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Clinical Factors and Characteristics that Affect Prognosis of COVID-19 Patients

Laith karim issa lutfi[1], Laith ishaq yousef alazrai[1], Aasem abdelraouf yahya rawshdeh[1], Raghad Mohammad Mahmoud Jaradat[1], Thaer jumah Mohammed AlKasasbeh[1], Ala'a Abdullah Bani Mustafa[2*]

[1] Internal medicine specialist, Queen Alia military hospital, Amman, Jordan
[2] Internal medicine resident, Internal medicine, Ministry of health, Amman, Jordan.

Abstract
Background: COVID-19 disease has been linked to severe and deadly respiratory disease in various age groups. In team of COVID-19 disease prognosis and mortality, age is a key factor. The chance of mortality climbs from 0.66 percent to 7.8 percent in those over the age of 80. Males have a greater COVID-19 prevalence rate than females. Furthermore, even in the absence of additional comorbidities, sex was an essential biological determinant in prognosis and death risk among COVID-19 positive people. Another factor that influences the prognosis of COVID-19 illness is comorbidity. It's critical to comprehend the clinical characteristics and variables that influence the prognosis of COVID-19 illness patients.
Objective: To describe the clinical factors and characteristics that affect COVID-19 patients' prognosis.
Methods: Retrospective research performed at Queen Alia Military Hospital by examining clinical characteristics of hospitalized individuals with a verified diagnosis of COVID-19 disease, as confirmed by polymerase-chain-reaction (PCR) assay. The research comprised laboratory outcomes, demographic features, chest imaging, and clinical data. Participants were categorized into the progression category and the improvement/stabilization group.
Results: A total of 51 participants with a mean age of 33.6 years were involved in the research. Forty-six participants (90.2%) were categorized as an improvement/stabilization group, and five patients were classified as a progression group (9.8%). Fever, diarrhea, breath shortness, and cough were the most common signs and symptoms. Significant differences were detected between groups concerning age, comorbid diseases (diabetes and hypertension), disease severity, length of stay in the hospital, WBCs, creatinine, total bilirubin, ALP, LDH, CRP, albumin, oxygen saturation, and pulmonary consolidation ($P < 0.05$). Moreover, multivariate logistic regression determined age (OR, 1.79; CI: .950 3.28; $P = 0.035$), diabetes (OR, 1.62; CI: 1.02 - 4.19; P 0.012), hypertension (OR, 1.13; CI: 1.04 - 3.62; $P = 0.023$), increased creatinine (OR, 3.57; CI: 2.30 - 6.71; $P = 0.01$), and increased total bilirubin (OR, 2.82; CI: 1.72 - 3.28; $P = 0.031$) as risk factors for disease progression.
Conclusion: Chronic disease and abnormal creatinine and bilirubin level including other factors contribute to poor prognosis of COVID-19 patients. This study shows that the clinical characteristics of the patient should be prioritized in disease management.

Running title: Prognosis of COVID-19 Patients

Keywords: coronavirus, clinical features, risk factors, prognosis.

Introduction

Towards the end of 2019, several unexplained pneumonia cases were detected in Wuhan city, the capital of Hubei province in China. Soon after, Wuhan city reported an outbreak. These cases have been epidemiologically linked to Wuhan's seafood market that sells different live animals (1). This unexplained pneumonia was studied by Chinese scientists via a sample collected from the lower respiratory tract during

bronchoalveolar lavage and documented a new type of coronavirus (2, 3). The World Health Organization (WHO) later named the virus COVID-19 in February 2020 since it is genetically related to the coronavirus that caused the 2003 outbreak of severe acute respiratory syndrome (SARS-CoV-2) (4,5).

Previous studies reported fatigue, fever, and cough as the most common COVID-19 disease symptoms, with diarrhea as the least common symptoms (6,7). A meta-analysis study including 43 studies and 3600 patients revealed that the main laboratory abnormalities detected were elevation of C-reactive protein, decreasing lymphocyte count, and increasing lactate dehydrogenase. Simultaneously, computed tomography (CT scan) showed ground-glass opacities and bilateral pneumonia (8). Patients who developed the need for ICU care reported high temperatures, dyspnea, increased respiratory rate, and changes in D-dimer, albumin, procalcitonin, and white blood cell count, especially, lymphocyte and neutrophil count (9).

