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A Consecutive Cohort with COVID-19 in Wuhan, China: Natural History, Clinical Features and Considerations

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Abstract

Background: A novel type of coronavirus pneumonia was first reported in Wuhan in December 2019. Clinical features and prognosis of elder patients were still unclear, therefore, this study was on a purpose to provide a better understand of this disease.

Methods: The clinical chart of 28 patients was confirmedly diagnosed with COVID-19 were retrospectively reviewed, between 20 January 2020 and 24 February 2020.

Results: The clinical chart of 28 patients, including 18 males (64.3%) and 10 males (ratio, 1.6:1), with the average age at the time of admission was 54.8 ± 15.1-years-old (Range, 23-81 years-old). The most common symptoms and signs were cough (n = 24, 85.7%). Older patients (≥ 60) were more likely to be at a higher risk of death than their counterpart under 60 (p = 0.030). Compared with non-elderly group, the value and positive rates of HGB and ALB in elder group were more significantly increased (p = 0.035 and p = 0.036; p = 0.016 and p = 0.019). Statistically significant difference was observed in value of PT and INR between these two groups (p = 0.031 and p = 0.027).

Conclusions: The overwhelming part of older patients usually happened to dyspnea posterior to a short time of onset of initial symptom, which can quickly progress to critical condition.

Keywords

COVID-19, Prognostic factors, Treatment

Abbreviations

APTT: Activated partial thromboplastin time; ALB: Albumin; ALT: Alanine aminotransferase; AST: Aspartate aminotransferase; BNP: Brain natriuretic peptide; BUN: Blood urea nitrogen; CK: Creatine kinase; CK-MB: Creatine kinase isoenzyme; CT: Computer tomographic; D-D: D-dimer; HGB: Hemoglobin; INR: International normalized ratio; L: Lymphocyte; LAC: Lacticacid; LDH: Lactate dehydrogenase; NHC: National Health Commission; PCT: Procalcitonin; PLT: Platelet; PT: Prothrombin time; RT-PCR: Real time-polymerase chain reaction; SD: Standard deviation; TBIL: Total bilirubin; WBC: White blood cells

Introduction

In December 2019, a novel type of coronavirus pneumonia was first reported in Wuhan, Hubei Province, China. The novel coronavirus infection, known as COVID-19, is caused by severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) [1,2]. In the early days, there was nothing we could do with this disease, and because of this, high rates of person-to-person transmission and mortality were still lasting. But, with the level-1 public health response initiated by Chinese government and stringent personal protective measures taken by Chinese people, China has successfully controlled the spread and improved the curative rate of COVID-19. Till in 07/05/2020 in China, confirmed 84407 cases of COVID-19 and 4643 deaths have been reported. Currently, an increasing number of studies have described the clinical characteristic, epidemiology, diagnosis, treatment and outcome about

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COVID-19 infection. But clinical features and prognosis of elder patients was still unclear, with only limited literature reported. In addition, the long-term outcome of curable patients was not described in previous studies. Therefore, we mainly retrospective reviewed elder patients in severe condition from Wuhan city to provide information to give a better understanding of this disease.

Materials and Methods

The clinical chart of 28 patients was confirmedly diagnosed with COVID-19 from Wuhan Xinzhou distract people's hospital between 20 January 2020 and 24 February 2020 were retrospectively reviewed, including 18 males (64.3%) and 10 males (ratio, 1.6:1) from Wuhan city of China with a mean age of 54.8 ± 15.1 years (Table 1). This study was approved by the ethics board of Wuhan Xinzhou distract people's hospital.

Data collection

Clinical data were retrospectively obtained from patients' medical, laboratory findings and chest computer tomographic (CT) scans. Clinical features included sex/age, symptoms as well as signs at admission and follow-up outcome. All patients with COVID-19 enrolled in this study were diagnosed by nucleic acid real time-polymerase chain reaction (RT-PCR) tests and treated based on the National Clinical guidelines (Edition 5) formulated by the China National Health Commission (NHC). Those with condition of one of the following clinical features was taken as a severe case: 1) Hypoxemia with reseing oxygen saturation ≤ 93%; 2) Respiratory frequency ≥ 30 times/min; 3) arterial partial oxygen pressure (PaO_2)/oxygen absorption concentration (FiO_2) ≤ 300 mmHg (1 mmHg = 0.133 KPa). In addition, the critically diagnostic criteria met one of the following conditions: 1) Respiratory failure and

Table 1: Clinical data of 28 severe/critical cases with COVID-19.

No.	Sex/age (yrs)	Symptoms at admission	Temperature at admission	Duration (days)	Length of ICU (days)	Status at discharge	Follow-up (nucleic acid tests)
1	Male/81	Anhelation and chest distress	37.5	5	4	Death	NA
2	Male/36	Dyspnea and cough	39	12	8	Death	NA
3	Male/74	Anhelation, chest distress, cough and phlegm cough and phlegm	36.8	7	1	Death	NA
4	Female/71	Cough	36.8	3	5	Death	NA
5	Male/56	Chest pain and cough	40	21	9	Death	NA
6	Male/67	Cough	38	9	12	Death	NA
7	Male/68	Chest distress, cough and phlegm	37.5	10	7	Death	NA
8	Male/39	Anhelation, chest distress, cough and phlegm	36.8	6	4	Death	NA
9	Female/69	Dyspnea, cough and phlegm	39	4	9	Death	NA
10	Male/59	Anhelation, chest distress and weakness	38.6	10	38	Death	NA
11	Male/66	Anhelation, chest distress, cough and weakness	38.5	12	20	Death	NA
12	Male/33	Cough and weakness	38.8	8	17	Survival	Negative
13	Female/53	Chest distress, cough and phlegm	37.5	7	12	Survival	Negative
14	Male/67	Anhelation, cough and phlegm	36.5	5	30	Survival	Negative
15	Male/43	Chest distress	39	7	11	Survival	Negative
16	Male/30	Chest distress and cough	36.5	4	5	Survival	Negative
17	Female/52	Chest distress, cough and weakness	39.5	10	16	Survival	Negative
18	Male/50	Cough and phlegm	38.5	7	27	Survival	Negative
19	Female/39	Anhelation, dyspnea, cough and pharyngalgia	36.9	13	29	Survival	Negative
20	Female/58	Cough and weakness	39	4	10	Survival	Negative
21	Female/64	Anhelation, cough and phlegm	38.7	20	12	Survival	Negative
22	Male/48	Anhelation, cough and phlegm	38.7	23	30	Survival	Negative
23	Male/35	Chest distress, cough and phlegm	39	35	10	Survival	Negative
24	Female/69	Chest distress, cough, phlegm and weakness	38.1	8	20	Survival	Negative
25	Male/64	Cough and weakness	40	3	9	Survival	Negative
26	Male/23	No	38	2	3	Survival	Negative
27	Female/58	Cough	39	7	6	Survival	Negative
28	Female/62	Chest distress and cough	37.4	3	7	Survival	Negative

mechanical ventilation is essential; 2) Shock; 3) Combined with other organ failure needing ICU care.

Statistical analysis

The use of mean or median was determined by the type and the normality of data; mean was used for continuous variables with normal distribution (distributed evenly or not) and median was used for data of abnormal distribution or rank variables, followed by Chi-square, independent sample t-test and Mann-Whitney u test for comparison. Furthermore, the spread of data (interquartile range [IQR] for median and standard deviation for mean) was provided. We chose the variables including patients' data and laboratory investigations in the present study, which was similar to published studies. The variables for statistical analysis included age, gender, symptoms as well as signs and WBC, HGB, LY, etc.

