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Coronavirus Pandemic

Initial Clinical Characteristics of 146 Patients with COVID-19 Reported in Guizhou Province, China: A Survival Analysis

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Abstract
Introduction: Coronavirus disease 2019 (COVID-19) has caused an outbreak around the world. Early detection of severe illness is crucial for patients' survival. We analysed initial clinical characteristics of 146 patients with COVID-19 reported in Guizhou province, China to explore risk factors for transforming mild illness to severe.
Methodology: Data of 146 laboratory-confirmed cases were collected and evaluated by the survival analysis of univariate and multivariate Cox proportional hazards model.
Results: On initial presentation, patients had fever (51.05%), dry cough (45.45%), headache (16.08%), shortness of breath (7.75%) and gastrointestinal symptoms (13.99%). Among 146 laboratory-confirmed cases, 30 patients (20.55%) had severe illness and needed Intensive Care Unit care for supportive treatment. The remaining patients (116, 79.45%) were non-severe cases. Nineteen (19/146, 13.01%) of 30 patients in the Intensive Care Unit had comorbidities, including hypertension (12, 40.00%), diabetes (5, 16.67%), cardiovascular disease (5, 16.67%) and pulmonary disease (4, 13.33%). For survival analysis, patients who had fever (HR = 3.30, 95% CI = 1.31, 8.29) and comorbidities (HR = 9.76, 95% CI = 4.28, 22.23) at baseline were more likely to be admitted into the Intensive Care Unit. Few variables were not related to the survival time of discharge from baseline to discharge and from Intensive Care Unit care to discharge.
Conclusions: Severe patients with COVID-19 should be paid more attention. On initial symptoms, many patients did not have fever, but those with fever were more likely to be admitted to the Intensive Care Unit. Comorbidities were likewise a risk factor of severe COVID-19.

Key words: COVID-19; survival analysis; clinical characteristic; epidemiological characteristics.

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Introduction
Coronavirus disease 2019 (COVID-19) has caused the current outbreak which was assessed by World Health Organization (WHO) as a pandemic on 11 March 2020. The novel coronavirus strain that causes respiratory infection has been named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). SARS-CoV-2 is one of beta-coronaviruses with enveloped RNA, round or elliptic shape, often pleomorphic characteristic and diameter of 60-140 nm. The spike (S) protein is one of the main proteins of the virus, and its coding genes are used for virus typing and infection. The nuclecapsid (N) protein is used for diagnosis and encapsulates the viral genome. The virus could be killed in some environments, such as ultraviolet rays, diethyl ether, ethyl alcohol, chlorine disinfectant and 56 °C in 30 minutes [1]. Cao *et al*. [2] found SARS-CoV-2 could bond with angiotensin converting enzyme-2 (ACE2) receptor of the respiratory tract epithelial cells, leading to infection.

SARS-CoV-2 is a new coronavirus that has not been previously identified in humans and exhibits phylogenetic similarity to SARS-CoV and MERS-CoV [3], which infect susceptible population via droplet and direct contact. These virus strains have a higher incidence of susceptibility among adults, elders, children and infants, leading to acute respiratory tract infection and even severe pulmonary infection. The most common symptoms at onset of illness are fever, dry cough, fatigue or myalgia. Less common symptoms include sneezing, sore throat, coughing of phlegm, rhinorrhea, diarrhea, headache or even dyspnoea.

SARS-CoV-2 has spread worldwide to more than 216 countries in six continents within only several months later after WHO announcement [4]. Determining the pathogenic mechanism, transmission route, epidemiologic features, clinical characteristics, survival rate and therapies as soon as possible remains challenging. We described the epidemiological and clinical characteristics and performed survival analysis of patients with COVID-19 in Guizhou province to provide references for further research.

