Republic of the Sudan
Federal Ministry of Health
General Directorate of Curative Medicine

Case Treatment Protocol For COVID-19 Patients

This protocol is developed on 16th March 2020 and updated on 25 November and 10th December and will be regularly updated (in footer)

This document is developed by members of the Case Management Committee in the Federal Ministry of Health (FMOH) to provide guidance to frontline clinicians caring for patients' withCOVID-19.
All hospitals should assign a suitable area for management of suspected COVID-19 patients till a decision to discharge or transfer to an isolation center is made. Assessment and treatment for all suspected patients should start immediately at the first encounter with health care professionals using this protocol even before transfer or admission is contemplated.

Clinical Syndromes Associated with COVID-19 Infection:

1- Mild Disease - Uncomplicated URTI:

- Patient with uncomplicated upper respiratory tract infection OR Atypical symptoms or GIT symptoms .
- Nonspecific symptoms such as fever, cough, sore throat, nasal congestion, fatigability, malaise and headache.
- The elderly and immune-compromised patients may present with atypical-symptoms.
- Patient doesn't show signs of dehydration, sepsis, Altered level of consciousness or shortness of breath.

Management:

- Symptomatic support– antipyretics for fever, hydration and rest.
- Supplemental vitamin C 1000 units daily, Vitamin D 25 microgram daily (1000U), Zinc 15mg daily, Black seed (Nigella Sativa) **2 gm** (tea spoon) and Honey (2 table spoon).
- For diabetic patients: Black seed (Nigella Sativa) **2gm (**tea Spoon**),** Honey: **5ml** (tea spoon) and warm water (1 cup)
- Check suitability for home isolation(checklist and hand-out).

2- Moderate Disease - Uncomplicated pneumonia:

- Patient with clinical suspicion of pneumonia, or radiological evidence of atypical or organised pneumonia.
  - *CXR: patchy or diffuse airspace opacities causing consolidation or ground-glass opacities, commonly distributed bilaterally, multi-lobar, peripheral and lower zones predominant.*
  - *HRCT: Ground-glass opacities, crazy paving, inter/intra-lobar thickening, consolidations.*
  - *Ultrasound: focal and diffuse B-lines, thickened pleural lines and*

Subpleural/alveolar consolidations.

- O_2 saturation >92% on room air.

Management:

- Symptomatic support as mentioned above.
- Check suitability for home isolation, otherwise admit to isolation centre.
- Give empiric antibiotics based for CAP pneumonia; recommend **Amoxicillin** 500mgTDS for 5 days + **Azithromycin** 500mg daily for 3 days OR **Doxycycline** 100 mg twice daily for 10 days.
- If bronchodilator treatment is required, provide Metered Dose Inhalers (MDI) and spacers- if available- instead of nebulisers.
- Add VTE prophylaxis for all hospital admitted patients or reduced mobility Enoxaparin **40 mg subcutaneous daily**. Adjust Enoxaparin the dose in renal impairment or use UFH 500 units BD.

3- Severe Disease- Severe pneumonia:

- Patient with clinical or radiological evidence of Pneumonia
- Desaturation to < 92 and/or require oxygen supplements.
- Patients are often in respiratory distress with an increased respiratory rate or minute volume.

Management:

- Provide **supplemental O_2** to achieve O_2saturations > 92%.
  - Nasal cannula
    - *20-40% oxygen*
    - *O2 dose1-5 L/min*
  - Simple face-mask
    - *40-60% oxygen*
    - *O2 dose 6-10 L/min*
  - Non-rebreather face-mask
    - *60-90% oxygen*
    - *O2 dose10-15 L/min*
- May deteriorate rapidly: so monitor O_2 saturation and other vital signs; escalate oxygen delivery device to maintain saturation of 92% and alleviate features of respiratory distress.
- Give empiric antibiotics for severe CAP pneumonia, **Ceftriaxone 1gm OD** + **Azithromycin 500mg daily** for 3 days.

