COVID-19 in two infants in China

Anni Li | Xiaolin Zhou | Wei Lu | Yuanhong Zhou | Qiang Liu

Yichang Central People's Hospital, The First College of Clinical Medical Science, China Three Gorges University, Yichang, China

Correspondence
Qiang Liu, Department of Infectious Disease, Yichang Central People's Hospital, No. 183 Yiling Road, The First College of Clinical Medical Science, Three Gorges University, Yichang, 43003 Hubei, China. Email: liuqiang@ctgu.edu.cn

Funding information
National Natural Science Foundation of China, Grant/Award Numbers: 81402404, 81403163

Abstract
Introduction: Since December 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread rapidly around the world and caused more than 487,000 infections and 22,000 deaths worldwide.

Methods: We report two infant cases with coronavirus disease 2019 (COVID-19) in Yichang, Hubei, China. The younger of the two is only 5-months old. We recorded their clinical manifestations, epidemiological history, laboratory examination, and treatment in detail. In addition, we provide computed tomographic images of their chest, which are the most serious imaging manifestation among the infants recorded so far.

Results: Although both of them eventually recovered and were discharged from the hospital, they were complicated with varying degrees of liver and myocardial injury. In addition, one of them was complicated with mycoplasma pneumoniae infection.

Conclusions: Pediatricians should consider the potential risks of developing severe illness of infants infected by SARS-CoV-2 and take them seriously.

Keywords
COVID-19, infant, infection, SARS-CoV-2

1 | INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a β coronavirus with envelope and 60 to 140 nm in diameter, which is a global urgent public health concern because of its alarmingly high infection rates. SARS-CoV-2 contributes to the decrease of lymphocytes, the increase of the level of C-reactive protein, and the secretion of a large number of inflammatory factors causing cytokine storm. It can lead to multiple organ failure in severe cases. However, there is no specific treatment in clinic. The previous view suggests that infants are not at a higher risk for severe coronavirus disease 2019 (COVID-19) pneumonia. We herein report two infant cases with COVID-19 in Yichang, Hubei, China.

2 | CASE PRESENTATION

The patients have been living with their own families in different districts. Patient 1 is the youngest infant diagnosed with Covid-19 infection in a hospital in Yichang. The summary of their clinical characteristics and treatment is shown in Table 1. Laboratory test results are shown in Table 2. Their chest computed tomographic (CT) images obtained on
admission showed bilateral patchy ground glass opacities (Figure 1). Informed consent was obtained from their parents or guardians for the publication of their clinical data.

### DISCUSSION

Since 30 January 2020, a total of 47 children (≤12 years of age) with fever, respiratory symptoms, and lung CT suspected viral infection were hospitalized in Yichang Central People’s Hospital, of which five were diagnosed with 2019-nCoV–infected pneumonia (10.6%). All five were from familial clusters. There were at least three to four family members in close contact with the highly suspected or confirmed cases of COVID-19. So far, all the children have recovered and have been discharged from the hospital.

The two infants presented varying degrees of increase in lactate dehydrogenase and aspartate aminotransferase. We treated them with agents to protect hepatocytes and cardiomyocytes. There is no specific antiviral drug for the treatment of infants with COVID-19. In our cases, we use three kinds of antivirals for the treatment of COVID-19 infants for 8 days. And the viral duration of these infants were 18 and 27, respectively. The heart function of infants are impaired, which predict a poor prognosis. One of our cases coinfected with *Mycoplasma pneumoniae* has a relative longer duration of symptom release, viral duration, and hospitalization than the other infants who do not. Therefore, the coinfection of COVID-19 infants should be taken seriously.

The current clinical data show that pregnant women, children, and infants are susceptible to SARS-CoV-2. The

---

**TABLE 1** Characteristics of two infants hospitalized with COVID-19 pneumonia

| Characteristic                        | Patient 1                      | Patient 2                      |
|--------------------------------------|-------------------------------|-------------------------------|
| Age, mo                              | 5                             | 7                             |
| Sex                                  | Male                          | Female                        |
| Birth weight, kg                     | 3.04                          | 3.35                          |
| The general situation at birth       | Premature delivery and no asphyxia | Full-term delivery and no asphyxia |
| Mode of birth                        | Cesarean section              | Cesarean section              |
| Growth assessment                    | Average                       | Above average                 |
| Onset time                           | 2020/1/27                     | 2020/2/4                      |
| Exposure to source of transmission   | Visited Wuhan 11 d before onset | Contacted with a neighbor confirmed with NICP |
| Characters of other family members   | Grandmother was diagnosed with severe NCIP; father and grandfather both have cough | Mother, father, grandmother, and grandfather were all diagnosed with NCIP |
| Symptoms on admission                | Cough, poor appetite (6 d), fever (1 d) | Fever                       |
| The highest temperature on admission, °C | 37.9                         | 39.5                          |
| Mental reaction                      | Normal                        | Normal                        |
| Coinfections                         | Not detected                  | Mycoplasma pneumoniae         |
| Treatment                            |                               |                               |
| Interferon atomization               | Yes                           | Yes                           |
| Antivirals                           | Ribavirin, Abidol             | Ribavirin, Abidol, and Oseltamivir |
| Antibiotics                          | Amoxicillin clavulanate potassium | Amoxicillin clavulanate potassium and roxithromycin |
| Intravenous immune globulin          | 10 g/d (days 1-3)             | 10 g/d (day 1)                |
| Glucocorticoids                      | No                            | No                            |
| Fever duration, d                    | 0                             | 10                            |
| Viral duration, d                    | 18                            | 27                            |
| Hospitalization, d                   | 15                            | 30                            |

Abbreviations: COVID-19, coronavirus disease 2019; NCIP, 2019-nCoV–infected pneumonia.