Methodology

Data sources and collection

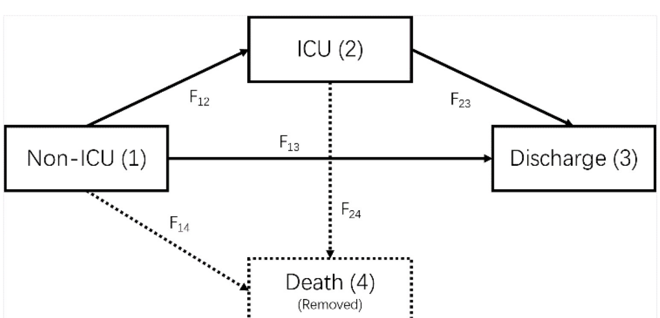
Since the first patient of COVID-19 in Guizhou province was reported on January 21, 2020, patients diagnosed later were transferred to designated hospitals. Preliminary epidemiological investigation needed to be accomplished within 24 hours, and advanced investigation, including on transmission chain, should be conducted.

A total of 146 laboratory-confirmed cases were reported in Guizhou province between the 21st of January and the 17th of February 2020. Data collection originated from the China Information System for Disease Control and Prevention, which is the most authoritative infectious disease surveillance system of China. Information of each case was uploaded by the local Centre for Disease Control and Prevention (CDC) and local designated hospitals after personal investigation, according to the legislation of infectious disease. Two researchers were responsible for collecting, enrolling data and cross-checking Data were then verified by their superiors before proceeding.

Diagnostic criteria

The guidelines for diagnosis and treatment of COVID-19 were published by the Chinese National Health Committee. An individual is diagnosed as a suspected case of COVID-19 if he has epidemiological exposure history in 14 days and has two of the three following criteria: clinical presentations (fever or respiratory infection); blood test showing normal or descending white blood cell count and declining

Figure 1. Multi-state model.



F refers to functions for the transition between states. E.g., F12 refers to the transition from state 1 (Non-ICU, namely the baseline) to state 2 (ICU). It is noted that state 4 was removed from the model, due to lack of sample size.

lymphocyte count; and radiological characteristics showing bilateral ground-glass opacity or local patchy shadowing. Respiratory tract specimens were obtained through nasal and pharyngeal swabs, sputum or bronchoalveolar lavage fluid and detected by Real-Time Polymerase Chain Reaction (RT-PCR) in designated laboratories. An individual is identified as a laboratory-confirmed patient if the result is positive. Patients were defined as Intensive Care Unit (ICU) cases when they have emerging dyspnoea and hypoxemia or require mechanical ventilation or any other situations that need ICU care for supportive treatment.

Statistical analysis

Data were analysed by R software version 3.6.2 (R Foundation for Statistical Computing).

Continuous variables with normal distribution were presented as means and standard deviations (SD). Other non-normal continuous variables were described as median and interquartile range (IQR). The categorical variables were summarized as summarized as counts and percentages of each category. When appropriate, the frequencies of categorical variables between ICU and non-ICU cases were compared using Pearson or Fisher's exact test. Continuous variables between the two groups were compared by independent samples Student's *t*-test.

For survival analysis, the duration was measured as days for each case. The main event was defined as the discharge of the case. Subjects might have two transitions, namely, admission to discharge directly, or admission to ICU care and then discharge. Figure 1 illustrates the possible transitions in our multi-state model. Death was another competing event in this multi-state model; however, considering the small sample size in the death event (only two cases), we removed this event from the model, and 144 cases were used. We aimed to consider the effect of early presentations, white blood cell count, lymphocyte count and comorbidities of each case on the probabilities of transitions among the states. All independent variables were time-invariant covariates that were maintained constant throughout the entire process. Univariate Cox proportional hazards model for each covariate was used for exploratory analyses, denoted as model 1. Accordingly, variables with p value of 0.05 or less in model 1 were entered into the multivariate Cox proportional hazards model with backward features selection, denoted as model 2. In the exploratory data analysis, we noted that some comorbidities such as cardiovascular disease were unevenly distributed in the non-ICU group (Table 1). As such, we merged all four comorbidities into a single covariate, called as "comorbidity". Only comorbidity was used in model 2. Statistical significance was assessed at ≤ 0.05.

