

The clinical data from 19 critically ill patients with Corona Virus Disease 2019: a single-centered, retrospective, observational study

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SUBJECT AREAS

Epidemiology

KEYWORDS

Corona Virus Disease 2019, Clinical manifestations, epidemiology, retrospective, D-dimer

Abstract

Background To analyze the clinical features of Corona Virus Disease 2019 (COVID-19) and evaluate the diagnosis and treatment.

Methods Making retrospective analysis of the clinical manifestation and auxiliary examination of the 19 patients of COVID-19 which from the Liyuan Hospital ICU between January 16, 2020 and February 20, 2020.

Results There were 11 male and 8 female cases among the patients. The median (range) age was 73 (38-91) years. There are 8 [42.1%] patients had died , and the median duration from ICU to death was 2 (IQR: 1-10.75) days in non-survivors. Seven patients have the basic diseases which in the dead patients. Auxiliary examination: fever (68.4%), dry cough (15.8%), dyspnea (10.5%), diarrhea (5.3%). 19 cases (100%) showed ground-glass changes on Chest computed tomography. Serum Hypersensitive C-Reactive Protein (hs-CRP) and Serum Amylase A (SAA) were increased obviously of 19 cases (100%); there are 16 [84.2%] cases which the total number of lymphocytes decreased; 12 cases (63%) liver function; 11 cases (58%) were deviant in fibrinogen (FIB) and D-dimer, in particular, the D-dimer was significantly higher compared with the **non-survivors** and **survivors**.

Conclusion More men than women in critically ill patients. All the cases showed ground-glass changes on chest CT, and the vast majority of patients will appear fever and dry cough. Clinical lab index changes obviously, especially the D-dimer in Non-survivors.

Introduction

Since December 2019, an outbreak of unexplained pneumonia in Wuhan, China, had spread rapidly to other provinces in China and around the world [Chen N et al. 2020; Holshue ML et al. 2020]. Then study says it was a novel coronavirus pneumonia which was called Corona Virus Disease 2019 (COVID-19). As of Feb 24, 2020, the total number of patients has risen sharply to 77262 in the China, with 2595 (3.2%) deceased. Now, the main diagnosis method is the results of pathogenic which by quantitative real time PCR (qRT-PCR) or to be proved highly homologous with the known genetic sequencing. But the positive rate is 30% to 50% because of the influence of individual factors, the onset time and specimen collection. It is very important to know the specific information

characterising of critically ill patients [Chung et al. 2020; Xie et al. 2020]. Therefore, we conducted a retrospective analysis of critically ill patients with corona virus Disease 2019.

Methods

All the patients of COVID-19 cases come from Liyuan Hospital intensive care unit (ICU) of Tongji Medical College, Huazhong University of Science and Technology from which in January 16, 2020-February 20, 2020.

According to WHO interim guidance, complying with any of the following article can be defined a heavy patient:

1. Respiratory distress, RR acuity 30 times/min;
2. Resting state refers to the oxygen saturation of 93% or less;
3. Arterial blood oxygen partial pressure (PaO₂)/(FiO₂) ≤300 mmHg (High altitude region (more than 1000 meters above sea level, according to the following formula for correction: PaO₂ / FiO₂ PaO₂ / FiO₂ x [760] (mmHg)/atmosphere.))

Defined critically ill patients with any of the following article:

1. A respiratory failure and mechanical ventilation;
2. A shock;
3. Combination of other organs function failure then need to ICU.

We collected the data about age, sex, basic disease (chronic pulmonary disease, chronic cardiac disease, cerebrovascular disease, diabetes, etc), symptoms, vital signs (heart rate, blood pressure, respiratory rate and so on), laboratory values (Blood, urine routine, liver function, renal function, electrolyte and myocardial enzymes, troponin, coagulation function, hs-CRP and SAA.

Results

Among the patients with COVID-19, there were 11 male cases, 8 female cases. The age structure is 38 to 91 years and the median (range) age was 73 (38-91) years. There are 8 (42.1%) patients had died, and the median duration from ICU to death was 2 (IQR: 1-10.75) days in non-survivors. There are 15 (78.9%) patients have basic disease mainly with High blood pressure or diabetes. Seven patients have the basic diseases which in the dead patients. All the patients are wuhan, China citizens

and have no history of contact with COVID-19 (*Table 1*).

Table 1. Characteristics of study population.

Groups	critically ill patients
	Survivors (n=11)
Age, median (range)	68 (38-87)
Male/Female, n	6/5
<u>Clinical</u> Symptoms	11/11
Chest CT (Positive/Tested)	11/11
RT-PCR assay (Positive/Tested)	10/11
Hypertension	6/11
Diabetes	1/11
chronic bronchitis	3/11
Chronic cardiac disease	0/11
Cerebrovascular disease	1/11

COVID 19 Symptoms includes fever, cough, lacking in strength.

