The Clinical Presentations and Outcomes in COVID-19 Hospitalized Elderly Egyptian Patients A cross-sectional study

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Abstract:

Background and aims: Elders at an increased risk of getting the novel COVID-19 infection. **Materials and Methods**: We analyzed the clinical presentations, laboratory and radiological investigations, and the patient's outcome in fifty seniors aged 60 years and more who were hospitalized due to COVID-19 infection in the period from December 2020 till March 2021. **Results:** The mean age was 68.2 ± 5.9 years (60% males and 40% females), 70% with comorbidities. Our patients exhibited a variety of clinical manifestations (constitutional, respiratory, gastrointestinal, and atypical) and hematological presentations with variable percentages. The mean period of hospital stay was15.05 days with 60% of the patients cured and 40% died (60% males, 40% females). The causes of death were septic shock (81.8%), ARDS (36.3%), AKI (18.2%), DIC (13.6), and encephalitis (9.1%). Using multivariant regression analysis and Roc curve analysis; levels of D-dimer >901ng/ml, interleukin-6 >13.5pg/ml, and >30% lung involvement were independent predictors of mortality after adjustment of other predictors. **Conclusion:** Elderly patients are vulnerable to complications caused by SARS Cov-2 infection especially in the setting of multiple comorbidities. Unexpectedly, gastrointestinal manifestations were associated with mortality in seniors along with low oxygen saturation, and wheezy chest. After multivariant regression analysis only D-dimer, interleukin-6, and the degree of lung involvement in CT were independent predictors of mortality in seniors after adjustment of other predictors.

Keywords: Sars-Cov-2, Coronavirus, COVID-19, Elderly patients, outcome.

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Introduction:

The COVID-19 pandemic is caused by the novel acute respiratory syndrome coronavirus 2 (SARS-Cov-2) which is closely related to the original SARS-CoV [1]. The main route of getting infection is through the respiratory route after exposure to the virus [2]. The respiratory system is the main target of COVID-19. The virus attacks alveolar cells "typert II" via binding to angiotensin-converting enzyme 2 (ACE2) receptors using surface glycoprotein (spike proteins) [3]. SARS-Cov-2 does not affect the lungs only, other body systems that express ACE 2 receptors are affected

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giving heterogenous clinical presentations. COVID-19 is associated with neurological manifestation although the way that the virus invades the brain remains unknown [4]. The gastrointestinal tract is another target for the SARS-Cov-2 virus. ACE2 is not exclusively present in respiratory tract but it is also found in other cells like enterocytes of the small intestine [5,6].

There is no classical clinical picture of COVID-19 disease. The patient may be completely asymptomatic or may have mild symptoms as fever, and body aches, and may suffer of complications [7].

CoVID-19 can affect patients at any age, but elders are more susceptible to poor outcome [8]. For example, ARDS was observed in about 96.8% of COVID-19 patients who died in the hospitals. Analysis of post-mortem COVID-19 patients' lungs revealed massive alveolar injury [9]. SARS-Cov-2 induces a widespread release of inflammatory mediators and cytokines causing what is called a cytokine storm [10]. Leisman D and his coworkers provided a crucial comparison of IL-6 with other inflammatory markers and stated that IL-6 showing that markedly elevated in septic shock and ARDS [11]. Mortality in the setting of cytokine storm can be explained by disrupted coagulative pathway [12]. Immunosenescent and inflammaging are two important features of old age that disrupt the elder's response to invading infections [13]. The impact of these features on the COVID-19 course in elderly patients remains questionable.

The current article aimed to explore the impact of infection with the SARS-Cov-2 virus in elderly patients aged 60 years who were admitted to hospitals due to COVID-19 disease. We analyzed the clinical presentation, laboratory and radiological investigations, the progression of the case and the length of hospital stay, and finally the patient's outcome.

Patients and methods:

The current study involved 50 elderly patients aged 60 years and more who were hospitalized in isolation centers in Alexandria fever hospital and Alexandria main University hospital as COVID-19 patients in the period from December 2020 till March 2021. The aim of the survey was explained to all participants or their caregivers and informed Witten consent was obtained and signed either by the patient or his/her caregivers. The proposal was accepted by the Alexandria university faculty of medicine committee of ethics.

All participants were confirmed to have COVID-19 infection using reverse transcription-polymerase chain reaction (RT-PCR) essay of swabs from nasopharynx, the participant either had a positive test done before admission, or it was done in the isolation centers.

All participants had thorough history taking including the onset and course of symptoms before admission to the hospital, smoking history, comorbid conditions as hypertension, dyslipidemia, diabetes mellitus, hyper/hypothyroidism, pulmonary diseases, malignancy, coronary artery diseases, drug history included Asprin, NSAIDs, statins, antidiabetic medications, Anti-hypertensives (ACEs and ARBs).

