

Original Research Paper

ASSOCIATION OF MATERNAL COVID-19 INFECTION WITH NEONATAL OUTCOMES AT A GOVERNMENT TERTIARY HOSPITAL IN KANYAKUMARI DISTRICT.

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Article Received: 15-08-2022

Revised: 03-09-2022

Accepted: 23-09-2022

ABSTRACT:

Background: The prevalence of SARS-CoV-2 transmission from mother to infant appears minimal and may be related to biological and social variables. However, there are data on the variables linked with newborn clinical or viral testing results. Therefore, to study the association of SARS CoV2 infection on perinatal transmission and neonatal outcomes. **Methods:** This is a retrospective cohort study in neonates born to SARS CoV2 RT-PCR Positive mothers at post-natal Day 3 of life admitted to Kanyakumari Government Medical College between Jul 01, 2020, to Dec 31, 2021. Testing was avoided within the first 48 hours to eliminate false-positive findings from superficial colonisation. Mothers with SARS-CoV2 positive reports were tested or recommended for admission. All newborns were followed for clinical signs over the first seven days after delivery and for as long as the mother remained in the hospital. **Results:** Among 194 neonates, 5 (2.6%) screened positive on Day 3 of birth, without mortality. 73% of the mothers had LSCS as the mode of delivery. 69% of neonates weighed more than 2.5 kg. 87% of neonates had no post-natal complications, and most were breastfed. 13.4% of neonates required NICU admission, mainly for respiratory distress, and none was mechanically ventilated for intra-uterine Pneumonia. No association was found between mode of delivery and type of feeding. **Conclusion:** There was no evidence of perinatal transmission in our cohort, and the neonates produced to SARS CoV2 Positive mothers survived well.

Keywords: Perinatal transmission, SARS CoV2, Neonate, IVIG, Respiratory distress, breastfeeding.

INTRODUCTION:

The COVID-19 pandemic has created lots of challenges for all age groups. COVID-19 Virus has infected over 2.7 million cases in Tamilnadu. (1) It directly impacts reproductive and perinatal health through infection-mediated complications. We learn more about epidemiology, clinical profiles, and therapy options daily. However, there is little evidence of perinatal SARS-COV2 infection in emerging countries because of the current outbreak. Mothers infected with SARS-COV2 had a positive SARS-COV2 quantitative Naso-pharyngeal RT-PCR test during the peripartum period (2). Perinatal transmission is a positive Naso-pharyngeal RT-PCR in newborns within the first 72 hours of life (3). This includes intrapartum and intrauterine transmission. Although multiple infectious vectors are potential for vertical transmission, the likelihood of SARS-CoV-2 vertical transmission out of an affected parent to a foetus or newborn has recently been debated, with

prior systematic assessments stating there was no confirmation of vertical transmission (4)(5). Concern over the possibility of vertical transmission of SARS CoV2 is due to the affinity of the Virus towards the ACE2 receptors expressed in syncytiotrophoblast cells of the placenta, ovary, and vagina (6). As a result, determining vertical transmission is critical for directing patient counselling about COVID-19-related concerns before and throughout pregnancy. As a result, we conducted these studies to analyse the prevalence, risk of vertical transmission, and outcomes of neonates delivered to SARS CoV2 positive mothers.

METHODS:

