The Effect of Cytokines and CD Markers in Patients Infected with COVID- 19

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Abstract

Study aimed to show the effect of inflammatory mediators (IL-6 and gamma interferon) and molecules CD54 & CD2 in patients infected with COVID-19

A overall of (100) positive patients for COVID-19 were selected for project .Patients attended general lab. With sings of COVID-19 then select to expression 0f gamma interferon & IL-6 in serum of patient and indication expression of CD54 and CD2in serum of patients. Results indicated that gamma interferon & IL-6 highly important increases ($p<0.001$) in serum level of covid- 19 patients as matched with healthy control groups , acute covid 19 exposed great as well as , rises in serum near of gamma interferon & IL-6 pointedly($p<0.001$) ,although modest cases of disease show great proliferation in serum level of IL-6 expressively($p<0.001$).immune molecules showed more expression of CD2 & CD54 in covid- 19 patients as matched with healthy normal groups.

Key word: *Inflammatory, immune reaction and COVID-19*

Introduction

Corona virus infected patient have several communal types such as fever, cough, and fatigue while diarrhea and dyspnea were initiate to be as unusual chin([1]). Numerous of them patient described bilateral abnormalities

Main case of corona virus was advised as cold in 1960([2]).

Original coronavirus-induced pneumonia, which was named as coronavirus disease 2019 (COVID-19) by the WHO on the February 11, 2020, has speedily improved in epidemic measure since it first appeared inWuhan, China, in December 2019([3]).

Coronaviruses are enveloped viruses with a positive sense single-stranded RNA genome (26e32 kb)([4]). Four coronavirus genera (a, b, g, d) have been recognized up to now([5])

IL -6 is noticed at a few management level during acute viral infection , the most patent increase in I L-6 is sensed in patients with a higher degree of neutrophil infiltration. The level of cytokines such as IF N-y , TN F-α , I L-6 and I L-8 are amplified in persons with chronic viral infection and some authors have revealed that this rise is virtual to the grade of the harm histologically in COVID-19 patient ([6]).

Cytokines expression due to pathogenesis of COVID-19 infection is relatively due to the immunologic response , plenty of interleukins & chemokines are elaborate in the progress of the inflammatory process by altering the evolution of the inflammatory via changing the native T h0 response to a T h1 ,T h2 or mixed T h1 & T h2 response. Both responses have been revealed to relate in a viral disease ([7]) and the inequality among them prefer HIR and depressed adjust CMI, that is essential for immunity beside diseases ([8]).

Materials & Methods

1- Patients

The study registered (100) COVID 19 patient , admitted at the public health laboratory and with fever, nonproductive cough, dyspnea, myalgia, fatigue,

normal or decreased leukocyte counts, and radiographic evidence of pneumonia .

Samples Collection

blood samples (5-10) ml was obtained from patients(COVID -19). then the blood samples were centrifuged to get blood serum

Serum cytokine

Sizes of cytokines in the serum were done by ELISA test (R&D Systems). The last concentration was expressed in pg/ml.

Statistical Analysis

Statistical analysis was showed by using Chi-square ($\chi 2$) test to regulate the statistical changes among diverse groups by using a proposal statistical platform for social science (SPSS 2020). The possibility of ($P \leq 0.05$) was measured to be statistically significant. The examined parameters were offered in terms of means ± standard errors (S.E.), and variances between means of patients and controls were calculated by ANOVA test and the Least Significant Difference (LSD). The difference was measured significant when the possibility (P) value were ($\leq 0.05, \leq 0.01$).

Results & Discussion

1-Clinical sings

Clinical sings in COVID 19 patients were , fever, nonproductive cough, dyspnea, myalgia, fatigue, normal or decreased leukocyte counts, and radiographic evidence of pneumonia, some patients showed intermediate and mild clinical sings as shown in table (1).

Table (1) Clinical signs for COVID 19 patient .

NO.	Clinical signs	Number	Percentage%
1	acute	10	80%
2	Intermediate	10	80%
3	Mild	80	80%

2. IL-6 in COVID 19 patients

Serum of all patients with COVID 19 and those with acute or intermediate disease action contain higher level of IL-6 than healthy control group . IL-6 concentration was particularly increased in patients with intermediate disease and acute patients similarly than mild disease as corresponding with control groups.

