

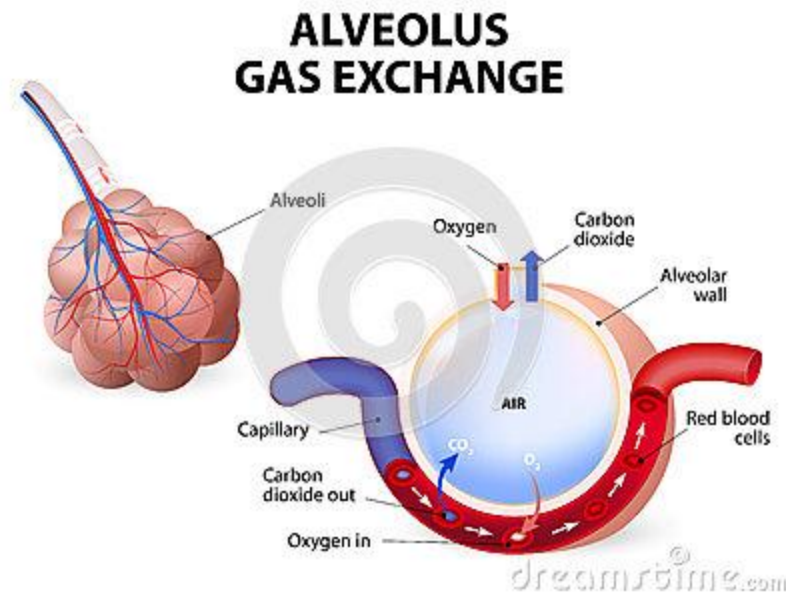
Modes of Mechanical Ventilation

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

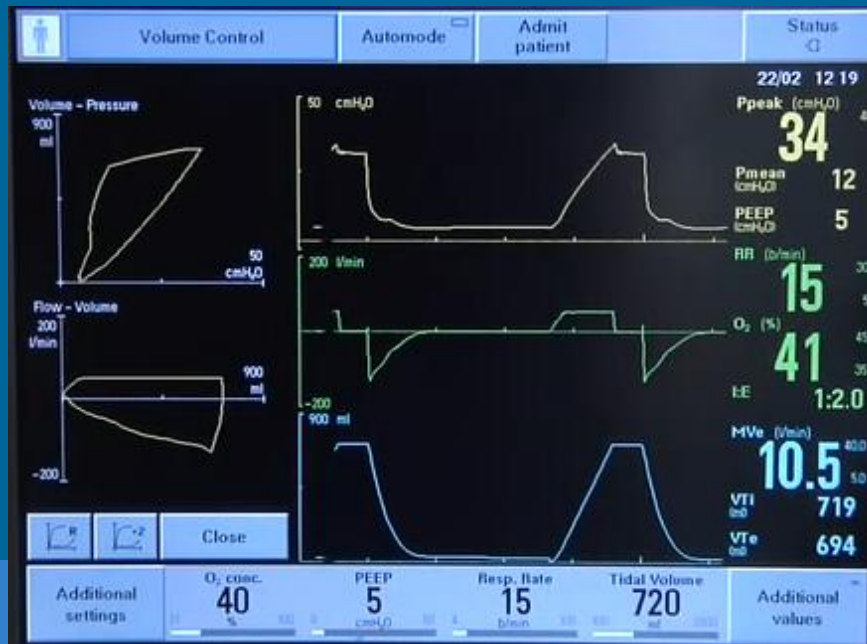


Overview

- 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)



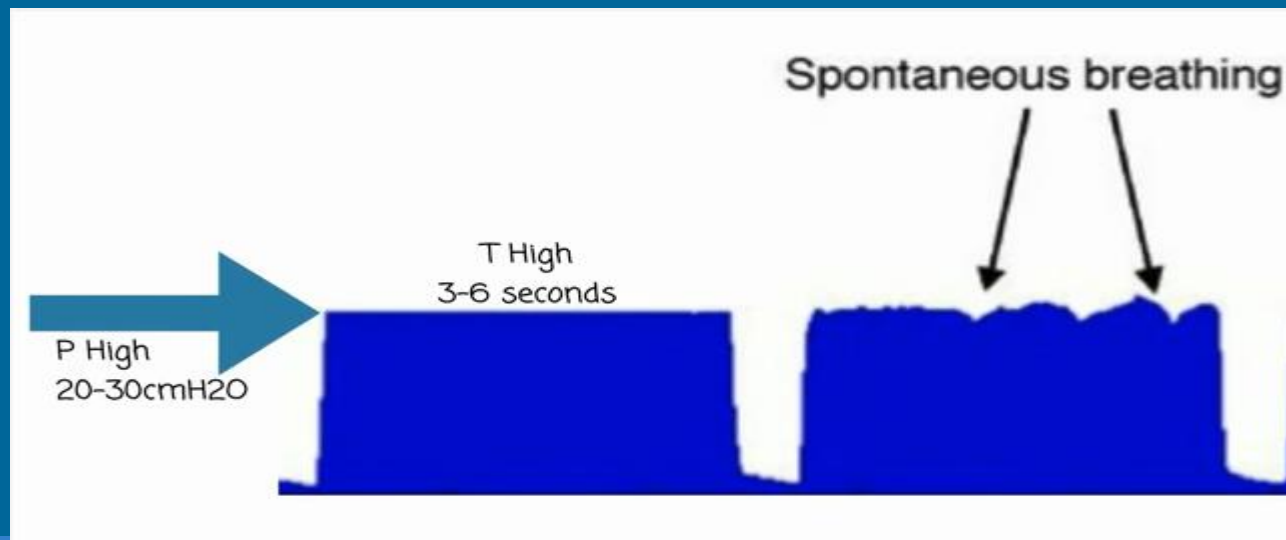
Synchronized Intermittent Mandatory Ventilation

- 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

Protocol second page check boxes

- 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 $45.5 + 2.3(\text{height in inches} - 60)$
 - M $50 + 2.3(\text{height in inches} - 60)$
 - 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

ARDS NET table guide

FiO2	<0.4	>0.4-0.5	>0.5-0.6	>0.6-0.7	>0.7-0.8	>0.8-0.9	>0.9-1.0	1
PEEP	5	8	10	12	15	18	20	20-24