

The Role of Fever Clinic During the COVID-19 Pandemic: A case study of 1034 febrile patients

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Case Study

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Abstract

Background

Since winter of 2019, when coronavirus disease 2019 (Covid-19) emerged in China and rapidly spread throughout the entire world, many fever clinics were rearranged and enlarged to triage febrile patients in China.

Methods

This study included fever clinic visits of Sichuan Provincial Peoples' Hospital to summarize the characteristics of these febrile patients retrospectively.

Results

From 24th January to 31th March, 1034 fever clinic visits with 530 male and 504 female, were triaged, treated and recorded. About 64.9% of them were checked with body temperature higher than 37.3°C. Cough (25.0%) and sore throat (19.2%) were the most common symptoms in addition to fever. Chest CT scan was ordered for 900 patients, and 172 cases (16.6%) were found ground glass opacity, 134 (13.0%) found local patchy shadowing, and 26 (2.5%) found bilateral patchy shadowing. At last 851 patients (82.3%) were excluded for COVID-19 or other severe diseases. Eighty patients (7.7%) were admitted to hospitalization for other conditions. One hundred and three (9.9%) patients were suspected or confirmed of COVID-19 at fever clinic, and then admitted to isolation ward.

Conclusions

The result of this study again verified the extraordinary role of fever clinics in pandemics. When confronted with a mass of unknown febrile patients, a well organized fever clinic may avoid the frustration of all medical staffs.

Background

The Coronavirus Disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) outbreak in China and throughout the world since winter of 2019[1, 2]. Up to April 1, 2020, over 2 million people were infected and about 7% of them dead.

As a main manifestation of this infectious disease, fever was screened in a special emergency department named Fever Clinic in most medical centers of China. All patients with fever or a recent history of fever were triaged to the fever clinic through specific receptions and passageways insulated

with other emergency patients in Sichuan Provincial Peoples' Hospital, a medical center of Sichuan Province.

The history of exposure to source of transmission within 14 days, main symptoms, body temperature and other physical examinations were referred for by trained medical staffs donning full personal protective equipment. Primary suspected cases of COVID-19 were transferred to an isolated area for immediate blood examinations, chest CT scan and PCR assay of nasal and pharyngeal swab specimens for SARS-CoV-2 [3, 4].

Methods

From 24th January to 31th March, all fever clinic visits of Sichuan Provincial Peoples' Hospital were included and analyzed retrospectively. The demographic and clinical characteristics of patients were extracted from the history information system.

Patients with history of exposure or body temperature higher than 37.3°C were defined as *primary suspected cases* and required to take blood examinations, chest CT scan and even RT-PCR assay of nasal and pharyngeal swab. All results of these examinations were read and judged by senior physicians of respiratory or infectious diseases according to the updated guideline issued by the National Health Committee of the People's Republic of China (<http://www.nhc.gov.cn/>). Suspected and confirmed cases would be admitted into different part of the isolation ward specially arranged for COVID 19.

The criteria of *suspected case* were as following [5–7]: a. with an epidemiology history of contacting with confirmed patients or a history of living or traveling in Hubei Province; b. with abnormal white blood cell or lymphocyte count; c. with abnormality in lungs detected by chest CT scan. Patients with real-time PCR test positive for SARS-CoV-2 were diagnosed as *confirmed cases*.

Categorical variables would be summarized as counts and percentages, while continuous data expressed as mean or medians according to normal distribution test. All data were analyzed with SPSS (v16.0).

Results

From 24th January the fever clinic was rearranged to 31th March, 1034 fever clinic visits with 530 male and 504 female, were triaged, treated and recorded. Their demographic and clinical characteristics are shown in table 1. The age data was tested to fit the normal distribution ($P < 0.05$) and the average is 37.43 with a range from 2 to 92. About 201 patients (19.5%) declared history of exposure to COVID-19 such as recently living or traveling to Hubei province, contact with local confirmed cases, or close contact with suspected cases. Patients with history of exposure were required to take on personal protective equipment and get subsequent test in isolated cells.

Table 1. The demographic and clinical characteristics of patients.

Characteristics		All patients (N=1034)
Gender	Male	530 (51.3%)
	Female	504 (48.7%)
Age	Mean (min, max)	37.43±0.51 (2, 92)
History of exposure	Recently visit of Hubei province	41 (4.0%)
	Contact with confirmed cases	133 (12.9%)
	Other exposure	27 (2.6%)
	No exposure	833 (80.5%)
Distribution of body temperature	<37.3°C	363 (35.1%)
	37.3°C-38.0°C	434 (42.0%)
	38.1°C-39.0°C	187 (18.1%)
	>39.1°C	50 (4.8%)
Blood pressure (BP)	Normal BP*	890 (85.1%)
	High BP	146 (14.1%)
	Low BP	8 (0.8%)
Hours from onset to clinic (N=853)	Median (min, max)	48 (0, 1440)

*Normal blood pressure was defined as 90-120mmHg/60-90mmHg.

Though all visits come to fever clinic for fever, only 64.9% of them were checked with body temperature higher than 37.3°C. Cough (25.0%) and sore throat (19.2%) were the most common symptoms in addition to fever, as shown in table 2. We ordered chest CT scan for 900 patients considering history and manifestations, and 172 cases (16.6%) were found ground glass opacity, 134 (13.0%) found local patchy shadowing, and 26 (2.5%) found bilateral patchy shadowing.

At last 851 patients (82.3%) were excluded for COVID-19 or other severe diseases and asked to go home with or without medications, and 80 patients (7.7%) admitted to hospitalization for other conditions. The other 103 patients (9.9%) were admitted to isolation ward as suspected or confirmed cases of COVID-19 for further test and treatment.

We summarized the symptoms and examinations of suspected cases, compared with all patients and shown also in table 2.

Only 5 patients were tested positive for SARS-CoV-2, and isolated as confirmed cases. Among the 103 cases admitted to isolation ward, another seven patients were finally confirmed of COVID-19 by RT-PCT assay of nasal and pharyngeal swab, 31 patients cured and discharged as suspected cases, and the other 60 patients excluded within 3 to 12 days.

Table 2. The manifestations and examination of all patients and suspected cases.

Symptoms and examinations	All patients (N=1034)	Admission as suspected (N=103)
Cough	259 (25.0%)	29 (28.2)
Sore Throat	199 (19.2)	20 (19.4%)
Fatigue	91 (8.8%)	9 (8.7%)
Running nose	73 (7.1%)	10 (9.7%)
Myalgia or arthralgia	69 (6.7%)	6 (5.8%)
Diarrhoea	49 (4.7%)	1 (1.0%)
Nasal Congestion	45 (4.4%)	7 (6.8%)
Headache	45 (4.4%)	2 (1.9)
Chills	37 (3.6%)	0
Dyspnea	36 (3.5%)	5 (4.9%)
Hemoptysis	5 (0.5%)	0
CT scan of chest (N=900)		
Normal	301 (29.1%)	3 (2.9%)
Ground glass opacity	172 (16.6%)	42 (40.8%)
Local patchy shadowing	134 (13.0%)	46 (44.7%)
Bilateral patchy shadowing	26 (2.5%)	6 (5.8%)
Interstitial abnormalities	6 (0.6%)	0
Other abnormalities	261 (25.2%)	6 (5.8%)
WBC count (N=927)		
WBC $<3.5 \times 10^9/L$	23 (2.2%)	3 (2.9%)
WBC $>9.5 \times 10^9/L$	325 (31.4%)	17 (16.5%)
Lymphocyte count (N=927)		
Lym $<1.1 \times 10^9/L$	323 (31.2%)	41 (39.8%)
Lym $>3.2 \times 10^9/L$	27 (2.6%)	5 (4.9%)
C-reaction protein $>5\text{mg/L}$ (N=878)	530 (51.3%)	69 (67%)
RT-PCR assay of nasal and pharyngeal swab (N=1013)		
Positive	5	5
Negative	1008	98

Discussion

Fever clinic is organized as an extraordinary approach to the febrile patients in the tropics or pandemics like severe acute respiratory syndrome (SARS) in 2003[8, 9]. Most medical centers in China rearranged and enlarged their fever clinics to triage potential patients at the very beginning of COVID-19 pandemic.

Separated with common emergency department, fever clinic should have specialized receptions and passageways to different areas and isolation ward [10]. All visits with fever are referred for epidemiological history at the first reception for primary triage. After that, visits with or without history of

exposure to COVID-19 are triaged to different areas for further inquiry and examinations, in order to reduce cross infection among patients.

The fever clinic for COVID-19 in Sichuan Provincial Peoples' Hospital has been running for about three months, with thousands of visits being triaged and treated. Up to now there were in total 166 confirmed cases in Chengdu City, where this hospital located. According to this study, nearly ten percent of febrile patients were suspected or confirmed of COVID-19 at fever clinic, and then admitted to isolation ward. Although 60 of 103 patients were exclude finally, twelve confirmed patients and 31 suspected patients were picked up and cured, with Zero nosocomial infection.

Conclusions

The result of this study again verified the extraordinary role of fever clinics in pandemics. When confronted with a mass of unknown febrile patients, a well organized fever clinic may avoid the frustration of all medical staffs.

Declarations

Ethics approval and consent to participate

The ethics committee of Sichuan Provincial Peoples' Hospital, Chengdu, China, approved this study, and all patients provided informed consent.

Consent for publication

Not applicable.

Availability of data and materials

No data and material are available for sharing.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Li Tang and Yanxia He contributed equally to this article. Bin Luo and Fangjing Bai designed the study, analyzed and interpreted the data. Li Tang, Yanxia He and Fangjing Bai contributed to data collection. All authors read and approved the final version of the manuscript.

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