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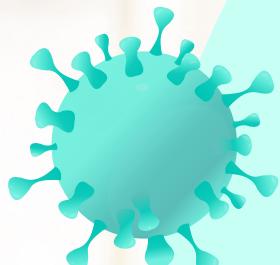
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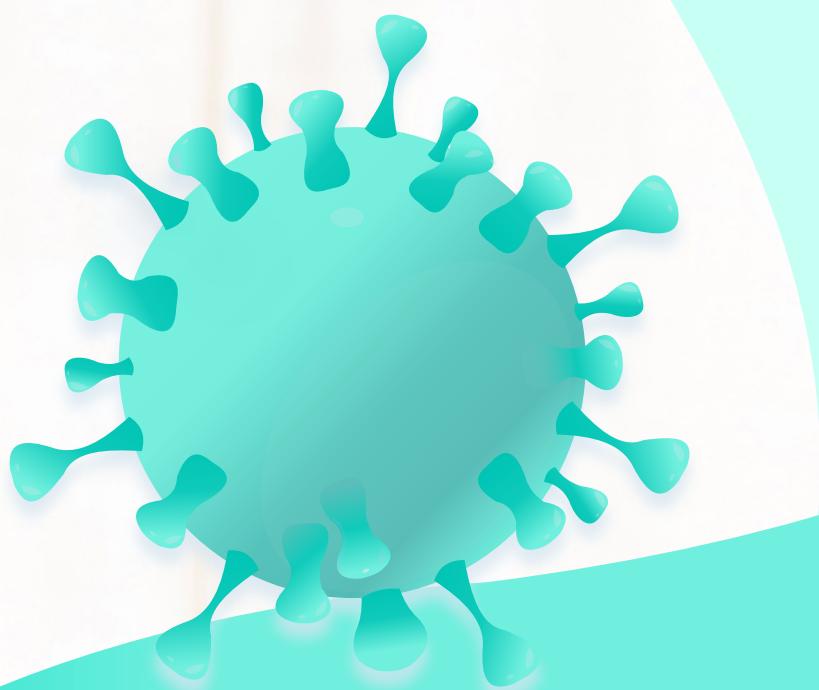
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Management Protocol for **COVID-19** Patients



Ministry of Health and Population, Egypt
Management protocol for COVID-19
Patients
Version 1.4 / November 2020