Clinical manifestations: fever (13/19, 68.4%), dry cough (3/19, 15.8%), dyspnea (2/19, 10.5%), diarrhea (1/19, 5.3%). 7 patients were treated by intubation and mechanical ventilation.

Auxiliary examination: 19 cases (100%) showed ground-glass changes on chest CT. Clinical lab index:

The infection index (hs-CRP and SAA) were increased obviously of 19 cases (100%); there are 16 (84.2%) cases which the total number of lymphocytes decreased; 12 cases (63%) liver function; 11

cases (58%) were deviant in fibrinogen (FIB) and D-dimer, In particular, the increase in D-dimer was significantly higher in the non-survivors patients (n = 8, 100%) than in the survivors patients (n = 11, 27%); 9 cases (47%) deviant in cardiac muscle enzymes and troponin T (Table 2).

Table 2: Symptoms, Clinical lab index results of critically ill patients with COVID-19 pneumonia.

critically ill patients (n=19)			
	Survivors (n=11)	Non-survivors (n=8)	All patients
G r o u p s			
S y m p t o m s			
F e v e r	7/11	6/8	13/19
C o u g h	5/11	3/8	8/19
	2/11	0/8	2/19
l a			

c
k
i
n
g
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0/11

2/8

2/19

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86.9 (47.9-120.5)

166.15 (82.3-129.4)

95.4 (54.1-120.5)

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65.7 (56.9-100.8)

95.1 (54.8-79.8)

64.3 (56.4-94.6)

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39.5 (26.4-77.5)

50.9 (43.2-71.2)

47.2 (29.7-75.8)

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36 (31.8-37.3)

33.65 (29.2-34.7)

34.1 (30.9-36.7)

D
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0.48 (0.42-0.97)

2.15 (1.4-9.2)

0.91(0.475-2.35)

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COVID-19 Symptoms includes fever, cough, lacking in strength.

Discussion

Till now, there is no specific drugs for COVID-19 but the general supportive therapy and treatment in isolation. For mild patients, it usually clears spontaneously, nevertheless severe illnesses develop to acute respiratory distress syndrome (ARDS), multiple system organ failure or even death easily. In this study, more men than women and more older than the younger in critically ill patients, and the median (range) age of the 19 patients was 73 (38-91) years. There are 8 (42.1%) patients had died, and the median duration from ICU to death was 2 (IQR: 1-10.75) days in non-survivors. These results suggest that Sex, age are affecting the risk factors. Patients with a history of basic disease (High blood pressure or diabetes) are at increased risk of becoming critically ill or dying if they have COVID-19 infection. These findings are consistent with previous reports [Chen N et al. 2020; Huang et al. 2020]. Population susceptibility to infection by the new virus drives the dynamics of an pandemic. Their clinical manifestations include fever, fatigue and dry cough without phlegm, a few patients with nasal congestion, runny nose, sore throat and diarrhea [Cui et al.2019; Zhu et al.2020]. Critically ill patients were more vulnerable to dyspnea, hypoxaemia even the ARDS, irreformable metabolic acidosis,sepsis and coagulation disturbance after one Week [Wang et al. 2020]. Our study found that the severe patients go to the hospital almost only at the first symptoms of fever and cough, and from the symptoms began until to ICU admission time is 6.4 d, and there 18 cases (94.7%) develop to ARDS rapidly.

As for laboratory tests, 19 cases (100%) showed ground-glass changes on chest CT. The vast majority of these Clinical lab index have changed significantly, the hs-CRP and SAA were increased obviously of 19 cases (100%); 9 cases (47%) deviant in cardiac muscle enzymes and troponin T. 12 cases (63%) liver function; 11 cases (58%) were deviant in fibrinogen (FIB) and D-dimer, In particular, the increase in D-dimer was significantly higher in the non-survivors patients (n = 8, 100%) than in the survivors patients (n = 11, 27%). It suggested that D-dimer can be used to monitor the change of the condition in severe patients (*Figure 1*); There are 16 (84.2%) cases which the total number of lymphocytes

decreased which may prompt that COVID-19 infects cells of the human immune system, destroying or impairing their function.

Previous studies showed that the virus can induce the body to produce oxidative stress and release a large amount of active oxygen free radicals which can one hand make the virus replication enhance unceasingly, on the other hand, the excessive free radicals can damage the body's biological membrane lipid peroxidation, enzyme, amino acid and the oxidative protein, last to injury the organs, such as lung, heart, liver, kidney, etc [Honce et al. 2019; Li et al. 2020; Zhu et al. 2019;].

COVID-19 belongs to the viru which easily to be a mistake in process of RNA replication as this result, we suspect that the new coronavirus in patients with multiple organ function damage most likely related to this. Imaging aspects: 19 cases (100%□showed ground-glass changes on chest CT which to evaluate the imaging signs in making its early diagnosis.

