A Fatal Case of Multisystem Inflammatory Syndrome in Adult (MIS-A) in a Post Covid-19 Patient

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Abstract

Multisystem Inflammatory Syndrome (MIS-A) is a hyperinflammatory condition occurring in adults with age >21 years. It is a rarely reported, potentially lethal condition observed in COVID-19 infections. We report a case of a 31-year-old young male with a history of COVID-19 infection one month prior, who presented with fever, abdominal pain, nausea and recurrent vomiting for 3 days and was eventually diagnosed with MIS-A. In adults presenting with raised inflammatory markers and multisystem involvement in a post COVID-19 infection, a high index of suspicion is required for diagnosis and prompt initiation of treatment with corticosteroids and IVIG is required for improved outcome.

Keywords: COVID-19, fever, inflammatory markers, MIS-A, acalculous cholecystitis

Introduction

The COVID-19 pandemic, caused by SARS-CoV-2, has affected approximately 293 million people worldwide with 34 million in India alone, as of January 4th, 2022.

SARS-CoV-2 virus has been found to affect multiple organs in varied manifestations with post COVID-19 syndrome sequelae like Multisystem Inflammatory Syndrome (MIS).

MIS associated with COVID-19 is a rare, potentially life-threatening illness, causing inflammation in different body parts including heart, lung, kidney, muscles, joints, brain, skin, eyes or gastrointestinal organs. More than 400 case reports have been published on MIS in children, however the frequency of same is far less in adults.

The whole world is facing new waves of the COVID-19 pandemic with emerging new variants having different mutations infecting population of adults who are >21 years.

Herein, we report a fatal case of an adult diagnosed with MIS-A with a history of COVID-19 illness.

Case Report

A 31-year-old male, with no past comorbidity, was diagnosed with positive COVID-19 illness through RT-PCR one month back, and he recovered within a week with symptomatic management at home. However, he started having rash, nausea, recurrent vomiting, abdominal pain and fever from the last 4 days. Aggravation of these symptoms was noted since the morning along with palpitation and breathlessness on mild exertion. Redness in the eyes was noted by family members from the last 2 days.

On examination, he had tachycardia (pulse rate 126/min), blood pressure of 90/60 mmHg, respiratory rate of 26/min, and his oral temperature was 101°F at the time of admission. Diffuse erythematous blanching rash over trunk with bilateral conjunctivitis was noted.

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His systemic examination was essentially normal.

Blood investigations on the day of admission showed markedly raised inflammatory markers including C-Reactive protein (CRP), Interleukin-6 (IL-6), serum ferritin with no evidence of any active infection (Table 1 and 2).

Table 1: Routine investigation and inflammatory markers

Investigation	At admission	Day 1	Day 2	Day 3	Day 4
Hb (g/dl)	12.2	11.8	11.0	10.7	10.1
TLC (109/L)	8.02	5.54	3.23	4.23	5.4
Platelet (109/L)	140	105	90	78	84
Creatinine (mg/dl)	0.8	0.9	1.8	3.2	5.1
Total Bilirubin (mg/dl)	1.3	1.7	2.2	2.5	2.1
SGOT (IU/L)	40	56	84	98	102
SGPT (IU/L)	111	112	95	118	124
ALP (IU/L)	82	70	94	99	84
C-Reactive protein (mg/L)	278	290	328	356	378
D-Dimer (ng/ml)	1935	1844	2340	2684	2867
Interleukin-6 (pg/ml)	1458	584	276	358	420
Ferritin (ng/ml)	1209	1386	1472	1542	1984
ESR (mm/hr)	90	94	110	104	114
LDH (IU/L)	228	320	344	305	288
NT proBNP (pg/ml)	2410	1880	2600	3200	3608
Trop-I (ng/ml)	0.04	0.06	0.86	1.2	1.8

Table 2: Infection screening

Investigation	Result
Urine culture and sensitivity	Sterile
Blood culture and sensitivity	Sterile
ET culture and sensitivity	Sterile
HIV	Negative
HBsAg	Negative
Anti HCV IgG	Negative
Dengue NS1	Negative
Dengue serology	Negative
Scrub typhus IgM	Negative
Weil felix test	Negative
Leptospira IgM	Negative
Malaria antigen	Negative
Typhidot	Negative
Peripheral smear	No toxic granules
COVID Antibody IgG (AU/ml)	35.6

Electrocardiography (ECG) showed sinus tachycardia and 2-D Echocardiography (ECHO) showed no regional wall motion abnormality (RWMA); left ventricular ejection fraction was 55%. Computed Tomography, chest and abdomen, showed mild bilateral pleural effusion, hepatomegaly with diffuse gall bladder wall thickening and enhancement.

