Case Report

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Clinical Diagnosis of COVID-19 Related Multisystem Inflammatory Syndrome in Children (MIS-C): A Case Report from Fiji Islands

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Abstract

Background: In the face of emergence of COVID-19, a new phenomenon, Multisystem inflammatory syndrome in children (MIS-C) has called attention to pediatricians worldwide. Here, we bring a Fijian case, treated at a small isolation facility of this small island nation, with a benign evolution.

Case Report: A preterm neonate initially tested negative for COVID-19 developed fever, rashes and gastrointestinal symptoms over 14 days of hospitalization at a COVID isolation facility. Baby was diagnosed of MIS-C, treated with IVIG and Methylprednisolone and achieved complete remission within few days.

Clinical Relevance: This case was reported in light of the increasing number of COVID-19 patients to apprise professionals in better equipping to recognize the spectrum of symptoms of MIS-C which is imperative for timely initiation of appropriate management.

Keywords: COVID-19 in children; MIS-C.

Introduction

The SARS-CoV-2 presenting across a continuum of severity from simple fever, cough, dyspnea to severe respiratory distress and multiple organ failure requiring intensive care[1] has created a catastrophe around the world. In a short time the highly contagious virus has caused debilitation of health systems, economies and governments of the most developed countries to the smallest island nations like Fiji. Although it was initially thought that COVID-19 did not have much impact on the pediatric population, it is now diagnosed across all ages including patients as young as 1 day old neonates.[2] The less common symptoms of COVID19 including diarrhea and vomiting that was initially found in a small percentage of patients has recently raised concern amongst the pediatric population.[3] Gastrointestinal symptoms were noted to be part of a Kawasaki disease (KD) like new phenomenon reported as Multisystem Inflammatory Syndrome in Children (MIS-C) by WHO and CDC or Paediatric inflammatory multisystem

syndrome (PMIS) by the Royal College of Pediatrics and Child Health. The first ever case of MIS-C was reported in US in April 2020. Since than MIS-C reports have emerged around the world corroborating the alert. Herein we report the first patient of MIS-C in Fiji observed in June, 2021.

Case Report

13 day old, female, preterm born at 33 weeks, weight of 1.4 kg, was admitted to the COVID isolation facility, as mother tested positive. Examination on admission was unremarkable except for a low weight of 1.3 kg. COVID test was negative.

On day 8 of admission, baby developed diarrhea and vomiting. Afebrile with normal vital signs, looked emaciated, abdomen slightly distended. Was screened and started on Cefotaxime, Ampicillin. COVID test was now positive. Baby became asymptomatic after 2 days. Antibiotics was discontinued as cultures were negative.

On day 14, became febrile (38°C) and vomiting again.HR remained normal with no respiratory symptoms, SpO_2 99%, fever persisted. BP could not be monitored due to unavailability of equipment. Cardiorespiratory examination was normal, abdomen slightly distended with no signs of peritonitis. Rescreened and recommenced on Cefotaxime, Ampicillin. Within a day developed macular rashes on fingers and lower limbs. White cell count of 17900/mm^3 with predominant lymphocytes 43%, neutrophils 38%, normal platelet count 493000/mm^3. Inflammatory markers ESR 5, C reactive protein 10mg/L, LDH 793U/L, Albumin 31g/L. d-Dimer, ferritin and fibrinogen was not available. Coagulation profile was normal, troponin 101ng/l. CSF negative, urine test negative and BC Coagulase negative Staphylococcus which was regarded a contaminant. Renal, electrolytes and liver functions normal. Stool culture was not sent as it was deemed unsafe for lab personnel to process. Hepatitis/HIV and VDRL serology were negative from birth. CXR, Echocardiography and ECG was not done due to want of facility. Baby received 2g/kg IVIG followed by IV Methylprednisolone 2mg/kg/day for 3 days. Antibiotics was discontinued after 5 days. Baby attained remission in 2 days and was successfully discharged at 7 weeks of life after achieving weight of 1.8 kg.

Discussion

MIS-C is a newly recognized phenomenon that has warranted need for awareness in the midst of a unprecedented global pandemic.

