Characteristics of confirmed coronavirus disease cases at the south campus of Shanghai East Hospital: A retrospective study

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Research Article

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Abstract

Background: A fever outpatient clinic at the south campus of Shanghai East Hospital (SEH) opened

in response to the coronavirus disease (COVID-19) outbreak. We analyzed the data of all 11,972

patients who visited the fever clinic and the 29 confirmed COVID-19 cases to determine the clinical and epidemiological characteristics of confirmed COVID-19 cases diagnosed at SEH.

Methods: Data were collected from all fever outpatient clinic patients between January 23 and September 30, 2020. We compared the characteristics of confirmed patients, including age, occupation, area, symptoms, laboratory results, and computed tomography (CT) findings, according to month.

Results: By September 30, 2020, 11,972 patients, including 29 (0.24%) confirmed COVID-19 cases, visited the clinic. Four of five confirmed domestic cases identified during January–February 2020 were from Wuhan (mainly elderly retirees and local employees), Hubei. After the epidemic spread internationally, all 22 confirmed cases identified during March–April 2020 were individuals who returned from abroad. They were predominantly young Chinese international students. The sporadic two confirmed cases during May–September 2020 included an employee returning to work from Hubei and an Indian servant from abroad. Symptoms, laboratory tests, and CT findings were consistent with previous reports of COVID-19-positive cases.

Conclusions: The characteristics of confirmed COVID-19 cases at SEH varied among different periods in response to the spread of the pandemic. However, due to the effective early isolation and quarantine measures, no outbreak occurred in SEH, which contributed to the prevention and control of the epidemic in Shanghai.

Background

Coronavirus disease (COVID-19) has spread rapidly as a global pandemic since the initial outbreak of a cluster of pneumonia cases of unknown origin in December 2019 [1]. The pathogen has been

identified as a novel enveloped ribonucleic acid (RNA) beta-coronavirus, using reverse transcription-polymerase chain reaction (RT-PCR) analyses of patients' lower respiratory tract samples [2]. On February 11, 2020, the World Health Organization (WHO) named the new coronavirus "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)" and the associated disease "coronavirus disease (COVID-19)" [3]. The high infectivity of SARS-CoV-2 led to the rapid spread of COVID-19 in China and worldwide. Consequently, on March 11, 2020, the WHO declared COVID-19 a pandemic [4]. As of September 28, 2020, the cumulative number of COVID-19 infections worldwide exceeded 32.7 million [5]. In China, COVID-19 was brought under control within 2 months due to effective preventive measures. As China's largest city and a bridge between domestic and international affairs, Shanghai faced both domestic and global epidemic pressure. Since the COVID-19 pandemic began, Shanghai has mainly experienced imported cases and reports the second-largest number of such cases in Mainland China. However, Shanghai adopted strict measures to prevent and control the spread of COVID-19 and reduce its transmission. Shanghai East Hospital (SEH) is one of the largest general tertiary care hospitals in Pudong New District and has played an important role in epidemic prevention and control in Shanghai. On January 23, 2020, when Wuhan was locked down, SEH opened a fever outpatient clinic in response to national and governmental policies. This clinic undertook screening, triage, and treatment of patients with COVID-19. Furthermore, because the south campus of SEH is located near the Pudong International Airport, the hospital had the responsibility of screening and treating imported cases. Herein, we analyze the data of all patients and confirmed COVID-19 cases identified between January 23 and September 30, 2020, at the fever outpatient clinic of the SEH south campus, aiming to elucidate the epidemic situation at SEH and in Shanghai as well as discuss the prevention and control measures for COVID-19.

Methods

Study design

This was a retrospective single-center study of data collected from 11,972 patients who visited the fever outpatient clinic at the SEH south campus between January 23 and September 30, 2020. All patients with a body temperature higher than 37.3℃ as assessed in the general outpatient department were referred to the fever outpatient clinic for COVID-19 screening. Patients with a temperature higher than 37.3℃ who were identified at either the Pudong International Airport or a quarantine site and those with a cough, headache, sore throat, or other symptoms of infection were also sent to the fever clinic by ambulance. COVID-19 was diagnosed according to the guidelines for the diagnosis and treatment program published by the National Health Commission of China (5th–7th edition, in Chinese). In brief, patients who had been to epidemic areas or in close contact with COVID-19-confirmed patients presented two of the following three clinical features and were identified as suspected cases: 1) fever and/or respiratory symptoms, 2) imaging characteristics typical of COVID-19, and 3) routine blood tests demonstrating normal or low white blood cell (WBC) counts (i.e., normal or low lymphocyte count). Suspected cases who had one of the following pathological or serological results were diagnosed as confirmed cases: 1) RT-PCR positivity for the COVID-19 nucleic acid, 2) viral-gene sequencing demonstrating high homology with COVID-19, and 3) positive COVID-19 immunoglobulin (Ig) M or IgG, or COVID-19-specific antibody IgG changes from negative to positive or elevated more than four times during the recovery phase than in the acute phase [6-8]. This study was approved by the Ethics Committee of SEH. Given the retrospective design, the need for written informed consent was waived.

Procedures and data collection

For all patients, epidemiological and demographic data, as well as disease symptoms and signs, were collected. Blood examinations, blood inflammation tests, lung computed tomography (CT) scans, and nucleic acid screening for COVID-19 were performed routinely at SEH. All data were obtained from patients' medical records. Fever was defined as a body temperature of 37.3°C or higher. Lymphocytopenia was defined as a lymphocyte count of less than 1.1×109/L. Based on the results of the laboratory tests and lung CT scans, suspected patients were consulted by specialists from the departments of radiology, infection, or pneumology. If COVID-19 could not be excluded, the patient was referred to the Chinese Centers for Disease Control and Prevention for further nucleic acid testing. Samples of post-nasal swabs were collected for nucleic acid testing, and COVID-19 was confirmed by RT-PCR. Confirmed cases were diagnosed according to the guidelines published by the National Health Commission of China, as described above. These confirmed cases were transferred to the Shanghai Public Health Clinical Center in special ambulances for further treatment.

Statistical analyses

The analyzed variables included the demographic and epidemiological data of all patients in the fever outpatient clinic as well as the main symptoms, signs, laboratory examination results, and imaging examination results of patients with confirmed COVID-19. Categorical and continuous data were analyzed using descriptive statistics. Categorical variables are presented as frequency rates and percentages, while continuous variables are expressed as means ± standard deviations. The means of normally distributed continuous variables were compared using one-way analysis of variance. Categorical variables were analyzed using the chi-square test. All statistical analyses were performed using SPSS 23.0, and $p<0.05$ was considered to indicate statistical significance.

Results

Positive rates and demographic data

Between January 23 and September 30, 2020, a total of 11,972 patients visited the fever outpatient clinic of the SEH south campus; of those patients, 29 (0.24%) were diagnosed with confirmed COVID-19. Between January 23 and January 31, 2020, 887 patients visited the fever clinic at the SEH south campus, of whom two were diagnosed with COVID-19 (0.23%). In February 2020, 2,344 visited the fever clinic, and three (0.13%) COVID-19-positive cases were identified. In March 2020, 15 (1.09%) out of 1,379 patients who visited the fever outpatient clinic were identified. Finally, in April 2020, 976 patients visited the fever outpatient clinic, and seven (0.72%) tested positive for COVID-19. The peak period passed after April 2020, and the epidemic has since remained under control in China, with a few sporadic cases. Only two (0.03%) COVID-19 cases were confirmed among all 7,273 patients who visited the clinic from May to September 2020. Of the 29 confirmed cases, 14 were men (48.28%), and 15 were women (51.72%). The ages and occupations of the patients varied significantly by month (p<0.05). The average age of all 29 confirmed patients was 32.55±16.96 years, whereas the average age of the two confirmed patients in January 2020 was 69.00±7.07 years. The average age of the three confirmed cases in February 2020 was 39.00±8.19 years. Due to the global spread of the pandemic, the source of transmission and target hosts of the COVID-19-confirmed cases changed at SEH. The mean ages of the confirmed cases in March and April 2020 were 29.13±15.11 and 27.86±15.34 years, respectively. The average age of the two confirmed cases diagnosed between May and September 2020 was 28.50±10.61 years. Regarding current occupations, the majority of the confirmed cases in January and February 2020 occurred among retirees (n=2 [100.00%]) and employees (n=2 [66.67%]), whereas the majority of the cases identified in March and April 2020 occurred among students (n=8 [53.33%] and 5 [71.43%], respectively). The one confirmed case in May 2020 occurred in a 21-year-old employee from Hubei province who returned to work in Shanghai, and the case confirmed in August 2020 occurred in an Indian servant. Such differences varied in accordance with the COVID-19-epidemic characteristics at different phases (Table 1 and Figure 1).

Regional distribution of confirmed COVID-19 cases from the SEH fever outpatient clinic

In terms of regional distribution, none of the 29 confirmed patients were residents of Shanghai. COVID-19-positive patients arrived from various regions at different times during the epidemic. All five confirmed cases that were identified during January and February 2020 involved domestic infection; four patients were residents of Wuhan (80.00%), and one was a resident of Hunan province (20.00%). All cases identified in March and April 2020 occurred in patients who came from abroad. Among the 15 cases identified in March, 13 were Chinese residents who had returned to Shanghai from abroad (86.67%), and two were foreigners (13.33%). All seven cases detected in April 2020 occurred in Chinese residents who returned to Shanghai from abroad. Once work resumed in May 2020, most of the patients at the fever clinic were employees or students presenting for COVID-19 screening before returning to their jobs or schools. One employee from Hubei was identified at this time, and the other one was an Indian servant (Table 1 and Figure 2A). Regarding imported cases, those identified in March 2020 occurred mainly in those coming from Europe, including six from the UK (40.00%), two from France (13.33%), and one each from Italy, Switzerland, and Russia (6.67%). The other four patients had returned from the United States (26.67%). All seven cases identified in April occurred in those who returned from abroad: five from the UK (71.43%), one from Brazil, and one from Russia (14.29%) (Figure 2A). The regional distribution of the total 29 confirmed cases is shown in Figure 2B. To further elucidate the occupation distribution of the confirmed cases from different regions, a stacked bar chart was created. Figure 3 shows that the majority of the patients who returned from abroad had traveled from the UK and were predominantly Chinese students who were studying abroad.

Symptoms and laboratory test analyses

The main symptom of the 29 confirmed patients was fever (n=14 [48.28%]), with an average body temperature of 37.29±0.78 ℃. Other common symptoms included cough (n=7 [24.14%]), pharyngalgia (n=3 [10.34%]), headache (n=3 [10.34%]), and muscle ache and rhinorrhea (n=1 [3.45%]) (Figure 4).

Laboratory tests revealed that the WBC counts of most COVID-19-confirmed patients were normal, with an average of 6.46±1.86×109/L. Only one patient had a lower WBC count (3.45%), and there were no significant differences in WBC

count among the patients identified using the different months (p=0.768). The average lymphocyte count of all confirmed cases was 1.86±1.10×109/L. Lymphopenia was observed in seven patients (24.14%), and the absolute number of lymphocytes was normal in the remaining 22 patients (75.86%). Sixteen (55.17%) patients had abnormal lung CT scans (Figure 5). The lung CT findings of most patients were marked by multiple areas of mottling and ground-glass opacities in the bilateral lung lobes. Typical lung CT findings are shown in Figure 6. According to the guidelines of the diagnosis and treatment program issued by the National Health Commission of China, all 29 confirmed patients had either mild illness or normal pneumonia. No cases of severe pneumonia or acute respiratory distress syndrome were detected at the clinic.