Results

In this study, between 20 January 2020 and 24 February 2020, we included 18 male patients (64.3%) and 10 female patients (35.7%), with a male female ratio of 1.8. The average age at the time of admission was 54.8 ± 15.1-years-old (Range, 23-81 years-old). The mean and median times of duration of symptoms were 9.5 ± 7.4 and 7 days, respectively (Range, 2-35 days). The most common symptoms and signs were cough (n = 24, 85.7%), followed by fever (n = 22, 78.6%), chest distress (n = 13, 46.4%), phlegm (n = 12, 42.9%), anhelation (n = 9, 32.1%), weakness (n = 6, 21.4%) and dyspnea (n = 9, 32.1%), weakness (n = 6, 21.4%) and dyspnea (n = 3, 10.7%); chest pain (n = 1, 3.6%) and pharyngalgia (n = 1, 3.6%) were not common. The median time from admission to ICU was 5 days (Range, 0-31 days). In regards to previous history, 16 patients (57.1%) had hepatitis, 5 patients (17.9%) had hypertension, 3 patients (10.7%) had diabetes, 3 patients (10.7%) had chronic obstructive pulmonary disease, 2 patients (7.1%) had coronary heart disease. In addition, only 2 patients (7.1%) had smoking history, all of which, in this study, did not significantly increase the risk of death (Table 1 and Table 2).

Table 2: Variables in death and survival patients with COVID-19.

Variables	Normal range	All	Death	Survival	P
		28	**11 (42.9)**	**17 (57.1)**	
			Median ± IQR		
Male		18 (64.3)	9 (81.8)	9 (52.9)	0.124†
Duration of Symptoms, days					0.794‡
Range		2-35	3-21	2-35	
Mean		9.5 ± 7.4	9.0 ± 5.0	9.8 ± 8.7	
Median		7	9	7	
Length of ICU, days					0.258‡
Range		1-38	1-38	3-30	
Mean		13.3 ± 9.7	10.6 ± 10.4	14.9 ± 9.1	
Median		10	8	12	
WBC (× 10^9/L), Mean ± SD	04-10	10.4 ± 5.0	12.0 ± 3.6	9.4 ± 5.6	0.186‡
Increased		12 (42.9)	7 (63.6)	5 (29.4)	0.081†
L (×10^9/L), Mean ± SD	0.8-4.0	0.7 ± 0.3	0.7 ± 0.4	0.8 ± 0.3	0.776‡
Decreased		19 (67.9)	8 (72.7)	11 (64.7)	0.493†
HGB (g/L), Mean ± SD	110-160	129.9 ± 20.0	137.3 ± 19.6	125.1 ± 19.3	0.117‡
Decreased		6 (21.4)	2 (18.1)	4 (23.5)	0.561†
PLT (×10^9/L), Mean ± SD	100-300	221.1 ± 111.9	153.3 ± 59.6	265.1 ± 117.1	0.003‡*
Decreased		2 (7.1)	2 (18.1)	0 (0)	0.146‡
PCT (ug/L)	0-0.5	0.2 ± 0.2	0.3 ± 0.2	0.2 ± 0.1	0.029¶*
Increased		3 (10.7)	2 (18.1)	1 (5.9)	0.336†
BNP (ng/L)§	0-300	781.4 ± 2018.4	916.5 ± 3000.3	275.5 ± 654.3	0.157¶
Increased		14 (77.7)	9 (100)	5 (55.6)	0.041†*
ALT (U/L)	0-40	37.0 ± 23.0	37.0 ± 27.0	36.0 ± 25.5	0.495¶
Increased		12 (42.9)	5 (45.5)	7 (41.2)	0.565†
AST (U/L)	0-40	35.0 ± 33.0	41.0 ± 37.0	35.0 ± 30.0	0.706¶
Increased		11 (39.3)	6 (54.5)	5 (29.4)	0.175†
ALB (g/L)	30-50	29.9 ± 6.4	26.9 ± 2.9	32.3 ± 5.3	0.002¶*

