

The Relationship of serum d-dimer and IL-6 with Oxygen Saturation and severity of infection in patients affected with COVID-19

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ABSTRACT

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KEY WORDS: COVID-19, Iraq, SPO2, CRP, IL-6, D-dimer.

Introduction: In December 2019, the emergence of a novel coronavirusinduced pneumonia in Wuhan, China, posed a serious and urgent threat to public health worldwide. The study aims to find a relationship between serum d-dimer and IL-6 and oxygen saturation and severity of infection in patients affected by COVID-19. Patients and methods: Ninety people participated in the present study: sixty patients and thirty healthy subjects. Patients refused to take the COVID-19 vaccination, while the control subjects were vaccinated against COVID-19. The study was done from the first of January 2022 to the end of March 2022. COVID-19 was diagnosed by using reverse-transcription polymerase chain reaction (RT-PCR), most commonly collected from nasopharyngeal (NP) swabs. Blood samples were obtained from the patients and people who were apparently healthy as control subjects. White blood cell count, CRP, ferritin, IL-6, and D dimer were measured. Results: There was an increase in the number of WBCs in COVID-19 patients, as compared with control healthy subjects, ($p \le 0.01$). Also, there was an increase in the concentration of serum ferritin in COVID-19 patients, as compared with control healthy subjects ($p \le 0.01$). However, in the present study, there is a significant decrease in the SPO2 % in COVID-19 patients, as compared with control healthy subjects, ($p \le 0.01$). Also, there was an elevation in the concentration of IL-6 and D dimer in COVID-19 patients, as compared with control healthy subjects ($p \le 0.01$). There was significant negative correlation between SpO2% and serum levels of (ferritin, r = -0.5, p < -0.50.01; CRP, r = -0.68, p < 0.01; IL-6, r = -0.6, p < 0.01; and D-dimer, r = -0.6-0.78, p < 0.01).

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INTRODUCTION

COVID-19 is an abbreviation of a disease that emerged in 2019 in the east of Asia and became a pandemic in 2020 [1]. The COVID-19 virus is transmitted through direct or indirect contact as people breathe in contaminated air with droplets, aerosols, or small airborne particles of an infected person by breathing, talking, coughing, and sneez^{ing [1, 2, 3]}.

The common symptoms of COVID-19 are dry cough, fever and Fatigue. Other symptoms that are less common and may affect some patients include Loss of taste or smell nasal congestion, conjunctivitis, Sore throat, Nausea, diarrhoea and Chills [5].

MATERIAL

Ninety people were involved in the present study, (60 patients and 30 healthy people). Patients refused to take the COVID-19 vaccination, while the control subjects took 2 vaccinations. This study was carried out from the first of January 2022 to the end of March 2022. Using a questionnaire form that the investigator created, an interview with these patients took .place COVID-19 was diagnosed reverse-transcription using by polymerase chain reaction (rt-PCR), most commonly collected from nasopharyngeal (NP) swabs [6].

The researcher conducted a face-toface interview to collect all data. Venous blood was obtained from each participant. Blood samples were obtained from the patients and controls. The blood sample obtained from each subject was transferred into a gel tube for separation of serum.

Exclusion criteria included

- 1) patients with thyroid, parathyroidism, and DM diseases
- 2) patients with autoimmune disease, liver disease, and renal disease.
- 3) patient with liver, kidney and pancreas problems. White blood cell count, Serum ferritin. (In vitro test for the quantitative determination of ferritin in human serum and plasma on Roche/Hitachi cobas С 311/501systems.). There was an immunoturbidimetric assav used to measure CRP in human serum and plasma in a lab setting on a Cobas C 311. While IL-6 was measured by standard procedures or by ELISA kits, Kit utilises the Double Antibody Sandwich ELISA technique.

X-oligomers, which are breakdown products of fibrin, in human plasma. All kits from are Roche/Germany [7]. Pulse oximetry, a nontechnique invasive for keeping track of a person's blood oxygen saturation, measured SPo2. Peripheral oxygen saturation (SpO_2) readings are typically within 2% accuracy.

