



Case Report

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Neonatal Clinical Early-Onset Sepsis and COVID-19: A Case Presentation

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Running Title Clinical Neonatal Sepsis Following Covid-19

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ABSTRACT

After the Ministry of the health of Iran officially announced widespread of COVID-19 on 19 February 2020, our attention focused on novel coronavirus. In our case, a 2-day-old neonate shows symptoms of sepsis. The main presentation was hypothermia and desaturation. The mother was COVID-19 positive with an active cough. The PCR of the neonate was negative. We don't claim that the neonate is affected by COVID-19, but this may be an atypical form of sepsis in neonates with positive mothers following COVID-19.

A 2-day-old female neonate with a gestational age of 40 weeks and a birth weight of 2370 grams was born via the cesarean route from a mother who was a 34-year-old primigravida woman without any history of disease during pregnancy. Two days before delivery, the mother had malaise and dry cough. She was diagnosed as a COVID-19 positive case based on RT-PCR after delivery. On the second day after birth, the parents brought the baby to the emergency room of the children's medical center hospital with complaints of poor feeding, poor sucking and decreased urination. Physical examination revealed the following signs; hypothermia; T=36°C, diminished primitive reflexes, hypotonia, and oxygen desaturation until 85% without respiratory distress that increased to 98% with oxy hood. We admitted and treated her early-onset sepsis and discharged in excellent condition. Early-onset sepsis as defined is a clinical state that is transferred from mother. The presentations in our case maybe a new form of clinical sepsis following a mother with COVID-19. We don't claim that our case is COVID-19 positive but in neonates with affected mother's insidious symptoms should be in concern.

Introduction

Since the winter of 2019, we observed a significant number of admitted neonates with viral pneumonia presentation in our NICU, that most of them were acquired from the community. In most cases, one of the family members was infected. Our attention focused on novel coronavirus when the

Ministry of the health of Iran officially announced widespread of COVID-19 on 19 February 2020. During the first month of widespread, we had suspicious cases of mother and neonates. However, due to the lack of diagnostic test kit and also because of the very low incidence in newborns based on previous reports, we performed no additional tests on the mother or her baby. Gradually neonatal cases born to mothers with COVID-19 are being reported in virtual space in

*** Corresponding Author:****Kayvan Mirnia****Address:** Department of Pediatrics, Division of Neonatology, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran**E-mail:** kayvanmirnia@yahoo.com

Iran, that most of them are not symptomatic, and in few cases, the neonate is COVID-19 positive. In the current case study, we want to introduce a neonate born from a mother COVID-19 positive that was symptomatic as clinical early-onset sepsis. We don't claim that the neonate is affected by COVID-19, but this may be an atypical form of sepsis in neonates with positive mothers following COVID-19.

Case presentation

A2-day-old female neonate with a gestational age of 40 weeks and a birth weight of 2370 grams was born via cesarean route due to CPD (Cephalopelvic disproportion). The baby had no delivery insult, and Apgar scores were 9 and 10 at 1 and 5 minutes, respectively. There were no remarkable physical findings. Therefore, after 24 hours, the doctor discharged mother and baby from the maternity hospital. The mother was a 34-year-old primigravida woman without any history of disease during pregnancy. Two days before delivery, the mother had malaise and dry cough, that she was treated like a common cold. On the second day after birth, the parents brought the baby to the emergency room of the children's medical center hospital with complaints of poor feeding, poor sucking and decreased urination. Physical examination revealed the following signs; hypothermia; T=36 C° diminished primitive reflexes, hypotonia, and oxygen desaturation until 85% without respiratory distress that increased to 98% with oxy hood. In addition, respiratory auscultation was clear and heart sounds were normal. After admittance, the baby became mottled. We admit her as early-onset sepsis in NICU. The day after, the mother came to NICU with dyspnea, frequent dry cough and fever that referred to an adult infectious physician. She was diagnosed as a COVID-19 positive case based on RT-PCR. Due to the possibility of the mother's infection, the baby was isolated from the first days of admission.