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A thorough clinical examination was done on all participants including frequent timely monitoring of blood pressure, pulse rate and regularity, respiratory rate, and O2 saturation using pulse oximetry, and temperature. Cardiac, pulmonology, abdominal and neurological examinations. Body mass index (BMI) was calculated by dividing the weight in kilograms divided by square meters of the height (Kg/height^2).

The following laboratory and radiological investigations were done to all participants and repeated weekly or as needed according to the patient's condition, complete blood count (CBC), liver transaminases (ALT and AST), C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR), lactate dehydrogenase (LDH), D-dimer, and serum ferritin. Serum interleukin-6 (IL-6) and cardiac troponin were done in selected complicated cases. Multi-slice computed tomography (CT) of the chest without contrast was done on all participants.

All these data were collected and recorded in a standardized checklist (supplementary file).

Demographic characteristics, clinical presentations, and outcomes either discharge or death were correlated with radiological findings, and laboratory results.

Statistical analysis:

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. **(**Armonk, NY: IBM Corp). Logistic regression was used to detect the most affecting factor for affecting mortality. The receiver operating characteristic curve (ROC) was used to determine the diagnostic performance of the markers, an area more than 50% gives acceptable performance, and an area of about 100% is the best performance for the test. The significance of the obtained results was judged at the 5% level.

Results:

From December 2020 till March 2021, fifty elderly COVID-19 patients were hospitalized in the isolation centers of Fever hospital and the Main Alexandria university hospital. Their age was 68.2 ± 5.9 years. The number of males was 30 comprised 60% of the sample, while the number of females was 20 represented 40% of the subjects. Most of the patients were smokers where they represented 74% of the patients and 26% of patients were non-smokers. Majority of the patients (70%) had chronic comorbidities with hypertension and diabetes mellitus were the most documented comorbidities represented 80% and 74.2% respectively followed by ischemic heart diseases and chronic kidney disease represented 31.4% and 25.7% respectively. Chronic obstructive lung diseases and liver impairment were the least documented with their percentage was 2.8%. Most of the patients (74%) were maintained on medications with angiotensin receptor blockers (ARBs) or angiotensin-converting enzyme inhibitor (ACEI) were the commonest drug used by the patients (54.1%) followed by antidiabetic medications were the commonest either insulin (35.1%) or oral hypoglycemics (32.4%) and nitrated (29.7%). Other drugs were used with varying degrees. **Table 1**

The mean weight of patients was 26.2 ± 3.04 kg/m^2. **Table 1**

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Table 1: Demographic data of the patients:

	No. (%)
Sex	
Male	30 (60%)
Female	20 (40%)
Age	
Mean ± SD.	68.2 ± 5.9
Median (Min. – Max.)	69 (60 – 96)
Smoking	
Non smoker	13 (26%)
Smoker	37 (74%)
Chronic disease	
No	15 (30%)
Yes	**35 (70%)**
Hypertension	28 (80%)
Diabetes mellitus	26 (74.2%)
Ischemic heart disease (IHD)	11 (31.4%)
Chronic kidney disease (CKD)	9 (25.7%)
Chronic obstructive lung disease (COPD)	1 (2.8%)
Liver impairment	1 (2.8%)
Drug history	
No	13 (26%)
Yes	**37 (74%)**
ARBs/ACEI	20 (54.1%)
Insulin	13 (35.1%)
Oral hypoglycemics	12 (32.4%)
Nitrates	11 (29.7%)
Calcium	7 (18.9%)
Vitamin D	7 (18.9%)
B blockers	7 (18.9%)
CCB	5(13.5%)
Aspirin	2 (5.4%)
Diuretics	2(5.4%)
Antihistamines	2 (5.4%)
Bronchodilators	1 (2.7%)
Liver support	1 (2.7%)
On dialysis	1 (2.7%)
BMI (kg/m^2)	
Mean ± SD.	26.2 ± 3.04
Median (Min. – Max.)	25 (22 – 35)

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Table 2: Clinical presentation of the patients:

