

# Medi Quest BRS Hospital

A monthly News letter from BRS Hospital

## POST COVID MULTI SYSTEM INFLAMMATORY SYNDROME IN AN ADULT

**DR. S. SATHIYAN.,** M.D,D.M Neph  
Consultant Physician and Nephrologist  
BRS HOSPITAL

**DR. S. RAMESH.,** M.D,DCh.  
Consultant Paediatrician  
BRS Hospital

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Editors

**Dr.B.Madhusudhan,**  
MS.MCh.,DNB(Plastic)

**Dr.S.Ramesh,MD,DCh**

28,Cathedral garden Rd,  
Nungambakkam,  
Chennai - 600 034.

Phone:

044 - 61434250

044 - 61434230

Email:

brsmadhu@yahoo.co.in

Web:

www.brshospital.com

### INTRODUCTION:

Most people with COVID-19 experience mild symptoms or moderate illness. About 5% become critically ill. Typically, people recover from COVID-19 after 2 to 6 weeks. Much is still unknown about how COVID-19 affects people over time. More time and research are needed to understand the long-term effects of COVID-19. Common post covid sequelae includes fungal and bacterial infections following recovery, which could be due to the immunosuppressive medications used. Here we present a young adult who had apparently recovered from COVID pneumonia to come back with fever and organ dysfunction about 5 weeks later. We suspected sepsis initially which turned out otherwise.

### CASE HISTORY AND COURSE:

A 22 year old adult with a history of COVID pneumonia six weeks ago from which he had recovered, presented to BRS hospitals in view of fever of 1 week duration, cough and throat pain for 6 days. He had undergone a CT Scan of neck prior to admission in view of throat pain - which revealed retropharyngeal inflammation and multiple neck lymph nodes.

At admission he was febrile(100.3F), tachypnoeic and was hypotensive with (BP 86/50mm Hg) and tachycardia (HR

120-130/min). He was started on empirical antibiotics on suspicion of sepsis (inj.Piperacillin Tazobactam and clindamycin ), IVF, O2 supports and supportive therapy. Initial results revealed neutrophilic leukocytosis and mild renal impairment: Hb-14.2; TC-13310 with PMN 90%; Urea-53; Creatinine-1.53; Sodium-133; Potassium-3.6. He had moderate elevation in liver enzymes (AST 254). RT PCR for COVID 19 was negative. IGG Antibody for SARS COV2 Antibody was positive.

He had progressive hypotension, worsening tachycardia and respiratory distress features in favour of Septic Shock. His BP further reduced to 80/40mm Hg and he was started on Noradrenaline infusion, and his heart rate was around 160 beats/min. ECG showed sinus tachycardia. He had respiratory distress despite being on high O2 supports. In view of worsening septic shock and ARDS and he was shifted to higher facility for further care. He was started on BiPAP Support and Inj.Hydrocortisone 50mg IV TDS was added in view of worsening hypotension. Fever workup was done. Blood culture and urine culture, MP-QBC, Dengue IgM/NS1, IgM Scrub typhus and IgM Leptospirosis were sent. All results were negative.



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CT Chest showed bilateral lower lobes show patchy ground glass densities and diffuse smooth septal thickening – suggestive of pulmonary congestion , Bilateral minimal pleural effusion; CORADS-3. CT abdomen was normal .

Echo showed: Global LV hypokinesia; No LV clot; Dilated LV with severe LV dysfunction EF-32%; Moderate MR; Adequate RV size and function; No PE. Cardiologist opined the case and advised to continue inotropic support and to start T.Digoxin, T.Flavedon MR and Inj.Clexane. Myocarditis leading to cardiomyopathy was suspected. Cardiac enzymes were marginally elevated.

ENT surgeon opined on the case and advised to continue antibiotics. CT neck was reviewed and there was no evidence of abcess in neck space or retropharyngeal region and was advised to continue antibiotics.

Antibiotics was escalated to Meropenam along with Doxycycline, IV Hydrocortisone, LMWH, Digoxin and BiPAP supports . The patient showed a gradual recovery in his hemodynamic status and he was eventually off vasopressors in 3 days and his BP was 94/54 mm Hg. His resting heart rate declined to 100 beats/min. He continued to need O2 supports via face mask for 3 more days and he came off this eventually.

The final culture results showed no growth. No identifiable cause for fever , hypotension, respiratory distress and cardiac failure could be made out . But the patient had showed a marked recovery in his clinical status with antibiotics, steroids, LMWH and supportive therapy. A retrospective diagnosis of Post covid Multi Inflammatory syndrome in Adults was made - which fitted the clinical picture.

Repeat Echo was done prior to discharge. It showed mild global hypokinesia of LV; No LV clot; Mild LV dysfunction EF-50%; Mild to moderate MR; Normal RV size and function; No PE. He was

discharged home in a hemodynamically stable condition.

### **DISCUSSION:**

Multisystem inflammatory syndrome in children (MIS-C) has become a recognized syndrome, whereas a parallel syndrome in adults has not been well defined.

### **CRITERIA FOR MULTISYSTEM INFLAMMATORY SYNDROME – CHILDREN (MIS-C) ASSOCIATED WITH COVID INFECTION:**

- 1.An individual aged <21 years presenting with fever, laboratory evidence of inflammation (elevated CRP, ESR, fibrinogen, procalcitonin, d-dimer, ferritin, LDH, or IL-6, elevated neutrophils, reduced lymphocytes and low albumin) and evidence of clinically severe illness requiring hospitalization, with multisystem ( $\geq 2$ ) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological); AND
- 2.No alternative plausible diagnoses; AND
- 3.Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or exposure to a suspected or confirmed COVID-19 case within the 4 weeks prior to the onset of symptoms.

### **MULTISYSTEM INFLAMMATORY SYNDROME IN ADULTS (MIS-A):**

Symptoms similar to children can develop in adults days to weeks after the COVID infection. Adults with MIS-A may have various signs and symptoms including fever, hypotension, abdominal pain, vomiting, diarrhea, neck pain, rash, chest pain, fatigue.

There is no standard definition for MIS -A. A working case definition for identifying this condition in reported literature included the following five criteria:



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- 1) Severe illness requiring hospitalization in a person aged  $\geq 21$  years;
- 2) A positive test result for current or previous SARS-CoV-2 infection (nucleic acid, antigen, or antibody) during admission or in the previous 12 weeks;
- 3) Severe dysfunction of one or more extrapulmonary organ systems (e.g., hypotension or shock, cardiac dysfunction, arterial or venous thrombosis or thromboembolism, or acute liver injury);
- 4) Laboratory evidence of severe inflammation (e.g., elevated CRP/ESR, neutrophilic leucocytosis, elevated ferritin, D-dimer, or interleukin-6)
- 5) Absence of severe respiratory illness ...This criteria is used to distinguish patients with active COVID infection with respiratory distress having organ dysfunction might be attributable simply to tissue hypoxia. The authors recognize there can be overlap with respiratory failure also .However our patient did not have active COVID infection , but had positive antibody titers .

Patients were excluded if alternative diagnoses such as bacterial sepsis were identified.

Our patient fitted with the diagnosis of MIS in adult. He had prior history of COVID pneumonia 5 weeks prior and had positive antibody titres. He had organ dysfunction requiring hospitalisation – severe cardiac failure, Acute Lung injury, mild renal impairment and hepatitis. He had laboratory evidence of inflammation with neutrophilic leucocytosis and raised ESR.

### **WHAT IS THE REASON FOR SOME PATIENTS DEVELOPING MIS?**

The pathophysiology of MIS in both children and adults is currently unknown.

About 30-45 % of reported patients have negative

PCR and positive SARS-CoV-2 antibody test results, suggesting MIS-A and MIS-C might represent postinfectious process.

In some patients, persistent infection outside the upper respiratory tract is possible; SARS-CoV-2 has been identified in multiple organs including the heart, liver, brain, kidneys, and gastrointestinal tract.

Proposed mechanisms for extrapulmonary dysfunction in COVID-19 include endothelial damage and thrombo inflammation, dysregulated immune response system.

### **WHAT ARE THE MANAGEMENT PLANS IN MIS?**

Patients presenting with shock should be resuscitated according to standard protocols. Fluid resuscitation is done initially. Most children with MIS-C presented with vasodilatory shock that is refractory to volume expansion. Epinephrine or norepinephrine are the preferred vasoactive agents for the management of fluid-refractory shock.

IVIg is recommended for most patients who present with shock or cardiac involvement. The usual dose given for patients is 1g / kg as an infusion over 8 to 12 hours. If there is fluid overload due to cardiac failure this dose can be given in divided doses over 3 days. Glucocorticoid therapy is given concomitantly with IVIg if severe or life-threatening illness is present. It is also given as a second-line treatment in patients who do not respond to IVIg. Glucocorticoid therapy is initially given intravenously (IV) with methylprednisolone at a dose of 2 mg/kg/day in two divided doses. Once the patient has defervesced and is improved clinically, this can be changed to an equivalent oral prednisone by the time of discharge and then tapered off over three to four weeks.

Patients with MIS-C are at risk of experiencing thrombotic complications including DVT, stroke and MI. Large vessel thrombosis has been reported in patients with MIS. Patients with severe LV

dysfunction are at risk for apical LV thrombus. Systemic anticoagulation is appropriate for patients with moderate to severe LV dysfunction.

#### TAKE HOME POINTS:

1. Multi system Inflammatory syndrome can be a dangerous complication following COVID infection. The usual mean time period in a few reported case series had been 2-5 weeks following COVID infection.
2. In patients with atypical or late manifestations of SARS-CoV-2 infection, positive antibody results might be crucial to augment clinical recognition of this condition and guide treatment.
3. The use of a panel of laboratory tests for inflammation, hypercoagulability, and organ damage (e.g., CRP, ferritin, D-dimer, cardiac enzymes, liver enzymes, and creatinine) might assist in the early identification and management of this COVID-19-associated condition.
4. A high index of suspicion is required for its diagnosis. Usually it is interpreted as severe sepsis at presentation.
5. Though it is common among children, post covid MIS is also being reported in adults.
6. It needs ICU care most often and appropriate treatment includes IVIG, Steroids and anticoagulation along with other organ supportive measures.



No.28, Cathedral Garden Road, Nungambakkam, Chennai - 600 034.

☎ 044 - 6143 4200 / 230 / 250 / 2823 5859

🌐 [www.hospitalsinchennai.in](http://www.hospitalsinchennai.in) ✉ : [brsmadhu@yahoo.co.in](mailto:brsmadhu@yahoo.co.in)

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