Mother's laboratory findings as follow:	
White blood cell, count	10.9×10 ³ /μL
Neutrophils	75%
Lymphocytes	22%
Monocytes	2%
Eosinophils	1%
Hemoglobin:	11.2 g/dl
Platelet count:	309×10 ³ /μL
ESR 1 st hr.57 mm/hr.	F<20
LDH	467 U/L 235-470

C-reactive protein:	3+
Chest CT image was normal	
Neonatal laboratory findings:	
White blood cell, count	13.84×10 ³ /μL
Neutrophils	60.5%
Lymphocytes	25.6%
Monocytes	9.2%
Eosinophils	4.6%
Hemoglobin:	17.5g/dL
Platelet count:	258×10 ³ /μL
C-reactive protein:	38mg/dL
Lactate:	21mg/dl
ABG:	
PH=	7.41
pCo2=	29.7mmHg
pO2=	70mmHg
HCO3=	18.6mmol/L
BE=	-4.0mmol/L
Blood Glucose:	48mg/dl

Electrolytes, BUN and Cr were within normal ranges. Blood Culture was negative. CSF culture was negative. RT-PCR for COVID-19 obtained from the baby was negative. We performed a Chest radiography that shows diffuse infiltrations on both sides of the lung (Fig. 1).

Treatment: We started antibiotics (ampicillin and amikacin) via venous route as early-onset sepsis for ten days. After improving oxygenation, we tapered oxygen. Lab tests became healthy as improving neonatal conditions.

We discharged the baby in an excellent condition with a clinical early-onset sepsis diagnosis.

Discussion

In our case, the mother presented symptoms of illness two days before delivery with a dry cough. If we estimate the incubation period about five days [1], the vertical transmission should be very unusual. However, Chen's small study did not show any evidence of vertical transmission of the virus in the late pregnancy [2] but is yet to be confirmed. As the mother was not diagnosed as COVID-19, the mother nursed her baby without any protections for droplets. Based on the latest Toronto region COVID-19 hospital guideline, if a mother is infected or suspected infection, she should avoid spreading

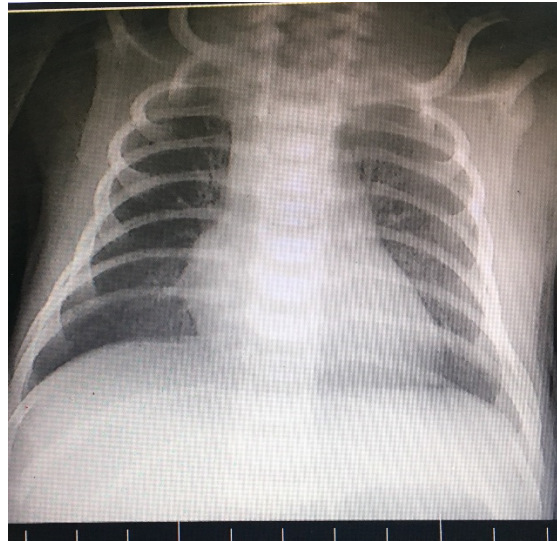


Fig. 1. The neonate's chest radiography shows streaky infiltrations on both sides of the lung.

droplets by wearing a mask and washing her hands. In cases when the mother is not well, breastfeeding is continued by pumping the milk and expressing via bottle [3]. However, there is no evidence about the passage of the virus via breast milk [4]. We conclude that the early symptoms of our baby may be due to unprotected droplets of the mother. The youngest neonate reported in china with COVID-19 was 36 hours old [2]. Nowadays, we have many reports from different hospitals in Iran that newborns are affected in the first few hours of life. In some cases, the neonates are COVID-19 positive too, so we are waiting for their publications. Zhu reported some adverse effects on newborns following the mother's infection that the most common were shortness of breath, fever, tachycardia. RDS was reported in two cases [5]. Qi Lu's findings showed that short breathing and fever were common among neonates whom he reported [6]. In both reports from china, they pointed to short breathing that its definition in adults is not distress syndrome, maybe their intention is oxygen requirement. The neonate of this study presented with poor feeding, hypothermia and oxygen desaturation. Chest X-ray findings in our baby are somehow similar to Zhu's findings. Lab tests showed a mild lymphopenia due to age [7]. Our lab test findings are similar to Yan Chen's report, but CRP is increased in our case [8]. Moreover, blood culture and CSF culture in our baby were negative. Usually, early-onset sepsis due to bacterial infections present with more severe manifestations, especially demonstrates prominent respiratory symptoms that we did not observe in our case. On the other hand, the mother did not have any gynecologic risk factors. RT-PCR can result in a false negative. False negatives

can be due to low test sensitivity or poor sampling. Unfortunately, we didn't have amniotic fluid RT-PCR due to delay diagnosis.

Conclusion

After the widespread COVID-19 pandemic, obstetricians should pay more attention to the mother's signs and symptoms. Early-onset sepsis is defined as a clinical state that is transferred from mother. The presentations in our case maybe a new form of clinical sepsis following a mother with COVID-19. We don't claim that our case is COVID-19 positive but in neonates with affected mother's insidious symptoms should be in concern.

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Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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Authors' contributions

All authors equally contributed in preparing this article.

Conflict of interest

Authors declare that there is no conflict of interest.

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