Results

A total of 146 laboratory-confirmed symptomatic cases of COVID-19 were recorded in Guizhou province. About 144 patients were discharged from the designated hospital and two died. The proportion of gender (male/female, 74/72) was 1.03. The median age of patients was 39 years (IQR = 27.75 years). The 15–44-year-old patients accounted for 52.74%, and the 45–64-year-old patients were 29.45%. Eighty patients (54.79%) were exposed outside the Guizhou province. At early date of symptom onset, the most common symptoms were fever (51.05%) and dry cough (45.45%). About 122 (91.04%) patients showed abnormal chest radiological features. Among the 30 ICU patients, 19 (13.01%) had comorbidities and some of them had more than one comorbidity. Analysis of blood count showed that lymphocytopenia accounted for 26.03%. Thirty cases with severe illness (20.55%) needed ICU care or mechanical ventilation for supportive treatment. The remaining patients (116, 79.45%) were non-severe cases. All characteristic terms are shown in Table 1.

For survival analysis, in the univariate Cox proportional hazards model, namely *model 1*, 12 of 21 covariates were associated with rates of cases transition from baseline to ICU care (Table 2). Among the 12 covariates, 11were associated with higher rates and only lymphocyte count denoted a lower rate. Persons who had fever at baseline were more likely to be admitted into ICU (Hazard Ratio [HR] =3.30, 95% Confidence Interval [CI] = 1.31, 8.29, Figure 2). Cases with dry cough were concerned with an increased risk of baseline to ICU transmission (HR = 4.09, 95% CI = 1.63, 10.28, Figure 2). Among the comorbidities (HR = 9.76, 95% CI = 4.28, 22.23, Figure 2), cardiovascular disease had the highest hazard ratio (HR = 17.47, 95% CI = 4.79, 63.69). The results of the two other transitions are shown in Tables 3 and 4.

Table 1. Demographics and clinical characteristics of confirmed COVID-19.

Characteristics	All cases (n = 146)	Non-ICU cases (n = 116, 79.45%)	ICU cases (n = 30, 20.55%)	*p* value
Median Age (IQR) – year	39 (27.75)	36 (24.75)	58 (21.00)	< 0.01[a]
Age group – n/N (%)				
< 15 years	12 (8.22)	12 (10.17)	0 (0)	< 0.01[b]
15–44 years	77 (52.74)	72 (61.02)	5 (17.86)	
45–64 years	43 (29.45)	30 (25.42)	13 (46.43)	
≥ 65 years	14 (9.59)	4 (3.39)	10 (35.71)	
Sex – n/N ()				
Male	74 (50.68)	58 (49.15)	16 (57.14)	0.58[c]
Female	72 (49.32)	60 (50.85)	12 (42.86)	
Exposure outside Guizhou province – n ()	80/66 (54.79)	63 (43.15)	17 (11.64)	0.52[c]
Symptoms –n with / n without (with)				
Fever	73/70 (51.05)	51/64 (44.35)	22/6 (78.57)	< 0.01[c]
Dry cough	65/78 (45.45)	45/70 (39.13)	20/8 (71.43)	< 0.01[c]
Myalgia or arthralgia	13/129 (9.15)	7/107 (6.14)	6/22 (21.43)	0.03[c]
Fatigue	23/116 (16.55)	14/97 (12.61)	9/19 (32.14)	0.03[c]
Sputum production	32/111 (22.38)	22/93 (19.13)	10/18 (35.71)	0.10[c]
Sore throat	32/110 (22.54)	26/88 (22.81)	6/22 (21.43)	1.00[c]
Headache	23/120 (16.08)	19/96 (16.52)	4/24 (14.29)	1.00[c]
Rhinorrhea	14/129 (9.79)	12/103 (10.43)	2/26 (7.14)	0.86[c]
Shortness of breath	11/131 (7.75)	4/110 (3.51)	7/21 (25)	< 0.01[c]
Gastrointestinal symptoms	20/123 (13.99)	16/99 (13.91)	4/24 (14.29)	1.00[c]
Chest distress	13/128 (9.22)	9/104 (7.96)	4/24 (14.29)	0.50[c]
Radiological feature	122/12 (91.04)	95/12 (88.78)	27/0 (100)	0.73[c]
Blood count				
Leukocyte count	5.68±2.09	5.76±2.21	5.34±1.55	0.24[a]
Lymphocyte count	1.4±0.76	1.51±0.78	0.97±0.44	< 0.01[a]
Comorbidity – n with / n without (with)	30/116 (20.55)	11/105 (9.48)	19/11 (63.33)	< 0.01[c]
Hypertension	19/127 (13.01)	7/109(6.03)	12/18 (40.00)	< 0.01[c]
Diabetes	8/138 (5.48)	3/113 (2.59)	5/25 (16.67)	0.01[c]
Cardiovascular disease	5/141 (3.42)	0/116 (0)	5/25 (16.67)	< 0.01[c]
Pulmonary disease	7/139 (4.79)	3/113 (2.59)	4/26 (13.33)	0.02[c]

Data is n/N (). N is the total number of patients. There are missing data of symptoms. *P* values comparing non-ICU cases and ICU cases are from t-test (a), Fisher' exact test (b), or χ^2 test (c). A "n with/n without" means the number of patients with any certain symptom or any comorbidity. ICU: intensive care unit.

Table 2. Hazard ratios of univariate and multivariate models among cases transition from baseline to ICU care.

Covariates	Model 1				Model 2			
	HR	SE	95 CI	*P*-value	HR	SE	95 CI	*p*-value
Gender								
Female *vs*. Male	0.90	0.40	[0.41, 1.97]	0.80	0.62	0.42	[0.27, 1.41]	0.31
Age	1.06	0.01	[1.04, 1.08]	< 0.01	1.05	0.02	[1.01, 1.09]	0.06
Exposure outside of Guizhou province	1.73	0.43	[0.74, 4.02]	0.21				
Symptoms								
Fever	3.30	0.47	[1.31, 8.29]	0.01	3.43	0.53	[1.21, 9.69]	0.03
Dry cough	4.09	0.47	[1.63, 10.28]	< 0.01	3.20	0.52	[1.15, 8.87]	0.02
Myalgia or arthralgia	3.54	0.47	[1.41, 8.89]	< 0.01				
Fatigue	2.57	0.46	[1.04, 6.33]	0.04				
Sputum production	2.18	0.42	[0.96, 4.97]	0.06				
Sore throat	0.96	0.47	[0.38, 2.41]	0.94				
Headache	0.97	0.55	[0.33, 2.85]	0.96				
Rhinorrhea	0.74	0.74	[0.17, 3.16]	0.69				
Shortness of breath	6.47	0.47	[2.58, 16.25]	< 0.01	7.62	0.59	[2.4, 24.22]	< 0.01
Gastrointestinal symptoms	0.87	0.62	[0.26, 2.93]	0.84				
Chest distress	1.51	0.62	[0.45, 5.09]	0.53				
Blood count								
Leukocyte count	0.92	0.11	[0.74, 1.14]	0.38				
Lymphocyte count	0.16	0.54	[0.06, 0.46]	0.01				
Comorbidity	9.76	0.42	[4.28,22.23]	<0.01	4.58	0.59	[1.44,14.56]	0.03
Hypertension	5.47	0.44	[2.31, 12.96]	<0.01				
Diabetes	5.06	0.55	[1.72, 14.87]	<0.01				
Cardiovascular disease	17.47	0.66	[4.79, 63.69]	<0.01				
Pulmonary disease	4.21	0.55	[1.43, 12.37]	< 0.01				

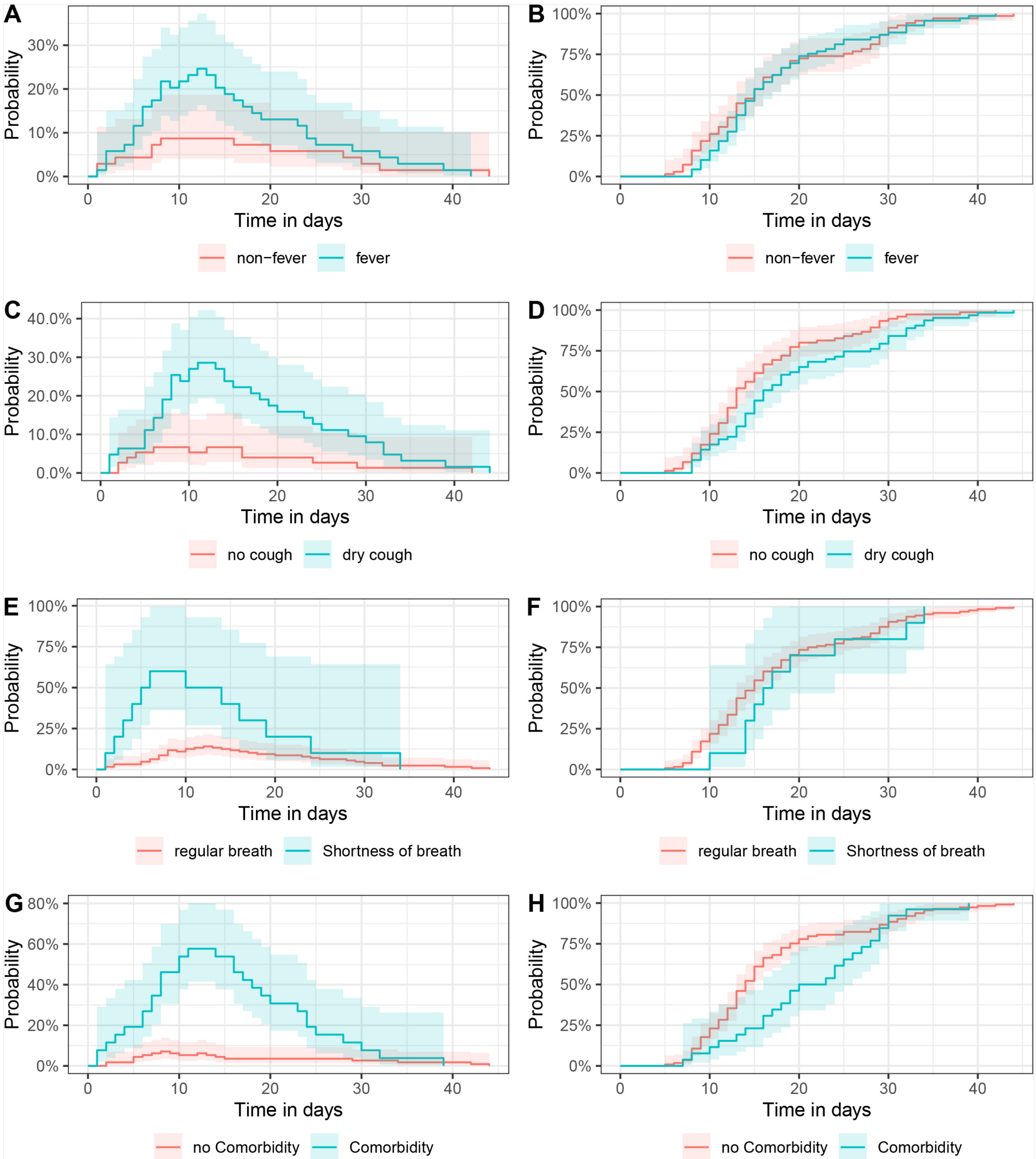
HR: Hazard Ratio; SE: Standard error; 95CI: 95 Confidence Interval.

Table 3. Hazard ratios of univariate and multivariate models among cases transition from baseline to discharge.

