

FULL PAPER

Biochemical and hematological variables in COVID-19 positive patients

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The coronavirus disease 2019 (COVID-19) pandemic has introduced attention to request for various diagnostic strategies, comparative validation of novel tests, quicker federal agency clearance, and quick manufacture of test kits to satisfy worldwide demand. Thus, this study was aimed to investigate biochemical and hematological variables in COVID-19 positive patients, so as to act early and improve patient outcomes. 34 patients with COVID-19 patients were diagnosed at Rifai General Hospital, Dhi Qar Health Directorate, during the period of (15 September 2020 to March 2021) in this study with two study group, as group one (i.e. the first week infection) and group two (i.e. the second week infection). The reagents kits for Random Blood Sugar (RBS) were used, and also urea, and creatinine measurements were done by spectrophotometry method (Biolabo/France), whereas D-dimer measurement was performed by (MAGLUMI 1000-China), Complete Blood Count measurement was conducted by XP-300™ Automated Hematology Analyzer System Device, USA. In this study, it was found that WBC had a significant difference (p-value 0.05) based on the comparison between the two groups, whereas RBS and creatinine had no significant difference (p-value>0.05) and urea and D-dimer had a significant difference (p-value 0.05) when compared between the two groups. The D-dimer and urea levels were significantly increased in the second group compared with the first group of the patients.

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Introduction

Coronavirus-2019 (COVID-19) is an infectious condition brought on by way of coronavirus 2's (SARS- CoV-2). The average time for SARS-CoV-2 incubation is five days, although this can vary from two to fourteen days, and symptoms often worsen within 12 days of exposure (ranging from 8 to 16 days)

[1]. A novel beta-coronavirus subtype was discovered in China in January 2020 using high-throughput sequencing and throat swab data. This coronavirus disease was given the designation "COVID-19" by the World Health Organization (WHO), which deemed it as a major global pandemic and public health issue [2]-[4]. Blood urea and creatinine are the byproducts of human nitrogen

metabolism. Because they may be small molecules, they are easily filtered from the nephrons. Between 30 and 40% of the time, BUN is normally reabsorbed from tubules, although creatinine is not always reabsorbed very well [2,5-7]. Blood urea and creatinine measurements have been helpful in figuring out the severity and prognosis of COVID-19 disease, whereas the byproducts of nitrogen metabolism in people are blood urea nitrogen (BUN) and creatinine (Cr) (repeated in other expression) (i.e. mechanism by which COVID effects on kidney). Typically, between 30 and 40 percentage of BUN is reabsorbed from tubules, whereas Cr is not always very efficaciously reabsorbed. According to the studies, humans with reabsorption procedure of acute heart failure is controlled [8]. Previous research have shown that COVID-19 was predicted by blood markers as blood urea, creatinine, D-dimer, and neutrophil-lymphocyte ratio [9,10,11,15,16].

Neutrophil/lymphocyte ratio (NLR), in step with a recent systematic review and meta-analysis conducted by Feng *et al.* on immune-inflammatory parameters in COVID-19 infection, is related to the contamination improvement and can be utilized by medical doctors to discover excessive-danger or deteriorating patients at an early level [17]. The Neutrophil-Lymphocyte Ratio (NLR) is a realistic and rapid (use scientific word) for identifying infection throughout laboratory trying out. It aids in the identification, management, and evaluation of pneumonia's prognosis [18]. NLR can be utilized as an early warning indication of excessive COVID-19 infection, in keeping with several additional investigations [19]-[21]. The aims of this study evaluation of biochemical and hematological variables in COVID-19 positive patients, so that you can act early and improve patient outcomes.

Materials and methods

Study design and participants

34 patients with COVID-19 were diagnosed at Rifai General Hospital, Dhi Qar Health Directorate, during the period of (15 September 2020 to March 2021). In addition, the written informed consent was obtained from each participant before enrollment in the study with two groups, as group one (i.e. the first week infection) and the second group (i.e. the second week infection).

Biochemical and hematological analyses

Blood sample was collected from each participant and centrifuged to get serum. The reagents kits for Random Blood Sugar (RBS) were used, and also urea, and creatinine measurements were done by spectrophotometry method (Biolabo/France), whereas D-dimer measurement was performed by (MAGLUMI 1000-China), Complete Blood Count measurement was conducted by XP-300™ Automated Hematology Analyzer System Device, USA.

Statistical analyses

Microsoft Office Excel 2019 for Windows and the Statistical Package for Social Sciences (SPSS), version 26 were used to statistically evaluate behavior. The terms "Mean" and "SD" were used to explicit the data. While Kruskal-Wallis test was used for continuous variables that were no longer normally dispensed, the p-value of 0.5 was considered statistically and good sized while comparing normally distributed continuous variables the use of independent t-test (two-tailed).

