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

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
Fever, sore throat, rhinorrhea, cough, diarrhea, vomiting (any one or more) AND
No fast breathing (age-based)

Mild Disease

Fast breathing (age-based) OR Presence of hypoxia (SpO₂ 90–93% on room air) AND
No signs of severe disease

Moderate Disease

Pneumonia with any of these:
- SpO₂ <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

Severe Disease

CLASSIFICATION OF DISEASE SEVERITY*

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

Mild Disease

<table>
<thead>
<tr>
<th>OPD/home Rx</th>
<th>Hydration, breastfeed (infants)</th>
<th>No antibiotics</th>
</tr>
</thead>
<tbody>
<tr>
<td>If ready access to health care: Continue as per mild disease at home</td>
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<td>If no ready access to health care: Admit for observation and evaluation; Manage as per comorbidities</td>
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<td>High-grade fever for &gt;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)</td>
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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 SpO₂ ≥94%:
- Hydration
- Paracetamol ± antimicrobials

If SpO₂ <94%:
- Oxygen, IV steroids ± remdesivir ± antimicrobials

Severe/Critical Disease

COVID-19 ICU/HDU/ward

Investigations:
- CBC, RFT, LFT, CRP, procalcitonin, 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 O₂ 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 Dexamethasone (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

Mild Disease with comorbidities

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<td>If fever—paracetamol; If nose block—nasal saline drops</td>
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<td>If no investigations required</td>
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<td>Multivitamins may be given though of no proven value</td>
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<td>Red flag signs: Rapid breathing, SpO₂ &lt;94, persistent fever, lethargy/drowsiness, poor feeding</td>
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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

Shock/ MODS/KD Phenotype

Yes

Send work-up for other etiologies

CBC, Complete metabolic profile (LFT/RFT/glucose), CRP and ESR, SARS-CoV-2 Serology, SARS-CoV-2 PCR

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

Cardiac (ECG, Echo, BNP, Trop I); Blood gas; Inflammatory markers (Procalcitonin, PT, PTT, D-dimer, Fibrinogen, LDH, Ferritin, Triglyceride, Cytokine panel)

No

Complete MIS-C work-up as per Tier 1 and 2

Tier 1 +ve: Both to be present and no other diagnosis

Tier 1

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)

Complete Tier 2 MIS-C work-up
• Work-up for alternate diagnosis
• Monitor for evolution of MIS-C

If positive

If negative

MIS-C Management

Supportive care is crucial

Shock or MODS

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

Treatment failure* & Worsening®

Consider expert/ pediatric rheumatologist opinion for biologics

KD phenotype

IVIG 2 gm/kg over 12–16 hours (max 100 gm)*
AND
• IV Methylprednisolone (MP) 1–2 mg/kg/day × 3–5 days

Treatment failure*

Mild MIS-C (No shock or cardiac dysfunction or KD phenotype)

• Clinical monitoring
• Preferably in hospital
• Investigations as needed
• Rule out alternative Dx

No improvement

• IV Methylprednisolone 1–2 mg/kg/day × 3–5 days

Treatment failure*

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.