A neonate born to mother with COVID-19 during Pregnancy & HELLP syndrome: A possible vertical transmission

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Case Report

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Abstract

COVID-19 infection in newborn is uncommon, and there is doubt regarding vertical transmission of COVID-19 from an infected mother. We report a preterm neonate born to a mother with HELLP syndrome and COVID-19 pneumonia, who was COVID-19 positive (RT-PCR of tracheal aspirate) at 12 hours of age.

Introduction

The ongoing pandemic caused by a novel coronavirus disease 2019 (COVID-19) or severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) has affected all age groups including the newborns [1]. There is a dearth of data on newborns with COVID-19 infection [2,3]. In addition, the published case reports and case series have shown conflicts in the mode of transmission from infected mothers to their newborns. The conflict is because of some reports suggesting a possible vertical (in-utero) transmission in contrast to other reports refuting this mechanism [4-8]. According to the published reports, the lowest age of a newborn getting diagnosed with COVID-19 (testing of naso-pharyngeal sample by RT-PCR) is 16 hours. Here we report a preterm newborn who was born to a mother with HELLP syndrome with COVID-19 pneumonia, and was found to be COVID-19 positive (testing of tracheal aspirate by RT-PCR) at the age of 12 hours. HELLP syndrome is a serious complication in pregnancy characterized by haemolysis, elevated liver enzymes and low platelet count occurring in 0.5 to 0.9% of all pregnancies, and in 10 to 20% of cases with severe preeclampsia [9].

Case Presentation

A 30 year old primigravida with history of travel outside compianed of low-grade fever, and malaise. She was tested for COVID-19, and the nasopharyngeal sample was positive. She got admitted to a designated COVID-19 hospital in the Western part of Odisha state. After 2 days, she developed shortness of breath, lack of perception of fetal movement, facial puffiness, and diminished vision. She was referreed to our Institute. She had conceived spontaneously, was immunized and was taking iron-folic acid and calcium tablets regularly. No anomaly scan was done. She was noted to have hypertension during 2^{nd} month of pregnancy. Antenatal USG done at 33 weks of gestation had shown a single, live fetus with weight of 930 g, AFI of 9, and gestational age of 26±5 weeks. She was having hypothyroidism and was taking thyroxine tablet 25µg once daily. At admission, she was conscious and co-operative. Her vital parameters were as follows: temperature = 98.6^0F, pulse rate = 112/min, respiratory rate = 30/min, blood pressure = 190/110 mmHg. Physical examination showed: facial puffiness +, pallor +, jaundice +, with urinary catheter in situ (50 ml of red coloured urine in urobag). Her last menstrualperiod (LMP) was on 25/10/19, and expected date of delivery (EDD) was on 1/9/2020. She underwent investigations, and finally a diagnosis of HELLP (haemolysis, elevated liver enzymes, and low platelet count) syndrome with hypothyroidism with COVID-19 pneumonia was made (**Table 1**). She received treatment as per our Institute protocol. She underwent a caesarean section, and a male baby with weight of 930 g (IUGR) was

born (on 16/06/20 at 33+2 weeks). The baby did not cry immediately after birth (Apgar at 1 min = 3/10, and 5 min = 5/10). Resuscitation was done, and the baby was immediately put on mechanical ventilation (SIMV mode with FiO2 = 25%, PIP/PEEP = 12/5 cm of H2O, and rate of 30/min) without delayed cord clamping and skin-to-skin contact. Chest x ray was not suggestive of pneumonia (**Figure 1**). The baby developed seizure after 2 hours, and was investigated (**Table 2**). Injection phenobarbitone was started along with maintenance fluids and antibiotics. Gradully the condition of the baby improved without any seizure recurenc. As the respiratory status and acivity improved, the baby was extubated to CPAP after 24 hrs. RT-PCR of tracheal aspirate taken after 12 hours came positive for COVID-19. Curently, the baby is in the COVID-19 neonatal ward, off respiratory support, tolerating feeds, and gaining weight.

Discussion

There is a dearth of data available on neonatal infection with COVID-19, limited to some case reports and case series. In one review, the authors could found 179 cases of newborns born to pregnant women infected in the third trimester of pregnancy, and getting tested for COVID-19 at birth [5]. These mothers were infected in late pregnancy, and the mean (range) time between delivery and infection was 3 (0 to 25) days. RT-PCRs performed on cord blood and amniotic fluid were negative. However, COVID-19 was detected in naso-pharyngeal samples from 6 of 179 newborns at 16 hrs of life (n = 1), 36 hrs of life (n = 2), and 48 hrs of life (n = 3). As a result, it is difficult to determine the timing of transmission in them. However, the following possibilities are plausible: droplet inhalation or contact by infected parents or health-care professionals (transmission at birth), or via breast-feeding. But, the newborns were delivered by cesarean section, immediately separated from their mothers, and placed in isolation. These steps taken in the hospital makes the transmission from the mother unlikely. In addition, breast-milk has not been shown to transmit COVID-19 till date [10]. So, a vertical (transplacental/in-utero) transmission still remains a possibility that cannot be excluded completely [11]. In the index case also, the mother was infected in third trimester, the time between infection and delivery was 3 days, the newborn was delivered by cesarean section, and immediately shifted to ICU without getting contact with the mother.

