



A STUDY OF NEONATAL OUTCOMES IN BABIES BORN TO COVID-19 POSITIVE MOTHERS

Neonatology

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ABSTRACT

MATERIAL & METHOD: This retrospective study was conducted during the period of June-August 2020 for 3months in newborns born to COVID-19 positive mothers at YMCH after obtaining ethical clearance. All newborns born to mothers with COVID-19 positive status during any trimester of pregnancy, irrespective of neonatal COVID-19 RT-PCR test, and delivered at YMCH during the study period were included. Relevant history and complete systemic examination findings of the neonate were noted down from the case records and laboratory results of RT-PCR test on nasopharyngeal and throat swab if done was noted down which was done at 24-48hours of birth. **RESULT:** Total of 25 newborns born to COVID-19 positive mothers were included in the study. Among the neonates born, 64% were female and 36% were male. 76% of the pregnant mothers were asymptomatic at the time of detection of COVID-19 infection. The neonatal outcome found to have only 1 newborn with positive COVID-19 infection compared to 24 healthy newborns. **CONCLUSION:** Significant measures for preventing neonatal SARS-CoV-2 infection are to prevent maternal illness and to decrease the potential of neonatal viral exposure.

KEYWORDS

Coronavirus, COVID-19, Neonates, SARS-CoV-2

INTRODUCTION:

Novel coronavirus infection is a disease caused by severe acute respiratory syndrome coronavirus2 and named as coronavirus-2019. COVID-19 infection in neonatal period is uncommon. If present, it can mostly be acquired through postnatal transmission, rather than vertical transmission.

It is unclear whether mother to infant vertical transmission is possible, and thus there is no evidence for the prevention and control of neonatal infections. Not only it is a public health issue, it also represents an obstetrical management issue in determining the care for pregnant mother. Neonates born with COVID-19 infection are usually asymptomatic or has mild respiratory symptoms. It can be because of relative Angiotensin Converting Enzyme-2(ACE) protein immaturity, which acts as a receptor for COVID-19 infection. Fetal hemoglobin can also be a protective factor.

With the present pandemic outbreak, there is an urgent need to examine specific questions, such as whether COVID-19 positive mothers can vertically transfer the disease to the fetus, clinical features, and management of neonates born to those mothers. The incidence of coronavirus has rapidly increased around the world. With the increase in the cases, number of pregnant mothers, neonates and children with COVID-19 infection are also increasing.

This study aimed to determine the outcomes in newborns born to COVID-19 positive mothers.

MATERIAL & METHOD:

This retrospective study was conducted during the period of June-August 2020 for 3months in newborns born to COVID-19 positive mothers at YMCH after obtaining ethical clearance. All newborns born to mothers with COVID-19 positive status during any trimester of pregnancy, irrespective of neonatal COVID-19 RT-PCR test, and delivered at YMCH during the study period were included. Newborns born in outside hospital and COVID-19 negative mothers and who refused to give consent during follow-up were excluded.

Relevant maternal history regarding COVID exposure and diagnosis were noted. Mode of delivery, birth asphyxia and any other relevant history were recorded. Relevant history and complete systemic examination findings of the neonate were noted down from the case records. Relevant laboratory findings and results of RT-PCR test on

nasopharyngeal and throat swab if done was noted down which was done at 24-48hours of birth after the consent from parents, according to the institutional protocol. Neonatal outcome was measured according to the development of clinical picture, i.e., symptomatic or asymptomatic along with COVID-19 test results. If symptomatic, classified as mild, moderate or severe. And any morbidity or mortality were noted down. All the babies were followed up through phone call to know about any further health issues after discharge.

Result: Total of 25 newborns born to COVID-19 positive mothers were included in the present study. Among the neonates born, 64% were female child and 36% were male child, with female predominance.

37-40 weeks of gestational age was seen in 76% of pregnancy. Majority of delivery documented were term pregnancy with normal vaginal delivery, followed by emergency LSCS, elective LSCS and 1 vacuum assisted delivery. Majority of the newborn were fed by expressed milk and direct breast feeding; only 2 newborns were put on formula feed. 76% of the pregnant mothers were asymptomatic at the time of detection of COVID-19 infection.(Table1)

Table 1: Table showing the demographic details of pregnant mothers

Table 1: Table showing the demographic details of pregnant mothers		Frequency	Percent
Gender of newborn	Male	9	36.0
	Female	16	64.0
Gestational age	Preterm	3	12.0
	Term	22	88.0
Whether baby was isolated from the mother?	Yes	14	56.0
	No	11	44.0
How was the baby fed?	Direct breast feeding	11	44.0
	Expressed milk	12	48.0
	Formula feeds	2	8.0
How is the baby fed at home?	Direct breast feeding	23	92.0
	Mixed feed	2	8.0
Mode of delivery	NVD	9	36.0
	Elective LSCS	7	28.0
	Emergency LSCS	8	32.0
	Vacuum assisted	1	4.0

Meconium stained liquor	Yes	1	4.0
	No	24	96.0
Gestational age by dates	34-37weeks	4	16.0
	37-40weeks	19	76.0
	>40weeks	2	8.0
Gestational age by ballards	34-37weeks	3	12.0
	37-40weeks	22	88.0
CBC	Normal	22	88.0
	Polycythemia	1	4.0
	TC raise	2	8.0
When was mother RTPCR positive	Before delivery	10	40.0
	After delivery	15	60.0
Was mother symptomatic	Asymptomatic	19	76.0
	Mild	5	20.0
	Moderate	1	4.0
Was mother exposed	Yes	2	8.0
	No	23	92.0

Table 2: Showing the details of newborn

		Frequency	Percent
Baby had any symptoms	Breathing difficulty	2	8.0
	Breathing difficulty, IUGR	1	4.0
	No	22	88.0
Birth weight	AGA	21	84.0
	SGA	1	4.0
	LGA	3	12.0
Apgar score at 1minute	5	1	4.0
	8	24	96.0
Apgar score at 5minute	8	1	4.0
	9	24	96.0
Baby cried soon after birth	Yes	24	96.0
	No	1	4.0
Length	Appropriate	24	96.0
	Not appropriate	1	4.0
Head circumference	Microcephaly	1	4.0
	Normal	24	96.0
Systemic examination	Normal	22	88.0
	Breathing Difficulty	1	4.0
	Retractions, ESM	1	4.0
Serum bilirubin	Normal	21	84.0
	Hyperbilirubinemia	4	16.0
TSH in baby	Normal	24	96.0
	Hypothyroidism	1	4.0

Table 3: Showing the outcome in newborn.

		Frequency	Percent
COVID RTPCR status of the baby	Positive	1	4.0
	Negative	16	64.0
	Not done	8	32.0
Neonatal outcome	Positive	1	4.0
	Negative	16	64.0
	Unknown	8	32.0

The neonatal outcome found to have only 1 newborn with positive COVID-19 infection compared to 24 healthy newborns. Antibody against SARS-CoV-2 was negative (0.087) in the same. Hyperbilirubinemia was found in 4 newborns and 1 had hypothyroidism. Majority had appropriate growth and physical parameters were within normal limits. (Table 2,3)

DISCUSSION:

Children appear to be less prone to SARS-CoV-2 infection, and when COVID-19 develops in children, it appears to be milder than in adult patients. It has been proposed that children are less susceptible because (1) immaturity of ACE-2, or (2) they don't generate a robust inflammatory response, which is thought to be responsible for the lung injury during COVID-19[3]. Because newborns lack antibodies against other corona viruses, they may be more susceptible to SARS-CoV-2 infection.

In present study, among 25 newborns born to COVID-19 positive mothers, only 1 was found to be positive for COVID-19 tested by RTPCR. None of the other showed any evidence of the disease. Similar to present study, Liu W et al., documented zero infectivity rate among infants born to COVID-19 positive mothers. Intrauterine vertical transmission, maternal blood and amniotic fluid contact during delivery, and postnatal infection, particularly while breastfeeding, are all examples of mother-infant transmission. Only intrauterine vertical transmission is referred to be mother to infant transmission on a narrow range. Liu W et al., used SARS CoV-2 nucleic acid detection in breast milk, cord blood, amniotic fluid, neonatal throat swab, faeces, and urine samples of infants to determine whether or not there is intrauterine vertical transmission. Because all of the test samples were negative, the findings of this investigation did not indicate intrauterine vertical transmission. Their findings are congruent with another series published in which no newborns were reported to be SARS-CoV-2 positive. Several case reports of neonates born to COVID-19 mothers support our findings. Neonate born to 33 weeks gestation mother who was tested positive for SARS COVID-2, RT-PCR of nasopharyngeal swab done at 16 and 48 hours of life was positive. Serology done soon after birth for IgM and IgG titres were however negative. Neonate born to infected mother showed elevated IgM antibody and abnormal cytokine test at 2 hours of life, which shows there is a chance of vertical transmission from infected mother to fetus. IgG and IgM levels were continuously elevated, liver function tests were deranged. However RT-PCR for nasopharyngeal and throat swab were negative which was done 5 times from 2 hours to 16 days of life. Hui Zeng et al, out of six newborns born to infected mothers, 5 showed elevated IgG levels, two were positive for IgG and IgM and all had elevated cytokine levels. All were negative for nasopharyngeal/throat swab RT-PCR.12

In study by Liu W et al, all newborns were fed term formula according to protocol. To ensure lactation, women should pump on a regular basis, and supporting psychological care should be offered. However in present study, direct breast feeding and expressed milk feeding was the most common practice seen among the included study participants. Falsaperla R et al., stated that a vertical transmission in utero cannot be completely ruled out. Because the disease is often ambiguous in newborns, with mild or absent symptoms, it is critical to define the most efficient joint management for infants born to COVID-19 positive mothers, while keeping in mind that the risk of horizontal transmission from a positive mother, when protective measures are used, does not appear to increase the risk of infection or affect the development of newborns from birth to first four weeks of life.13

Limitation: Small sample size and the testing of COVID-19 was done only using the single swab sample.

Conclusion: The most significant measures for preventing neonatal SARS-CoV-2 infection are to prevent maternal illness and to decrease the potential of neonatal viral exposure. High-risk neonates should be closely monitored in accordance with prenatal, intrapartum, and postpartum isolation management standards.

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