	No. (%)
Systolic (mm/Hg)	
Mean ± SD.	136.3 ± 14.5
Median (Min. – Max.)	135 (100 – 170)
Diastolic (mm/Hg)	
Mean ± SD.	83.1 ± 7.8
Median (Min. – Max.)	80 (70 – 100)
Pulse (beats/min.)	
Mean ± SD.	95.2 ± 6.8
Median (Min. – Max.)	96.5 (80 – 110)
Temp.(˚c)	
Mean ± SD.	38.3 ± 0.36
Median (Min. – Max.)	38.4 (37.5 – 39)
Respiratory rate (cycles/min.)	
Mean ± SD.	29.8 ± 2.1
Median (Min. – Max.)	30 (25 – 36)
O_2 saturation (%)	
Mean ± SD.	83.3 ± 10.7
Median (Min. – Max.)	85 (45 – 96)
GIT manifestations	
No	19 (38%)
Yes	**31 (62%)**
Diarrhea	30 (96.7%)
Vomiting	19 (61.3%)
Abdominal pain	17 (54.8%)
Anorexia	17 (54.8%)
Pulmonary manifestations	
Cough	50 (100%)
Dyspnea	49 (98%)
Wheezy chest	32 (64%)
Sore throat	25 (50%)
Rhinorrhea	25 (50%)
Atypical presentations/ others	
No	11 (22%)
Yes	**39 (78%)**
Dizziness	38 (92.3%)
Loss taste & smell	35 (89.7%)
conjunctival irritation	15 (38.4%)
Hemoptysis	12 (30.7%)
Bleeding	12 (30.7%)

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Clinically, all patients (100%) presented with constitutional manifestations in the form of fever, malaise, body aches, arthralgia, and headache. All patients were represented with respiratory manifestations; 100% with cough, 98% with dyspnea, 86% with non-specific chest pain, 64% with wheezy chest, 50% with a sore throat, and 50% with rhinorrhea. 62% of the patients had gastrointestinal symptoms with diarrhea was the most presenting symptom (96.7%), followed by vomiting (61.3%). Anorexia and abdominal pain represented 54.8% each.74% of the patients presented with atypical symptoms with dizziness was the commonest presentation (92.3%), followed by loss of taste and smell (89.7%), conjunctival irritation represented 38.4%, bleeding tendency, and hemoptysis were the least common represented 30.7% each. **Table 2**

The mean systolic blood pressure was 136.3 ± 14.5mm/Hg and the mean of diastolic blood pressure was 83.1 ± 7.8 mm/Hg. The pulse mean was 95.2 ± 6.8 beats/minute. The mean temperature was 38.3 ± 0.36 ˚c. The mean respiratory rate was 29.8 ± 2.1 cycles/minute, and the mean O2 saturation was 83.3 ± 10.7%. **Table 2**

The results of the complete blood picture revealed that the mean hemoglobin concentration was 11.5 ± 1.5 g/dl, the mean white blood cell count was 4.5 ± 2.2 x 10^9/L, with the mean percentage of lymphocytes was 17 ± 4%. The platelets' mean was 347.5 ± 89.1 x 109/L. The serum ferritin mean was 378.3 ± 117.4 ng/ml, the mean of C-reactive protein (CRP) was 65.5 ± 28.1, and that of erythrocyte sedimentation rate (ESR) was 98.1 ± 18.4. the mean of d-Dimer was 1058.8 ± 540.8. the mean of LDH was 573.5 ± 182 IU/L. For liver transaminases, the mean of alanine aminotransferase (ALT) was 58.6 ± 17.4 IU/L, and for aspartate aminotransferase (AST) was 53.7 ± 14.6 IU/L. The interleukin-6 showed a mean value of 28.3 ± 22.8 pg/mL. All patients showed variable degrees of lung infiltrates on chest computed tomography, with a mean of 42.1 ± 22.9%. **Table 3**

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Table 3: The laboratory findings of the patients:

	No. (%)
Hb (g/dl)	
Mean ± SD.	11.5 ± 1.5
Median (Min. – Max.)	11.5 (8.3 – 14.5)
WBCs ($\times 10^9$/L)	
Mean ± SD.	4.5 ± 2.2
Median (Min. – Max.)	4 (2.1 – 11.4)
Lymphocytes (%)	
Mean ± SD.	17 ± 4
Median (Min. – Max.)	17 (11 – 35)
Platelets ($\times 10^9$/L)	
Mean ± SD.	347.5 ± 89.1
Median (Min. – Max.)	370 (150 – 490)
Serum ferritin (ng/ml)	
Mean ± SD.	378.3 ± 117.4
Median (Min. – Max.)	355 (200 – 600)
CRP	
Mean ± SD.	65.5 ± 28.1
Median (Min. – Max.)	65 (15 – 180)
ESR	
Mean ± SD.	98.1 ± 18.4
Median (Min. – Max.)	100 (40 – 130)
D-dimer (ng/ml)	
Mean ± SD.	1058.8 ± 540.8
Median (Min. – Max.)	800 (401 – 2010)
LDH (IU/L)	
Mean ± SD.	573.5 ± 182
Median (Min. – Max.)	501 (230 – 980)
ALT (IU/L)	
Mean ± SD.	58.6 ± 17.4
Median (Min. – Max.)	55 (25 – 114)
AST (IU/L)	
Mean ± SD.	53.7 ± 14.6
Median (Min. – Max.)	50 (36 – 95)
IL-6 (pg/mL)	
Mean ± SD.	28.3 ± 22.8
Median (Min. – Max.)	13 (7.2 – 66.7)
Lung infiltrates on CT (%)	
Mean ± SD.	42.1 ± 22.9
Median (Min. – Max.)	30 (15 – 80)

