Neonatal Late Onset Infection with Severe Acute Respiratory Syndrome Coronavirus 2

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Abstract

Objective To date, no information on late-onset infection in newborns to mother with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) contracted in pregnancy are available. This study aimed to evaluate postdischarge SARS-CoV-2 status of newborns to mothers with COVID-19 in pregnancy that, at birth, were negative to SARS-CoV-2.

Study Design This is an observational study of neonates born to mothers with coronavirus disease 2019 (COVID-19).

Results Seven pregnant women with documented SARS-CoV-2 infection have been evaluated in our institution. One woman had a spontaneous abortion at 8 weeks of gestational age, four women recovered and are still in follow-up, and two women delivered. Two newborns were enrolled in the study. At birth and 3 days of life, newborns were negative to SARS-CoV-2. At 2-week follow-up, one newborn tested positive although asymptomatic.

Conclusion Our findings highlight the importance of follow-up of newborns to mothers with COVID-19 in pregnancy, since they remain at risk of contracting the infection in the early period of life and long-term consequences are still unknown.

Keywords

- SARS-CoV-2
- newborn
- COVID-19
- pregnancy

Key Points

- Newborns to mothers with coronavirus disease 2019 (COVID-19) in pregnancy can acquire the infection later after birth.
- Newborns to mothers with COVID-19 in pregnancy need a long-term follow-up, even if they tested negative at birth.
- Specific guidelines for the long-term follow-up of newborns to mothers with COVID-19 in pregnancy are needed.

Since its first description, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread worldwide with over 2 million cases reported and thousands of deaths. Every human is susceptible to the infection, and pregnant

women are not spared. Although reports documented COVID-19 infections among pregnant women^{1,2} and described the neonatal outcome relatively to early days of life,³ to date, no information on late-onset infection in newborns to mother with SARS-CoV-2 contracted in pregnancy are available.

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Table 1 Main clinical and epidemiological data of newborns evaluated and their families		
Variable	Newborn 1	Newborn 2
Mother status	SARS-CoV-2 positive	SARS-CoV-2 positive
Timing of maternal Infection	Third trimester	Third trimester
Type of delivery	Cesarean section	Cesarean section
Gestational age at delivery	38 ^{3/7} weeks	35 ^{5/7} weeks
Birth weight	3,390 g	2,300 g
In-hospital care	Mother/newborn separation	Mother/newborn separation
In-hospital feeding	Formula	Formula
Day of life when discharged	5	13
Newborn status at discharge	SARS-CoV-2 negative blood IgG slightly positive	SARS-CoV-2 negative
Mother status when discharged home	COVID-19 positive	COVID-19 negative
Father status when newborn discharged home	COVID-19 negative	COVID-19 negative
Place where the newborn and mother were discharged	Same household	Same household
Household setting	Newborn 1 Mother (COVID-19 positive) Father (COVID-19 negative) Three brothers (not tested, asymptomatic)	Newborn 2 Mother (COVID-19 negative) Father (COVID-19 negative) One sister (not tested, asymptomatic)
Advice given to parents on discharge	Express breast milk to stimulate lactation Avoid breastfeeding and breast milk at home Father feeds the newborn with formula milk Mother maintain a distance of at least 6 feet for as much of the time as possible Hygiene suggestions	Express breast milk Father feeds the newborn with expressed milk Hygiene suggestions
Feeding practice at home	Breastfeeding with the mother wearing a mask	Father feeding the newborn with expressed breast milk
Other parents with COVID-19 not living in the same household	None	Grandfather COVID-19 positive Grandmother COVID-19 positive
Newborn outcome	SARS-CoV-2 positive at 15 days of life Clinically well	SARS-CoV-2 negative at 18 days of life Clinically well

Abbreviations: COVID-19, coronavirus 2019; RT-PCR, real time-polymerase chain reaction; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

Notes: Newborn 1 was born at term and when discharged the mother was still positive.

Since the mother has three other children at home, she asked to be discharged at home respecting hygiene measures and wearing a mask, as well as the other indications given on discharge.

At home, she decided to breastfeed the newborn, which eventually turned SARS-CoV-2 positive on day 15 of life, although asymptomatic.

Newborn 2 was born late-preterm and when discharged the mother was negative, as well the father, which was responsible to feed the newborn with expressed milk.

Newborn 2 was born at 35^{5/7} weeks of gestational age, birth weight 2,300 g, and Apgar's scores was 8 to 9. He was immediately quarantined in the neonatal unit. RT-PCR tests on nasopharyngeal swabs on day 1 and 5 of life turned negative. At 18-day follow-up, the newborn was in good clinical conditions, birth weight was 2,800 g with normal clinical examination. The father fed him at home with expressed milk. The newborn nasopharyngeal and rectal swabs were negative.

Discussion

We demonstrated SARS-CoV-2 late-onset neonatal infection in a newborn to mother with confirmed COVID-19 in pregnancy.

The vertical infection was excluded by microbiological tests on the placenta, amniotic fluid, and two tests on the newborn.

Since evidences are still insufficient regarding the optimal perinatal care and no definitive guidelines are issued,⁵ risks/benefits analyses must be shared with the family—discussing the choice of delivery, the impact and need of mother/newborn separation, the benefits of breastfeeding and its role in protecting newborns from infection, and factors influencing the postnatal risk of infection after discharge.⁶ In case 1, the mother opted for breastfeeding. Since milk samples tested negative, respiratory secretions were the probable source of late-onset neonatal infection. However, the newborn was asymptomatic. We can speculate that the maternal immunoglobulin G (documented at birth

in the neonatal blood) and breastmilk antibodies may have protected the newborn from a symptomatic infection, preserving the benefits of breastfeeding. The previous description of a 17-day-old newborn with COVID-19 pneumonia who contracted the infection via contact with his parents, who developed fever and cough after the newborn birth, would support our hypothesis that maternal antibodies might have protected our patient.⁷

Our report highlights the need of newborn follow-up even after the exclusion of vertical or early-onset neonatal infection with SARS-CoV-2, as happens with other viral infections acquired during pregnancy. To date, we do not know the long-term effects of SARS-CoV-2 infection acquired in the neonatal period. Our protocol include follow-up on day 15 and months 1, 3, 6, 9, and 12 of life. During each visit, the child undergoes clinical evaluation and nasopharyngeal/rectal swabs, cerebral ultrasound is performed at months 1 to 6 (until the fontanel allows it), and visual and hearing tests are performed at months 6 to 12.

Recently, Zeng et al³ reported a series of 33 newborns to mother with COVID-19, three of them being diagnosed with early-onset SARS-CoV-2 infection. Consistent with previous studies,³ the outcomes were good. However, these studies do not provide follow-up of these newborns.

Conclusion

Our findings highlight the importance of follow-up of newborns to mothers with COVID-19 in pregnancy, since they remain at risk of contracting the infection in the early period of life and long-term consequences are still unknown.

Conflict of Interest

None declared.

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