Table(2) The Concentration of IL-6 in patients and controls

Group	NO.	Serum level of IL-6		
		Mean	Minimum	Maximum
Mild	80	500.00	180.00	440.00
Acute	10	900.00	300	900
Intermediate	10	1500.00	1300.00	1400.00
Control	10	70.00	50.00	80.00

Chemokines apply their biological activity through linking to certain cell surface receptors. An infrequent feature of greatest chemokine receptors is their great attraction for numerous ligands ([9]). inflammatory cytokines

such as IL-6, 10 &12 ,create irritable oxygen species. IL-8 excretion effects in an elevated employment of neutrophils into lung ([10],[11]). Lung I L -6 is noticed at less preservation grade at acute stage of COVID 19 impurity, while noticable rises in blood serum and liver grade can be detected patients with moderiate infection This rise in I L-6 associates completely with an elevated in T NF – α([12]).

3- level of gamma interferon

Current study showed that all patients with COVID- 19 cover higher level of gamma interferon than healthy control group , gamma interferon concentration was improved particularly with acute COVID patients, moderate patients and mild patients correspondingly . table(3)

Table(3) The Concentration of gamma interferon in patients and controls

Group	NO.	Serum level of gamma interferon		
		Mean	Minimum	Maximum
Acute	10	600.00	400.00	650.00
Intermediate	10	80.00	75.00	83.00
mild	80	20.00	17.00	21.00
Control	10	17.00	9.00	18.00

gamma interferon is a central cytokine to the of inflammatory pathogenesis routes. The T N F -α pro-inflammatory effect is facilitated via straight initiation of other pro- inflammatory cytokines([13])

The cytokine storm will activate a forceful round by the immune system to the body, cause ARDS and multiple organ failure, and lastly lead to death in severe cases of SARS-CoV- 2 infection([14])

4- Expression of CD54 and CD2 in COVID 19 patients

Results as in table (4) shown that there was highly significant differences in mean of CD 54 expression among COVID 19 patients and healthy control groups ($p<0.05$) ,the cell surface CD54 was over expressed in acute compared to intermediate COVID 19 patients, mild and healthy control groups individually

The results demonstrated in table (5) shows there was high statistically significant difference in mean of CD2 expression among COVID- 19 patients and healthy control groups ($p<0.05$)

To get rid of COVID 19 is related with vital multi-vague C D 4+ and C D 8+ T cell responses ,while persons that progress mild infection likely to have fragile, slimly dedicated responses [[15]]. CD8+ effector cells in the lung were initiate to have less serviceable proficiency, as proved by low IF N -y fabrication [[16]]. The determination of lung pathogens is frequently attended thru frail "CD8+ T cell response " antigens subsequent[[17]]. We exasperated to conclude the pathogenic status of C D74 over comparing of its expression during infection , our results make it clear that robust up-regulation of both C D2&C D54 manage a tough mark that lymphocytes in peripheral blood of COVID- 19 persons within formal of immune dysregulation. Acute determining infections are considered complete primary enlargement of "poly clonal C D 4+andCD8 + T –cell" residents that continued over allowance[[17],[18]]. On other hand, prolonged infections are related with temporary hindered responses that are frail and goal a slight array of MHC class I and II limited epitopes [[19],[20]]

Table(4) The expression of CD54 in patients

Group	NO.	Serum level of CD54		
		Mean	Minimum	Maximum
Intermediate	10	9.00	5.00	10.00
Acute	10	13.00	10.00	14.00
mild	80	6.00	4.00	7.00
Control	10	2.00	1.00	3.00

Table(5) The Concentration of CD2 in patients

Group	NO.	Serum level of CD2		
		Mean	Minimum	Maximum
Mild	12	10	7.00	12.00
Acute	4	35.00	20.00	40.00
Intermediate	7	14.00	11.00	15.00
Control	10	4.00	5.00	6.00

Ethical Clearance: Taken from department committee

Conflict of Interest Nil

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