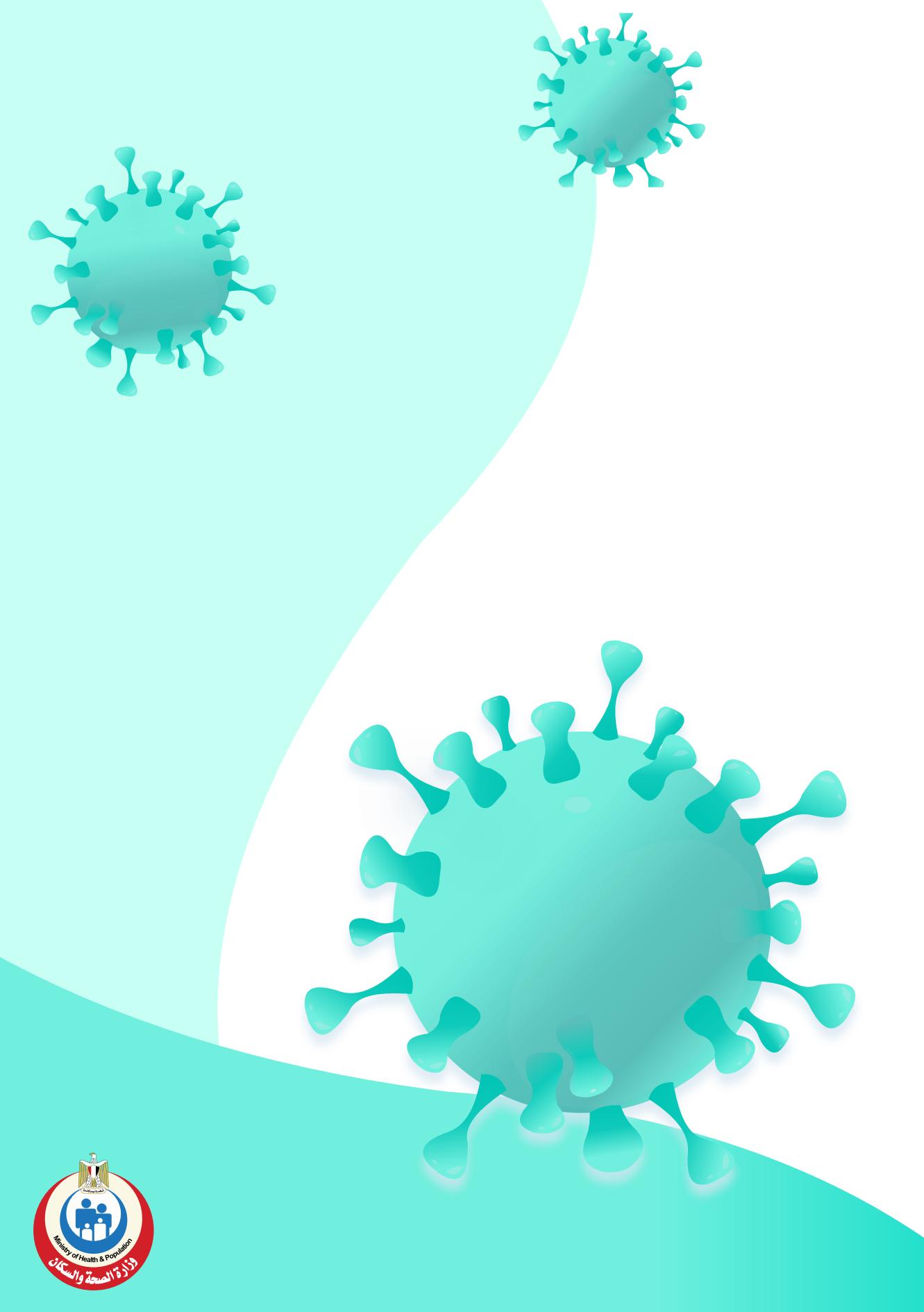


Table of contents

| Item | Page Number |
|--|-------------|
| Triage Protocol | 4 |
| Management Protocol | 6 |
| Gastrointestinal Manifestations of COVID-19 | 15 |
| Anticoagulation of COVID-19 Patients | 16 |
| High-Velocity Nasal Insufflation | 17 |
| Post-acute COVID Syndrome | 18 |
| Prevention and Control of COVID-19 Inside Health Care Facilities | 20 |
| Antibiotics in Covid-19 | 25 |
| List of Editors | 26 |



1st Step: Triage Case definition + severity assessment

Suspect Case Definition

A) Clinical AND epidemiological criteria:

OR: B

-Acute onset of fever and cough OR
-≥ 3 of the followings: fever, cough, sore throat, coryza, general weakness/fatigue, headache, myalgia, dyspnea, anorexia/nausea/vomiting, diarrhea, altered mental status

And 1 of the followings within 14 days of symptom onset:

Residing or working in an area with high risk of transmission*

Working in a healthcare setting

Residing or travel to an area with community transmission

Patient with severe acute respiratory illness (SARI: acute respiratory infection with history of fever or measured fever $\geq 38^{\circ}\text{C}$ and a cough; onset within last 10 days; requires hospitalization)

*Closed residential settings, humanitarian settings such as camp and camp-like settings for displaced persons.

NB: Minimal role for the epidemiological criteria during the period of community spread

Probable Case

A patient who meets clinical criteria AND is a contact of a probable or confirmed case, or epidemiologically linked to a cluster with at least one confirmed case.

OR

Suspect case with chest imaging showing findings suggestive of COVID-19 disease*

OR

Recent onset of loss of smell or taste in the absence of any other identified cause

OR

Unexplained death in an adult with respiratory distress who was a contact of a probable or confirmed case or epidemiologically linked to a cluster with at least 1 confirmed case

*Hazy opacities with peripheral and lower lung distribution on chest radiography; multiple bilateral ground glass opacities with peripheral and lower lung distribution on chest CT; or thickened pleural lines, B lines, or consolidative patterns on lung ultrasound.

Confirmed Case

A person with laboratory confirmation* of COVID-19 infection, irrespective of clinical signs and symptoms

*Molecular testing(PCR) with deep nasal swab is the current test of choice for the diagnosis of acute COVID-19 infection

During seasonal flu period, clinical differentiation between influenza and COVID 19 is difficult. Swab for influenza A &B may help in early differentiation.



Triage Protocol

Severity assessment

Suspected case

- PCR to confirm the diagnosis *
- Assess disease severity (clinical, lab & imaging)

-Mild symptoms
-Normal imaging

Imaging: +ve
 $\text{SpO}_2 \geq 92\%$

$\text{SpO}_2 < 92\%$, $\text{PaO}_2/\text{FiO}_2 < 300$,
respiratory rate > 30 breaths/min, or
lung infiltrates > 50%

Respiratory failure,
septic shock, and/or
multiorgan dysfunction

Mild

Moderate

Severe

Critical illness

Home isolation &
close follow up
If possible, < 65 years
old & no uncontrolled
comorbidity

Hospitals admission
COVID area

Admit to
Intermediate Care

Admit to
Intensive care

Risk Factor

No

Yes

In severe and critically ill patients, if-ve 1st PCR, repeat within 48 hours, negative case is considered after 2 –ve consecutive RT-PCR results from respiratory samples tested at least 1 day apart.

NB: Unstable patient who don't meet the suspected criteria should receive 1st aid therapy in non-COVID area before referral to general hospital.+ Risk factors include, old age > 60 years, uncontrolled comorbidity as hypertension, DM, or Social un applicable to home isolation.