Decreased		16 (57.1)	10 (90.9)	6 (35.3)	0.005†*
TBIL (umol/L)	0-22	17.4 ± 12.5	26.4 ± 18.3	13.2 ± 9.0	0.045¶*
Increased		9 (32.1)	6 (54.5)	3 (17.6)	0.052†
BUN (mmol/L)	2.5-9.4	6.8 ± 4.1	7.2 ± 7.2	6.2 ± 4.1	0.115¶
Increased		7 (25)	3 (41.7)	4 (23.5)	0.581†
CK (U/L)	24-204	84.0 ± 157.0	118.0 ± 402.0	81.0 ± 157.0	0.588¶
Increased		7 (25)	3 (27.3)	4 (23.5)	0.581†
CK-MB (U/L)	0-24	14.0 ± 11.0	17.0 ± 18.0	11.0 ± 9.5	0.028¶*
Increased		5 (17.9)	4 (36.4)	1 (5.9)	0.062†
LDH (U/L)	109-245	409.0 ± 233.0	563.0 ± 248.0	380.0 ± 136.5	0.002¶*
Increased		26 (92.9)	11 (100)	15 (88.2)	0.633†
K (mmol/L)	3.5-5.6	3.9 ± 1.1	3.3 ± 1.1	4.1 ± 0.8	0.034¶*
Decreased		8 (28.6)	6 (54.5)	2 (11.8)	0.022†*
Na (mmol/L)	130-150	137.0 ± 5.0	139.0 ± 3.0	135.0 ± 4.0	0.042¶*
Decreased		2 (7.1)	1 (9.1)	1 (5.9)	0.640†
PT (s)	Sep-14	12.4 ± 2.7	14.3 ± 2.2	11.8 ± 2.0	0.005¶*
Increased		7 (25)	6 (54.5)	1 (5.9)	0.007†*
APTT (s)	22-38	26.5 ± 9.7	31.6 ± 11.0	26.2 ± 7.3	0.063¶
Increased		2 (7.1)	2 (18.1)	0 (0)	0.146†
INR	0.8-1.5	1.06 ± 0.26	1.2 ± 0.2	1.0 ± 0.2	0.006¶*
Increased		1 (3.6)	1 (9.1)	0 (0)	0.393†
D-D (ug/ml)	0-1	3.0 ± 6.32	4.3 ± 12.4	3.0 ± 5.4	0.689¶
Increased		19 (67.9)	7 (63.6)	12 (70.6)	0.507†
LAC (mmol/L)	0.5-2.0	1.4 ± 0.8	1.5 ± 1.4	1.3 ± 0.9	0.187¶
Increased		7 (25)	4 (36.4)	3 (17.6)	0.249†

(%) is the percentage of the proportion in this group.

*P < 0.05; †Chi-square test; ‡Independent sample t-test; ¶Mann-Whitney U test; §10 cases were unavailable.

Eleven patients (42.9%) died in ICU with uncorrectable hypoxemias; 17 patients (57.1%) got a good recovery and then received self-quarantine for a range from 14 to 28 days. Complete follow-up data, at the most recent evaluation, were available for all survivors with a long-term follow-up duration of 3 months, and the nucleic acid tests (two times) were identified to be negative in those patients. But CT scans indicated that 6 patients still had mild inflammatory exudation.

Older patients were more likely to be at a higher risk of death than their counterpart (62.4 ± 14.0 vs. 49.4 ± 3.4 years, the median age; p = 0.030). In terms of laboratory tests, the value and positive rate of ALB were more significantly decreased in death group than those in survival group (p = 0.002 and p = 0.005) and the value and positive rate of PT were more increased in death group than those in survivor group (p = 0.002 and p = 0.007). There were statistically significant differences in level of PLT (p = 0.003), PCT (p = 0.029), TBIL (p = 0.045), CK-MB (p = 0.028), LDH (p = 0.002) and INR (p = 0.006), but positive rates of these parameters did not reveal a significant difference between death and survivor group.

To be specific, patients with COVID-19 were divided into groups, as older group over 60-years-old and young group under 60-years-old. There were 12 elder cases (42.9%) among the 28 cases, with a mean age of 62.4 ± 14.0 years (Range 60-81 years) and 7 cases (58.3%) were males. The mean and median duration of symptoms in senior group were 7.4 ± 5.0 days and 6 days, respectively (Range, 3-20 days). The mean and median period of stay in ICU was 11.3 ± 8.2 days and 9 days (Range, 1-30 days), respectively after the date of the ICU admission. The most common symptoms of onset were cough (n = 11, 91.7%), followed by fever (n = 9, 75%) and chest distress (n = 6, 50%). We made an attempt to obtain some different clinical behavior between elder and young adult group, and found that only more young adult patients (n = 11, 84.6%) got a high fever (38.5 °C), which did not reach a statistical significance (p = 0.064) Table 3.

