COVID-19 Management For 1 Month - 19 Years Old: Statement by the Indian Academy of Pediatrics, Ver. 2.0 (June 2021)

When to suspect COVID-19?*

- Fever, headache, myalgia, fatigue, tiredness, coryza, cough, sore throat, rapid breathing
- Diarrhea, vomiting, abdominal pain
- Poor feeding in an infant, loss of taste or smell (>8 year)
- Rash, conjunctival congestion, mucositis, shock
- Asymptomatic but has a close/household contact with a COVID-19 case

*Symptoms and signs of COVID-19 are nonspecific, may present alone or in combination and mimic any viral illness

Whom to test?

- Testing is recommended ideally for all the suspect cases (to avoid transmission to other household members)
- Prior to any procedure/ hospitalization
- However, if resources are scarce, then testing may be deferred for both asymptomatic contacts and children with mild symptoms AND no comorbidities# AND a known positive family member (Should be isolated)
- Such children may be presumed to be COVID-19 infected and be managed as per the guidelines in this document

#Chronic kidney disease/ congenital heart disease/ chronic liver disease/ neurodisability/morbid obesity/severe malnutrition/ current malignancy/ immunocompromised state/ diabetes

Which tests?

- Testing should be done as soon as possible after onset of symptoms
- Rapid Antigen Test (RAT) in nasopharyngeal swabs (low sensitivity, so if negative, RT-PCR should be done)
- RT-PCR in nasopharyngeal ± oropharyngeal swabs (Xpert SARS-CoV-2 and Truenat give faster results)
- SARS-CoV-2 antibodies also, if features of MIS-C or if symptoms are protracted

Children with symptoms suggestive of COVID-19 but negative RT-PCR, should be evaluated for other illness. If COVID-19 is strongly suspected, RT-PCR may be repeated. If symptoms of COVID-19 are protracted, RT-PCR is negative and the child needs admission, CT chest may be done. If no alternative diagnosis, treat as per COVID-19

CLASSIFICATION OF DISEASE SEVERITY*

Mild Disease

- Fever, sore throat, rhinorrhea, cough, diarrhea, vomiting (any one or more)

AND

- No fast breathing (age-based)

Moderate Disease

- Fast breathing (age-based) OR Presence of hypoxia (SpO_2 90–93% on room air)

AND

- No signs of severe disease

Severe Disease

- *Pneumonia with any of these:*
  - SpO_2 <90%
  - Increased respiratory effort
  - Grunting, severe retractions
- Lethargy, seizures, and somnolence
- Gastrointestinal symptoms with severe dehydration
- *Critical disease (a subset of severe disease) is defined, if any of these is present:*
  - ARDS
  - Shock
  - Multiorgan dysfunction syndrome
  - Acute thrombosis

*** Including children who have high index of suspicion because of a family member testing positive; but child's test result is awaited.**

Mild Disease

- OPD/home Rx
- Hydration, breastfeed (infants)
- No antibiotics
- If fever—paracetamol; If nose block—nasal saline drops
- No investigations required
- Multivitamins may be given though of no proven value
- *Red flag signs:* Rapid breathing, SpO_2 <94, persistent fever, lethargy/drowsiness, poor feeding
- High-grade fever for >3–4 days could be due to COVID but should also investigate for alternate diagnosis (CBC, CRP, Urine R/E, Blood Culture, Chest X-ray)

Mild Disease with comorbidities

- If ready access to health care
  - Continue as per mild disease at home
- If no ready access to health care
  - Admit for observation and evaluation
  - Manage as per comorbidities

Moderate Disease

- Admit in COVID-19 ward
- *Investigations:*
  - CBC, RFT, LFT, CRP, CXR
  - May be repeated at 48–72 hours, as per clinical condition
- If SpO_2 ≥94%
  - Hydration
  - Paracetamol ± antimicrobials*
- If SpO_2 <94%
  - Oxygen, IV steroids ± remdesivir ± antimicrobials

Severe/Critical Disease

- COVID-19 ICU/HDU/ward
- *Investigations:*
  - CBC, RFT, LFT, CRP, procal, D-dimer, ABG, lactate, ECG, CXR,
  - If needed, Trop I, ECHO, ferritin, LDH
  - May be repeated at 24–48 hrs, as per clinical condition
- Start O_2, and if needed HHFNC, CPAP, NIV, invasive ventilation
- Consider prone positioning, restrictive fluids
- IV steroids, ± remdesivir, ± enoxaparin ± antimicrobials
- Manage shock, ARDS, AKI, HLH, myocarditis as per protocol

