

RESEARCH ARTICLE

Levels of Some Cytokines in Pregnant Women with COVID-19 Infection

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ABSTRACT

The current work was objective to estimate the levels of some cytokines in pregnant women with COVID-19 infection. A total of 58 blood samples were obtained from infected pregnant women with COVID-19 and 30 healthy pregnant women (age range: 18–40 years). The blood samples collected (at a period June 2020 to January, 2021) from Al Shifa Medical Center, Azadi Teaching Hospital, Kirkuk, Iraq. The findings of current work showed that the levels of D-dimer in infected pregnant women significant elevated compared with healthy pregnant women. On the other hand, the findings showed that the levels of IL-6 and IL-10 in infected pregnant women significant elevated compared with healthy pregnant women. Therefore, it is concluded from the current work that infection with the COVID-19 cause higher levels of cytokines that have been studied in infected pregnant women compared to healthy pregnant women.

Keywords: COVID-19, Cytokines, D-dimer

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INTRODUCTION

The cytokines defines as a cell-signaling cluster which are polypeptides or glycoproteins extracellular and their molecular weight are low, its synthesized and produced by various immune cells, generally T cells and macrophages that responsible to regulate and improved the immune response. The cytokines act on signaling molecules and cells, activating them toward traumas, inflammation sites, infection processes, acting on growth factors of primary lymphocyte.¹⁻³ Cytokines have been involved as intermediating in physiologic responses as cellular apoptosis and promote cell survival, tumor malignant, viral and bacterial infection, anti-inflammatory responses, and against infectious agents and diseases or pathogenesis agents.^{4,5} Cytokine storm syndrome (CSS) appears the most danger and significant complication of COVID-19 infection due to a severe reaction of immune response to coronavirus cause by infiltration of inflammatory cell in lungs and abundant produce of cytokines into the blood stream.^{6,7} CSS led to distributed intravascular coagulation and various studies have showed the presence microthrombi in venules, capillaries and arterioles in COVID-19 infected patient autopsies.^{8,9} The COVID-19 might generally act on the lymphocytes, especially T lymphocytes, and lead to a cytokine storm in human body that is distinguished by elevated plasma cytokines concentrations.^{10,11} Therefore, the current work was objective to estimate the levels of some cytokines in pregnant women with COVID-19 infection.

MATERIALS AND METHODS

Blood Collection

A total of 58 venous blood samples were obtained from infected pregnant women with COVID-19 and 30 healthy pregnant women (age range: 18–40 years). The blood samples collected (at a period June 2020 to January, 2021) from Al Shifa Medical Center, Azadi Teaching Hospital, Kirkuk, Iraq. The blood was put in test tubes and centrifuged to obtain serum for analysis, than stored at -20°C until use. The questionnaire papers were used in current study. Where, the form of questionnaire papers contains questions about age, heredity diseases, and severity of COVID-19 infection.

Cytokine Values

The serum D-dimer, IL-6 and IL-10 levels were estimated in both patients and healthy persons by using enzyme-linked immunoassay (ELISA) technique according to the manufacturer's procedures (Abcam-UK).

Statistical Analysis

The statistical analysis was done by using statistical package for the social sciences (SPSS) 18 Statistical program. The levels of cytokines analysis were performed by utilizing t-test for tables with means \pm standard deviations (SD). p value of ≤ 0.05 was utilized as significance level. Descriptive statistics for the clinical and the outcomes were formulated as mean \pm standard error.

RESULTS AND DISCUSSION

D-Dimer Levels

The levels of D-dimer in an infected pregnant women (14.304 ± 2.165) show significant ($p < 0.05$) elevated compared with healthy pregnant women (1.392 ± 0.285) as shown in Figure 1.

The current work is agreed with¹² who referred that patients with severe COVID-19 infection showed that the D-dimer levels 5 times higher compared with healthy persons. Also,

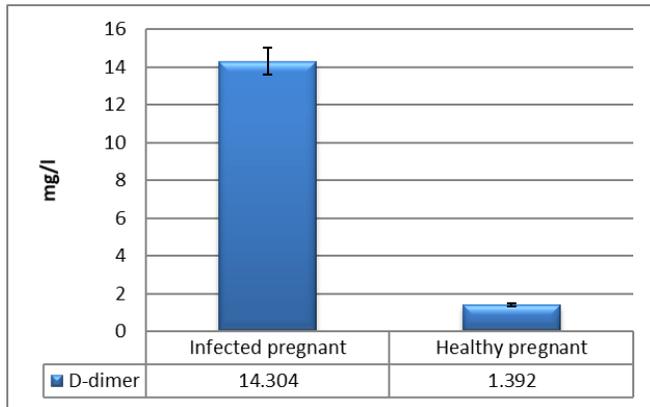


Figure 1: Levels of D-dimer in both pregnant groups.

