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Letter to the Editor

Children hospitalized for coronavirus disease 2019 (COVID-19): A multicenter retrospective descriptive study

Dear editor:

We read with interest the article by Dr. Song R and colleagues in the Journal of Infection titled “Clinical and epidemiological features of COVID-19 family clusters in Beijing, China.”¹, published online in April 2020. The authors presented the epidemiological and clinical features of the clusters of four families and found that SARS-CoV-2 is transmitted quickly in the form of family clusters. Children in the families generally showed milder symptoms. As of April 28, 2020, the coronavirus disease 2019 (COVID-19) caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been responsible for more than 3.05 million confirmed cases around the world. Early evidence showed that children seemed to be escaping the worst effects of the SARS-CoV-2.² However, a recent study indicated children with SARS-CoV-2 infection could be detected in early January 2020 in Wuhan.³ Another study reported that children are as susceptible to COVID-19 as adults.⁴ As the number of children infected with COVID-19 gradually increases, the disease has been documented in infants, children and adolescents, however, limited reports analyzed pediatric patients with COVID-19. Although a recent review has summarized the clinical features and management of infected children,⁵ the spectrum of disease of children outside Wuhan are still limited. Therefore, we included 46 children (≤ 18 years of age) hospitalized with positive real-time fluorescence polymerase chain reaction (RT-PCR) results of throat swabs were included from four tertiary-care hospitals in Guangdong, Hunan, and Hubei Provinces, China between January 20, 2020 and March 9, 2020. Demographic data and clinical features are summarized in Table 1. Details of the laboratory, chest radiological findings and treatment are provided in Supplementary Tables 1–2 and Figure 1. All 46 children cases were non-severe by clinical examination. 29 children (63%) were male, with a median age of 8 years (interquartile range, 4–14 years; range, 7 months to 18 years). 32 children (70%) had at least one infected family member, indicating pediatric patients acquired infections mainly through close contact with their parents or other family members who lived in Wuhan, or had visited there. Unlike adults, no children in this study had comorbidities. 22 children (48%) were asymptomatic at the onset. The most common clinical symptoms were dry cough [12 children (26%)] and fever [eight children (17%)] accompanied by other upper respiratory symptoms, such as nasal congestion and runny nose. Our children cases had no gastrointestinal symptoms, such as nausea, vomiting, and diarrhea. No children had leukopenia and lymphopenia. 20 children (43%) had chest imaging abnormalities, such as unilateral nodular or patchy ground-glass opacities. Recent studies questioned the role of chest CT in the diagnosis of COVID-19 because of biologic

Table 1

Demographic and clinical characteristics of the study children.

Characteristics	Value
Mean (standard deviation) age, months	105 (64)
Median (interquartile) age, months	96 (48–168)
Age groups (years)	
0–1	3 (7)
1–5	13 (28)
6–10	10 (22)
11–18	20 (43)
Sex	
Male	29 (63)
Female	17 (37)
Symptoms at onset	
Fever	10 (22)
Dry cough	15 (33)
Dry throat	4 (9)
Nasal congestion/runny nose	6 (13)
Weak	3 (7)
Epidemiologic history	
No. of infected family members	
1	8 (17)
2	10 (22)
≥ 3	13 (28)
Wuhan linkage	22 (48)
Body temperature on admission (°C)	
≤ 36	1 (2)
36–37.5	39 (85)
> 37.5	5 (11)
Chest imaging abnormalities	
Ground-glass opacity	13 (28)
Consolidation	1 (2)
Mixed ground-glass opacity and Consolidation	4 (9)
Local patchy shadowing	1 (2)
Unilateral	15 (33)
Bilateral	4 (9)
Time from illness to first hospital admission, days	2 (1–3)

Note: Values are numbers (percentages) unless stated otherwise. Wuhan linkage was defined as residing in or visiting Wuhan or contact with visitors from Wuhan ≤ 2 weeks before the onset of infection.

effects of ionizing-radiations, therefore, doctors should choose the optimal radiological imaging tool (CT, X-ray, or US) based on clinical conditions and possible adverse events. According to the findings of previous literature and our study, chest CT may be not a preferred screening tool of COVID-19 in children. After confirmation of COVID-19, most of children were treated with one to three antiviral drugs. No children needed intensive care unit care or invasive mechanical ventilation. As of March 9, 2020, all children had been discharged and no children had died. No children had severe complications. The median length of hospital stay was 15 days. Four children had a positive rectal swabs but negative throat swabs after recovery; the time from hospital discharge to positive RT-PCR test after recovery was 2–12 days.

This report describes a spectrum of COVID-19 pneumonia in children outside Wuhan, China, which might provide an insight into the prevention and control of COVID-19 in children across other areas of China and other countries. In contrast with infected children from Wuhan, the SARS-CoV-2 infected children was more milder and insidious regarding the symptoms, laboratory, and radiological findings. The burden of COVID-19 in children may be low compared with adult patients, but the high proportion of asymptomatic or mildly symptomatic infections in children should be paid close attention. After discharge, a small proportion of the recovered children may still be virus carriers because persistent rectal swab positives occurred even after throat swab testing turned negative in children. The fecal viral shedding could be as long as 57 days.⁶ Viral shedding through gastrointestinal tract suggested the possibility of fecal-oral viral transmission. However, this finding should be confirmed in larger studies. Available evidence showed recovered pediatric patients with positive RT-PCR might not be caused by virus recurrence or second virus infection.

Declaration of Competing Interest

The authors declare no competing interests.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.jinf.2020.04.045](https://doi.org/10.1016/j.jinf.2020.04.045).

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