Epidemiological studies have suggested the vulnerability of different age groups to COVID-19 disease, leading to severe and fatal respiratory disease (10-12). Age is a critical characteristic in the field of prognosis and mortality of COVID-19 disease. Developed countries (Europe and the United States) have been hit more aggressively than developing countries by COVID-19 (the Middle East and South Asia) because they have a large aging population. It has been estimated that the risk of death increases from 0.66% to 7.8% among people above the age of 80 years (13).

The COVID-19 prevalence rate is higher in males than in females (7,9,14). Moreover, sex was an important biological variable in prognosis and death risk among COVID-19 positive individuals, even with or without other comorbidities (15).

Comorbidity is another issue affecting the prognosis of COVID-19 disease. Hypertension, coronary artery disease, infections, respiratory diseases, diabetes, and malignancies were the most prevalent comorbidities affecting COVID-19 positive individuals (14, 16). The risk for poor prognosis and critical outcomes among patients with COVID-19 were analyzed in nationwide research by stratifying comorbidities status. It was concluded that risk was increased from 1.79 for patients with at least 1 comorbidity to 2.59 for those with two or more comorbidities (14).

In the literature, smoking status as a risk factor that impacts the prognosis of COVID-19 patients has been controversial. Patanavanich and Glantz analyzed data from 19 studies that include around 11,590 COVID-19 positive individuals; an immense association reported between smoking and poor COVID-19 progression as well, as the odd was higher in smoker patient (OR, 1.91; 95% CI: 1.42-2.59; $P = 0.001$) than non-smoker (17). A similar result has also been reported by Zhao et al. (18). In contrast, data of five studies with a total of 1549 positive individuals were analyzed to examine the relative risk for smoking on disease severity and reported a non-significant relationship between the previous variables (19).

The purpose of this research was to identify the clinical features and factors influencing the prognosis of individuals with COVID-19 disease in Jordan's Queen Alia Military Hospital. For this, we analyzed clinical data for 51 persons with COVID-19 disease.

Methodology

Retrospective research was conducted at Queen Alia Military Hospital. Data were obtained via electronic medical files for patients admitted to the hospital from 16 of March 2020 to 16 of August with a confirmed diagnosis of COVID-19 infection as proved by polymerase-chain- reaction (PCR) assay for pharyngeal and nasal swab specimens. Clinical characteristics include the prevalence of comorbidities, home medications, signs and symptoms, hospital treatments, laboratory results at the time of admission, radiologic examinations, comprising chest X-ray and/or computed tomography (CT) as available, performed as per the documentation in medical files. Furthermore, demographic characteristics (smoking status, sex, and age) and clinical outcomes during the hospitalization period (such as invasive mechanical ventilation, death, renal dialysis) were included. The disease's seriousness was also established as severe versus non-severe in conjunction with American Thoracic Society guidelines for community-acquired pneumonia (20). Length of stay, mortality, readmission, and discharge is included in the clinical results. In terms of comorbidity risk, the Charlson Comorbidity Index predicts 10-year survival as an indicator of overall comorbidity burden in

individuals with multiple comorbidities (21). The lowest score, 0, correlates to a 10-year survival rate calculated at 98 %.

Furthermore, laboratory and radiologic findings were classified to achieve a better understanding of the clinical data. Pulmonary consolidation was categorized according to chest radiographic findings into three grades: grade 1 for no consolidation or consolidation in ≤ 1/4 of lung field; grade 2 for consolidation in ≥ 1/4 but < 2/4 of lung field; and grade 3, for consolidation in ≥ 2/4 of lung field. Creatinine level changes were categorized as indicated below: (0) for normal level; (1) for level of >1.06 and ≤ 1.30 mg/dL; and (2) for level of >1.30 mg/dL. Hypoxemia was categorized into the following four grades: grade 0 for no hypoxemia; grade 1 for sphagnous oxygen saturation of the blood (Spo2) equal to 93%; grade 2 for Spo2 of ≥ 90% and < 93%; and grade 3 for Spo2 of < 90%. C reactive protein, D-dimer, and Troponin test were categorized as negative (-) or positive (+).

Based on progression, patients were classified into two groups. (1) The progression group: For patients identified as common-type at the time of admission, then adjusted to extreme or severe-type or death; for individuals identified as severe-type then adjusted to critical-type or death; and patents identified as critical-type then advanced to death. (2) The improvement/stabilization group: for patients determined at the time of admission as common, or severe, or critical types and remained unchanged; patient determined as common type then recovered; patient determined as severe-type then changed to common type; and patient determined as critical-type then changed to a severe or common type.

All data were gathered under strict confidentiality conditions, and data were analyzed anonymously by patient ID number. This research acquired approval from the Ethics Review Board at Royal Medical Services.

Descriptive statistical analyses were run using SPSS software for Windows version 20, and the level of significance was set as $P < 0.05$. Normal variables' distribution was tested using the Kolmogorov-Smirnov procedure. Mean, standard deviation, and proportion were used to summarize continuous and categorical variables of sample characteristics as appropriate. The t-test was performed to evaluate the mean of continuous variables, while the chi-square test was performed to test the categorical variables' relation. Pearson correlation was run to test the association between clinical characteristics and prognosis. Besides, the influence of variables that were historically associated with prognosis was calculated using univariate and multivariate logistic regression analysis.

Results

The Study Sample's Demographic Data and Clinical Characteristics:

In the current study, a total of 51 individuals diagnosed with COVID-19 were involved with a mean of age 33.6 years, and most of them were younger than 50 years (45 patients). Most of them were male patients (42 patients). Nineteen patients were smokers, and 32 were non-smokers. Regarding comorbidities, most were healthy (37 patients), and the rest were diagnosed with chronic illnesses, such as chronic obstructive pulmonary disease, diabetes, and hypertension (14 patients). Fever was the most common sign among COVID-19 patients (20 patients), whereas, fatigue (four patients) and sore throat (four patients) were the least common signs among the study sample. Furthermore, 16 patients were not complaining of any signs or symptoms of COVID-19 disease. Four patients were determined as severe cases according to the study criteria. The mean score of the admission period was 17.82 (SD=4.3). The study sample was not included in any readmission or death cases. Moreover, 46 patients were classified into the stabilization/improvement category, while the rest (five participants) were classified into i the progression category.

In comparison between progression and improvement/stabilization groups, individuals in progression category were older than participants in stabilization/improvement category (M = 49.0 and 31.9 respectively, t = 2.481, P = 0.007). The number of patients determined as severe cases in the progression group was significantly greater than those in the improvement/stabilization group (four and one patients, respectively, P = 0.000). Length of stay in hospital was essentially higher among participants in the progression category than participants in the stabilization/improvement category (M = 24.0, 17.15 days, t = 3.804, P = 0.000). Total comorbidity burden was estimated in the study using the Charlson Comorbidity Index, which

estimates death's risk over 10 years. Most (37%) patient's scores were in the first degree, which has an estimated death rate of 8%.

A significant detected when comparing the progression and improvement group concerning diabetes and hypertension (P = 0.036 and 0.041, respectively). There were no significant differences between progression and improvement/stabilization groups concerning the rest of demographic patient's data and clinical characteristics: sex, smoking status, and sign and symptoms (P > 0.05) (Table1).

Laboratory findings and imaging features of individuals with COVID-19:

In the present study, many laboratory results and imaging differences were detected between the progression and improvement/stabilization categories of individuals with COVID-19. WBCs were notably higher in the stabilization/improvement category than those in the progression category. The mean score of WBCs for both groups was still within the normal range (M = 4.580×10^{9}/L and 6.082×10^{9}/L respectively, t = 2.311, P = 0.025). Creatinine was notably increased in the progression category compared to the stabilization/improvement category (M = 1.562 mg/dL and 0.9067 mg/dL respectively, t= 4.929, P = 0.000). Total bilirubin was notably increased in the progression category compared to the stabilization/improvement category (M = 1.102 mg/dl, and 0.8033 mg/dl respectively, t = 2.147, P = 0.037). ALP was notably higher in the progression category of patients than those in the stabilization/improvement category. The mean score of ALP for both groups was still within the normal range (M = 111.6 U/L and 87.65 U/L respectively, t = 2.188, P = 0.033) Moreover, albumin level was notably decreased in the progression category compared to stabilization/improvement category (M = 31.80 mg/L and 36.89 mg/L respectively, t = 2.109, P = 0.04). LDH was significantly increased in the progression category compared to the stabilization/improvement category (M = 448.4 U/L, and 332.4 U/L, respectively, t = 2.036, P = 0.047). CRP positive results were significantly higher in the progression category compared to the stabilization/improvement category (P=0.037). The frequencies of grade 2 and grade 3 of hypoxemia were higher in proportion in progression category (grade 2=2 participants (40%), grade 3=2 participants (40%) and for stabilization/improvement category (grade 2=11 patients (23.9%) and grade 3= 5 patients (10.9%) (X^2 = 8.425 and 9.241 respectively, P = 0.001 and 0.006 respectively). There were no significant differences in RBCs, Hb, platelets, PT, INR, ALT, AST, ferritin, D-dimer, and troponin levels between the progression and improvement/stabilization groups.

Regarding chest image (X-ray and CT scan); there was a significant difference in pulmonary consolidation in all grades of pulmonary consolidation between the progression and improvement/stabilization group ($P < 0.005$). There were three patients in the progression group complaining of grade 3 of pulmonary consolidation compared to no patient in the improvement/stabilization group ($X^2 = 2.119$, $P = 0.000$) (Table 2).

Treatments:

Among a total of 51 patients, two patients did not receive any form of treatment during the admission period. Most patients (43 patients) received anticoagulant agents within treatment protocols. The most common type of treatment for the progression group was anticoagulant, antibacterial, hydroxychloroquine, and amino acid. The most used anticoagulant was tinzaparin sodium, and the most used antibacterial was azithromycin and piperacillin. No significant differences were reported between the progression and improvement/stabilization groups with regard to treatment protocols anticoagulant, hydroxychloroquine, anticoagulant + vitamin C, anticoagulant + antibacterial + hydroxychloroquine + amino acid, anticoagulant+ antibacterial + vitamin C, vitamin C + antibacterial + hydroxychloroquine + anticoagulant, multivitamin, antibacterial + anticoagulant, anticoagulant + hydroxychloroquine, anticoagulant + antibacterial + hydroxychloroquine (P > 0.05) (Table 3).

Disease progression risk features among COVID-19 positive individuals:

Univariate Logistic Regression showed that age (OR, 2.92; CI: 1.86-3.99; P = 0.026), diabetes (OR, 2.651; CI: 2.43-5.96, P = 0.033), hypertension (OR, 1.45; CI: 1.21 - 3.92; P = 0.042), creatinine (OR, 5.38; CI: 3.38 - 10.2; P = 0.009), total bilirubin (OR, 3.48; CI: 2.01 - 4.10; P = 0.024), ALP (OR, 0.360; CI: 0.292 - 994; P = 0.03), LDH (OR, 0.063; CI: 0.017 - 997; P = 0.04), albumin (OR, 1.66; CI: 0.944 - 4.71; P = 0.048), and SpO2 (OR, 2.55; CI: 1.19 - 5.45; P = 0.015) were notably related with progression of the infection.

Moreover, multivariate logistic regression determined age (OR, 1.79; CI: 0.950 - 3.28; P = 0.035), diabetes (OR, 1.62; CI: 1.02 - 4.19; P = 0.012), hypertension (OR, 1.13; CI: 1.04 - 3.62; P = 0.023), creatinine (OR, 3.57; CI: 2.30 - 6.71; P = 0.01), and total bilirubin (OR, 2.82; CI: 1.72 - 3.28; P = 0.031) as disease progression risk factors (Table 4).

Discussion

This is a descriptive study addressing the clinical features and factors associated with COVID-19 patients' prognosis, including 51 patients hospitalized at Queen Alia Military Hospital in Amman-Jordan with laboratory-confirmed COVID-19 disease. The present study provides a comprehensive review of demographic characteristics, clinical features, chest imaging findings, laboratory findings, and disease progression and severity.

The study results reported progression in five patients (9.8%) and stabilization/improvement in 46 participants (90.2%). Forty-five participants (88.2%) were under 50 years old and only six patients (11.8%) were older than 50 years old (mean age 33.6 years). The study suggests that all age categories are vulnerable to COVID-19 infection, and this is confirmed in the literature (10- 12). Sixty percent of individuals in the progression category were above the age of 50, compared to 6.5% of patients in the improvement/stabilization group, with a notable difference between the two groups ($P < 0.05$). Moreover, age above 50 years was a significant risk factor for COVID-19 disease prognosis according to the multivariate logistic regression analysis result. A similar study reported that higher age is evidently increased severity and affects the disease (22, 23).

COVID-19 disease affects both males and females, but it was more prevalent among males (82.4%) than females (17.6%). On the other hand, sex was not a significant risk factor for disease prognosis according to univariate logistic regression analysis. In contrast, Meng et al. (2020) reported that sex was an important demographic variable in disease progression, either with or without other comorbidities (15). This might be explained by the protection role of sex hormones and the X chromosome, which perform a critical role in adaptive and innate immunity against viral infections (24). Our study suggests that sex might affect the spreading of COVID-19, but it has not impacted the prognosis of the disease. Additional research is needed to examine the potential impact of sex on disease progression.

Comorbidities should be considered when assessing any disease progression or disease risk factors, especially for patients who suffer from pneumonia (25). In our study, diabetes and hypertension were the most common comorbidities, asthma, chronic kidney disease, and chronic obstructive pulmonary diseases were the least common comorbidities. There were notable discrepancies between the two categories concerning diabetes and hypertension ($P < 0.05$). Furthermore, diabetes and hypertension were determined as COVID-19 disease risk factors progression according to multivariate logistic regression ($P < 0.05$). Globally, it has been estimated that 20 - 50% of COVID-19 patients had diabetes, which explains the link between them (26). Previously, diabetes was determined as a risk factor that increases the mortality rate in SARS coronavirus and Middle East Respiratory Syndrome-related coronavirus (MERS CoV) (27, 28). A strong association has been found between hypertension and risk for acute respiratory disease either by the disease itself or during treatment, especially for those treated with angiotensin- converting enzyme inhibitors (ACEI) (29, 30). Zaki et al. reviewed and critically appraised 54 articles regarding the association between COVID-19 disease prognosis and comorbidities and concluded that diabetes, hypertension, and cholesterol level were associated with poor disease outcomes (31).

The proportion of smoker participants in the progression category (60%) was more than those in the stabilization/improvement category (34.8%). Possibly due to the limited sample size, there were no notable differences between the groups concerning smoking status, and smoking was not identified as a risk factor for disease progression ($P > 0.05$). A meta-analysis of five studies conducted in China to estimate the odds ratio of smoking in patients with or without the severe form of COVID-19 found that active smoking does not notably relate to an enhanced risk of poor progression (32). However, another meta-analysis has reported that the risk for disease progression among smoker patients was 2.5 times higher than among non-smokers (OR, 2.51; 95% CI, 1.39 - 3.32; $P = 0.0006$) (33).

Fever, diarrhea, shortness of breath, cough, and vomiting were the most dominant clinical features of COVID-19 diseases, and those signs were not identified as risk factors for disease progression ($P = 0.05$). Similarities of clinical features have been noted in several studies (7, 9, 34).

A recent study reported that fever at the time of admission was a risk factor for disease progression (22). The most frequently reported laboratory abnormality in both improvements/ stabilization and progression groups was C reactive protein and D-dimer. The progression group reported elevated creatinine, elevated total bilirubin, elevated lactic acid dehydrogenase, and decreased albumin compared to the improvement/stabilization group. Significant differences were also reported between groups regarding creatinine, total bilirubin, lactic acid dehydrogenase, and albumin ($P < 0.005$). Elevated lactic acid dehydrogenase and C reactive protein were frequently reported in literature among persons with COVID-19 (10, 35). The

Usefulness of these laboratory findings for identifying markers for differential diagnosis is limited since they are non-specific tests. On the other hand, elevated C reactive protein is most commonly seen in critically ill patients, and it could be used as an indicator for the severity of inflammatory response. Additionally, multiple linear regression elevated creatinine, and total bilirubin were reported as risk factors for disease progression ($P < 0.05$). The retrospective study included 85 patients to estimate the glomerular filtration rate of COVID-19 patients, and the study concludes that 27.06% developed acute renal failure (36). Besides, kidney tissue was a specific target for COVID-19 disease, as explained by the accumulation of SARS-CoV-2 NP antigen in kidney tubules (36). Another study revealed that patients with abnormal liver tests (total bilirubin and aspartate aminotransferase, gamma- glutamyl transferase, and alanine aminotransferase) had had higher chances of progressing to severe disease (37).

Hypoxia is a sign of lung involvement of patients suffer from COVID-19 disease, and it is useful to use as a marker that guides the medical team to triage the individuals to a higher level of care. In the present study, the proportion of patients suffering from hypoxia grade 2 and 3 (SpO2 >90-

>93 and <90 respectively) was notably higher in the progression category than stabilization/ improvement category ($P < 0.05$), but this was not identified as a risk factor for disease progression according to multivariate logistic regression ($P < 0.05$). Lu et al considered oxygen saturation as prognostic markers that facilitate early intervention and classified survival rate according to oxygen saturation (SpO2) (38).

Radiology studies reported ground glass (GGO) pattern as dominant features of COVID-19 disease. This is usually peripheral, bilateral, and multifocal in nature, but it most commonly appears as a unifocal lesion in the early stage in the right lung's inferior lobe (39). In the present study, pulmonary consolidation was categorized into three grades based on radiograph findings. All patients in the progression category were classified as group 2 (consolidation in ≥1/4 but less < 2/4 of lung field) or 3 (consolidation in ≥ 2/4 of lung field), and there were significant differences between progression and stabilization/improvement categories ($P < 0.05$). However, pulmonary consolidation was not reported as a disease progression risk factor ($P > 0.05$). In contrast, Francone et al. reported that more lobular involvement was related to an increased mortality risk among COVID-19 patients (40).

Limitations

A few limitations may appear regarding the research design in the present study, which is retrospective in nature; some relevant data such as electrocardiograph and body mass index could not be recorded or not available in an electronic medical file. Few of electronic medical files didn't include chest CT image and the authors depended on reported report during data collection. The study included a small sample size, which may affect the accuracy of the result or lead to a biased result. Although the sample size was small, it represents more than half of hospitalized patients from the beginning of the pandemic until the time of data collection.

Conclusion

The present study provides comprehensive data about risk factors and clinical traits that affect the prognosis of COVID-19 patients in Jordan, most cases were not severe cases. Age, diabetes, hypertension, increased creatinine, and increased total bilirubin were determined as risk factors for disease progression. The present study provides valuable data that can be used in the management of COVID-19 disease.

Table (1): Study sample's clinical characteristics and demographic data.

Variables	**Total (N=51)** **Mean (SD) or Frequency**	**Improvement/ Stabilization group (N=46)**	**Progression group (N=5)**	**Statistics t or X^2**	***P*-value**
Age (years) <50 >50	33.63 (13.6) 45 (88.2%) 6 (11.8%)	31.9 43 (93.5%) 3 (6.5%)	49.0 2(40%) 3(60%)	2.481*	.007
Sex Male Female	 42 (82.4%) 9 (17.6%)	 38 (82.6%) 8 (17.4%)	 4(80%) 1(20%)	.021**	.638
Smoking status Yes No	 19(37.3%) 32(62.7%)	 16(34.8%) 30(65.2%)	 3(60%) 2(40%)	1.22**	.348
Comorbidities					
Non	37 (72.5%)	37 (80.4%)	0 (0%)	3.21**	.312
DM	4 (7.8%)	2 (4.3%)	2 (40%)	.982**	.036
HTN	2 (3.8%)	1 (2.2%)	1 (20%)	.428**	.041
COPD	1 (2%)	0 (0%)	1 (20)	.012**	.132
DM, HTN	3 (5.9%)	3 (6.5%)	0 (0%)	.661**	.000
HTN, COPD	1 (2%)	1 (2.2%)	0 (0%)	.524**	.328
CKD	1 (2%)	0 (0%)	1 (20%)	.013**	.063
Asthma	1 (2%)	1 (2.2%)	0 (0%)	.010**	.441
others	1 (2%)	1 (2.2%)	0(0%)	.023**	.229
Signs & symptoms					
no complaint	16 (31.4%)	15 (32.6%)	1 (20%)	4.13**	.196
fever	20 (39.2%)	15 (32.6%)	5 (100%)	1.52**	.069
cough	8 (15.7%)	5 10.9%)	3 (60%)	.582**	.598
loss of smell	7 (13.7%)	6 (13%)	1 (20%)	3.61**	.132
sore throat	4 (7.8%)	2 (4.3%)	2 (40%)	1.77**	.612
nausea	5 (9.8%)	3 (6.5%)	2 (40%)	.612**	.087
vomiting	8 (15.7%)	8 (17.4%)	0 (0%)	1.98**	.326
diarrhea	12 (23.6%)	10 (21.7%)	2 (40%)	.551**	.539
SOB	10 (19.6%)	5 (10.9%)	5 (100%)	.924**	.061
Chest pain	7 (13.7)	5 (10.9%)	2 (40%)	.669**	.745
Headache	5 (9.8%)	4 (8.7%)	1 (20%)	.728**	.221
Fatigue	4 (7.8%)	3 (6.5%)	1 (20%)	.615**	.072
Severity					
Sever	4 (7.8%)	0 (0%)	4 (80%)		.000
Not-sever	47 (92.2%)	46 (100%)	1 (20%)		
Length of stay	17.82 (4.3)	17. 15	24.0	3.804*	.000
Total comorbidity burden					
death rate over10 years= 8%	37 (72.5%)	36 (78.2%)	1 (20%)	18.63**	.008
death rate over 10 years= 25%	9 (17.7%)	8 (17.4%)	1 (20%)	11.69**	.005
death rate over 10 years=48%	1 (2%)	0 (0%)	1 (20%)	2.811**	.000
death rate over 10 years= 59%	4 (7.8%)	2 (4.4%)	2 (40%)	13.08**	.082

Mortality		
Yes	0 (0%)	
No	51 (100%)	
Readmission		
Yes	0 (0%)	
No	51 (100%)	

DM: diabetes; HTN: hypertension; COPD: chronic obstructive pulmonary disease; CKD: chronic kidney disease; SOB: shortness of breath; * t test; **X^2 Value.

Table (2): Imaging characteristics and Laboratory of patients with COVID-19.

Variables	**Total (N=51)** **Mean (SD) or Frequency (%)**	**Stabilization/Improvement group (N=46)**	**Progression group (N=5)**	**Statistics**	***P* value**
WBC $\times 10^9$/L	6.425 (3.350)	6.082 (2.748)	4.580 (6.444)	2.311*	.025
RBC $\times 10^9$/L	4.953 (.6442)	4.946 (.6331)	5.020 (.8197)	.240*	.811
Hb g/dl	13.24 (1.940)	13.29 (1.822)	12.76 (3.060)	.585*	.561
Platelets $\times 10^9$/L	239.7 (69.55)	239.9 (66.01)	237.4 (106.9)	.077*	.939
PT seconds	12.64 (1.609)	12.65 (1.526)	12.62 (2.486)	.042*	.967
INR	.9429 (.1526)	.9441 (.1462)	.9320 (.2247)	.167*	.868
Creatinine mg/dL	.9710 (.3418)	.9067 (.2492)	1.562 (.5265)	4.929*	.000
ALT U/L	47.94 (11.86)	47.07 (12.02)	56.00 (6.595)	1.624*	.111
AST U/L	38.66 (9.338)	38.51 (9.729)	40.00 (4.743)	.335*	.739
Bilirubin Total mg/dL	.8325 (.3059)	.8033 (.2927)	1.102 (.3244)	2.147*	.037
ALP U/L	90.00 (24.11)	87.65 (24.21)	111.6 (4.979)	2.188*	.033
LDH U/L	343.8 (124.6)	332.4 (125.5)	448.4 (40.12)	2.036*	.047
Albumin g/L	36.39 (5.299)	36.89 (4.994)	31.80 (6.418)	2.109*	.040
Ferritin ng/ml	103.6 (49.30)	106.5 (49.11)	76.60 (47.33)	1.29*	.200
C Reactive protein +ve -ve	 13(33.3%) 34(66.7%)	 13(28.26%) 33(71.74%)	 4(80%) 1(20%)		.037
D-dimer +ve -ve	 6(11.8%) 45(88.25)	 5 (10.67%) 41 (89.33%)	 1(20%) 4(80%)	5.433**	.480
Troponin +ve -ve	 1 (2%) 50 (98%)	 1 (2.17%) 45 (97.8%)	 0 (0%) 5 (100%)		.902

Pulmonary consolidation					
no consolidation or consolidation in ≤1/4 of the lung field	29(56.8%)	29(63%)	0 (0%)	30.76**	.001
consolidation in≥1/4 but less < 2/4 of the lung field	19(37.3%)	17(37%)	2 (40%)	25.61**	.000
consolidation in ≥ 2/4 of the lung field	3 (5.9%)	0 (0%)	3 (50%)	2.119**	.000
SpO2					
Grade 0(>93)	30 (58.8%)	30 (65.2%)	0 (0%)	25.42**	.041
Grade 1(=93)	6 (11.8%)	5 (10.9%)	1(20%)	3.272**	.005
Grade 2(>90->93)	13 (25.5%)	11 (23.9%)	2(40%)	8.425**	.001
Grade 3 (<90)	2 (3.9%)	0 (0%)	240%)	9.241**	.006