Hb: Hemoglobin. **WBCs:** White blood cell count. **CRP:** C-reactive protein. **ESR:** Erythrocyte sedimentation rate. **LDH:** Lactate dehydrogenase. **ALT:** Alanine transferase. **AST:** Aspartate transferase. **IL-6:** Interleukin-6. **CT:** Computed tomography

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The mean period of hospital admission was15.05 days with 60% of the patients cured and discharged from the hospital and 40% died due to complications. **Table 4**

Table 4: The patients' outcome:

	No. (%)
Outcome	
Curd	30 (60%)
Died	20 (40%)
Complications	
No	28 (56%)
Yes	**22 (44%)**
Septic Shock	18 (81.8%)
ARDS	8 (36.3%)
Acute Kidney injury	4 (18.2%)
DIC	3 (13.6%)
Encephalitis	2 (9.1%)

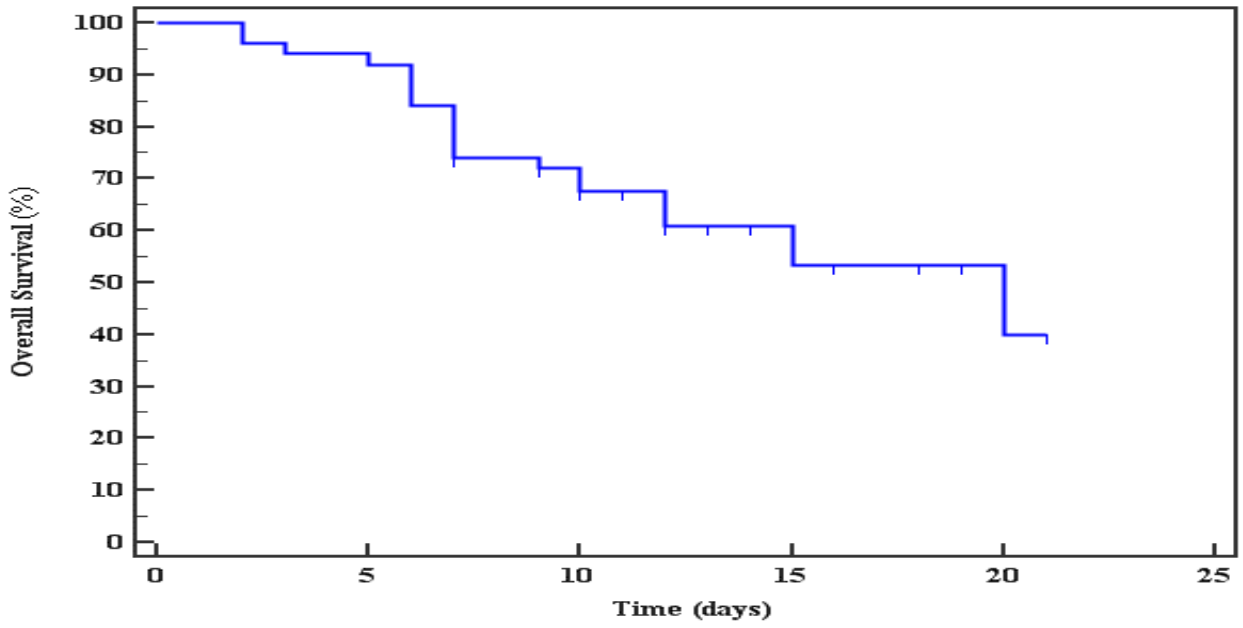
ARDS: Acute respiratory distress syndrome. **DIC:** Disseminated coagulopathy.

The patients who died comprised 12 males and 8 females where 44% of admitted patients suffered from complications with septic shock was the commonest (81.8%), followed by adult respiratory distress syndrome (ARDS) (36.3%), acute kidney injury (18.2%), disseminated coagulopathy (DIC) (13.6%). The least complication was encephalitis (9.1%). **Table 5 & Graph 1**

Table 5: Kaplan-Meier survival curve for Overall Survival:

	Mean (days)	Median (days)	%
Overall Survival	15.05	20.0	40.0

Graph 1: Kaplan-Meier survival curve for Overall Survival



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In our study, using the univariate regression analysis revealed that low oxygen saturation (p=0.001, OR= 0.684), presence of GIT manifestations (p=0.003, OR=11.769), wheezy chest (p=0.003, OR= 24.846), low lymphocytic count (p=0.001, OR= 0.567), high CRP (p=0.006, OR= 1.044), high D-dimer (p<0.001, OR= 1.005), high interleukin-6 (p<0.001, OR= 1.095), and the degree of lung infiltration (p<0.001, OR= 1.120) all are good predictors of mortality. **Table 6**

