

## Management of COVID-19 patients

### HKL ICU protocol

#### General

- *Admission to ICU:*
  - Category 4 and 5
  - Consider category 3 with pre morbid: obesity, pregnancy, COPD, DM, heart failure, CKD
- *Transfer of patients:*
  - Non-intubated patients: primary unit to arrange for transfer
  - Intubated patients in main block: ICU team
  - Intubated patients outside the main block: primary team/ED
- *Relevant history on admission:*
  - Onset of symptoms
  - Day of illness
  - Steroids used
- *Investigations on admission:* FBC, RP, LFT/AST, PT/APTT, D-dimer, CRP, Sr. Ferritin and CXR
- A specific investigation form with the relevant investigations to be filled daily to look at trends

#### Non – ventilatory support

##### O2 therapy

- Start supplementary oxygen using nasal prongs 2- 4/min or face mask 5- 8L/min to maintain SpO<sub>2</sub> > 92%
- Patient to use 3-ply surgical mask to reduce aerosol dispersion

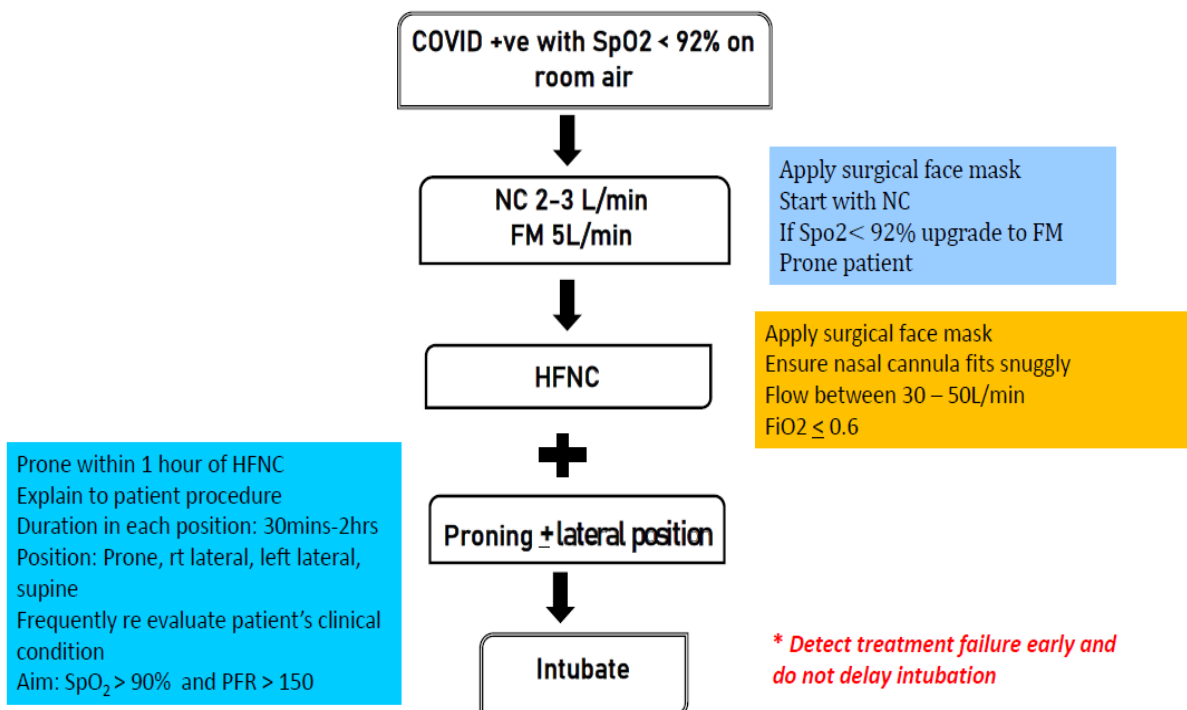
##### High flow nasal cannula (HFNC)

- Place patient in a single room. If single room not available, patient be placed in the cubicle
- Not more than 2 patients on HFNC in each cubicle
- Settings: Flow 30 – 50L/min with FiO<sub>2</sub> ≤ 0.6 to maintain SpO<sub>2</sub> > 90%
- Heated humidifier: Start with temperature of 34°C and adjust if needed for better tolerance
- Ensure nasal cannula is of the correct size and fits snugly (Nasal cannula size should be ≤ 50% of the patient's nostril size)
- Place 3-ply surgical mask over nose and nasal interface to reduce aerosol dispersion
- Consider awake prone positioning and lateral positioning
- Consider intubation if PF ratio ≤ 150 after 6 -8 hours of HFNC

## Awake prone positioning

- Contraindications: hemodynamic instability, spine instability, chest trauma/chest drains, pregnancy, obesity (BMI > 40)
- Explain procedure
- Check all lines and nasal cannula prior to proning
- Patient to prone him/herself under supervision. Provide assistance if needed
- Ensure oxygen therapy is continued during proning
- Prone for at least 30mins -2 hours followed by left and rt lateral position if possible
- Monitor oxygen saturation and PF ratio