In conclusion, to analyze the clinical features of patients with Corona Virus Disease 2019 (COVID-19), we foud that Sex, age are affecting the risk factors. Patients with a history of basic disease (High blood pressure or diabetes) are at increased risk of becoming critically ill or dying if they have COVID-19 infection. Chest computed tomography (CT), lymphocyte count, hs-CRP and SAA can be used in disease diagnosis. D-dime plays an important role in critically ill patients and it suggested that D-dimer can be used to monitor the change of the condition in severe patients. There is a certain limitation as the less sample of this study and it belongs to the retrospective study. We hope have more samples, a more comprehensive study to bring better means for the clinical treatment of COVID-19.

Declarations

Acknowledgment

We thank the medical staff of liyuan hospital for their assistance in collecting clinical samples.

Conflict of interest

The authors declared that they have no conflicts of interest to this work. We declare that we do not have any commercial or associative interest that represents a conflict of interest in connection with

the work submitted.

Ethnics Statement

The study was approved by the Ethical Committee of Liyuan Hospital, Tongji Medical College (Wuhan, China), Huazhong University of Science and Technology. Written informed consent was obtained from

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Figures

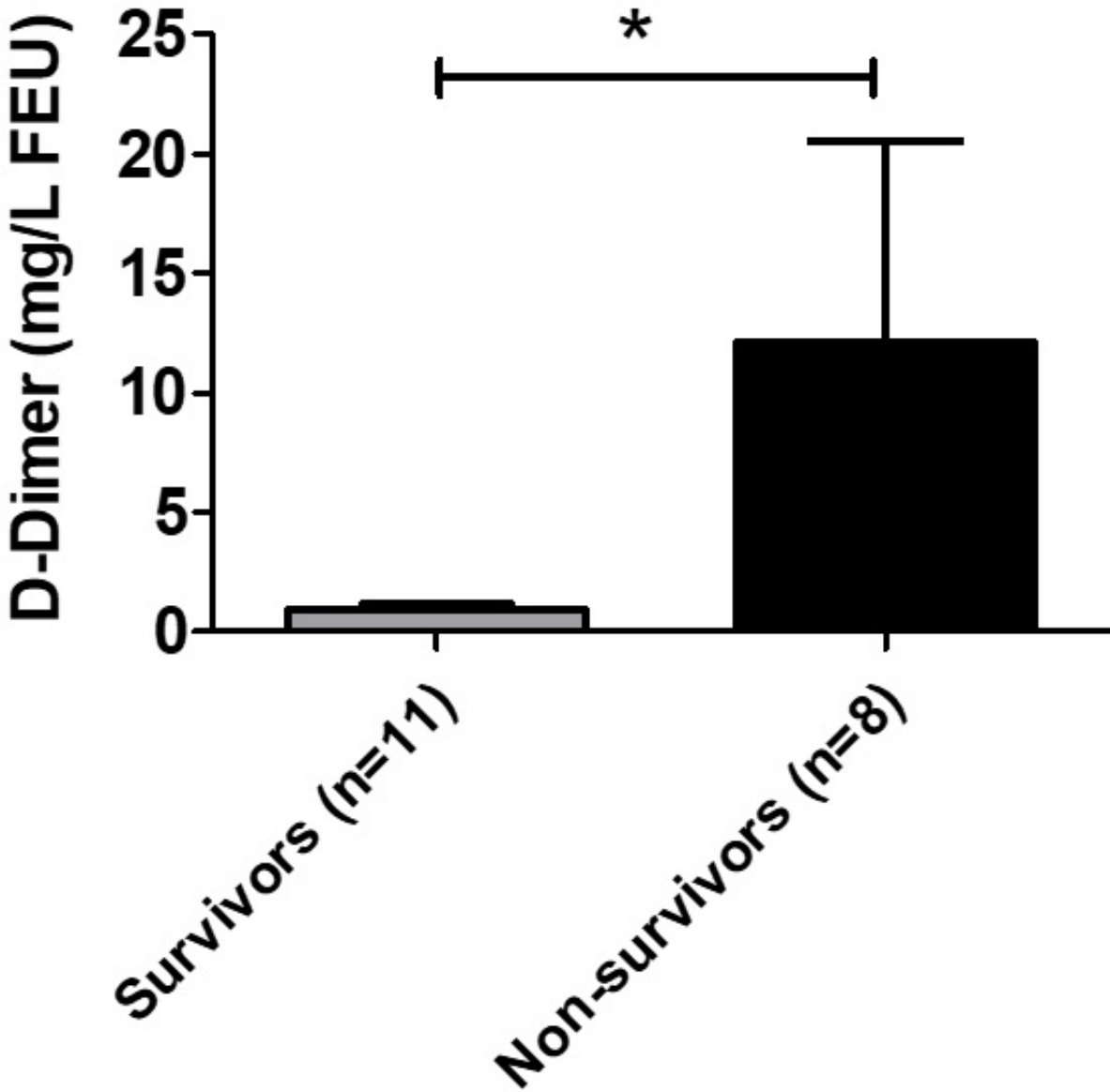


Figure 1

Comparison of D-dimer in Non-survivors and Survivors patients. *p < 0.05 (Mann-Whitney U test).