Table 6: Univariate Logistic regression analysis for the parameters affecting mortality (n=20 vs. 30) for different parameters:

	Univariate	
	p	**OR (95%C.I)**
Age (years)	**0.315**	0.943 (0.842 – 1.057)
Gender	**1.000**	1.000 (0.315 – 3.174)
Smoking	**0.241**	0.464 (0.129 – 1.674)
Hypertension	**0.298**	1.857 (0.579 – 5.952)
Diabetes mellitus	**0.137**	2.429 (0.755 – 7.814)
Ischemic heart disease	**0.781**	0.821 (0.206 – 3.279)
Chronic kidney disease	**0.764**	1.250 (0.291 – 5.366)
ARBs/ACEI	**0.081**	2.852 (0.879 – 9.255)
Body mass index	**0.124**	1.166 (0.959 – 1.418)
Temperature(˚c)	**0.124**	3.786 (0.693 – 20.675)
O_2 saturation (%)	**0.001***	0.684 (0.546 – 0.857)
GIT manifestations	**0.003***	11.769 (2.307 – 60.045)
Dyspnea	**1.000**	–
Wheezy chest	**0.003***	24.846 (2.933 – 210.464)
Atypical presentations	**0.999**	–
Lymphocyte count (%)	**0.001***	0.567 (0.408 – 0.789)
C-reactive protien	**0.006***	1.044 (1.012 – 1.077)
Serum ferritin (ng/ml)	**0.067**	1.005 (1.000 – 1.010)
D-dimer (ng/ml)	**<0.001***	1.005 (1.002 – 1.008)
IL-6 (pg/mL)	**<0.001***	1.095 (1.050 – 1.141)
Lung infiltrates percentage on CT (%)	**<0.001***	1.120 (1.060 – 1.184)

Further analysis using multivariant regression analysis, only interleukin-6, D-dimer, and the degree of lung infiltration were independent predictors of mortality after adjustment of other factors. **Table 7**

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Table 7: Multivariate logistic regression analysis for the parameters predicting mortality (n=20 vs. 30) for different parameters:

	Univariate		Model A	
	p	**OR (95% C.I)**	**p**	**OR (95% C.I)**
D-dimer (ng/ml)	**<0.001***	1.005 (1.002 – 1.008)	**0.009***	1.005 (1.001 – 1.009)
IL-6 (pg/mL)	**<0.001***	1.095 (1.050 – 1.141)	**0.008***	1.089 (1.022 – 1.159)
Lung infiltrates on CT (%)	**<0.001***	1.120 (1.060 – 1.184)	**0.007***	1.115 (1.030 – 1.206)

OR: Odd`s ratio C.I: Confidence interval LL: Lower limit UL: Upper Limit
Model A: Adjusted by GIT manifestations, Wheezy chest, Lymphocytes percentage (%), C-reactive protein.
*: Statistically significant at $p \leq 0.05$

Using Roc curve, IL-6 more than 13.5 pg/ml had 95% sensitivity, 86.67 specificity, D-dimer more than 901ng/ml had 95% sensitivity, 93.33 specificity, and finally, lung infiltration of more than 30% had a 90% sensitivity, 86.67specificity to predict mortality in the studied patients. **Table 8 & Graph 2**

Table 8: Validity (AUC, sensitivity, specificity) for D-dimer, IL-6 and Lung infiltrates percentage on CT to prognoses mortality (n = 20) from Curd patient (n = 30):

	AUC	**p**	**95% C.I**	**Cut off**	**Sensitivity**	**Specificity**	**PPV**	**NPV**
D-dimer (ng/ml)	0.970	<0.001*	0.926 – 1.014	>901	95.0	93.33	90.5	96.6
IL-6 (pg/mL)	0.950	<0.001*	0.888 – 1.012	>13.5	95.0	86.67	82.6	96.3
Lung infiltrates on CT (%)	0.957	<0.001*	0.907 – 1.006	>30%	90.0	86.67	81.8	92.9

AUC: Area Under a Curve. **P-value:** Probability value. **C.I:** Confidence Intervals.
NPV: Negative predictive value **PPV**: Positive predictive value
*: Statistically significant at $p \leq 0.05$
#Cut off was choose according to Youden index