With regards to laboratory test findings, compared with non-elderly group, the value and positive rates of HGB and ALB in elder group were more significantly increased (p = 0.035 and p = 0.036; p = 0.016 and p = 0.019). According to assessment of infection indicators, the value of PCT was more significantly increased in senior patients than those in young adult patients (p = 0.001), but positive rate of it did not any statistical difference between these two groups (p = 0.067). Statistically significant difference was observed in value of PT and INR between these two groups (p = 0.031 and p = 0.027) Table 4.

Table 3: Clinical Characteristics in elderly and non-elderly Patients.

Clinical characteristics	**All**	**Elderly**	**Non-elderly**	**P**
Overall n (%)	**28**	**12 (42.9)**	**16 (57.1)**	
Male	18 (64.3)	7 (58.3)	11 (68.8)	0.430†
Duration of Symptoms, days				0.208‡
Range	2-35	3-20	2-35	
Mean	9.5 ± 7.4	7.4 ± 5.0	11.0 ± 8.6	
Median	7	6	7.5	
Length of ICU, days				0.374‡
Range	1-38	1-30	4-38	
Mean	13.3 ± 9.7	11.3 ± 8.2	14.7 ± 10.7	
Median	10	9	10.5	
Signs and symptoms				
Fever, ≥ 38.5 °C	15 (68.2)	4 (44.4)	11 (84.6)	0.064†
Anhelation	9 (32.1)	5 (41.7)	4 (25)	0.299†
Dyspnea	3 (10.7)	1 (8.3)	2 (12.5)	0.611†
Chest distress	13 (46.4)	6 (50)	7 (43.8)	0.521†
Chest pain	1 (3.6)	0 (0)	1 (6.25)	0.571†
Cough	24 (85.7)	11 (91.7)	13 (81.3)	0.417†
Phlegm	12 (42.9)	6 (50)	6 (37.5)	0.391†
Pharyngalgia	1 (3.6)	0 (0)	1 (6.25)	0.571†
Weakness	6 (21.4)	3 (25)	3 (18.8)	0.521†
Death	11 (39.3)	7 (58.3)	4 (25)	0.081†

(%) is the percentage of the proportion in this group.

†Chi-square test; ‡Independent sample t-test.

Table 4: Lab tests of COVID-19 in elderly and non-elderly patients.

Variables	**Normal range**	**All**	**Elderly**	**Non-elderly**	**P**
		28	**12 (42.9)**	**16 (57.1)**	
			Median ± IQR		
WBC (×10^9/L), Mean ± SD	4-10	10.4 ± 5.0	11.9 ± 5.6	9.3 ± 4.4	0.177†
Increased		12 (42.9)	7(58.3)	5 (31.3)	0.148‡
L (×10^9/L), Mean ± SD	0.8-4.0	0.7 ± 0.3	0.7 ± 0.3	0.8 ± 0.3	0.446†*
Decreased		19 (67.9)	9 (75)	10 (62.5)	0.388‡
HGB (g/L), Mean ± SD	110-160	129.9 ± 20.0	120.8 ± 22.1	136.7 ± 15.7	0.035†*
Decreased		6 (21.4)	5 (41.7)	1 (6.25)	0.036‡*
PLT (×10^9/L), Mean ± SD	100-300	221.1 ± 111.9	181.4 ± 101.0	250.9 ± 113.4	0.105†
Decreased		2 (7.1)	2 (16.7)	0 (0)	0.175‡
PCT (ug/L)	0-0.5	0.2 ± 0.2	0.3 ± 0.1	0.2 ± 0.1	0.001¶*
Increased		3 (10.7)	3 (25)	0 (0)	0.067‡
BNP (ng/L)§	0-300	781.4 ± 2018.4	916.5 ± 3000.3	275.5 ± 654.3	0.157¶
Increased		14 (77.7)	9 (90)	5 (62.5)	0.429‡
ALT (U/L)	0-40	37.0 ± 23.0	44.0 ± 49.0	36.0 ± 22.0	0.430¶
Increased		12 (42.9)	6 (50)	6 (37.5)	0.391‡
AST (U/L)	0-40	35.0 ± 33.0	35.0 ± 36.0	33.0 ± 34.0	0.834¶
Increased		11 (39.3)	3 (25)	8 (50)	0.172‡

