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CASE REPORT

Infectious Disease

Multisystem inflammatory syndrome in adults: A case in a previously healthy adult

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Abstract

A 25-year-old previously healthy female presented to the emergency department (ED) with 5 days of rash, fevers, shortness of breath, and generalized weakness. She had presented to another ED 4 days previously and noted that her rash had improved, but her other symptoms were worsening. She had recovered from COVID-19, confirmed by positive antigen test 5 weeks prior. On ED arrival, she was afebrile and persistently tachycardic to a rate of 120 beats per minute, despite aggressive fluid resuscitation with 3L of IV crystalloid. She was found to have a troponin elevated to 0.06 ng/mL in addition to a d-dimer elevated to 1.42 mcg/mL FEU. She was admitted to the hospital where she developed hypotension requiring vasopressor support and was admitted to the intensive care unit (ICU). A transthoracic echocardiogram revealed a newly reduced ejection fraction of 31%. She was diagnosed with multisystem inflammatory syndrome in adults (MIS-A). The patient received intravenous immunoglobulin and methylprednisolone 60 mg Q12 hours while admitted. She was discharged on hospital day 3 with a prednisone taper and is currently doing well at her most recent follow-up with infectious disease.

KEYWORDS
Covid 19, critical care, emergency medicine, heart failure, IVIG, MIS-A, MIS-C, SARS-CoV2

1 | INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus causing coronavirus disease 2019 (COVID-19), has disrupted lives as part of the ongoing pandemic and is the leading cause of death in the United States.[1] After many have recovered from their initial disease, multisystem inflammatory syndrome in children (MIS-C) has become a rare but well known complication of COVID-19 infection in pediatric populations characterized by shock, decreased ejection fraction and myocardial damage, and elevated inflammatory markers.[2] Even fewer reports of a similar multisystem inflammatory syndrome in adults (MIS-A) exist, with scattered reports across the United States and several cases with similar features internationally.[3] MIS-A is currently defined by 5 features, summarized here, including (1) age ≥21, (2) positive test result for SARS-CoV2 within the previous 12 weeks, (3) severe dysfunction of extrapulmonary organ systems, (4) elevated inflammatory markers, and (5) absence of severe respiratory illness.[4] We present a case of MIS-A in a previously healthy young adult patient.

2 | CASE

An otherwise healthy 25-year-old female contacted her primary care physician in mid-October with 9 days of congestion, anosmia,

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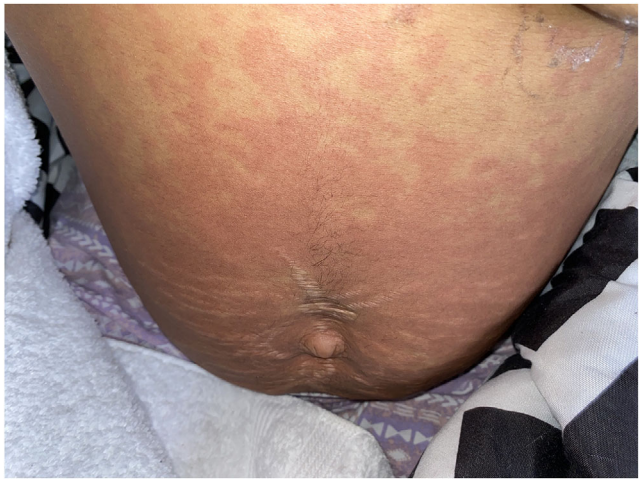

FIGURE 1 Multisystem inflammatory syndrome in adults; rash on abdomen

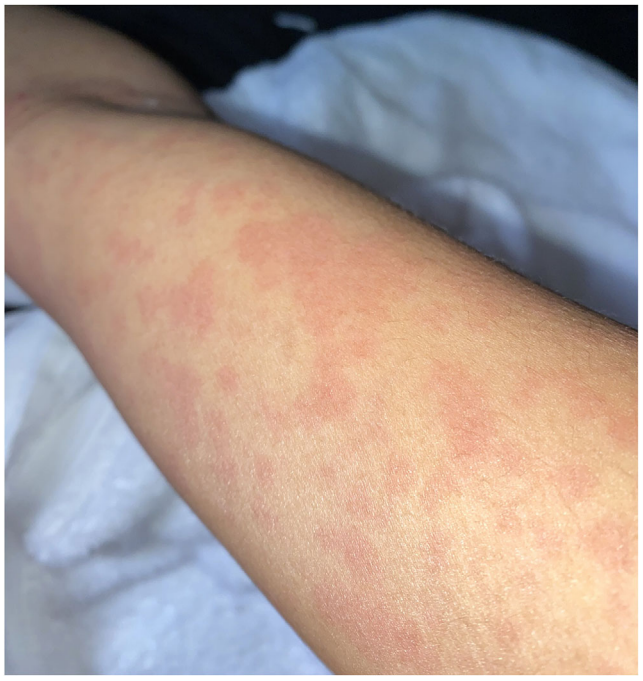

FIGURE 2 Multisystem inflammatory syndrome in adults; rash on arm

and mild sore throat. She had close contact with another household member who tested positive for COVID-19. She was well appearing on presentation and discharged home from the outpatient setting with instructions for symptomatic care. Her SARS-CoV2 antigen test was positive on October 22, 2020. She was monitored at home with several telemedicine visits and recovered uneventfully.

She presented to care in the emergency department 5 weeks later with 2 days of shortness of breath, fevers, sore throat, weakness, and rash. At that time, she was overall well appearing and had laboratory testing that included negative flu, negative strep, and unremarkable basic metabolic panel and complete blood count. She had some improvement in her symptoms with IV fluids and was discharged home with supportive care measures. Repeat SARS-CoV-2 antigen testing was negative.

She was evaluated again at a telemedicine primary care visit 2 days later where she was noted to have visible maculopapular rash with swelling of her hands and feet (Figures 1 and 2). She was noted not to be in acute distress and instructed to continue supportive care measures at home.

She presented to another ED 2 days later. At that time, she was noted to be tachycardic with a maximal heart rate of 130 beats per minute, without an associated fever. She endorsed multiple days of diarrhea, ongoing shortness of breath and myalgias, and resolving rash. She endorsed dyspnea severity to the point it was causing her difficulty caring for her young children. While in the ED, she received 3L of IV fluids. She was noted to have an elevated d-dimer with subsequently negative computed tomography pulmonary embolus study and a mildly elevated troponin to 0.06 ng/mL. Her tachycardia did not improve while in the ED, and she subsequently developed a fever.

She was admitted to the hospital where she continued to have tachycardia and subsequently developed hypotension unresponsive to fluids. She was evaluated by the infectious disease service and transferred to the ICU. Additional laboratory testing revealed elevated inflammatory markers, including C-reactive protein, erythrocyte sedimentation rate, and fibrinogen. Her troponin continued to rise peaking at 0.13 before downtrending. While in the ICU, she received intravenous immunoglobulin (IVIG) and steroids with improvement of her shock. A transthoracic echocardiogram revealed a newly reduced ejection fraction of 31%. She received an additional dose of IVIG and was subsequently improved enough to be discharged on hospital day 3. She was discharged with a steroid taper.

3 | DISCUSSION

We present a case of MIS-A presenting in an otherwise healthy young adult approximately 5 weeks after initial COVID-19 infection. MIS-C is now well established in children.[2] Although rare, multiple case reports are now documented with MIS-A, adding to the growing list of known postdisease complications in COVID-19.[4,5,3] This clinical case is the first to highlight the rash as a key presenting symptom for MIS-A, as no existing images of the associated rash have been documented in adult patients.

The Centers for Disease Control and Prevention (CDC) have described a case series of 16 patients found to have MIS-A. These patients range in age from 21–50 and are heterogenous in their comorbidity profile. Many of the patients described in the CDC case series have no comorbidities at all, similar to our patient, raising concern that this is a disease process that can have serious impacts on young, otherwise healthy individuals' function.[4]

To date, the pathophysiology of MIS-A or MIS-C is not understood. Multiple proposed mechanisms exist including endothelial dysfunction and dysregulated immune response among others.[6] These pathways

are relatively similar to other proinflammatory disease processes and emphasize COVID-19 as a proinflammatory and prothrombotic disease process with long-reaching effect

We want to emphasize the relatively benign presentation of this patient to the ED. Aside from tachycardia, her initial vital signs were not markedly abnormal on her ED presentation before the visit where she was admitted. It is important for frontline physicians to maintain a high level of suspicion for this disease process, especially in young, otherwise healthy people. Persistent tachycardia, despite resuscitative efforts should be a reminder to consider more sinister pathologies in what otherwise may appear to be a simple viral illness.

In summary, we present a case of a novel disease process, MIS-A, in a young, healthy patient. As we treat more COVID-19 survivors during the ongoing COVID-19 pandemic, we should maintain a high level of suspicion for post-COVID complications.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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