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Case report

Multi-Systemic Inflammatory Syndrome in Childhood with Neurological Presentation: A Case Report

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ABSTRACT

Since the earliest reports of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in China in 2019, COVID 19 has rapidly spread worldwide. Though earliest reports considered children as low risk compared to adults, the pandemic progression unveiled severe COVID-19 in pediatric age groups with different presentations. Furthermore, several serious COVID 19-related consequences in the form of a multisystem inflammatory syndrome (MIS-C) or so-called Kawasaki-like illness have been described in different countries. MIS-C has a wide range of clinical symptoms, including persistent fever, severe malaise, the inclusion of two or more organ systems, laboratory markers of inflammation, and confirmation of SARS-CoV-2 disease in the patients or the patients' contact with a COVID19 positive case. After the patient meets WHO or CDC diagnostic criteria, the diagnosis is typically confirmed. Include fever more than three days with clinical signs of multisystem involvement and elevated markers of inflammation, evidence of SARS-COV-2 infection with no other obvious cause. This report presents a case of MIS-C who presented with aseptic meningitis to highlights the value of testing for COVID-19 in children with new-onset neurological symptoms during the COVID 19 era, especially in the presence of a history of contact with a confirmed case after excluding other apparent causes.

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INTRODUCTION

Since the earliest reports of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in China in 2019, COVID 19 has rapidly spread worldwide [1]. Although earlier reports tend to consider children as low risk compared to adults, the pandemic's progression revealed severe infections in the pediatric age group [2,3]. Since late February 2020, worldwide reports have described plenty of severe complications in pediatrics age that were accredited for COVID-19 infections. A group mainly of healthy kids were admitted to the hospital with cardiogenic shock or Kawasaki disease–like symptoms that were sequentially linked to SARS-CoV-2 virus [4]. This severe appearance is described in a variety of ways. It is recognized as Multisystem inflammatory Syndrome associated with Coronavirus Disease 2019 (MIS-C) in the United States and many other countries [5]. MIS-C has a wide range of clinical manifestations, including persistent fever, severe malaise, gastrointestinal, lung symptoms, multi-organ involvement, and lab evidence of inflammation and lab or epidemiological proof of

SARS-CoV-2 illness. The diagnosis of MIS-C is usually made once the patient fulfills one of the diagnostic criteria published by WHO or CDC. With some differences between them but in general, to meet either of the criteria, the child should be febrile for more than three days, plus there should be clinical signs of multisystem involvement and laboratory evidence of inflammation, a confirmation of SARS-COV-2 infection with no other apparent causes [7,8].

A growing body of evidence indicates that the condition is uncommon; it mainly affects children in late childhood and is commonly accompanied by gastrointestinal complaints and serious cardiovascular problems. There is some similarity with features of other diseases like Kawasaki Disease, toxic shock syndrome, and secondary hemophagocytic lymphohistiocytosis/macrophage activation syndrome [6]. Owing to the diversity of clinical presentations of MIS-C, no consensus exists for its management. Supportive treatment is the mainstay and involves critical care support [5]. Drugs used include Intervenus immunoglobuline, steroids, and biological medications [9]. Although it was only recently that neurological manifestation was reported in MIS-C patients [8], this case report will discuss the clinical courses and outcome in a young child presented with MIS-C.

CASE PRESENTATION

A previously healthy 7-years old girl presented to the emergency department with ten days history of frontal headache. It was throbbing in nature, unresolved by oral analgesia. During the last five days, the headache increased in severity, particularly in the mornings. Later on, she developed a high-grade fever unresponsive to antipyretics with one attack of non-projectile vomiting associated with generalized colicky abdominal pain. No significant medical, surgical, or drug history was of value. Upon entry to the emergency department, examination signified an irritable child with positive meningeal irritation signs. The body temperature was 40.5 C; blood pressure was 90/70 mmHg, heart rate was 120 bpm, and respiratory rate was 23 cycles per min.

Based on the presentation, meningitis was suspected. Complete blood count revealed leukocytosis with 95% neutrophilia, C-reactive protein=168.3, slightly elevated liver enzymes as for chest x-ray; it was unremarkable. A lumbar puncture was done, showed 140 cells, predominantly lymphocytes with normal cerebral spinal fluid's (CSF) sugar and protein. CSF culture was negative, implying a case of aseptic meningitis; the patient was admitted to the infectious unit, and treatment was urgently initiated.

However, after five days of treatment, the fever did not subside. A generalized maculopapular rash was noticed; non-itchy neither tender (Fig.1). The lips were fissured, cracked (Fig.2) with bilateral non-purulent conjunctivitis (Fig 3). The chest was clear with no added sounds, normal S1&S2 heart sounds, abdomen soft, no organomegaly, and no palpable lymph nodes. Non-petting edema of both feet was detected.

Figure 1: The maculo-papular rash on the body (the neck and upper chest)

Figure 2: The cracked reddened fissured lips, perioral perinasal redness

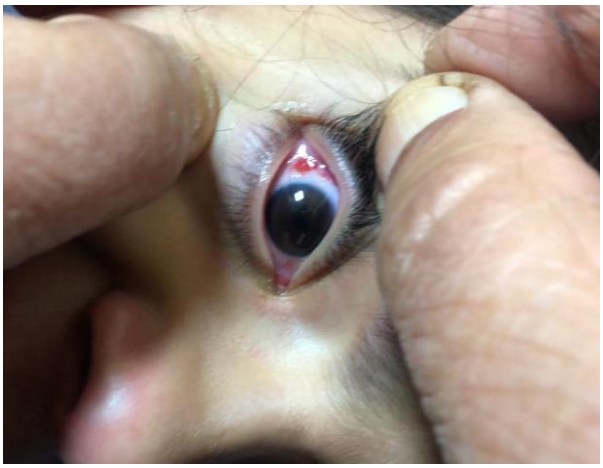

Figure 3: The non-purulent conjunctivitis

Interestingly, both parents developed mild signs of respiratory distress and subsequently tested positive for SARS COV2. They run a favorable course; no other family members tested, and all remain asymptomatic. At that point, we suspect COVID 19 based on family history, later on, confirmed by polymerase chain reaction (PCR) of a deep nasal swab. In addition, the case had positive IgG, IgM for COVID 19, serum ferritin 854 ng/ml, and elevated

Lactic Acid Dehydrogenase (LDH). Thus, the diagnosis was confirmed for MIS-C as the patient fulfilled the CDC diagnostic criteria. Treatment was intravenous immunoglobulin (IVIG), iv methylprednisolone followed by oral prednisone, and high dose aspirin. The patient's general condition improved after two days; her fever subsided, the rash disappeared, and the edema of feet decreased in severity. After ten days of admission to our hospital, she was discharged well.

DISCUSSION

Many MIS-C or Kawasaki-like disease cases have been observed in the pediatric age range during the ongoing COVID19 pandemic. MIS-C had a wide spectrum of clinical presentation, which may delay diagnosis without a high degree of suspicion. Therefore, this patient initially was diagnosed as a case of aseptic meningitis based on clinical signs and symptoms and the result of lumper puncture. However, once the other criteria of MIS-C became obvious alongside a contact with a confirmed COVID 19 cases, the diagnosis of MIS-C was suggested.

The patient in this report fulfills the CDC diagnostic criteria for MIS-C post COVID19 [8]. The patient suffered from prolonged fever, elevated inflammatory markers, and the involvement of more than two systems (gastrointestinal, dermatologic, and neurological). Moreover, she tested positive for SARS-COV2. Interestingly, all cultures (CSF, blood, and urine) were negative, which excluded other etiology with similar presentation.

Aseptic meningitis is one of the clinical presentations of MIS-C [8]. In July 2020, a case report from New Jersey reported a case of MIS-C presented with neurologic involvement. Kest et al. describe a nine years old child with MIS-C who presented with aseptic meningitis. Unlike their case, our patient did not suffer from cardiogenic shock or altered mental status [10]

In multiple reports, recovery was achieved by varying degrees of intensive care. The majority required respiratory support, inotropes, IVIG (intravenous immunoglobulin), and steroids [11-13]; likewise, our patient, with the only exception, was that no inotropes was required.

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Disclaimer

The article has not been previously presented or published, and is not part of a thesis project.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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