Remdesivir (Only in hospital setting):

- 3.5-40 kg: 5 mg/kg on day 1, 2.5 mg/kg from D2 to D5
- > 40 kg: 200 mg on day 1, 100 mg from D2 to D5
- To be used within 10 days of onset of symptoms and child is on oxygen
- Contraindicated: if ALT/ AST > 5 times normal or if creatinine clearance less than 30 mL/minute

Steroids:

0.15 mg/kg of IV Dexa (max 6 mg) once daily for 5–14 days (stop at discharge).

Antimicrobials:*

IV Amoxicillin/Co-amoxiclav/Ceftriaxone
(In a suspect COVID case or in confirmed COVID, if bacterial co-infection suspected)

Enoxaparin:

- ≤2 *months:* 1.5 mg/kg/dose once daily
- >2 *months:* 1 mg/kg/dose once daily

Multi-system Inflammatory Syndrome in Children (MIS-C): Statement by the Indian Academy of Pediatrics, Ver. 2.0 (June 2021)

DEFINITION OF MIS-C (WHO)

0–19 years old child with fever ≥3 days

AND Two of the following:

- Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs (oral, hands or feet)
- Hypotension or shock
- Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (including ECHO findings or elevated Troponin/NT-proBNP)
- Evidence of coagulopathy (by PT, PTT, elevated d-dimers)
- Acute gastrointestinal problems (diarrhea, vomiting, or abdominal pain)

AND

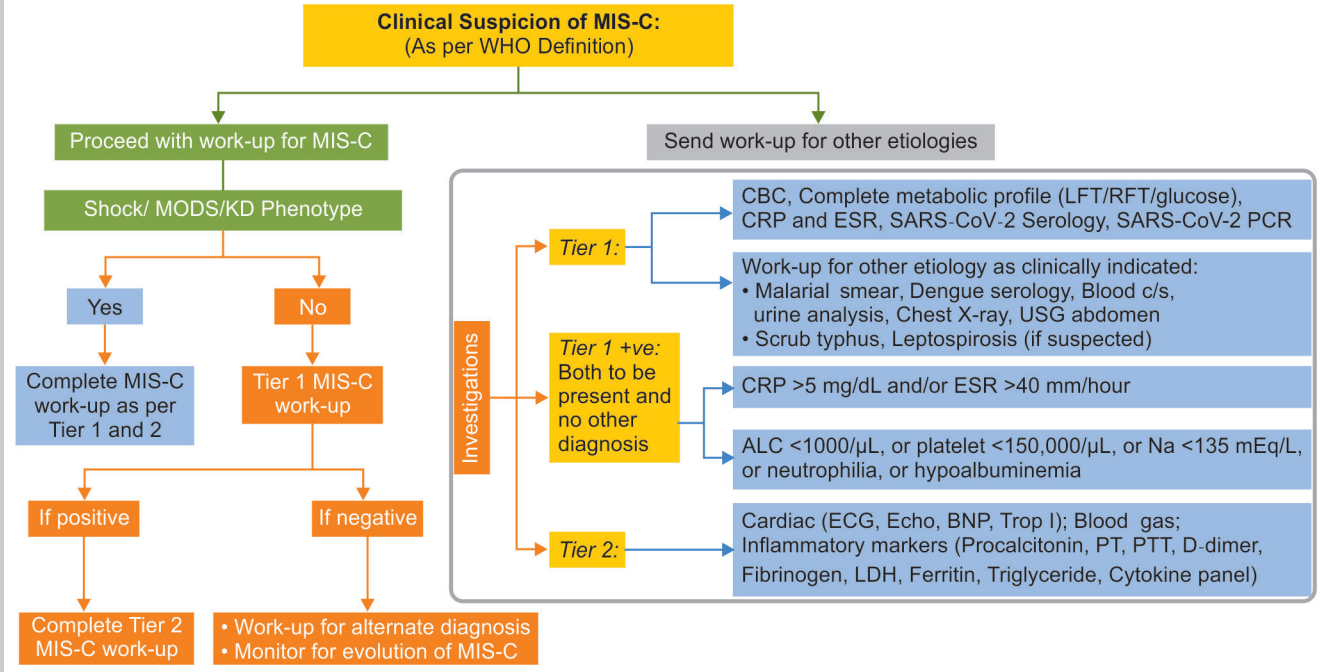
- Elevated ESR, C-reactive protein, or procalcitonin

