

Severe coronavirus disease 2019 pulmonary disease in very low birth weight preterm babies

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ABSTRACT

Severe coronavirus disease 2019 (COVID-19) in neonates is considered a rarity due to vertical transmission and most of the affected babies are asymptomatic. Here, we describe two severe cases of very low birth weight (VLBW) preterm babies in sick newborn care unit (SNCU) due to horizontal transmission. Case 1 describes a VLBW preterm baby (29 weeks) weighing 1300 g who was undergoing care in SNCU. He developed classical symptoms of cold in the form of nasal congestion with mild rhinorrhea, fever, and cough followed by severe prolonged hypoxia with full recovery. Case 2 describes another VLBW preterm (27.3 weeks) weighing 1175 g who was suffering from severe progressive hypoxia around same time. He was initially responsive to oxygen therapy but succumbed to refractory hypoxia later on. We conclude that severe COVID-19 pulmonary disease can occur in few unfortunate VLBW preterm neonates.

Key words: Coronavirus disease 2019, Hypoxia, Preterm, Very low birth weight


We all are learning and relearning about the coronavirus disease 2019 (COVID-19) disease. There is a paucity of data about disease in neonates and most of them have concluded that the disease is very mild or asymptomatic in neonates [1]. Initially, the focus was on vertical transmission all over the world. Here, we are describing horizontal transmission in a new disease with majority cases being asymptomatic or mildly symptomatic. Initially, there was limited availability of reverse transcription polymerase chain reaction (RT-PCR) testing and was available only for symptomatic cases in public health set ups during the first wave in India (April–June 2020). As neonatal data on the disease are limited, we share our experience involving two very low birth weight (VLBW) preterm babies with typical severe COVID-19 pulmonary disease due to horizontal transmission.

CASE PRESENTATION

Case 1

A male preterm (29 weeks) baby (weight: 1300 g) was born to primipara mother, after vaginal delivery and cried immediately after birth at a private nursing home in the 2nd week of May 2020. He was being treated in another private neonatal intensive care

unit (NICU) with intravenous (IV) fluids, injection piperacillin tazobactam, amikacin, caffeine, and calcium gluconate. He was referred to our municipal sick newborn care unit (SNCU) on day 3 of life (56 h) due to non-affordability issues. On admission, the baby was stable and started on expressed breast milk tube feeds and tapering IV fluids. Oral caffeine was continued. Antibiotics were stopped on admission in absence of any justifiable reason for continuation, with baby being asymptomatic, stable, feeding well, and sepsis screen being negative twice. Of note, we do not have blood culture facility at our set up. By day 4, the baby tolerated full feeds and IV fluids were stopped. On day 6, nadir weight of 1130 g was recorded and thereafter started gaining appropriate weight and supplemented with calcium, multivitamins, and zinc. The baby remained asymptomatic till day 22 (1400 g, on tube plus wati spoon feeds) but developed mild cold in the form of nose block and fever spike of 38°C, which subsided after uncovering the baby for half an hour. Complete blood count (CBC) and C-reactive protein (CRP) were normal. For the next 3 days, the baby was having daily 1–2 fever spikes but continued to feed well and gained weight. CBC and CRP repeat were also normal. On day 31 (weight: 1680 g), the baby had mild cough for 1 day, and in next 24 h, he developed tachypnea (respiratory rate or RR: 62–72) without other signs of significant respiratory distress in the form of increased work of breathing or grunting but severe desaturations with oxygen saturation (SpO₂) falling up to 50% and mildly decreased activities. The

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baby required 4 L/min oxygen to maintain saturation between 90 and 95 and was started on cefotaxime and amikacin. His reports were as follows: Hemoglobin (Hb): 9.3 g/dL, white blood cell count: $21.5 \times 10^9/L$, and CRP: 26.37 mg/L. Chest X-ray did not reveal any gross obvious abnormality. SpO₂ used to drop up to 30–40 within few seconds of oxygen interruption, however, the requirements decreased after 48 h to 1 L/min. Antibiotics were stopped after 72 h. Repeat X-ray after 72 h was similar without any gross abnormality. RT feeds were continued with decreased quantity from initial 30 cc feeds to 20 cc. COVID-19 test, done on day 36, was negative. Later on, mother's testing was requested even though she was asymptomatic and reported negative on day 39 of baby (day 17 of symptom onset in baby). Oxygen was needed for total 9 days and weaned off on day 40. In spite of continuous oxygen requirements, weight gain continued (1720 g). COVID-19 IgG antibodies tested positive on day 44 and the baby was discharged on day 46 with weight of 1785 g on exclusive breastfeeding with supplements. After discharge, the baby was followed up telephonically after 2 weeks, 1 month, and 3 months, as they had gone to their native place and reported as normal.

Case 2

G4P4L3 mother had preterm (28.3 weeks) vaginal delivery in the 1st week of June 2020 with baby weighing 1175 g. The baby had mild respiratory distress syndrome and required oxygen (2 L/min by hood) to maintain SpO₂ between 90 and 93. Recurrent apneas on day 2 were treated with caffeine. On day 3, tube feeds of expressed breast milk were initiated and full feeds were achieved from day 5 onward. Oxygen requirements had come down to 0.5 L/min by 72 h and continued so for next 8 days. On day 10, the baby reached 1045 g of weight. On day 19 (1200 g), the baby developed fever and hypoxia requiring oxygen between 4 and 5 L/min to maintain SpO₂ between 90 and 95. SpO₂ used to come down to 20–30% immediately after few seconds of interruption. CBC, CRP, and X-ray chest were grossly normal and the baby was started on oseltamivir. Next 4 days, the baby had fever spikes and repeat CBC, CRP, and chest X-ray were normal. Despite fever and hypoxia, the baby tolerated feeds well and weight gain was continued. On day 25, COVID-19 testing was done by a newly appointed technician from a private laboratory and reported negative. Oxygen requirements decreased to 1–2 L/min and full tube feeds were continued. Normal satisfactory weight gain (1620 g/day 40) was observed. From day 40 onward, the baby was not able to maintain saturation between 90 and 95, dropping up to 20% at times with increasing oxygen requirements and also started having recurrent apneas. Deriphyllin and two doses of dexamethasone were given. Repeat CBC, CRP, and chest X-ray were normal. The baby was put on ventilator but downhill course was continued and succumbed on day 43 (weight: 1.69 kg).

As both the babies were tested negative for RT-PCR, we checked COVID-19 antibodies among SNCU staff to find and confirm the infection retrospectively with personal funds out of curiosity and three out of 10 tested positive. Some of the family

members of staff nurses were confirmed positive and admitted and they were quarantined after confirmed reports in their family but that could have been late or mother might have got infection from her relations during her prolonged stay in SNCU due to open-access policy.

DISCUSSION

SNCU accepts both outborn and inborn babies in the same combined area. Mothers are fully involved in SNCU care as part of learning, bonding, and assistance and also due to perennial staff shortages. They have full access to their relations during the prolonged SNCU stay. During May–July 2020, we had some normal and cesarean section deliveries which were reported COVID positive after delivery.

The reasons for babies having negative testing could be late testing, inexperienced technician collecting swab for the 1st time and inherent 67% specificity of the test. Furthermore, mother could be source as asymptomatic COVID-19 illnesses are known to occur in upto 80% of cases. Another possibility of developing the infection from SNCU staff cannot be ruled out. Horizontal transmission due to prolonged stay in the first peak season is most likely.

In a study by Kalamdani *et al.*, involving another public sector hospital involving a large cohort of 12 neonates, few had symptoms and none of them required NICU admission. However, all of them were >34 weeks of gestation and >2 kg [2]. In a study by Shah *et al.* from a large referral tertiary center involving 18 neonates, they observed that all were symptomatic, 15 recovered and three succumbed, and no contact was identifiable in 8 (44%) of the babies [3]. In a systematic review of 58 cases by Dhir *et al.*, they observed that 29 (50%) were symptomatic and 23 required ICU, with respiratory symptoms as the most common presentation, 16 among them being preterm [4]. Another study from the same Megapolis and designated COVID-19 center for obstetric services demonstrated higher risk of adverse outcomes including deaths in severe acute respiratory syndrome COVID-19-infected neonates as compared to non-infected ones [5].

Due to overlap of usual morbidities of preterm and term neonates, it is difficult to tease out the contribution of SARS-CoV-2 infection to reported symptoms and morbidities. We normally have 1500 deliveries per annum and approximately 15% (n=225) require admission in SNCU and nearly 1/4th of this number are outborn babies referred from other hospitals and maternity homes but housed in same section, in an area of 500 square feet (warmer area). Our neonatal mortality rate is 3.1 per 1000 live births for inborn babies (excluding referred surgical cases to tertiary institutes requiring urgent intervention, e.g., critical congenital heart disease, esophageal atresia, etc.). The management follows as per the guidelines given in the operational guide for facility-based neonatal care by Ministry of Health and Family Care, 2011 [6].

In our cases, we noticed that both babies had typical symptoms of fever and cough followed by severe hypoxia, disproportionate to

the severity of respiratory signs matching with the observation of happy hypoxia noticed in adults. Sepsis and other conditions like bacterial pneumonia were ruled out as babies continued to accept and tolerate feeds well and demonstrated normal expected weight gain in the critical oxygen responsive hypoxic situation, supporting the notion of similar vulnerabilities like other adult human beings, especially when faced with inherent susceptibilities due to limited respiratory reserve in premature VLBW babies. The presented cases help to increase the awareness and open up further scope of research.

CONCLUSION

Preterm VLBW neonates having severe hypoxia disproportionate to the severity of physical signs and symptoms but responsive to oxygen therapy in the current epidemiological settings should raise suspicion of COVID-19 disease.

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