There have been no clear criteria of what actually defines a congenital COVID-19 infection. In one study, the authors described 3 newborns with positive antibodies (IgM and IgG) at birth who were born to mothers with COVID-19 infection [7,8]. Whether, these cases fit into congenital COVID-19 due to vertical transmission is debated though IgM antibody is of fetal origin (as it can not cross placenta in contrast to IgG antibody) [5]. In a cohort study of 33 newborns, 3 were having severe pneumonia, and found to be positive for COVID-19 RT-PCR of naso-pharyngeal and anal swab samples, on day 2 and day 4 of life [8]. The authors were sceptical about the possibility of peri-natal or post-natal transmission, as these newborns were born by cesarean section like in the index case, and separated from mothers from birth. But the index case in this report was positive at 12 hours of life without severe COVID-19 infection or COVID-19 pneumonia, and is stable currently. It has been described that, maternal COVID-19 infection can cause premature deliveries, respiratory distress at birth, and even intra-uterine fetal death [3,5]. All these could be secondary to the effct of severe hypoxemia resulting from COVID-19 pneumonia in the mother. In the index case decreased fetal movement and resulting birth asphyxia could be due to these factors, as

mother had severe COVID-19 pneumonia with underlying HELLP syndrome. Our report has some limitations. We did not evaluate the presence of virus in amniotic fluid, cord blood, or placental tissue that could further clarify pathogenesis, and no antobody testing was done in the newborn.

Conclusion

The present report supports the fact that COVID-19 infection may get vertically transmitted from the mother to the fetus. More research in this area could throw light on the pathogenetic mechanism.

Declaration

Consent to Publish

The patient consented to participate and publish both hers and her child's case report and accompanying image.

Conflicts of interest

All authors have no example conflicts of interest to disclose

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Author contributions

HKY, MR, and SS: conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript. SK, NS, and SSN: designed the data collection instruments, collected data, carried out the initial analyses, and reviewed and revised the manuscript. NKM: conceptualized and designed the study, coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content. All authors approved the final manuscript as submitted and agree to be accountable for all
aspects of the work. NKM will act as guarantor.

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Tables

Table 1: Laboratory results of mother

Variables	Reference range	Results during hospital stay			
		Day 0 (admission)	Day 1 (24 hr)	Day 2	Day 5
Hemoglobin (g/dL)	12 – 15	8.6	8.9	8.9	9.3
TLC (/cumm)	4000 – 10000	12640	10400	8800	8700
Platelet count (/cumm)	1.5 – 4.5 lakh	0.5	0.18	0.25	0.86
ALC (/cumm)	1000 – 3000	2022	1894	1900	2430
CRP (mg/dL)	< 5.0	12.0	<5.0	<5.0	-
Procalcitonin ng/mL	< 0.5	0.51	-	-	-
D-dimer (µg/mL)	< 0.5	5.7	3.2	< 0.5	-
Ferritin (ng/mL)	12 – 150	630	428	256	-
CPK (U/L)	< 170	52	-	-	-
Random blood glucose (mg/dL)	70 – 140	92	1111	102	-
Creatinine (mg/dL)	0.5 – 1.04	1.03	0.9	0.7	-
Urea (mg/dL)	7 – 17	41	32	30	-
Total bilirubin (mg/dL)	0.2 – 1.20	7.8	7.1	6.8	5.0
AST (U/L)	14 – 36	220	176	165	132
ALT (U/L)	9 – 52	164	158	120	98
Sodium (mEq/L)	135 – 145	130	134	131	132
Potassium (mEq/L)	3.5 – 5.1	4.8	4.2	3.5	3.6
Chloride (mEq/L)	98 – 107	100	101	104	104
ABG		Respiratory alkalosis	Respiratory alkalosis	Normal	Normal
Chest x ray		Bilateral heterogenous opacities	-	-	Normal

TLC: total leucocyte count; ALC: absolute lymhocute count; CRP: C - reactive protein; CPK: creainine phosphokinase; AST: aspartate transminase; ALT: alanine transaminase

Table 2: Laboratory results of the newborn

Variables	Reference range	Results during hospital stay		
		Day 0 (admission)	Day 1 (24 hr)	Day 2
Hemoglobin (g/dL)	15 – 21	17.0	18.0	16.5
TLC (/cumm)	5000 – 10000	2800	5400	10200
Platelet count (/cumm)	1.5 – 4.5 lakh	1.59	1.80	1.78
ALC (/cumm)	1000 – 3000	1008	1942	3668
CRP (mg/dL)	< 5	3	-	-
Total calcium (mg/dL)	7.2 – 11.0	8.8	-	-
CPK (U/L)	<170	210	148	-
Random blood glucose (mg/dL)	> 40	62	124	-
Creatinine (mg/dL)	0.5 – 1.04	1.1	1.0	1.0
Urea (mg/dL)	12 – 42	44	38	36
Total bilirubin (mg/dL)	< 5	4.2	4.1	4.1
AST (U/L)	47 – 150	170	148	134
ALT (U/L)	13 – 45	52	44	44
Sodium (mEq/L)	135 – 145	132	135	137
Potassium (mEq/L)	3.5 – 5.1	5.1	4.9	4.6
Chloride (mEq/L)	98 – 107	104	101	105
pH	7.35 – 7.43	7.19	7.32	7.34
Chest x ray	Normal	Normal	-	-

TLC: total leucocyte count; ALC: absolute lymhocute count; CRP: C - reactive protein; CPK:creainine phosphokinase; AST: aspartate transminase; ALT: alanine transaminase

Figures


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Figure 1

Chest X-ray of the newborn done at 1 hr of age