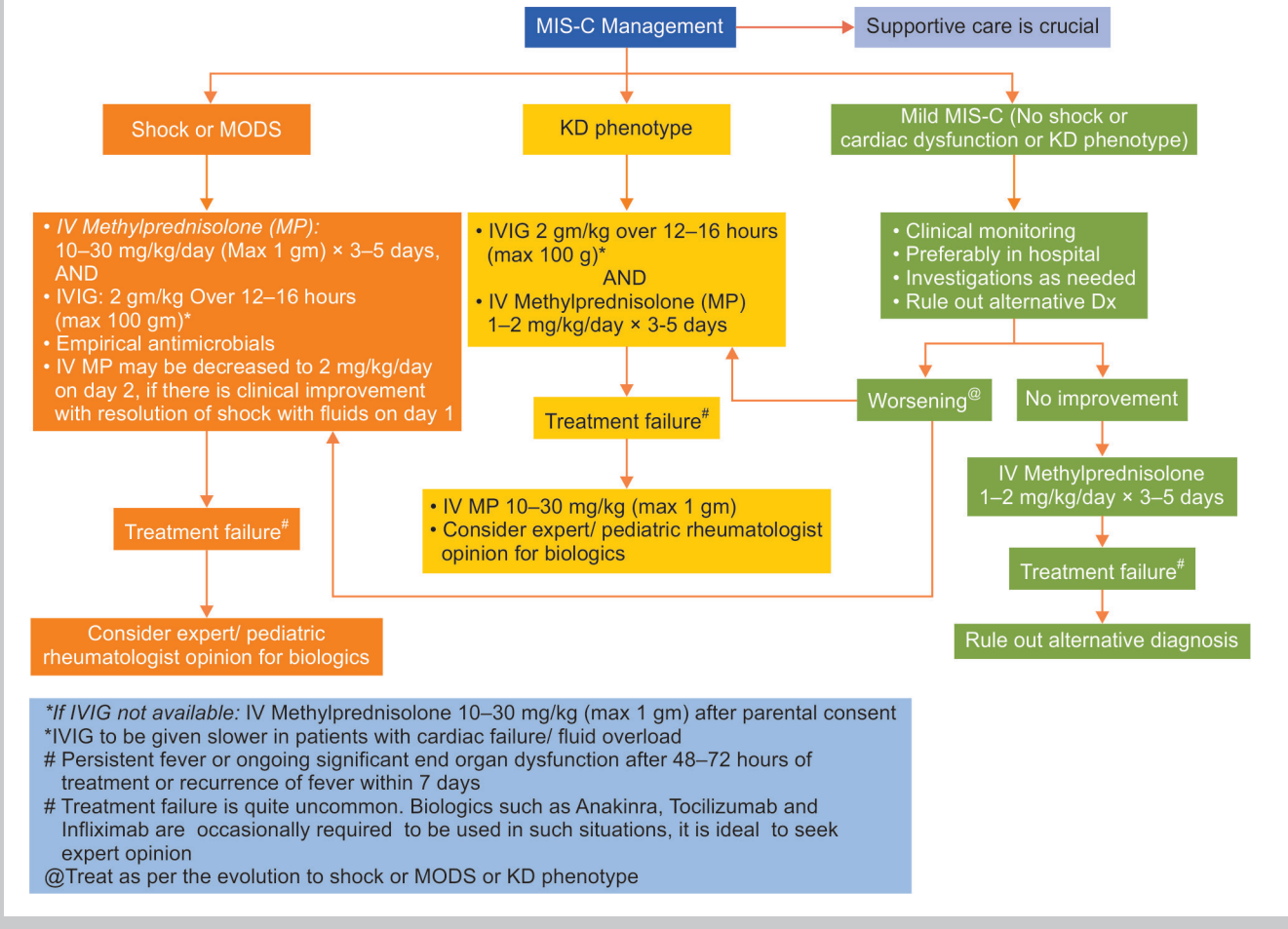
AND

- 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


Clinical Suspicion of MIS-C:
(As per WHO Definition)
Proceed with work-up for MIS-C
Send work-up for other etiologies
Shock/ MODS/KD Phenotype
Yes
No
Complete MIS-C work-up as per Tier 1 and 2
Tier 1 MIS-C work-up
If positive
If negative
Complete Tier 2 MIS-C work-up
• Work-up for alternate diagnosis
• Monitor for evolution of MIS-C
Investigations
Tier 1:
CBC, Complete metabolic profile (LFT/RFT/glucose), CRP and ESR, SARS-CoV-2 Serology, SARS-CoV-2 PCR
Work-up for other etiology as clinically indicated:
• Malarial smear, Dengue serology, Blood c/s, urine analysis, Chest X-ray, USG abdomen
• Scrub typhus, Leptospirosis (if suspected)
Tier 1 +ve: Both to be present and no other diagnosis
CRP >5 mg/dL and/or ESR >40 mm/hour
ALC <1000/µL, or platelet <150,000/µL, or Na <135 mEq/L, or neutrophilia, or hypoalbuminemia
Tier 2:
Cardiac (ECG, Echo, BNP, Trop I); Blood gas; Inflammatory markers (Procalcitonin, PT, PTT, D-dimer, Fibrinogen, LDH, Ferritin, Triglyceride, Cytokine panel)


MIS-C Management
Supportive care is crucial
Shock or MODS
KD phenotype
Mild MIS-C (No shock or cardiac dysfunction or KD phenotype)
• IV Methylprednisolone (MP): 10–30 mg/kg/day (Max 1 gm) × 3–5 days, AND
• IVIG: 2 gm/kg Over 12–16 hours (max 100 gm)*
• Empirical antimicrobials
• IV MP may be decreased to 2 mg/kg/day on day 2, if there is clinical improvement with resolution of shock with fluids on day 1
• IVIG 2 gm/kg over 12–16 hours (max 100 g)*
AND
• IV Methylprednisolone (MP) 1–2 mg/kg/day × 3-5 days
• Clinical monitoring
• Preferably in hospital
• Investigations as needed
• Rule out alternative Dx
Worsening@
No improvement
Treatment failure#
Treatment failure#
• IV MP 10–30 mg/kg (max 1 gm)
• Consider expert/ pediatric rheumatologist opinion for biologics
IV Methylprednisolone 1–2 mg/kg/day × 3–5 days
Treatment failure#
Consider expert/ pediatric rheumatologist opinion for biologics
Rule out alternative diagnosis
*If IVIG not available: IV Methylprednisolone 10–30 mg/kg (max 1 gm) after parental consent
*IVIG to be given slower in patients with cardiac failure/ fluid overload
Persistent fever or ongoing significant end organ dysfunction after 48–72 hours of treatment or recurrence of fever within 7 days
Treatment failure is quite uncommon. Biologics such as Anakinra, Tocilizumab and Infliximab are occasionally required to be used in such situations, it is ideal to seek expert opinion
@Treat as per the evolution to shock or MODS or KD phenotype

MIS-C Management *(Contd...)*

MIS-C is a diagnosis of exclusion. Diagnosis of MIS-C should be made strictly as per WHO definition. Other causes of inflammation and infection to be excluded

As many children are seropositive in current epidemiology, clinician has to be careful to avoid overdiagnosis

Stop antimicrobials once cultures are sterile and sepsis is reasonably excluded

Repeat laboratory investigations, ECG and ECHO as per need

Steroid therapy

- Switch to oral prednisolone (1–2 mg/kg/day) after 3–5 days of methylprednisolone and then taper over next 2–3 weeks

Low dose aspirin 3–5 mg/kg (max 75 mg/day)

- For all patients with MIS-C (including Mild MIS-C) for at least 4–6 weeks and longer if persistent coronary artery dilatation
- *Contraindicated:* If bleeding/platelet count <80,000/µL

Therapeutic LMWH: Enoxaparin 1 mg/kg SC twice daily (>2-month-old); 1.5 mg/kg SC (≤2-month-old)

- Acute thrombosis
- Moderate-to-severe ventricular dysfunction (LVEF <35%)
- Coronary dilation/aneurysm with z-score ≥10
- Duration individualized

FU cardiac evaluation (ECHO) at 2 weeks and 6 weeks and then as per need

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