In view of no evidence of active infection and above-mentioned findings in the setting of a recent COVID-19 infection, a diagnosis of MIS-A (Multisystem Inflam-matory Syndrome-Adult) was made.

He was intubated and put on mechanical ventilator due to low GCS, hemodynamic instability, and impending respiratory failure. Treatment with corticosteroids, low molecular weight heparin was initiated, along with continuous renal replacement therapy (CRRT). Cytosorb was also started on day 2 in view of acute kidney injury. However, his condition continued to deteriorate and had sudden bradycardia followed by asystole, CPR was done as per ACLS guideline; however, he could not be revived and was declared dead 6 days after admission.

Discussion

Multisystem inflammatory syndrome, a hyperinflammatory illness associated with antecedent or current COVID-19 infection is an emerging entity reported in both child (MIS-C) and adult (MIS-A).[1] MIS-C is a well-recognized syndrome, whereas MIS-A is rare and has more severe outcome.[2] Case Definition for MIS-A, as suggested by CDC, ispatient aged ≥21 years, hospitalized for ≥24 hours, or with an illness resulting in death, who meets the following clinical and laboratory criteria. The patient should not have a more likely alternative diagnosis for the illness (e.g., bacterial sepsis, exacerbation of a chronic medical condition).[1]

I. Clinical Criteria

Subjective fever or documented fever (≥38.0 C) for ≥24 hours prior to hospitalization or within the first THREE days of hospitalization* and at least THREE of the following clinical criteria occurring prior to hospitalization or within the first THREE days of hospitalization*. At least ONE must be a primary clinical criterion.

*These criteria must be met by the end of hospital day 3, where the date of hospital admission is hospital day 0.

A. Primary clinical criteria

1. Severe cardiac illness– Includes myocarditis, pericarditis, coronary artery dilatation/aneurysm, or new-onset right or left ventricular dysfunction (LVEF<50%), 2nd/3rd degree A-V block, or ventricular tachycardia. (Note: cardiac arrest alone does not meet this criterion)
2. Rash AND non-purulent conjunctivitis

B. Secondary clinical criteria

1. New-onset neurologic signs and symptoms– Includes encephalopathy in a patient without prior cognitive impairment, seizures, meningeal signs, or peripheral neuropathy (including Guillain-Barré syndrome)
2. Shock or hypotension not attributable to medical therapy (e.g., sedation, renal replacement therapy)
3. Abdominal pain, vomiting, or diarrhoea
4. Thrombocytopenia (platelet count <150,000/ microliter)

II. Laboratory evidence

The presence of laboratory evidence of inflammation AND SARS-CoV-2 infection.

A. Elevated levels of at least TWO of the following: C-reactive protein, ferritin, IL-6, erythrocyte sedimentation rate, procalcitonin

B. A positive SARS-CoV-2 test for current or recent infection by RT-PCR, serology, or antigen detection

Three case series of MIS-A have been published across the world, and very few case reports from India have been reported.[2-6]

No guidelines for diagnosis and management of MIS-A have been accepted till date. Modalities used in the treatment of MIS-A have been extrapolated from MIS-C as the pathophysiology seems to be similar. Pulse steroid therapy, IVIG, aspirin and anticoagulant are different modalities that have been used in the management of MIS-A.[7]

Conclusion

MIS-A must be one of the differential diagnoses in patients presenting with febrile illness, multisystem involvement and raised inflammatory markers, in post COVID-19 illness. Infection and cardiac screening should be done before making a diagnosis of MIS-A. High index of suspicion is required for timely intervention using steroids and IVIG combination, preventing potentially fatal outcome. The purpose of this case report is to raise awareness among healthcare providers about this emerging illness, which can be fatal if left untreated.

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