



COVID 19 ASSOCIATED MULTISYSTEM INFLAMMATORY SYNDROME IN CHILDREN (MIS-C): VARIED MANIFESTATIONS AND MANAGEMENT

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ABSTRACT In children, COVID-19 is usually mild but may present with severe post COVID manifestation. Multisystem inflammatory syndrome in children (MIS-C) or pediatric multisystem inflammatory syndrome (PMIS) is linked with severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) and presents as unremitting fever (>38 degree Celsius), red tongue, non-purulent conjunctivitis, rash, respiratory symptoms, myalgias, myocardial dysfunction, arrhythmias, serositis, hypotension and shock. It can also manifest with renal, hepatic or gastro-intestinal affection; cardiac affection has been seen in our cases with coagulopathies. Herein we are reporting four cases of MIS-C between June to August 2021 (2nd wave).

KEYWORDS : Covid 19, multisystem inflammatory syndrome in children, methylprednisolone

CASE SERIES:

Case Number 1:

A 11-year-old male child presented with high grade, continuous fever associated with chills and rigors and wet spasmodic cough for 7 days. On examination, patient's vital parameters were stable, however child had non-purulent conjunctivitis, bilateral cervical lymphadenopathy and decreased air entry in right inframammary region. Complete blood count (CBC) showed neutrophilic predominance (71%) with negative Covid RTPCR and rapid antigen test. Chest Xray was normal. Patient was shifted to pediatric intensive care unit on day 2 of admission in view of tachycardia (150 beats/minute) with tachypnoea (36 cycles/min) and hypotension (96/ 54 millimeter of mercury). Other investigations included erythrocyte sedimentation rate (ESR) 30 mm at 1 hour, C-reactive protein (CRP) >160 mg/l, ferritin 458 ng/ml, fibrinogen 552 mg/dl, D-Dimer >1600 ng/ml, NT pro-BNP 849 pg/ml, LDH 218 U/l, procalcitonin 5.78 ng/ml with positive covid antibodies. Triglycerides, prothrombin time, activated partial thromboplastin time, liver and renal function test were normal and cultures showed no growth. Two-dimensional echocardiography (2D ECHO) was normal. Patient was started on injection methylprednisolone 30 mg/kg/day for 5 days and subsequently shifted to oral prednisolone tapered on day 3. Injection enoxaparin 1 mg/kg/day was administered along with tab aspirin 2.5 mg/ kg/day and injection ceftriaxone 100 mg/kg/day. Patient was given adrenaline infusion for hypotension which was tapered on day 3. D-dimer test normalized after 7 days. Patient's vital parameters were stable after 7 days and repeat 2D ECHO at 2 weeks was normal.

Case Number 2:

A 3.5-year-old female child was admitted with high grade continuous fever, abdominal pain, vomiting and loose motions since 10 days. Patient's mother had history of anosmia and ageusia 1.5 months back. On examination patient was sick looking with tachypnoea (Respiratory rate 44 cycles/minute) and bilateral cervical lymphadenopathy. Air entry was reduced in bilateral inframammary and infraaxillary area. Covid RTPCR and rapid antigen test were negative, chest Xray was normal and CBC revealed neutrophilic predominance. CRP (93 mg/l) and ESR (110 mm at 1 hour) were raised and covid antibodies were positive. 2D ECHO showed pericarditis and thin rim of pericardial effusion. D-Dimer was 431 ng/ml, ferritin 142 ng/ml, triglycerides 120, NT ProBNP 37 pg/ml, with normal prothrombin time, activated partial thromboplastin time, liver and renal function test. Patient was administered methylprednisolone 10 mg/kg/day for 3 days and injection ceftriaxone 100 mg/kg/day. Oral prednisolone was initiated after 3 days, tapered and omitted. Repeat

2D ECHO at 2 weeks was normal.

