

Clinical Characteristics and Outcomes of COVID-19 in Newborn and Infants

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Abstract

Objective: To describe the clinical and outcome of neonates born from women infected with COVID-19 while pregnant.

Design : Our study was observational cohort study

Material and Methods: We identified all neonates born between April - October 2020 at RSUP H. Adam Malik Medan from mothers who tested positive for COVID-19 during childbirth.

Result: From 122 deliveries mothers with suspected COVID-19, 43 (35.2%) mothers tested positive for COVID-19. All neonates were examined in the first 24 hours of life, and there were 5 (11.6%) neonates identified as positive for COVID-19. 2 (40%) neonates had symptoms of shortness of breath, and 1 (20%) had symptoms of fever. 2 (40%) neonates died.

Conclusion: Given the lack of current research, vertical transmission cannot be confirmed or refuted. The existing literature does not support the prohibition of breastfeeding or the separation of mothers and newborns. Further evidence is needed to establish definite guidelines and recommendations.

Keywords: neonates, COVID-19, pregnant women

Background

Six coronavirus species are known causing illness in humans so far, four of which (229E, OC43, NL63, and HKU1) usually cause flu symptoms in immunocompetent people;¹ two remaining (Severe acute respiratory syndrome coronavirus- SARS-CoV and Middle East respiratory syndrome coronavirus- MERS-CoV) is the zoonotic origin and identified as the causative agent for severe respiratory disease outbreaks.² In December 2019, in Hubei Province, China discovered a new previously unknown coronavirus, originally named 2019-nCoV: this agent is a member of the seventh family of coronaviridae that can potentially infect humans.³ Since its emergence in Wuhan, the 2019-nCoV infection has rapidly spread throughout China and around the world. This highly contagious and deadly virus was later named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)⁴ and related diseases “Coronavirus Disease 2019” (COVID-19).⁵

All age groups are susceptible to infection, but people with comorbidities or the elderly are more at risk of developing severe disease. Although children have less severe clinical symptoms when infected, the potential harm of this disease remains largely unknown in neonates, especially in premature infants.⁶ In the most extensive pediatric population-based study to date with 2143 cases, more than 90% of patients were asymptomatic to moderate. However, the proportion of severe and critical cases was 10.6% under 1 year of age, indicating that infants may be at higher risk of severe respiratory failure than previously thought.⁷ Respiratory viruses rarely cause intrauterine-to-fetal transmission of infection; therefore, intrauterine transmission of SARS-CoV-2 is thought to be low. Two case reports describing the isolation of SARS-CoV-2 from amniotic fluid⁸ and placental tissue⁶ and isolation of SARS-CoV-2 from the nasopharynx of two neonates within the first 48 hours of life suggest the possibility of congenital infection; however, the rate of congenital infection in neonates born to SARS-CoV-2 positive mothers is still unknown. The risk of perinatal transmission, especially while breastfeeding, and the risk of neonates getting COVID-19 during the perinatal period, are also unknown.^{9,10}

Method

Our study was conducted at Perinatology division H. Adam Malik Medan Hospital in April 2020 – October 2020 after ethical approval was obtained from the ethics committee of the Universitas Sumatera Utara, Medan

– North Sumatera. This is a cohort observational study in mothers who tested positive for COVID-19 from nasopharyngeal swab samples at delivery and in mothers suspected/suspected of COVID-19 during childbirth by carrying out universal screening using anti-COVID-19 Ig M and Ig G rapid tests. SARS-CoV-2 testing was performed using real-time PCR (RT-PCR) on mothers and neonates on nasopharyngeal swab samples at the first 12-24 hours of life and day 2. This time point was chosen to provide an opportunity for repeated testing and treatment. neonatal routine. The data used in this study were collected from patient's medical records at birth. Data collected included demographics, neonatal, and maternal clinical presentation at delivery, hospitalization, and microbiological results (SARS-CoV-2 rtPCR testing). Neonates were assessed at all time points for fever, hypothermia, respiratory distress, lethargy, cough, rhinorrhea, irritation, rash, diarrhea, and feeding intolerance. Mothers were assessed at each visit for symptoms such as fever, cough, anosmia, age, shortness of breath, sore throat, rhinorrhea, myalgia, vomiting, and diarrhea.