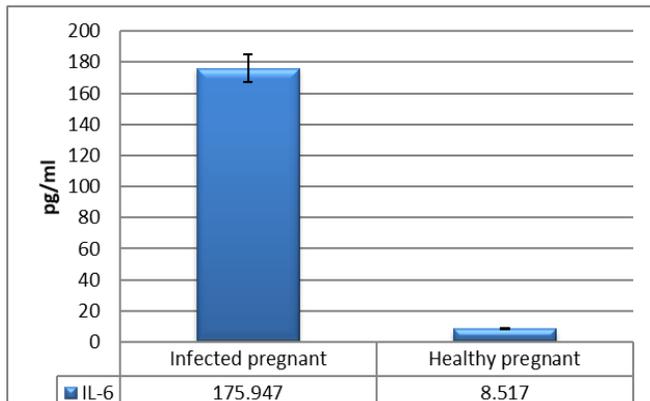


Figure 2: Levels of IL-6 in both pregnant groups.

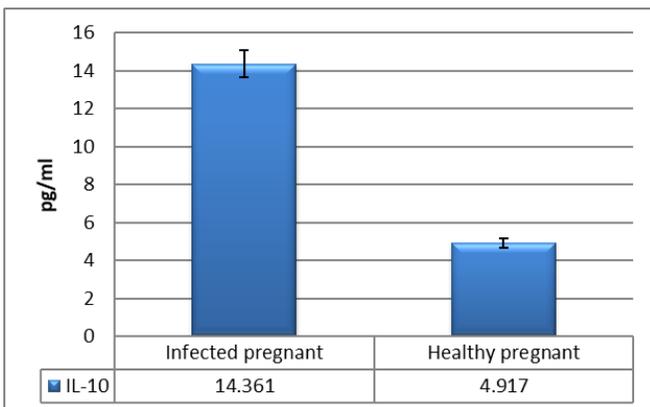


Figure 3: Levels of IL-10 in both pregnant groups.

an study¹³ showed that the D-dimer level was approximately 3.5 times higher in that 183 COVID-19 patients compared with patients of other infections. 1022 infected patients with COVID-19 were tested for detect the D-dimer that showed that the D-dimer average $1.53 \mu\text{g/mL}$ elevated. The D-dimer rates have a significant relationship to mortality as shown in various studies.¹⁴⁻¹⁸ Also, the current work is agreed with other researches¹⁹ that referred that 12 person's diagnosis with severe pneumonia, increased D-dimer level ($9.2 \mu\text{g/mL}$) and SARS-CoV-2 infection was diagnosed by RT-PCR.

IL-6 Levels

The levels of IL-6 in an infected pregnant women (175.947 ± 10.16) show significant ($p < 0.05$) elevated compared with healthy pregnant women (8.517 ± 0.913) as shown in Figure 2.

The current work is agreed with²⁰ who referred that the serum IL-6 levels were significant rise in the COVID-19 infected patients, and elevated the levels of IL-6 to be in turn significantly related with adverse clinical findings. In another study, increased in levels of IL-6 ($> 80 \text{ pg/mL}$) was strongly related with a 22 times higher in patients whose need for mechanical ventilation, suggesting that the high level of IL-6 might relate to severity of COVID-19 infection.²¹ Among COVID-19 infected patients, studies referred that the mean of IL-6 concentration was 61.3 pg/mL in infected patients with coronavirus.²²

IL-10 Levels

The levels of IL-10 in an infected pregnant women (24.382 ± 4.571) show significant ($p < 0.05$) elevated compared with healthy pregnant women (4.917 ± 0.749) as shown in Figure 3.

The elevated signaling of IL-10 can prevent production of pro-inflammatory cytokine via direct targeting of effector kinds, but also indirectly modulate immune function by inhibiting the maturation process of macrophage and other cells, thereby decreased the co-stimulatory and the ability of chemokine secretion in host cells.^{23,24} The current work is agreed with some researches,²⁵ who referred that the high levels of serum IL-10 correlating in severe infection of COVID-19. Also,²⁶ some researches indicate that out of all analyzed cytokine types, the levels of IL-6 and IL-10 are significant ($p < 0.05$) elevated in the severe infection of patients, and these results were reported in other studies.^{27,28} In a previous study²⁹ a significant increase of IL10 levels in non-survivors patients of COVID-19 was discovered.

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