A recent meta-analysis of 953 patients with MIS-C reported a median age of 8.4 years, a male predominance of 58.9% and higher occurrence in Black (37%), followed by Caucasian 29.2% and Asian origin (8.7%).[1] 23.3% of these patients fulfilled the criteria for complete KD while 24% fulfilled 2 or 3 of the KD criteria in combination with prolonged fever resembling incomplete KD.[1] Fever was documented in nearly all the patients (99.4%)as was in our patient, while the majority (85.6%) presented gastrointestinal symptoms (abdominal pain in 58.4%, vomiting in 57.5% and diarrhea in 50.4%).[1] Our patient had developed diarrhea and vomiting as such. 79.3% patients manifested cardiovascular symptoms including tachycardia (76.7%), shock or hypotension (59.9%), myocarditis (41.4%), decreased left ventricular ejection fraction (55%), coronary dilatation (11.6%) and aneurysms (10.3%). Pericardial effusion was found in 22.3% cases while half of the patients had respiratory symptoms including dyspnea, upper respiratory tract symptoms and radiological infiltrates. Our patient did not manifest any respiratory symptoms. A very small number of patients (1.4%) revealed thrombotic complications.[1] Polymorphous exanthema occurred in 54.9% of the patients[1], a finding that raised the index of suspicion for MIS-C in our patient. Non-purulent conjunctivitis was found in 49.8%.[1] Similar symptoms have been reported from multiple studies across the globe.[4,5]

The common biochemical markers of MIS-C include inflammatory markers like C-reactive protein, ferritin, interleukin-6, increased white cell count with lymphocytopenia and thrombocytopenia (as opposed to thrombocytosis in KD).[1,5] Coagulation profile including d-Dimers and fibrinogen are also high.[1,6] Myocardial injury markers troponin and brain natriuretic peptide are often elevated as well.[1,7] Hyponatremia is another finding.[1]

Laboratory tests for our patient showed 43% lymphocytes as opposed to the usual lymphocytopenia in MIS-C, normal platelet levels as opposed to thrombocytopenia, C reactive protein of 10 that wasn't very convincing, troponin 101ng/l that doesn't qualify for a high level in preterm neonates and negative cultures. Not all the biochemical markers were consistent with the WHO case definition of MIS-C. We were also limited by the unavailability and want of facility in carrying investigations like d-Dimer,

fibrinogen, interleukin, ECG and Echocardiography which led to the clinical diagnosis and treatment.

The commonly used treatment modalities for MIS-C include intravenous immunoglobulins (IVIG) and systemic corticosteroids.[1,5,7] Other treatment used are acetylsalicylic acid, heparin for anti-thrombotic effects. Some patients have also been treated with IL-1 receptor antagonists (Anakinra), Interleukin-6 inhibitors (Tocilizumab/Siltuximab) and TNFα-inhibitors(Infliximab).[1,8] Remdesivir was rarely used.[1] Inotropic support, ventilation and ECMO have been used at a relatively high rate as well.[1,4] Our patient showed complete recovery with IVIG transfusion followed by 3 days of IV methylprednisolone. This is an important point to be observed as even with a disease requiring aggressive treatment, most reported outcomes have been favorable.[4,7] Children have been discharged successfully once afebrile with normal inflammatory markers.[4] The best treatment modalities are not yet known but may become clearer once more scientific data become available and with a better understanding of the pathogenic mechanism of the disease which is currently unclear.

Conclusion

In view of the current pandemic and the emergence of this new phenomenon, it is important for clinicians to keep MIS-C as one of the differentials for children presenting with multisystem illness. Despite most MIS-C patients surviving, the multi-facet nature of the disease should prompt early recognition and care to avoid rapid compromise and fatality.

Recommendations

We suggest the bare minimum clinical criteria for diagnosing MIS-C in low resource countries be explored as it may not be possible to carry out all the investigations in resource scarce countries.

We also hope that some future studies may lay down clinical criteria for diagnosing and set the timings for therapeutic intervention or coin new terms like Clinical/Incomplete MIS-C. Emphasis here is to capture the cases at the earliest, intervene therapeutically at the appropriate time and evolve separate guidelines for the developing world where the majority of such cases are likely to occur on account the poor health and laboratory infrastructure, high population density and lack of awareness amongst the medical fraternity as well as the population. Follow up is also important as the long term sequelae is still unknown and needs further research.

Learning Points

MIS-C is a new disease entity in Pediatrics which physicians should be aware off when reviewing newborns with COVID positive mothers.

Overlap of the symptom complex with severe COVID and Macrophage activation syndrome & non-availability of investigative modalities in the third world calls for sharpening of the acumen on part of the attending clinicians.

Pediatricians should keep a constant watch on further research in this area.

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