



Case Report

<http://wjpn.ssu.ac.ir>**Death of a 3 Month-Old Infected Infant with Dilated Cardiomyopathy after COVID-19 Infection: A Case Report**Fatemeh Baghalsafa¹, Hossein Neamatzadeh^{1,2}, Sedigheh Ekraminasab^{1,3*}¹ Mother and Newborn Health Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran² Department of Medical Genetics, School of Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran³ Department of Hematology and Blood Banking, School of Allied Medical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

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ABSTRACT

Background: Several numbers of studies have reported that coronavirus disease-2019 (COVID-19) in infants and children have shown milder symptoms and a better prognosis than in adult patients. However, there is no sufficient evidence on the effect of cardiovascular involvement in COVID-19 in the infant.

Case Report: Here, we report an infant infected with COVID-19 with the manifestations of dilated myocarditis. The patient was referred to Pediatric Emergency with lethargy and tachypnea. On physical examination, she had holosystolic murmur with grade 3/6. The laboratory examinations showed anemia as well as increased alkaline phosphatase (ALP) levels. Due to respiratory distress, she was intubated and put under mechanical ventilation. The diagnosis of COVID-19 infection was confirmed by real-time polymerase chain reaction (RT-PCR) using a pharyngeal specimen. Finally, dilated cardiomyopathy (DCM) was diagnosed and one day after hospitalization the infant was died due to complications of DCM.

Conclusion: It seems that in the infant with severe underlying disease, even a mild COVID-19 infection, may be lethal. Focal viral myocarditis is a very rare condition described by localized disturbance of the myocardium occurring in ventricular dysfunction with significant morbidity and mortality. Thus, due to the possibility of cardiac injury in infected neonates with COVID-19 disease and the manifestation of myocarditis, effective measurement is recommended.

Introduction

Coronavirus disease 2019 (COVID-19) is a global pandemic generated by the Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2 virus). The outbreak of SARS-COV-2 has been revealed as a global public health emergency by the World Health Organization (WHO).¹ SARS-CoV-2 infection is not only correlated with respiratory symptoms but also with multi-organ presentation that includes cardiac, gastrointestinal, renal, hematologic, and neurologic ones.² COVID-19 appears to be less aggressive in pediatric patients and associated symptoms than in adults. Adults often present with respiratory distress and cardiac engagement in the acute phase, whereas children more commonly present with fever and respiratory symptoms, with rare cardiac demonstration.³ The most common signs in children are mild fever, cough, rhinorrhea, and sore throat. However, gastrointestinal symptoms such as vomit and diarrhea are probable, too.^{4,5} Older children with COVID-19 have revealed sinus tachycardia with ventricular repolarization abnormalities, but even this has not been well defined in infants.³ Myocarditis, arrhythmia, and coronary artery dilation are the other cardiovascular outcomes of COVID-19 displayed in some studies.^{6,7} While current data propose that the incidence of cardiac complications in children with COVID-19 is low, especially in the acute phase.³ Although children have been influenced less seriously by the COVID-19 pandemic than adults.⁸ A concern has been developed about the risk of severe COVID-19 in the pediatric population with chronic illnesses, such as severe heart disorders.^{9,10} Consequently, the fast global spread of the pandemic, the disease features in pediatrics with congenital heart disease (CHD) remains largely unclear.¹¹ Especially no information is available about COVID-19 infection in the first various months of life.¹² Following the crisis of SARS-COV-2 disease in various parts of the world, this outbreak in

Iran was formally established in February 2020.¹ The lack of documented information on pediatric cases causes trouble in making a clinical diagnosis in those patients.¹³ Furthermore, there is little proof in kinds of literature on the clinical exhibition and disease severity in children with congenital or acquired heart disease infected with SARS-CoV-2.⁹ Here, a 3-month-old case infected with COVID-19 who died due to dilated myocarditis and hypoxia was described.