All persons with suspected, probable or confirmed COVID-19 should be immediately isolated to contain the virus transmission.



2nd Step: Management

All patients with symptomatic COVID-19 and risk factors for severe disease should be closely monitored. The clinical course may rapidly progress in some patients.

Antibiotics are not recommended to prevent bacterial infection in mild patients. Administer empiric antibiotics if bacterial pneumonia/sepsis strongly suspected; re-evaluate daily.

In non-hospitalized patients, do not initiate therapeutic anticoagulants or antiplatelet unless other indications exist.

No harmful effect for administration of vitamin C or D or Zinc or Lactoferrin within the required daily dose.

Check Every Patient For Risk Factors

- . Age 65 years
- . SpO₂ < 92%
- . Heart Rate ≥ 110
- . Respiratory Rate ≥ 25 /min.
- . Neutrophil / lymphocyte ratio on CBC ≥ 3.1
- . Uncontrolled Comorbidities
- . On Immunosuppressive or chemotherapy drug
- . Pregnancy
- . Active Malignancy
- . Obesity (BM>40)

Time is an important issue in management of COVID-19. Before day 12 (stage of viral load), Antiviral drug is essential. After day 12, the role of antiviral declines with augmentation for the role of anti-inflammatory, immune-modulators and Supportive drugs (stage of hyper-immune state).

Potential antiviral drugs under evaluation for the treatment of COVID-19 include:

- Hydroxy Chloroquine 400mg/ 12 hours 1st day followed by 200 mg/12 hours for 6 days,
- Ivermectin 6 mg (36 mg on day 0 -3-6),
- Favipiravir 1600 twice daily first day then 600 mg twice daily,
- Remdesivir 200 mg IV on day 1, followed by 100 mg IV daily for high risk population for 5 days that could be extended to 10 days if the response is unsatisfactory or
- Lopinavir/Ritonavir 200/ 50 mg 2 tablets PO BID
- Monoclonal antibodies: early testing in blocking SARS-CoV-2.
- Convalescent plasma: for impending severely ill after counseling the scientific committee

Mild illness

Home isolation and **symptomatic treatment** (eg, antipyretics for fever, adequate nutrition, appropriate rehydration).

Educate the patients on signs/symptoms of complications that, if developed, should prompt pursuit of urgent care.

There are insufficient data to recommend either with or against any antiviral or immune-based therapy in patients with COVID-19 who have mild illness.

IS IT A FLU OR COVID-19?

| SYMPTOM | FLU | COVID-19 |
|----------------------------|--------------------------|---|
| FEVER | ✓ | ✓ |
| FATIGUE | ✓ | ✓ |
| COUGH | ✓ | ✓ |
| SORE THROAT | ✓ | ✓ |
| HEADACHES | ✓ | ✓ |
| RUNNY NOSE | ✓ | ✓ |
| SHORTNESS OF BREATH | ✓ | ✓ |
| BODY ACES | ✓ | ✓ |
| DIARRHEA AND/OR VOMITING | ✓ | ✓ |
| ONSET | 1-4 days after infection | About 5 days after infection but can range from 2-14 days |
| LOSS OF TASTE AND/OR SMELL | | ✓ |
| RED, SWOLLEN EYES | | ✓ |
| SKIN RASHES | | ✓ |

All patients with symptomatic COVID-19 and risk factors for severe disease should be closely monitored. In some patients, the clinical course may rapidly progress.



Mild Case

Symptomatic case
with lymphopenia or leucopenia
with no radiological signs for pneumonia

Check for

1. Age 65
 2. Temperature > 38
 3. $\text{SaO}_2 \leq 92\%$
 4. Heart Rate ≥ 110
 5. Respiratory Rate $\geq 25 / \text{min.}$
 6. Neutrophil / lymphocyte ratio on CBC ≥ 3.1
 7. Uncontrolled Comorbidities
 8. Immunosuppressive Drug
 9. Pregnancy
 10. Active Malignancy
 11. On Chemotherapy
 12. Obesity (BMI > 40)

All No

AND

Age < 65

Any YES

OR

Age ≥ 65

- Strict Home Isolation (Symptomatic Treatment)
- Follow and use personal protective guide equipment
- If any deterioration occurs, back to hospital

NB: Paracetamol is the preferred antipyretic

If more than 3 symptoms admit

Treatment

- Hydroxychloroquine (400 mg twice in first day then 200 mg twice for 6 days)
- OR Ivermectin 6 mg (36 mg on day 0 -3-6)
- OR Favipiravir 1600 TWICE daily first day then 600 mg twice daily

- Zinc 50mg daily
- Acetylcysteine 200 mg t.d.s.
- lactoferrin one sachet twice daily
- Vitamin C 1 gm daily

Moderate Case

Patient has pneumonia manifestations on radiology associated with symptoms &/Or leucopenia or lymphopenia.

| Anti-virals | Immune-modulators Anti-inflammatory | Anti-coagulation |
|--|---|--|
| Hydroxychloroquine + Ivermectin or | Steroids (if patient has severe dyspnea) RR>24 or CT scan showing rapid deterioration Dexamethasone 6 mg or its oral equivalent | Prophylactic anticoagulation if D-Dimer between 500 -1000 Therapeutic anti-coagulation if D-dimer > 1000 |
| Lopinavir/Ritonavir or | | |
| Remdesivir for high risk population with SaO ₂ < 92 | | |

Severe cases

RR > 30, SaO₂ < 92 at room air, PaO₂/FiO₂ ratio < 300, Chest radiology showing more than 50% lesion or progressive lesion within 24 to 48 hrs.