Covariates	Model 1				Model 2			
	HR	SE	95 CI	*p*-value	HR	SE	95 CI	*p*-value
Gender								
Female *vs*. Male	0.93	0.19	[0.64, 1.35]	0.68	0.89	0.20	[0.60, 1.32]	0.55
Age	0.98	0.01	[0.96, 1.00]	< 0.01	0.99	0.01	[0.97, 1.01]	0.04
Exposure outside of Guizhou province	1.44	0.19	[0.99, 2.09]	0.07				
Symptoms								
Fever	0.93	0.19	[0.64, 1.35]	0.93	0.99	0.20	[0.67, 1.47]	0.97
Dry cough	0.68	0.23	[0.43, 1.07]	0.07	0.70	0.20	[0.47, 1.04]	0.08
Myalgia or arthralgia	1.44	0.39	[0.67, 3.09]	0.33				
Fatigue	1.49	0.30	[0.83, 2.68]	0.12				
Sputum production	0.71	0.25	[0.43, 1.16]	0.17				
Sore throat	1.02	0.23	[0.65, 1.60]	0.94				
Headache	0.91	0.26	[0.55, 1.51]	0.70				
Rhinorrhea	0.83	0.31	[0.45, 1.52]	0.54				
Shortness of breath	0.71	0.51	[0.26, 1.93]	0.33	0.75	0.54	[0.26, 2.16]	0.57
Gastrointestinal symptoms	0.95	0.27	[0.56, 1.61]	0.82				
Chest distress	0.69	0.35	[0.35, 1.37]	0.17				
Blood count								
Leukocyte count	1.00	0.04	[0.92, 1.08]	0.97				
Lymphocyte count	1.24	0.12	[0.98, 1.57]	0.06				
Comorbidity	0.79	0.32	[0.42, 1.48]	0.32	0.87	0.36	[0.43, 1.76]	0.68
Hypertension	1.03	0.39	[0.48, 2.21]	0.94				
Diabetes	0.71	0.59	[0.22, 2.26]	0.37				
Cardiovascular disease	<0.01	>100		<0.01				
Pulmonary disease	0.61	0.59	[0.19, 1.94]	0.08				

HR: Hazard Ratio; SE: Standard error; 95 CI: 95 Confidence Interval.

Figure 2. Predicted survival proportion and 95% CI for the transitions from baseline to ICU, and from baseline to discharge. The measurements for the duration were days. The covariates were fever, dry cough, dyspnoea (shortness of breath), and comorbidity respectively for each row. The leftmost column (Panels A, C, E, and G) was the transitions from baseline to ICU. The rightmost column (Panels B, D, F, and H) was the transitions from baseline to discharge.



Cardiovascular disease had a statistically significant decrease rate ($p < 0.01$), but it also had a high standard error.

In the multivariate Cox proportional hazards model that considered age and gender, fever (HR = 3.43, 95% CI = 1.21, 9.69), dry cough (HR = 3.20, 95% CI = 1.15, 8.87), shortness of breath (HR = 7.62, 95% CI = 2.4, 24.22), and comorbidity (HR = 4.58, 95% CI = 1.44, 14.56) were related to cases transition from baseline to ICU care. Various factors were not associated with the survival time of discharge from baseline to discharge and from ICU care to discharge ($p > 0.05$).

Discussion

A total of 146 laboratory-confirmed symptomatic cases of COVID-19 were recorded in Guizhou province between the 21st of January and the 17th of February 2020. Sixty-five patients (44.52%) had residence or travel history from Hubei province, and 15 (10.23%) patients had epidemiological exposed history outside the Guizhou province but not in the Hubei province within China. The remaining other 66 cases (45.21%) were their close contacts. Considering that no new cases have been reported in Guizhou province since 17th of February 2020, imported cases should be prioritised for subsequent prevention and control. The same is true for other provinces or countries. The proportion of gender was around 1:1. The median age of the patients was 39.0 years (IQR = 27.75 years) ranging from 1 month to 87 years old, which was younger than those reported in the studies of Huang *et al*. (47.0 years) and Guan *et al*. (57.0 years) [5,6].

