CASE REPORT

Multisystem Inflammatory Syndrome in a Child with Post-acute COVID-19 Infection Presenting as Kawasaki-like Illness

Venkat Reddy[1], Aditya V Kabra[2], Sudharshan Raj Chitgupiker[3]

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Abstract

Amidst increasing concerns of children presenting with multisystem inflammatory syndrome (MIS) simulating Kawasaki disease, we report a child with MIS-C presented with abdominal pain and fever. A 9-year-old child presented with acute febrile illness, abdominal pain, and later had skin rash with mild bulbar conjunctivitis, oral mucosal erythema, and posterior pharyngeal congestion. Investigations showed high inflammatory markers, leukopenia with neutrophil predominance with high CRP (205 mg/L), ESR (89), D-dimer, and ferritin. Reverse transcriptase polymerase chain reaction (RT-PCR) for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was negative, but antibodies for SARS-CoV-2 was strongly reactive. During hospital stay, he developed arthralgia and tachypnea requiring oxygen. He was treated with oxygen, IV immunoglobulins, aspirin, steroids, and low-molecular-weight (LMW) heparin. Child has responded well, with fever and rash subsiding in 24 hours and no further complications.

Keywords: COVID-19, IV Immunoglobulin, Kawasaki mimic, Multisystem inflammatory syndrome in childhood.

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Introduction

In this pandemic of coronavirus disease (COVID-19) caused by the novel coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the disease was initially thought to be less severe in children than adults.[1] Recently, it has been known to be associated with a set of clinical manifestations presently called multisystem inflammatory syndrome in children (MIS-C).[1] It's unknown whether this increase in COVID-19 cases among children will also increase cases of MIS-C.[2] Children meeting the MIS-C criteria have different demographic and clinical features depending on whether they have acute SARS-CoV-2 infection (polymerase chain reaction positive) or post-COVID-19 infection (antibody positive).[3] We present a child who met the criteria of MIS-C, with SARS-CoV-2 antibodies positivity and clinical picture like Kawasaki disease.

Case Description

A previously healthy 9-year-old child had presented with high grade fever of 4 days, myalgia, severe abdominal pain, and vomiting. On examination, he was alert (GCS-15/15), febrile (103°F), and had conjunctival congestion (nonpurulent), posterior pharyngeal wall congestion, and erythematous nonpruritic macular rashes were present over the trunk. He had the respiratory rate of 32/minutes without retractions, SpO_2 (96%) in room air, tachycardia (HR 128/minutes), and BP—110/64 mm Hg with normal skin perfusion. Mild tenderness was present in epigastric and umbilical areas. Initial investigations showed leukopenia (total WBC counts—4,000/μL) with neutrophilia (80%), Hb—9.4 g/dL, and raised acute-phase reactants (CRP—75 mg/L and ESR—45 mm/hour). Chest X-ray showed few patchy opacities in left mid and lower zones. USG abdomen was normal. Treatment was empirically started with amoxicillin-clavulanate, proton pump inhibitors, and paracetamol.

[1]Department of Pediatrics, Navodaya Hospital, Secunderabad, Telangana, India

[2]Department of Critical Care, Navodaya Hospital, Hyderabad, Telangana, India

[3]Anaesthesia and Critical Care Department, Navodaya Hospital, Secunderabad, Telangana, India

Corresponding Author: Venkat Reddy, Department of Pediatrics, Navodaya Hospital, Secunderabad, Telangana, India, Phone: +91 9701967237, e-mail: Sudha.venkatreddy@gmail.com

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There was no history of respiratory or any other infections in last 2 months. The child did not have any contact with COVID-19-infected patients.

With the above history, examination, and investigations, streptococcal pharyngitis and incomplete Kawasaki disease were considered in differential diagnoses.

Even after 2 days of treatment, he continued to have high-grade fever spikes (104°F), abdominal pain, tachycardia, and tachypnea. The child developed mucosal (oral) erythema and left knee joint pain. Inflammatory markers have shown a further increase in CRP and ESR values (CRP—205 mg/L, ESR—57 mm/1st hour). Computed tomography chest showed minimal bilateral pleural effusion with few patchy areas of consolidation in the left lower lobe—CORADS-2 (coronavirus disease 2019 (COVID-19) Reporting and Data System). Blood culture did not show any growth in first 2 days. Antibiotics were changed to piperacillin-tazobactam and doxycycline. The differentials considered were Kawasaki disease

and multisystem inflammatory syndrome of childhood. 2D-ECHO was normal (ejection fraction—64%) and coronaries were normal. D-Dimer (1731 ng/mL), ferritin (1235 ng/mL), and ESR (89 mm/hour) were elevated. The SARS CoV-2 antibody IgG by the immunoassay method was reactive (30.70) (less than 1.0 is nonreactive). The nasopharyngeal swab for SARS CoV-2–RT PCR report was negative.

Intravenous immunoglobulin (IVIg) (2 g/kg) was started along with IV methyl prednisolone (2 mg/kg/day) and aspirin (35 mg/kg/day). Low-molecular-weight heparin was also started as his D-dimer levels were elevated. Fever subsided within 1 day of starting IVIg and steroids. Dyspnea and oxygen requirement reduced and he was off oxygen after 2 days. Rashes, arthralgia, and abdominal pain subsided by 2 days. The child was discharged after 5 days of hospital stay. At discharge, aspirin was continued (antiplatelet dose—75 mg/day), and oral prednisolone tapered and stopped in next 2 weeks.

Follow-up

Final blood culture did not show any growth.

Repeat 2D-ECHO after 5 days showed normal coronaries.

The child was asymptomatic, investigations showed thrombocytosis (10 lakhs/cm^3), normal CRP (4 mg/L), and ESR (33 mm/hour) levels.

Discussion

Our child had features consistent with MIS-C with positive SARS-CoV-2 antibodies and negative COVID-19 RT-PCR. The child did not have hypotension/shock and sepsis. As there were features that met the WHO criteria,[1] the child has been labeled to have MIS-C. In this child, the disease progression and response to IVIg is much similar to Kawasaki disease[4] except for lung involvement, age of presentation, and gastrointestinal symptoms. Troponin-T and N-terminal proBNP were not done as the child did not have shock or any significant hemodynamic compromise.

According to the present classification by the WHO/CDC/RCH,[5] any child presenting with persistent fever, inflammation (neutrophilia, elevated CRP, and lymphopenia), and evidence of single or multiorgan dysfunction with exclusion of other infective cause and evidence of COVID-19 infection is labeled as MIS-C. Though our child has met the criteria of MIS-C by the CDC and WHO, he also meets diagnostic criteria of atypical Kawasaki disease with multisystem involvement. As we are in the midst of understanding these novel manifestations of COVID-19 in children, reporting is essential for clinicians for timely initiation of appropriate management. One question researchers need to address is "the likely implications of the immune dysregulation that is the hallmark of MIS-C in development of vaccines for COVID-19 (as MIS-C seem to coincide with the phase of antibody production)."

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