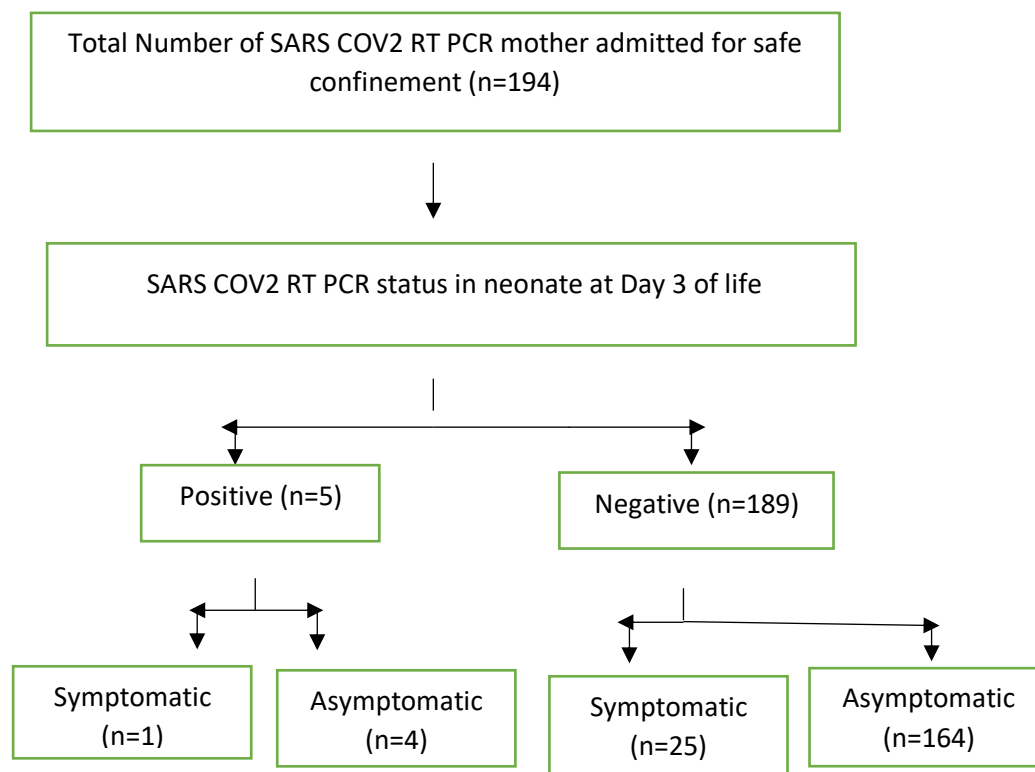
In this Cohort study, SARS-COV2 positive mothers' neonates in Kanyakumari Government medical college were studied for 15 months (July 2020 – October 2021). Details regarding the demographic profile, Antenatal history, and perinatal history were entered in a structured questionnaire. A nasopharyngeal swab for SARS-COV2 was taken on Day-3 of life in the

neonate born to mothers who were COVID 19 positive to find out the possibility of perinatal transmission of COVID-19 in the neonate. Testing was avoided within the first 48 hours to eliminate false-positive findings from superficial colonisation. Mothers with SARS-CoV2 positive reports were tested or recommended for admission. The Indian Council for Medical Research (ICMR) and NNF recommendations were followed for testing and treatment (7)(8). All newborns were followed for clinical signs over the first seven days of birth and for as much as the mother was hospitalised to the hospital. Data on Antenatal history, mode of delivery, perinatal history, clinical presentation, diagnosis at admission, type of feeding, rooming in and neonatal outcomes were entered in a structured questionnaire and compiled using MS Excel. In

addition, all neonatal parents provided written informed consent. The study's primary goal was to determine the prevalence of perinatal transmission. The secondary outcomes were to find out the outcome of neonates born to SARS-COV2 Positive mothers and Rates of SARS COV2 virus positivity in association with the way of delivery & kind of feeding. For categorical variables, descriptive statistics were employed, and comparisons were made using the chi-square test.

RESULTS:

Out of 194 COVID 19 Positive mothers, five mothers delivered neonates who were COVID19 Positive at 72 hours of life. Out of 194 mothers, only 22 were symptomatic (11%), and one mother succumbed to COVID 19 in the immediate post-natal period.



The majority of the mothers delivered a male baby (51%). Caesarean section was the mode of delivery in 73% of the patients to prevent the dissemination of infection in the labour ward. Amongst 194 newborns with COVID 19 positive mothers, five neonates (2.6%) tested positive for COVID 19 at 72 hours of life. Among the five neonates who tested positive, four neonates were born of LSCS, and one neonate was born of normal vaginal delivery. The majority of the neonates who turned COVID 19 positive were full-

term neonates, and only one neonate (20%) was born preterm who was symptomatic, requiring resuscitation and had respiratory distress due to immature lungs and not due to intrauterine Pneumonia and was managed with nasal oxygen and antibiotics which was stopped after a negative septic screen. 80% of the neonates were asymptomatic and did not require NICU admission. Most neonates were breastfed within 1 hour of life and were roomed in with their mother. There was no neonatal mortality.

Table 1. Demography and risk factors of neonates born to COVID19 positive mothers.

Parameter	SARS COV2 status	
	Positive (5 Neonates)	Negative (189 Neonates)
Male gender	3 (60%)	96 (51%)
Birth Weight < 2500gms	1 (20%)	59 (31%)
Gestational week < 37 weeks	1 (20%)	9 (5%)
Caesarean delivery	4 (80%)	137 (72%)
Breastfeeding	4 (80%)	149 (79%)
Roomed in with the mother	4 (80%)	143 (76%)
Admission to NICU	1 (20%)	25 (13%)
Mother symptomatic	1 (20%)	21 (11%)
Maternal mortality	0	1 (0.5%)

Among the mother who delivered COVID19-negative neonates at 72 hours of life, 11% of the mothers were symptomatic, and one mother succumbed to COVID19 (0.5%) in the postpartum period. In addition, 59 neonates (31%) weighed less than 2500gms. Nine neonates (5%) were born Preterm. 25% of the neonates

required NICU admission. Direct breastfeeding was initiated in 79% of the mothers within one hour of life. Only 76% of neonates were roomed in with the mother as some mothers were symptomatic, and some infants developed symptoms and were admitted to the NICU.

Table 2. Clinical features of neonates born to COVID 19 positive mothers.

Parameter	SARS COV2 status	
	Positive (5 neonates)	Negative (189 neonates)
Resuscitation	1 (20%)	19 (10%)
Symptomatic	1 (20%)	25 (13%)
RDS	1 (20%)	9 (5%)
Pneumonia	0	6 (3%)
Sepsis	0	4 (2%)
Seizures	0	4 (2%)
Jaundice	0	2 (1%)

Among the children tested for COVID-19 negative, only 25 neonates (13%) were symptomatic and required NICU care. However, 19 neonates (10%) required neonatal resuscitation. Among the 25

neonates admitted to NICU, nine neonates (5%) had RDS. 6 neonates (3%) had Pneumonia. In addition, seizures and sepsis were found in 4 neonates (2%), and two neonates (1%) had NNH.

Table 3. Management of neonates born to COVID19-positive mothers.

Parameter	SARS COV2 status	
	Positive (5 neonates)	Negative (189 neonates)
Oxygen therapy	1 (20%)	8 (4%)
CPAP	0	8 (4%)

Mechanical ventilation	0	9 (5%)
Antibiotics	1	8 (4%)
Surfactant	0	6 (3%)
Inotropes	0	6 (3%)
Corticosteroids	0	4 (2%)
IVIG	0	1 (0.5%)
Mortality	0	0

Out of 189 SARS COV2 negative neonates, nine neonates (5%) required mechanical ventilation due to immature lungs and not intrauterine Pneumonia. 4% of neonates required oxygen support through nasal prongs and CPAP. 8 neonates (4%) required IV antibiotics, 6

neonates (3%) required surfactant, 6 neonates (3%) required inotropic support, 4 neonates (2%) required antiepileptics, one neonate required phototherapy (0.5%) and IVIG (0.5%). There was no mortality.

Table 4. Association of risk factors of neonates born to COVID 19 positive mother.

Parameters		COVID status				P value
		Negative (n=189)		Positive (n=5)		
LSCS	No	52	27.5%	1	20%	0.710
	Yes	137	72.5%	4	80%	
Mechanical ventilation	No	180	95.2%	5	100%	0.617
	Yes	9	4.8%	0	0.0%	
Breastfeeding	No	40	21.2%	1	20%	0.950
	Yes	149	78.8%	4	80%	
Roomed in with the mother	No	46	24.3%	1	20%	0.823
	Yes	143	75.7%	4	80%	
Isolation NICU admission	No	164	86.8%	4	80%	0.661
	Yes	25	13.2%	1	20%	

In our study, there was no association of perinatal transmission between the mode of delivery (p=0.710) and type of feeding (p=0.950). Rooming a neonate with a COVID-19-positive mother was not a risk factor. Most COVID-19 neonates were asymptomatic and did not require NICU admission (p=0.661). None of the COVID19-positive neonates had intrauterine Pneumonia.

DISCUSSION:

This study analysed the incidence of perinatal transmission, clinical presentation and outcomes of the neonates born to SARS CoV2 positive mothers. 2.6% of neonates turned positive at 72 hours after birth, but only 20% of the neonates were symptomatic, and 80% of the neonates were term. Nanavati R et al. conducted a study in which most SARS-CoV-2-infected infants (80.9%) were term, and none required resuscitation.

One-third (33.3%) of the infected infants showed neonatal COVID-19 symptoms. The respiratory (33.3%) but also gastrointestinal (33.3%) systems were involved in the majority of them (4.8%). Infected infants were provided supportive therapy, with six requiring intensive care (28.6 %). Four preterm and two-term newborns were enrolled, with two receiving non-invasive ventilation and one who is undergoing invasive ventilation, which includes intra-tracheal surfactant instillation.¹⁰

Kotlyar AM et al. studied a systematic review that shows a total number of 27 newborns who tested positive for SARS coronavirus two viral RNA that used a nasopharyngeal swab, showing a percentage of 3.2% for transmission. CoV-2 viral RNA analysis in newborn blood revealed positive in 2.9% of samples (1/34) and 7.7% of placenta samples (2/26).¹¹ Gale C et

al. showed that 42% of neonates had serious clinical SARS-CoV-2 infection, and 16 (24%) newborns were delivered prematurely. 36 (55%) of the newborns belonged to white ethnic groupings. SARS-CoV-2 infectious disease, 26% of infants with proven infection, were newborns to mothers with identified perinatal SARS-CoV-2 infectious disease, and two (3%) were thought to have possibly vertically acquired Virus. Eight (12%) of the infants had a nosocomially caused infection.¹² Dileep A et al. reported that 6.5% (n = 53) of the 200 pregnant women having COVID-19 had moderate/severe illness and a greater risk of preterm births (88.7%). Furthermore, SARS-COV-2 infected more than half of the infants born to moms with severe illness (58.5%). Pregnant women experiencing moderate to severe COVID-19 had a considerably increased risk of pregnancy complications, lower birth weight, newborn infection, and neonatal ICU hospitalisation.¹³ In this study, 20% of the SARS CoV2 positive neonates were symptomatic, and Respiratory distress was the most prevalent symptom, 20% required oxygen therapy and antibiotics, but the mortality was zero. Tadas MP et al. reported 97.23% mild instances, 2.76% intermediate cases, and 0.55% severe cases. Within the third trimester, 178 (98.34%) were detected. More COVID-19 instances were found in cities. The mild group had a mean gestational age of 38.1 weeks, whereas the moderate/severe category had a gestational age of 37.5 weeks. A total of 154 people (85.08%) were asymptomatic. Medical and pregnant morbidity was higher in cases than in control, which was statistically significant. Caesarean section was performed in 52.49% of cases and 33% of controls. In certain incidents, the length of hospital stay was longer. According to the study, The majority of COVID-19-infected mothers who seem to be asymptomatic fall into the mild category, and the infection has no harmful maternal or neonatal consequences.¹⁴

CONCLUSION

Perinatal transmission and subsequent complications are insignificant in SARS CoV2 infected neonates. The incidence of perinatal transmission in our study population is very minimal in our study. The subsequent complication was minimal among the infected population, and the outcomes were good. The COVID-19-positive mother's neonates did not require hospital admission, and breastfeeding and rooming were not found to transmit COVID to the neonate.

LIMITATIONS

The study's major limitation was that the PCR for SARS CoV2 was done only once on day 3 of life and was not repeated as per the guidelines. Therefore, as 13% of the negative population becomes symptomatic

later, it needs further re-evaluation with PCR study to find latent infection with COVID. In addition, as the study population of COVID-19-positive neonates was limited, it needs further prospective study to determine the statistical significance of rooming in and breastfeeding versus artificial feeds in isolation and without isolation.

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