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Case Report

The Youngest Palestinian Case of Multisystem Inflammatory Syndrome in children (MIS-C)

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ABSTRACT

The multisystem inflammatory syndrome in children (MIS-C) considers a post-infectious immunological response to coronavirus illness (COVID-19) that was originally identified in the United Kingdom and later identified in other countries. A previously healthy 3-month-old boy was admitted to hospital context with -5-day history of fever, gastrointestinal symptoms [diarrhea, vomiting of normal gastric contents], hypoactivity, and poor oral intake, but so far no history of covid-19 active disease. The infant was dehydrated, with macular non-blanching skin rash everywhere over his body and widespread non-pitting edema. With supportive measures, methylprednisolone and IV immunoglobulin, the child improved, with his fever, skin rash, and laboratory tests returning to normal. On the seventh day of hospitalization, he was discharged. This is identified as the youngest reported case of MIS-C since the beginning of the COVID-19 pandemic.

Introduction

SARS-CoV-2-related Multisystem Inflammatory Syndrome in Children (MIS-C) is becoming ever more frequent. It might be a life-threatening illness that affects previously healthy children and adolescents 2–6 weeks following Covid 19 disease (COVID-19). Although the precise cause of this illness is unclear, immunological processes and vasculopathy have been suggested. Fever, scientific indications of inflammation (including elevated ferritin and IL-6), and clinically severe sickness needing hospitalization with multisystem (>2) organ involvement mark this disorder (cardiac, renal, respiratory , dermatologic, hematologic, gastrointestinal, or neurological); Furthermore, no other possible diagnoses should be considered, and a marker for current and recent SARS-CoV-2 infection (RT-PCR, serology, or antigen test) or COVID-19 exposure must have occurred through the four weeks preceding the onset of symptoms (RT-PCR, serology, or antigen test). (1, 2). Both diagnosis and therapies, including resuscitation, have been difficult due to the syndrome's non-specific combination of symptoms and lab results (and the requirement of a positive COVID-19 test).

Symptoms of MIS-C are highly similar to those of Kawasaki disease, toxic shock syndrome (TSS), and also macrophage activation syndrome (MAS), a pattern of secondary haemophagocytic lymphohistiocytosis. Because several clinical signs were similar to Kawasaki's illness, MIS-C was first labeled as Kawasaki-like (KD) (3). Current statistics, on the other hand, show that there are certain differences between these two situations, such

as the time of presentation: KD affects the number of kids before they reach the age of five, while MIS-C begins to affect older children, with such an average age of eight years. (4). It is obvious that MIS-C tends to affect kids of all ages, having 70 percent of papers reporting a median age of seven to ten years. There appear to be proportionally fewer instances reported among kids and young adults 16 and older compared to COVID-19 infection rates in the same categories, however. this might be related to the fact that many of the papers are based on studies done in pediatric hospitals. In contrast to what has been published regarding MIS-C rates thus far, old-aged teenagers and young adults are much more likely to become infected (or examined and diagnosed as cases) than children (5).

Case Presentation

Here we report a case of SARS-COV-2 related multisystem inflammatory syndrome of an infant observed on 15\10\2021. A previously healthy 3 months old male infant without a history of COVID-19 symptomatic disease, was admitted to the pediatric ward with 5 days history of fever, gastrointestinal symptoms [diarrhea, vomiting of normal gastric contents], hypoactivity, and poor oral intake.

On physical examination, the baby was dehydrated with generalized non-pitting edema and macular non-blanching skin rash all over the body figure (1). His abdomen was distended, tympanic on percussion but without organomegaly or ascites. Otherwise, he was afebrile, alert, and conscious with normal vital signs, regular heart rate without any murmurs, good air entry bilaterally with harsh breathing sound, good muscle tone, and strength.

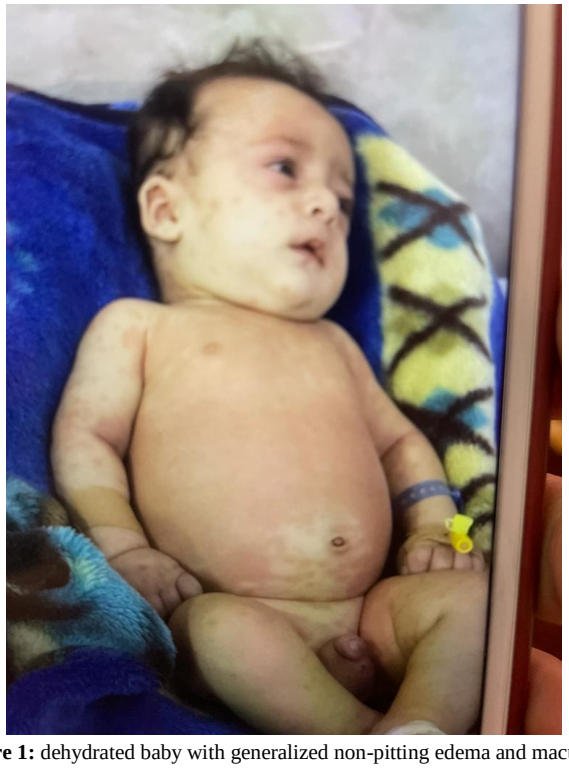

Figure 1: dehydrated baby with generalized non-pitting edema and macular non-blanching skin rash all over the body

Laboratory tests showed anemia, leukocytosis with lymphopenia, and normal neutrophil count. Troponin and COVID-19 antigen PCR were negative but COVID-19 IgG was positive. Ferritin, d-dimer, CRP, and LDH were elevated. Coagulation profile components including PT, aPTT, and INR were elevated, but platelets were still normal. Ultrasound for abdominal distention was done and intussusception was ruled out. An echocardiogram and blood culture were done and were normal.