WBC: White blood cell; RBC: Red blood cell; Hb: Hemoglobin; PT: Prothrombin time; INR: International normalized ratio; ALT: Alanine transaminase; AST: Aspartate aminotransferase; ALP: Alkaline phosphatase; LDH: Lactate dehydrogenase; SpO2: Oxygen saturation; * t test; **X^2 Value;

Table (3): Types of treatment of COVID-19 patients.

Types of treatment	**Total (N=51)**	**Stabilization/Improvement group (N=46)**	**Progression group (N=5)**	**Statistics**	***P*-value**
No treatment	2	2	0	13.04	.243
Tinzaparin	2	2	0		
Hydroxychloroquine	1	1	0		
Tinzaparin, Vitamin C	16	16	0		
Tinzaparin, Azithromycin, Hydroxychlorquin, Argimine	1	1	0		
Tinzaparin, Azithromycin Hydroxychloroquin, Argimine, Pipracillin	11	7	4		
Tinzaparin, Azithromycin,Pipracillin, Vitamin C	4	3	1		
Vitamin C, Azithromycin, Hydroxychloroquin, Metronidazole,Tinzaparin	2	2	0		

Multivitamin	5	5	0		
Ceftriaxone, Tinzaparin, Azithromycin	2	2	0		
Tinzaparin, Hydroxychloroquine	4	4	0		
Tinzaparin, Azithromycin Ceftriaxone, Hydroxychloroquine	1	1	0		

Table (4): Risk factors of COVID-19 disease progression.

Variables	**Univariate analysis**			**Multivariate analysis**		
	OR	**95% CI**	***P***	**OR**	**95% CI**	***P***
Age (>50 years)	2.92	1.86-3.99	.026	1.79	.950-3.28	.035
Gender (male vs female)	.589	.029-12.7	.731			
Smoking (yes vs no)	.729	.082-6.49	.777			
Comorbidities						
DM (yes vs. no)	2.65	2.43-5.96	.033	1.62	1.02-4.19	.012
HTN (yes vs. no)	1.45	1.21-3.92	.042	1.13	1.04-3.62	.023
Sign and symptom **Fever (≥37.5 C0 vs <37.5 C0)**	1.05	.850-1.31	.624			
Increased WBCs	.800	.640-1.01	.051			
Decreased RBCs	1.957	1.20-4.45	.956			
Decreased Platelets	1.01	.986-1.11	.971			
Decreased Hb	1.15	.720-1.83	.559			
D-dimer (+ve vs –ve)	.478	.043-5.29	.548			
Increased PT	1.03	.577-1.85	.909			
Increased INR	7.99	.101-8.80	.128			
Increased Creatinine	5.83	3.38-10.2	.009	3.57	2.30-6.71	.010
C Reactive Protein(+ve vs –ve)	1.95	1.01-2.45	.100			
Increased ALT	.070	.828-1.050	.150			
Increased AST	.018	.871-1.18	.771			

Increased Total bilirubin	3.48	2.01-4.10	.024	2.82	1.72-3.28	.031
Increased ALP	.360	.292-.994	.030	.259	.223-1.35	.193
Increased LDH	.063	.017-.997	.040	.051	.022-2.08	.182
Decreased Albumin	1.66	.944-4.71	.048	1.29	.813-3.82	.081
Decreased Ferritin	1.041	1.01-1.83	.711			
Troponin (+ve vs –ve)	18.8	.000-.983	.910			
Decreased SpO2	2.55	1.19-5.45	.015	.213	.524-1.32	.150
Pulmonary consolidation	5.37	4.03-21.7	.997			

DM: diabetes; HTN: hypertension; WBC: White blood cell; RBC: Red blood cell; Hb: Hemoglobin; PT: Prothrombin time; INR: International normalized ratio; ALT: Alanine transaminase; AST: Aspartate aminotransferase; ALP: Alkaline phosphatase; LDH: Lactate dehydrogenase; SpO2: Oxygen saturation

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