

COVID-19 in Children

Interim Management protocol
(14 April 2021)

Department of Pediatrics
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Management protocol



- Applicable to children with confirmed COVID-19 infection
- Based on currently available evidence

Severity Classification



Mild disease

Sore throat, rhinorrhea, cough.
No fast breathing

Moderate disease

Pneumonia

Fast breathing (age based)*
≥ 60/min for <2 months,
≥ 50/min for 2-12 months,
≥ 40/min for 1-5 years,
≥ 30/min for >5 years.

No signs of severe pneumonia

Severe disease

Severe pneumonia

Pneumonia with any of these,
Cyanosis ($SpO_2 < 90\%$)
Increased respiratory efforts
(grunting, severe retraction)
Lethargy, somnolence, seizure

Critical disease

ARDS
Sepsis
Septic Shock
MODS
Acute thrombosis
MIS-C

Mild Disease



- **Home isolation**
- Supportive care; monitoring at home
- Adequate hydration and feeding
- Paracetamol 10-15 mg/kg/dose for fever
- Explain danger signs
- To report to health facility if any worsening

Duration of home isolation



- 10 days after symptom onset and no fever for 3 days
[This is followed by further 7 days of home isolation and self monitoring]
- **Documentation of negative RT-PCR/ CBNAAT no longer recommended**

Mild illness with Co-morbidities



■ Co-morbidities

- Chronic lung disease
- Uncorrected heart disease (heart failure or cyanotic heart disease)
- Chronic renal disease
- Neurological disability (cerebral palsy, muscular dystrophy)
- Immune-compromised state

■ Management

- Treat as mild illness with home care if
 - Parents are capable of home monitoring and health access if danger signs appear

■ Otherwise, admit for monitoring and treat as mild illness

Indications for hospital admission



- Respiratory distress
- SpO₂ < 94% on room air
- Shock/ poor peripheral perfusion
- Poor oral intake, especially in infants and young children
- Lethargic, especially in infants and young children
- Seizures/ encephalopathy
- Children with high risk for severe disease with mild symptoms:
 - congenital or acquired heart disease,
 - chronic lung, liver, kidney or neurological disease,
 - immunosuppressive drugs,
 - congenital or acquired immunodeficiency

Indications for PICU admission



- Moderate to severe ARDS requiring mechanical ventilation
- Shock requiring vasopressor support
- Worsening mental status
- Multi-organ dysfunction syndrome
- MIS-C

Children with COVID-19 RT-PCR positive

Mild illness
Sore throat,
rhinorrhea, cough.
No fast breathing

Home isolation
Supportive care
Rest
Adequate hydration and feeding
Paracetamol 10-15mg/kg/dose for fever
Report if worsening of danger signs.

**Moderate illness
Pneumonia**
Fast breathing (age based): $\geq 60/\text{min}$ for <2months, $\geq 50/\text{min}$ for 2-12 months, $\geq 40/\text{min}$ for 1-5 years, $\geq 30/\text{min}$ for >5years.
No signs of severe pneumonia

Admit in isolation
Monitor for progress
Feeds / fluids: avoid dehydration and overhydration
Antipyretic: Paracetamol
Amoxycillin if suspicion of bacterial infection.
If SpO₂ <94%, start oxygen and give steroids

Severe pneumonia
Pneumonia with any of these,
Cyanosis (SpO₂ < 90%)
Increased respiratory efforts (grunting, severe retraction)
Lethargy, somnolence, seizure

Admit in isolation
Steroids
Empiric antimicrobials
Oxygen therapy: nasal prong, face mask
HFNC and NIV
SpO₂ target > 94% during resuscitation (once stable > 90%)
Consider Awake Prone (in older children)
Restrictive fluid therapy

Critically ill

Admit in isolation, preferably negative pressure room
Steroids
Empiric antimicrobials.
Evaluate for hemophagocytic lymphohistiocytosis
Organ support – renal replacement.

Shock
Septic shock/ Myocarditis
Crystalloid bolus 10-20 ml/kg over 30-60 min, fast if hypotensive
Early inotrope support
Monitor for fluid overload

ARDS

- HFNO/NIV trial for **mild ARDS**
- Mechanical ventilation: Low tidal volume (6ml/kg), high PEEP, cuffed endotracheal tube
- Fluid restriction
- Sedation
- If poor response: may need prone ventilation, HFOV, ECMO

Evaluate all admitted children with CBC, LFT, RFT, Coagulogram, D-dimer, Fibrinogen, Chest X-ray, blood culture.

Admit/ closely monitor children with co-morbidities: chronic lung disease, symptomatic heart disease, chronic kidney disease.

Avoid nebulization; Use MDI and spacer

Drugs used for COVID-19



Drug	Dose in children	Current status
Steroids	Prednisolone; 1 mg/kg/day, up to 40 mg/day for 5-14 days (depending on clinical response) (or equivalent dose of dexamethasone, methylprednisolone, or hydrocortisone)	Recommended for severe and critical COVID-19 Improved survival

- Anticoagulants (LMWH) are not recommended for prophylaxis in any disease severity. It should be used only for established thrombosis.
- Favipiravir, Remdesivir, Tocilizumab, Hydroxychloroquine, Chloroquine, Ivermectin, Azithromycin and Lopinavir/ ritonavir are not recommended for routine use in COVID-19 in children with any disease severity.
- None of the drugs including Ivermectin, Hydroxychloroquine have any role in prophylaxis.

Discharge Criteria



- After 10 days of symptom onset, AND
 - Clinical resolution of symptoms, AND
 - SpO₂ > 95%, off oxygen for 3 days
-
- Followed by home isolation and self-monitoring for 7 days

MIS-C

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MIS-C; WHO criteria



- Children and adolescents 0–19 years of age 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 (diarrhoea, vomiting, or abdominal pain).

AND

- Elevated markers of inflammation such as ESR, C-reactive protein, or procalcitonin.

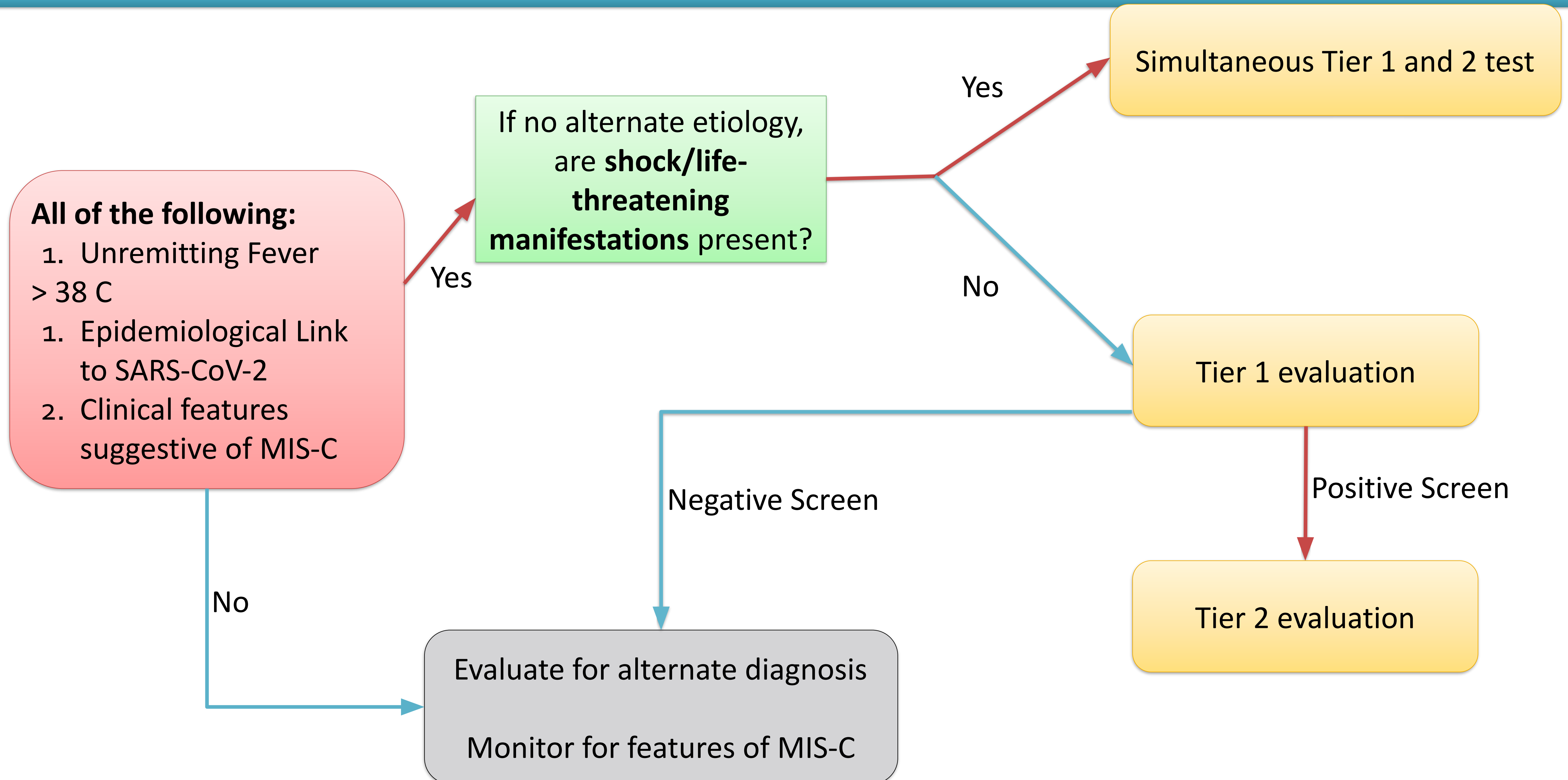
AND

- 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.

Evaluation of MIS-C



Tier 1 (Screening Evaluation)



Test

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

Tier 1 (Screening Evaluation)...



Positive Screen

Both of these present

1. CRP > 5 mg/dL and/or ESR > 40 mm per hour
2. At least one of these
 - ALC < 1000/ μ L
 - Platelet < 150,000/ μ L
 - Na < 135 mEq/L
 - Neutrophilia
 - Hypoalbuminemia

Tier 2 / Complete Evaluation



- Cardiac
 - ECG
 - Echocardiogram
 - BNP, Trop T
- Inflammatory markers
 - Procalcitonin
 - PT, PTT, D-dimer, Fibrinogen
 - LDH
 - Triglyceride
 - Cytokine panel
- Blood Smear
- SARS-CoV-2 serology

Treatment of MIS-C



MIS-C with **shock or life-threatening disease**

Steroid
(Methylprednisolone
1-2mg/kg/d) + IVIg (2 g/kg
over 24-48 hr) +
Antimicrobials

Simultaneously evaluate
for tropical infections

MIS-C: **not immediately
life-threatening**

Rule out tropical infection
first

Steroid
(Methylprednisolone
1-2mg/kg/d): first line OR
IVIg: alternative/first line,
as per availability

Anti-platelets and Anti-coagulation



Aspirin

- 3-5 mg/kg/day;
max 81 mg/day
- Indications
 - Thrombocytosis
 - Coronary aneurysm
(Z-score ≥ 2.5)

Enoxaparin

- Target factor Xa level 0.5- 1
- Indications
 - Coronary aneurysm (Z-score > 10)
 - Thrombosis
 - LVEF $< 35\%$

Cardiac specific recommendations



- ECG repeated 48 hourly
- Echo repeated at 7-14 days and 4-6 weeks
 - Repeat at 1 year if initial echo is abnormal
- Optional
 - Cardiac MRI at 2-6 months (if initially LVEF < 50%)
 - Cardiac CT (if suspecting distal coronary aneurysm)