

Ventilator Weaning Protocol

1. Patients are to be evaluated for clinical readiness to wean from the ventilator at least once each shift by the RT and RN. Providers may activate the 'Pain and Agitation Management for the Mechanically Ventilated Patient in the ICU' order set upon intubation/initiation of mechanical ventilation. Within this order set is an option to activate Spontaneous Awakening Trial (SAT) practice. SAT practice is guided by an associated ICU SAT practice guideline which outlines awakening/sedation practice, inclusion criteria and exclusion criteria. Awakening practice will occur prior to ventilatory weans or Spontaneous Breathing Trials (SBTs). RNs and RTs will provide care and coordination for the SAT and coordinated SBT process. For activation of the SBT process, ICU team will review the following criteria:
 - a. Underlying reason for intubation is reversed or improving; demonstrating resolution of acute phase of disease.
 - b. Difficult intubations/airway will be noted in ICU team discussions prior to SBT.
 - c. Intact airway reflexes.
 - d. Hemodynamics are stable, no significant dysrhythmias, ischemia, or high dose inotropes.
 - e. Minute ventilation less than 20 l/min Fluid, electrolyte, and acid-base status are appropriate.
 - f. FiO_2 0.50 or less and PEEP less than or equal to 8. PaO_2/FiO_2 greater than or equal to 150 mmHg.
 - g. The patient is without neuromuscular blockade.
 - h. The patient is triggering ventilator or will trigger ventilator when set RR is decreased by half. If the patient meets the above criteria, RT initiates patient on a spontaneous breathing trial (SBT).
2. SBT Procedure
 - a. Notify RN to ensure semi-fowlers position is appropriate/safe and that the patient has not been recently sedated or provided analgesia which may affect spontaneous breathing.
 - b. Patient is placed on Pressure Support 5 cmH₂O, and PEEP 5 or 8 cmH₂O.
 - c. If after 5 minutes, Rapid Shallow Breathing Index (RSBI) is less than 105 leave on these settings.
 - d. If RSBI is 90-105 titrate PSV (5, 8, 10 cmH₂O) until RSBI is less than 100. (Maximum PSV for SBT = 10 cmH₂O)
 - e. An ABG may be ordered and drawn 30-120 minutes after initiation of SBT.
 - f. Check for cuff leak if appropriate and document.
3. SBT Failure – if any of the following measurements are maintained, document SBT failure and place the patient back on previous ventilator settings. Document the reason for SBT failure:
 - a. RSBI is 105 or greater.
 - b. V_e greater than 20.
 - c. V_t less than 4 ml/kg IBW.
 - d. Vital Capacity (VC) less than 15 ml/kg IBW.
 - e. SpO_2 less than 90 % saturation.
 - f. Systolic Blood Pressure greater than 180 or less than 90 mmHg.
 - g. Respiratory Distress
 - h. HR greater than 120 % of baseline HR or greater than 140 bpm or less than 50 bpm, or a change of \pm 20% (less than 5 min of increased HR may be tolerated)

- i. Marked use of accessory muscles
 - j. Abdominal paradox
 - k. Diaphoresis
 - l. Marked subjective dyspnea
 - m. Marked decrease in VCO₂, or marked increase in ETCO₂
 - n. Apnea
4. Successful SBT – RT to contact appropriate provider for extubation order if patient meets the following criteria:
- a. RR less than 35
 - b. V_t 5 ml/kg (IBW) or greater;
 - c. V_e ≤ 15 L/min;
 - d. VC 10ml/kg (IBW) or greater;
 - e. RSBI 105 or less.
 - f. SpO₂ 90% or greater and PaO₂ 55 mmHg or greater on FiO₂ 0.50 or less
 - g. Systolic BP less than 180 or greater than 90 mm hg
 - h. Inspiratory Trigger: P_{imax} -20 cm H₂O or greater
 - i. P/F ratio 150 or greater
 - j. The patient tolerates SBT for 30-120 minutes without any failure criteria.
 - k. An ABG may be ordered and drawn and be within acceptable limits (discuss with the provider).
 - l. If the provider decides to hold extubation secondary to other clinical reasons, the RT will continue to monitor tolerance of SBT documenting RSBI, outcome and vital signs with every ventilator check and at the termination of the SBT.
5. Other considerations for successful SBT:
- a. P_{o.1} (Occlusion Pressure) greater than -6 cm H₂O
 - b. Work of Breathing (WOB) less than 0.8 J/L (joules per Liter)
 - c. Cd greater than 25 ml/cmH₂O
 - d. Integrated multiple variables indices
 - i. PaO₂/PAO₂ greater than 0.47
 - ii. P_{0.1}/P_{imax} less than 0.3
 - iii. Compliance, rate, oxygenation, and pressure (CROP) greater than 13 ml/breaths/minute. Note: CROP = [Crs x P_{imax} x (PaO₂/PAO₂)]/f where: PAO₂ = (PB-47) x FiO₂ – PaCO₂/0.85 and PB is barometric pressure. (630 cm H₂O for Aurora, CO; however this is a dynamic number value to be reviewed prior to each calculation)
6. Successful SBT for patients with tracheostomy – Procedure:
- a. Place patient on t-collar/t-piece wean.
 - b. Evaluate for liberation from ventilator per above criteria.
7. SBT Failure for patients with trach tubes per above criteria.