



## COVID-19: A Short View of Intensive Care Management

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Currently, Coronavirus disease 2019 (COVID-19) is an emerging and pandemic disease worldwide. Clinical pictures may be asymptomatic, mild or severe. The most common symptoms of COVID 19 are fever and cough, and pulmonary involvement is seen in some of the patients. Severe pneumonia and extensive pulmonary involvement mostly require respiratory support and care in Intensive Care Units (ICUs).

COVID-19 may also affect the nervous system, skeletal muscle, and gastrointestinal tract, as well as the respiratory tract. Atypical presentations of COVID-19 are also reported (1, 2). Mild cases can be treated at home, with attention to the progression of the disease and dangerous symptoms. The standard management is hydration, nutrition and managing fever. Paracetamol can be used for fever (10–15 mg/kg), ibuprofen is not recommended in these patients (3).

Approximately 5–9% of all actively infected patients require intensive care treatment. In one retrospective study from Italy, ICU mortality was reported as 26% (4).

### Intensive Care Indications

- Respiratory rate >30/minute
- Dyspnea and respiratory failure
- Patient with oxygen saturation <90% and PaO<sub>2</sub> <70mmHg (despite nasal oxygen supply of 5 liters/minutes)
- PaO<sub>2</sub>/FiO<sub>2</sub> <300
- Lactate>4mmol/L
- Bilateral infiltration or multilobar involvement in lung CT
- Hypotension
- Skin perfusion disorder
- Kidney and liver function test disorder, thrombocytopenia and organ dysfunction
- Immunosuppressive patients
- Uncontrolled comorbidity
- Elevated troponin, arrhythmia

Intubation indications: Tachypnea and PaO<sub>2</sub> to FIO<sub>2</sub> ratio <150 mmHg after 2-h High-flow Nasal Oxygen (HFNO) or Noninvasive Mechanical Ventilation (NMV)

During the airway management, enhanced droplet/airborne personnel protective equipment (PPE) should be used by the health care providers (Fig. 1). For with COVID-19 patient, awake intubation should be avoided, and rapid sequence induction should be done and adequate muscle relaxation should be provided before intubation.

Aerosols generated by medical procedures (AGPs) are one route for the transmission of the COVID-19 virus. For this reason, AGPs should be done if absolutely necessary for patients with suspected/confirmed COVID-19.

Where these procedures are indicated, they should be carried out in a single room with the doors shut but preferably should be completed in a Negative Pressure Side Room. The following procedures are considered to be potentially infectious AGPs: Intubation, extubation, tracheotomy/tracheostomy, manual ventilation, open suctioning, bronchoscopy, NMV, High-Frequency Oscillating Ventilation (HFOV), HFNO, Administration of Pressurized Humidified Oxygen.

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**Figure 1. Personnel protective equipment**

**Ventilatory Support:** Starting supplemental oxygen is recommended if the  $SpO_2$  is less than 90%.  $SpO_2$  should be between 92–96%.

Gattinoni et al. (5) reported that type L and type H COVID 19 pneumonia.

There may be a transition between phenotype. Type L may worsen. Since the treatment of type L and type T for ventilation support is different, it is important to identify them.

**Type L:** Although elastance is low in L type pneumonia, compliance is high, Low Ac weight, reduced V/P ratio, it cannot be recruited because there is very little non-aired tissue.

Respiratory support in type L pneumonia:  $FiO_2$  is increased, HFOV and NMV can be used, Low PEEP should be used. (PEEP 8–9 cm  $H_2O$  should not exceed). Intubation should not be delayed in cases that cannot be managed with HFOV and NIV. Patients should be intubated with deep sedation. In patients with type L pneumonia, ventilation should be high in tidal volume (8–9 ml/kg). Since non-aired areas are few, this type does not benefit from prone position and recruitment.

**Type H:** Type H pneumonia is seen in approximately 20–30% of COVID patients. Hypoxemia, bilateral infiltrates, decreased compliance, increased lung weight and potential for recruitment.

Respiratory support in type H pneumonia: Type H pneumonia pa-

tients should be treated according to the current ARDS guideline. These treatments: higher PEEP, neuromuscular blockade, prone positioning, and ECMO.

**Hemodynamic Support:** For acute resuscitation with shock, the following are suggested: Measuring dynamic parameters to assess fluid responsiveness. Using a conservative fluid administration strategy and using crystalloids over colloids. Balanced crystalloids are preferred over unbalanced crystalloids.

- For the patient with shock: using norepinephrine as the first-line vasoactive, use of either vasopressin or epinephrine as the first line if norepinephrine is not available. Dopamine is not recommended if norepinephrine is not available.
- Adding vasopressin as a second-line agent is suggested if the target (60–65 mmHg) mean arterial pressure cannot be achieved by norepinephrine alone (6, 7).

Patients often develop myocardial dysfunction. Thus, troponin and beta natriuretic measurements and echocardiography should be performed (8).

Continuous renal replacement therapy can be used as adjunctive therapy for patients with COVID 19 in the intensive care unit (9).

**Pharmacological Treatment:** In patients with COVID-19 receiving mechanical ventilation who have respiratory failure, the use of empiric antimicrobial/antibacterial agents is suggested. In critically ill with fever, the use of pharmacologic agents for temperature control is suggested; cooling is not recommended.

Chloroquine/hydroxychloroquine (antimalaria): Chloroquine/hydroxychloroquine was used to treat COVID-19. However, its effectiveness is controversial.

#### Antiviral Agents

Lopinavir-Ritonavir (protease inhibitor): is a licensed treatment for HIV. Not enough clinical evidence yet for COVID 19.

