Analysis on the Clinical Characteristics of 10 Cases of Asymptomatic SARS-CoV-2 Novel Coronavirus Infection

Lijun Chen[1], Xiaoyong Ma[2*], Juanxia Chen[1], Liting Ma[1]

[1]Department of Respiratory and Critical Care Medicine, Second Affiliated Hospital of Ningxia Medical University(The First People's Hospital of Yinchuan), Yinchuan 750001, Ningxia Province, China;

[2]Department of Traditional Chinese Medicine, General Hospital of Ningxia Medical University, Yinchuan 750004, Ningxia Province, China

Abstract: *Objective:* To analyze the clinical features of asymptomatic patients infected with the SARS-CoV-2 novel coronavirus. *Methods:* The clinical data of 10 asymptomatic cases and 12 symptomatic cases of COVID-19 diagnosed during February 2020 to April 2020 was collected and the clinical features of the two groups of patients were compared. *Results:* 10 cases of asymptomatic infection and 12 cases of symptomatic patients were tested positive for the novel coronavirus nucleic acid test. There was no significant difference in gender distribution between the two groups ($P>0.05$); the average age of patients in the asymptomatic group was lower than that of the symptomatic group ($P<0.05$), the difference in clinical classification between the two groups was statistically significant ($P<0.05$); there was no statistically significant difference in the results of chest CT examination involving lung lobes between the two groups ($P>0.05$), and there was no statistically significant difference in mortality between the two groups ($P>0.05$). *Conclusion:* The average age of asymptomatic novel coronavirus infections was lower than that of confirmed cases of COVID-19, mainly among young people. There was no significant difference in clinical classification, mortality and chest CT examination results between symptomatic and asymptomatic cases.

Keywords: Novel coronavirus pneumonia; Asymptomatic infection; Clinical features

1 Introduction

Since the outbreak of the COVID-19 pandemic, it has spread rapidly and became a global pandemic. The population is highly susceptible to the novel coronavirus, which is highly infectious and pathogenic. According to the information at hand currently, the clinical manifestations of the disease are mainly upper respiratory symptoms, but some patients will not develop symptoms after being infected with the virus, and become cases of asymptomatic infections. In view of the insidious transmission features of the virus, asymptomatic infections are likely to become the source of infection, invisibly causing a cluster of pandemic and increasing the difficulty of pandemic prevention and control[1].

Therefore, active research and understanding of the clinical features of asymptomatic infections are of great significance to further strengthening the prevention and control of the pandemic. The following report summarizes the clinical features of asymptomatic infections of the novel coronavirus by comparing the differences in epidemiological features between asymptomatic infections and confirmed cases.

2 Subjects and Methods

2.1 Subjects Data

According to the National Health Commission "Novel Coronavirus Pneumonia Diagnosis and Treatment Plan (Fifth Trial Edition Amendment)"[2], cases of asymptomatic and confirmed cases of novel coronavirus infections were selected as the research subjects.

2.2 Methods

2.2.1 Pandemic Investigation

Information about confirmed cases of COVID-19 and asymptomatic infections was searched in the China Disease Prevention and Control Information System. Basis for screening of asymptomatic infections: refers to those who show no clinical symptoms, respiratory tract and other specimens tested positive for the novel coronavirus, the sources mainly include the following: (1) close contacts of confirmed patients with COVID-19; (2) asymptomatic infections found during active testing of exposed populations in the process of tracing the source of infection of confirmed cases of COVID-19; (3) Asymptomatic infections found during active testing on people who have lived in areas where the outbreak of the COVID-19 pandemic was continuing.

2.2.2 Information Filtering

All case data of patients with and without symptoms, including their clinical symptoms, imaging examinations, basic conditions and epidemiological history, etc. were collected.

2.3 Data Processing

Statistical analysis was performed using the SPSS25.0 data software, the clinical data of confirmed cases of COVID-19 and asymptomatic infections was descriptively analyzed, count data value was expressed as number of cases and percentage and checked with the chi-square test method, measurement data value was expressed as mean ± standard deviation and checked with the t-test method, and $P<0.05$ is used as the basis for meaningful inter-group evaluation.

3 Results

3.1 Comparison of General Data Results

10 cases of asymptomatic and 12 cases of symptomatic patients were tested positive with the novel coronavirus nucleic acid test. In terms of gender, the difference in gender distribution between the two groups was not statistically significant ($P>0.05$); the average age of the asymptomatic group was lower than that of the symptomatic group ($P<0.05$), and the difference in clinical classification between the two groups was statistically significant ($P<0.05$), Table 1:

Table 1. Comparison of General Data

Indicator	Asymptomatic	Symptomatic	χ^2/t	P
Gender [$n(\%)$]				
Male	3(30.0)	6(50.0)	0.903	>0.05
Female	7(70.0)	6(50.0)		
Age ($\bar{x} \pm s$)	35.1±2.3	58.4±3.6	17.647	<0.05
Disease Category [$n(\%)$]				
Mild - Normal	6(60.0)	2(16.7)		
Severe	3(30.0)	6(50.0)	4.657	<0.05
Critical	1(10.0)	4(33.3)		

3.2 Chest CT Examination Results

Scanning with 16-slice spiral CT, patients were instructed to hold their breath, scanned from the tip of the lung to the bottom of the lung, there was no significant difference in the results of chest CT examination involving the lung lobes between the two groups(Table 2) ($P>0.05$).

Table 2. Comparison of Chest CT Examination Results [n(%)]

Long Lobe Involved	Asymptomatic	Symptomatic	χ^2	P
Right Upper Lobe	5(50.0)	7(58.3)	0.153	>0.05
Right Middle Lobe	3(30.0)	6(50.0)	0.903	>0.05
Right Bottom Lobe	6(60.0)	8(66.7)	0.105	>0.05
Left Upper Lobe	5(50.0)	7(58.3)	0.153	>0.05
Left Bottom Lobe	6(60.0)	9(75.0)	0.566	>0.05

3.3 Mortality

As of April, 1 patient (10.0%) in the asymptomatic group had died, the patient was severely ill and had a history of malignant tumor; in the symptomatic group, 2 patients (16.7%) had died, 1 was critically ill, and 1 was severely ill. There was no significant difference in mortality between the two groups (χ^2=0.206, P>0.05).

4 Discussions

Although cases of asymptomatic infection of the novel coronavirus show no clinical symptoms, tests on the pathogens of respiratory tract specimens or serum-specific IgM antibody will be positive, which is the key to pandemic control. As this group of people shows no clinical manifestations, it is difficult to discover. Currently, asymptomatic infections of the novel coronavirus are mainly found through screening of close contacts, investigations on cluster outbreaks, and tracking of the source of infections[3]. In this study, 10 cases of asymptomatic infection were found through the above three routes. As asymptomatic infections are not easy to detect, they may become the trigger for the continuous spread of the pandemic. Therefore, timely investigation of asymptomatic infections is conducive to early control of their transmission as a source of infection, which will provide good support for pandemic prevention and control in the future.

Based on the analysis of clinical features, there is no statistically significant difference in gender distribution between the 10 asymptomatic infections and the 12 asymptomatic confirmed cases in this study. However, in terms of age, asymptomatic infection cases are on average younger than those showing symptoms. Further analysis shows that among the symptomatic confirmed cases, most of them are predominantly in the elderly age group of over 40 years old, while asymptomatic infections are mostly teenagers. Combined with current research, it is believed that although most of the confirmed cases of novel coronavirus infections are middle-aged and elderly, young people may also be infected, but there is a possibility that a smaller proportion of them will be symptomatic[4].

In the COVID-19 diagnosis and treatment plan for the novel coronavirus infection, the disease is divided into mild, normal, severe and critical. This is also a result of our dynamic acquisition process of COVID-19 in the long battle. As some patients do not have significant clinical symptoms, they rarely go to the doctor and receive examinations, but it cannot be ruled out that they are still highly infectious, and as an invisible source of infection, which is a potential infectious hazard to the public. The study in this paper found that there is no significant difference in disease classification between symptomatic and asymptomatic infection cases.

The current clinical diagnosis of COVID-19 is still mainly based on overall indicators such as epidemiological history, clinical manifestations, imaging examinations, and nucleic acid testing. Although nucleic acid testing has always been the gold standard for the diagnosis of COVID-19, the test specimens are pharyngeal swabs taken from the upper respiratory tract which will be affected by various factors such as test kits, specimen collection and sampling tubes etc., and there is a high possibility of false negative test results[5]. Chest CT has the characteristics of being simple and easy to perform, so its important value is highlighted in the clinical diagnosis of COVID-19, especially for those infected with no clinical symptoms, it is more conducive to early detection of suspected patients and take timely quarantine measures to reduce the scope of their contacts and reduce the infection rate[6].

This study analyzed the chest CT imaging manifestations of asymptomatic infections, and found that asymptomatic infections were more frequently invaded in the lower lung lobes, but there was no statistically significant difference in chest CT imaging findings from symptomatic confirmed cases. Although the definition of asymptomatic infection

has been proposed, and it is clear that asymptomatic infections are very likely to become the source of infections, there are still some subjective factors in the determination of asymptomatic infection, symptoms that are only subjectively assessed such as fatigue and malaise are likely to be ignored, leading to a certain possibility of misdiagnosis. Therefore, in future research, when conducting epidemiological investigations, the possible symptoms should be further refined to achieve as much quantification and standardization as possible. Through chest CT screening, abnormal images of the lungs of asymptomatic infections can be detected early, and asymptomatic infections can be detected in combination with multiple methods.

What is clear is that since asymptomatic infections have no clear clinical signs, it is more difficult to discover, which will further increase the difficulty of pandemic prevention and control. Therefore, it is of great significance to get hold of the clinical features of asymptomatic infections and find the differences with confirmed cases of COVID-19. This can provide a lot of reference for the rational formulation of prevention and control measures. There are still many shortcomings in the study of this paper. First, the number of asymptomatic infections and those with definitive diagnoses in this paper are limited, so the results may not be widely representative, and only provide basic data for related studies. Secondly, as there is not enough in-depth understanding on asymptomatic infections, not all suspected people (people living in pandemic areas, and close contacts, etc.) have not been screened, so the actual data may deviate from the existing data, thereby imposing certain limitations on the research results. In the follow-up research, more complete and larger group studies should be adopted to obtain more representative data results and provide effective data support for future pandemic prevention and control.

In conclusion, the average age of asymptomatic novel coronavirus infections is lower than that of symptomatic confirmed cases, and asymptomatic cases are predominantly among young people. There is no significant difference in clinical classification, mortality and chest CT examination results between the cases with and without clinical symptoms.

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