ALB (g/L)	30-50	29.9 ± 6.4	27.5 ± 2.5	32.3 ± 4.6	0.010¶*
Decreased		16 (57.1)	10 (83.3)	6 (37.5)	0.019‡*
TBIL (umol/L)	0-22	17.4 ± 12.5	25.4 ± 22.3	13.2 ± 7.6	0.227¶
Increased		9 (32.1)	6 (50)	3 (18.8)	0.090‡
BUN (mmol/L)	2.5-9.4	6.8 ± 4.1	9.2 ± 10.0	6.3 ± 1.8	0.210¶
Increased		7 (25)	5 (41.7)	2 (12.5)	0.093‡
CK(U/L)	24-204	84.0 ± 157.0	133.0 ± 394.0	81.0 ± 140.0	0.516¶
Increased		7 (25)	4 (33.3)	3 (18.8)	0.328‡
CK-MB (U/L)	0-24	14.0 ± 11.0	22.4 ± 24.0	13.0 ± 5.0	0.077¶
Increased		5 (17.9)	5 (41.7)	0 (0)	0.008‡*
LDH (U/L)	109-245	409.0 ± 233.0	638.0 ± 814.0	385.0 ± 121.0	0.131¶
Increased		26 (92.9)	11 (91.7)	15 (93.8)	0.683‡
K (mmol/L)	3.5-5.6	3.9 ± 1.1	3.3 ± 1.4	4.1 ± 0.8	0.103¶
Decreased		8 (28.6)	7 (58.3)	1 (6.25)	0.004‡*
Na (mmol/L)	130-150	137.0 ± 5.0	139.0 ± 7.0	135.0 ± 4.0	0.013¶*
Decreased		2 (7.1)	1 (8.3)	1 (6.25)	0.683‡
PT (s)	9-14	12.4 ± 2.7	14.0 ± 2.8	11.6 ± 1.7	0.031¶*
Increased		7 (25)	5 (41.7)	2 (12.5)	0.093‡
APTT (s)	22-38	26.5 ± 9.7	30.4 ± 9.7	24.8 ± 8.0	0.078¶
Increased		2 (7.1)	2 (16.7)	0 (0)	0.175‡
INR	0.8-1.5	1.06 ± 0.26	1.3 ± 0.3	1.0 ± 0.2	0.027¶*
Increased		1 (3.6)	1 (8.3)	0 (0)	0.429‡
D-D (ug/ml)	0-1	3.0 ± 6.32	4.2 ± 8.9	2.8 ± 0.3	0.816¶
Increased		19 (67.9)	8 (66.7)	11 (68.8)	0.429‡
LAC (mmol/L)	0.5-2.0	1.4 ± 0.8	2.2 ± 1.5	1.2 ± 0.7	0.094¶
Increased		7 (25)	6 (50)	1 (6.25)	0.429‡

(%) is the percentage of the proportion in this group;

*P < 0.05; †Independent sample t-test; ‡Chi-square test; §Mann-Whitney U test; ¶10 cases were unavailable.

Discussion

Since December 2019, the 2019 novel coronavirus, known as severe acute respiratory syndrome corona virus 2 (SARS-Cov-2), has been spreading quickly from its origin in Wuhan city of Hubei province of China to the rest of the country [1]. In this study, we clearly described the demographics and outcome of patients with COVID-19 to provide a better understanding and control of the COVID-19 epidemic.

The median age in our series at the time of diagnosis was 58-years-old, which was similar with previous studies that reported a median age at diagnosis of 59-years-old [1,3]. In consistent with those [4,5], our study indicated that larger age was an adverse predictor of poor outcome among patients with COVID-19 as escalating rates of severe/critical and mortality with increase in age. Unfortunately, no previous study, including this current one, has performed statistical analysis to identify the strong relation between outcome and age. It was obvious; however, old adults as high risk targets were susceptible to COVID-19 pandemic. The government should take powerful measures-outdoor activities limited, adequate isolation and earlier diagnosis-to control the potential community spread of COVID-19. Since human-to-human transmission was a paramount factor of an epidemic that each patient spread infection to 2.2 other individual on average [3]. Additionally, some investigations have indicated that COVID-19 had a propensity to afflict males and male patients were more likely to experience a worse prognosis compare to females [6-9].