Statistical analysis

We did a descriptive analysis with results presented as proportions for categorical variables.

Result

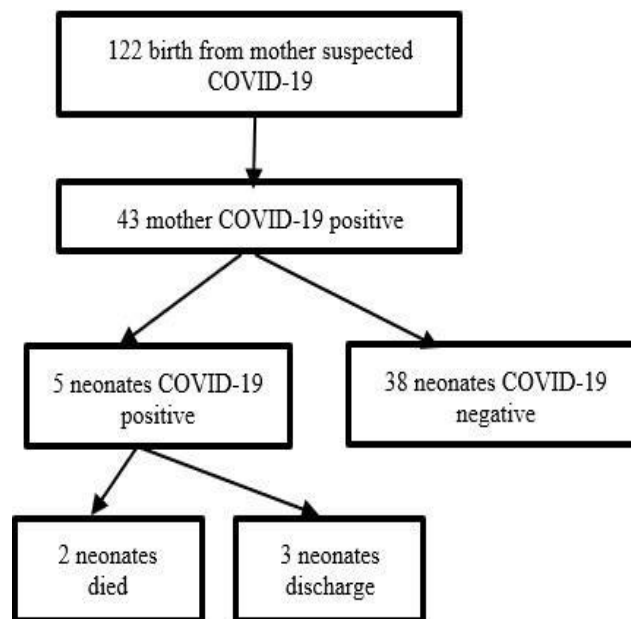


Fig. 1 Study profile

Figure 1 shows the study profile. Between April - October 2020, there were 122 deliveries with mothers with suspected COVID-19, with 43 (35.2%) mothers testing positive for COVID-19 based **on nasopharyngeal**

swabs. From 5 (11.6%) of 43 neonates positive for COVID-19 based on nasopharyngeal swab results. From 5 neonatus, 3 (60%) female, 4 (80%) preterm birth, 1 (20%) aterm birth. Shortness of breath were found in 2 (40%) neonates and fever in 1 (20%) neonates. 4 (80%) neonates were treated in the isolation room of the neonatal intensive care unit (NICU) using a ventilator. 2 (40%) neonates died. All babies were cared separately from the mother and given formula milk as a diet. (Tabel 1)

Tabel 1. Neonates Characteristic

Neonates Characteristic	n(%)
Cases	5
Gender	
Female	2 (40%)
Male	3 (60%)
Gestation age	
< 37 weeks	4 (80%)
≥ 37 weeks	1 (20%)
Birth weight	
< 1.000 grams	0
1.000 - 1.499 grams	3 (60%)
1.500 - 2.499 grams	1 (20%)
> 2.500 grams	1 (20%)
Symptom	
Fever	1 (20%)
Respiratory distress	2 (40%)
Asymptomatic	2 (40%)
Complication	
Yes	3 (60%)
No	2 (40%)
Treatment	
Oxygen + antibiotics	1 (20%)
Ventilator + antibiotics	4 (80%)
IT ratio	
≤ 0,2	4 (80%)
> 0,2	1 (20%)
CRP	
< 0,7 mg/dL	4 (80%)
> 0,7 mg/dL	1 (20%)
Outcome	
Died	2 (40%)
Discharge	3 (60%)

In mothers, 3 (60%) of 5 mothers who had children with a positive COVID-19 test had never had symptoms, and 2 (40%) were symptomatic. 2 mothers reported had symptoms, 1 (50%) with cough, and another 1 (50%) with fever with onset in 7 days before delivery. (Table 2)

Tabel 2. Mother Characteristic

Mother Characteristic	n(%)
Cases	5
Symptom	
Fever	1 (20%)
Cough	1 (20%)
Asymptomatic	3 (60%)
Complication	
Yes	3 (60%)
No	2 (40%)
Outcome	
Died	2 (40%)
Discharge	3 (60%)