Case Report

At 21:00 on 19th June 2020, a 3-month-old girl was referred to the pediatric emergency department due to lethargy. The baby was placed under the warmer and the oxygen flowed through the hood and she received 5 ml/kg of 5% glucose solution by IV injection. Fresh packed red blood cells (less than 7 days) were injected within 3 hours and serum volume was reduced. On June 20, the child was treated with antibiotics include vancomycin and cefotaxime. She received 25 and 30 cc of plasma twice and underwent serum therapy. Cardiac consultation and medical treatment were performed, Lasix ampoules, Aldactone tablets, dopamine, and dobutamine drip were performed, and endocrine and infectious counseling was recommended to rule out other causes, and echocardiography was also performed. Echocardiography showed, left ventricular (LV) function is reduced and Left ventricular ejection fraction (EF) was 25-30% with a large atrial septal defect (ASD). Moreover, she had mild Mitral Regurgitation (MR), mild Pulmonary Hypertension (PH). Chest x-ray (CXR) photographs were performed. At 15:15 on 20th June, the infant suffered a decrease in oxygen levels, which was immediately ventilated with a bag valve mask (BVM). The infant had an obstruction due to apnea and subsequently, her heart rate decreased. Heart massage was started and she received three courses of epinephrine and was resuscitated for 35 minutes, after which the infant was resuscitated. At 4:45 p.m. On June 20, the

infant again experienced hypoxia and decreased heart rate, so underwent cardiopulmonary resuscitation for 45 min, and three intravenous epinephrine and one endotracheal epinephrine were administered, which unfortunately were not successful and the infant died of hypoxia and dilated myocarditis.

As shown in table 1, the baby had severe weakness due to severe anemia and did not return to normal despite the blood transfusion. High levels of alkaline phosphatase (ALP) and ammonia in her blood test indicated a severe liver condition or infection. Other liver enzymes, Alanine Aminotransferase (ALT), and Aspartate Aminotransferase (AST) were also high, indicating a serious liver problem.

Table 1. Patient's Paraclinical Tests Results

Variables	Value	Unit
VBG		
HCO ₃	16.9-11.9	mmol/L
PCO ₂	27-21.6	mmol/L
PH	7.41-7.36	
K	4.8	mmol/L
Na	133	mmol/L
Mg	2.02	mg/dL
AST	86	U/L
ALT	35	U/L
Ca	8.6	mg/dL
Cr	0.5	mg/dl
Urea	43	mg/dl
BS	85	mg/dl
PLT	421	10 ³ /μL
HB	7.8	g/dl
WBC	7.3	10 ³ /μL
ALP	730	U/L
D-Bil	0.6	mg/dl
T-Bil	0.9	mg/dl
CRP	negative	
Lactate	36.3	mg/dl
Ammonia	458	μg/dL

BS: Blood sugar; T-Bil: Total bilirubin; D-Bil: Direct bilirubin; HB: Hemoglobin.

The pH was normal but the blood PaCo₂ was low and the infant had respiratory

alkalosis and HCO₃ was lower than normal, so the baby had metabolic acidosis. These findings indicate the presence of a respiratory problem and the presence of an external viral or bacterial agent. According to echocardiography, there was previously an underlying heart problem, and due to hypoxia and infection, external cardiomyopathy may also have developed. Finally according to our results, the differential diagnosis includes anemia, liver problems, and dilated cardiomyopathy (DCM).

Discussion

Several studies showed SARS-CoV-2 in pediatric has a milder exhibition and a better prognosis than adults.⁸ In addition, COVID-19 mortality rates in infected children are less than 1%.¹⁴ Although the respiratory tract is the main target for SARS-CoV-2, cardiovascular engagement is rising as one of the most important and life-threatening difficulties of COVID-19 disease in adults.¹⁵ Prior investigations about the pneumonia outbreak produced by COVID-19 were largely based on knowledge from adult groups. Insufficient data are available for pediatrics with SARS-CoV-2, particularly for infected infants. Moreover, evidence displayed that the neonatal infection with COVID-19 is usually asymptomatic.¹⁶ Overall, the majority of infected pediatrics endure mild to moderate illness with important inter-individual variability in the laboratory and radiographic findings.¹¹ Nonetheless, in healthy pediatrics with SARS-CoV-2, the cardiac complication has been documented and is associated with different causes. Myocarditis, arrhythmias, cardiogenic shock, in children are all found.¹¹ Our case indicates that in pediatrics with acute underlying disease, even a mild COVID-19 disease may be lethal that needs combined treatment actions to be taken. Our findings are compatible with a previous case study in a four-month-old girl with severe DCM. Kristoffersen et al., evaluated COVID-19 disease in an infant with severe DCM. They assessed a four- and a half-month-old girl