# Oxygen administration



### **Ventilatory support**

- For patient receiving mechanical ventilation, a major focus is the avoidance of ventilator-induced lung injury (VILI) while facilitating gas exchange via lung-protective ventilation
- Limit tidal volumes to 6-8ml/kg predicted body weight and plateau pressure to < 30cmH<sub>2</sub>O
- Mode: Use volume controlled ventilation (VCV)
- If Pressure control ventilation is used, aim for driving pressure of not more than 15cmH<sub>2</sub>O
- Prone positioning for at least 16 hours should be considered in severe ARDS i.e. P/F ratio < 100mmHg. Refer to prone positioning guidelines below
- Muscle paralysis may be considered in the early phase of severe hypoxemia in selected patients
  - patients with ventilator dyssynchrony
  - prone position

### **Hemodynamic support**

- For acute resuscitation of patients in shock, measure dynamic parameters to assess fluid responsiveness
- Administer fluids cautiously. A restrictive fluid administration strategy is generally recommended
- Early use of vasoactive agent( e.g. noradrenaline) if patients remain in shock despite fluid therapy
- Aim for MAP > 60 – 65 mmHg if there is evidence of inadequate tissue perfusion
- ECHO is useful in guiding circulatory status and the diagnosis and management of shock

### **Sedation**

- Ensure adequate depth of sedation to prevent patient ventilator dyssynchrony
- Sedate with iv fentanyl and propofol\* infusion
- If there is still ongoing ventilator dyssynchrony despite fentanyl infusion of > 1 – 1.5 mcg/kg/hour and propofol infusion > 2mg/kg/hour, change sedative agent to morphine ± midazolam
- Generally higher doses of morphine compared to midazolam is required

*\*Please refer to the ICU protocol on the administration of propofol infusion*

## Corticosteroids

Corticosteroids is strongly recommended in severe and critical COVID-19 patients

### Dose and duration

Oxygen therapy	Steroid	Dose	Comment
Nil	Not indicated		Increases risk of mortality <sup>3</sup>
Nasal prongs or Facemask 5-8L/min	IV Dexamethasone	6mg daily x 7 – 10 days	7 days of therapy to be considered in patients who improve rapidly
HFNC/NIV* or Mechanical ventilation	IV Dexamethasone	20mg daily x 5 days then 10mg daily for 5 days	Shorter duration of treatment may be considered. This may be guided by clinical condition and inflammatory markers** Rule out other causes of hypoxaemia when patient deteriorates e.g. pulmonary oedema or embolism, heart failure, etc

\* HFNC: high flow nasal cannula \* NIV: non-invasive ventilation

\*\* Inflammatory markers: CRP, D-dimer, serum ferritin and LDH

*Note: If dexamethasone or methylprednisolone already given in the ward/ED on day of admission to ICU, then the next dose to be given after 24 hours only.*

### Venous thromboembolism prophylaxis

- Start VTE prophylaxis if there is no contraindication
- Use LMWH: 40 – 60 mg q24H
- In BMI > 30, use LMWH 40mg q12H
- Renal adjusted dose:
  - CrCl 20 – 30ml/min: LMWH 20 mg q24H
  - CrCl < 20ml/min: Use UFH 5000 units q8H or q12H (q8H for BMI > 30)

## Nutrition

### Non-ventilated patients

- allow enteral nutrition with oral nutrition supplements i.e. ensure, glucerna or nephro
- withhold enteral nutrition in patients on HFNC with deteriorating PF ratios

### Ventilated patients

- If no contraindication, start bolus feeding, 50ml 3H
- Aim to achieve only 70% of calories in the first 72 hours
- In feeding intolerance start prokinetic e.g. iv metoclopramide 10mg 8H
- Start continuous feeding in patients, unable to tolerate bolus feeding despite prokinetics

### Other Issues

#### Family update

- Update family the progress of the patient between 4pm – 6pm daily
- Video conferencing is permissible

#### Cause of death

- Discuss with the ICU consultant on call on the cause of death

### Investigations for COVID-19 patients

<b>On admission</b>	1. FBC 2. RP 3. LFT/AST 4. PT/APTT 5. CRP 6. Sr Ferritin 7. D.Dimer 8. CK/CK MB/LDH and Trop T 9. ECG
<b>Daily</b>	FBC RP
<b>Daily Inflammatory markers*</b>	CRP D-dimer Ferritin LDH
<b>Twice a week (Mon &amp; Thurs)</b>	LFT/AST PT/APTT Triglycerides ( if patient is on propofol infusion > 48 hours)

\* Inflammatory markers to be sent twice a week (Monday and Thursday) after one week of ICU admission.

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