Case Report

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A case report on COVID-19 associated multisystem inflammatory syndrome in children

Sachin Kumar^{1*}, Deepak Sharma², Khushboo Tongaria³, Naman Bansal¹

¹Department of Pediatrics, Bansal Hospital, New Friends Colony, New Delhi, India

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*Correspondence: Dr. Sachin Kumar,

E-mail: sachin.bablu88@gmail.com

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ABSTRACT

As severe acute respiratory syndrome coronavirus 2 continues to spread worldwide, there have been increasing reports from different parts of India during second wave of infection describing children and adolescents with COVID-19-associated multisystem inflammatory conditions. We describe clinical features and management in children with multisystem inflammatory syndrome children (MIS-C) from the Delhi metropolitan area, which had a high incidence of coronavirus disease 2019 (COVID-19). We report a similar case presenting with persisting fever, rashes, bulbar conjunctivitis, abdominal pain, decreased urine output and shock. Initial reports suggestive of high inflammatory markers, neutrophilic leukocytosis, high D-dimer and found to have COVID-19 IgG antibodies positive in high titre. Managed successfully in PICU with bolos fluids, intravenous antibiotics, steroids and anticoagulation.

Keywords: COVID-19, MIS, Children

INTRODUCTION

Multiple case reports of MIS-C have appeared describing children with unusual febrile illnesses that have features of Kawasaki disease, toxic shock syndrome, acute abdominal symptoms, and encephalopathy, along with elevated inflammatory markers, and multisystem involvement in the background of this COVID-19 pandemic. 1-5

Preliminary WHO case definition⁶

Children and adolescents 0-19 years of age with fever >3 days and two symptoms such as: a) Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs (oral, hands or feet), b) Hypotension or shock, c) Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (including ECHO findings or elevated troponin/NT-proBNP), d) Evidence

of coagulopathy (by PT, PTT, elevated D-Dimers) and e) Acute gastrointestinal problems (diarrhea, vomiting, or abdominal pain).

Elevated markers of inflammation such as ESR, C-reactive protein, or procalcitonin or no other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes and evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19.

As many of these children may deteriorate quickly and initially present to non-tertiary care facilities, a general guide for an approach to such children is warranted.

These insights provide evidence for the need to develop a clear case definition and treatment protocol for this new

²Department of Pediatrics, Kadam Hospital, Bhiwani, Haryana, India

³Department of Obstetrics and Gynaecology, Fortis La-Femme, Greater Kailash, New Delhi, India

condition and also shed light on future therapeutic interventions and the potential for vaccine development.

CASE REPORT

A 12-year-old male child with no significant past medical history presented with 3 days of febrile illness (fever up to 102-degree F) which was associated with multiple episodes of diarrhoea (8-10 times) watery, non-bloody, non-mucoid, along with 4 -5 episodes of non-bilious vomiting and decreased urine output. On presenting to paediatric emergency child was lethargic, febrile with temperature of 101-degree F, generalised blanching rash, mild epigastric tenderness. Child was in shock with poor peripheral pulses and BP 70/40 mmHg, required 3 IV normal saline boluses.

Table 1: Patient's characteristics/various investigations at the time of admission and discharge.

Variables	On admission	At discharge
Age (years)	12	
Sex	Male	
Time to presentation	3 days	
Sars cov 2 (RTPCR)	Negative	
Anti-sars cov 2	Positive (26.88	
antibody	COI)	
Haemoglobin (g/dl)	11.5	10
$TLC (10^3/uL)$	20,008	12000
Platelet (10 ³ /mm ³)	1.9	2.02
Neutrophils (%)	96	
Lymphocytes (%)	1	
Prothrombin time	18.6	
(seconds) INR	1.40	
APTT (seconds)	92	45
1 /	>5000	43
IL-6 (pg/ml) PRO-BNP (pg/ml)	3000 4540	
Lactate (mmol/L)	4.8	1.5
Serum ferritin	4.8	1.3
(ng/ml)	379.6	
CRP	278 (max during	14 (on
	hospital course)	discharge)
Serum sodium (mmol/L)	128	134
Serum albumin (g/dl)	2.4	3.5
LDH (U/L)	226	3.3
ESR (mm/hour)	16	
D-DIMER (ng/ml)	2410	
Creatinine	2.8 (highest)	0.4 (on
Echo	Normal	discharge)
	B/L Hilar	
X-ray	infiltrates	
Steroids	Given	
Anticoagulant	Given	
Duration of hospital stay	7 days	

On investigation, he had neutrophilia, lymphocytosis, leucocytosis, increased CRP but all other relevant fever investigations were normal. On further suspicion D-Dimer, IL-6, PROBNP were done which were significantly high. Patient had Covid RTPCR negative but with positive COVID antibody titre. He presented with AKI with serum creatinine value of 1.9 at admission. He received IV antibiotics (inj ceftriaxone) and steroids (inj methylprednisolone 2 mg/kg/day) for 7 days. Patient also started on enoxaparin 30 mg s/c OD. Patient symptoms improved after starting treatment and creatinine improved and urine output increased. Child was discharged after 7 days of hospital stay.

DISCUSSION

MIS-C is a rare disorder, affecting only 0.6% of patients <21 years of age infected with SARS Cov-2.⁶⁻⁸ In our case, we have a persisting fever, non-purulent conjunctivitis, generalized rash, high D-dimer, abdominal pain, high inflammatory markers with IgG antibody positivity which clinches the diagnosis of MISC.

In the present case, RT-PCR was negative but the antibody test was positive. The patient hailed from a COVID hotspot area. History of fever in family was positive a month ago, resolved on antipyretics. As the general condition of the child was deteriorating very fast, we considered pulse dose steroids and I/V antibiotics very early in the course. After which there was a remarkable improvement in kidney function and shock. As general condition improved remarkably and no thrombosis on detailed ultrasound doppler, As the child had deranged coagulation and high D-Dimer level, decision for early anticoagulation with low molecular heparin was taken to prevent thrombosis.

There may be an association between the COVID-19 antibodies and such type of hyperinflammatory conditions mimicking Kawasaki disease or toxic shock syndrome which needs further research work but awareness of such condition will ease the management.

CONCLUSION

MIS-C is a rare yet severe and highly critical complication of COVID-19 infection in pediatrics, leading to serious and life-threatening illnesses. Knowledge about wide spectrum of presenting signs and symptoms and disease severity, including early detection and treatment, is pivotal to prevent a tragic outcome.

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