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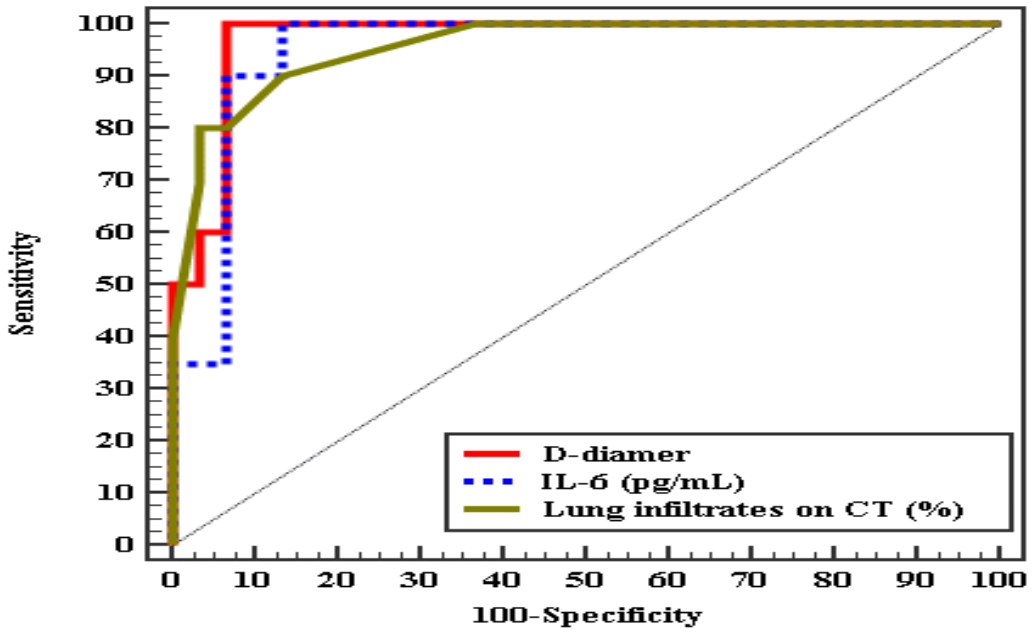
Graph 2: ROC curve for D-dimer, IL-6 and Lung infiltrates on CT to prognoses mortality (n = 20) from Curd patient (n = 30):



Discussion:

The current study followed fifty elderly patients who were hospitalized due to COVID-19 infection in the period from December 2020 till March 2021. The clinical presentations, laboratory investigations, radiological findings, and outcomes of the patients were analyzed.

In our study, the patients' mean age was 68.2 ± 5.9 years. It is well known that elderly people are more susceptible to get infections due to functional decline in the innate immunity [14]. Most studies stated that seniors are more susceptible to get COVID-19 and this susceptibility increases with each decade.

The current work shows that, males were affected more than females (60% males versus 40% females). Koh J et al, in their systematic review of 29 publications showed male predominance (60%) [15]. Also, males had a worse prognosis compared to females as males presented 60% of patients died due to complicated disease course.

In the current study, 15 patients (30%) had no comorbidities while 35 patients (70%) had comorbidities. The commonest comorbidities were hypertension, diabetes mellitus, ischemic heart diseases, and chronic kidney disease (80%, 74.2%, 31.4%, and 25.7% respectively). Koh J et al, detected comorbidities in about 45% of their patients [15]. Hypertension (30%), diabetes (19%), and coronary heart disease (8%) were the commonest comorbidities detected in a study by Zhou F et al [16].

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In our patients, the commonest clinical presentation were constitutional manifestations followed by respiratory ones (cough 100%, dyspnea 98%, 86%, non-specific chest pain 86%, wheezy chest 64%, sore throat 50%, and rhinorrhea 50%), then gastrointestinal manifestation (diarrhea 96.7%, vomiting 61.3%, anorexia 54.8% and abdominal pain 54.8%), and lastly atypical presentation (dizziness 92.3%, loss of taste and smell 89.7%,conjunctival irritation 38.4%, bleeding tendency 30.7% and hemoptysis 30.7%).

A study compared the clinical presentations between elderly and young adults and found that fever and productive cough are equally common in all age groups while running nose, headache, and gastrointestinal manifestations were less common. Dyspnea, tachypnea, and pneumonia Severity were higher in elders. Also, they found that atypical presentation as neurological manifestations and abdominal pain were common in elders and may complicate the diagnosis [17].

Gan JM et al [14] followed 122 elderly patients and found that about forty percent of patients were presented atypically with fall, delirium, and generalized weakness while the other sixty percent presented with a typical presentation. They also stated that the mortality does not correlated either with atypical symptoms or typical symptoms, or the length of hospital stay.

Analysis of health records of 206,377 individuals, including 2471 positive cases showed that high temperature, cough, and fatigue were the commonest presentation where syncope, rhinorrhea, and headache were less common [18].

Elders compared to young adults respond differently to infections. The absence of pyrexia in response to infection in elders may be due defect in the thermoregulation by the hypothalamus. In our patients, the mean of their temperature was 38.3 ± 0.36˚C. A review in PLOS One on 25,000 COVID-19 patients, fever presented in 78% of cases. Other studies reviewed the symptoms of hospitalized COVID-19 patients found that 90% of patients had fever [19].

