Harbor-UCLA COVID-19 Airway Management Recommendations

**Key Points:**
- Aerosol generating procedures, such as non-invasive ventilation (NIV), High-flow nasal Cannula (HFNC), bag-mask ventilation (BMV), nebulizers, and intubation are all particularly high-risk procedures
- Airway devices providing 6L/min or more of oxygen are considered high flow and their use should be discouraged if an airborne infection isolation room is unavailable
- Double gloving, as a standard practice might provide extra protection and minimize spreading via fomite contamination to surrounding equipment after intubation
- Early intubation should be considered in a patient with deteriorating respiratory condition
- Have a backup airway plan ready to go prior to intubation

**Non-Invasive Oxygenation/Ventilation:**
- Supplemental oxygen can be provided with nasal prongs but a surgical mask should be worn over the patients face and prongs to reduce droplet spread
- HFNC can theoretically increase the risk of viral spread through aerosol generation. However this plus a surgical mask would be preferred over CPAP/BiPAP if needed.
- In general, CPAP/BiPAP should be avoided. Theoretically, could use if an appropriate viral exhalation filter is available and in the appropriate airborne isolation room.

**Nebulization:**
- Should be avoided
- Bronchodilators should be administered using metered-dose inhalers (MDIs)
- Mild to Moderate Asthma/COPD: MDI with spacer
- Severe Asthma/COPD: 0.1 – 0.3mg Epi and consider early intubation
• **Intubation:**
  - **High-Risk Patient + High-Risk Procedure = Higher Level of Precautions**
    - Ideally, want to be in an airborne isolation room with appropriate airborne/droplet PPE plus respirator (PAPR / CAPR). N95 with eye protection (face shield or goggles) is also acceptable.
  - Most skilled person at intubation should perform the procedure to minimize attempts.
    - Similarly, avoid the # of individuals that are in the room during the procedure.
  - **Pre-oxygenation:**
    - Optimize preoxygenation with non-aerosol generating means: bed up head elevated, airway maneuvers (i.e. jaw thrust), use of positive end expiratory pressure valves, and airway adjuncts.
    - BVM prior to intubation can generate aerosols and generally should not be used. Again, theoretically could use a viral exhalation filter between the resuscitation bag and mask.
      - If BVM is required, use gentle ventilation via a supraglottic airway (SGA) instead of BMV. No robust evidence is available to show that SGA are less aerosol-generating than BMV. The devices are easy to place and spare man/woman power and thus reduces staff exposure.
  - **RSI** is the treatment of choice for intubation and all patients should get this, as inadequate sedation and paralysis can produce coughing during laryngoscopy which can also generate aerosols.
  - **Video laryngoscopy** (VL) is recommended over direct laryngoscopy with a display separate from the blade to avoid placing the face of the intubator close to the patient.
    - VL equipment should be cleaned properly post-intubation

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**COVID-19 Intubation**

- **Personal protective equipment (PPE)**
  - Standard PPE
    - N95 or PAPR.
    - Face shield / goggles.
    - Gloves, gowns.
  - Consider also (depending on availability):
    - Handseal (preferable, disposable mask to cover both).
    - Two pairs of gloves, outer layer/disposable long-cuffed surgical gloves.
    - Koozie all for cannon body coverage.

- **Medications & pre-planned ETT depth**
  - High dose paralytic (e.g. Rocuronium at least 1.2 mg/kg).
  - Calculate optimal ETT depth (using MDCso2).

- **Stuff**
  - Volar laryngoscope & blade.
  - BVM with PEEP valve & viral filter.
  - Additional viral filter on exhalation port of ventilator.

- **Procedure**
  - Most experienced staff, limit people in room.
  - Pre-oxygenation: Options may include:
    - BIPAP with a two-tube system & viral filter.
    - BVM with viral filter, PEEP valve, and nasal cannula.
  - During apneas:
    - If using BIPAP: Continue with backup rate.
    - If using BVM: Hold mask (with PEEP valve) on patient’s mouth to prevent desaturation (but don’t actively bag the patient).
  - Inflated ETT cuff prior to ventilation.
  - Secure ETT at pre-calculated depth.

- **Post-procedure**
  - Meticulous removal of PPE (use ethanol hand wash before and after removal of PPE).
- **Viral Filters:**
  - For BiPAP, use the ISO-Gard HEPA light (left)
  - For BVM / ventilations, use Ventlab (right)

- **Mechanical Ventilations:**
  - COVID doesn’t appear to cause substantially reduced lung compliance, which is generally a hallmark finding of ARDS.
    - The predominant problem might be one or more of the following:
      - Atelectasis (alveolar collapse)
      - Drowning of the alveoli by fluid
  - Tidal volumes should be targeted to a lung-protective range (6 cc/kg ideal body weight).
  - Lower peep with early proning is recommended. If difficulty oxygenation in ED, high PEEPs should be utilized with ARDSnet protocol (see table below).
  - Consider consulting pulmonary / CCM to discuss airway pressure release ventilation (APRV) if difficulty oxygenating.

<table>
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<th>FIO2</th>
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<th>High PEEP</th>
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<tr>
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<td>5-8</td>
<td>14-16</td>
</tr>
<tr>
<td>0.5</td>
<td>8-10</td>
<td>16-20</td>
</tr>
<tr>
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PEEP tables don’t need to be followed precisely, but can be useful as a general guide. The WHO recommends using a high-PEEP strategy, which seems consistent with available experience thus far with COVID-19. If high PEEPs are used, make sure to keep tidal volumes low to prevent excessively high plateau pressures. APRV is an alternative strategy which would likewise provide high mean airway pressures.
• **References / Resources:**
  
  
  
  
  