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PURPOSE:

This protocol is intended to facilitate a timely evaluation of patient’s ability to discontinue mechanical ventilation, to simplify physician-weaning orders and to utilize the experience of the Respiratory Therapy and Nursing staff in the weaning process.

POLICY STATEMENT:

Evaluate and assess patients ability to spontaneously breathe without ventilator support.

ENTITIES AFFECTED BY THIS POLICY (SCOPE):

All Respiratory Care Departments will be affected by this policy.

WHO SHOULD READ THIS POLICY:

All Respiratory Therapists, Respiratory Care Supervisors and Respiratory Care Directors should read this policy. All critical care nurses, especially nursing Supervisors/educators, and all critical care medical providers should read this policy.

PROCEDURES:

I. GUIDING PRINCIPLES

- a. All patients requiring mechanical ventilation will have weaning readiness and Spontaneous Awakening Trial (SAT) determined by Respiratory and Nursing staff daily.
- b. All patients will be candidates for the weaning protocol when their underlying indication for mechanical ventilation has resolved or significantly improved, according to protocol readiness criteria.
 - i. Do not perform daily SBT if patient does not meet “Readiness Criteria”
 - ii. For patients eligible for SBT perform SBT after Spontaneous Awakening Trial (SAT) per nursing unit policy.
 - iii. Hold enteral nutrition during SBT if applicable. If extubation not performed, restart enteral nutrition if applicable.
- c. Standard weaning trials should not be performed after 10pm or before 8am. Patients should be well rested through the night.
- d. The sedation score should ideally be a RASS score of -1 to +1 to facilitate weaning trial. If the sedation is < -1 or > +1 on the RASS scale, the therapist/nurse team caring for the patient will discuss the appropriateness of decreasing the doses of sedation/analgesics to allow for an SBT. Patients that successfully maintain ventilation during the SBT will be extubated.
- e. Physicians will not have to write orders for: (See Exclusion Criteria)
 - i. Weaning parameters for readiness criteria
 - ii. Progression through SBT
 - iii. Criteria for terminating weaning trial


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- iv. Extubation order for patient that successfully completes SBT.
- f. Extubation Exclusion Criteria
 - i. Patients managed by Surgical Services (Call Surgical Attending with SBT results)
 - ii. DNR/ DNI
 - iii. Known difficult Airway / Intubation
 - iv. Planned surgery within the next 24 -36 hours
 - v. RT, RN, MD concerns.
 - vi. Cervical spine immobilization
 - 1. Prior failed extubation
 - vii. Physicians will write orders for:
 - 1. Other weaning modes
 - 2. Weaning outside protocol criteria
 - 3. Extubation for patients with exclusion criteria.
 - viii. Physicians will be notified if there is a significant change in patient's status at any time during the weaning protocol.

II. KEY COMPONENTS

a. Protocol Timeline:

- i. Respiratory Therapist does evaluation of readiness criteria daily to identify candidates for SBT.
- ii. Therapist/nurse team will assess and nurse will adjust sedation of potential candidates as necessary.
- iii. Therapist/nurse team plan and therapist will conduct SBT if appropriate on all vented patients during morning rounds.
- iv. Therapist/nurse team will discuss contraindications regarding extubation upon successful completion of SBT.
- v. Goal is immediate extubation post successful completion of SBT.

b. Step 1 – Readiness:

- i. The 'Readiness Criteria' is a screening tool that suggests the patient may be successfully weaned off mechanical ventilation.
- ii. Evaluate:
 - 1. SpO2 must be >90% with FiO2 < to 50%
 - 2. pH must be >7.35 on most recent ABG within 24 - 48 hours.
 - 3. Respiratory rate < 25
 - 4. Heart rate < 130
 - 5. PEEP < 5

Note: Issues related to sedation, vasopressor therapy and coronary disease may or may not limit weaning attempts. Therapist/nurse team will discuss prior to initiating a SBT.

- iii. Weaning may be attempted on patients outside these criteria after additional discussion between therapist/nurse team and Physician. Physician order will be


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required to proceed with SBT. If SBT is successful therapist/nurse team will discuss contraindications and proceed with extubation if agreeable.

c. Step 2 – Spontaneous Breathing Trial (SBT)

- i. At the initiation of the SBT, the Respiratory Therapist will remain at the bedside for at least the first 5 minutes. The therapist/nurse team will then closely monitor the patient for the duration of the SBT.
- ii. The intent is to continue the SBT for a period of 30-60 minutes and obtain ABG prn.
- iii. If at any point during the SBT the patient's parameters exceed the 'SBT Termination Criteria', ($V_e < 4$ or $V_e > 10$, $RR > 30$, $HR > 130$, $BP + 20\%$ of baseline, $SpO_2 < 90\%$ for two minutes, anxiety, chest pain, diaphoresis, or somnolence), the SBT will be stopped and the patient will be placed back on the previous ventilator settings.

d. Step 3 – Protocol End Decision and Considerations

- i. Therapist/nurse team will discuss contraindications regarding extubation.
- ii. Upon successful completion of SBT proceed with extubation if no exclusion criteria apply and RT and RN agree.
- iii. If exclusion criteria for protocol directed extubation apply contact physician for further guidance.
- iv. If the patient does not complete the SBT successfully, they will be placed back on ordered ventilator settings and re-evaluated in 24 hours.

