Predictors of the chest CT score in COVID-19 patients: A cross-sectional study

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Abstract

Background: Since the COVID-19 outbreak, pulmonary involvement was one of the most significant concerns in assessing patients. In the current study, we evaluated patient's clinical and laboratory findings on the first visit to predict the severity of pulmonary involvement and their outcome. Methods: Four hundred seventy-eight COVID-19 patients with positive real-time reverse-transcriptase-polymerase chain reaction (RT-PCR) or highly suggestive symptoms with computed tomography(CT) imaging results with typical findings of COVID-19 were enrolled in the study. The clinical features, initial laboratory, CT findings, and short-term outcomes (ICU admission, mortality, length of hospitalization, and recovery time) were recorded. In addition, the severity of pulmonary involvement was assessed using a semi-quantitative scoring system (0-25). Results: Among 478 participants in this study, 353 (73.6%) were admitted to the hospital, and 57 (11.9%) patients were admitted to the ICU. A review of chest CT scans showed that Ground Glass Opacity (GGO) (58.5%) and consolidation (20.7%) were the most patterns of lung lesions. Among initial clinical and laboratory findings, anosmia (P = 0.01), respiratory rate (RR) [?] 25 (P = 0.001), C-reactive protein (CRP) [?] 91 (P = 0.002), white Blood Cell (WBC) >10,000 (P = 0.009), and SpO2 [?] 93 (P = 0.04) was associated with higher chest CT score. Lung involvement and consolidation lesions on chest CT scans were also associated with more extended hospitalization and recovery period. Conclusions: Initial assessment of COVID-19 patients, including symptoms, vital signs, and routine laboratory tests, can predict the severity of lung involvement and unfavorable outcomes.

Introduction

The coronavirus disease (COVID-19), Caused by a novel coronavirus named severe acute respiratory syndrome coronavirus2 (SARS-CoV-2), has spread to 223 countries with more than 186 million confirmed cases and more than 4 million deaths (World Health Organization)(1). SARS-CoV-2 shares similarities in disease dynamics, transmission route, and cell entry receptors, angiotensin-converting enzyme 2 (ACE2) with severe acute respiratory syndrome coronavirus (SARS-CoV). (2-4)

Person-to-person transmission of SARS-CoV-2 occurs with respiratory droplets from an infected person to others. Viral shedding may occur 1-2 days before the onset of symptoms and may continue for 1-2 weeks in mild to moderate cases or go beyond two weeks in severe cases(5, 6). Symptoms usually appear between 2 and 14 days after exposure; The common initial symptoms of COVID-19 are fever, cough, fatigue, and dyspnea (7, 8), with more specific symptoms, including loss of taste and smell(6). SARS-CoV-2 targets multiple organs, including respiratory, cardiac, and renal systems causing pneumonia and respiratory failure in patients (9, 10). In addition, systemic inflammatory response syndrome and cytokine storm contribute to multi-organ failure and coagulopathy in critical patients with COVID-19 (11, 12).

Computed tomography (CT) is the most sensitive tool for diagnosing COVID-19, and several radiological patterns are seen in different phases of disease (13, 14). Among different patterns of chest CT scan, Ground-glass opacities (GGO) and mixed GGO with consolidation is reported as the most common patterns in COVID-19 patients(15). Although definite diagnosis relies on real-time reverse-transcriptase-polymerase chain reaction (RT-PCR) (16), chest CT is a valuable modality to measure the extent of lung involvement and propose a treatment plan.

Initial assessment of COVID-19 patients is essential for further management. In this study, we assessed the patient's signs, symptoms, laboratory tests, and imaging findings to identify which initial clinical and laboratory findings may predict the severity of lung involvement and, accordingly, short-term outcome.

Method

Study design and participants

The study protocol\souts and consent notes were reviewed and approved by the ethics board of our institute (approval code: XXX.REC.1399.138). This study is a cross-sectional, observational, single-center study conducted between April and August 2020 at a tertiary medical center. All referred patients to the COVID-19 clinic of XXX, university hospital, were evaluated for eligibility of participation in the study. Patients with clinical symptoms suggestive of COVID-19 who had positive RT-PCR confirming COVID-19 or suggestive chest CT scan were recruited after signing a written informed consent form. Four physicians did the patient examination and data registration, and five medical residents followed up with the patients through telephone calls. Both hospitalized (after discharge) and outpatient participants were followed through telephone calls until symptoms resolved. Treatment regimens were based on the latest version of the national protocol of COVID-19 (hydroxychloroquine was used as the primary therapeutic option in the outpatient setting; hydroxychloroquine, lopinavir/ritonavir

(Kaletra), atazanavir (nonboosted with ritonavir or cobicistat) were administered for hospitalized patients, and in case of severe hypoxemia (not attaining SpO2 of $>$ 88% with reservoir mask), corticosteroid was given).

Data collection

Following Clinical data were collected in the specific forms for each patient, including: (a) *demographics information* : (age and sex); (b) *vital signs* : temperature (T-Celsius), oxygen saturation (SpO_2), respiratory rate (RR per minute), and pulse rate (PR per minute); (c) *symptoms* : myalgia, generalized weakness, fever, chills, headache, chest pain, dyspnea, sore throat, cough, sputum, loss of appetite, loss of taste, anosmia; (d)*comorbidities* : hypertension (HTN), diabetes mellitus (DM); (e)*laboratory data* : white blood cell (WBC-cell/mm3), lymphocyte count (cell/mm3), platelet(cell/mm3), C-reactive protein (CRP-mg/L), erythrocyte sedimentation rate (ESR-mm/hr), and lactate dehydrogenase (units/L); (f) *admission status:* inpatient or outpatient; (g)*Intensive care unit (ICU) admission* ; (h) *death* ; (i)*radiologic findings* (will be mentioned in following section); (j)*length of hospitalization (day) and recovery time (day).* The recovery time was defined as the patient's subjective statement indicating no symptoms other than his/her baseline.

Chest CT protocols and interpretation

All chest CT scans were performed on either lightspeed 64-detector CT (GE Healthcare) or the 16-slice (Siemens SOMATOM Emotion) MDCT scanner with patients in the supine position at full inspiration breath-hold. The leading scanning parameters were as follows: 120 kVp tube voltage; 50-150 mAs tube current; 0.75 s tube rotation time; 0.5–0.75 s gantry rotation time; 2–3-mm section thickness; and 0.6–2 mm beam collimation.

The visual chest CT interpretation was performed using a single, experienced (10 years) thoracic radiologist. The radiologist was blinded to clinical and laboratory data of participants and reviewed on both lung and mediastinal window settings. The presence of CT features including *(a) predominant pattern of lesions:* ground-glass opacification (GGO), consolidation, or mixed GGO and consolidation;*(b) dominant distribution*

of lesions: central, peripheral, diffuse, or peri- broncho vascular; *(c) shape of lesions* : round, elongated, wedged, or confluent; *(d) additional findings:* crazy paving pattern, reverse-halo sign, interlobular septal thickening, linear opacities combined, air bronchogram sign, tree in bud, adjacent pleural thickening, pleural effusion, pericardial effusion, lymphadenopathy, and pulmonary emphysema, was reported as defined in Fleischner Society Glossary of terms for Thoracic Imaging (17).

To quantify the extension of lung lesions, a scoring system as follows was used: each of the five lobes of lungs visually scored from 0 to 5 (0, no involvement; 1, $<$ 5% involvement; 2, 5–25% involvement; 3, 26–49% involvement; 4, 50–75% involvement; 5, $>$ 75% involvement). Then, the total chest CT score was calculated by the sum of each lob's scores, ranging from 0 to 25 (18).

Statistical analysis

The statistical analysis was performed using SPSS version 16 (SPSS Inc. Chicago, IL). Continuous variables were presented as mean (standard deviation), and categorical variables as frequency and percentages. Variables were tested for normality using Kolmogorov-Smirnov test. Normally distributed continuous variables were analyzed using the independent sample t -test; otherwise, the Mann-Whitney U test was used. A Chi-square test was employed for nominal variables. P values less than 0.05 were considered statistically significant.

Results

Participant's characteristic

A total of 478 participants were recruited in the current study with convenient sampling. Of those, 353 (73.6%) participants were admitted to the hospital, and among hospitalized participants, 57 (11.9%) were admitted to ICU. The patient's mean age was 53.92 (15.4), and 267 (55.8%) was male. The most common complaints of patients were myalgia (60.3%), fever (59.3%), dyspnea (57.8%), chills (49.5%), and generalized weakness (45.3%). Demographics, initial signs, symptoms, and laboratory data of all participants are listed (Table 1).

Chest CT scan findings

The most common patterns of pulmonary involvement were GGO (58.5%) and consolidation 99 (20.7%) with peri-broncho-vascular (33.7%), peripheral (33%), and diffuse (32%) distribution, and the most common shape of lesions were confluent (47.2%). Detailed chest CT scan findings are presented (Table 2).

Our results showed that the total chest CT score was significantly higher in patients with anosmia (mean of 12.46$\pm$7.73 vs. 8.73$\pm$8.33;P = 0.01), and had a significant positive association with RR with a cut point of 25 (mean of 8.37$\pm$7.94 vs. 12.37$\pm$9.23; P = 0.001), CRP with a cut point of 90 (mean of 7.82$\pm$7.89 vs. 10.83$\pm$8.67;P = 0.002), WBC with a cut point of 10000 (mean of 8.70$\pm$8.33 vs. 12.02$\pm$8.17; P = 0.009) and negative association with SpO2 with a cut point of 93 (mean of 9.75$\pm$8.54 vs. 7.76$\pm$7.58; P = 0.04). Chest CT score was also associated with a higher risk of ICU admission (mean of 11.10$\pm$9 vs. 7.71$\pm$7.88; P = 0.003), longer hospital stay (mean of 9.08$\pm$8.23 vs. 12$\pm$9.21; P = 0.037) and recovery period (mean of 7.28$\pm$8.02 vs. 9.29$\pm$8.09; P = 0.009) (Table 3).

Further analysis showed consolidation on chest CT scan had a significant association with initial lower SpO2 (P = 0.001), higher risk of ICU admission (P = 0.005), extended hospitalization (P = 0.003), and longer recovery time (P = 0.008) (Table 4).

Discussion

As treatment protocols are based on the extent of lung involvement, assessing the severity of pulmonary involvement is crucial in determining the treatment plan for COVID-19 infected patients. Chest CT scan is not available everywhere, and its usage is sometimes limited, especially in pregnant patients. Therefore, physicians need prompt assessment according to patient's initial signs and symptoms and routine laboratory tests for timely management. In the current study, we assessed clinical and laboratory findings on the first

visit to predict the extent of lung involvement in COVID-19 patients. We found that patients with anosmia, lower SpO2 (<93), and higher respiratory rate (>25 per minute), WBC count (>10,000 cells/mm3), CRP (>90 mg/Liter) had higher total CT scores. Besides, consolidation opacities as the worst lung lesions were more commonly detected in patients with lower initial SpO2 or admitted to ICU. Moreover, patients with consolidation on their chest CT scan experienced extended hospitalization ([?]15) and recovery period ([?]15). A higher chest CT score was also associated with more extended hospitalization and recovery time.

Predictors of severe lung involvement

In line with previous studies, our results showed that higher initial WBC and CRP are associated with more severe cases of COVID-19 patients, as WBC >1000 cell/mm3 and CRP >90 mg/L were associated with higher chest CT scores. Similar to our findings, Salvatore et al. reported hospitalized and critical COVID-19 patients had higher CRP, leukocyte count, neutrophils, LDH, D-dimer, and troponin (19). Zhang et al. also reported that chest CT score positively associated with WBC count, CRP, ESR, procalcitonin, and abnormal coagulation function (20).

Among several clinical symptoms on the first visit, just anosmia was associated with extended pulmonary involvement. A literature review did not show any previous report of extended lung involvement in patients with anosmia, and our study is the first to report this correlation. Association of anosmia and pulmonary involvement can be justified by the roll of CXCL10 chemokine, as previous reports defined CXCL10 contribution in both cytokine storm of COVID-19 patients causing acute respiratory distress syndrome (ARDS) and demyelination process of the olfactory nerve causing anosmia(21).

Several clinical signs of patients on the first visit, including higher RR and lower SpO2, were associated with higher total chest CT scores. Lower SpO2 was also associated with consolidation opacities as the most severe lesion of COVID-19 in chest CT scan. In line with our findings, Kunwei Li et al. also showed that patients with RR [?] 30 times/min, and SpO2 [?] 93% as categorized in severe type patients, had significantly higher total chest CT scores than common type patients(22). Another study also confirmed that severe/critical patients with respiratory rate [?] 30 times/min and SpO2 of 93% or less in a resting state had higher total CT scores than ordinary COVID-19 patients (23). Aalinezhad (24) and Osman(25) et al. also reported higher chest CT score is inversely associated with O2 saturation. Furthermore, a multicenter cohort study demonstrated that consolidation in upper lungs on the initial chest CT of COVID-19 patients was associated with increased odds of adverse endpoints, including SpO2 < 93% and partial arterial pressure of oxygen less than 60 mm Hg on room air(26).

Chest CT predictors of unfavorable outcomes

We found that ICU admission, more extended hospitalization, and recovery period were associated with higher total CT scores and consolidation opacities in chest CT of these patients. Similarly, a previous study showed a higher pulmonary score [?] of 8 accompanied by age [?] 53, and SpO_2 [?] 91 predicts ICU admission and mortality (27). Deepak Nagra et al. also reported a higher lung opacification score is a reliable predictor of ICU admission for COVID-19 patients (28). Another study on baseline chest CT scans and clinical and laboratory data of 72 patients admitted with COVID-19 pneumonia showed lung severity score > \sout4 was associated with a significantly lower recovery rate and discharge and extended hospitalization in patients admitted for COVID-19 pneumonia (29). Similar to our findings, Ahlstrand et al. previously reported that chest CT score at hospital admission correlates closely with hospital length of stay and ICU admission (30). CT severity score combined with age and history of at least one underlying disease had 79.7% sensitivity and 65.5% specificity in predicting the adverse outcomes in a previous study (31).

Initial assessment of patients in the clinic determines the treatment plan, so we assessed lung involvement based on initial signs, symptoms, and laboratory tests. Taken together, we found that patients with anosmia, higher respiratory rate, WBC count, or CRP, and lower SpO2 had extended pulmonary involvement of COVID-19 pneumonia, which can cause adverse outcomes, including more extended hospitalization and recovery period. Hence, those patients should be prioritized for greater attention and intensive care.

Limitations

As recovery time was defined as a subjective statement of patients, this could have resulted in a conclusion error; inviting the patients to the clinic for evaluation could have been more precise to confirm recovery. In addition, in this study, we assessed just the presence of symptoms, not their severity; we recommend further studies assessing the severity of symptoms and their correlation with lung involvement or adverse outcomes.

Conclusion

Extended lung involvement of COVID-19 pneumonia can be predicted in clinics with patient's initial symptoms, vital signs, and laboratory tests, including anosmia, low SpO2, high RR, WBC, and CRP. Therefore, these patients should be considered high-risk patients for further medical planning.

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Tables

Table 1: detail of demographic data and baseline signs, symptoms, and laboratory findings of all studied participants

Variables	**Variables**	All patients N = 478
Demographics	**Demographics**	
Age, years <39 39-49	Age, years <39 39-49	53.92(15.4) 90 (18.8%)
50-59 60-69 [?]70	50-59 60-69 [?]70	102 (21.3%) 104 (21.7%) 98 (20.5%) 84 (17.5%)
Gender (male)	Gender (male)	267 (55.7%)
Symptoms on the first visit	**Symptoms on the first visit**	
Myalgia	Myalgia	289 (60.3%)
Generalized weakness	Generalized weakness	217 (45.3%)
Fever	Fever	284 (59.3%)
Chills	Chills	237 (49.5%)
Headache	Headache	134 (28%)
Chest pain	Chest pain	126 (26.3%)
Dyspnea	Dyspnea	277 (57.8%)
Sore throat	Sore throat	80 (16.7%)
Cough	Cough	334 (69.7%)
Sputum	Sputum	15 (3.1%)
Loss of appetite	Loss of appetite	194 (40.5%)
Loss of taste	Loss of taste	48 (10%)
Anosmia	Anosmia	60 (12.5%)
Vital signs on first visit	**Vital signs on first visit**	
Temperature (° C)	Temperature (° C)	
	[?]37.2	212 (44.3%)
	[?]37.3	266 (55.7%)
O2 saturation %	O2 saturation %	
	[?]93	276 (57.7%)
	<93	202 (42.3%)
Respiratory rate (breaths/ minute)	Respiratory rate (breaths/ minute)	
	<25	389 (81.3%)
	[?]25	89 (18.7%)
Initial laboratory findings	**Initial laboratory findings**	
White Blood Cell (WBC) (cell/ mm3)	White Blood Cell (WBC) (cell/ mm3)	
	<4000	51 (10.6%)
	4000-9999	364 (76.3%)
	[?]10000	63 (13.1%)
Lymphocyte count (cell/ mm3)	Lymphocyte count (cell/ mm3)	

	[?]1000		103 (21.5%)
	>1000		375 (78.5%)
Platelet (cell/mm3)	Platelet (cell/mm3)		
	<150000		82 (17.1%)
	[?]150000		396 (82.9%)
C-reactive protein (CRP) (mg/L)	C-reactive protein (CRP) (mg/L)		
	[?]90		17 (3.5%)
	[?]91		461 (96.5%)
Erythrocyte sedimentation rate (ESR) (mm/hr)	Erythrocyte sedimentation rate (ESR) (mm/hr)		
	[?]60		13 (2.7%)
	[?]61		465 (97.3%)
Lactate dehydrogenase (LDH) (units/L)	Lactate dehydrogenase (LDH) (units/L)		
	<480		65 (13.5%)
	[?]480		413 (86.5%)
All variables are reported as N (%).	All variables are reported as N (%).	All variables are reported as N (%).	All variables are reported as N (%).

Table 2: Radiological findings in all studied participants

Variables	**Variables**	**Variables**	**All patients N=478**
Pulmonary involvement scores *	**Pulmonary involvement scores ***	**Pulmonary involvement scores ***	
	RUL Total Score	**RUL Total Score**	1.57 (1.75)
	RML Total Score	**RML Total Score**	1.26 (1.71)
	RLL Total Score	**RLL Total Score**	1.91 (1.84)
	LUL Total Score	**LUL Total Score**	1.56 (1.72)
	LLL Total Score	**LLL Total Score**	1.79 (1.84)
	Total PI Score	**Total PI Score**	8.11 (8.08)
Frequency of lobe involvement	**Frequency of lobe involvement**	**Frequency of lobe involvement**	
	RUL	**RUL**	266 (55.5%)
	RML	**RML**	225 (47%)
	RLL	**RLL**	304 (63.5%)
	LUL	**LUL**	274 (57.3%)
	LLL	**LLL**	287 (60%)
Laterality of lung involvement	**Laterality of lung involvement**	**Laterality of lung involvement**	

	Unilateral	**Unilateral**	52 (10.8%)
	Bilateral	**Bilateral**	286 (59.8)
Pattern of lesions	**Pattern of lesions**	**Pattern of lesions**	
	GGO	**GGO**	280 (58.5%)
	Consolidation	**Consolidation**	99 (20.7%)
	Mixed GGO and consolidation	**Mixed GGO and consolidation**	78(16.3%)
Dominant Distribution of Lesions	**Dominant Distribution of Lesions**	**Dominant Distribution of Lesions**	
	Peripheral	**Peripheral**	158 (33%)
	Central	**Central**	6 (1.3%)
	Diffuse	**Diffuse**	153 (32%)
	Peri broncho vascular	**Peri broncho vascular**	161 (33.7%)
Shape of lesions	**Shape of lesions**	**Shape of lesions**	
	Round	**Round**	73 (15.2%)
	Elongated	**Elongated**	82 (17.1%)
	Wedged	**Wedged**	183 (38.2%)
	Confluent	**Confluent**	226 (47.2%)
Additional findings	**Additional findings**	**Additional findings**	
	Crazy paving pattern	**Crazy paving pattern**	87 (31%)
	Reverse-halo	**Reverse-halo**	14 (2.9%)
	Interlobular septal thickening	**Interlobular septal thickening**	20 (4.1%)
	Linear opacities combined	**Linear opacities combined**	81 (16.9%)
	Air bronchogram sign	**Air bronchogram sign**	114 (23.8%)
	Tree in bud	**Tree in bud**	15 (3.1%)
	Adjacent pleura thickening	**Adjacent pleura thickening**	15 (3.1%)
	Pleural effusion	**Pleural effusion**	27 (5.6%)
		Unilateral	12 (2.5%)
		Bilateral	15 (3.1%)
	pericardial effusion	**pericardial effusion**	10 (2%)
	lymphadenopathy	**lymphadenopathy**	7 (1.4%)
	pulmonary emphysema	**pulmonary emphysema**	10 (2%)

reported as mean (standard deviation), all other variables reported as N (%).	reported as mean (standard deviation), all other variables reported as N (%).	reported as mean (standard deviation), all other variables reported as N (%).	reported as mean (standard deviation), all other variables reported as N (%).	reported as mean (standard deviation), all other variables reported as N (%).	reported as mean (standard deviation), all other variables reported as N (%).

Table 3: Demographic, clinical, laboratory findings, and outcomes of patients with COVID-19 based on the total chest CT scan score

Variables	**Variables**	**Total CT score Mean ± SD**	**P-value**
Demographic data	**Demographic data**		
Age (years)	Age (years)		
	<39	10.47±8.02	0.54
	39-49	8.15±8.19	
	50-59	9.96±9.03	
	60-69	9.57±8.23	
	[?]70	8.44±8.04	
Sex	Sex		
	Male	7.70±7.84	0.193
	Female	8.67±8.37	
Symptoms on first visit	**Symptoms on first visit**		
Fever	Fever		
	Yes	9.06±8.25	0.78
	No	9.34±8.53	
Dyspnea	Dyspnea		
	Yes	9.56±8.58	0.20
	No	8.38±7.82	
Sputum	Sputum		
	Yes	9.64±9.70	0.87
	No	9.14±8.30	
Cough	Cough		
	Yes	9.10±8.20	0.85
	No	9.29±8.68	
Chest pain	Chest pain		
	Yes	9.42±8.08	0.74
	no	9.07±8.43	
Anosmia	Anosmia		
	Yes	12.46±7.73	0.01*
	No	8.73±8.33	
Vital signs on first visit	**Vital signs on first visit**		
Temperature (° C)	Temperature (° C)		
	[?]37.2	9.00±8.37	0.76
	[?]37.3	9.28±8.35	

Respiratory rate(breath / minute)	Respiratory rate(breath / minute)		
	<25	8.37±7.94	0.001*
	[?]25	12.37±9.23	
SpO2 %	SpO2 %		
	[?]93	7.76±7.58	0.04*
	<93	9.75±8.54	
Initial laboratory findings	**Initial laboratory findings**		
WBC (cell/ mm3)	WBC (cell/ mm3)		
	[?]10000	8.70±8.33	0.009*
	>10000	12.02±8.17	
Lymphocyte count(cell/ mm3)	Lymphocyte count(cell/ mm3)		
	[?]1000	9.77±8.88	0.42
	>1000	8.91±8.07	
CRP (mg/L)	CRP (mg/L)		
	[?]90	7.82±7.89	0.002*
	[?]91	10.83±8.67	
ESR(mm/hr)	ESR(mm/hr)		
	[?]60	8.24±8.45	0.10
	[?]61	10.05±8.54	
LDH (units/L)	LDH (units/L)		
	<480	9.02±7.92	0.12
	[?]480	11.02±8.64	
Underlying disease	**Underlying disease**		
DM	DM		
	Yes	8.54±8.10	0.35
	No	9.42±8.45	
HTN	HTN		
	Yes	9.11±8.30	0.92
	No	9.22±8.36	
Outcomes	**Outcomes**		
ICU admission	ICU admission		
	Yes	11.10±9	0.003*
	No	7.71±7.88	
Recovery time (days)	Recovery time (days)		
	<15	7.28±8.02	0.009*
	[?]15	9.29±8.09	
Hospitalization time (days)	Hospitalization time (days)		
	<15	9.08±8.23	0.037*
	[?]15	12±9.21	
Death	Death		
	Yes	8.51±1.85	0.86