Favipravir (RNA-dependent RNA polymerase inhibitor): No published scientific data on its use in COVID-19 (8).

Remdesivir (nucleotide analog): A study reviewed 53 severe COVID-19 who were treated with remdesivir and most of the patients experienced clinical improvement (10).

Interferon beta 1a: Used in the treatment of multiple sclerosis.

**Corticosteroids:** Routine use of corticosteroids is not recommended. However, it has been reported that it would be appropriate to use it in with ARDS patients with COVID (6).

**Convalescent Plasma and Immunoglobulins:** Routine use of standard IV immunoglobulins and Convalescent plasma is not suggested. It was found effective in a preliminary study involving five patients (11). However, this number of patients is limited, and advanced clinical studies are needed in this regard.

**Deep vein thrombosis prophylaxis:** Microthrombosis and associated ischemic events are very common (also strokes). D-dimer levels should be monitored frequently. All patients with COVID-19 (including non-critically ill) should be treated with low molecular weight heparin if there is no contraindication.

Supportive therapy is the most important treatment we can provide to patients with COVID-19 in intensive care. Because we do not have enough scientific evidence about pharmacological treatment, the SOLIDARITY study investigating combinations of drugs used in COVID 19 in various countries managed by WHO continues. This study will guide the pharmacological treatment of COVID-19.

In conclusion, the outbreak is still going on. Although ICU Physicians and other health care workers experienced the care of patients with COVID19, implementation of infection control procedures is very important for the prevention of the infection in ICUs. Currently, there is no specific therapy for COVID-19; timing adequate supportive therapy is also important for reducing mortality.

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## REFERENCES

- Mao L, Jin H, Wang M, Hu Y, Chen S, He Q, et al. Neurologic Manifestations of Hospitalized Patients With Coronavirus Disease 2019 in Wuhan, China. *JAMA Neurol.* 2020 Apr 10: e201127. doi: 10.1001/jamaneurol.2020.1127. [Epub ahead of print] [\[CrossRef\]](#)
- Kim J, Thomsen T, Sell N, Goldsmith AJ. Abdominal and testicular pain: An atypical presentation of COVID-19. *Am J Emerg Med.* 2020 Mar 31:S0735-6757(20)30194-7. doi: 10.1016/j.ajem.2020.03.052. [Epub ahead of print] [\[CrossRef\]](#)
- Özdemir Ö: Coronavirus Disease 2019 (COVID-19): Diagnosis and Management (Narrative Review). *Erciyes Med J.* 2020; 42(3): 00–00. doi: 10.14744/etd.2020.99836. [Ahead of print] [\[CrossRef\]](#)
- Grasselli G, Zangrillo A, Zanella A, Antonelli M, Cabrini L, Castelli A, et al; COVID-19 Lombardy ICU Network. Baseline Characteristics and Outcomes of 1591 Patients Infected With SARS-CoV-2 Admitted to ICUs of the Lombardy Region, Italy. *JAMA.* 2020 Apr 6:e205394. doi: 10.1001/jama.2020.5394. [Epub ahead of print] [\[CrossRef\]](#)
- Gattinoni L, Chiumello D, Caironi P, Busana M, Romitti F, Brazzi L, et al. COVID-19 pneumonia: different respiratory treatments for different phenotypes? *Intensive Care Med.* 2020 Apr 14:1–4. doi: 10.1007/s00134-020-06033-2. [Epub ahead of print] [\[CrossRef\]](#)
- Poston JT, Patel BK, Davis AM. Management of Critically Ill Adults With COVID-19. *JAMA.* 2020 Mar 26. doi: 10.1001/jama.2020.4914. [Epub ahead of print] [\[CrossRef\]](#)
- Alhazzani W, Möller MH, Arabi YM, Loeb M, Gong MN, Fan E, et al. Surviving Sepsis Campaign: guidelines on the management of critically ill adults with Coronavirus Disease 2019 (COVID-19). *Intensive Care Med.* 2020 Mar 28:1–34. doi: 10.1007/s00134-020-06022-5. [Epub ahead of print] [\[CrossRef\]](#)
- Phua J, Weng L, Ling L, Egi M, Lim CM, Divatia JV, et al; Asian Critical Care Clinical Trials Group. Intensive care management of coronavirus disease 2019 (COVID-19): challenges and recommendations. *Lancet Respir Med.* 2020 Apr 6:S2213-2600(20)30161-2. doi: 10.1016/S2213-2600(20)30161-2. [Epub ahead of print] [\[CrossRef\]](#)
- Wang L, Li X, Chen H, Yan S, Li D, Li Y, et al. Coronavirus Disease 19 Infection Does Not Result in Acute Kidney Injury: An Analysis of 116 Hospitalized Patients from Wuhan, China. *Am J Nephrol.* 2020 Mar 31:1-6. doi: 10.1159/000507471. [Epub ahead of print] [\[CrossRef\]](#)
- Grein J, Ohmagari N, Shin D, Diaz G, Asperges E, Castagna A, et al. Compassionate Use of Remdesivir for Patients With Severe Covid-19. *N Engl J Med.* 2020 Apr 10 doi: 10.1056/NEJMoa2007016.[Ahead of Print] [\[CrossRef\]](#)
- Shen C, Wang Z, Zhao F, Yang Y, Li J, Yuan J, et al. Treatment of 5 Critically Ill Patients With COVID-19 With Convalescent Plasma. *JAMA.* 2020 Mar 27:e204783. doi: 10.1001/jama.2020.4783. [Epub ahead of print] [\[CrossRef\]](#)