

The Passy-Muir™ Valve. Ventilator Applications For The Non-RT

Ventilation/Respiration

- The act or process of inhaling and exhaling; breathing. Also called *ventilation*.
- Inhale O₂, exhale CO₂ = *Ventilation*
- Gas Exchange/Cellular Level is *Respiration*.

Structures Respiratory Failure

- Defined as inability to maintain adequate *ventilation* to maintain normal oxygenation and carbon dioxide elimination.

Indications for Mechanical Ventilation

- Respiratory Failure / Impending Respiratory Failure – multiple reasons
- Post op – whatever the duration
- C-Spine Injuries - quad
- Neuromuscular Disease – progressing
- Central Sleep Apnea – nocturnal ventilation only
- Trauma – multiple reasons

Types of Ventilation

- Non-Invasive Ventilation
- Invasive Ventilation

Ventilator Settings

Just What Does The Doctor Order?

- Mode of Ventilation
- V_t = tidal volume (cc or ml)
- RR = respiratory rate
- FiO₂ = % oxygen
- PEEP = positive end expiratory pressure
- Pressure Support/Pressure Control

Ventilator Settings

Things The Doctor Does Not Order

- Flow Rate – L/min
- Alarms Settings
- Trigger Sensitivity
- Rise Time %
- Exp % Sensitivity (time limits PS breaths)
- I/E Ratio
- Etc.

Types of Ventilation

Volume Ventilation = ventilator delivers the pre-set V_t regardless of the peak pressure required.

Volume is a constant.

Pressure Ventilation = ventilator delivers a pre-set pressure and volume can vary depending on lung compliance/resistance. Pressure is a constant, volume may be variable.

Ventilation Terminology

Modes of Ventilation – *Alphabet Soup!!*

- *SIMV, IMV, w/wo PS* – synchronized intermittent mechanical ventilation (pressure support is an option)
- *A/C and/or PC* – assist control ventilation/pressure control
- *PRVC* – pressure regulated volume control
- *APRV, Biphasic, BiLevel* – airway pressure release ventilation – this pt is typically too sick for PMV on this mode.
- *CPAP/PS* – continuous positive airway pressure / pressure support – this is a spontaneous breathing mode.
- *BIPAP* – bi-level positive airway pressure --- to name a few!!

Ventilation Terminology

Modes of Ventilation That are PMV Friendly

- *SIMV w PS* – synchronized intermittent mechanical ventilation with Pressure Support for spontaneous breathing
- *A/C* – assist control ventilation
- *PRVC* – pressure regulated volume control (with all vents?)
- *CPAP/PS* – continuous positive airway pressure / pressure support – this is a spontaneous breathing mode.
- *BIPAP* – bi-level positive airway pressure

Ventilator modes

- *Assist control (AC)* – Machine does all the work. If the pt attempts to trigger a breath the vent will deliver the preset volume/pressure setting at the preset rate
- *Pressure Regulated Volume Control (PRVC)*, vent adjusts pressure delivered during each breath to ensure target volume

Ventilator modes (continued)

- *Synchronized Intermittent Mandatory Ventilation (SIMV)* – Vent will deliver a predetermined number of breaths per minute at a certain volume/pressure. If the pt initiates spontaneous breaths, those breaths will be at the pt's spontaneous volumes. Used in beginning of weaning.

Ventilator modes (continued)

- *Pressure support* – ventilator delivers a pre-set pressure, volume is variable, during spontaneous breathing. Can be utilized with other vent modes during spontaneous breaths to provide pressure support to overcome resistance from vent tubing. Pressure support is like physical therapy for spontaneous breathing.

Ventilator modes (continued)

- **Continuous Positive Airway Pressure (CPAP)**- During spontaneous breathing only. Pt determines how many breaths per minute will be taken. No preset volumes are presented to the patient. Pt is given continuous positive air pressure to maintain integrity of gas exchange at alveoli. Final weaning step before trach collar. Almost always used in conjunction with PS.

Ventilator modes (cont)

- **BiPAP = (Bi level Positive Airway Pressure)** typically used for non-invasive ventilation.

Ventilation Terminology

"Must Knows" for PMV Use!

- FiO₂ = oxygen % (<50%)
- PEEP = positive end expiratory pressure (<10cmH₂O)
- Pressure in our lungs at end exhalation (the air we can never exhale that maintains lung inflation)
- V_t = volume of delivered vent breath (cc's)
- PIP/PAP = peak airway pressure (<40)
- How much driving pressure from the machine is required to deliver the set V_t

Critical Care Application

Modes of Ventilation That are PMV Friendly For Long Periods of Time

Consider:

- NIPPV Mode
- NIV (non-invasive ventilation) is typically seen delivered with a face mask, and is referred to as mask BiPAP or mask CPAP, but may be a good alternative mode, with better alarm options for longer term PMV applications.

Vision BiPAP - Ventilation Terminology

Ventilators That are PMV Friendly

- Most acute care, sub-acute, and home care vents are PMV friendly.

Ventilators That are NOT PMV Friendly

- Avea by Viaysis – upgrading in Dec 2009 though

Ventilation Terminology

- Double Limb Circuit
- Single Limb Circuit
- Cuff Inflated-Closed Circuit
- Cuff Deflated-Open Circuit

PMV In-line Ventilator Adjustments & Ventilator Alarms For PMV Applications

- Low Exhaled V_t and V_e alarms
- Low Pressure Alarm – set 5 to 10 cm below PIP

- High Pressure Alarm – set 10cm above PIP

Connections

- Tubing Alternatives
- 22/22mm Silicone Adaptor

TEAM APPROACH

TRACH TEAM CO-TREATMENT STRATEGIES

What are the goals ???

HOW DO I GET THE RT TO HELP ME ???

Educational Opportunities

WEBINARS or **SELF STUDY COURSES**

Basic Application

Ventilator Application-Advanced

Pediatric Application

Swallow and PMV

Building a Trach Team

www.passy-muir.com

ASHA , AARC and California Board of Nursing Credit

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