



EVIDENCE-BASED

Comprehensive Guidelines for Management of COVID-19 in **CHILDREN** and **ADOLESCENTS** (below 18 years)

Revised **17 January 2022**

Supersedes previous version issued on 16 June 2021; kindly check www.dghs.gov.in for latest version

Directorate General of Health Services

Ministry of Health and Family Welfare, Government of India



The Comprehensive Guidelines for Management of COVID-19 in CHILDREN and ADOLESCENTS (below 18 years) were reviewed by the group of experts in view of the current surge mainly attributed to the Omicron variant of concern. The available data from other countries suggests that disease caused by the Omicron variant is less severe; however, there is need for a careful watch, as the current wave evolves. These guidelines are dynamic, and will be reviewed and updated, on availability of new evidence.

The experts have assessed the available evidence and overall, the management remains unchanged, barring a few changes outlined below.

1. Title of the document has been changed from Comprehensive Guidelines for Management of COVID-19 in CHILDREN (below 18 years) to Comprehensive Guidelines for Management of COVID-19 in CHILDREN and ADOLESCENTS (below 18 years).
2. As of now, use of antivirals or monoclonal antibodies is not recommended for children less than 18 years of age, irrespective of the severity of infection.
3. For diagnosing MIS-C, caution should be exercised while interpreting an isolated increase in COVID antibodies.
4. The CRP level for diagnosis of MIS-C has been revised as >5mg/dL.
5. If steroids are used, they should be tapered over 10-14 days, subject to clinical improvement.
6. Use of anticoagulants has been revised.
7. New section on Post-COVID care has been added.

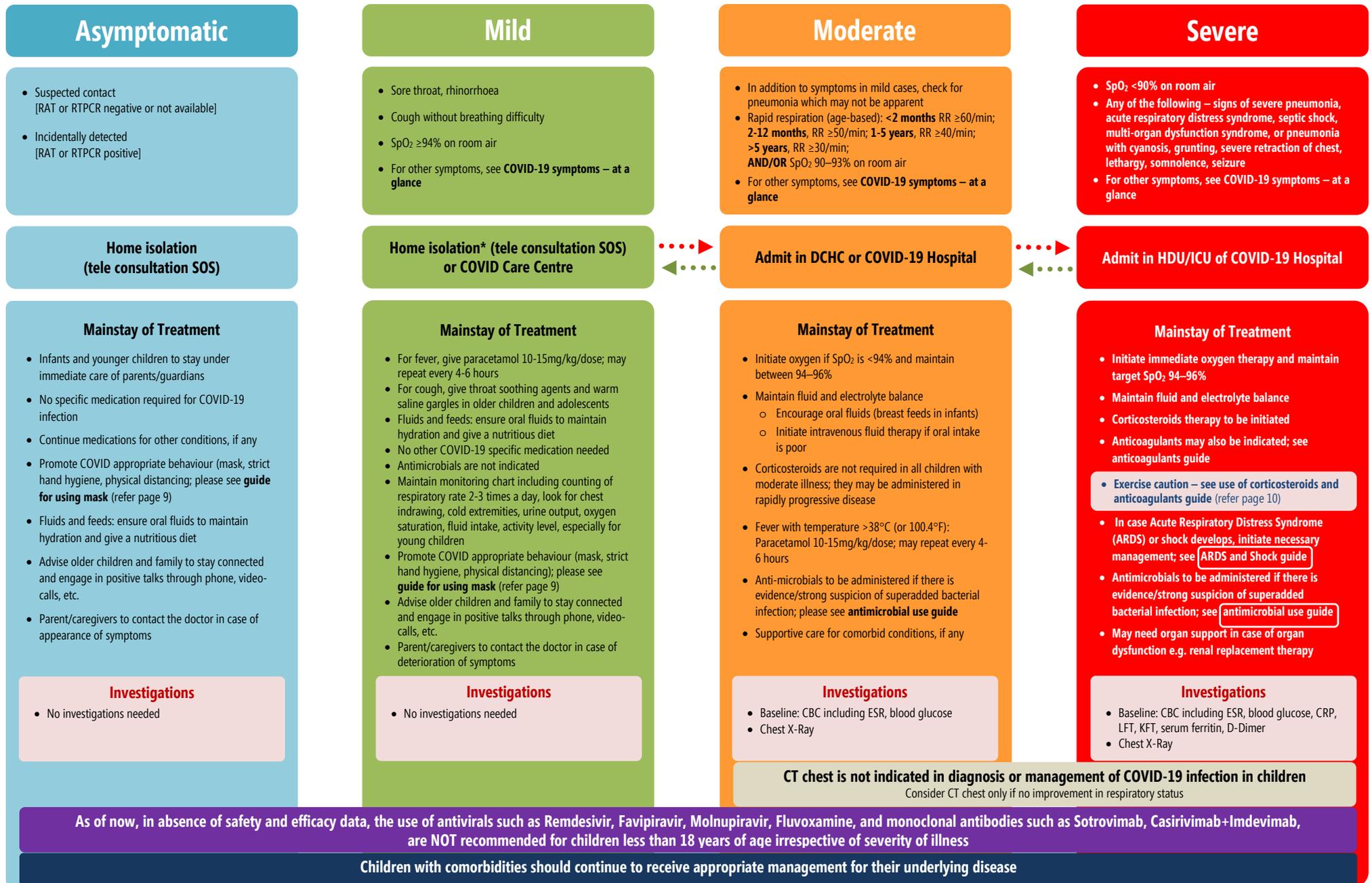
Attention is drawn to the following MoHFW guidelines:

