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BRIEF REPORT

Clinical features of pediatric patients with COVID-19: a report of two family cluster cases

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Abstract

Background Coronovirus disease 2019 (COVID-19) has spread rapidly across the globe. People of all ages are susceptible to COVID-19. However, literature reports on pediatric patients are limited.

Methods To improve the recognition of COVID-19 infection in children, we retrospectively reviewed two confirmed pediatric cases from two family clusters. Both clinical features and laboratory examination results of the children and their family members were described.

Results The two confirmed children only presented with mild respiratory or gastrointestinal symptoms. Both of them had normal chest CT images. After general and symptomatic treatments, both children recovered quickly. Both families had travel histories to Hubei Province.

Conclusions Pediatric patients with COVID-19 are mostly owing to family cluster or with a close contact history. Infected children have relatively milder clinical symptoms than infected adults. We should attach importance to early recognition, early diagnosis, and early treatment of infected children.

Keywords Children · Coronavirus · COVID-19 · Wuhan

Introduction

Since the outbreak of the coronovirus disease 2019 (COVID-19) in Wuhan City, China, a total of 82,488 confirmed cases have been reported globally as of February 27, 2020 [1]. Of these cases, 78,824 were from China and 3664 were from 46 other countries [1]. Among the confirmed cases, 2788 died in China and 57 died in other countries [1]. The novel coronavirus has been named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), whereas the disease associated with it is referred to as COVID-19 [2].

A series of recent published articles have reported the epidemiological and clinical characteristics of the hospitalized patients in Wuhan with COVID-19 [3–5]. Most patients reported in the literature were adults, and adult patients commonly presented as pneumonia with abnormal findings on chest CT [3–6]. Elderly men with comorbidities were more likely to exacerbate with severe and even fatal respiratory diseases such as acute respiratory distress syndrome (ARDS) [3–5]. The Chinese Center for Disease Control and Prevention reported 72,314 COVID-19 patients as of February 11, 2020. Among the 44,672 confirmed cases, 416 cases were aged 0–10 years [7]. However, literature reports on pediatric patients are limited [8, 9]. Herein, we report two children with confirmed COVID-19 from two family clusters. This paper will help pediatricians early recognize pedaitric cases with COVID-19.

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Methods

We retrospectively reviewed two pediatric patients confirmed with COVID-19. Epidemiological features, physical examinations, laboratory studies and clinical outcome were described. We also collected data of their family members including clinical manifestations and laboratory examinations. Oropharyngeal swab tests were collected for detecting SARS-CoV-2, and chest CT examinations were done for the two pediatric patients and their family members.

Results

Case 1

A 15-year-old boy presented with a 1-day history of fever and was admitted to our hospital on January 25, 2020. He was previously healthy. History inquiry revealed that he had a travel history to Wuhan City (the epicenter of COVID-19 outbreak) with his parents one week ago. In Wuhan City, the boy's entire family had dinner with several friends, and one of these friends was confirmed with COVID-19 three days later.

Upon admission, his body temperature was 37.9 °C (100.2°F), and he only had pharyngeal congestion. Breath sounds of both lungs were normal at auscultation. Laboratory studies showed elevated white blood cell count (11.82×10^9/L; normal range, 4–10×10^9/L), with 67.3% neutrophils and 25.7% lymphocytes, and elevated C-reactive protein level (34.64 mg/L; normal range, 0–10 mg/L). The oropharyngeal swab tested positive for SARS-CoV-2. No other pathogens were found. Unenhanced chest CT results were normal (Fig. 1a).

His family members displayed similar symptoms. His father had a low fever of 37.8 °C for one day, with no cough or other discomforts. His mother had a mild cough for one week without fever. His father's chest CT showed bilateral pneumonia with ground-glass opacities especially in the left lung (Fig. 1b), and his mother's chest CT was normal. They both tested positive for SARS-CoV-2.

Symptomatic treatment was given to the patient, and symptoms disappeared after treatment for two days.

Case 2

A 9-year-old boy was admitted to the hospital because of a history of mild diarrhea for two days on February 3, 2020. He was previously healthy. He did not experience fever or cough. History inquiry showed that he had traveled with his family to Xiaogan City, China (the subcenter of COVID-19 outbreak neighboring Wuhan City in Hubei Province) 10 days ago. Both the physical and laboratory examinations of the boy were unremarkable. White blood cell count was normal of 6.6×10^9/L, with 34.1% neutrophils and 52% lymphocytes. C-reactive protein was also normal (3.49 mg/L; normal range, 0–10 mg/L). Unenhanced chest CT results were normal (Fig. 2a). The oropharyngeal swab tested positive for SARS-CoV-2.

His mother presented with fever and cough two days earlier than the boy. Although her oropharyngeal swab tests for SARS-CoV-2 were negative during two consecutive times, she was still suspected with COVID-19 because she had a travel history and multiple peripheral ground-glass opacities in both lungs on chest CT (Fig. 2b). The boy's father had a mild cough for four days, and his two-year-old sister had a transient low fever for two days. Chest CT results of the father and sister were normal, and oropharyngeal swab tests were negative for SARS-CoV-2.

