Suspected or Confirmed COVID-19 Infection
Basic Care of the Adult Patient on Mechanical Ventilation

MODES OF VENTILATION

Acute Respiratory Distress Syndrome (ARDS) Management

For more specific information, please view the **Vent Guidance**

Volume Assist Control

- The provider sets the tidal volume and the patient receives that programmed set tidal volume with each machine breath.
- The Peak Inspiratory Pressure (PIP) varies with the patient's pulmonary compliance.
- At a given tidal volume, the patient's PIP will increase with worsening ARDS.
- At any set rate, the patient gets that machine breath on a time cycle.

Pros:
Set Tidal Volume - consider lung protection.

Cons:
PIP may escalate quickly with compliance changes.

Pressure Assist Control

- Patient receives an inhaled breath according to the set Peak Inspiratory Pressure (PIP) until set pressure is reached for each machine breath.
- The tidal volume may vary from breath to breath, a decrease in lung compliance will decrease tidal volume.
- At a given set pressure, the patient's tidal volume will decrease with worsening ARDS.
- At any set rate, the patient gets that machine breath on a time cycle.

Pros:
Set PIP limits – monitor for barotrauma.

Cons:
Volumes may vary widely depending on lung compliance.

Pressure Support

- Spontaneous mode of ventilation, which is more comfortable for the patient and may require less sedation.
- Typically a weaning mode for ARDS, not used for conditions of worsening pulmonary status.
- Helps the patient achieve a greater TV/MV for a given inspiratory effort or work of breathing.
- Since the patient controls their I-time, flow rates, tidal volume, and rate, the patient tolerates ventilation better, and less sedation is required.

Pros:
Augments/supports patient volume.

Cons:
Not ideal for ARDS patient.

Ventilation Terms

Respiratory Rate: Number of breaths per minute

Tidal Volume: Size of each breath (ml). Typical is 450-550 based on 6-8ml/kg ideal body weight (IBW)

Minute Volume: Amount of gas in/out of lungs over a minute

Tidal Volume X RR = Minute volume (LPM)

PIP: Peak Inspiratory Pressure – Pressure required to administer tidal volume into the lungs

Oxygenation Terms

FiO2: Fraction of inspired oxygen (O2%)

PEEP: Positive End Expiratory Pressure (pressure held in lungs at end of breath)

I:E Ratio: Inspiratory to Expiratory ratio (normal 1:2-1:3)

MAP: Mean Airway pressure or pressure maintained throughout the respiratory cycle

I-Time: Time spent in inspiration

Alarm Management

First and foremost – always treat the patient first and the ventilator second.

Alarm

High Pressure Possible Causes
- Patient coughing
- Ansynchronization (fight vent)
- Patient biting ET tube
- Kinked tube

High Volume Possible Causes
- Agitation and/or Pain
- Patient coughing and neuro breathing
- Decrease in lung compliance
- Patient more awake

Action

High Pressure Possible Solutions
- Suction Patient
- Place Bite Block
- Remove Kink in Tube

High Volume Possible Solutions
- Evaluate for extubation if awake
- If agitated, consider pain or sedation – Call RT/MD to assess/manage

WHEN IN DOUBT, BAG AND SHOUT

Low Pressure Possible Causes
- Patient Disconnected
- Patient taking large, fast breaths
- Leak in the circuit (assess cuff pressure)

Low Rate and/or Apnea Possible Causes
- Secretions and/or mucous plug
- Coughing
- Decrease in lung compliance
- Kink in circuit ET tube

Low Pressure Possible Solutions
- Suction Patient
- Look/listen for disconnection or leak
- Decrease sedation – call RT to assess/manage

Low Rate and/or Apnea Possible Solutions
- Call RT/MD to assess/manage
- Decrease sedation – call RT to assess/manage
- Perform neurologic exam

MONITORING CONSIDERATIONS

Tidal Volume – Vt (exhaled) should be 6-8 ml/kg of predicted or ideal body weight (IBW).

Respiratory Rate – Maintain RR below (<) 30 breaths per minute.

Peak Airway Pressure – Maintain Peak Airway Pressure below 30 cmH20.

Plateau Pressure – Requires inspiratory hold maneuver to measure; ideally less than 30 cmH20, preferably 20 cmH20.

ETT placement/depth – Measure regularly at the teeth or lip (per facility protocol).

Breath Sounds – Should be equal and bilateral.

Cuff Pressure – Measure once per shift.

A or Dysynchrony with Ventilator – Observed by assessment findings, such as patient work of breathing not aligned with vent cycle, patient unable to complete breath cycle, and ventilator continuing to alarm.