STICU/BICU Mechanical Ventilation Guidelines

I. Initial ventilator settings:
   a. Mode: Volume control (VC)
   b. Tidal Volume: 6 ml/kg predicted body weight (PBW)
   c. Rate: individualize based on pH & PaCO2.

II. Ventilator management:
   a. Ventilation:
      i. Document plateau pressure every 4 hours and following ventilator changes
      ii. Goal plateau pressure is <30 cm H2O
      iii. Decrease tidal volume to 4 ml/kg PBW as needed to keep plateau pressure <30 cm H2O
      iv. Increase rate as needed up to 35 breaths/min to maintain pH>7.2 (do not allow PaCO2 to drop below 30-35). Monitor for breath stacking.
   
   b. Oxygenation:
      i. Goal PaO2 is 60-80 mm Hg. Goal oxygen saturation is >90%
      ii. Increase peep/FiO2 as needed using the following table:

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   c. Airway Pressure Release Ventilation (APRV):
      i. Consider changing ventilator mode to APRV when patients are requiring an increase in PEEP, have a plateau pressure > 30 cm H2O, and are breathing spontaneously.
      ii. Prior to changing modes, determine the patient’s mean airway pressure. The initial P high setting should be high enough to increase mean airway approximately 2-3 cm H2O higher than the previous mean airway pressure.
      iii. Settings should be individualized based on each patient’s clinical status.
          Common initial settings are:
          1. P high 20-30 cm H2O (try to avoid pressures > 30 cm H2O)
          2. P low 0-5 cm H2O (adjust based on the measured peep with goal of 3-5 cm H2O).
          3. T high: 3-5 seconds
          4. T low: 0.5-1 seconds

   d. Pressure Regulated Volume Control (PRVC):
      i. Consider changing to PRVC when patients are requiring increase in PEEP, have a plateau pressures are > 30 cm H2O, and are not or minimally breathing spontaneously.
      ii. Do NOT use PRVC/SIMV.
      iii. Some patients may require sedation to tolerate the application of PRVC.
III. **Refractory hypoxemia (PAO2:FiO2 ratio <150) and/or plateau pressure >30-35 cm H2O on 4 ml/kg PBW in VC or PRVC** (Evaluate and treat causes of hypoxemia and elevated plateau pressure as indicated by clinical condition. These include pneumonia, atelectasis, pulmonary edema, pneumothorax, pleural effusions, and abdominal compartment syndrome)

a. Initiate continuous sedation with fentanyl and/or propofol. Midazolam may be substituted in hypotensive patients.

b. If PAO2:FiO2 ratio <120 or plateau pressure remains above 30-35 cm H2O while sedated, initiate neuromuscular blockade (NMB) using either cisatracurium or atracurium x 24-48h. Attempt to stop NMB by 48h. Continuous infusion of fentanyl and propofol required. Midazolam may be substituted in hypotensive patients.

c. Consider changing I:E to 1:1 or 2:1

d. If PAO2:FiO2 ratio remains < 150, place patients without contraindications in prone position.
   i. Patients should be turned to the supine position as needed for procedures and then returned to the prone position.
   ii. When the PAO2:FiO2 ratio remains >150 with FiO2 ≤60 and PEEP ≤10, attempt to place patient in supine position. If PAO2:FiO2 ratio drops below 150, return to prone position.
   iii. Ongoing paralysis is not required in prone position. Spontaneous awakening trials should still be performed.
   iv. Attempts should be made to turn patients every 2 hours and provide routine skin care.
   v. Contraindications to prone positioning:
      1. **Absolute:**
         a. Spinal instability
         b. Open abdomen
      2. **Relative:**
         a. Recent thoracic or abdominal surgery
         b. Hemodynamic instability
         c. Cardiac abnormalities (eg, pacemaker)

References: