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Coronavirus (COVID-19) Infection in Newborns

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Abstract

Background

The COVID-19 infection, which has been a pandemic since early 2020, can occur in pregnant women and transmit to the baby after birth. There are few reports of this transmission in newborns. Regarding the effect of multiple causes of respiratory symptoms in a neonate, it is difficult to diagnose COVID-19 infection in the newborn. In this regard, the evaluation of antibodies in the blood umbilical cord may be an option. We studied the COVID-19 infection in newborns.

Materials and Methods

In this longitudinal follow-up study, pregnant mothers who had suspicious symptoms of coronavirus infection before or after childbirth were consulted by the medical team for neonatal infection. Newborns were evaluated for respiratory symptoms. PCR test for coronavirus was performed on a pharyngeal swab or tracheal tube sample of the newborns.

Results

Twenty-five pregnant women with symptoms of suspicious coronavirus infections were consulted by a team of specialists from March 15 to April 15, 2020. After delivery, their babies were carefully examined and followed up. Four neonates had coronavirus confirmed by the PCR test.

Conclusion

Our study shows that neonates can become infected with Covid-19. This issue should be considered among various differential diagnoses of neonatal respiratory diseases.

Key Words: COVID-19, Neonate, Pregnancy.

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1- INTRODUCTION

The COVID-19 infection is a pandemic caused by Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-2), which was first an epidemic in China in 2019 and then became a pandemic in 2020 (1). The disease has caused considerable financial and human losses (2). The most common symptoms at the onset of the COVID-19 illness are fever, cough, headache, sore throat, and difficulty breathing. Some asymptomatic carriers may transmit the virus to others for 21 days. Molecular methods are preferred for diagnostic purposes whereas serological tests do not help in epidemics (1).

Pregnant women and neonates can be infected by the COVID-19 virus. It is commonly mild and asymptomatic in children (3), although the severe forms of the disease have also been reported. Therefore, pregnant women should be screened for coronavirus, especially those with symptoms or having suspected contacts with COVID-19 patients (4). COVID-19 has not been detected in umbilical cord blood (5). The study of 38 pregnant women with COVID-19 did not show any intrauterine or transplacental transmission (6). An increase in immunoglobulin M (IgM) level in blood was reported in neonates (7).

However, the question remains whether the virus can be vertically transmitted from the mother to the fetus (2). For the first time in China, four full-term infants were born from pregnant women with COVID-19 infection. Three of them were born by cesarean section. Three of them were tested for COVID-19 and none was positive. None of them showed severe respiratory symptoms and thus were discharged with good conditions (2). The Centers for Disease Control believes that the neonates of mothers suspected of COVID-19 are not infected (8), but the baby may be infected after birth. COVID-19 infection is contagious and can be a serious disease. So far, many cases have been reported in adults and children, but there are few reports in pregnant women and their babies. This study aims to evaluate the COVID-19 infection in newborns.

2- MATERIALS AND METHODS

2-1. Method

In this longitudinal follow-up study, mothers who were referred to maternity centers for labor and had symptoms of fever, cough, and respiratory problems or history of contact with COVID-19 infection were tested for the coronavirus with pharyngeal swabs. A team of subspecialists in pediatric infectious diseases, neonatologists, and gynecologists was asked for a consultation about maternity hospitals for newborns with coronavirus disease. After consulting the team, the newborns of pregnant women delivered from March 15 to April 15, 2020, who were suspected of having coronavirus, were carefully examined and followed up for respiratory symptoms. If the baby had breathing difficulty, it was requested for tachypnea or respiratory distress, chest radiography, complete blood count (CBC), C-reactive protein (CRP) level, and pulse oximetry. Coronavirus test (RT-PCR) was performed for newborns suspected to have the infection.

2-2. Ethical considerations

Conscious consent was obtained from the parents of our cases. We informed them about publishing the information of their neonates. The Research Ethics Committee of Mashhad University of Medical Sciences approved the study protocol (ID-code: 99/66384).

3- RESULTS

In this cross-sectional study, of 25 women, 20 cases had coronavirus infection (**Table.1**), which was proved with RT-

PCR. The other five were suspicious of corona but had a negative coronavirus test (RT-PCR). Nineteen pregnant women had a cesarean section for various reasons and 6 mothers had a normal delivery (**Table.2**). Neonates were 10 preterm, 12 terms, and 3 post-term (**Table.3**). From 25 neonates of pregnant women who were consulted by our specialist team, 18 neonates (72%) had respiratory symptoms on days 1, 2, 3, or 4 following the birth (**Table.4**). Ten neonates had abnormal chest X-ray. Most neonates (n=18) had PO2 < 90% and positive CRP. Coronavirus test (RT-PCR) was performed on pharyngeal swabs or tracheal tube samples of these infants and was positive in only 4 neonates. One positive baby, who weighed only 900 grams, died 12 days after birth. Another COVID-19 positive baby with meconium aspiration died on day 4 of life. Fifteen neonates had breast milk feeding with the medical team consultation.

Table-1: Frequency distribution of women on suspicious coronavirus infection.

RT-PCR	Number	Percent
Positive	20	80
Negative	5	20

RT-PCR: Reverse transcription polymerase chain reaction.

Table-2: Frequency distribution of pregnant women on type of delivery.

Type delivery	Number	Percent
Cesarian section	19	76
Vaginal	6	24

Table-3: Frequency distribution of newborns on gestational age and mean weight.

Gestational Age	Number	Percent	Weight/gram
<37 weeks	10	40	1.560
37-40weeks	12	48	3.100
>40 weeks	3	12	3.900

Table-4: Frequency distribution of newborns on respiratory and Laboratory symptoms.

Symptoms	Number	Percent
Tachypnea/Distress	18	72
PO2<90%	18	72
RT-PCR Positive	4	16

PO2: Partial Pressure of Oxygen; RT-PCR: Reverse transcription polymerase chain reaction.

4- DISCUSSION

Coronavirus does not appear to be transmitted through the placenta, but it can be transmitted through contacts with maternal secretions during normal delivery. It is rarely transmitted by breast milk feeding or from hospital staff who have been in contact with the baby. The method of delivery does not appear to affect viral transmission although the

cesarean section is recommended for mothers who have positive coronavirus test results (9). In a study in the USA, of 149,760 tests performed, 2,572 (1.7%) were in children < 18 years old. Ten percent had a travel history and 90% had household or community exposure (10). Children of all ages can be affected by the virus (11). Most babies had mild to moderate form of the disease and recovered within 2 weeks. Less than 5% of them had severe disease (11-14). Infants who were less than 1-year-old and immune-compromised are prone to suffer from a severe disease (10). The causative agent may be isolated from the upper respiratory tract of children with asymptomatic pharyngitis (15).

Other respiratory pathogens such as influenza, mycoplasma, and respiratory syncytial virus (RSV) may be detected in the nasopharynx of children along with the Covid-19 infection (16). In our study, all pregnant women recovered after appropriate treatment and care. There was not any death due to coronavirus disease during a study in pregnant women. Mothers who were positive for the coronavirus can continue to directly breastfeed their babies with precautions whilst wearing a mask. Otherwise, they can feed their babies with indirect milking for at least two weeks.

5- CONCLUSION

COVID-19 disease in the neonate is an obvious fact that should be considered in the differential diagnosis of neonatal respiratory distress syndrome.

6- CONFLICT OF INTEREST: None.

7- REFERENCES

1. Rodriguez-Morales A, Bonilla-Aldana DK, Tiwari R, Sah R, Rabaan AA, Dhama K. COVID-19, an Emerging Coronavirus Infection: Current Scenario and Recent Developments-An Overview. Journal of Pure and Applied Microbiology. 2020;14:6150.

2. Chen Y, Peng H, Wang L, Zhao Y, Zeng L, Gao H, et al. Infants born to mothers with a new coronavirus (COVID-19). Frontiers in Pediatrics. 2020;8:104.

3. Dong Y, Mo X, Hu Y, Qi X, Jiang F, Jiang Z, et al. Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. Pediatrics. 2020. Pediatrics. 2020; doi: 10.1542/peds.2020-0702.

4. Sutton D, Fuchs K, D'Alton M, Goffman D. Universal Screening for SARS-CoV-2 in Women Admitted for Delivery. New England Journal of Medicine. 2020; 382(22):2163-64. doi: 10.1056/NEJMc2009316.

5. Wang W, Xu Y, Gao R, Lu R, Han K, Wu G, et al. Detection of SARS-CoV-2 in different types of clinical specimens. JAMA. 2020;323(18):1843-44. doi:10.1001/jama.2020.3786.

6. Schwartz DA. An analysis of 38 pregnant women with COVID-19, their newborn infants, and maternal-fetal transmission of SARS-CoV-2: maternal coronavirus infections and pregnancy outcomes. Archives of Pathology & Laboratory Medicine. 2020. DOI: 10.5858/arpa.2020-0901-SA.

7. Zeng H, Xu C, Fan J, Tang Y, Deng Q, Zhang W, et al. Antibodies in infants born to mothers with COVID-19 pneumonia. JAMA. 2020. 323(18):1848-49. doi: 10.1001/jama.2020.4861.

8. Control CfD, Prevention. Interim considerations for infection prevention and control of coronavirus Disease 2019 (COVID-19) in inpatient obstetric healthcare settings. Acessado em. 2020;18(02).

9. Boelig RC, Manuck T, Oliver EA, Di Mascio D, Saccone G, Bellussi F, et al. Labor and Delivery Guidance for COVID-19. American Journal of Obstetrics & Gynecology MFM, 25 Mar 2020, 2(2):100110. DOI: 10.1016/j.ajogmf.2020.100110

10. Bialek S, Gierke R, Hughes M, McNamara LA, Pilishvili T, Skoff T.

Coronavirus Disease 2019 in Children-United States, February 12–April 2, 2020. 69(14):422-26.

doi: 10.15585/mmwr.mm6914e4.

11. Wei M, Yuan J, Liu Y, Fu T, Yu X, Zhang Z-J. Novel coronavirus infection in hospitalized infants under 1 year of age in China. JAMA. 2020;323(13):1313-1314. doi:10.1001/jama.2020.2131.

12. Qiu H, Wu J, Hong L, Luo Y, Song Q, Chen D. Clinical and epidemiological features of 36 children with coronavirus disease 2019 (COVID-19) in Zhejiang, China: an observational cohort study. The Lancet Infectious Diseases. 2020. doi:https://doi.org/10.1016/S1473-3099(20). 30198-5.

13. Cao Q, Chen Y-C, Chen C-L, Chiu C-H. SARS-CoV-2 infection in children: Transmission dynamics and clinical characteristics. Journal of the Formosan Medical Association. 2020;119(3):670.

14. Liu W, Zhang Q, Chen J, Xiang R, Song H, Shu S, et al. Detection of Covid-19 in children in early January 2020 in Wuhan, China. New England Journal of Medicine. 2020;382(14):1370-71.

15. Lu D, Wang H, Yu R, Yang H, Zhao Y. Integrated infection control strategy to minimize nosocomial infection of coronavirus disease 2019 among ENT healthcare workers. Journal of Hospital Infection. 2020; 104(4):454-55.

16. Pongpirul W, Mott J, Woodring J, Uyeki T, MacArthur J, Vachiraphan A, et al. Clinical Characteristics of Patients Hospitalized with Coronavirus Disease, Thailand. Emerging Infectious Diseases. 2020; 26(7). doi: 10.3201/eid2607.200598.