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RESEARCH ARTICLE

A study on the clinical profile and outcome of neonates with COVID-19 infection admitted in Fakhruddin Ali Ahmed Medical College and Hospital, Barpeta, Assam

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ABSTRACT

Background: On 31st December 2019, the first case of infection with novel pathogenic corona virus (1-6) was detected in Wuhan city of Hubei province of China. Later, on 11th March 2020, it was recognized by WHO as pandemic. Covid-19 infection is common in children and adults but remains uncommon in neonates. **Objectives**: To identify the clinical presentations and outcome of neonatal covid-19. **Methods**: It was a retrospective hospital based observational study conducted on neonates with covid-19 infection admitted in COVID ward and COVID NICU of Fakhruddin Ali Ahmed Medical College and Hospital, Barpeta, Assam. **Results:** A total 36 neonates tested positive for covid-19 infection. 17 (47.2%) neonates were asymptomatic, 4 (11.1%) neonates had symptoms attributable to COVID 19 infection and 15 (41.6%) of the neonates had associated co-morbidities. Out of 4 symptomatic babies, 2 (50%) had mild symptoms, 1 (25%) each had moderate and severe symptoms. There was no mortality during the hospital stay. **Conclusion**: Most of the babies with Covid-19 were asymptomatic, out of symptomatic babies half of them had mild symptoms and there was no mortality.

Keywords: Neonate, Covid-19 positive, Clinical profile.

The first case of corona virus [1-6] infection was first detected in Wuhan city of Hubei province of China on 31st December 2019. On March 11th 2020, WHO recognized it as pandemic and the corona virus disease was officially named as Covid-19. On 30th January 2020, the first case of India was detected in Kerala. Over 598 million cases were confirmed as on 1st September 2022 and all over the world 6.4 million deaths [7] and in India, 44 million confirmed cases and 0.5 million deaths had occurred [8].

Covid-19 is common in older children and adults but is quiet uncommon in neonates [9]. All around the world little is known about epidemiology, clinical manifestations and outcome of SARS-CoV-2 infection among neonates. The clinical presentations in neonates is different to that in older children and adults with gastrointestinal features and poor feeding were more commonly seen [10, 11]. A population based study on SARS-CoV-2 infection in neonates from UK found that, during first wave of pandemic, 66 neonates with confirmed SARS-CoV-2 infection received in-patient care [12]. Short term outcome of neonates with Covid-19 infection to date are good, with no deaths attributable to SARS-CoV-2 infection noted in UK data [10]. In Norway, a country less severely affected by the pandemic, only 3 babies with SARS-CoV-2 infection were admitted to a neonatal unit in 2020, all with very mild symptoms. There is dearth of data in neonates and clinical manifestations have been reported to be mild [13]. Recent reviews have provided some information on pediatric patients with SARS-CoV-2 infection [14, 15] but data on neonates are very limited. One of the largest series of COVID-19 neonatal cases in Spain reported that clinical

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manifestations were mild and clinical spectrum included upper respiratory infection, febrile seizure, acute gastroenteritis, apnea and mild respiratory distress [16]. Although symptomatic neonates may require to be admitted in ICU, most of COVID-19 infected neonates presented with mild symptoms and have good prognosis [17,18]. To our knowledge, the existing data on neonatal COVID-19 infections and outcomes are derived from studies done in Europe and United states; limited data is available from Indian subcontinent.

Aim of this study was to describe the clinical profile and outcome of neonates with COVID-19 infection who received inpatient care in a tertiary care hospital.

Methods

This hospital based retrospective study was carried out in NICU, Fakhruddin Ali Ahmed Medical College and Hospital, Barpeta, Assam. Approval was taken from Institutional Ethical Committee. All the neonates (0-28 days), who tested COVID-19 positive and were admitted in COVID NICU or COVID Ward from 2020 to 2022 were included the study. Tests need to diagnose COVID positivity were Rapid Antigen Test (RAT) and RTPCR for COVID-19. A neonate was said to be COVID-19 positive when a neonate tested positive for Rapid Antigen Test (RAT) or PCR or both. We collected information from bed head ticket about age at the time of admission, sex, maturity, weight, clinical manifestations if any, like fever, cough, diarrhea, vomiting, and poor feeding. Physical findings like, respiratory rate, presence of cyanosis, grunting, severe chest retraction, lethargy, seizure, SpO2, features of shock and organ dysfunction were noted. Any co-morbidities like HIE, sepsis, jaundice, transient tachypnoea of newborn and any obvious congenital anomaly was noted. Those babies with symptomatic COVID-19 were classified as mild, moderate and severe disease adapted from Revised Comprehensive Guidelines for Management of COVID-19 in Children and Adolescents (below 18 years), 2022.

Results

In this study, a total of 36 neonates were identified as COVID positive. 19 (52.7%) neonates were male and 17 (47.3%) were female. 32 (88.8%) neonates were term and 4 (11.2%) neonates were preterm. 30 (83.3%), 5 (13.8%) and 1 (2.7%) neonates were normal weight (≥ 2500gram), low birth weight (1500-2499gram) and very low birth weight (1000-1499gram) respectively. No neonate was extremely low birth weight (<1000gram). Out of the total of 36 neonates 17 (47.2%) neonates were asymptomatic and only 4 (11.1%) neonates were symptomatic with Covid-19 related symptoms. 15 (41.6%) neonates had associated co-morbidities namely sepsis in 5 (13.8%) neonates, hypoxic ischemic encephalopathy in 4 (11.1%) neonates, transient tachypnoea of newborn in 4 (11.1%) neonates and jaundice in 2 (5.5%) neonates. Of the 4 symptomatic neonates, 2 (5.5%) neonates had mild symptoms, 1 (2.7%) neonate had moderate symptoms and 1 (2.7%) neonates had severe symptoms. No death was noted among the 36 COVID-19 positive neonates during the hospital stay (table 1, 2).

Table 1: Demographics and variables of the study population.

Sex	
Male	19 (52.7%)
Female	17 (47.3%)
Maturity	
Term	32 (88.8%)
Preterm	4 (11.2%)
Weight at admission	
<1000 gram	0
1000-1499 gram	1 (2.7%)
1500-2499 gram	5 (13.8%)
>2500 gram	30 (83.3%)
Inborn neonate	25 (69.4%)
Outborn neonate	11 (30.6%)
Asymptomatic neonate	17(47.2%)
Symptomatic neonate	4 (11.1%)
Mild symptomatic	2 (5.5%)
Moderate symptomatic	1 (2.7%)
Severe symptomatic	1 (2.7%)
Neonates with co-morbidities	15 (41.66%)
Death	0 (0%)

Table 2: Profile of co-morbidities

Co-morbidity	No. of babies (%)
Sepsis	5 (13.8%)
Hypoxic ischemic encephalopathy	4 (11.1%)
Transient tachypnoea of newborn	4 (11.1%)
Jaundice	2 (5.5%)

Discussion

In this study, the occurrence of COVID-19 among male sex were more than female (N=19; 52.7% vs N=17; 47.3%), which is similar to a study in Spain by BF Colomer et al (2020) [16], where most of the COVID-19 neonates were male (N=15; 57.5%). Similar findings were noted by D Trevisanuto et al (2020) [17] in a study done in Italy where the prevalence in male was 58% (N=18). Also similar was the finding in a study done in United state by J Devin et al (2022) [19] where males accounted for 55%. However in contrast, C Gale et al (2021) [12] in their study in UK found majority (n=35; 56%) were female.

Most neonates in this study were born at term gestation (n=32; 88.8%). This similar to the study done by C Gale et al [12] in UK where most (n=48; 73%) neonates were delivered at term.

In this study, 30 (83.3%), 5(13.8%) and 1(2.7%) neonates weighed more than 2500 gram, between 1500 and 2499 gram and between 1000 and 1499 grams respectively. J Devin et al [19] in US found similar findings that most of the COVID-19 positive neonates (n=621; 67.6%) weighed more than 2500 grams followed by 45 (4.9%) and 7 (0.8%) neonates weighing between 1500-2499 grams and 1000-1499 grams respectively. However they found that 23 (2.5%) neonates weighed less than 1000 grams; but in this study no baby weighed less than 1000 grams. 25 (69.4%) of the neonates were inborn, while 11 (30.6%) were outborn.

Out of total 36 COVID-19 positive neonates, 17 (47.2%) neonates were asymptomatic and 4 (11.1%) neonates had symptoms attributable to COVID-19 infection. 15 (41.6%) neonates had symptoms due to existing co-morbidities. In contrast, BF Colomer et al [16] documented in their study, out of 22 neonates admitted, 19 (86.3%) were admitted for COVID-19 related symptoms and 3 (13.63%) were asymptomatic. D Trevisanuto et al [17] found that in their study, 26 (68.42%) out of the 38 infected neonates were symptomatic. J Devin et al [19] reported that 249 (27.1%) babies had co-morbidities.

This study revealed that 2 (5.5%) neonates had mild symptoms and 1 (2.25%) had moderate and severe symptoms each. Majority of the neonates in the study by D Trevisanuto et al [17], showed mild symptoms. J Devin et al [19] in their study found that out of 918 Covid-19 positive neonates, majority i.e. 847 (92.26%) had non severe Covid-19, while 71 (7.73%) babies had severe Covid-19.

15 (41.6%) neonates in this study had co-morbidities. 5 (13.8%), 4 (11.1%), 4(11.11%) and 2(5.5%) neonates had associated sepsis, hypoxic ischemic encephalopathy, transient tachypnoea of newborn and jaundice respectively. J Devin et al [19] in their study found that 249 (27.1%) neonates had co-morbidities namely jaundice (n=107; 11.7%), congenital anomalies (n=95; 10.4%), sepsis (50; 5.4%), seizure disorder in 17 (1.9%) and hypoxic ischemic encephalopathy (n=2; 0.2%).

In this study, there was no mortality during the hospital stay. 35 (97.2%) neonates were discharged home. However, 1 (2.7%) neonate was transferred to another tertiary care hospital for further evaluation. In their study, J Devin et al found that 93.6% neonates were discharged home and 0.1% neonates expired due to multisystem inflammatory syndrome in children [19]. D Trevisanuto et al found in their study that all neonates were discharged home [17]. In a study by C Gale et al during their publication found that, 88% of neonates had been discharged, 11% were still admitted and 2% had died of a cause not related to SARS-Cov-2 infection [12].

Limitation of the study: Study population in this study was low. A large sample size would be more beneficial. Maternal COVID-19 status was not known in most of the neonates, so potential vertical transmission cannot be confirmed.

Conclusion

In this study it was found that most of the Covid-19 neonates were asymptomatic. Very few Covid-19 neonates had symptoms attributable to Covid-19. Half of the symptomatic babies had mild symptoms. Moderate and severe symptoms of Covid-19 were found in a quarter of symptomatic babies and there was no mortality during the hospital stay.

Conflict of interest: None. **Disclaimer:** Nil.

References

1. Novel CPERE. The epidemiological characteristics of an outbreak of 1919 novel corona virus diseases (Covid-19) in China. Zhonghua liu xing bing xue za zhi= Zhonghua liuxingbingxue zazhi; 41(2):145.
2. Guan WJ, Ni Zy, Hu Y, et al. Clinical characteristics of coraonavirus disease 2019 in China. N Eng J Med. 2020; 382 (18): 1708-20.
3. Zhu N, Zhang D, Wang W, et al. A novel corona virus from patients with pneumonia in China, 2019. New England Journal of Medicine. 2020. 382(8):727-33.
4. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel corona virus in Wuhan, China, of novel corona virus in Wuhan, China. Lancet. 2020; 395 (10223): 497-506.
5. Li Q, Guan X, Wu P, et al. Early transmission dynamics in Wuhan, China, of novel corona virus infected pneumonia. N Engl J Med. 2020. 382(13):1199-1207.
6. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. Lancet 2020;395 (10223): 470-3.
7. WHO. Coronavirus disease (COVID-19) Weekly Epidemiological Updates and Monthly Operational Updates . Geneva: WHO; 2019. Available from: https://www.int/emergencies/diseases/novel-coronavirus-2019/situation-reports.
8. GOI. India; Meity(india)(My Gov Cell);January 2020 to September 2022 mygovy.in.

9. Cyranoski D. Why children avoid the worst coronavirus complications might lie in their arteries. Nature. 2020 Jun;582(7812):324-25.
10. Sharif-Askari NS, Sharif-Askari FS, Alabed M, Temsah MH, Al Heialy S, Hamid Q, et al. Airways expression o SARS-COV-2 receptor, ACE2 and TMPRSS2 is lower in children than adults and increases with smoking and COPD. Mol Ther Methods Clin Dev. 2020: 18: 1-6.
11. Soraya GV, Ulhaq ZS. Interleukin-6 levels in children developing SARS-COV-2 infection. Pediatr. Neonatal. 2020; 61: 253-54.
12. Gale C, Quigley MA, Placzek A, et al. Characteristics and outcomes of neonatal SARS-Cov-2 infection in UK: a prospective national cohort study using active surveillance, Lancet Child Adolesc Health. 2021; 5: 113-21.
13. Shalish W, Lakshminrusimha S, Manzoni P, Keszler M, Sant'Anna GM. COVID-19 and neonatal respiratory care: current evidence and practical approach. Am J Perinatol. 2020; 37:780 - 91.
14. Castagnoli R, Votto M, Licari A, et al. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in children and adolescents: a systematic review. JAMA pediatr. 2020; 174(9):882-89.
15. Liguoro I, Pilotto C, Bonanni M, et al. SARS-CoV-2 infection in children and newborns: a systematic review. Eur J Pediatr. 2020; 179:1029-46.
16. Colomer BF, et al. Neonatal Infection Due to SARS-CoV-2: An Epidemiological Study in Spain. Front. Pediatr. 2020; 8:580584.
17. Trevisanuto D, Cavallin F, Cavicchiolo ME, et al. Coronavirus infection in neonates: a systematic review. Arch Dis Child Fetal Neonatal Ed. 2021; 106: F330-35.
18. Raschetti R, Vivanti AJ, Vauloup Fellous C, Loi B, Benachi A, De Luca D. Synthesis and systematic review of reported neonatal SARS-CoV-2 infections. Nat Commun. 2020;11(1): 5164.
19. Devin J, Marano R, Mikhael M, et al. Epidemiology of Neonatal COVID-19 in United States. Pediatrics. 2022; 150(4): e2022056297.

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