- For patients with underling lung disease e.g Bronchiectasis: consider antipseudomonal antibiotic in-stead of Ceftriaxone.
- For suspected aspiration Pneumonia : add Clindamycin or Metronidazole.
- Start **Dexamethasone 6 mg tabs or I.V. for 10 days**.
  (For pregnant women use hydrocortisone 80 mg twice per day for 10 days)
  - All patients on steroids should receive PPI (eg pantoprazole 40 mg daily) unless there are contraindications.
- Provide **conscious prone positioning** or modified prone positioning for all patients who can position themselves and tolerate the prone positioning. Keep in prone for > 40 minutes at a time. Evidence support prone positioning as it was found to improve oxygenation through recruitment of posterior lung zones and reduces the need for invasive ventilation.
- Send baseline laboratory testing including CBC, RFT,LFT CRP and consider other laboratory tests eg: D-dimer.
- Escalate to NIV using preferably HNFC or CPAP in designated area to minimise the risk of aerosol generation for patients with features of respiratory distress, desaturation or fatigue while on NRM.
- Add VTE prophylaxis for all hospital admitted patients or reduced mobility, **Enoxaparin 40 mg subcutaneous daily**. Adjust Enoxaparin the dose in renal impairment or use UFH 500 units BD.
- Use of antiviral medications (***Favipiravir*** Or ***Remdesivir*****)** are limited to clinical trials only as currently no data to prove they are effective in improving patient's outcome.
- Begin arranging for transfer to higher level of care as needed.

4- Critical Disease - Sepsis/shock and Respiratory failure

- All patients with single or more organ failure that require support, including-
  - Hypoxic respiratory failure, Acute Respiratory Distress Syndrome (ARDS), shock, Life threatening organs dysfunction, OR altered mental status.

Management:

- NIV or early Endotracheal intubation and mechanical ventilation to manage ARDS. These aerosol generating procedures should be performed with air-borne precautions in place in a suitable location.
  Use low flow non-rebreather masks or masks with reservoir bags to oxygenate prior to intubation. Minimize the use of bag valve mask (BVM) as it can aerosolize the virus and increase risk of transmission.

- Mechanical ventilation goals:
  - Protective lung strategy.
  - SpO_2 > 90%.
  - Tidal volumes of 4-8mL /kg
  - Inspiratory pressures < 30cmH_2O

- ECG and baseline laboratory testing including CBC, RFT,LFT CRP and consider other laboratory tests (D-dimer, ABG and Lactate) to monitor for complications including myocarditis, acute kidney injury, liver injury, and shock.
- Closely monitor for secondary pneumonia, hospital acquired and co-infections with Malaria, or other tropical infections.
- Consider *Piperacillin /Tazobactam* or *Meropenem* plus *Levofloxacin.*
- If concerns for MRSA: add Vancomycin, Teicoplanin or Linezolid.
- For shock rapidly initiate fluid resuscitation aiming to reverse hypovolemia and provide adequate perfusion, avoid aggressive fluid resuscitation as it may worsen oxygenation and cause fluid over load.
  - 20 ml/kg rapid bolus of normal saline or lactated ringers.
  - Monitor for signs of fluid overload before giving additional boluses of 10ml/kg.
  - Administer vasopressors if shock persists.
    - goal MAP > 65 mmHg.
    - If central lines are not available, give pressor/ inotrope through peripheral IVs with dose monitoring for extravasation.
    - Noradrenaline is the first line vasopressor.
    - Adrenaline is the second to be added.
  - Start **Dexamethasone 6 mg IV daily for 10 days**. Use Hydrocortisone 80 mg BD for pregnant ladies.
  - Unless contraindicated, cover with Pantoprazole 40 mg IV daily.
  - In patients with low risk for bleeding AND suspected or proven DVT/PE OR high D-Dimer level > 2 **start full dose anticoagulation with Enoxaparin 1 mg/kg twice per day.** Adjust Enoxaparin dose in patients with renal impairment. Otherwise all patient should be on Prophylactic regimn as mentioned for all hospitalised patients.
- Use of antiviral medications (***Favipiravir*** Or ***Remdesivir*****)** are limited to clinical trials only as currently no data to prove they are effective in improving patient's outcome.

