Case Study

Rare cases of Multisystem inflammatory syndrome (MIS-C) among Neonates as a result of antenatal exposure to SARS COV-2

Pooja Makadia [1], Mehul Pancholi [2]

Author's Affiliation:
1- Children Hospital and Neonatal care Unit, Surat, Gujarat, India.

Correspondence:
Pooja Makadia, Email: ppppoojapatel@gmail.com

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Background: Multisystem Inflammatory Syndrome in Children (MISC) has been becoming very common now days. It usually occurs 2 to 6 weeks after infection with SARS-CoV-2.

Aims: To understand the presentation of MISC among neonate after exposure of SARS-CoV-2.

Case Description: A rare uncommon presentation of MISC found in three of our newborn patients. Each one has a unique presentation with different systemic organ involvement1. All came up with good outcome after difficult NICU course. MISC can occur in a neonate following in-utero exposure to SARS-CoV-2, resulting in multiple organ injury. There is a scarcity in the data about the COVID 19 and MISC presentation among the neonates. So to fill the gap in the knowledge present study was attempted.

Conclusion: Perinatal transmission of SARS-CoV-2 can occur but it is rare. These cases highlight the need to better understand the effect of COVID-19 on the maternal–fetal dyad. Protecting the maternal–fetal dyad from SARS-CoV-2 through appropriate vaccination strategies and other measures might become an important public health need.

Keywords: MISC, SARS-CoV-2, COVID 19, antenatal

INTRODUCTION

The Royal College of Paediatrics and Child Health referred to this acute condition as paediatric multisystem inflammatory syndrome temporally associated with COVID-19 (PIMS-TS).[2] The illness was labelled multisystem inflammatory syndrome in children (MIS-C) by the Canters for Disease Control and Prevention and the World Health Organization[3-5].

The definition of MISC across the organizations is based on 6 principle elements: paediatric age, fever, inflammatory lab markers, manifestation of organ dysfunction, lacking an alternative diagnosis, and a temporal relation to COVID-19 infection or exposure. MISC in children is a condition where different body parts can become inflamed, including the heart, lungs, kidneys, brain, skin, eyes, or gastrointestinal organs[1]. MISC can be moderate, serious, even deadly, but most children who were diagnosed with this condition have gotten better with proper treatment.

METHODS

These case series include three confirmed cases of MISC admitted in Amar children hospital, Surat in Gujarat, India during September to December 2020. Study was conducted by doing secondary data analysis from case.

RESULT

Table 1. Haematological, cardiological and neurological parameter

Variable	Case 1	Case 2	Case 3
Intrapartum H/O	Full term/ LSCS delivery	Full term/ normal vaginal delivery	Full term / LSCS delivery
Parity	Primi gravida	Primi gravida	Primi gravida
Birth weight	2.45 kg	2.9 kg	3.8 kg
Antenatal H/O of COVID19	Present	Present	Present
Haematological			
Hb (gm/dl)	17.1	19.6	9.9
TWC (/microliter)	8510	19080	22080
Platelet (microliter)	193000	242000	476000
C-Reactive protein(m/l)	1	5	2
S. Calcium (mg/l)	10	9.6	8.9
S.LDH (IU/L)	550	823	584
S.Ferritin (ng/ml)	26	495	663
D Dimer (ng/ml)	570	2750	>10000
NT ProBnP (pg/ml)	2530	11420	>25000
S.Urea (mg/L)	19	12	17
S.creatinie (mg/L)	0.41	0.3	0.6
CSF Analysis			
TC cells (/microlitre)	17	-	-
DC Lymphocyte(%)	100%	-	-
Protein(mg/dl)	76.1	-	-
Sugar(mg/dl)	11	-	-
Anti-SARSCov-2 antibody (COI)	Reactive (16.66)	Reactive (22.16)	Reactive (18.7)
Chest X-ray	Normal	Small patchy diffuse infiltrates	Cardiomegaly
2D ECHO	Normal	Moderate PPHN	Severe acute left ventricular dysfunction
EEG	Severe encephalopathy	-	Mod to severe encephalopathy
MRI –Brain	Viral encephalopathy	-	-

CASE SUMMARY:

Case 1: Full term 39 weeks Small for Gestational Age baby boy born via emergency caesarean section (indication: severe oligohydramnios with impending foetal distress). On the day 3 of life, the baby was brought to hospital with complaints of poor feeding and abnormal eye movements. On clinical examination, the baby was lethargic, hypotonic and had mild jaundice. Vitals and systemic examination were normal. After 30 minutes, the baby had convulsions in the form of 30-40 seconds of apnoea with desaturation and cyanosis. So the baby started on inj. phenobarbitone and oxygen by hood. Haematological parameters were normal. Cerebrospinal Fluid examination was suggestive of possible viral aetiology.

After 4 hours, the baby had repeated focal convulsions. Baby was started on inj. levetiracetam. Baby had persistent shallow respiration with respiratory alkalosis. Therefore, the baby was intubated and put on invasive ventilator with minimum parameters. COVID-19 antibody test of baby came positive with increased levels of inflammatory markers. On examination, the baby was comatose. EEG showed moderate to severe

encephalopathy therefore diagnosis of MISC/MIS-N/COVID encephalopathy was considered. This clinical presentation with multi organ dysfunction, elevated inflammatory markers, temporal association with prenatal exposure to COVID-19, and laboratory evidence of IgG antibodies to SARS-CoV-2, in the absence of other possible explanations, we consider the possibility of a hyper inflammatory response to prenatal exposure to COVID-19. Dexamethasone and Intravenous Immunoglobulin was started. Gradually baby improved hemodynamically and was extubated after 2 days and discharged on day 12.

Case 2: Baby girl was admitted to NICU for mild respiratory distress at birth and started on Oxygen by hood. After few hours, baby developed moderate to severe respiratory distress. Then immediately baby put on Non-invasive Continuous Airway Pressure (NCPAP) initially. Due to no any improvement, put on invasive mechanical ventilation. 2D- ECHO showed moderate Primary Pulmonary Hypertension in New born hence started on inotropic support. Baby's COVID-19 antibody test came positive. Inflammatory markers were also in higher range. So, we have considered MISC in neonates and treated with IVIG at 2gm/kg over 48-hour infusion. Gradually baby started improvement so after 3 days Inj. dobutamine was tapered and stopped, ventilator support was weaned off and baby started taking feeds well. Baby discharged on day 8.

Case 3: 12-day old baby was brought to us with complaints of fever and not taking feeds since 1 day. Initially baby was stable and taking feeds since birth. On examination, baby had tachycardia, tachypnea and mild subcostal retractions. SpO2 was 85% on room air. Baby was started on airvo (Heated Humidified High Flow Nasal Cannula). 2d-Echo was done which showed severe acute left ventricular dysfunction. Inj. lasix and dobutamine was started. Baby still had persistent fever. Baby's COVID-19 antibody report was done which came positive along with high inflammatory markers. So baby was started on IVIG and inj. Heparin. Baby also had intermittent drowsiness and irritability so EEG was done which showed moderate encephalopathy and treated with leveracetum and Dexamethasone. Gradually respiratory distress resolved, cardiac function was also improved and baby was discharged.

DISCUSSION

In present study all three mother had antenatal exposure to covid19 and all three babies shown IgG antibodies against SARS CoV2. This phenomenon explains that antenatal exposure to COVID19 leads to severe form of MISC.

Mubbasheer A et al6 found in their study that despite of being critically ill and had extraordinary inflammation, most children responded to prompt administration of anti-inflammatory agents, namely IVIG and corticosteroids. Similar treatment plan is also suggested in study done by Jessica et al7 and executed in present study.

CONCLUSION

Perinatal transmission of SARS-CoV- 2 can occur but it is rare. These cases highlight the need to better understand the effect of COVID-19 on the maternal–fetal dyad. Protecting the maternal–fetal dyad from SARS-CoV-2 through appropriate vaccination strategies and other measures might become an important public health need.8 Along with this, it is also required to know that at what period of gestation is highly risky to have adverse effect of exposure to COVID 19 during antenatal period.

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