Admit to Intermediate Care

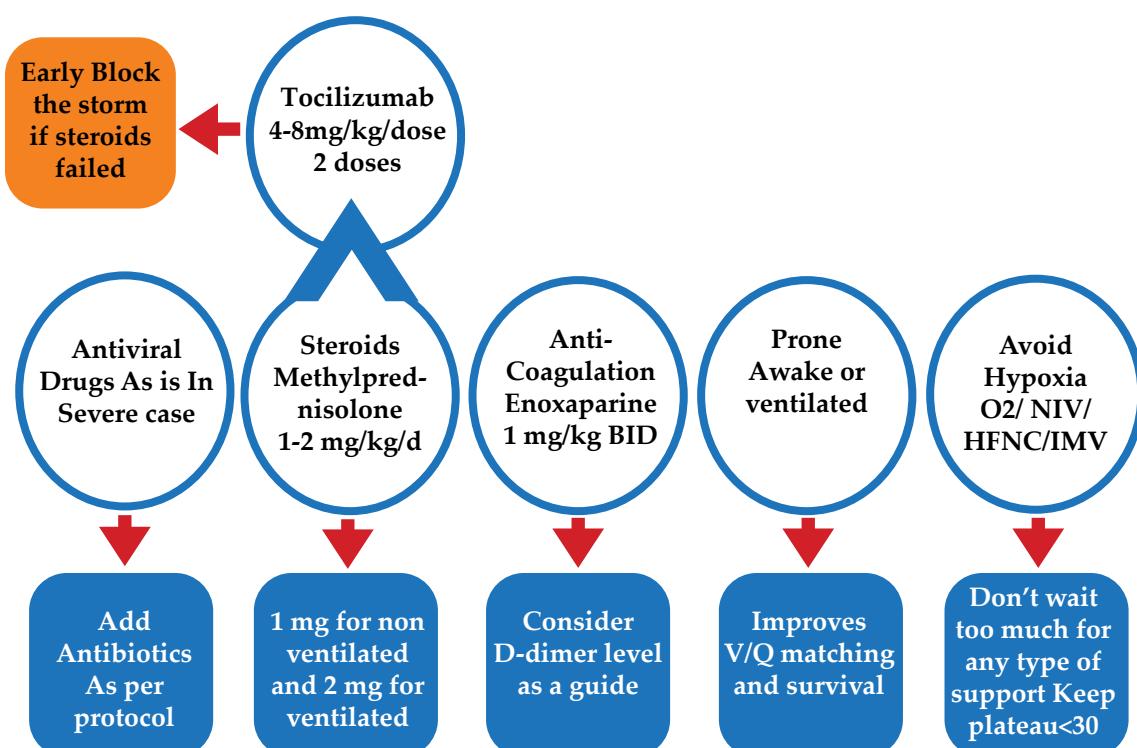
| Anti-virals | Anti-coagulant Prophylactic | Anti-inflammatory | Convalescent plasma |
|---|---|---|--|
| Remdesivir or Lopinavir/ Ritonavir | anticoagulation if D-Dimer between 500 -1000 Therapeutic anti-coagulation if D-dimer > 1000 Or if severe hypoxia | Steroids (Dexamethasone 6 mg or methyl prednisolone (1 mg / kg /24 hours) Tocilizumab 4-8 mg/kg/day for 2 doses 12 to 24 hours apart after failure of steroid therapy to improve the case for 24 hours | Before day 12 (under clinical trial) (after scientific committee approval) |

Critically ill patients

RR > 30, SaO₂ < 92 at room air, PaO₂/FiO₂ ratio < 300, Chest radiology showing more than 50% lesion or progressive lesion within 24 to 48 hrs. Critically ill if SaO₂ < 92, or RR > 30, or PaO₂/FiO₂ ratio < 200 despite Oxygen Therapy.

Admit to Intensive care

| Anti-virals | Anti-coagulant | Anti-inflammatory |
|---|---------------------------------|---|
| Remdesivir or Lopinavir/ Ritonavir | Therapeutic anti-coagulation | <p>Steroids (Methyl prednisolone 2mg /kg or its equivalent)</p> <p>Tocilizumab 4-8 mg/kg/day for 2 doses 12 to 24 hours apart after failure of steroid therapy to improve the case for 24 hours</p> |
| | | |



High flow nasal oxygen is an important modality in the early management of critically ill patients.