Collection of specimens for laboratory diagnosis:

- Collect specimens from both the upper respiratory tract (URTI; nasopharyngeal and oropharyngeal)and lower respiratory tract(LRT; Expectorated sputum, endotracheal aspirate, Broncho alveolar lavage) for nCOV testing by RT-PCR or Gene-Expert. Clinicians may elect to collect only LRT samples when these are readily available (for example in mechanically ventilated patients).
- Approved Antigen Rapid Diagnostic Test (RDT) would be the first diagnostic test for suspected COVID-19 patients in health care facilities. Only suspected patients with negative RDT will proceed to have RT-PCR testing if required.
- baseline laboratory testing including CBC, RFT, LFT and CRP. Consider other laboratory tests like D-dimer, ABG and Lactate guided with clinical needs.
- Collect blood cultures, ideally before antimicrobial therapy, **DO NOT** delay antimicrobial therapy to collect blood cultures.

Additional Supportive Measures:

- Optimize nutritional support and hydration.
- Rationalize medications and guard against possible interactions.
- Start VTE prophylaxis in all admitted patients with no contraindication.

Specific Anti-Novel-CoV Treatments and Clinical Research:

- There is currently no evidence to support use of specific anti-viral agent.. Clinical trials are highly encouraged to advance medical knowledge for this pandemic as well as future epidemics.
- Few trials evaluating the safety and efficiency of Hydroxychloroquine (HCQ) in patients with COVID-19 infection found no patient's outcome benefit.
- Emerging evidence discourage the use of Convalescent plasma infusion in COVID-19 patients even early in the disease.
- FMOH is encouraging researchers and clinicians to come forward.

Special Considerations for Pregnant and Lactating Women:

- Treatment centers should be equipped to accommodate for normal labor and cesarean section.
- If operation room not available, safe delivery should complete in nearest facility while observing adherence to infection control measures. Mother and neonate should transfer to an treatment center when it's safe to do so.
- COVID-19 confirmed or suspected mothers should continue breast feeding while wearing medical grade mask.
- In the events of deterioration, move the infant to a separate room and continue feeding using formulae or expressed milk.
- A midwife should be present in every treatment center.
- A nutritionist should be present in every treatment center.

Paediatrics and PIMS:

- Acute disease manifestations are substantially less severe in children than in adults the majority of paediatric COVID-19 cases have been mild and self-limited with few hospitalizations. Supportive care and oxygenation as required may be sufficient for mild and moderate cases. The management of cases presenting with severe respiratory distress and/or shock involves mechanical ventilation and use of IVIG. Thromboembolic episodes are not as frequent as in adults, although cases of myocarditis have being described.
- SARS-CoV-2 has been associated with a potentially severe inflammatory syndrome in children, referred to as ***Paediatric Multisystem Inflammatory Syndrome–Temporally associated with SARS-CoV-2*** [**PMIS-TS].**
- The presenting signs and symptoms are a mix of the ones for Kawasaki disease (KD) and toxic shock syndrome (TSS).
- Most patients (86%) had involvement of ≥ 4 organ systems; many had cardiac dysfunction (40.6%), shock (35.4%), myocarditis (22.8%), coronary artery dilatation or aneurysm (18.6%), or acute kidney injury (AKI) (18.4%).
- The most common signs and symptoms were abdominal pain (61.9%), vomiting (61.8%), skin rash (55.3%), diarrhea (53.2%), hypotension (49.5%), and conjunctival injection (48.4%).

Case definition include all of the following:

1. Fever and severe clinical illness requiring hospitalization.
2. Evidence of raised inflammatory markers.
3. Multi organ involvement.
4. Evidence of current or recent SARS-COV2.

PMIS-TS characterized with highly elevated D-dimer and B-type natriuretic.

Recommended investigations in addition to routine are:

1. D-dimer
2. B- NP
3. Troponin
4. CRP

Treatment in addition to supportive care in ICU includes:

1. IVIG
2. Aspirin
3. Anticoagulation

In all paediatric patients with clinically severe disease or suggestive raised inflammatory markers, prompt consultation and referral to a center with specialist paediatric services is highly recommended.

General nutritional guidance during the treatment period:

- Drink water in sufficient quantities constantly.
- Drink liquids which contain Vitamin C, such as lemon/ orange/ grape fruit/ guava/baobab and hibiscus local juices.
- Eat a healthy and balanced food throughout the day, which contains carbohydrates, proteins, fats, vitamins and minerals.
- Focus on eating a variety of vegetables and fruits, especially ones which contains zinc, vitamin D and iron, to strengthen the immune system.

Staff to use standard PPE + assess the patient in dedicated respiratory illness area of the hospital:

Presentation	Features	Management & intervention
Mild disease	URTI	-Assess vitals and concerns -Test blood using approved Antigen RDT (when available) or take Nasopharyngeal swabs for SARS-Cov2 PCR. -Simple antipyretics eg: Paracetamol. - Assure adequate Vitamin D, C, and zinc supplements.
Moderate disease	Pneumonia without oxygen support	-Assess Vitals, Focused exam, PMH and Medication history - Test blood using approved Antigen RDT (when available) or NPS for SARS-Cov2 PCR -treat empiric CAP (Amoxicillin 500mg TDS+ Azithromycin 500mg daily for 3 days OR Doxycycline 100 mg BD for 10 days) - Enoxaparin 40 mg subcut daily for all admitted to hospital patients or significantly reduced mobility.
Severe disease	Severe Pneumonia with oxygen requirement -	-Assess Vitals, Focused exam, PMH and Medication history Test blood using approved Antigen RDT (when available) or -NPS for SARS-Cov2 PCR- -Supplemental oxygen Keep saturation > 92% -Empiric severe CAP (Ceftriaxone 1 Gm OD +Azithromycin 500mg OD) - Dexamethasone 6mg tabs or I.V. for 10 days -Enoxaparin 40 mg\OD -Specialist consultation for considering antivirals/immunomodulators.
Critically ill	Sever Sepsis/Respiratory failure	- ABCD support - Treat as severe sepsis - ICU bed - Don't delay I&V once optimise Haemodynamic with fluids and pressors. - Dexamethasone 6mg I.V. for 10 days - Enoxaparin 1 mg/kg BD - Specialist consultation for considering antivirals/immunomodulators.

Discharge criteria:

Discharge from hospital is a clinical decision depending upon:-

1. Absence of need for close monitoring or hospital-delivered treatment (services) e.g. Oxygen
   AND
2. Reduced (low) probability of further deterioration.

Upon discharge patients are advised to continue transmission-based precautions.

Decision to discontinue transmission-based precautions depends on the following:

A. For symptomatic patients, decision depends on **BOTH** type and duration of symptoms:

1. Absence of fever for 3 days without use of antipyretics **AND** improvement in respiratory symptoms e.g.: cough, SOB.
2. Isolation duration is 14 days from start of symptoms.

B. For asymptomatic patients (confirmed or suspected), decision depends on either:

1. 14 days from time of first positive test (for confirmed cases) **OR**
2. 14 days form time of close contact with COVID-19 cofirmed case or breach in PPE (without testing)

Note: Positive cases could shed the virus for longer durations; however detecting viral RNA via PCR **DOES NOT** necessarily mean the infectious virus is present, as detected by viral cultures. **These guidelines follow theaters update by the CDC.**

- **Adhere to all standard infection control measures to prevent disease transmission.**
- **Advice to wear the mask if there is cough even after two weeks of recovery.**