MULTISYSTEM INFLAMMATORY SYNDROME IN A 12-YEAR-OLD BOY AFTER MRNA-SARS-COV-2 VACCINATION

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Abstract: Multisystem inflammatory syndrome in children (MIS-C) following SARS-CoV-2 infection is well known. We describe a 12-year-old child developing MIS-C after receiving 2 doses of mRNA COVID-19 vaccines without clinical evidence of COVID-19 infection. A possible association between the SARS-CoV-2 vaccine and MIS-C cannot be excluded.

Keywords: MIS-C, SARS-CoV-2 vaccine, COVID-19, child

Accepted for publication December 7, 2021
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The authors have no funding or conflicts of interest to disclose.
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DOI: 10.1097/INF.0000000000003442

Multisystem inflammatory syndrome in children (MIS-C) following SARS-CoV-2 infection is relatively well known.[1] A similar multisystem hyper-inflammatory syndrome following COVID-19 vaccination is not well described in the pediatric age group. We describe a 12-year-old child developing MIS-C after receiving 2 doses of mRNA COVID-19 vaccines. A possible association between the SARS-CoV-2 vaccine and MIS-C cannot be excluded.

CASE REPORT

A 12-year-old boy presented by continuous, high-grade fever for 3 days, redness of eyes, followed by a diffuse erythematous non-itchy rash, fatigue and abdominal pain, 5 weeks after his second dose of Moderna vaccine that was preceded by the first dose of Pfizer-BioNTech vaccine given 3 weeks apart. He had no history of COVID-19 infection or exposure. He had no history of cough or respiratory symptoms, headache, seizures or joint pain. There was also no history of recent travel, contact with sick persons, bird or animal exposure and no raw milk product use. There were no known allergies or drug use. On admission, he was hypotensive and febrile, with mild tachypnea and tachycardia. There was bilateral conjunctivitis but no lymphadenopathy or sore throat. Cardiac, chest, abdominal and neurologic examination was unremarkable. Two days later, the patient developed vomiting, diarrhea and facial puffiness.

SARS-CoV-2 PCR was negative, but SARS-CoV-2 IgG (against S protein) was highly positive (>5680 IU/ML). He had increased inflammatory markers and troponin level, and also, he had thrombocytopenia, neutrophilia and lymphopenia. Echocardiography showed mildly affected LV function (EF=55%). Investigations are illustrated in Table 1.

The diagnosis of MIS-V, or MIS-C following vaccination was entertained. In addition to intravenous fluids, acetaminophen and empirical antibiotic use (azithromycin and ceftriaxone), we started intravenous immunoglobulin 2 gm/kg on the fourth day of admission. He responded well, with resolution of fever, rash and facial swelling and also his laboratory parameters started to improve. The patient developed thrombocytosis so the patient was discharged on aspirin 81 mg/d to be followed in the clinic one week after discharge. He returned to his premorbid baseline except mild fatigue.

DISCUSSION

There are few reports of MIS-C following SARS-CoV-2 vaccination and almost all reported cases have been diagnosed in

TABLE 1. Laboratory Investigations Results

Lab Parameter	Intial Lab Result	Labs After IVIG	Follow-Up Lab One Week From Discharge	Normal Range
Leukocytes	13	13	6.7	4.5–13.5 K/uL
Lymphocytes	0.66	3.17	4.06	1.5–4 K/uL
Neutrophils	12	2.9	4.73	2–7.5 K/uL
Hemoglobin	11.3	13.6	13.4	12–15 gm/dL
Platelets	145	516	365	150–450 K/uL
creatinine	48	33	NA	53–115 µmol/L
CRP	136	20	2	0–3 mg/L
ESR	26	62	22	< 20 mm/h
D-dimer	5	2.5	NA	0–0.5mg/L
Ferritin	522	303	NA	10–244 ng/mL
Fibrinogen	>370	262	NA	200–393 mg/dL
Troponin-I	0.8	0.03	NA	0.02–0.04 ug/L
AST	36	55	NA	<34–118 U/L
ALT	28	37	NA	10–49 U/L
procalcitonin	10	0.33	NA	0.0–0.1 ng/mL
SARS-CoV-2 PCR	Negative			
SARS-CoV-2-IgG	>5680			< 17 IU/ML
ASOT	98			0–200 IU/ML
ANA	Negative			
Blood culture	Negative			
Urine culture	Negative			
Bacterial, viral GI multiplex stool	Negative			
Other virology	Negative			
Malaria film	Negative			
Brucella culture	Negative			

ALT indicates alanine aminotransferase; AST, aspartate aminotransferase; ANA, antinuclear antibodies; ASOT, anti-streptolysin O titer; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; GI, gastro-intestinal; PCR, polymerase chain reaction; SARS-CoV-2, severe acute respiratory syndrome coronavirus-2.

the adult population with or without preceded COVID-19 infection. Almost all of them were successfully treated by immunomodulatory therapy,[1–3] except one fatal MIS-A case following SARS-CoV-2 vaccination in a patient with prior COVID-19 infection.[4]

To our knowledge, this is the first informed case of a child developing MIS-C after receiving 2 doses of different mRNA COVID-19 vaccinations fulfilling the definitive case definition of MIS-C following SARS-CoV-2 vaccination.[5] A nucleocapsid antibody test was not performed in this patient so a prior history of asymptomatic COVID-19 infection cannot be excluded and hence this case cannot be attributed to vaccination or MIS-V. This case emphasizes the need to exclude prior SARS-2-CoV infection by testing for nucleocapsid antibody which is induced only by infection and not vaccination.

Cases of MIS-C should be cautiously interpreted, as misattribution of such cases to vaccination can unjustifiably increase vaccine hesitancy.

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