



Symptomatic Hospital Acquired Neonatal SARS-CoV-2 Infection with Deranged Laboratory profile

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Abstract

The global pandemic of Coronavirus disease 2019 has affected a significant population across all ages around the globe. There is limited evidence exists on severe acute respiratory syndrome coronavirus-2 (SARS-Co-2) infection in neonates. We report a case of symptomatic neonatal Covid-19 infection in one week old neonate, admitted due to different reason. In spite of popular thinking of normal Covid related blood parameters, we observed very high and deranged investigation profile, very atypical of Covid-19 presentation in neonates, hence we are reporting this case.

Keywords: SARS-CoV-2, neonatal, symptomatic Covid-19.

INTRODUCTION

At the end of 2019, a sudden outbreak of novel coronavirus pneumonia in Wuhan, China, brought a series of calamities to both Chinese society and global communities¹. The dynamics of SARS-CoV-2 transmission occurs from human to human through respiratory droplets². However, there is inadequate information on the consequences of SARS-CoV-2 infection in neonates till date. Neonates can acquire infection vertically during delivery or horizontally from caregivers. Most neonates born to mothers with confirmed Covid-19 infection were asymptomatic and discharged home well³.

In spite of the significant number of case reports on neonatal Covid published all over the world, there is paucity of data on cases reported from India especially from western part. We report a case of symptomatic neonatal Covid-19 infection from R.N.T. Medical College, Udaipur, Rajasthan. This case highlights the symptomatic presentation of Covid-19 acquired during hospital stay, in a full-term neonate born to Covid-19 negative mother.

Case report-

A full-term female newborn, weighing 2.015kg at birth, born to 19-year-old mother, by normal delivery, with delayed cry at birth (after 1 min) was referred to our NICU on live day 2. The mother had an uneventful antenatal course. Treatment was started on line of mild birth asphyxia with no HIE. A complete septic screen and chest X-ray (FIG-1) done, was found normal. Gradually baby improved and nasogastric feeding by milk from mother milk bank was started over a period of 5 days.

On live day 8th again, baby developed fever and respiratory distress with fall in saturation. In the light of community transmission of Covid-19, a nasopharyngeal swab was sent for RTPCR Covid-19, which was found positive but mother was negative for same. A complete repeat septic screen was done and the baby was shifted to the Covid neonatal isolation ward with all standard precautions according to institutional Covid guidelines. A chest-Xray (FIG-2) showed bilateral patchy infiltrates suggestive of

pneumonitis. Inflammatory markers markedly elevated as described in table, which were indicative of severe infection

TIME	DAY-2	DAY-7	DAY-14	DAY-20
Hemoglobin (11-18 gm/dl)	18.1	14.1	11.6	11.4
Total leucocyte count (4-11×10 ³ /μL)	7,900	23,000	15,800	11,600
NLR (1-3)	0.8	4.8	0.9	0.6
Platelet (150-500×10 ³ /μL)	2,34,000	82,000	2,44,000	3,14,00
Serum ferritin (13.0-400.0 ng/ml)	-	1058	964.2	549
IL-6 (0-4.4 pg/ml)	-	167.4	138.6	75.3
D-dimer (<500 ng/ml: normal > 500 ng/ml High)	-	5020	2049	858
C-reactive protein (≤ 5.0 mg/L Negative ≥ 5.0 mg/L Positive)	8.25	23.71	12.30	11.7
Blood culture	Sterile	Sterile	Sterile	-

NLR neutrophil: lymphocyte ratio

Oxygen support was given in form of mechanical ventilation for 2 days, which was weaned later on to CPAP. Antibiotics were upgraded according to NICU antibiotic policy. Due to deranged laboratory parameters, Injection enoxaparin, low dose I.V. methylprednisolone for 5 days, and 2 gm/kg IVIG given. Repeat blood parameters and chest x-ray were done every 7 days. Gradually blood parameters improved in form of decreasing CRP, D-dimer, serum ferritin, IL -6. Chest x-ray (FIG-3) improved very slowly. It took more than 15 days for chest x-ray and

blood profile to return to normal values. Oxygen support could not be weaned for initial 10 days and it was required for total 15 days.

As the baby started improving clinically, feeding was started as per NICU protocol. After 20 days of strict NICU care, baby became asymptomatic, the Chest Xray and blood profile returned to normal. She was discharged successfully with normal neurological status after routine ROP and OAE screening, and advised for further follow-up and neurodevelopment assessment regularly.



FIG-1- Chest X-ray at Admission



Fig-2 Bilateral patchy infiltrates suggestive of pneumonitis



FIG-3 partially improved Chest x-ray after treatment

DISCUSSION

Despite the growing body of literature about the current SARS-CoV-2 pandemic, the impact of virus contracted during pregnancy on the mother and fetus is still to be determined. We report a case of Covid-19 disease in newborn, who very likely acquired the infection horizontally. Previous reports suggest the intrauterine vertical transmission potential of SARS-CoV-2 and its implications on newborn infants Chen et al., 2020⁴ and Zhu et al. 2020⁵. In our case mother was asymptomatic throughout her antenatal, perinatal period and RTPCR for Covid-19 was also negative, so there was less chances of transmission of infection perinatally. We have excluded breast-feeding as a mode of transmission because direct breast feeding was not established at all, before the occurrence of sign and symptoms in the baby. Baby developed symptoms after a week of admission in NICU, so most probably baby had acquired infection from the healthcare workers.

Most of reported cases in newborns were asymptomatic (Phadke et al)⁶. Our case had symptomatic pneumonia, which could be explained by pre-existing other ailment, which could have caused decreased immunity leading to flaring of symptoms.

There are several hypotheses explaining the reason for neonates being at a lower risk for severe Covid-19. One hypothesis is related to the maturation and functioning receptors. Angiotensin-converting-enzyme 2 has been proven to be the principal target of SARS-CoV-2 virus. In neonates, it is possible that the

receptor activity is immature or there is an increase in angiotensin-converting-enzyme 2 activity⁷.

In our case baby had persistent high-grade fever and signs of respiratory distress. Chest-Xray was also suggestive of severe bilateral atypical pneumonia, symptomatic presentation of Covid disease in neonates. Previously reported symptomatic (Zhao et al., 2020)⁸ newborn had lymphopenia as indicator of severity of Covid-19 in patient; however, it was not observed in our case. But thrombocytopenia, high inflammatory markers like, CRP, IL-6, serum ferritin, D-dimer were observed (Table-1) in our case which suggested severity of infection and responded well to treatment. Similar findings were reported by R. Kulkarni et al⁹.

CONCLUSIONS-

Based on the limited evidence on this time, the probable mode of transmission of neonatal COVID-19 appears to be horizontal, while vertical transmission is a possibility in early-onset infections. Fever and shortness of breath are the main presenting symptoms of neonatal COVID-19 and its testing should be considered in the evaluation of all febrile neonates. Inflammatory markers should be considered in all COVID-19 positive symptomatic neonates.

LIMITATIONS OF OUR STUDY-

There are few limitations in our case report. We had not done antibody testing in mother and baby. We did not test for the presence of virus in amniotic fluid, cord blood, or placental tissue that exclude the vertical transmission.

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