There were some significant differences, in this study, between young adult and older patients, in clinical behaviors and laboratory tests. The fever and cough were taken as the most common symptom in many previous studies and ours [9-12]. Our study revealed that compared with young adult patients (n = 11, 84.6%), fewer older patients had a fever more than 38.5 °C, and this difference was treading toward a significance. Lian, et al. reported 15 that more older patients experienced shortness of breath and nasal obstruction. In regard to laboratory investigations, there were significantly decreased lever of ALB in older group than those in young adult group. A similar result was also reported by Lian, et al. [13] Moreover, the abnormal level of HGB, K^+, PT and PCT (infection-related variable) were observed in the older group.

With regard to underlying disease, a small number of cas-

es had it in which there was no significant difference between mild and severe/critical group [10]. Also, our study replicated its result. On the contrary to us, one study reported that significant difference was found in underlying condition between these two groups [13].

Many previous studies described that the value of LDH and PCT were significantly increased in the severe group than those in their counterparts [6,10,12]. This result was also confirmed in our study in which the increase in PCT or LDH was a risk predictor of death due to strong relation between LDH/PCT and cardiopulmonary as well as inflammation. In addition, elevated BNP and TBIL are more common in death patients, who had a significantly higher level than those in survivor patients. Plus, our cohort of dead cases also suggested that a poor prognosis observed a decrease in ALB. Moreover, the blood system and myocardium witnessed a devastating damage, the PT and CKMB were significantly in death group than those in survivor group [7,14]. We obtained a duplicated result.

Seventeen (57.1%) severely ill ICU patients had died at median time of 8 days (Range, 1-38 days) mainly due to acute respiratory distress syndrome, shock, acute cardiac injury and coagulation dysfunction. But we failed to identify the severity as an independent risk factor of poor prognosis compared with young adult ICU patients, those more than 60-years-old were more subjective to these severe complications. Laboratory test, such as CK, BNP, D-dimer, should be given priority.

Sheng, et al. [15] reported that viral infection was related to a higher risk of pulmonary fibrosis which might cause one of the severe complications after patients recovered from COVID-19 infections. Among the 17 patients who were negative for two-time nucleic acid tests, 6 had CT findings of pulmonary inflammation malabsorption. It was requisite and imperative to address the issue that the prevention and treatment of pulmonary fibrosis in severe/critical patients recovered from COVID-19 infection.

Conclusion

Our study clearly reported and analyzed clinical behaviors and outcome in patients with COVID-19. Old patients are a vulnerable population, and the main symptoms are fever and cough. The overwhelming part of older patients usually happened to dyspnea posterior to a short time of onset of initial symptom, which can quickly progress to critical condition. Thus, potential risks of severe of complication should be closely taken notice of, and clinical behaviors as well as laboratory tests should be fully understood. Further randomized controlled clinical trials are required to give a comprehensive understanding of the variables in older adult with COVID-19 and to identify the independent factors of death.

Credit Authorship Contribution Statement

Bin Sun and Hao Wang: Conceptualization, Writing - review & editing, Writing - original draft, Formal analysis, Methodology, Software.

Hui-Xia Xu: Resources.

Gui-Jun Zhang: Conceptualization, Writing - review & editing, Writing - original draft, Formal analysis, Methodology, Software and supervision.

Declaration of Competing Interest

We declare that we have no financial and personal relationships with other people or organizations that can inappropriately influence our work.

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None.

Quick Look

Current knowledge

Clinical features and prognosis of elder patients was still unclear, with only limited literature reported. In addition, the long-term outcome of curable patients was not described in previous studies.

What this paper contributes to our knowledge

Our study clearly reported and analyzed clinical behaviors and outcome in patients with COVID-19. Older patients (≥ 60) were more likely to be at a higher risk of death than their counterpart under 60. Compared with non-elderly group, the value and positive rates of HGB and ALB in elder group were more significantly increased.

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