	No		8.05±0.37		
*: statistically significant (p – value < 0.05) HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, ICU: intensive care unit	*: statistically significant (p – value < 0.05) HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, ICU: intensive care unit	*: statistically significant (p – value < 0.05) HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, ICU: intensive care unit	*: statistically significant (p – value < 0.05) HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, ICU: intensive care unit	*: statistically significant (p – value < 0.05) HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, ICU: intensive care unit	*: statistically significant (p – value < 0.05) HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, ICU: intensive care unit

Table 4: Details of demographic and clinical data of patients with or without consolidation

Variables	**Variables**	**Variables**	**Variables**	**All patients N=478**	**With consolidation N=99**	**Without consolidation N=379**
Demographic Data	**Demographic Data**	**Demographic Data**	**Demographic Data**			
	Age	**Age**	**Age**	53.92(15.4)	51.96(15.6)	54.62 (15.6)
	Gender	**Gender**	**Gender**			
		Male	**Male**	267 (55.8%)	55 (11.5%)	212 (44.3%)
		Female	**Female**	211 (44.2%)	44 (20.8%)	167 (23.4%)
Clinical data	**Clinical data**	**Clinical data**	**Clinical data**			
	Temperature (º C)	**Temperature (º C)**	**Temperature (º C)**	37.49 (0.7)	37.56 (0.7)	37.47 (0.7)
	Respiratory rate (breath /per minute)	**Respiratory rate (breath /per minute)**	**Respiratory rate (breath /per minute)**	21.65 (5.1)	22.18 (6)	21.41 (4.9)
	SpO2	**SpO2**	**SpO2**	91.07 (5.4)	89.39 (6.4)	91.47 (5.3)
	WBC (cell/mm3)	**WBC (cell/mm3)**	**WBC (cell/mm3)**	7.74 (5.1)	7.88 (5.6)	7.29 (4.2)

Lymphocyte count(cell/mm3)	**Lymphocyte count(cell/mm3)**	**Lymphocyte count(cell/mm3)**	1372.8 (1341.3)	1375.5(1876.5)	1279 (870)
LDH (U/L)	**LDH (U/L)**	**LDH (U/L)**	640.8 (302.4)	624.6 (266.4)	630.1 (302.4)
CRP (mg/L)	**CRP (mg/L)**	**CRP (mg/L)**	96.90 (76.2)	105.97 (69.6)	90.82 (77)
ESR (mm/hr)	**ESR (mm/hr)**	**ESR (mm/hr)**	74.06 (32.2)	77.34 (33.3)	71.23 (31.2)
Underlying dis-ease	**Underlying dis-ease**	**Underlying dis-ease**			
		DM	132(27.6%)	26 (5.4%)	106 (22.2%)
		HTN	136 (28.4%)	23 (4.8%)	113 (23.6%)
Recovery time (days)	**Recovery time (days)**	**Recovery time (days)**	15.48 (8.3)	17.46 (9)	14.95 (8.1)
Hospitalization dura-tion (days)	**Hospitalization dura-tion (days)**	**Hospitalization dura-tion (days)**	6.89 (7.2)	8.97 (9.4)	6.25 (6.2)
ICU ad-mis-sion	**ICU ad-mis-sion**	**ICU ad-mis-sion**	297 (62.1%)	79 (16.5%)	218 (45.6%)
Death	**Death**	**Death**	16 (3.3%)	4 (0.8%)	12 (2.5%)

*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,	*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,	*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,	*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,	*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,	*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,	*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,	*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,	*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,	*: statistically significant (p-value < 0.05), reported as mean (standard deviation), all other variables reported as N (%). HTN: hypertension, DM: diabetes mellitus, SpO2: oxygen saturation, WBC: white blood cell, LDH: lactate dehydrogenase, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate,