Challenges in Neonatal COVID-19 Infection

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Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2), a new novel corona virus is the cause for the present pandemic with significant morbidity and mortality. SARS-CoV-2 enters the system by attaching to the angiotensin converting enzyme 2 (ACE-2) receptor on non-immune cells [1]. This receptor is found on the type 2 alveolar cells, esophageal epithelial cells, ileal and colonic enterocytes. The predominant mode of transmission is via direct droplet followed by contact spread from contaminated items and rarely via feco-oral route [2]. All age groups are susceptible, but people with comorbidities or the elderly are more likely to develop severe form of the disease.

In children, it seems to have less severe clinical symptoms but the potential harm remains largely unknown in neonates [3]. Clinical manifestations are usually mild among children. They often have more gastrointestinal symptoms like diarrhea, abdominal distension and vomiting. Some may be asymptomatic while others have minimal congestion of nose, cough, mild fever and headache. Some of them especially neonates, may develop respiratory distress. The exact reason for the milder disease among children is known. It is possible that their immune systems are not well developed and this may reduce the risk of cytokine storm. Children who received regular routine immunization were found to have milder diseases compared to those who had delayed or incomplete immunization, suggesting that routine immunization may give some protection against COVID-19 infection. The distribution of ACE2 may be reduced among children compared to adults making them at less risk for COVID infections. Since many children can be asymptomatic carriers, it is essential to

identify and isolate them for reducing transmission [4]. At present, there is no evidence to confirm the vertical transmission of covid-19 via transplacental route from mother to fetus. The samples such as amniotic fluid, cord blood, neonatal throat swab collected at birth from babies delivered by infected mothers and breast milk were tested negative for SARS-CoV-2 [5].

Given the above background, the findings reported by Jain et al. are relevant; more so because the information related to vertical transmission is very limited. The authors have described two neonates born to SARS-CoV-2 positive women with diverse manifestations. They observed that both the infants were not positive for COVID infection by RT-PCR [6]. These findings are similar to a previous study which had demonstrated that out of 33 neonates born to women with SARS-CoV-2 infection, only 3 were found to be positive by RT-PCR at varied time period after birth [7]. In another case series, all of the seven neonates born to SARS-CoV-2 infected women were found to be negative with diverse manifestations including premature birth, fetal distress, and Neonatal Respiratory Distress Syndrome (NRDS) [8]. These findings clearly illustrate possibility of postnatal infection with no evidence of transplacental transmission. In order to obtain clear view on vertical transmission, further studies on IgG and IgM antibodies in neonates of SARS-CoV-2 positive women are needed. The report by Kanburoglu et al. published in this issue tried to trace source of infection in SARS-CoV-2 positive neonates born to parents negative by RT-PCR. These authors could not trace the source of infection in spite of screening health care workers and visitors. The authors also suggested that the infecting dose of the SARS-CoV-2 may be lesser for transmission in neonates due to lowered immunity [9]. It could also be because in hospitals, it is almost impossible to trace all the casual contacts.

To avoid postnatal transmission, screening of all infants with respiratory syndrome is not needed, whereas infants born to the suspected or confirmed mothers for SARS-CoV-2 may be subjected to screening, in order to reduce wastage of resources. Infected mother can breastfeed her baby after following proper hand and breast hygiene. Otherwise caretaker who

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is not infected can feed expressed mother's milk to the baby with a tumbler and spoon following good hand hygiene. It appears that most of the neonates are infected postnatally. Therefore, health care worker must wear mask and avoid close contact with the baby or wear PPE to avoid postnatal infection. Proper cleaning and disinfection of the hospital surfaces is also needed to avoid the droplet transmission. Routine vaccination should be continued to the baby for the development of immune system to fight against several other vaccine preventable infections.

Although current available evidence does not suggest transmission via trans-placental route, infants born to infected mothers may have perinatal asphyxia, respiratory distress, gastrointestinal symptoms, thrombocytopenia and shock. It is not clear whether these symptoms are caused by the condition in the mother or because of transmission of infection to the fetus. Future studies focusing on timing of transmission using sensitive diagnostic tools are required for conclusively proving or disproving intrauterine transmission of infection to the fetus.

Compliance with Ethical Standards

Conflict of Interest None.

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