Case Number 3:

A 2-year-old female child was hospitalized for fever, high grade, intermitted for 10 days, wet cough 3 days and vomiting for 1 day. Patient had tachycardia (heart rate 146 beats/minute) with decreased air entry bilaterally in inframammary and infrascapular areas with crepitations. CBC revealed thrombocytopenia (91000 cells/mm³) with hyponatremia (129) and chest Xray showed blunting of cardiophrenic angle. Liver function tests showed elevated enzymes (SGOT 745 U/L and SGPT 219 U/L). Covid RTPCR and rapid antigen tests were negative and covid antibodies were positive. 2D ECHO done on day 2 revealed pericardial and pleural effusion. Injection methylprednisolone was started 30mg/kg/day. Dopamine was started for hypotension and omitted on day 3. On day 2, child developed petechiae and CBC showed further drop in platelet count (45 cells/mm³). Dengue antigen and IgM was positive. USG showed mild hepatosplenomegaly with minimal ascites and bilateral pleural effusion. Prothrombin time was normal with deranged APTT (>180). Fresh frozen plasma was given thrice to normalize the APTT. Oral prednisolone started after 5 days of injectable methylprednisolone, tapered and omitted. Liver function test showed improvement and platelets were normalized. Patient's vital parameters were stable hence was discharge on weekly follow-up. 2D ECHO after 2 weeks is still suggestive of pericardial effusion and is being kept on a strict follow-up.

Case Number 4:

A 5-year-old male child presented with high grade, continuous fever since 6 days and was sick looking with cheilosis, red-tongue, rash and normal vital parameters. CBC showed neutrophilic predominance, CRP 102 mg/l, ESR 50 mm at 1 hour, D-dimer 1270 ng/ml, Ferritin 1083 ng/ml. RTPCR and rapid antigen test were negative and covid antibodies were positive. 2D ECHO was normal. Patient was started on Injection methylprednisolone 10mg/kg/dose for 3 days tapered and omitted on oral prednisolone, inj. Enoxaparin 1 mg/kg/dose for 7 days. D-dimer repeated on day 7 was 386 ng/ml. Patient discharged and advised 2D-echo scan at 2 and 6 weeks.

DISCUSSION:

The term COVID-19 was designated by WHO for severe acute respiratory syndrome coronavirus 2 infection (SARS-CoV-2). [1] In children, it is very mild but can have unique presentation as MIS-C. The 1st case of MIS-C was reported in April 2020 in United Kingdom presenting as incomplete Kawasaki disease (KD) or toxic shock syndrome.[2] Our cases varied between 2.5 years to 11 years.

The common symptoms reported were fever, gastrointestinal symptoms, rash, conjunctivitis, mucous membrane involvement (red or swollen lips, strawberry tongue), cardio-respiratory and lymphadenopathy. [3,4] Our cases presented with similar symptoms along with hepatic involvement, shock, coagulopathies and dengue.

The mandatory investigations would be RAT/RTPCR, CRP/ESR, CBC, D-dimer. However, an ECG and 2D echo would be essential in each and every case. [5] We have seen pericarditis with a thin rim of pericardial effusion in 2 cases performed on admission, 2 and 6 weeks post discharge. We should also observe for myocarditis, coronary artery abnormalities and LV dysfunction. [6,7]

Multiple studies have administered intravenous immunoglobulins and/or intravenous methylprednisolone. [8,9,10] The results have been promising with methylprednisolone (B III evidence) and low molecular weight heparin. Hospitalization is essential along with monitoring of respiratory rate, blood pressure and pulse oximeter. We need to maintain hydration and administer paracetamol 15 mg/kg/dose 6-8 hourly, vitamin supplements, zinc and warm saline gargles. We have administered broad spectrum antibiotics in three of our cases. Empirical antibiotics should be given case wise.

In the pandemic situation, one should consider covid 19 in children presenting with varied manifestations. Awareness, sensitization, early hospitalization and diagnosis with prompt appropriate therapy could prevent and mitigate complications.

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