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Spontaneous Awakening Trial (SAT) Protocol

Perform Spontaneous Awakening Trail every am. Document exclusion criteria in EMR.

A. Exclusion Criteria

- a. Active Seizures
- b. Paralyzed with Neuromuscular Blocking Agents
- c. Therapeutic hypothermia
- d. Comfort Care
- e. Per prescriber

B. **Contact** provider for direction with SAT if patient meets the following:

- a. Elevated Intracranial Pressure > 20mmHg
- b. RASS score > +1
- c. Respiratory Rate >35 breaths/min \geq 5 min
- d. O2 sat <88% \geq 5 min
- e. Alcohol or substance withdrawal
- f. Pregnant

C. **Decrease** dexmedetomidine and continuous analgesics (Fentanyl, Morphine, hydromorphone) by 50% and **hold** continuous, scheduled, & PRN sedatives (Midazolam, lorazepam, Propofol) until Spontaneous Breathing Trial (SBT) completed.


D. **Fails** SAT if patient meets below criteria. Restart sedatives at $\frac{1}{2}$ pre-SAT dose and titrate based on previous analgesia/sedation orders.

- a. RASS score +2 or greater
- b. RR>35 breaths/min \geq 5 min
- c. O2 sat \leq 88% \geq 5 min
- d. Increase ICP > 20 mmHG
- e. Acute cardiac arrhythmias
- f. Two or more signs of respiratory distress (tachycardia, bradycardia, use of accessory muscles, abdominal paradox, diaphoresis)

E. **Passes** if patient opens eyes to verbal stimuli and follows any of the simple commands below:

- a. track with eyes
- b. squeeze hands
- c. move tongue
- d. cough
- e. raise head off bed

F. **Proceed** to (Spontaneous Breathing Trial) SBT when patient meets pass criteria.

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Spontaneous Breathing Trial (SBT) Protocol

A. **Inclusion Criteria:** Patients must meet each of the following criteria to perform spontaneous breathing trial:

- a. Passed spontaneous awakening trial
- b. SpO₂ ≥ 90% at FiO₂ ≤ to 50%
- c. RR ≤ 25 and HR ≤ 130
- d. Most recent ABG obtained within last 24 hours, pH ≥ 7.35 and ≤ 7.45
- e. Peep ≤ 5 cm H₂O

B. **Trial start:**

- a. RN to hold enteral Nutrition until extubation trial completed, if applicable
- b. Trial start: Ventilator settings: Mode: Pressure Support Ventilation(PSV), PS 7 / CPAP 5, current FiO₂ setting

C. **During and post SBT:**

1. If patient presents with **failure criteria:**

- a. Return patient to previous ventilator settings
- b. Notify RN to restart enteral nutrition to previous order, if applicable
- c. Notify RN to restart sedatives at ½ pre-SAT dose and titrate based on previous analgesia/sedation orders.

A. **Failure Criteria:** Patient fails with any of the following criteria:

- RR <6bpm or >30bpm for > 2 min
- SpO₂ <90% for > 2 min
- Minute ventilation (Ve) <4 or >10
- Anxiety, diaphoresis, somnolence, or chest pain
- HR +/- 20% from baseline or >130
- BP +/- 20% from baseline
- Ectopy
- Accessory muscle use

2. If patient does not meet any failure criteria for minimum of 30 minutes, but meets exclusion criteria for extubation:

a. Notify MD for extubation direction

A. **Exclusion Criteria for extubation:**

- Patient care is being managed by an attending surgical practitioner
- DNR/DNI code status
- Known difficult airway or known history of difficult intubation
- Scheduled surgery within the next 36 hours
- Questionable successful extubation for any clinical reason
- Cervical spine immobilization in place


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3. If patient does not meet any failure criteria for minimum of 30 minutes and does not meet exclusion criteria for extubation:
 - a. Perform extubation
 - b. Place patient on 6L nasal cannula, titrate oxygen 1-6L to keep SpO2 ≥90%
 - c. Notify RN to contact physician to obtain orders for enteral nutrition and analgesia/sedation.

*Adapted from "Wake Up and Breathe" Protocol, Vanderbilt University ©2008.

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