- FAQs on SARS-CoV-2 Variant-Omicron, available at <https://www.mohfw.gov.in/pdf/FAQsonOmicron.pdf>
- Revised guidelines for Home Isolation of mild /asymptomatic COVID-19 cases, available at <https://www.mohfw.gov.in/pdf/RevisedHomeIsolationGuidelines05012022.pdf>
- Guidelines for COVID-19 vaccination of children between 15-18 years, available at <https://www.mohfw.gov.in/pdf/GuidelinesforCOVID19VaccinationofChildrenbetween15to18yearsandPrecautionDosestoHCWsFLWs&60populationwithcomorbidities.pdf>

COVID Appropriate Behaviour is recommended to prevent SARS-CoV-2 infections:

- **3 Ws**
 - Watch your distance (more than 2 metres)
 - Wash your hands
 - Wear a mask
- **2 Vs**
 - Ventilation – open spaces are less risky than closed or poorly ventilated areas
 - Vaccination – for 15-18 years age group

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COVID-19 symptoms in children – at a glance

Common symptoms				
	Fever	Sore throat/throat irritation	Diarrhoea	
	Cough	Body ache/headache	Anorexia/nausea/vomiting	
	Rhinorrhoea	Malaise/weakness	Loss of sense of smell and/or taste	
Differentiating symptoms/signs	Asymptomatic	Mild	Moderate	Severe
Respiratory rate/min	Normal with age dependent variation	Normal with age dependent variation	Rapid respiration (age based) <2 months ≥60/min 2-12 months ≥50/min 1-5 years ≥40/min >5 years ≥30/min	Rapid respiration (age based) <2 months ≥60/min 2-12 months ≥50/min 1-5 years ≥40/min >5 years ≥30/min
SpO ₂ on room air	≥94%	≥94%	90–93%	<90%
Grunting, severe retraction of chest	×	×	×	+/-
Lethargy, somnolence	×	×	×	+/-
Seizure	×	×	×	+/-



Management of Acute Respiratory Distress Syndrome (ARDS) and Shock guide

Management/treatment of ARDS

ARDS may be classified based on Pediatric Acute Lung Injury Consensus Conference (PALICC) definition into mild, moderate and severe

Mild ARDS

- High flow nasal oxygen (start with 0.5 L/kg/min to begin with and increase to 2 L/kg/min with monitoring) or non-invasive ventilation (BiPAP or CPAP) may be given

Moderate – Severe ARDS

- Lung protective mechanical ventilation may be initiated; low tidal volume (4-8 ml/kg); plateau pressure <28-30 cmH₂O; MAP <18-20 cmH₂O; driving pressure <15 cmH₂O; PEEP 6-10 cmH₂O (or higher if severe ARDS); FiO₂ <60%; sedoanalgesia ± neuromuscular blockers; cuffed ETT, inline suction, heat and moisture exchange filters (HMEF)
- Avoid frequent disconnection of ventilator circuit, nebulization or metered dose inhaler
- Restrict fluids; calculate fluid overload percentage, keeping it <10%
- Prone position may be considered in hypoxemic children if they are able to tolerate it
- Daily assessment for weaning and early extubation; enteral nutrition within 24 hours, achieve full feeds by 48 hours
- Transfusion trigger Hb <7g/dL if stable oxygenation and haemodynamics and <10 g/dL if refractory hypoxemia or shock