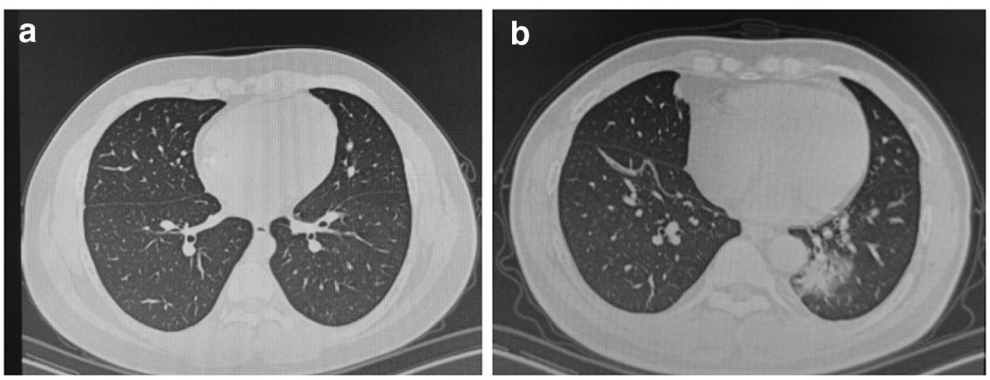

Fig. 1 **a** Unenhanced CT images of Case 1 showing normal results; **b** Unenhanced CT images of Case 1's father showing bilateral pneumonia with ground-glass opacities especially in the left lung

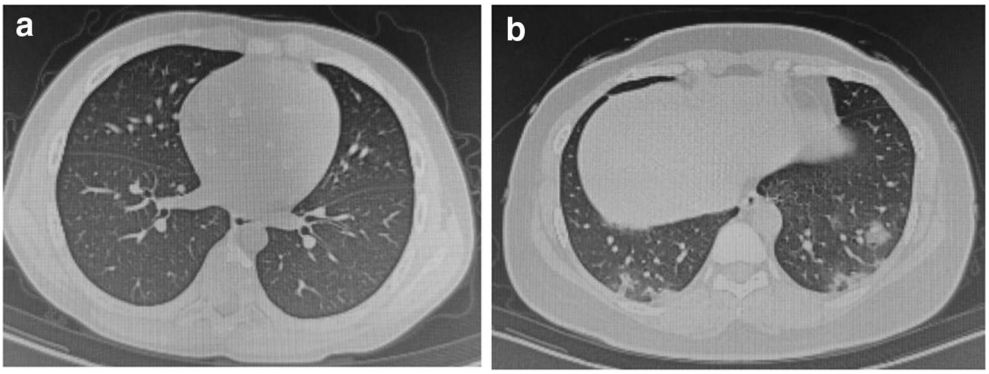

Fig. 2 **a** Unenhanced CT images of Case 2 showing normal results; **b** Unenhanced CT images of Case 2's mother of C showing multiple peripheral ground-glass opacities in bilateral lungs

Oral probiotic was given to the boy, and his symptoms disappeared after two days of treatment.

Discussion

The two pediatric patients in this series were family cluster cases. Both families had a travel history to Hubei Province, the epicenter of this outbreak. The two patients had different clinical presentations; however, both tested positive for SARS-CoV-2. Case 1 presented as an upper respiratory tract infection, and Case 2 presented with mild diarrhea only. Compared with their parents and to previous reported adults with COVID-19, the two cases in our study showed relatively mild clinical manifestations and recovered soon. Their chest CTs were normal. The clinical features in these two patients are different from previous reports in pediatric cases. A report of a family cluster demonstrated an asymptomatic child (aged 10 years) had radiological ground-glass lung opacities and positive SARS-CoV-2 test [8]. And another report demonstrated an infected case with very severe pneumonia [9]. These reports showed that children infected with SARS-CoV-2 may have variable symptoms, which may be partly related to the previous health status and interval from onset to consultation and comorbidities. Experts recently have formulated a recommendation for the diagnosis and treatment of COVID-19 in children, which is of paramount important for clinical practice [10, 11]. Owing to the limited number of pediatric cases and experiences, these recommendations or guidelines were based mainly on standards and experiences with adult patients [10]. Additional data from pediatric cases need to be collected to further recognize the clinical features of COVID-19 in children.

In conclusion, pediatric patients with COVID-19 are mostly from family cluster with clear travel histories to Hubei Province, the epicenter of the outbreak. Close contact in the family is the main transmission way of infection in children. Pediatric patients may present as asymptomatic or only with mild symptoms of respiratory or gastrointestinal system with normal chest CT images, and thus easily be missed. Our study highlights the importance that pediatricians be vigilant in treating patients with a travel history to areas of the epidemic, or with family cluster, to ensure an early diagnosis, early quarantine and early treatment.

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Compliance with ethical standards

Ethical approval This study was approved by the Institution Review Board (IRB) of Beijing Tsinghua Changgung Hospital. Written consents were obtained from the parents of the patients for publication.

Conflict of interest No financial benefits have been received or will be received from any party related directly or indirectly to the subject of this article.

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