RESULTS

The mean and standard deviation of the age of normal healthy control and COVID-19 patients are as follows; Group 1 (Covid 19)= 56.8 ± 11.7 years. b-Group 2 (Control healthy subjects) = 52.1 ± 8 years.

In the present, Table 1 shows the result of white blood cells (WBCs), There is a significant increase in the white blood cell number (WBCs) in COVID-19 patients, as compared with control healthy subjects, (p \leq 0.01).

Table-1: show the mean and standard deviation of WBCs, serum ferritin and SPO2.

Parameters	Patients (60)	Controls (30)	P value
WBCs (10 ⁹ /L)	15.5 ± 4.1	8.5 ± 3.2	0.01
Ferritin (ng/ml)	889.5 ± 275	64.2 ± 13	0.01
SPO2 %	76.9 ± 9.8	99 ± 0.5	0.01

Also, there is a significant increase in the concentration of serum ferritin in COVID-19 patients, as compared with control healthy subjects, ($p \le 0.01$). However, (Table 1) shows the result SPO2 there is a significant decrease in the SPO2 % in COVID-19 patients, as compared with control healthy subjects, ($p \le 0.01$). In the present, (Table 2) there is a significant elevation in the concentration of CRP in COVID-19 patients, as compared with control healthy subjects, ($p \le 0.01$). Also, there is a significant elevation in the concentration of IL-6 in COVID-19 patients, as compared with control healthy subjects, ($p \le 0.01$).

Dimer			
Parameters	Patients (60)	Controls (30)	P value
CRP (mg/dl)	147.3 ± 16.5	5.1 ± 1.2	0.01
IL-6 (ng/l)	$266,5 \pm 85$	110.5 ± 15.6	0.01
D Dimer (ng/ml)	5857.9 ± 1011	121.9 ± 47	0.01

Table-2: show the mean and standard deviation of CRP, IL-6 and D-Dimer

Moreover, there is a significant elevation in the concentration of D-Dimer in COVID-19 patients, as compared with control healthy subjects, ($p \le 0.01$). As shown in (table 2).

In the present study, there is a significant negative correlation between SpO2% and serum levels of ferritin, r = -0.5, p < 0.01; and IL-6, r = -0.6, p < 0.01.

DISCUSSION

In the present, **Table 1** shows the result of white blood cells (WBCs), there is a significant elevation in the number of WBCs in COVID-19 patients, as compared with control healthy subjects, ($p \le 0.01$). This result agrees with previous findings,[8,9]. In the present study, there was an increase in serum ferritin in covid 10 patients. A previous study stated that serum ferritin has been linked to poor recovery in COVID-19 patients,[10].

However, the present study, finds that result of SPO2 in Covid 19 patients is a significant decrease in the SPO2 % in COVID-19 patients, as compared with control healthy

subjects, ($p \le 0.01$). The present study agrees with previous studies,[11,12]. In the present study, there was a significant elevation in the concentration of CRP and IL-6 in COVID-19 patients, as compared with control healthy subjects, ($p \le 0.01$). These findings agree with previous results, [11,13]. Moreover, there is a significant elevation in the concentration of D-Dimer in COVID-19 patients, as compared with control healthy subjects, ($p\leq$ 0.01). This finding agrees with a previous study, [14]. For patients with COVID-19, pulse oximetry helps with early detection of silent hypoxia, in which the patients still look and feel comfortable, but their SpO2 is dangerously low. This happens to patients either in the hospital or at home. Low SpO2 may indicate severe COVID-19related pneumonia, requiring a ventilator, [15]. The present study that there was **conclude**d а significant negative correlation between SpO2% and serum levels of (ferritin, r = -0.5, p < 0.01; CRP, r = -0.68, p < 0.01; IL-6, r = -0.6. The present study recommends that measurement extend to IL 10,

IL-17A and spirometric measurement. Also, investigate for other PCR testing after vaccination.

CONCLUSION

The present study **conclude**d that there was a significant negative correlation between SpO2% and serum levels of (ferritin, r = -0.5, p < 0.01; CRP, r = -0.68, p < 0.01; IL-6, r = -0.6.

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