Non Invasive Ventilation or High Flow Nasal Cannula

(HFNC):

Conscious patients with minimal secretions.

Hypoxia $\text{SpO}_2 < 90\%$ on oxygen. Or $\text{PaCO}_2 > 40 \text{ mmHg}$ provided $\text{pH} 7.3$ and above.

NIV trial shall be short with ABG 30 minutes apart.

Any deterioration in blood gases from baseline or oxygen saturation or consciousness level shift to IMV.

CPAP gradually increased from 5-10 cmH₂O.

Pressure support from 10-15 cm H₂O.

HFNC can be alternative to NIV.

Invasive Mechanical Ventilation:

Use PPE specially goggles during intubation and avoid bagging.

Indications:

Failed NIV or not available or not practical.

$\text{PaO}_2 < 60 \text{ mmhg}$ despite oxygen supplementation.

Progressive Hypercapnia.

Respiratory acidosis ($\text{PH} < 7.30$).

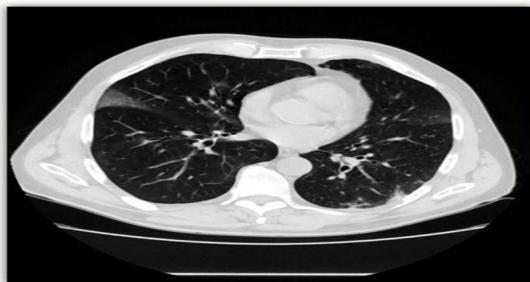
Progressive or refractory septic shock.

Disturbed consciousness level ($\text{GCS} \leq 8$) or deterioration in consciousness level from baseline

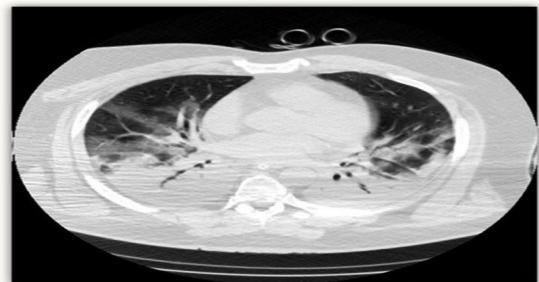




COVID-19 PNEUMONIA (type L & type H)

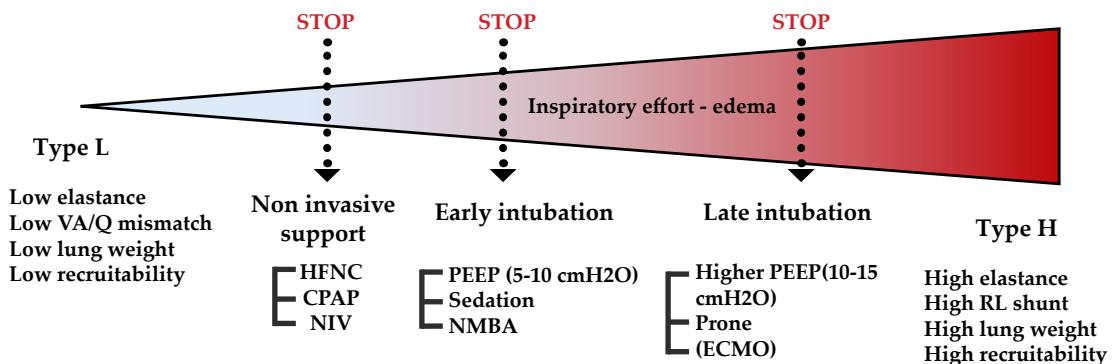


Type L



Type H

Lung Damage Progression (Virus + P-SILI)