*Discontinued because of allergic reaction.*
clinical manifestations of most children are relatively mild. Some children will gradually develop fever, fatigue, dry cough, nasal congestion, runny nose, and other upper respiratory symptoms 3 to 7 days after infection. Some children just have digestive tract symptoms such as diarrhea, nausea, and vomiting while showing no symptoms of fever or pneumonia. Most of them recover within 2 weeks and have good prognosis. But a small number of children may progress to lower respiratory tract infection. Although there was only one death—a 10-month-old infant with intussusception died of multiorgan failure—as recorded. Therefore, the potential risk of death in COVID-19 infection in infants cannot be ignored, especially when combined with serious or congenital disease.

Table 2: Main laboratory findings on admission of two infants hospitalized with COVID-19 pneumonia

| Laboratory data on admission (reference range) | Patient 1 | Patient 2 |
|-----------------------------------------------|-----------|-----------|
| White blood cell count (3.5-9.5 × 10^9/L)      | 7.92      | 8.52      |
| Neutrophil count (1.8-6.3 × 10^9/L)           | 0.91      | 5.49      |
| Lymphocyte count (1.1-3.2 × 10^9/L)           | 6.09      | 1.84      |
| Platelet count (125-350 × 10^9/L)             | 506       | 288       |
| Hemoglobin (13.0-17.5 g/dL)                    | 12.3      | 10.7      |
| C-reactive protein (0-10 mg/L)                 | 2         | <0.499    |
| Erythrocyte sedimentation rate (0-20 mm/h)    | 23        | 29        |
| Procalcitonin (<0.05 ng/mL)                    | <0.05     | 0.12      |
| Lactate dehydrogenase (120-250 U/L)           | 407       | 274       |
| Creatine kinase (40-200 U/L)                  | 135       | 123       |
| Creatine kinase-MB (0-25 U/L)                 | 28        | 25        |
| Alanine aminotransferase (9-50 U/L)           | 63        | 48        |
| Aspartate aminotransferase (15-40 U/L)        | 66        | 62        |
| Total bilirubin (6.5-8.5 g/dL)                 | 5.6       | 5.9       |
| Globulin (2.0-4.0 g/dL)                       | 1.8       | 1.7       |
| Urea nitrogen (8.0-22.0 mg/dL)                | 5.4       | 9.7       |
| Creatinine (0.64-1.10 mg/dL^d)                | 0.2       | 0.24      |
| IgG (7-16 g/L)                                 | 5.91      | ...       |
| IgA (0.7-4 g/L)                                | 0.35      | ...       |
| D-dimer (0-0.05 mg/L)                          | 0.4       | 0.35      |

Abbreviations: COVID-19, coronavirus disease 2019; IgA, immunoglobulin A; IgG, Immunoglobulin G; MB, muscle and brain type.

A, The chest computed tomography (CT) of patient 1 showed multiple patchy ground glass opacity shadows in both lungs, and local interlobular septum thickening like a grid. B, The chest CT of patient 2 showed extensive fusion with patchy blurred shadows in both lungs.

Acknowledgments

The authors are grateful to Dr. Lu for their clinical guidance in treatment of these two infants and providing these two case reports. The authors sincerely thank every medical staff for their efforts to fight with COVID-19. This study was funded by the National Nature Science Foundation of China (Nos. 81403163 and 81402404).
DATA AVAILABILITY STATEMENT
The data generated within the study is shown in this manuscript. Any raw data or analysis would be available from the corresponding author upon request.

ETHICS STATEMENT
The study was approved by Medical Ethic Committee of Yichang Central People’s Hospital. Informed consent was obtained from their parents or guardians for the publication of their clinical data.

ORCID
Anni Li http://orcid.org/0000-0002-3301-0091
Qiang Liu https://orcid.org/0000-0002-9719-2023

REFERENCES
1. Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020. https://doi.org/10.1056/NEJMoa2002032
2. Liu W, Zhang Q, Chen J, et al. Detection of Covid-19 in children in early January 2020 in Wuhan, China. N Engl J Med. 2020:382. https://doi.org/10.1056/NEJMc2003717
3. Wei M, Yuan J, Liu Y, Fu T, Yu X, Zhang Z. Novel coronavirus infection in hospitalized infants under 1 year of age in China. JAMA. 2020. https://doi.org/10.1001/jama.2020.2131
4. Lu X, Zhang L, Du H, et al. SARS-CoV-2 infection in children. N Engl J Med. 2020:382. https://doi.org/10.1056/NEJMc2005073

How to cite this article: Li A, Zhou X, Lu W, Zhou Y, Liu Q. COVID-19 in two infants in China. Immun Inflamm Dis. 2020;8:380–383. https://doi.org/10.1002/iid3.319