## Critical Care Management of Patient Confirmed with COVID-19

### What do we know
- Patients may present with significant hypoxemia in the absence of dyspnoea or radiological abnormalities
- Hypercoagulability is common and manifests with thrombi particularly in the pulmonary vasculature
- A subset of patients develop a dysregulated immune response characterized by excessive cytokine production which in turn drives organ dysfunction
- Initially infiltrates are confined to alveolar walls (low elastance) and if a hyper inflammatory response ensues, the alveolar cavities become fluid filled resulting in a small percentage of patients manifesting with ARDS (high elastance)
- Patients may present primarily with non-pulmonary pathology (strokes, seizures, encephalitis, myocardial infarction, acute kidney injury)

### Respiratory Management of Patients unable to maintain a SpO$_2$ > 90% with reservoir bag oxygen mask (15L/min)
- Self-proning encouraged
- High flow nasal oxygen cannula (tape into position) under a surgical facemask
- Monitor clinical response and SpO$_2$
- Not recommended:
  - Venturi mask
  - Nebuliser mask
- Caution with Non-invasive ventilation

### Poor Outcomes Noted in:
- Late onset respiratory failure
- Two, or more organ failures
- Elderly patients (especially >65 years)
- Comorbidities (especially diabetes, hypertension or ischemic heart disease)
- Obesity
- Need for dialysis
- Immunocompromised

### Consider Intubation
- Hypoxaemia with severe respiratory distress despite standard O$_2$ therapy
- Cardiac dysfunction
- Cytokine storm/Hyperinflammatory state
  (Refer to separate guideline on how to conduct intubation)

### CPR
- Consider CPR if a rapidly reversible aetiology for cardiac arrest
- High risk with BVM
- If BVM:
  - Ensure good seal
  - Use high efficiency particulate filter
  - Hold mask with 2 hands (2 persons)

### High risk for viral transmission during
- Intubation
- Bronchoscopy
- Bag mask ventilation (BMV)
- CPR
- Nebulisation
- Transfer

### Investigations
Refer to investigation guideline
Respiratory Management

• **Degree of lung elastance will influence ventilation strategy.**
  - **Low elastance** (alveoli well aerated so good lung compliance)
    - Will not significantly benefit from lung recruitment strategies
    - TV 6-8 ml/kg IBW with PEEP (initiate at 10 cm H₂O and titrate)
  - **High elastance** (atelectasis and poor lung compliance due to consolidation)
    - Should benefit from small tidal volumes
    - TV 4-6 ml/kg IBW and lung recruitment strategies with PEEP (initiate at 10 cm H₂O and titrate)
    - Consider Airway Pressure Release Ventilation early (if experienced)
  - Limit plateau pressure to 30 cm H₂O and driving pressure to 15 cm H₂O
  - Consider **prone ventilation** early if refractory hypoxemia
  - Target SaO₂ of >90% and aim to reduce FiO₂ to <0.6
  - Permissive hypercapnia provided stable hemodynamically and pH>7.15
  - Role of **ECMO** unclear: Consider V-V ECMO in young patients with single organ failure after discussion with ECMO centre

General Management

• **Judicious fluid therapy:** ensure adequate intravascular volume as patients may be hypovolemic initially. Avoid fluid overload. Calculate daily fluid balance.
  - In ARDS patients aim for a neutral to 500ml negative fluid balance.
  - Initiate **thromboprophylaxis** in ALL patients (if no contraindication): 40-60mg s/c enoxaparin daily
  - Use **therapeutic anticoagulation** (1mg/kg enoxaparin s/c 12 hourly - unless contra-indicated or requiring dosage adjustment for renal or hepatic dysfunction) for severely hypoxaemic patients with a hyperinflammatory state and elevated D Dimer (>1)
  - Ulcer prophylaxis if at high risk for stress ulcers or unable to feed enterally
  - **Vasopressor** use: Low threshold to initiate rather than excessive fluid loading
  - Initiate **enteral feeding** if no contraindication
  - For all suspected CAP patients: Amoxycillin-Clavulanate + Macrolide + Oseltamavir
  - Corticosteroid Rx: Administer daily dexamethasone (i.v. 6-8mg) [or hydrocortisone (i.v. 200mg) or methylprednisone (i.v. 30mg) or prednisone (p.o. 40mg)] for 10 days.

Unproven but possibly beneficial therapies

• Several agents are currently being explored
• Includes: Remdesivir, Tocilizumab, Colchicine, Immunoglobulins
• There is currently insufficient evidence to support their inclusion as standard therapy.
• If considering these agents: seek expert opinion and use as per MEURI framework
• Additionally, Zinc, vitamin C, vitamin D supplementation may be considered.
  * Dual anti-platelet therapy is not recommended