

Surgical Intensive Care Unit Ventilator Management Protocol

Policy

All patients requiring mechanical ventilation in the SICU are managed following this protocol unless otherwise ordered by their physician in the computerized physician order entry system (CPOE).

A. All changes to the ventilator strategy will require effective communication to the current team. The Protocol team members include the SICU Fellow, patient's Nurse, Respiratory Therapist and Resident. Inadvertent changes to the ventilator are not made. Any deviation from the protocol will require specific orders entered into the CPOE system.

B. Maintaining continuity of care and communication plan:

1. Day shift- the Respiratory Therapist reviews all patients' ventilator orders and plan for the day with the critical care team during rounds (if unavailable with the SICU Fellow after morning rounds).
2. Night shift- the Respiratory Therapist reviews all patients' ventilator orders and plan for the night with the SICU Fellow after evening rounds (approximately 8pm). The SICU Fellow pages (835-5990) Respiratory Therapy (RT) pager for SICU.

Procedures

- A. **MODE:** PRVC (Pressure regulated volume control) with SIMV (Synchronized intermittent mandatory ventilation) is the preferred mode of ventilation. Alternative modes of ventilation may be used when more aggressive ventilation is needed due to patient acuity and familiarity of the team.
- B. **Tidal Volume:** 6-7 ml/kg (IBW) initially and insure the Pplat is <30 cmH₂O. If Pplat is >30, decrease Vt by 1ml/kg to a minimum of 4-5 ml/kg. Notify SICU Attending or Fellow should you have to reduce the tidal volume to decrease Pplat
- Use IBW to determine tidal volume:
FEMALES IBW (kg) = (height in inches – 60) * 2.3 + 45.5
MALES IBW (kg) = (height in inches – 60) * 2.3 + 50
- C. **Rate:** 12 bpm; Titrate rate to maintain a normal range of pH 7.37-7.42. Attempt to maintain PCO₂ <55mmHg, correct by adjusting respiratory rate. Contact SICU Attending or Fellow if unable to maintain PCO₂ < 55 to maintain a normal pH.
- D. **Pressure Support:** If patient has a spontaneous tidal volume, titrate to maintain tidal volume minimum of 4-5 ml/kg.
- E. **FiO₂:** Initiate at 100% and titrate FiO₂ to maintain SpO₂ > 93%.
- F. **PEEP:** In an effort to increase surface area for gas exchange start all patients with 10 cm H₂O PEEP and FiO₂ of 100%. Compliance measurements should be utilized as a reference point for further PEEP adjustments. Weaning PEEP should also utilize this measurement to guide appropriate changes in PEEP in conjunction with FiO₂ changes without compromising compliance. Note: On the Servo I static compliance measurements can be automated, and should be used to decrease variability in clinician calculations.
- G. Wean patient to the lowest level of FiO₂ and PEEP while maintaining SpO₂ >93%. Goal is FiO₂ ≤40 and SpO₂ >93%.

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- H. **Spontaneous Breathing (SCREEN) Readiness Assessment:** to be completed prior to or during morning rounds by the Respiratory Therapist/Nurse (7am/7pm) based on the following criteria:
- Hemodynamics are stable, no significant dysrhythmias, ischemia, or high dose intotropes.
 - Minute ventilation less than 10l/min.
 - Fluid, electrolyte, and acid/base status are appropriate.
 - FiO₂ (inspired oxygen) less than or equal to 0.50 and PEEP ≤ 6 – 8 cm H₂O.
 - Patient is without neuromuscular blockade.
 - Patient is triggering ventilator or will trigger ventilator when set BPM (breaths per minute) is decrease by ½.
- I. **Initiate SBT (Spontaneous Breathing Trial/CPAP Trial)-30 minute trial**
- Maintain current FiO₂
 - CPAP- 5 cmH₂O and PS (pressure support)- 0
- Document on the ventilator flow sheet and in **Mediserve template name “Spontaneous Breathing Trial SBT”**
- J. Evaluate patient during SBT, **successful if:**
- Respiratory rate < 35 BPM
 - HR < 140 or within 20% of baseline
 - No complaints of respiratory distress
 - No anxiety or diaphoresis
 - Titrate FiO₂ to maintain SpO₂ > 93%
 - Contact MD with results of SBT; obtain order to initiate weaning protocol.
- K. **Weaning and/or SBT Success**
- Contact appropriate MD for extubation order if patient meets the following criteria:
 - Respiratory rate < 35 BPM.
 - VT (tidal volume) greater than or equal to 5 ml/kg (IBW); VC greater than or equal to 10ml/kg (IBW)
 - Patient tolerates SBT or minimal ventilator setting PS (pressure support) 5 cmH₂O for 30-120 minutes without any failure criteria.
 - ABG within acceptable limits (discuss with MD)
- L. **Weaning and/ or SBT Failure**
- If any of the following occur, document SBT failure and place the patient back on previous ventilator settings. Document reason for SBT failure in Mediserve and on Ventilator flow sheet at the bedside:
- BPM greater than 35 (less than or equal to 5 minutes at BPM greater than 35 may be tolerated)
 - Minute Volume greater than 10 l/m.
 - SpO₂ less than 90% saturation
 - Systolic Blood Pressure greater than 180 or less than 90 mmHg
 - Respiratory Distress
 - HR greater than 120% of baseline HR (Less than 5 min of increased HR may be tolerated)
 - Marked use of accessory muscles
 - Abdominal paradox
 - Diaphoresis
 - Marked subjective dyspnea
 - Apnea
- M. **Weaning:** With a physicians order in the WIZ (CPOE) system for “SICU Protocol Wean” initiate the following weaning protocol.
- Change current mode of ventilation to Pressure Support. Titrate pressure support to deliver tidal volume 4-5 mls/kg.

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- Continue to drop PS (pressure support) level by increments of 2 cmH₂O as long as patient maintains adequate minute volume (70% baseline on previous mode) and a respiratory rate <35 bpm.
- If patient's respiratory rate > 35 bpm increase PS level to previous setting. If patient's respiratory rate remains >35 bpm change back to PRVC or previous mode and notify SICU fellow.

N. Post Extubation Protocol

- Start IS q 1 hour X 4 hours
- After 8 hours If IS <10 ml/kg IBW, begin Acapella Therapy q 4 hours.

If patient unable to perform effective airway clearance consider IPPB.

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This document has been signed as of October 1, 2006.
Revised July 16, 2007