Mitamura Y, Nakahara T, et al. IL-24 negatively regulates keratinocyte differentiation induced by tapinarof, an aryl hydrocarbon receptor modulator: implication in the treatment of atopic dermatitis. Int J Mol Sci. 2020;21:9412

[16] Hadjadj J, Yatim N, Barnabei L, Corneau A, Boussier J, Smith N, et al. Impaired type I interferon activity and inflammatory responses in severe COVID-19 patients. Science (80-). 2020;369(6504):718–24.

[17] Sun D, Li H, Lu X-X, Xiao H, Ren J, Zhang F-R, et al. Clinical features of severe pediatric patients with coronavirus disease 2019 in Wuhan: a single center's observational study. World J Pediatr. 2020;16(3):251–9.

[18] Cox RJ, Brokstad KA. Not just antibodies: B cells and T cells mediate immunity to COVID-19. Nat Rev Immunol. 2020;20(10):581–2.

[19] Ruan Q, Yang K, Wang W, Jiang L, Song J. Clinical predictors of mortality due to COVID-19 based on an analysis of data of 150 patients from Wuhan, China. Intensive Care Med. Springer Berlin Heidelberg; 2020

[20] Mesoblast Limited. Mesoblast To Evaluate Anti-Inflammatory Cell Therapy Remestemcel-L for Treatment of Covid-19 Lung Disease. Melbourne; New York, NY: ASX announcement (2020). p. 2060–2.

[21] Zaki AM, van Boheemen S, Bestebroer TM, Osterhaus ADME, Fouchier RAM. Isolation of a novel coronavirus from a man with pneumonia in Saudi Arabia. N Engl J Med. (2012) 367:1814–20. doi: 10.1056/NEJMoa1211721

[22] Payne DC, Iblan I, Rha B, et al. Persistence of antibodies against Middle East respiratory syndrome coronavirus. Emerg Infect Dis 2016; 22: 1824–26.

[23] Tan, L. et al. Lymphopenia predicts disease severity of COVID-19: a descriptive and predictive study. Signal. Transduct. Target. Ther. 5, 33 (2020).

[24] Chen Z, Wherry EJ. T cell responses in patients with COVID-19. Nat Rev Immunol. 2020;20(9):529–36.