Consistent with recent studies, the most common signs at onset of illness involved fever (73, 51.05%) and dry cough (65, 45.45%). These findings are close to those reported by Guan *et al*. (fever 43.8%, cough 67.8%) [6], but lower than the data reported by Zhang *et al*. (fever 91.7%, cough 75.0%) [7]. The other cases presented with fatigue (23, 16.55%), sore throat (32, 22.54%), sputum production (32, 22.38%), headache (23, 16.08%), myalgia or arthralgia (13, 9.15%), shortness of breath (11, 7.75%), rhinorrhea (14, 9.79%), gastrointestinal symptoms (20, 13.99) and chest distress (13, 9.22%). The numbers were less than those in recent reports [7-9], probably due to the different inclusion criteria. Given the limitation of wards in some cities when overloaded, patients were only allowed to the hospitals if they have distinct symptoms and signs. Patients with mild symptom were admitted to the designated hospitals in Guizhou province, which could explain the lower death rate (1.37%) than the national official statistics of China (5.03%) [10] and the global data of WHO [11]. The mean and SD of leukocyte count and lymphocyte count were 5.68 ± 2.09 and 1.4 ± 0.76 respectively, in which 28 (26.03%) of the patients had lymphocytopenia, consistent with the report of Turkey

Table 4. Hazard ratios of univariate and multivariate models among cases transition from ICU care to discharge.

Covariates	Model 1				Model 2			
	HR	SE	95 CI	*p*-value	HR	SE	95 CI	*p*-value
Gender								
Female *vs*. Male	0.18	0.42	[0.08, 0.41]	0.67	1.30	0.52	[0.47, 3.60]	0.58
Age	0.97	0.02	[0.93, 1.01]	0.03	0.97	0.03	[0.91, 1.03]	0.16
Exposure outside of Guizhou province	1.76	0.45	[0.73, 4.25]	0.18				
Symptoms								
Fever	1.92	0.51	[0.71, 5.22]	0.16	0.96	0.02	[0.92, 1.00]	0.01
Dry cough	0.92	0.48	[0.36, 2.36]	0.87	0.53	0.64	[0.15, 1.86]	0.23
Myalgia or arthralgia	3.47	0.55	[1.18, 10.2]	< 0.01				
Fatigue	2.59	0.47	[1.03, 6.51]	0.05				
Sputum production	0.87	0.44	[0.37, 2.06]	0.75				
Sore throat	1.80	0.50	[0.68, 4.8]	0.12				
Headache	1.49	0.59	[0.47, 4.47]	0.23				
Rhinorrhea	0.96	0.75	[0.22, 4.18]	0.94				
Shortness of breath	1.65	0.48	[0.64, 4.23]	0.29	1.53	0.52	[0.55, 4.24]	0.34
Gastrointestinal symptoms	0.91	0.63	[0.26,3.13]	0.83				
Chest distress	2.04	0.65	[0.57, 7.29]	0.07				
Blood test								
Leukocyte count	0.83	0.14	[0.63, 1.09]	0.21				
Lymphocyte count	0.86	0.44	[0.36, 2.04]	0.67				
Comorbidity	1.42	0.48	[0.55, 3.64]	0.51	2.20	0.58	[0.71, 6.68]	0.22
Hypertension	1.05	0.44	[0.44, 2.49]	0.91				
Diabetes	1.08	0.56	[0.36, 3.24]	0.83				
Cardiovascular disease	1.89	0.65	[0.53, 6.76]	0.09				
Pulmonary disease	2.03	0.58	[0.65, 6.33]	0.07				

HR: Hazard Ratio; SE: Standard error; 95CI: 95 Confidence Interval.

(5.95 and 1.35 respectively) [12]. A total of 122 (91.04%) patients had abnormal chest radiological features, which approached the discovery of Fang *et al*. (98%), Carotti *et al*. (97%) and Pan *et al*. (85.7%) [13-15] but was higher than the data of Young *et al*. (33.0%) [16].

Our results demonstrated that 30 (20.55%) severe patients needed ICU care or mechanical ventilation for supportive treatment, which was higher than the data reported by Surme [17]. The others (116, 79.45%) were non-severe cases. Different countries had variable proportion of patients admitted to ICU, namely, 7%-26% in China, 5%-12% in Italy and the highest rate of 81% in the United States [18-20]. In relation to ICU cases, 13 (43.33%) patients were 45-64 years old. Nineteen (19/146, 13.01%) of 30 ICU patients with comorbidities, including hypertension (12, 40.00%), diabetes (5, 16.67%), cardiovascular disease (5, 16.67%) and pulmonary disease (4, 13.33%), consistent with the report of Huang *et al.* but lower than those in other current reports [5,21,22]. Despite that SARS-CoV-2 infection causes around 80% mild illness, 19 (19/30, 63.33%) of 30 ICU patients with comorbidities deteriorated into severe illness. A study in Saudi Arabia showed patients with comorbidities had a higher risk of developing ICU cases [23]. Hence, elders and patients with comorbidities should be paid close attention to.

For survival analysis in the univariate Cox proportional hazards model, 12 of 21 covariates were associated with rates of cases transition from baseline to ICU care. Twelve covariates were risk factors of transition from mild illness to severe. Individuals with fever, dry cough and shortness of breath at the initial phase of COVID-19 were more likely to be admitted into ICU (HR = 3.30, 4.09, 6.47 respectively). For comorbidities (HR = 9.76), cardiovascular disease had the highest hazard ratio (HR = 17.47). The results of the two other transitions were notable, that is, cardiovascular disease for case transition from baseline to discharge had a statistically significant decreasing rate ($p < 0.01$). Hence, patients with cardiovascular disease had a longer course of the disease. However, the standard error was high mainly due to the uneven distribution of the non-ICU group.

In the multivariate Cox proportional hazards model of survival analysis concerning age and gender, we observed that fever (HR = 3.43), dry cough (HR = 3.20), shortness of breath (HR = 7.62) and comorbidity (HR = 4.58) were related to case transition from baseline to ICU care but were not associated with the survival time of discharge transition from baseline to discharge and from ICU care to discharge ($p > 0.05$), except that fever increased the course of the disease from ICU care to discharge. It reminded that fever might be a specific trigger of admission of ICU care when an individual has fever, dry cough, shortness of breath and comorbidity at the earliest date of symptoms onset.

Guizhou province immediately prepared to deal with the rapidly spreading pandemic since the first case reported in China. The first case was discovered through active investigation in Guizhou province. All people from outside the Guizhou province were investigated for advance identification of groups at risk for COVID-19 infection. Patients with mild symptoms started intervention in designated hospitals, while patients with severe symptoms or required a ventilator and other supportive management were admitted to ICU in our province. The occurrence of local cases ended on February 17, 2020, and 144 patients were discharged from the hospitals, except for two individuals who died under mental and physical treatment. We were only highly concerned about people and cargo from overseas as well as people in medium- and high-risk areas. Under strict prevention and control, no local cases have occurred so far, which was the reason why the population size was relatively small. The global situation is still grim. Only by strict controlling it as soon as possible can we restore social economic development and people's daily life.

Conclusions

Several hints through this article. Firstly, approximately 50% of patients merely had fever on initial presentation, which was different from routine respiratory infectious diseases involving influenza, avian influenza, SARS-CoV and MERS-CoV [24-27]. Therefore, surveillance of elevated temperature cannot be the only way to screen patients with COVID-19. We found that 91.04% of the patients had abnormal chest radiological features, which could be considered, but complicated operation and high cost prompted us to conduct further exploration. Secondly, given of the incubation period of infection and asymptomatic status, innovative measures should be developed and unique projects should be conducted for control and prevention of infectious diseases. Thirdly, patients with severe illness should be paid more attention in current control and prevention protocols. On initial presentation, many patients did not have fever, but those with fever were more likely to be admitted to the ICU as well as those with comorbidity. Early detection, diagnosis and treatment could significantly reduce death and number of sufferers. Fourthly, a vaccine was developed. This progress emphasises the merit of discovering fundamental scientific elements, regardless of they have apparent or immediate clinical applications [28]. SARS-CoV-2 that causes COVID-19 with high morbidity has aroused a global pandemic, but we have limited knowledge about it. Data should be discovered and published for advancement of studies to promote therapeutic effect and prevention.

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