The mean O2 saturation in our patients was 83.3 ± 10.7 %, which was a prognostic sign of a worse prognosis. Studies showed that Oxygen saturation less than ninety percent is strongly correlated with mortality in hospitalized COVID-19 patients [20].

In our study, the mortality rate was 40% (60% males, 40% females), using logistic regression analysis; the main predictors of mortality were low oxygen saturation, presence of GIT manifestations, wheezy chest, low lymphocytic count, high CRP, high D-dimer, high interleukin-6, and the degree of lung infiltration. While other factors showed no significant values.

Further analysis using multivariant logistic regression analysis, D-dimer, interleukin-6, and the degree of lung infiltration were independent predictors of mortality in the elderly after adjustment of other predictors.

On contrary, in a study by Khan H and his colleagues, the case fatality was three times more in patients older than 55 years and the mortality rate was 5.41%. The discrepancies between Khan's

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results and our results may be firstly due to our small sample size and secondly, we investigated elderly patients only and did not compare them with young adults. [21].

In our study 60% of patients died secondary to COVID-19 complication were males. Despite when using regression analysis, we cannot detect gender difference as a risk of mortality. Michelozzi P et al stated that the rate of mortality was higher in males and it increases by increasing age. [22]. Asper our results, Khan and his team found no significant difference in gender regarding mortality rates [23].

As per our results, Giannoglou D et al, found that intubation due to low oxygen saturation was a strong predictor of mortality in hospitalized patients [24].

As per our results, several studies stated that D-dimer significantly correlates with the disease severity and is a good predictor of morbidity in COVID patients [25,26].

Following our results, several studies were confirmed the correlation between high levels of IL-6 and mortality [27,28]. On contrary, Cavallei G and his co-workers found that Anti-IL-6 administration does not improve prognosis of hospitalized COVID patients [29].

Yasin R and his team examined 220 COVID-19 patients and found that radiographic findings are significant predictors of the disease outcome, also mortality with more in patients aged more than 40 years of age, and in male gender [30].

Conclusion:

In Conclusion elderly patients are more susceptible to the complications of SARS Cov-2 infection especially in the setting of multiple comorbidities. Unexpectedly, gastrointestinal manifestations were associated with mortality in seniors along with low oxygen saturation, and wheezy chest. Using multivariant regression analysis only D-dimer, interleukin-6, and the degree of lung involvement in CT were independent predictors of mortality in seniors after adjustment of other predictors.

Abbreviations:

ACE2: angiotensin-converting enzyme 2
ACEIs: Angiotensin converting enzyme inhibitors.
ALT: Alanine aminotransferase
AST: Aspartate aminotransferase
ARBs: angiotensin receptor blockers (ARB).
ARDS: acute respiratory distress syndrome
BMI: body mass index
CBC: complete blood count.

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CKD: Chronic kidney disease.
CNS: central nervous system
CRP: C-reactive protein
COPD: chronic obstructive pulmonary disease
COVID-19: coronavirus disease 2019.
CT: computed tomography.
DM: Diabetes mellitus.
IHD: Ischemic heart disease.
IL: Interleukins
LDH: lactate dehydrogenase.
NSAIDs: non-steroidal anti-inflammatory drugs
RT-PCR: reverse transcription polymerase chain reaction
SARS-Cov-2: acute respiratory syndrome coronavirus 2
TLRs: Toll like receptors.
TNF-α: tumor necrosis factor alpha.

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Conflicts of interest

There are no conflicts of interest.

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References:

1. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. "A Novel Coronavirus from Patients with Pneumonia in China, 2019". The New England Journal of Medicine.2020; 382 (8): 727–33.
2. "Q&A: How is COVID-19 transmitted? (How is the virus that causes COVID-19 most commonly transmitted between people?)". www.who.int. 9 July 2020. Retrieved 14 October 2020.
3. Verdecchia P, Cavallini C, Spanevello A, Angeli F. "The pivotal link between ACE2 deficiency and SARS-CoV-2 infection". European Journal of Internal Medicine.2020; 76: 14–20.
4. Pezzini A, Padovani. "Lifting the mask on neurological manifestations of COVID-19". Nature Reviews. Neurology.2020; 16 (11): 636–44.