Management of shock

- Consider crystalloid fluid bolus 10-20 ml/kg cautiously over 30-60 minutes with early vasoactive support (epinephrine)
- Start antimicrobials within the first hour, after taking blood cultures, according to hospital antibiogram or treatment guidelines
- Consider inotropes (milrinone or dobutamine) if poor perfusion and myocardial dysfunction persists despite fluid boluses, vasoactive drugs and achievement of target mean arterial pressure
- Hydrocortisone may be added if there is fluid refractory catecholamine resistant shock (avoid if already on dexamethasone or methylprednisolone)
- Once stabilized, restrict IV fluids to avoid fluid overload
- Initiate enteral nutrition – sooner the better
- Transfusion trigger Hb <7g/dL if stable oxygenation and haemodynamics, and <10 g/dL if refractory hypoxemia or shock



Management of Multisystem Inflammatory Syndrome (MIS-C) in children and adolescents temporally related to COVID-19

Multi System Inflammatory Syndrome in Children (MIS-C) is a new syndrome in children characterized by unremitting fever $>38^{\circ}\text{C}$ and epidemiological linkage with SARS-CoV-2

Diagnostic criteria (WHO)

- Children and adolescents 0–18 years of age with fever ≥ 3 days
- **And any 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 (PT, PTT, elevated D-Dimers)
 - Acute gastrointestinal problems (diarrhoea, vomiting, or abdominal pain)
- **And** elevated markers of inflammation such as ESR (>40 mm), C-Reactive Protein (>5 mg/dL), or procalcitonin
- **And** no other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes
- **And** evidence of recent COVID-19 infection (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19

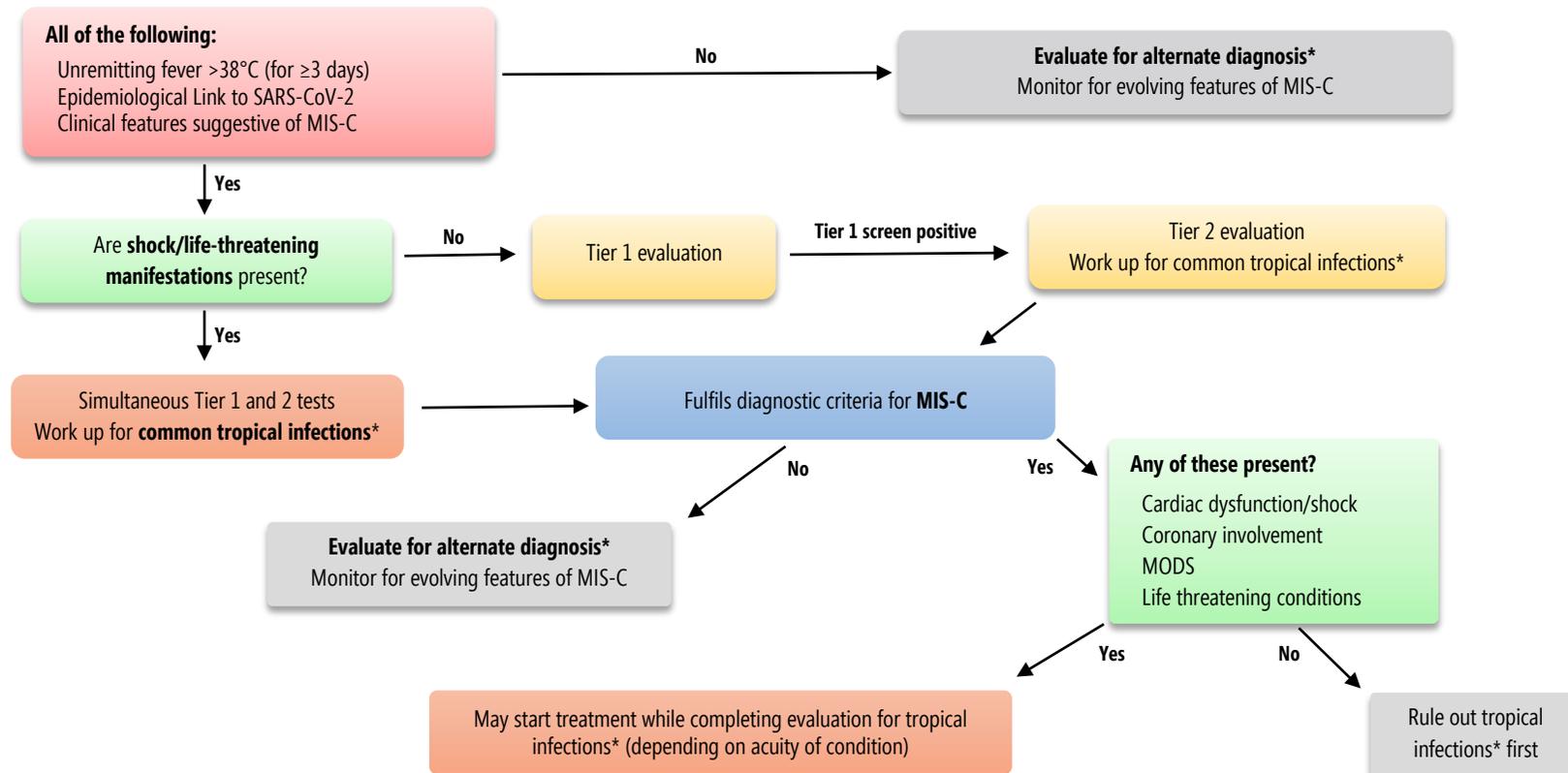
Alternative diagnoses that must be excluded before making a diagnosis of MIS-C

- Tropical fevers (malaria, dengue, scrub typhus, enteric fever)
- Toxic shock syndrome (staphylococcal or streptococcal)
- Bacterial sepsis

MIS-C with Kawasaki Disease (KD) phenotype is characterised by fever, conjunctival redness, oropharyngeal findings (red and/or cracked lips, strawberry tongue), rash, swollen and/or erythematous hands and feet and cervical lymphadenopathy



Stepwise investigations in a patient with MIS-C



Tier 1 tests (may be done at Covid Care Centre, Dedicated Covid Health Centre): CBC, complete metabolic profile (LFT/KFT/blood gas/glucose), CRP and/or ESR, SARS-CoV-2 serology and/or RT-PCR, blood culture

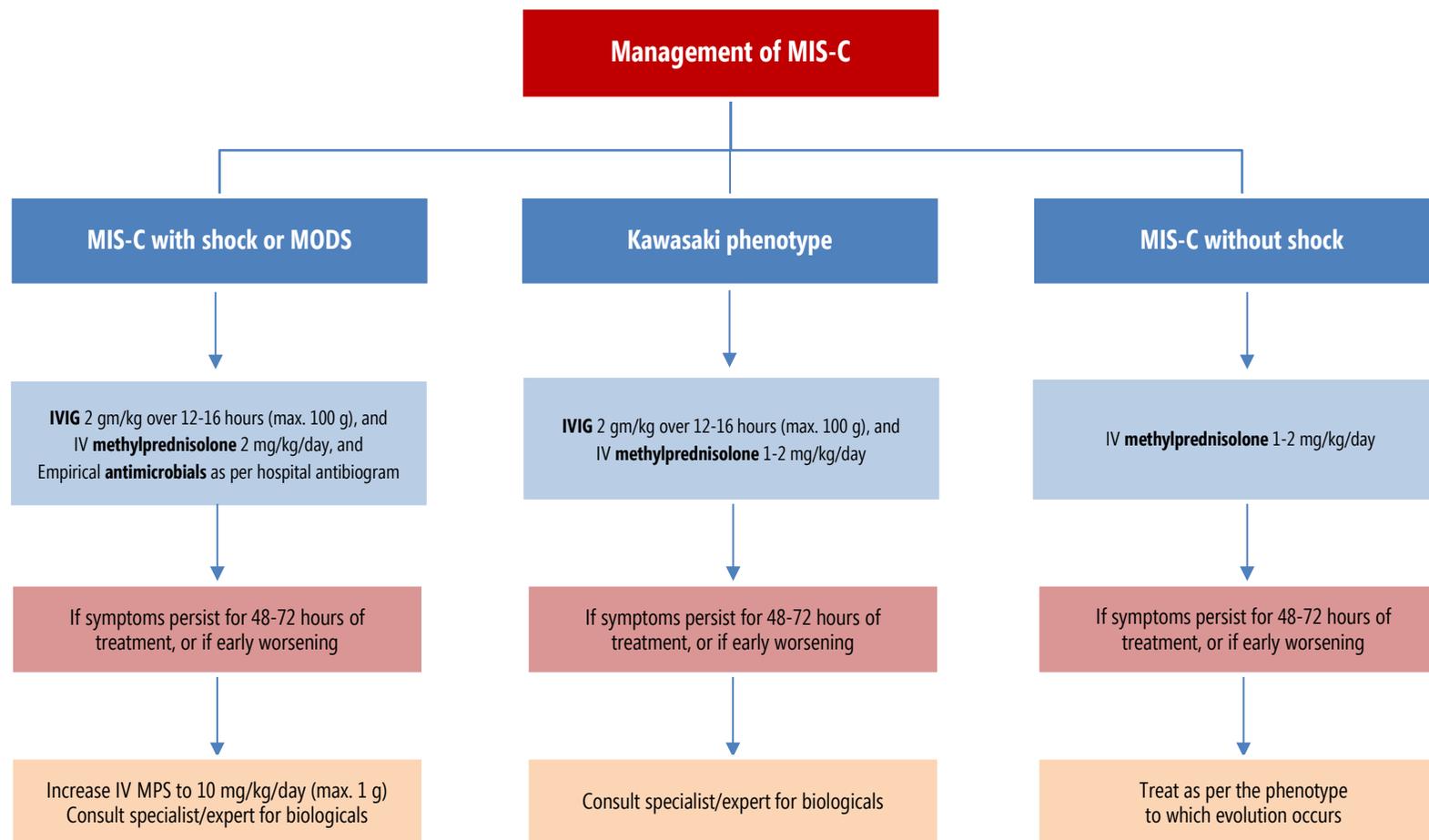
Positive Tier 1 screen (*both* of these should be present):

1. CRP >5 mg/dL *and/or* ESR >40 mm/hour
2. At least *one* of these: ALC <1000/μL, platelet count <150,000/μL, Na <135 mEq/L, neutrophilia, hypoalbuminemia

Tier 2 tests (may be done at Dedicated Covid Hospital): Cardiac (ECG, echocardiogram, BNP, troponin T); inflammatory markers (procalcitonin, ferritin, PT, PTT, D-Dimer, fibrinogen, LDH, triglyceride, cytokine panel); blood smear; SARS-CoV-2 serology

Isolated increased COVID-19 antibodies are NOT SYNONYMOUS with MIS-C

* For diagnosis of MIS-C, it is mandatory to rule out common tropical infections including malaria, dengue, enteric fever, rickettsial illness (scrub typhus), etc.



- Appropriate supportive care is needed preferably in ICU for treatment of cardiac dysfunction, coronary involvement, shock or multi-organ dysfunction syndrome (MODS)
- IVIG to be given slower (over up to 48 hours) in children with cardiac failure/ fluid overload
- Taper steroids over 2-3 weeks with clinical and CRP monitoring
- Aspirin 3-5 mg/kg/day, maximum 75 mg/day in all children for 4-6 weeks (with platelet count >80,000/ μ L) for at least 4-6 weeks or longer for those with coronary aneurysms
- Low molecular weight heparin (Enoxaparin) 1 mg/kg/dose twice daily s/c in >2 months (0.75mg/kg/dose in <2 months) if patient has thrombosis or giant aneurysm with absolute coronary diameter \geq 8 mm or Z score \geq 10 or LVEF <30%
- For children with cardiac involvement, repeat ECG 48 hourly & repeat ECHO at 7-14 days and between 4 to 6 weeks, and after 1 year if initial ECHO was abnormal

**Use biologicals only after expert consultation
and at tertiary care only**



Suggested proforma for monitoring in children

Name: Age: Sex: Date:

#	Co-morbid conditions (if any)	Controlled (yes/no)	Drugs being taken
1			
2			
3			

Template for recording of symptoms and signs (may be done more frequently for sicker children)

Time	Lethargy/malaise*	SoB**	Temperature	BP#	Respiratory rate##	Chest indrawing	SpO ₂ *** & pulse rate	Physical activity
	(yes/no)	(yes/no)	(record)	(record)	(record)	(yes/no)	(record)	(normal/low)
06:00 am								
12:00 noon								
06:00 pm								
12:00 am								

*Malaise: feeling of unwellness; **SoB: shortness of breath/breathing difficulty/breathlessness ***SpO₂: oxygen levels to be measured by pulse oximeter

measure BP if age appropriate BP cuffs are available; ## record respiratory rate in a calm or sleeping child



Infection Prevention and Control (IPC)

Every COVID care facility should have a multidisciplinary hospital infection control committee; key components of infection control strategy are:

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> • Standard precautions • Droplet precautions • Airborne precautions • Contact precautions and hand hygiene • Physical distancing | <ul style="list-style-type: none"> • Cough etiquette/respiratory hygiene • Well ventilated rooms • Monitor healthcare associated infections • Train all health care workers to develop IPC skills • Environment cleaning, disinfection and sanitation | <ul style="list-style-type: none"> • Cleaning/disinfection of frequently touched surfaces/equipment • Cleaning and disinfection of linen • Safe management of bio-medical waste • Triple layer mask to be worn by patient, as per guidance below • Masks for care givers (home/hospital) |
|--|--|---|

Guide for using mask

- Masks are not recommended for children aged **5 years and under**
- Children aged **6-11 years** may wear a mask depending on the ability of child to use a mask safely and appropriately under direct supervision of parents/guardians
- Children aged **12 years and over** should wear a mask under the same conditions as adults
- Ensure hands are kept clean with soap and water, or an alcohol-based hand rub, while handling masks

Antimicrobial use guide

COVID-19 is a viral infection, and antimicrobials have no role in the management of uncomplicated COVID-19 infection

Asymptomatic and mild cases: antimicrobials are not recommended for therapy or prophylaxis

Moderate and severe cases: antimicrobials should not be prescribed unless there is clinical suspicion of a superadded infection

Septic shock: empirical antimicrobials (according to body weight) are frequently added to cover all likely pathogens based on clinical judgement, patient host factors, local epidemiology and antimicrobial policy of the hospital



Use of steroids and anticoagulants; Post COVID care

Steroids

- **Steroids are not indicated and are harmful in asymptomatic and mild cases of COVID-19**
- Indicated only in hospitalized severe and critically ill COVID-19 cases **under strict supervision**
- Steroids should be used at the **right time**, in **right dose** and for the **right duration**
- Indications and recommended dose of corticosteroids – may be used in rapidly progressive moderate and all severe cases
 - Dexamethasone 0.15 mg/kg, maximum dose 6 mg once a day **OR**
 - Methylprednisolone 0.75 mg/kg, maximum dose 30 mg once a day
- Continue for 5-7 days and taper up to 10-14 days, depending on clinical assessment on daily basis
- Avoid steroids in first 3-5 days since onset of symptoms as it prolongs viral shedding

Self-medication of steroids must be avoided

Anticoagulants

- Not indicated routinely
- All hospitalized children should be evaluated for risk of developing thrombosis and monitored for development of thrombosis
- **Prophylactic anticoagulant** is indicated in following circumstances (the decision to administer prophylactic anticoagulation must be balanced with the child's bleeding risk):
 - a) strong personal or family history of VTE, or
 - b) an indwelling central venous line and two or more additional risk factors*, or
 - c) four or more risk factors*

(*Predisposing risk factors for development of thrombosis – personal history of venous thrombotic events (VTE), family history of first-degree relative with VTE, presence of central venous line, decreased mobility from baseline, burns, active malignancy, estrogen therapy, flare of inflammatory disease, morbid obesity, severe dehydration, recent surgery or trauma)
- Prophylactic dose of low molecular weight heparin (Enoxaparin): 0.5 mg/kg twice daily, till child is discharged from hospital
- On suspicion of thrombosis, confirm by appropriate investigations and start on low molecular weight heparin in therapeutic doses for period of 12 weeks with monitoring
- Children already on anticoagulation therapy may continue same unless they develop active bleeding
- Therapeutic dose of low molecular weight heparin (Enoxaparin): 1 mg/kg twice daily

Post COVID Care

- Children with asymptomatic infection or mild disease should receive routine childcare, appropriate vaccination, nutrition counselling, and psychological support on follow up
- In addition to above, for children with moderate to severe COVID, at discharge from hospital, parents/caregivers should be counselled regarding monitoring for persistence/worsening respiratory difficulty and explained the indications for bringing the child back to facility
- Children who develop any organ specific dysfunction during hospital stay or subsequently should receive appropriate care

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