Results and discussion

TABLE 1 Statistical analysis of biochemical variable level in patients group one compared to group two, using t-test (two-tailed)

Variables	Group one (N=34)	Group two (N=34)	P-value
RBS (mg/dl)	224±112	231±109	0.676
Urea (mg/dl)	42.4±11.1	49.7±21.6	0.014
Creatinine (mg/dl)	1.08±0.683	1.16±0.686	0.150
D- Dimer (µg/L)	787±621	1273±1521	0.017

Table 1 showed urea and D-dimer had significant a difference (p-value < 0.05) compared between both groups, whereas RBS and Creatinine had no significant difference (p-value >0.05), Despite the high level of RBS in Corona patients in our study as well as previous studies [22-24], found no statistically significant difference between the infection in the first week and the second week in Corona patients. Our study showed that in RBS, there was no significant difference between the first and second week infection, thus it is concluded that the RBS level continues significantly during infection, whereas urea level increased in the second week more than first one week [25] because in severe cases of infection (the second week), the levels of urea and creatinine were increased. This study was consistent with

previous studies mechanism of effect on kidney in brief [24,25]. The blood urea and creatinine levels in non-survivors of COVID patients gradually increased until death. The BUN:Cr ratio is crucial for the treatment and clinical monitoring of patients with acute myocardial infarction (AMI) [8], also this study founded that the D-dimer level increased significantly in the second week more than first week of infection, and thus this study was consistent with previous studies [16,18,26,27]. Higher probabilities of in-hospital mortality were linked to increased D-dimer levels, which have been found to be more prevalent among COVID-19-positive dead patients. D-dimer and COVID-19 severity appear to be related. However, the relationship is unclear [16].

TABLE 2 Statistical analysis of hematological variable level in patients group one compared to group two, using t-test (two-tailed)

Variables	Group one (N=34)	Group two (N=34)	P-value
WBC	9.89±5.29	12.2±5.00	0.028
Lymphocytes (%)	11.2±6.09	11.3±6.92	0.983
Neutrophils (%)	82.3±7.23	81.4±9.20	0.575
Hb (g/dl)	13.1±2.21	13.0±2.33	0.690
HCT (%)	41.4±6.84	41.1±7.56	0.750
MCV	85.0±6.66	85.4±5.13	0.628
MCH	26.9±2.51	27.0±2.61	0.760
RDW- CV	12.8±2.55	12.4±0.943	0.485

RDW- SD	40.3±6.38	39.4±5.02	0.455
PLTs count	284±165	279±122	0.850
MPV	9.84±0.940	10.0±0.915	0.191
PCT	0.300±0.179	0.276±0.112	0.444
P-LCR PLATELET large cell ratio	28.9±7.31	29.3±8.42	0.731

In Table 2, white blood cells level increase significantly (p-value less than 0.05), in group two compared with group one, despite the fact that different variables were not appreciably specific (p-value > 0.05), as established in this observation. Patients had higher baseline WBC and neutrophil counts, and it turned into also proven that each COVID-19 organization had lower baseline lymphocyte and eosinophil counts compared with the health institution. However, our research did no longer discover any big differences between the primary and the 2nd weeks of infection, that is with in advance studies [28-30]. Patients with COVID-19 frequently experienced lymphopenia and eosinopenia in terms of WBC counts, and the severity of these conditions was inversely linked with the disease severity. This makes it easier to distinguish this condition from usual viral infections, which frequently have elevated lymphocyte counts but seldom eosinopenia [28]. The COVID-19 pathophysiology is assumed to be supported by the inflammatory response. According to the abrupt clinical deterioration observed in the first week following the beginning of initial symptoms, the acute respiratory failure COVID-19 is caused by an unusual pattern of immunological malfunction. With prolonged cytokine production and hyperinflammation, severe COVID-19 exhibits a distinct pattern of immunological dysregulation [18]. Generally speaking, individuals with elevated NLR who have COVID-19 may have a bad prognosis or even a danger of mortality, thus it is important to pay attention to them. These results serve as a reminder that in addition to the total blood count, future research should

focus more on the dynamic changes in immune function and cytokines, as well as the relationship between these variables and the disease severity.

Conclusion

In this study concluded that WBC had a significant difference based on the comparison between the two groups, whereas RBS and creatinine had no significant difference, and urea and D-dimer had a significant difference when compared between the two groups. The D-dimer and urea levels were significantly increased in the second group compared with the first group of the patients.

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Conflict of Interest

The authors have no conflict of interest.

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