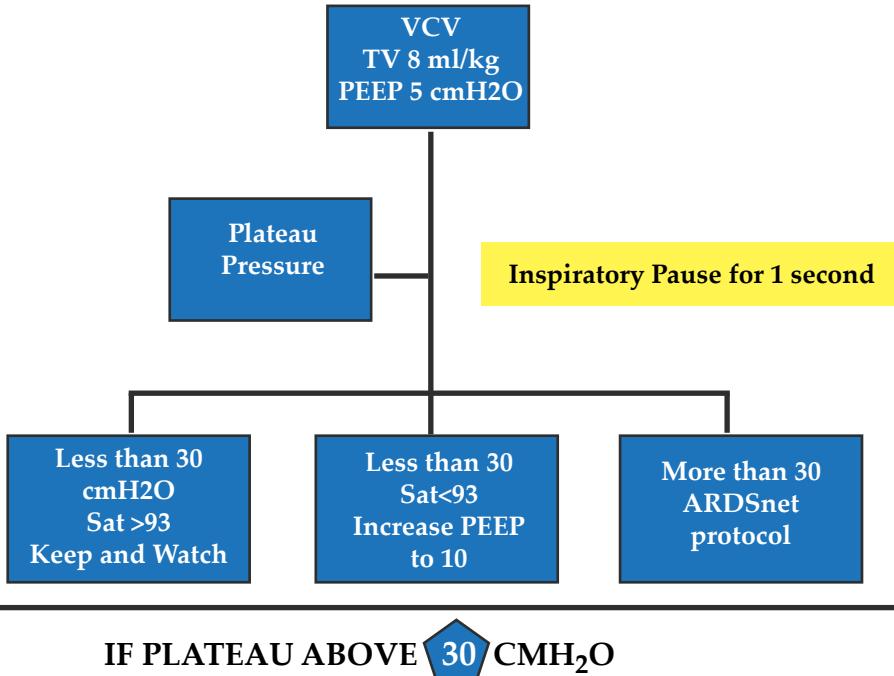


Type L and Type H patients are best identified by CT scan and are affected by different Pathophysiological mechanisms. If CT not available, definition could be used as surrogates: Respiratory system elastance and recruitability.

Understanding the correct pathophysiology is crucial to establishing the basis for appropriate treatment.

Step 1: 

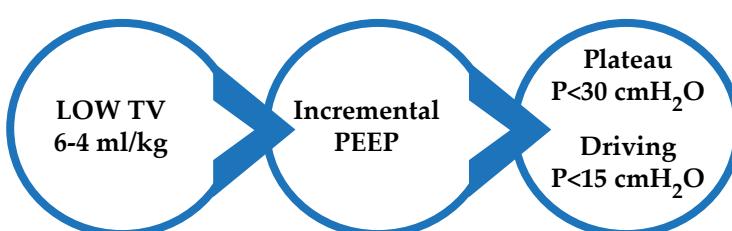
Initiation of Invasive Mechanical Ventilation



Step 2: 

Shift to ARDSNet protocol if needed

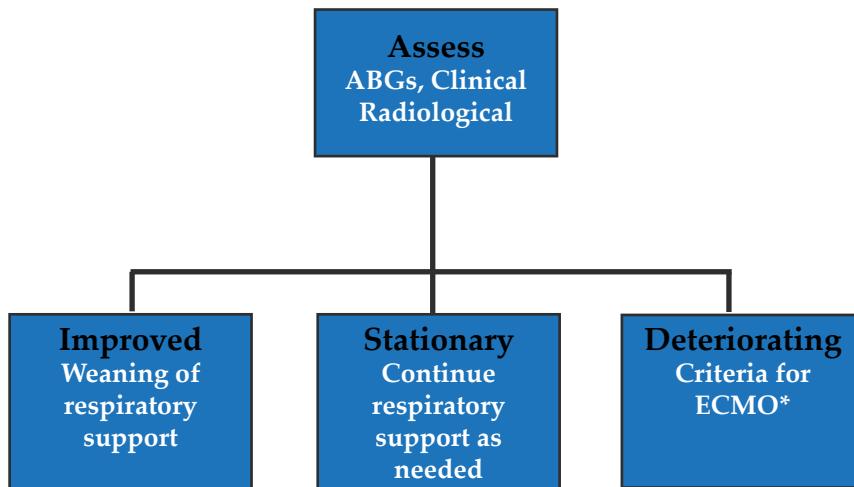
- ARDSNet protocol:





Start with tidal volume of 6 ml/Kg to keep plateau pressure on volume controlled ventilation (VCV) below 30 cmH₂O, decrease to 4 ml/kg if the plateau remain higher than 30 allow permissive hypercapnia so long the pH is above 7.3 compensate by increasing respiratory rate up to 30 breath/ minute. Consider heavy sedation and paralysis. If pressures are high or any evidence of barotrauma shift to pressure controlled ventilation and be cautious about low tidal volume alarms for fear of unnoticed endotracheal tube obstruction. Consider ECMO early if eligible. Increase PEEP gradually if the patient remains hypoxic according to FIO₂ level to keep driving pressure < 15cmH₂O. **NEVER FORGET PRONE POSITION.**

Step 3: Assessment of respiratory support outcome



***Criteria for VV ECMO:** Age below 55, mechanical ventilation duration less than 7 days, no comorbidities, preserved conscious level, PaO₂/FiO₂ <100 despite prone RESPscore >0. Expert opinion is needed and depends on availability.

Gastrointestinal Manifestations of COVID-19

- Gastrointestinal (GI) symptoms are seen in patients with COVID-19. The prevalence could be as high as 50%, but most studies show ranges from 16% to 33%
- Some patients with COVID-19 have presented with isolated GI symptoms that may precede the development of respiratory symptoms
- It is important to note that medications used for COVID-19 may be associated with GI symptoms as well.
- Approximately 50% of patients with coronavirus disease 2019 (COVID-19) have detectable viral RNA in the stool
- Loss of appetite or anorexia is the most commonly reported symptom.
- Diarrhea was the second most common symptom.
- Other digestive manifestations include nausea or vomiting and abdominal pain.
- Dysgeusia has also been reported, often in conjunction with anosmia.
- Currently, management of GI symptoms in patients with COVID-19 is mainly supportive.
- Treatment should be individualized according to the patient's symptoms, underlying comorbidities and COVID-19-associated complications.
- Oral or intravenous hydration
- The antidiarrheal agent loperamide can be used in an initial dose of 4 mg and with a maximum daily dose of 16 mg in patients without fever, bloody stools, or risk factors for *C. difficile* infection
- Antiemetic drugs can often help relieve symptoms.