Discussion

There is little data on the impact of the current COVID-19 outbreak on women during pregnancy, newborns, and child populations. There is still no evidence to support the vertical transmission of COVID-19. Only 6 studies reported positive newborns for COVID-19 (confirmed within 36 hours-17 days after birth) and found only 13 positive newborns out of 222 mothers exposed to SARS-CoV-2.¹¹⁻¹⁶ From the two case reports^{12,17} and two case series reports^{16,18} reported the newborn tested positive at 36 hours, 8 days, 2 and 4 days after birth. Few of the newborns positive for COVID-19 regardless of the use of precautions were reported during

and after delivery,^{11,12,16,17} but even in these cases there was no evidence to support vertical transmission. The clinical features of COVID-19 in neonates may not be specific. Neonates with COVID-19 can also develop, causing multiple organ damage and rapid disease changes. Although laboratory data on neonates infected with COVID-19 is still limited, several case reports provide some laboratory findings. Laboratory test results showed a change in liver function tests. Lymphocyte count, platelet count, liver function tests, procalcitonin, and serum IgM levels all increased slightly. Other laboratory tests including CRP, ESR, coagulation tests, hemoglobin, D-dimer and kidney function tests did not show any abnormalities. Although all the cases described were asymptomatic or with mild clinical manifestations, their laboratory results differed and conflicted. For example, the lymphocyte count varies from lymphopenia to lymphocytosis and normal CRP in neonates.^{18,19} In this study, non-specific results were also obtained in neonates who were confirmed COVID-19 based on both clinical and laboratory symptoms.

The Chinese Expert Consensus on the Perinatal and Neonatal Management for the Prevention and Control of the 2019 Novel Coronavirus Infection has recommended that symptomatic pregnant women be isolated in an intensive care unit (or critical care unit) in a negative pressure room, with oxygen supplementation and a lateral decubitus position, regardless of respiratory system status. Also, vaginal delivery should be protected, according to obstetric indications and women's preferences.²⁰ Similarly, WHO recommends that a cesarean section be performed only if medically justified, based on gestational age, the severity of the mother's condition, and the fetus's survival and well-being.²¹

Determining whether to separate a mother from known or suspected COVID-19 and her baby must be done only by case based on a joint decision between the mother and the medical team. The Royal College of Obstetricians & Gynecologists does not recommend routine separation of mother and infant with suspected or known COVID-19.^{22,23} There is no COVID-19 infection in the newborn from positive mothers, whether no attachment and breastfeeding were restricted, and the implementation of strict precautions and support from the health system. However, very different guidelines exist today with consistent evidence lacking.²⁴

Our study provides additional evidence regarding newborn care that can contribute to developing guidelines and recommendations. According to current evidence, it appears that skin-to-skin contact and breastfeeding can be recommended, but it is imperative to have screened the pregnant women, implement prevention and control measures, and monitor newborns who are at risk of contracting COVID-19. Substantial evidence is needed to develop discharge instructions for newborns born from mothers with COVID-19 or newborns with COVID-19 alone in terms of vaccines, and postnatal follow-up, especially for newborns with conditions at risk of being extremely preterm.

Until now, evidence of mother-to-child transmission is inconsistent, base on lacking research on COVID-19 and pregnant women. The current literature does not support recommendations to prohibit breastfeeding based on a lack of evidence regarding the virus's presence in breast milk. Likewise, there is insufficient evidence to recommend the separation of mother and baby. It is imperative to screen pregnant women for controlling and prevent infection and carry out close monitoring of neonates at risk of COVID-19.

Our study only describes the characteristics of mothers who are suspected or confirm having COVID-19. The characteristics of neonates born from mothers with COVID-19 positive from nasopharyngeal swab results can be used as an overview for handling the next neonate with COVID-19.

Conclusion

Given the lack of current studies, vertical transmission cannot be confirmed or refuted. The existing literature does not support abstinence from breastfeeding or the separation of mothers and newborns. Although we still don't know how massive SARS-CoV-2 will spread around the world and affect populations around the world; due to the limited number of cases and clinical evidence, pediatricians should keep their knowledge up-to-date and be aware of the risks, particularly in the high-risk population of newborns and preterm infants. Additionally, perinatal transmission of COVID-19 is unlikely if proper hygiene precautions are taken.

Acknowledgements

I would like to dedicate my gratitude to all the lecturers of Department of Child Health, Faculty of Medicine Universitas Sumatera Utara, my family, and my friends for their endless support.

Conflicts of interest

The author declares that there is no conflicts of interest.

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