



Medication and Treatment

The following steps are taken in the treatment of adult and pediatric patients of COVID-19, in the hospital:

I. Triage

- This is a method of timely identification and sorting, of patients with COVID-19 infection in the emergency department or at the first point of entry or contact in a hospital. The table lists the sorting criteria for patients presenting with COVID-19:

| Patients presenting with different forms of COVID-19 | Sorting /Diagnosing Criteria | Action |
|--|---|--|
| SARI (Severe Acute Respiratory Illness) | Fever with temperature ≥ 38 °C or a history of fever or cough Onset of symptoms within 10 days. | Suspect COVID-19; Requires hospitalization |
| SARI with atypical presentation | All symptoms above plus - International travel 14 days prior - Health care professional - Sudden deterioration of symptoms in spite of treatment | Suspect atypical COVID-19 even in the presence of any other etiology; Requires hospitalization; Test for community-acquired pneumonia and pneumonia from other etiologies. |
| ARI of any degree of severity | History of close physical contact with confirmed COVID - 19 patient within past 14 days | Suspect atypical COVID-19; Requires hospitalization |



| | | |
|--|---------------|--|
| | - At home | |
| | - In hospital | |

- The infection prevention and control measures are carried out simultaneously.

II. Early supportive therapy and monitoring:

The presentation of COVID-19 may be in the form of mild, moderate, severe or critical illness ranging from severe pneumonia, ARDS, sepsis to septic shock.

1. Supplemental oxygen:

- Indications:
All patients with SARI and respiratory distress, hypoxemia, or shock.
- Dosage:
5 L/min or until SpO₂ ≥90% in non-pregnant adults, SpO₂ ≥92-95 % in pregnant patients and SpO₂ ≥94% in children is achieved.

2. Fluid support:

- Indications:
In shock, conservative IV fluid support is recommended.

3. Antimicrobial therapy:

- Indications:
For all SARI pathogens in patients with sepsis.
- Administration:
 - Within one hour of initial patient assessment in sepsis, in spite of presence of COVID-19, based on clinical diagnosis of community-acquired pneumonia and treatment guidelines.
 - Include neuraminidase inhibitor to combat influenza.
 - Reduce antimicrobial therapy based on culture and sensitivity results and clinical judgment.

4. Systemic corticosteroids:



- Indications:
Presence of underlying disease that necessitates corticosteroid therapy.
5. Other supportive care interventions:
 - Indications:
Clinical deterioration, rapidly progressing respiratory failure or sepsis.
 6. Discontinue chronic therapies temporarily based on patient's co-morbid condition and critical illness.
 7. Provide timely information to patient and family, on prognosis and understand the patient's beliefs regarding resuscitative procedures.

III. Collection of specimens for laboratory diagnosis:

1. Collect blood for culture and sensitivity tests, preferably before starting antimicrobial therapy.
2. Collect specimens from upper respiratory tract: nasopharyngeal and oro – pharyngeal swabs, to test for Reverse Transcription Polymerase Chain Reaction (RT-PCR); with droplet and contact precautions.
3. Collect lower respiratory tract specimens in patients on mechanical ventilator, with airborne precautions.
4. Use PPE for specimen collection
5. Use viral swabs such as sterile Dacron or rayon, along with viral transport media.
6. Collect additional upper and lower respiratory tract samples.
7. Collect repeat upper respiratory tract samples, once in 2 or 4 days, until two consecutive negative results are achieved. The negative results should be more than 24 hours apart. This indicates clearance of the virus.

IV. Management of hypoxemic respiratory failure and ARDS

Mechanical ventilation may be required due to intrapulmonary ventilation-perfusion mismatch or shunt. The methods used are:

1. High – flow nasal cannula oxygenation (non – invasive mechanical ventilation)
 - Indications:
Mild or moderate and non-worsening hypercapnia.



2. Endotracheal intubation and invasive mechanical ventilation

- Indications:

Conditions do not improve within 1 – 2 hours.

Hemodynamic instability, multiple organ failure and altered mental status.

- Administration:

In ARDS:

Use 4–8 ml/kg predicted body weight and lower inspiratory pressures to a plateau pressure of <30 cmH₂O. This is strongly recommended.

In severe ARDS:

Prone ventilation for adults and children, for more than 12 hours/ day is recommended.

Conservative fluid support is recommended.

Maintaining a higher positive end-expiratory pressure (PEEP) is recommended.

3. Refer the patient for extracorporeal life support (ECLS):

- Indications:

Patients with refractory hypoxemia.

Availability of expert centers with expertise to apply IPC measures for COVID – 19 patients.

- Avoid disconnecting the patient from ventilator.
- Use in-line catheters for suctioning airways.
- If disconnecting, then clamp endotracheal tube.

V. Management of septic shock

The following therapies must be initiated within 1 hour of diagnosing shock

1. Antimicrobials
2. Fluids:

Administer fluids till perfusion targets are achieved (MAP >65 mmHg in adults and urine output >0.5 ml/kg/hr in adults)



Reduce or discontinue fluids in case signs of volume overload are seen, or in case there are no mechanical ventilators available.

3. Vasopressors:

Administer through central venous catheters or peripheral IV in a large vein or intraosseous needles and monitor closely.

4. Isotonic crystalloids:

In adults: 30 ml/kg in the first 3 hours.

In children: 20 ml/kg as a rapid bolus and up to 40-60 ml/kg in the first 1 hr.

5. Inotrope (Dobutamine):

Indications:

Poor perfusion and cardiac dysfunction persist in spite of achieving MAP target with fluids and vasopressors.

VI. Other Therapeutic Measures:

1. Glucocorticoids:

- Indications:

Progressive worsening of indicators of oxygenation, or seen on imaging studies and extreme inflammatory response

- Dose:

Equivalent to methylprednisolone 1 – 2mg/kg/day for 3 to 5 days.

- Caution:

Large doses delay clearance of COVID -19 virus.

2. Termination of pregnancy:

- Indications:

Pregnant severe and critical cases

3. Psychological counseling

VII. Complications associated with critical illness

Specific measures are implemented to prevent the complications associated with critical illness such as reducing the number of days of invasive mechanical ventilation or reducing the incidence of:



1. Pneumonia associated with ventilator use
2. Venous thromboembolism
3. Catheter-related hematological infections
4. Pressure sores or ulcers
5. Stress ulcers and gastrointestinal bleeding
6. ICU-related weakness

VIII. Medication Specific to COVID - 19

Current guidelines recommend the following therapy for use on a case-to-case basis in severe illness, with informed consent, along with supportive therapy:

1. Lopinavir/ Ritonavir

- **Indications:**

In laboratory confirmed, symptomatic patients, of COVID – 19, with following criteria:

Hypoxia

Hypotension

Recently developed one or multiple organ dysfunction

- Increase in creatinine by 50% from baseline
- GFR decreased by >25% from baseline
- Urine output below 0.5 ml/kg for 6 hours
- GCS reduced by 2 or more
- Any other organ dysfunction

High Risk Groups

- Age above 60 years
- Diabetes Mellitus
- Renal Failure
- Chronic Lung disease
- Immune – compromised persons

- **Dosage:**

Lopinavir/ Ritonavir (200 mg/ 50 mg) – 2 tablets twice daily or



Lopinavir 400mg/ Ritonavir 100 mg – 5ml suspension twice daily

- **Duration:** 14 days or for 7 days after becoming asymptomatic.

IX. Other Medications Being Studied or Being Used to Treat COVID – 19

1. According to a WHO online press release on 22nd March 2020, research is being carried out on 4 therapies that may prove to be beneficial against COVID-19. These agents are:
 - Anti - viral: Remdesivir (experimental stage)
 - Anti - malarial: Chloroquine and Hydroxychloroquine
 - Anti-HIV drugs in combination: Lopinavir and Ritonavir
 - Combination of Lopinavir and Ritonavir, plus interferon-beta
2. As per management guidelines issued on 20th March 2020, by AIIMS, New Delhi, the treatment for mild cases and moderate cases being carried out at AIIMS, New Delhi is as follows:
3. Medication being used for the Treatment of Mild Cases:
 - Tablet Oseltamivir 75 mg twice per day for 7 to 14 days
Indicated for high-risk influenza patients
 - Tab Azithromycin plus Amoxicillin- Clavulanic acid
 - Tab Paracetamol 500mg as needed
4. Medication being used for the Treatment of Moderate Cases:

Oxygen therapy as needed

Antipyretics, Antitussives, Antibiotics

Broncho-dilation: Metered Dose Inhalers (MDI) are preferred over nebulization

 - **Hydroxychloroquine:**
 - Initial Dose: 400 mg twice per day on the first day,
 - Followed by: 200 mg twice daily for 5 days
 - **Lopinavir/ Ritonavir (200 mg/ 50 mg)**



- **Dose:**

2 tablets twice daily for use on a case-to-case basis within 10 days of onset of symptoms.

- **Cautions:**

Avoid combining Hydroxychloroquine with Lopinavir/ Ritonavir to avoid drug interactions.

Avoid the use of corticosteroids.