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5. Gu J, Han B, Wang. "COVID-19: Gastrointestinal Manifestations and Potential Fecal-Oral Transmission". Gastroenterology.2020; 158 (6): 1518-19.
6. Zhang H, Li HB, Lyu JR, Lei XM, Li W, Wu G, et al. "Specific ACE2 expression in small intestinal enterocytes may cause gastrointestinal symptoms and injury after 2019-nCoV infection". International Journal of Infectious Diseases. Elsevier BV.2020; 96: 19–24.
7. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet (Lond Engl) 2020; 395:507–513.
8. Palmieri L, Andrianou X, Barbariol P et al.Characteristics of SARS-CoV-2 patients dying in Italy report based on available data on April 16th, 2020.
9. Wichmann D, Sperhake J-P, Lütgehetmann M, et al. Autopsy findings and venous thromboembolism in patients with COVID-19: a prospective cohort study. Ann Intern Med. 2020.
10. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020; 395:497–506.
11. Leisman DE, Ronner L, Pinotti R et al. Cytokine elevation in severe and critical COVID-19: a rapid systematic review, meta-analysis, and comparison with other inflammatory syndromes. Lancet Respir Med. 2020; 8: 1233-44.
12. Mehta P, McAuley DF, Brown M, et al. COVID-19: consider cytokine storm syndromes and immunosuppression. Lancet. 2020; 6736:19–20.
13. Aw D, Silva AB, Palmer DB. Immunosenescence: emerging challenges for an ageing population. Immunology. 2007; 120:435–46.
14. Gan JM, Kho J, Akhunbay-Fudge M, et al. Atypical presentation of COVID-19 in hospitalised older adults [published online ahead of print, 2020 Sep 21]. Ir J Med Sci. 2020;1-6.
15. Koh J, Shah SU, Chuna PEY, Gui H, Pang J. Epidemiological and Clinical Characteristics of Cases During the Early Phase of COVID-19 Pandemic: A Systematic Review and Meta-Analysis. Front. Med., 11 June 2020.
16. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical Course and Risk Factors for Mortality of Adult Inpatients With COVID-19 in Wuhan, China: A Retrospective Cohort Study. Lancet. 2020; 395:1054–1062.
17. Liu K, Chen Y, Lin R, Han K. Clinical features of COVID-19 in elderly patients: A comparison with young and middle-aged patients. J Infect. 2020;80(6):e14-e8.
18. Sattar N, McInnes IB, McMurray JJV. Obesity a risk factor for severe covid-19 infection: multiple potential mechanisms. Circulation. 2020 22/4/20; accessed 12 May 2020.
19. Jiang, F. et al. Review of the clinical characteristics of Coronavirus disease 2019 (COVID-19). J. Gen. Intern. Med.2020; 35, 1545–9.
20. Izrahi, B., Shilo, S., Rossman, H. et al. Longitudinal symptom dynamics of COVID-19 infection. Nat Commun. 2020; 11: 6208.
21. Mejía F, Medina C, Cornejo E, Morello E, Vásquez S, Alave J, et al. (2020) Oxygen saturation as a predictor of mortality in hospitalized adult patients with COVID-19 in a public hospital in Lima, Peru. PLoS ONE 15(12): e0244171.

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Print ISSN 2636-3224
Online ISSN 2636-3232

22. Khan H, Hussain S, Zar A, Fawad, S. Analysis of demographic variables in acquiring infection and mortality due to COVID-19. Microbes and Infectious Diseases 2020; 1(2): 70-76.
23. Michelozzi P, de'Donato F, Scortichini M, De Sario M, Noccioli F, Rossi P, et al. Mortality impacts of the coronavirus disease (COVID-19) outbreak by sex and age: rapid mortality surveillance system, Italy, 1 February to 18 April 2020. Euro Surveill 2020; 25(19): 2000620.
24. Khan H, Rehman K. Linear regression analysis showing the predictors of mortality in COVID-19. Microbes and Infectious Diseases. 2020; 1 (3): 13-139.
25. Giannoglou D, Meimeti E, Provatopoulou X, Stathopoulos K, Roukas I, Galanis P. Predictors of mortality in hospitalized COVID-19 patients in Athens, Greece. MedRxiv 2020.10.12.20211193.
26. He, X., Yao, F., Chen, J. et al. The poor prognosis and influencing factors of high D-dimer levels for COVID-19 patients. Sci Rep.2021; 11:1830.
27. Shoar S. D-dimer and poor clinical outcome in patients with COVID-19: lessons from meta-analysis of case-control studies. Heart & Lung.2021; 50, (2):298.
28. Chen LYC, Hoiland RL, Stukas S,Wellington CL ,Sekhon MS. Confronting the controversy: Interleukin-6 and the COVID-19 cytokine storm syndrome. Eur Respir J. 2020; 562003006.
29. Cruz SA, Frias AM, Dias L, Oliveria AI, Matos AR, et al. Interleukin-6 is a biomarker for the development of fatal acutr respiratory distress syndrome coronavirus pneumonia. Front. Immunol., 18 February 2021
30. Cavalli G, Larcher A,Tomelleri A, Campochiaro C, Della-Torre E, De Luca G, et al. Interleukin-1 and interleukin-6 inhibition compared with standard management in patients with COVID-19 and hyperinflammation: a cohort study. The Lancet Rheumatology. 3 Feb. 2021.

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