Since admission the patient received 10 grams of IVIG twice daily for one day, 6mg of methyl-prednisone twice daily for 6 days, 300 mg of ceftriaxone twice daily for 5 days, 6mg of IV Esomeprazole twice daily for 6 days, 30 mg of albumin 20% over 1 hour on the 2nd day of admission since it was found to be decreased (2.7 g/dl) and 50 mg of IV paracetamol as needed.

On the 4th day of admission, his Ferritin was decreased to 728 and platelets increased to 113. On the 6th day of admission, his d-dimer was decreased to 849, CRP fall to 8.4, and platelets normalized. With appropriate management and supportive measures, the child evolved with resolution of fever, skin rash, and normalization of his laboratory findings. And discharged on the 7th day of admission.

Table 1: Lab values after starting treatment

Laboratory test		Result	Normal range
CBC	HB	7.9	
	HCT	23.32	40-52%
	WBC	27.56 (neutrophils :21) (lymphocytes :63.7)	(5-10) *10^6 45-65% 25-45%
	PLTs	15.61	150-400
CRP		138.4	Up to 6 mg\l
Troponin		7.5	Healthy patient : <30 ng\l AMI patient : >30 ng\l
ESR		5	0-15
COVID-19 antigen		Negative	Negative
Ferritin-serum		1600	Males:21.8-275 ng\ml Children:7-140 ng\ml
D-dimer		2561	0-250
LDH		530	125-220 U\L
SGOT		49	0-37
COVID-19 IgG-II-spike protein		1220	Negative < 50 AU\ml Positive > 50AU\ml
Albumins		2.7	3.5-5.5 g\dl

Discussion

To the best of our knowledge, this is the first reported case of MIS-C in this age in Palestine since the onset of the COVID-19 pandemic. And it's the youngest case of MIS-C among reported cases around the world. Our case clinical presentation and laboratory evaluation were consistent with CDC, WHO, and RCPCH case definitions (2, 6, 7). As there's a fever of 5 days duration, elevated inflammatory markers, involvement of gastrointestinal organs and dermatological findings, positive IgG serology test, and negative blood culture. Furthermore, ECG, echo, abdominal ultrasound, and other diagnostic and laboratory tests excluded other potential diagnoses.

It's very difficult to differentiate between MIS-C and other pediatric inflammatory syndromes such as toxic shock syndrome (TSS) and Kawasaki disease (KD); however, they're not the same entity despite the similarities in the presentations (8). Gastrointestinal symptoms like vomiting and diarrhea are distinguishing features of MIS-C. Also, the inflammatory storm observed in MIS-C is much more intense than TSS and KD (8).

In our case, there's much more evidence of inflammatory storm (CRP of 138.4, D-dimer of 2561, albumin of 2.7) along with vomiting and diarrhea (8). The age of our case was 3 months old and since Kawasaki disease presents in children less than five years of age, we can't depend on the age to distinguish between KD and MIS-C, as it's not the only case of MIS-C in children younger than 5 years old (9).

The differentiation between severe COVID-19 and MIS-C is also important. Five days history of fever, presence of rashes and Gastrointestinal symptoms are more consistent with MIS-C, also the severe elevation of inflammatory markers previously mentioned is more consistent with MIC-S rather than severe COVID-19 infection (8).

As the treatment of MIS-C is directed against the inflammatory process they have, then IVIG and/or glucocorticoids are frequently used. IVIG is frequently used if there are KD-like features, shock, cardiac or coronary involvement, and if the patient remains persistently febrile with elevated of his inflammatory markers. Glucocorticoids are added to IVIG in the case of refractory shock, KD-like features, persistent elevation of inflammatory markers, and fever (10). However, recent studies didn't find any strong evidence that recovery rates differ with glucocorticoids alone, IVIG plus glucocorticoids, or IVIG alone (11).

Also, Immunomodulators can be used in refractory cases .low dose aspirin and should be considered in certain circumstances. However, aspirin should be avoided if the platelets count is less than 80,000/ μL. And as symptoms overlap with severe bacterial illness, then empiric broad-spectrum antibiotics should be used before blood culture is taken (12).

In our case, there are refractory KD-like features along with severe inflammatory response, so our patient received IVIG with glucocorticoids. Ceftriaxone was used as an empiric antibiotic. Antiplatelet therapy was not used as platelets count was less than 80,000 /µl (it was 15.6/µl on admission in our case). Albumin was given to our patient on the second day of admission as it was decreased. IV Esomeprazole and paracetamol were also used as ajuvent therapties.

We monitor the patient signs and symptoms along with laboratory findings including CRP to see the response to the treatment previously mentioned. Our patient symptoms and laboratory findings rapidly improve in the next 7 days following the treatment. Before discharge, he was afebrile, there was no vomiting or diarrhea and his skin rashes and edema were also resolved .his CRP, Ferritin, D-dimer, Wbcs, and platelets count were also normalized before the discharge.

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Conflict of Interest

No conflict of interest

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