Discussion

In this study, we demonstrated the characteristics of all the confirmed cases from the fever outpatient clinic at SEH. First, the positive rate of COVID-19 at SEH was quite low, with a whole positive rate of 0.24%. The highest was in March 2020, which was only 1.09%. Furthermore, none of the confirmed patients who visited the fever outpatient clinic at the south campus of SEH were local residents. Additionally, no infections were reported among the medical staff, whether at SEH or in Shanghai [9]. These data indicated that the prevention and control measures at SEH were quite effective. The characteristics of all the confirmed COVID-19 cases at SEH, such as age, occupation, and region, varied at different phases of the epidemic. These data potentially reflected the prevention and control pressure at SEH shifting from domestic to imported cases as well as the real-time epidemic situation in SEH. In January and February 2020, the COVID-19 epidemic was mainly contained within the Chinese mainland. Patients with fever who visited the SEH south campus between January and February 2020 were mainly domestic, and four of the five confirmed cases were from Wuhan. In March 2020, with the lockdown being imposed in Wuhan for the control of the epidemic in China, the number of confirmed cases decreased significantly in mainland China. However, the epidemic had spread to Europe and other parts of the world, and large numbers of Chinese citizens who lived abroad returned home, which placed new pressure on China. This group of citizens comprised mainly of students who were studying abroad. Our data indicated that among the cases identified in March and April 23, 2020 had returned from abroad: 10 of the 11 from the UK were Chinese citizens studying in that country. Since May 2020, with the achievement of control over the epidemic in China, the SEH south campus fever clinic has mostly screened employees and students returning to their respective workplaces and schools. The sporadic two confirmed case identified at the clinic from May to September 2020 reveals the current, generally normal situation in China. As one of the largest general tertiary care hospitals in Pudong New District, SEH has made its contribution to COVID-19 prevention and control in Shanghai. On the other hand, the measures adopted by SEH were in response to national policies, which were confirmed to be quite successful [9]. Currently, the Shanghai customs office classifies people returning to Shanghai from abroad based on their region of origin. People returning from high-risk countries and regions are targeted for nucleic-acid testing when passing through Shanghai customs. If the nucleic-acid test is negative, they are quarantined for medical observation for a period of 14 days at a designated place. If the nucleic-acid test is positive, the medical administration arrange for an ambulance to transport the patient to our hospital with a closed-loop management system. The patient is isolated immediately after arriving at our hospital fever clinic. In addition to CT scan, medical history is taken, and nucleic acid and blood sample testing, expert consultation, and preliminary treatment are all performed in the isolation room. The samples are sent to the Center for Disease Control, where, if the nucleic acid tests positive again, the patient is transferred to the Shanghai Public Health Center for further treatment. During quarantine, their body temperature is monitored daily. People who show symptoms such as a fever or cough, are sent to nearby fever outpatient clinics for COVID-19 screening in a timely manner [10], and confirmed cases are transferred to the Shanghai Public Health Clinical Center for further treatment. Regarding the prevention and control of COVID-19, we have implemented strict measures to identify the source of infection among people entering Shanghai, cut off the route of transmission, and protected susceptible populations. The symptoms of the 29 confirmed patients reported in this study are consistent with the symptoms reported in the extant literature [11,12]. The main symptoms

included fever, cough, pharyngalgia, and headache. Furthermore, laboratory tests revealed normal WBC counts and lymphopenia. Lung CT scans indicated that more than half of the patients had remarkable lung CT imaging findings. According to the new coronavirus pneumonia diagnosis and treatment program implemented by the National Health Commission, the lung CT scans of COVID-19-positive patients indicated ground-glass opacity findings, which are typical changes observed in viral pneumonia [13]. The diagnosis of COVID-19 mainly relies on the etiology of the disease and the results of coronavirus RT-PCR testing, and patients with positive results are considered to have confirmed cases. Specific treatment and prevention options for COVID-19, such as targeted antiviral drugs, nucleoside analogs, chloroquine, protease inhibitors, and vaccines, were not available because of the lack of clinical evidence during the timeframe in which the study was conducted [14]. Instead, clinicians in China focused on traditional public health outbreak response tactics such as isolation, quarantine, social distancing, and community containment. Patients with mild illness and normal pneumonia were mainly treated with supportive care. On May 1, 2020, the China Food and Drug Administration granted emergency access to remdesivir, a nucleotide analog prodrug that inhibits viral RNA polymerases, for patients and children with severe COVID-19. However, the use of remdesivir to treat COVID-19 remains controversial [15-17]. To date, there is no evidence for the role of traditional Chinese medicines and other antiviral drugs in the treatment of COVID-19. Corticosteroids for COVID-19 treatment are neither recommended by the WHO nor by the China National Health Commission [18]. Based on the characteristics of the confirmed cases at SEH and the clinical evidence and availability of drugs, supportive care is the main treatment for patients at the SEH fever clinic. This study had some limitations. First, more detailed patient information, particularly regarding the clinical outcomes, was unavailable at the time of analysis, and therefore, this is not included in this study. Second, the data of confirmed COVID-19 cases at SEH alone are presented. A larger sample size is required to be more representative of the population of Shanghai. Third, the confirmed cases were transferred to the Shanghai Public Health Clinical Center, which collected limited treatment data.

Conclusions

In summary, the results presented herein suggest that the target population for the prevention and control of the COVID-19 epidemic in SEH has shifted since the beginning of the COVID-19 outbreak, as the disease has continued to spread across the world. However, the prevention and control measures adopted at SEH in response to the Shanghai government's recommendation were generally positive and effective. Fever outpatient clinics in Pudong's new area played a pivotal role in the screening, triage, and treatment of confirmed cases and contributed to the prevention and control of COVID-19. The clinical manifestations of the confirmed patients reported herein were consistent with the Chinese guidelines and relevant literature reports [19]. However, no clearly effective drug is available to eliminate the virus at the time of this writing. Early diagnosis and isolation are rudimentary, yet effective strategies, to mitigate the transmission of SARS-CoV-2.

List Of Abbreviations

COVID-19: coronavirus disease

CT: computed tomography

RT-PCR: reverse transcription-polymerase chain reaction

SARS-CoV-2: severe acute respiratory syndrome coronavirus 2

SEH: Shanghai East Hospital

WHO: World Health Organization

Declarations

Ethics approval and consent to participate

The study was approved by the Ethics Committee of the Shanghai East Hospital affiliated with Tongji University. As this study has a retrospective design, the need for written informed consent was waived.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

FCH, QLH, and SF collected the epidemiological and clinical data and processed statistical data. GZL and ZJH determined the diagnoses of confirmed cases. LQ, KS, WY, XL, WW, YWZ, ZY, WJ, WYY, HY, and LRL screened all the positive cases. FCH and XJL drafted the manuscript. XJL and SF revised the final manuscript. XJL was responsible for summarizing all data related to the virus. QLH was responsible for summarizing all epidemiological and clinical data. All the authors were physicians at Shanghai East Hospital who worked in the fever outpatient clinic voluntarily during the epidemic. All the authors have read and approved the final manuscript.

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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. N Engl J Med. 2020;382:727–33.
2. Wu F, Zhao S, Yu B, Chen Y-M, Wang W, Song Z-G, et al. A new coronavirus associated with human respiratory disease in China. Nature. 2020;579:265–9.
3. World Health Organization. Coronavirus disease (COVID-19) outbreak. World Health Organization. 2020. https://www.who.int/emergencies/diseases/novel-coronavirus-2019. Accessed 2 July 2020.
4. World Health Organization. Coronavirus disease (COVID-19) pandemic. World Health Organization. 2020. https://www.who.int/emergencies/diseases/novel-coronavirus-2019. Accessed 2 July 2020.
5. World Health Organization. Coronavirus disease 2019 (COVID-19) situation report-163.

6. World Health Organization. 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200928-weekly-epi-update.pdf?sfvrsn=9e354665_6 Accessed 2 October 2020.
7. National Health Commission of China. New coronavirus pneumonia diagnosis and treatment program (7th ed.) (in Chinese). 2020.http://www.nhc.gov.cn/yzygj/s7652m/202003/a31191442e29474b98bfed5579d5af95.shtml. Accessed 2 July 2020.
8. National Health Commission of China. New coronavirus pneumonia diagnosis and treatment program (5th ed.) (in Chinese). 2020.http://www.nhc.gov.cn/yzygj/s7652m/202002/e84bd30142ab4d8982326326e4db22ea.shtml. Accessed 2 July 2020.
9. National Health Commission of China. New coronavirus pneumonia diagnosis and treatment program (6th ed.) (in Chinese). 2020.http://www.nhc.gov.cn/yzygj/s7652m/202002/54e1ad5c2aac45c19eb541799bf637e9.shtml.Accessed 2 July 2020.
10. Chen J, Qi T, Liu L, Ling Y, Qian Z, Li T, et al. Clinical progression of patients with COVID-19 in Shanghai, China. J Infect. 2020;80:e1–6. Pudong International Airport screening (in Chinese). 2020. http://finance.sina.com.cn/roll/2020-04-11/doc-iirczymi5626797.shtml. Accessed 2 July 2020.
11. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. J Autoimmun. 2020;109:102433.
12. Lake MA. What we know so far: COVID-19 current clinical knowledge and research. Clin Med (Lond). 2020;20:124–7.
13. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet. 2020;395:507–13.
14. Ahn D-G, Shin HJ, Kim M-H, Lee S, Kim H-S, Myoung J, et al. Current status of epidemiology, diagnosis, therapeutics, and vaccines for novel coronavirus disease 2019 (COVID-19). J Microbiol Biotechnol. 2020;30:313–24.
15. Wang Y, Zhang D, Du G, Du R, Zhao J, Jin Y, et al. Remdesivir in adults with severe COVID-19: a randomized, double-blind, placebo-controlled, multicenter trial. Lancet. 2020;395:1569–78.
16. Grein J, Ohmagari N, Shin D, Diaz G, Asperges E, Castagna A, et al. Compassionate use of remdesivir for patients with severe Covid-19. N Engl J Med. 2020:382:2327–36.
17. Beigel JH, Tomashek KM, Dodd LE, Mehta AK, Zingman BS, Kalil AC, et al. Remdesivir for the treatment of Covid-19-preliminary report. N Engl J Med. 2020;doi:10.1056/NEJMoa2007764.
18. World Health Organization. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected. Interim Guidance. World Health Organization. 2020. https://www.who.int/docs/default-source/coronaviruse/clinical-management-of-novel-cov.pdf. Accessed 2 July 2020.
19. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020; 395: 497–506.

Tables

Table 1. *Characteristics of COVID-19-confirmed cases at South East Hospital's south campus fever outpatient clinic*

Characteristics	January 2020	February 2020	March 2020	April 2020	May–September 2020	Total	*p-value*
All patients	887	1457	1379	976	7273	11972	
Confirmed cases (rate%)	2 (0.23)	3 (0.21)	15 (1.09)	7 (0.72)	2(0.03)	29 (0.24)	
Sex, n (%)							0.847
Male	1 (50.00)	1 (33.33)	7 (46.67)	3 (42.86)	2 (100.00)	14 (48.28)	
Female	1 (50.00)	2 (66.67)	8 (53.33)	4 (57.14)	0(0.00)	15 (51.72)	
Age, n (%)	69.00±7.07	39.00±8.19	29.13±15.11	27.86±15.34	28.50±10.61	32.55±16.96	0.015
12 Y	0 (0.00)	0 (0.00)	1 (6.67)	0 (0.00)	0 (0.00)	1 (3.45)	
12-44 Y	0 (0.00)	2 (66.67)	11 (73.33)	6 (85.71)	2(100.00)	21 (72.41)	
45-64 Y	1 (50.00)	1 (33.33)	3 (20.00)	1 (14.29)	0 (0.00)	6 (20.69)	
≥65 Y	1 (50.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (3.45)	
Occupation, n (%)							0.011
Retiree	2 (100.00)	0 (0.00)	1 (6.67)	0 (0.00)	0 (0.00)	3 (10.34)	
Employee	0 (0.00)	2 (66.67)	2 (13.33)	0 (0.00)	1(50.00)	5 (17.24)	
Service	0 (0.00)	1 (33.33)	3 (20.00)	0 (0.00)	1 (50.00)	5 (17.24)	
Student	0 (0.00)	0 (0.00)	8 (53.33)	5 (71.43)	0 (0.00)	13 (44.83)	
Unemployed	0 (0.00)	0 (0.00)	1 (6.67)	2 (28.57)	0 (0.00)	3 (10.34)	
Region, n (%)							0.001
Shanghai residents	0(0.00)	0(0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	
Non-resident	2 (100.00)	3 (100.00)	0 (0.00)	0 (0.00)	2 (100.00)	7 (24.14)	
Abroad	0 (0.00)	0(0.00)	15 (100.00)	7 (100.00)	0 (0.00)	22 (75.86)	
Nationality, n (%)							0.416
Chinese	2 (100.00)	3 (100.00)	13 (86.67)	7 (100.00)	1 (50.00)	26 (89.66)	
Foreigner	0 (0.00)	0 (0.00)	2 (13.33)	0 (0.00)	1 (50.00)	3 (10.34)	
Symptoms, n (%)							
Temperature	37.55±0.78	37.46±1.32	37.14±0.88	37.33±0.43	37.70±0.42	37.29±0.78	0.851
<37.3°C	1(50.00)	2 (66.67)	8(53.33)	4 (57.14)	0 (0.00)	15(51.72)	
37.3-38.0°C	0 (0.00)	0 (0.00)	4 (26.67)	3 (42.86)	2 (100.00)	9 (31.03)	
38.1-39.0°C	1 (50.00)	1 (33.33)	3 (20.00)	0 (0.00)	0 (0.00)	5 (17.24)	
>39.0°C	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	

Cough	0 (0.00)	1 (33.33)	6 (40.00)	0 (0.00)	0 (0.00)	7 (24.14)	0.242
Pharyngalgia	0 (0.00)	0 (0.00)	3 (20.00)	0 (0.00)	0 (0.00)	3 (10.34)	0.799
Headache	0 (0.00)	1 (33.33)	2 (13.33)	0 (0.00)	0 (0.00)	3 (10.34)	0.674
Muscle ache	0 (0.00)	0 (0.00)	1 (6.67)	0 (0.00)	1 (50.00)	2 (6.90)	0.372
Rhinorrhea	0 (0.00)	1 (33.33)	0 (0.00)	0 (0.00)	0 (0.00)	1 (3.45)	0.241
Laboratory test							
White blood cells	5.88±3.36	6.37±1.45	6.25±1.94	7.29±1.35	5.86±3.35	6.46±1.86	0.768
Normal	2 (100.00)	3 (100.00)	15 (100.00)	7 (100.00)	1 (50.00)	28 (96.55)	
Abnormal	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (50.00)	1 (3.45)	
Lymphocytes	1.34±0.21	1.73±0.47	2.00±1.43	1.84±0.62	1.05±0.34	1.82±1.10	0.797
Normal	2 (100.00)	3 (100.00)	11 (73.33)	5 (71.43)	1 (50.00)	22 (75.86)	
Lymphopenia	0 (0.00)	0 (0.00)	4 (26.67)	2 (28.57)	1 (50.00)	7 (24.14)	
Lung CT, n (%)							0.175
Normal	0 (0.00)	1 (33.33)	5 (33.33)	5 (71.43)	2 (100.00)	13 (44.83)	
Abnormal	2 (100.00)	2 (66.67)	10 (66.67)	2 (28.57)	0 (0.00)	16 (55.17)	

COVID-19, coronavirus disease; CT, computed tomography; Y, years

Figures

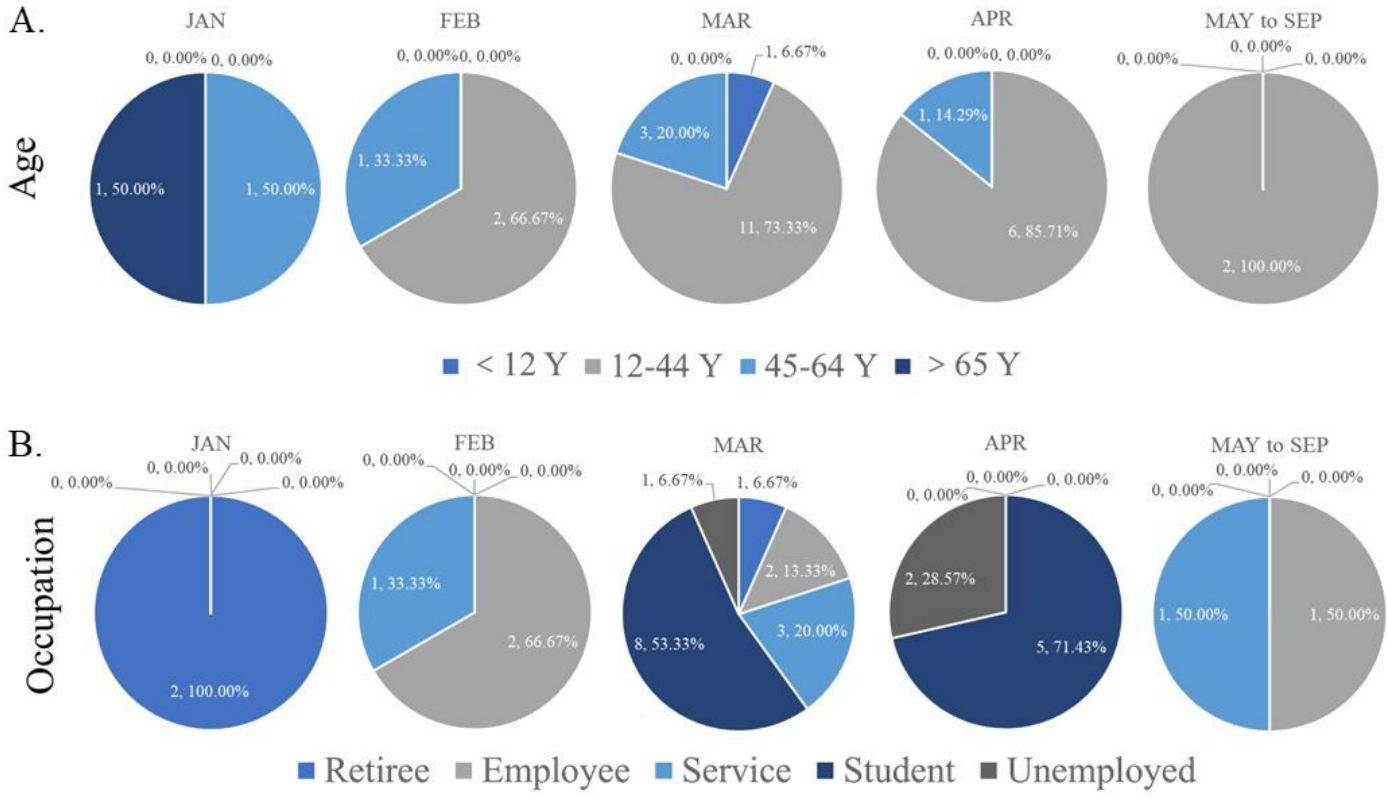

Figure 1

Age and occupation analysis of all confirmed COVID-19 patients at SHE's south campus fever clinic The variations in the patients' ages and occupations according to month were based on the fact that the patients came from various regions during different phases of the epidemic. A. Patients with confirmed cases in March and April 2020 were much younger in terms of mean age than those in January and February 2002. B. Students comprised the majority of patients identified in March and April 2020, whereas those in January and February 2020 were mostly retirees and employees. COVID-19, coronavirus disease; SEH, Shanghai East Hospital; Y, years

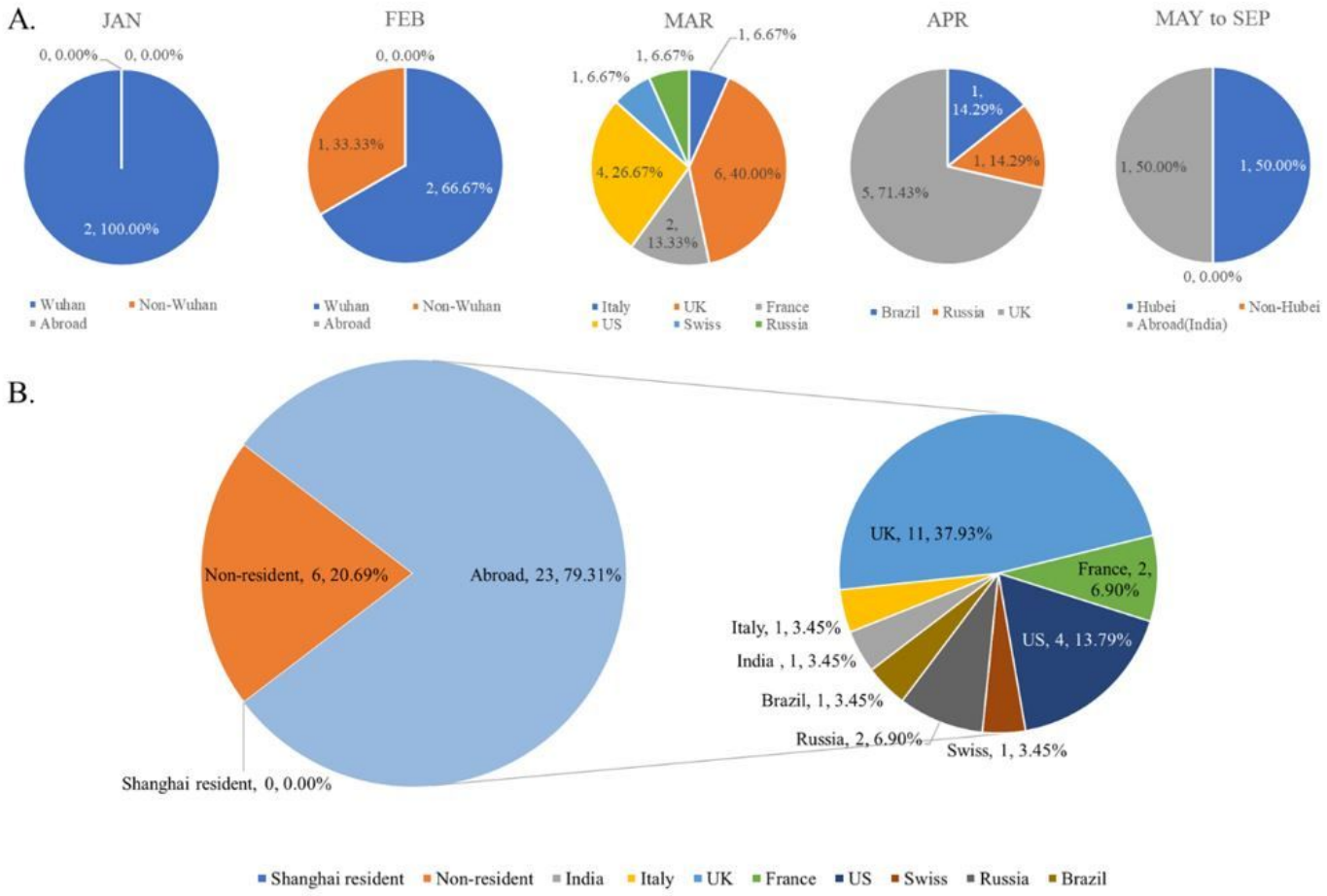

Figure 2

Regional distribution of confirmed COVID-19 cases at SEH. A. COVID-19-positive cases came from various regions at different times. In January and February 2020, all cases were infected domestically. All cases identified in March and April 2020 occurred in patients coming from abroad and mainly involved Chinese residents who had returned to Shanghai. Only one domestic patient was confirmed in May 2020. B. Of the 22 imported cases, the majority had returned from the UK while others traveled from the US, France, Russia, Italy, Brazil, and Swiss. COVID-19, coronavirus disease; SEH, Shanghai East Hospital

