COVID- 19 Infection in Children

Covid – 19 infection in children are mostly mild symptomatic or asymptomatic.
Children are 5.8% of total Covid positive patients in India.
COVID-19–associated hospitalization among children 8.0 per 10^5 population vs 164.5 per 10^5 in adults
ICU admission rate ranges from 8-20% among hospitalized children
2 main categories of manifestations are observed– 1. Acute Covid -19 infection, 2. Post Covid MIS-C

DISEASE SEVERITY CLASSIFICATION OF ACUTE COVID-19 INFECTION

MILD DISEASE

Fever and or any of the following -

1. URTI – Cough, sore throat, coryza, nasal obstruction)

2. Diarrhoea and/vomiting with no dehydration/some dehydration with good oral intake and good urine output

4. Normal activity in between the spikes of temperature, normal feeding.

5. Loss of taste or smell (>8 year)

MODERATE DISEASE

Moderate to high grade temperature for 4 days or more and or

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

2. SPO2 - <94%

3. Diarrhoea and /vomiting with severe dehydration and decreased oral intake

4. Decreased activity in between the fever spikes, decreased feeding.

SEVERE DISEASE

1. **Severe pneumonia**
Pneumonia with any of these,
-Cyanosis (SpO2< 90%)
- Increased respiratory efforts (grunting, Severe retraction)
2. Lethargy, refusal to feed

3. Altered sensorium and/ seizure

4. Tachycardia disproportionate to the temperature.

5. Hypotension/shock

6. Fulfils MIS-C Criteria

CRITICAL DISEASE

1. **Refractory/super refractory status epilepticus.**

2. Coma with GCS persistently<8/15.

3. ARDS

4. Shock requiring inotropic agents

5. Myocarditis/Features of Heart failure

6. Oliguria/Acute Kidney Injury

7. Acute thrombotic Events

8. MODS

Evaluate all admitted children with CBC, LFT, RFT, CRP, d –dimer, Chest x-ray and blood culture. Repeat after 48-72 hours if clinically indicated.

Possible tropical infections like malaria, typhoid, dengue, scrub typhus and leptospira to be ruled out

Selected patients may need echocardiography and cardiac biomarkers.

ABG, Lactate, Ferritin, Procal, in selected patients

Mild disease with co-morbidity

1. **Ready access to health care** – Continue home care.
2. **No ready access to healthcare** – Admit for observation and evaluation.

Co- morbid conditions - chronic neurological disorder, chronic respiratory disease, congenital heart disease, patients on imuunosupressive agents, chronic kidney disease

MANAGEMENT

MILD DISEASE

1. Home isolation(17 days from symptom onset)

2. Supportive care

a. Adequate hydration and feeding.
b. ORS for diarrhoea and vomiting.
c. Monitoring of vitals and activity.
d. Vitamin C, Vit D and Zinc may be considered.(No proven evidence)

3. Symptomatic care:

a. Paracetamol (10-15mg/kg/dose, not more than 5 times/day,minimum 4 hours gap between 2 doses)
b. Anti-histaminic /Saline nasal drops/Decongestant drops may be considered to alleviate URTI symptoms.
c. Zinc ± probiotics for diarrhoea.
d. Domperidone/Ondansetron for vomiting.

4. Danger signs to be explained in details

5. Report to health care facilities if dangersigns develops.

Danger signs – Any one of the following.

Persistent fever for ≥ 5 days, Reappearance of fever, Reduced oral intake, Decreased urine output or signs of dehydration, becomes lethargic, Shortness of breath and SpO2 <94% .

MODERATE DISEASE

1. Hospitalisation in Isolation/dedicated Pediatric covid ward settings.

2. Supportive Care

a. Adequate hydration and feeding. May need iv fluids and /or Nasogastric feeding.
b. ORS/IV fluids according to standard protocol.
c. Zinc ± probiotics to be considered for diarrhoea.

3. Symptomatic Care:

Oral Paracetamol (10-15mg/kg/dos, (not more than 5 times/day, minimum 4 hours gap between 2 doses)

Domperidone/Ondansetron for vomiting.

3. Oxygen therapy: Give supplemental oxygen through nasal prongs/ face mask if oxygen saturation is less than 94 %.

4. MDI with Salbutamol and/Ipratropium may be considered in patients with pre-existing Reactive airway disease who presented with wheezing.

5. Avoid Nebulization

6. **Systemic steroid: To be started if SPO2<94%.***

7. Consider awake proning in children > 8 yrs.

8. Remdesivir on case-to-case basis (respiratory)

9. Empirical antibiotics if bacterial co-infection is suspected.

**Inj Dexamethasone 0.15mg/kg/day as a single dose(maximum 6mg/day) for 5 to 14 days according to severity of the disease and clinical response.

- Equivalent dose of other [Prednisone (1 mg/kg/day, up to 40 mg/day)/Methylprednisolone (0.5-1 mg/kg in 2 divided doses) steroids may be given.

Oxygen Delivery–
Nasal Prong -Flow range 1-5 L/min
The formula is FiO_2 = 20% + (4 × oxygen litre flow).
Simple Oxygen Mask - delivers an FiO_2 of 40-60% at 5-10 L/min

Non-Rebreathing Mask – FiO2 90% at flow rate -8-10L/min

Indication of LMWH – Patient with moderate to severe disease requiring oxygen and D-dimer > 2000 ng/ml.
Enoxaparin –
< 2 months - 1.5 mg/kg 12 hrly SC
>2 months – 1 mg/kg 12 hrly SC

SEVERE DISEASE

1. **Admit in Pediatric covid HDU/ PICU settings**

2. Supportive Care

Appropriate hydration, if needed isotonic fluid boluses.

Start early enteral feeding

3. Symptomatic Care:

Syrup Paracetamol through ng tube/IV paracetamol for fever

Control of seizure according to standard protocol

3. Oxygen therapy-Start with NRBM(10L/min) followed by HHFNC with a flow of 2L/kg and fio2 of 40%.**Target SPO2 92to 96%.**Titrate according to response.(increase flow by0.5L/kg above 12kg)

If no response to HHFNC, step-upto NIV/Invasive mechanical ventilation.

Consider awake proning in children > 8 yrs.

4. Systemic steroid: To all patients with severe disease with respiratory presentation. *

7**. Remdesivir: To all patients with severe disease with respiratory presentation. ****

8. Empirical broad spectrum antibiotic according to local protocol

9. Consider IVIG if fulfils criteria of MIS-C

Antimicrobials – Amoxicillin/Co-Amoxiclav/Ceftriaxone – if bacterial co-infection

****Remdesivir**

3.5kg to 40 kg: 5mg/kg on day 1 and then 2.5mg/kg from day 2 to day 5.

>40 kg: 200mg on day 1 and then 100mg once daily fromday 2 to day 5

To be used within 10 days of onset of Symptoms

Contraindicated if ALT/AST> 5 times normal and /or Creatinine Clearance <30 ml/min

CRITICAL DISEASE

1. Admit in Covid PICU settings

2. Supportive Care

Appropriate hydration, if needed isotonic fluid boluses. Maintain euvolumia.

Restrictive maintenance fluid for Severe ARDS or Myocardial dysfunction

3. Symptomatic care

a. Control of seizure according to standard protocol
b. Elective intubation if coma/GCS persistently below 8/Super refractory status epilepticus.

4**. Respiratory support:**HHFNC/NIV may be tried for mild ARDS. For failed HHFNC or moderate to severe ARDS invasive mechanical ventilation.(PARDS protocol)

If poor response consider proning, HFOV, ECMO.

5. Systemic Steroid*

6. Remdesivir**

7. Tocilizumab (on case-to-case)

7. **SHOCK**- adequate istonic fluid boluses (10-20 ml/kg over 30-60 min,). Intropic agents for fluid refractory shock.Adrenalin Infusion for cold shock and Nor adrenalin infusion for warm shock.

8. Manage AKI/Myocarditis/HLH as per protocol

9. Empiricalbroad spectrum antibiotic according to local protocol

10. Consider IVIG if fulfils criteria of MIS-C

DISCHARGE CRITERIA

Patient is out of all organ support or in pre-morbid condition

Marinating Saturation >94% in room air for 24 hrs

Afebrile for 72 hours.

Accepting oral feed well.

Mother is Confident to take care at home

No repeat testing is required in Mild to moderate disease

Follow up after 1-2 wks followed by 4-6 wks.