with severe DCM who was infected with SARS-CoV-2. They treated her with diuretics and milrinone for the past 4 months. The disease course was characterized by high fever and gastrointestinal exhibitions. They showed that she had severe heart failure and her condition was compensated and stabilized by continuous IV inotropic/ vasodilator treatment.¹⁰ In 2020, De Avila et al., evaluated a 10-day-old male with lower oral intake and dyspnea. His Chest X-Ray showed pulmonary edema and cardiomegaly. They had made an investigation of focal viral myocarditis. They conclude focal myocarditis is a rare exhibition of viral myocarditis in infants. Nonspecific exhibition and echocardiogram images mimic cardiac ischemia.¹⁷ Hopkins et al., evaluated aberrated supraventricular tachycardia correlated with neonatal fever and SARS-CoV-2 disease. They showed, severe infection with fever presumably reduced her threshold for developing clinical arrhythmia. It is significant to distinguish this demonstration from myocarditis.³ Even though COVID-19 disease in pediatrics is less usual and with milder manifestations than when happening in adult cases, it is not without the risk of cardiac involvement, particularly in cases with a history of CHD. In infants and pediatric, former cardiac surgery is associated with the risk of a more acute kind of illness, being admitted to the intensive care unit, and requiring intubation as well as mechanical ventilation.⁵

Conclusion

In summary, as COVID-19 is a current new infection and based on previous knowledge with respiratory infections, pediatrics with underlying CHD should be given specific consideration.

Conflict of Interests

Authors have no conflict of interests.

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References

1. Amiraskari R, Sayarifard E, Kharrazi H, Naserfar N, Sayarifard A. Neonatal sars-cov-2 infection and congenital myocarditis: A case report and literature review. *Arch Pediatr Infect Dis* 2020; 8(3): e103504.
2. Filatov A, Sharma P, Hindi F, Espinosa PS. Neurological complications of Coronavirus disease (COVID-19): Encephalopathy. *Cureus* 2020; 12(3): e7352.
3. Hopkins KA, Webster G. Aberrated supraventricular tachycardia associated with neonatal fever and COVID-19 infection. *BMJ Case Rep* 2021; 14(4): 10-3.
4. Zimmermann P, Curtis N. Coronavirus infections in children including COVID-19: An overview of the epidemiology, clinical features, diagnosis, treatment and prevention options in children. *Pediatr Infect Dis J* 2020; 39(5): 355-68.
5. Sanna G, Serrau G, Bassareo PP, Neroni P, Fanos V, Marcialis MA. Children's heart and COVID-19: Up-to-date evidence in the form of a systematic review. *Eur J Pediatr* 2020; 179(7): 1079-87.
6. Courtney RJ, Pennesi ME. Retinal Dystrophy in 2 Brothers With α -Mannosidosis. *Arch Ophthalmol* 2011; 129(6): 798-804.
7. Alsaied T, Tremoulet AH, Burns JC, Saidi A, Dionne; Audrey, Lang SM, et al. Review of Cardiac Involvement in Multisystem Inflammatory Syndrome in Children. *Circulation* 2021; 143(1): 78-88.
8. Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. *Acta Paediatr* 2020; 109(6): 1088-95.
9. Alsaied T, Aboulhosn JA, Cotts TB, Daniels CJ, Etheridge SP, Feltes TF, et al. Covid-19 in pediatric and congenital heart disease. *J Am Heart Assoc* 2020; 9(12): 1-29.
10. Kristoffersen AW, Knudsen PK, Møller T. SARS-CoV-2 infection in an infant with severe dilated cardiomyopathy. *Cardiol Young* 2021;31(3): 485-7.

11. Zareef RO, Younis NK, Bitar F, Eid AH, Arabi M. Covid-19 in pediatric patients: A focus on CHD patients. *Front Cardiovasc Med* 2020; 7: 612460.
12. Wise J. Covid-19: New coronavirus variant is identified in UK. *BMJ* 2020; 371: m4857.
13. Li C, Luo F, Wu B. A 3-month-old child with COVID-19. 2020; 99(23): e20661.
14. Bahrami R, Neamatzadeh H, Akbarian E. COVID-19 and Renal Complications in Neonates and Pediatrics. *World J Peri Neonatol* 2020; 3(2): 48-9.
15. Piccinelli M. *Psicoterapia e Scienze Umane*. 2020; 54: 481-9.
16. Javaheri A, Noorishadkam M, Mazaheri M, Dadbinpour A, Dastgheib SA, Bahrami R, et al. Current State of Knowledge about Transplacental Transmission of SARS-CoV-2 Infection. *World J Peri Neonatol* 2020; 3(2): 50-5.
17. De Avila C, Toro S, Applegate S, Ugale-Wilson J. focal viral myocarditis in an infant : a challenging diagnosis. [Online], [2020]. Available from: URL: <https://gme.ecu.edu/wp-content/pv-uploads/sites/162/2021/05/C.-De-Avila-Focal-Viral-Myocarditis-in-an-Infant-A-Challenging-Diagnosis.pdf>