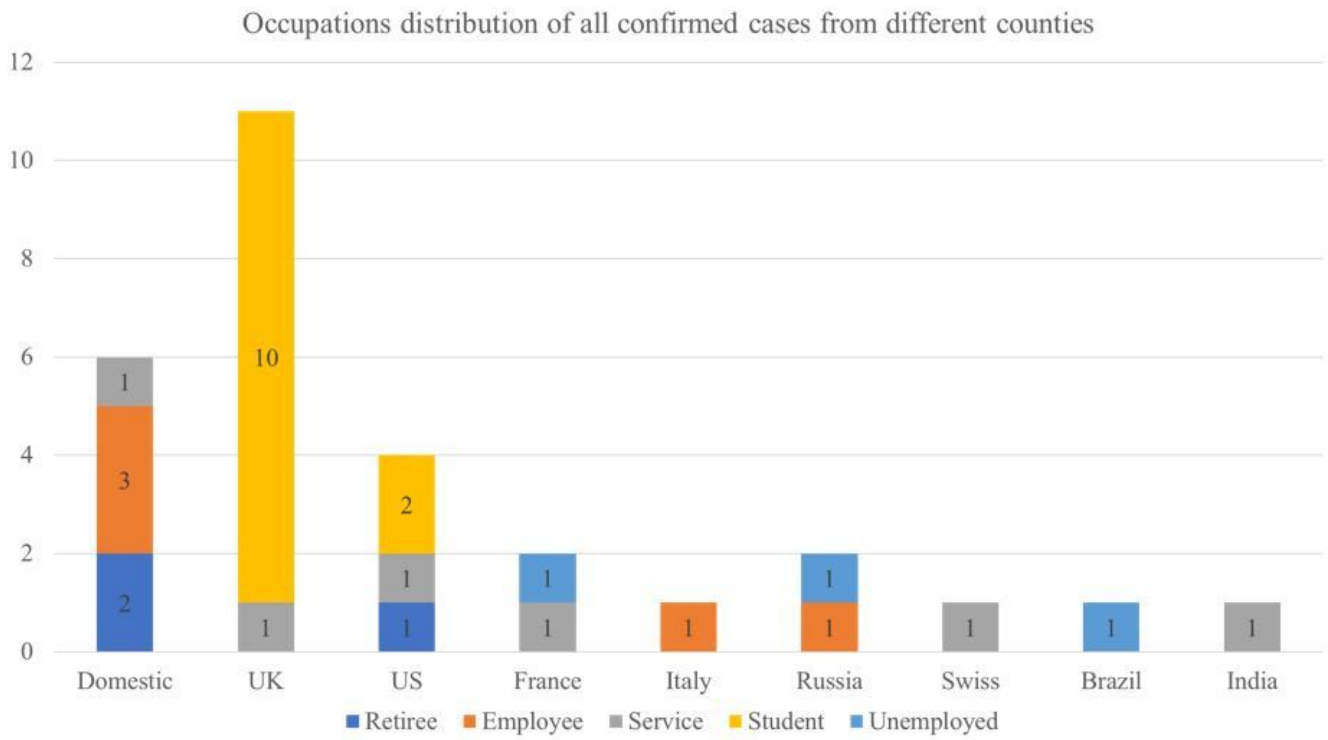

Figure 3

Occupations of the confirmed COVID-19 cases according to region The majority of patients who returned from abroad came from the UK and were predominantly Chinese students who were studying abroad. Other occupational categories included services, employees, and unemployed citizens. COVID-19, coronavirus disease

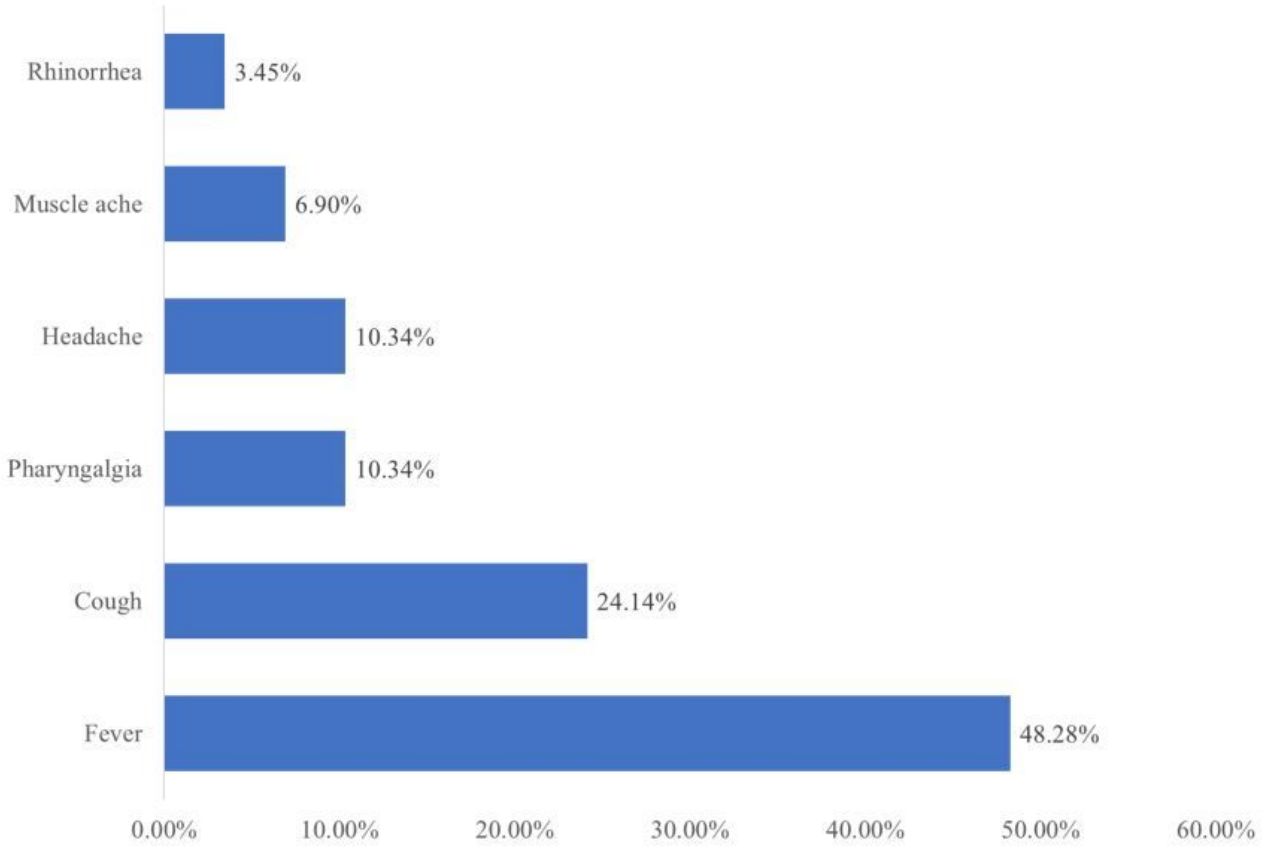

Figure 4

Most common symptoms of confirmed COVID-19 cases at SHE's south campus fever outpatient clinic. The main symptoms of the 29 confirmed patients were fever, cough, pharyngalgia, headache, muscle ache, and rhinorrhea, consistent with the symptoms reported in extant literature. COVID-19, coronavirus disease; SEH, Shanghai East Hospital

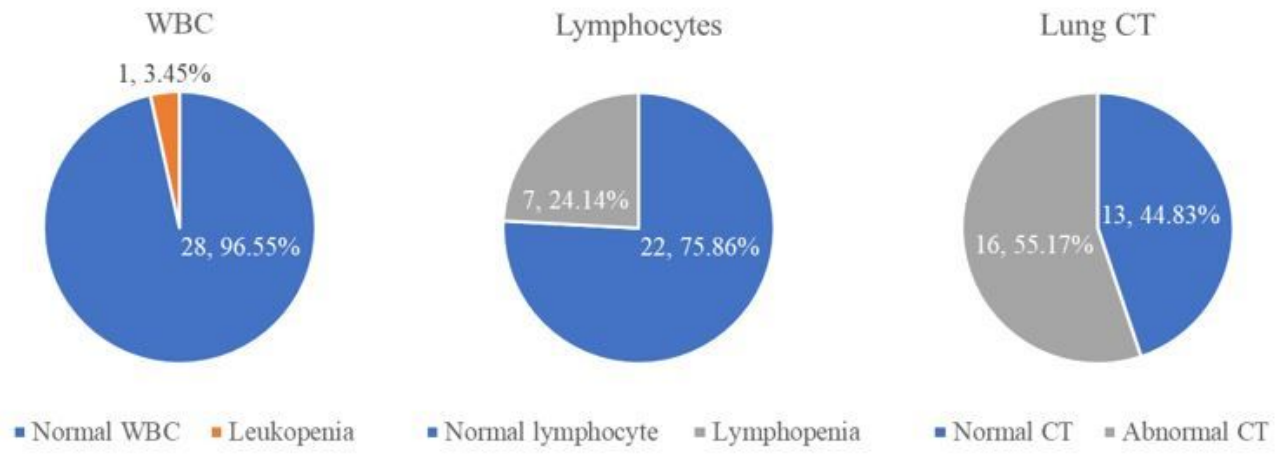

Figure 5

Laboratory test and lung CT scan analysis of 29 COVID-19-confirmed cases. Among 29 patients with confirmed COVID-19, lymphopenia was observed in seven patients (24.14%), and abnormal lung CT scans were observed in 16 patients (55.17%). COVID-19, coronavirus disease; CT, computed tomography

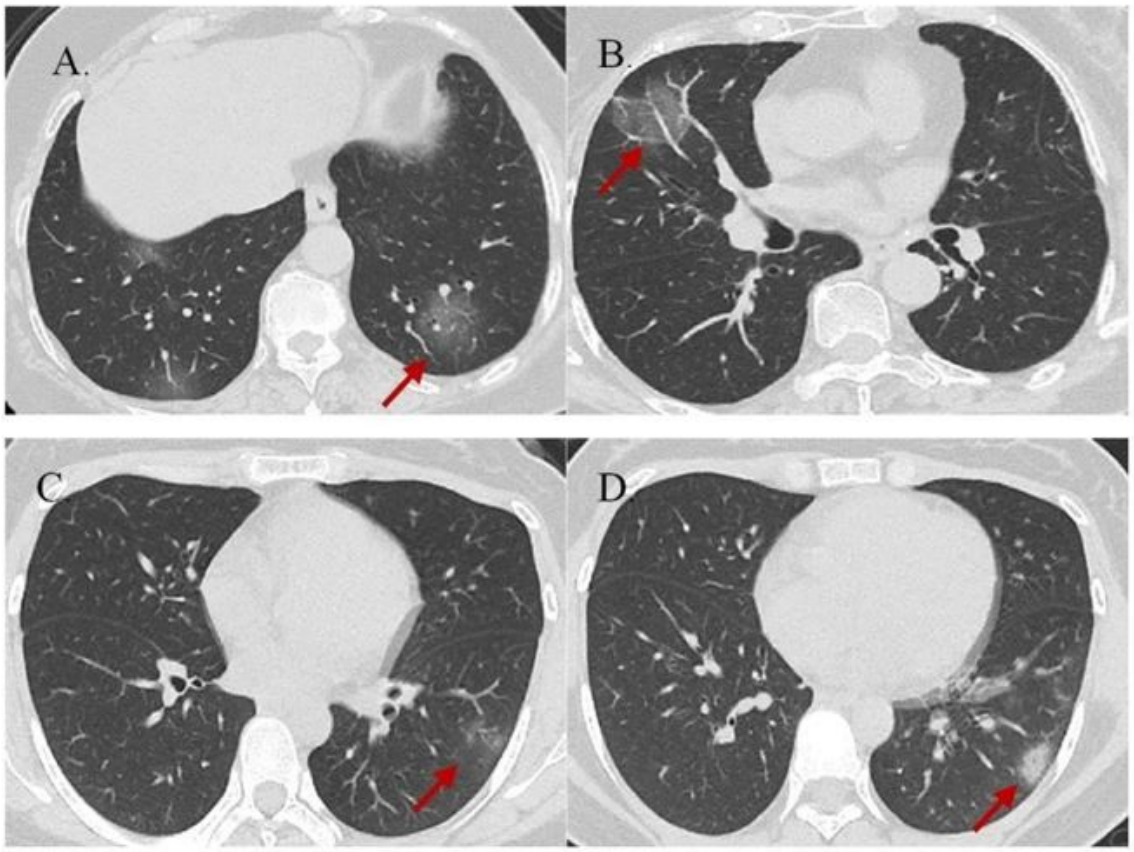

Figure 6

Typical lung CT findings of confirmed COVID-19 cases. Bilateral ground-glass opacities are marked on the scans. A. Ground-glass opacity in the left lower lobe and multiple areas of mottling. B. Typical ground-glass opacity in the right middle lobe. C. Ground-glass opacity in the left lobe. D. Patchy shadow in the left lobe that indicated inflammatory lesions (arrows). COVID-19, coronavirus disease; CT, computed tomography.