

Case report

Bowel gangrene in neonate born to COVID mother – Is it a manifestation of Multisystem Inflammatory Syndrome in Newborn?

ABSTRACT

Aims: Pregnant mothers with SARS-CoV2 infection are postulated to transfer anti-COVID-19 antibodies to their fetus, which may lead to cytokine storm and fetal inflammatory syndrome, similar to multisystem inflammatory syndrome in children (MIS-C). Manifestations of this newly emerging entity are not elucidated, but MIS in Newborn (MIS-NB) must be suspected whenever a neonate born to COVID positive mother is presenting with unusual symptoms.

Clinical description: We report a preterm, low birth weight, MCDA twin neonate born to COVID positive mother who developed abdominal distension in first few hours of life, initially suspected to have small bowel atresia. Baby had elevated inflammatory panel and given IVIG, suspecting MIS-NB. Intraoperatively the baby was noted to have gangrenous bowel, which required extensive surgical resection, but baby succumbed postoperatively.

Conclusion: This report highlights possible intestinal manifestations of possible COVID-19 related fetal inflammatory syndrome.

Comment [b1]: Please expand

INTRODUCTION :

COVID-19, a rapidly spreading lethal pandemic across nations, has not spared the pregnant mothers or their newborns from complications, with increased incidence of intrauterine infections being reported in medical literature.[1-3] Newborns born to COVID-19 mothers can exhibit multisystem symptoms secondary to passive transfer of antibodies similar to fetal inflammatory response syndrome (FIRS).[4,5] Gastrointestinal manifestations are seen either during the acute phase of COVID illness or in the post-viral inflammatory phase (MIS-C).[6,7] We describe a premature newborn born to a SARS-CoV2 infected mother with acute gastrointestinal symptoms from first day of life. The baby was initially suspected to have small bowel atresia, but intraoperatively diagnosed with inflammatory colonic gangrene.

Comment [b2]: Can be replaced by baby

PRESENTATION OF CASE:

Second born male neonate, appropriate for gestational age, MCDA twin with birth weight of 1.75kg was born to COVID-19 mother with moderate illness, at 32weeks of gestation via vaginal route. Mother is a known case of rheumatic heart disease with mild mitral stenosis, oral metoprolol, frusemide and penicillin prophylaxis since past 1year. Twin gestation was confirmed in 1st trimester and all antenatal investigations were normal. Pregnancy was terminated early in view of maternal illness by induction of labour. The baby and its twin, received passive neonatal care at birth and were admitted to NICU for low birth weight and preterm care.

Comment [b3]: Very long sentence. Break into two

Comment [b4]: the sentence is not clear do you mean baby received routine care at birth ?

The baby was started with oro-gastric tube feeding, but noted to have abdominal distention at 6hours of life. Erect X-ray abdomen revealed multiple dilated bowel loops. (Fig.1). Suspecting surgical abdomen, paediatric surgery consultation was obtained and baby was kept nil by mouth. First day investigations revealed positive CRP (44mg/dL) with total leucocyte counts of 7000 with neutrophilic predominance (80%) and the baby was started on

Comment [b5]: newborn xray swill be usually AP view and cross table if perforation is suspected. Multiple dilated bowel loops means surgical abdomen ? Is it air, fluid levels?

first line antibiotics as per unit policy. The other twin remained asymptomatic throughout its NICU course.

Comment [b6]: We can write ANC (absolute neutrophil level) interpret as normal or high.

New onset respiratory distress, with progressive abdominal distension developed at 16hrs of life requiring non-invasive continuous positive pressure support. Baby passed meconium post rectal stimulation. Nasopharyngeal swab for SARS-CoV2 RT-PCR sent at 24hrs of life was negative. Contrast barium enema confirmed distal dilated bowel loops with obstruction. (Fig. 2) Inflammatory panel was performed suspecting MIS-NB. Trial of IVIG at 2g/kg was given in view of elevated d-dimers (2361ng/mL) and S. Ferritin (456ng/mL). Anti-COVID-19 antibodies also turned out positive. Baby was taken up for emergency explorative laparotomy and intraoperatively found to have dilated gangrenous transverse colon. (Fig 3) Multiple clots were noted along the supplying vasculature suggestive of vascular insult. The gangrenous bowel of 6cm was surgically resected and colostomy was performed. Baby was ventilated postoperatively with need for vasopressor support to tackle hypotensive shock. Baby succumbed at 20hours post-surgery from inotrope resistant shock.

Comment [b7]: Sentence can be made to give clear message

DISCUSSION

COVID-19 infection is notorious in causing vascular and thrombotic events in adults and has been recently observed to cause isolated gastrointestinal involvement with minimal respiratory symptoms in adults as well as in pediatric population.[6-8] Although there is uncertainty regarding the extent of vertical transmission of SARS-CoV2 infection, COVID-19 has been reported to cause fetal inflammatory response syndrome (FIRS).[4,5]

Comment [b8]: Very long sentence.

Please remove notorious.

The incidence of gastrointestinal manifestations in newborn of SARS-CoV2 mother is unknown. Hyper-coagulability induced by systemic inflammatory state, endothelial activation, hypoxia could lead to mesenteric vascular thrombosis or direct viral infection acting on ACE-2 receptor could cause bowel and vascular endothelial damage. COVID-19 associated intestinal ischemia, bowel gangrene has been reported to occur with or without involvement of major arteries in adults.[8] Kenchappa et al, reported a 10year old girl with acute abdomen, SARS-CoV2 RT-PCR positive, operated for small bowel gangrene.[6]

Comment [b9]: Please look into Grammar

The baby described had gangrene of transverse colon which presented clinically as intestinal obstruction. Baby had elevated inflammatory markers suggestive of systemic coagulopathy and possible intrauterine fetal inflammatory syndrome resulting from maternal COVID-19. Kalyanshettar et al, have reported arterial thrombus and gangrene of lower extremity in a SARS-CoV2 positive newborn, treated with anticoagulants.[9] Being a novel entity, not much is known regarding the varied manifestations and treatment options available in newborns. Role of anticoagulants and IVIG in such cases of MIS-NB needs further validation.

CONCLUSION

We hope this case report draws attention towards intestinal gangrene as novel possible presentation of FIRS/MIS-NB in newborns born to COVID-19 mothers. Gastrointestinal

manifestations must not be overlooked in a neonate with exposure to COVID-19, as it may be a harbinger of bowel gangrene.

CONSENT: Informed consent has been taken from the parents of the patient involved in the study.

Comment [b11]: This can be written in the methodology.

REFERENCES

Comment [b12]: Please look at the authors guidelines for references.

1. Dubey P, Reddy SY, Manuel S, Dwivedi AK. Maternal and neonatal characteristics and outcomes among COVID-19 infected women: An updated systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol.* 2020;252:490-501. Doi:10.1016/j.ejogrb.2020.07.034
2. Dong L, Tian J, He S, Zhu C, Wang J, Liu C, Yang J. Possible Vertical Transmission of SARS-CoV-2 From an Infected Mother to Her Newborn. *JAMA.* 2020 May 12;323(18):1846-1848. Doi: 10.1001/jama.2020.4621.
3. Sankaran D, Nakra N, Cheema R, Blumberg D, Lakshminrusimha S. Perinatal SARS-CoV-2 Infection and Neonatal COVID-19: A 2021 Update. *NeoReviews* May 2021, 22 (5) e284-e295; DOI: <https://doi.org/10.1542/neo.22-5-e1001>
4. McCarty KL, Tucker M, Lee G, Pandey V. Fetal Inflammatory Response Syndrome Associated With Maternal SARS-CoV-2 Infection. *Pediatrics.* 2020 Oct 29:e2020010132. Doi: 10.1542/peds.2020-010132. Epub ahead of print. PMID: 33122348.
5. Hofer N, Kothari R, Morris N, Müller W, Resch B. The fetal inflammatory response syndrome is a risk factor for morbidity in preterm neonates. *Am J Obstet Gynecol.* 2013 Dec;209(6):542.e1-542.e11. doi: 10.1016/j.ajog.2013.08.030. Epub 2013 Aug 29. PMID: 23994220.
6. Kenchappa Y, Hegde S, Kumar P, Lalitha AV, Bukelo M. Caught Off Guard with COVID-19 Bowel Gangrene: A Case Report. *Indian J Crit Care Med* 2020;24(12):1269–1271.
7. Lin L, Jiang X, Zhang Z, Huang S, Zhang Z, Fang Z, et al. Gastrointestinal symptoms of 95 cases with SARS-CoV-2 infection. *Gut* 2020;69(6):997–1001. DOI: 10.1136/gutjnl-2020-321013.

8. Varshney R, Bansal N, Khanduri A, et al. (April 26, 2021) Colonic Gangrene: A Sequela of Coronavirus Disease 2019. *Cureus* 13(4): e14687. Doi:10.7759/cureus.14687
9. Kalyanshetkar S., Charki S. Arterial Thrombosis and Gangrene in A Neonate With COVID-19 – A Case Report. *Iranian Journal of Neonatology IJN* 2021. Doi:10.22038/IJN.2021.52842.1948

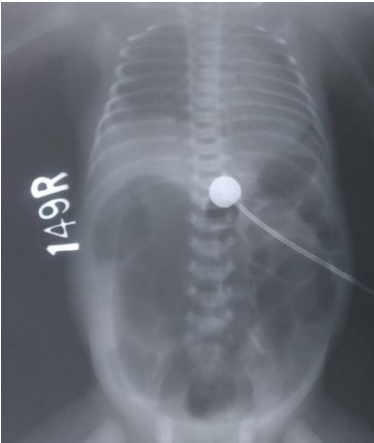


Fig 1 Erect Xray Abdomen showing grossly dilated bowel loops



Fig 2 Barium contrast study suggestive of intestinal obstruction



Fig 3 Intraoperative findings of gangrenous bowel loop

UNDER PEER REVIEW