Modes of Mechanical Ventilation

And Protocol
Overview

- Lungs use ventilation (tidal volume and respiratory rate) to transfer CO2 from the blood to the alveoli and out of the body. Oxygenation (PEEP and FiO2) occurs when the oxygen transfers from the air in the lungs to the blood stream.
Overview

- Mechanical ventilation provides *positive* pressure ventilation, while normal breathing is *negative* pressure.
Volume Control

Set respiratory rate, volume, FiO2, PEEP, and pause time.

“Square waveform”

- Higher PIP (Peak Inspiratory Pressure is the highest level of pressure applied to the lungs)
- Low mean pressure (better venous return and cardiac output)
Pressure Regulated Volume Control

- Set respiratory rate, volume, FiO2, and PEEP
- “Ramp waveform”
  - Least peak pressures
  - High mean airway pressure (helps lung inflation and oxygenation)
Pressure Support/CPAP

- Set pressure support above PEEP, PEEP, and FiO2
- Patient triggers breath with no dialed in volume nor respiratory rate
- Volumes should be 85-90% of ideal volume
- PIP = PS + PEEP
- Mode before extubation. PS usually weaned down to 10 or 8 and PEEP to 5
Pressure Control

- Set respiratory rate, pressure above PEEP, PEEP, and FiO2
- Patient’s volume will be determined on when the breath is shut off when set pressure is reached (PEEP + PC = PIP)
Synchronized Intermittent Mandatory Ventilation

- Used with PRVC, VC, or PC
- Set settings of mode and PS
Bi Vent

- Set P High, PEEP, T High, T PEEP, PS above P High, PS above PEEP, and FiO2
- Uses high MAP to oxygenate
  - **Mean Airway Pressure** correlates with alveolar ventilation, arterial oxygenation, hemodynamic performance, and barotrauma
Protocol

- 2 pages, must be checked and signed for every patient placed on vent.
- If they are off protocol a reason must be stated and settings are to be written for what type of mode.
- BiVENT has a separate check box and sheet.
Protocol subsequent check boxes

- ABG 1 hour after ventilator initiated
- Routine Respiratory Culture
- Albuterol 4 puffs Q4 hours PRN
- Hold weaning trials, with reason
- Suction ETT/Tracheostomy and subglottic
• ABG as needed 1 hour after ventilation adjustment
• Spontaneous Breathing Protocol
  – PF ratio > 150
  – PEEP < 8
  – SpO2 equal to/> 90% on a FiO2 equal to/<40%
  – Minute ventilation < 12 LPM
  – MAP >60 mmHg
  – Patient has adequate cough
  – Awake and follows simple commands
PEEP and Oxygenation

- PEEP is started at 5 cmH2O which is the estimated normal anatomical physiologically PEEP when the epiglottis is closed
- PEEP maybe increased up to 10 by RT
  - Physician order must be obtained for PEEP greater than 10
- Weaning PEEP must not go past 4 in a 24 hour period
  - Physician order for greater than 4
- PF ratio that is greater than 150
  - PaO2 of 80 on a FiO2 of 50% is 160
Ventilation

• IBW
  – F 45.5+2.3(height in inches-60)
  – M 50+2.3(height in inches-60)
  – 6-10 mL/kg
• Notify physician for PIP >40 or a plateau pressure >30
  – **Plateau Pressure** is a pressure applied to small airways and alveoli and is measured with an inspiratory hold
• Inverse I:E ratio must have a physician order
• If PS is greater than 15, notify physician
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<th>&gt;0.5-0.6</th>
<th>&gt;0.6-0.7</th>
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<td>8</td>
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