Anticoagulation in COVID-19 Patients the patient clinically indicated for hospitalization

Yes

No

Is he/she critically ill

No

Yes

Prophylactic dose

Higher than standard
dose
0.5 mg/kg/m

Consider also therapeutic anticoagulation for patients with high clinical susceptibility of VTE and those with Severe hypoxia not explained by the chest CT findings

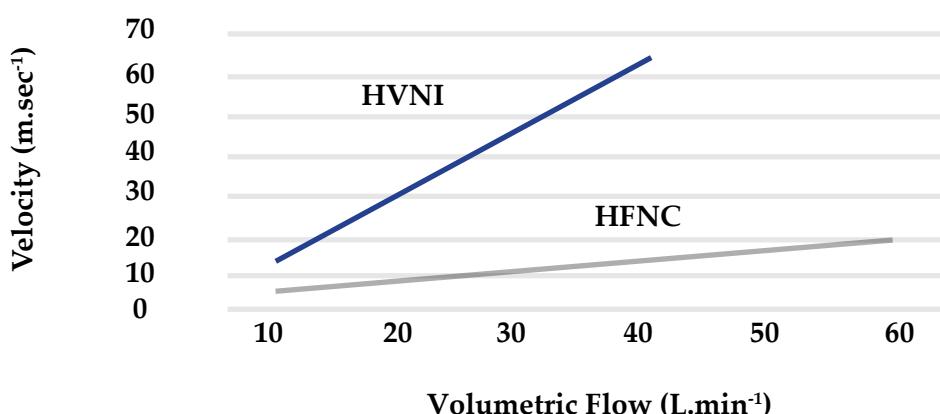
Therapeutic dose

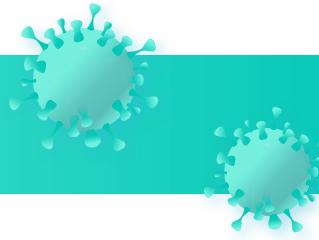
The preferred agents are LMWH and Fondaparinux unless contraindicated
In renal patients, heparin is the preferred agent.
If the dose of LMWH exceeds 150 twice daily use heparin instead.

High-Velocity Nasal Insufflation

High Velocity Nasal Insufflation (Hi-VNI)

- Hi-VNI is a first-line therapy for COVID-19 patients who are struggling to breathe.
- Hi-VNI Technology and WOB reduction: The fact that small-bore cannulas reduce the time required to fully purge the upper airway dead space³ is significant because as the respiratory rate of a patient in respiratory distress increases, the time between breaths decreases. By quickly clearing the upper airway dead space of end-expiratory gas rich in CO₂, Hi-VNI Technology helps patients breathe directly from a fresh gas reservoir and thereby reduces their WOB.





Post- acute COVID syndrome (long COVID)

Definition & incidence:

In the absence of agreed definition, it may be defined as “patients not recovering for several weeks or months following the start of symptoms that were suggestive of COVID, whether patients were tested or not.” It may extend beyond 3 weeks from the onset of first symptoms up to 3 months, sometimes occurring after a relatively mild acute illness. If symptoms are extending beyond 3 months, it is termed Chronic COVID.

In short, “Despite their illness being ‘over,’ they are having a lot of trouble returning to normal life.” It occurs in around 10% of patients.

Patients can be divided into those who may have serious sequelae (such as thromboembolic complications) and those with a non-specific clinical picture, often dominated by fatigue and breathlessness. One last group of covid-19 patients whose acute illness required intensive care management.

Management:

Specialist referral may be indicated based on clinical finding, for example:

Respiratory: if suspected pulmonary embolism, severe pneumonia.
Cardiology: if suspected myocardial infarction, pericarditis, myocarditis or new heart failure.
Neurology: if suspected neurovascular or acute neurological event.
Pulmonary rehabilitation may be indicated if patient has persistent breathlessness.

Medical management:

Symptomatic: treating fever by paracetamol & NSAIDs

Management of co-morbidities including diabetes, hypertension, kidney diseases & ischemic heart diseases

Listening and empathy

Consider antibiotics for secondary infection

Treat specific complication as indicated

Self-management:

Daily pulse oximetry.

Attention to general health like:

Good diet

Good sleep hygiene

Quitting smoking

Limiting alcohol

limiting caffeine

Rest and relaxation.

Self-pacing and gradual increase exercise.

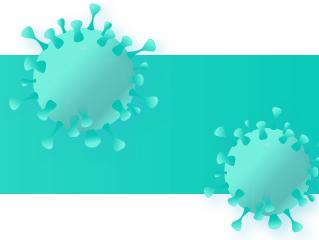
Set achievable targets.

Prevention and Control of Transmission of COVID-19 inside Health Care Facilities

General Recommendations for Prevention and Control of Transmission of COVID-19 inside Health Care Facilities

- 1-Daily screening of health care workers and patients before entering the health care facility (HCF) based on clinical signs (fever, respiratory symptoms.....).**
- 2- Any health care worker appears/reports to be diseased should be segregated until proper examination/management.**
- 3- All health care workers are required to wear surgical masks during work hours (during existence in HCFs).**
- 4- Minimal number of health care workers should be present at the same time in patient's units to keep social distancing**
- 5- Restrict unneeded movements between departments.**
- 6- Suspected or confirmed cases should take a separate route from other patients beginning from the facility entrance (Triage area), and all facility sections should follow the same separation.**
- 7- Suspected or confirmed cases should be isolated in a well- ventilated isolation room.**
- 8- Standard precaution should be applied :**
 - Hand hygiene
 - Cough etiquette.
 - Personal protective equipment.
 - Clean and disinfected Environmental surfaces.
 - Sterile instrument and devices
 - Sharp safety.
 - Isolation transmitted precaution.
 - Safe injection practices.





Recommendations According To The Type Of Procedure

1) Non Aerosol Generating Procedures (AGPs)

- Standard precautions.
- Isolation precautions taken to prevent the spread of infection by spray and contact.
- The need to adhere to washing hands before donning personal protective equipment and immediately upon doffing.
- The necessity to adhere to donning personal protective equipment as follows:

1- Surgical mask.

2- Protect your eyes by wearing goggles or face shield.

3- Long-sleeve medical gowns (gown) clean, non-sterile or sterile, according to type of technique.

4- Clean or sterile gloves depending on type of technique.

5- Health care worker are not required to wear protective boots and protective suits during routine care of cases.

6- Extended use of surgical masks, gowns, eye protectors, and face shields can be applied while caring for COVID-19 patients in the event of a shortage of personal 2 protective equipment for the length of the work shift (preferably not more than six hours).

7- Always remember not to touch the eyes, mouth or nose with contaminated hands or used gloves (wash your hands or rub using alcohol when touch any environmental surface).

8- Always clean and disinfect surfaces .

Medical Recommendations

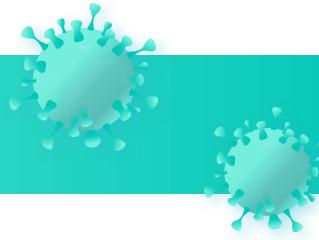
2) Procedures that include (AGPs):

- Tracheal intubation .
- Non-invasive ventilation e.g. BiPAP, CPAP.
- Tracheotomy.
- Cardiopulmonary resuscitation.
- Manual ventilation before intubation or bronchoscopy.
- Sputum induction by using nebulizer hypertonic saline.

The health care workers must adhere to the following:

- Standard precautions.
- Perform procedures inside a well-ventilated room.
- Follow the isolation precautions taken to prevent the spread of infection through air and contact.
- The need to adhere to washing hands before donning personal protective equipment and immediately upon doffing them.





Donning personal protective equipment as follows:

- A high-performance respiratory masks such as N95 or FFP2 or equivalent, with the need to conduct a tightness test to ensure that there is no leakage.
- Protect your eyes by wearing goggles or face shield.
- Long-sleeve medical gowns (gown) clean, non-sterile or sterile according to the procedure.
- Clean or sterile gloves depending on type of technique.
- The extended use of a mask, medical gown, eye goggles, or face shield (Extended use) can be applied while caring for patients with COVID-19 in the event of a lack of personal protective equipment and for the length of the work shift (preferably no more than six hours).
- Care must be taken not to touch the eyes, mouth or nose with contaminated bare hands or using gloves (wash your hands or rub using alcohol when touch any environmental surface).
- Always clean and disinfect surfaces regularly.

ANTIBIOTICS IN COVID-19

Indications:

- Rapid development of consolidation pattern.
- Development of lobar consolidation.
- Leukocytosis with absolute neutrophilia.
- Reappearance of fever after afebrile days.
- Increased CRP with improved other markers as ferritin.
- Procalcitonin is highly specific.

Low-risk inpatients:

- Combination therapy:
β-lactam (eg, ceftriaxone, or cefotaxime) plus either a macrolide (eg, azithromycin or clarithromycin) or doxycycline.
- Monotherapy:
Respiratory fluoroquinolone (eg, levofloxacin or moxifloxacin)

High-risk inpatients:

- β-lactam plus a macrolide or fluoroquinolone is recommended.



Treatment Protocol

Revised By:



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Ministry of Health and Population
Egypt / November 2020