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A Case Of Multisystem Inflammatory Syndrome Associated With Covid 19

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Abstract

During COVID-19 outbreak, there was a higher incidence of severe inflammatory disease observed in children. This condition was later named Pediatric Multi-inflammatory Syndrome temporally associated with COVID-19 (PIMS-TS) or Multisystem Inflammatory Syndrome associated with Coronavirus Disease 2019 (MIS-C). This condition usually presents with cervical adenopathy, skin lesions like erythema and induration, conjunctival injection and fever. This pattern of disease is commonly observed in cases of Kawasaki disease. This condition is further worsened by myocarditis or shock. Cytokine storm syndromes triggered by SARS-CoV-2 infection is the most widely accepted theory behind the inflammatory response. So far, intravenous immunoglobulin (IVIG) and systemic glucocorticoids are the drugs which are employed in treating this group of patients. However, the use of anakinra in patients with severe forms of COVID-19 is showing promising results. Here we report a case with multisystem inflammatory syndrome.

Keywords: MISC-C, PIMS-TS, COVID-19, SARS-CoV-2, Kawasaki, IL-1

Introduction

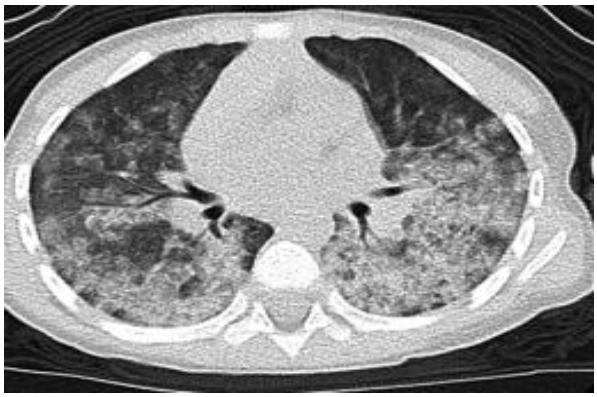
Children are relatively less infected by SARS-CoV-2 infection and when infected they tend to develop milder forms of the disease (1, 2). However, in few children severe inflammatory conditions may develop, who required intensive care, have been reported during COVID-19 outbreak, (3–5). There are multiple reports of pediatric SARS-CoV-2 related inflammatory conditions, named Pediatric Multi-inflammatory Syndrome which shows temporal association with COVID-19 (PIMS-TS) or Multisystem Inflammatory Syndrome associated with Coronavirus Disease 2019 (MIS-C), which have some clinical features common with Kawasaki disease (KD) and Kawasaki shock syndrome (KSS) (6–8). Clinical characteristics that are seen PIMS-TS are persistence fever, bulbar conjunctivitis, skin rash, or mucosal involvement which is similar to Kawasaki disease. However, the classical criteria for diagnosis of Kawasaki disease may be absent MIS-C. Hence it will be more appropriate to have a comparison of this condition to a form of atypical or incomplete Kawasaki disease (9). Della Paolera et al. Case Report has discussed the role of Anakinra in Multisystem Inflammatory Syndrome disease, complicated by cardiac involvement in the form of myocarditis and shock (10–12), and macrophage activation syndrome (MAS) (4, 13, 14). The syndrome is attributed to the hyper-inflammation due to a cytokine storm associated with the immune response to SARS-CoV-2 infection (15). In SARS-CoV-2, cytokine storm syndrome has a varied spectrum of clinical features and varying degrees of severity. Some patients present an inflammatory syndrome with multiorgan dysfunction (MODS) and severe thrombocytopenia, increased inflammatory

markers, increased ferritin levels, and coagulopathy, sometimes meeting the diagnostic criteria for macrophage activation syndrome (15–17). Based on our knowledge, MIS-C is a distinct entity however belonging to the spectrum of cytokine storm syndromes (17,). Anakinra is a recombinant human IL-1 receptor antagonist (IL-1ra) approved for treating cases of rheumatoid arthritis and other inflammatory conditions. Case reports and case series in patients with MIS-C reported the treatment with IL-1ra suggesting its safe and effective use in this specific condition (10, 11, 13).

Case Study

We present a previously healthy 4-year-old male child came to the OPD with complaints of fever for 4 days associated with abdominal pain, vomiting and rashes all over the body. He had edema of the hands and feet. His medical history reported a close contact with a relative with COVID19 one month before, and a recent positivity of Naso-pharyngeal swab for SARS-CoV-2. On examination he was febrile (102 °C), Blood Pressure was 100/60 mmHg, Heart Rate is 120/min, Respiratory Rate 38/min. He was afebrile, conscious, oriented but dehydrated. Per abdomen was tender and other system examinations were normal. The blood test showed a severe lymphopenia (lymphocyte 31.5 %), thrombocytosis (platelets 3,85,000/mm3), sodium low (134 meq/ml), increased C-reactive protein (CRP 67.5 mg/L), elevated IL-6 (put if needed) elevation of PT ratio (INR 1.8) and increase of D-dimer levels (8.38 mg/L) check if correct. Chest xray showed few inhomogeneous opacities and CT thorax was done which showed ground glass opacities with interspersed areas of consolidation in peripheral distribution.

Fig 1:CT thorax showing ground glass opacities with interspersed areas of consolidation in periphery



Echocardiography was normal. Patient was treatment with IV methylprednisolone 2 mg/kg/day and intravenous immunoglobulin (IVIG) 2 g/kg was started. Fever subsided and Laboratory workup showed a gradual increase of blood cells count and a reduction of C-reactive protein. The patient was discharged in good condition.

Discussion:

The multisystemic signs of MIS-C are similar to those of other previously recognized illnesses, particularly Kawasaki disease, despite the fact that some findings seem to suggest that it is a unique clinical entity. Furthermore, adults who have COVID-19 frequently experience acute sickness during the first two weeks of infection, in contrast to children who typically experience the disease state over two weeks after contracting the virus. However, recent reports of adult instances of multisystem inflammatory syndrome demonstrate that SARS-CoV2 can generate this clinical presentation in people of any age. In our case Fever, abdominal pain, vomiting, and diarrhea are typical presenting characteristics of MIS-C, while age and clinical aspects are common to the early presentations of the condition in the literature. Whereas MIS-C and Kawasaki Disease (KD) have certain similarities, Kawasaki disease is more common among Asian children while MIS-C is thought to be uncommon in this population. Furthermore, the incidence of Kawasaki disease peaks about 10 months of age and is most common in children under the age of five.

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During the COVID-19 pandemic in Paris, France, prospective observational research with 21 children and adolescents hospitalized with symptoms of Kawasaki-like disease during a 15-day period found that 12 (57%) had African ancestry [18]. Different therapeutic techniques have been attempted because the pathophysiology of MIS-C is unclear, but no specific therapy is currently available. Early detection of MIS-C is important to enable prompt prescription of the most effective medication for the patient's clinical situation.

Conclusion:

It is evident that the criteria currently used to diagnose MIS-C are too broad and that this allows inclusion of children with different diseases. Also there is no clarity on the pathogenesis of MIS-C, no specific therapy is currently available. In conclusion, further studies are urgently needed for a better definition of MIS-C, its true impact on child health, the best clinical and therapeutic approach, and its true prognosis.

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