Spontaneous Breathing Trial (SBT) and Mechanical Ventilation Weaning Process

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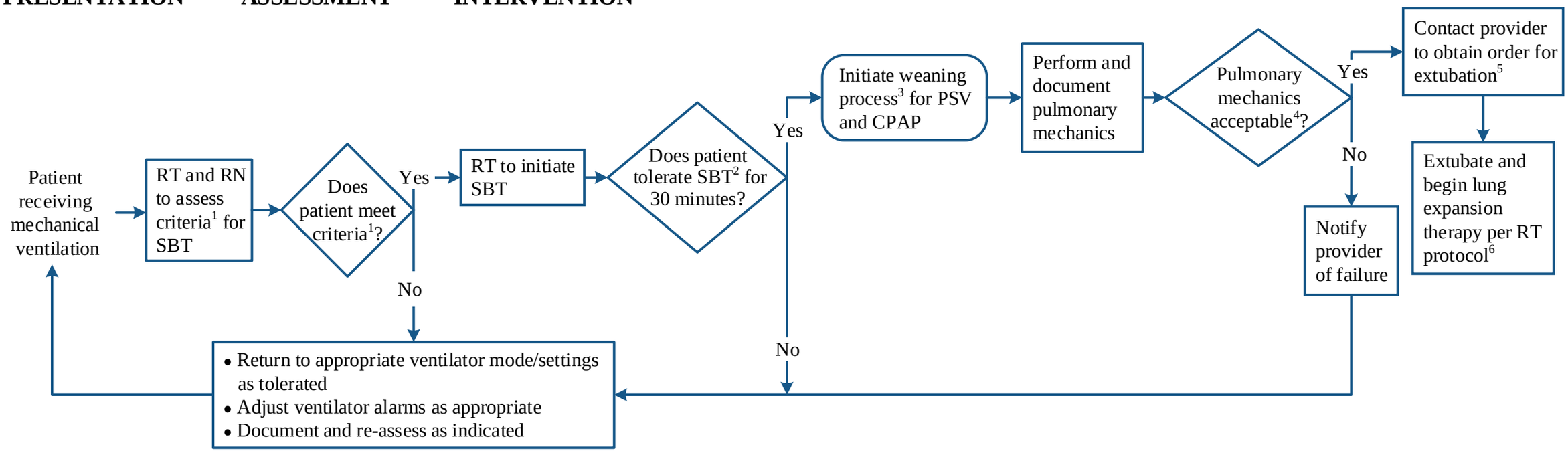
PRESENTATION **ASSESSMENT** **INTERVENTION**



CPAP = continuous positive airway pressure
PSV = pressure support ventilation
RN = registered nurse
RT = respiratory therapist
SBT = spontaneous breathing trial

[1] See Appendix A: SBT Criteria

[2] Signs of intolerance which would require termination of SBT include:

- Signs of dyspnea or fatigue
- $SpO_2 < 90\%$
- Asynchronous or discordant respiratory pattern
- Use of accessory muscles
- Noted diaphoresis
- New onset of dysrhythmias
- Sustained HR > 20 bpm above baseline for 10 minutes

[3] See Appendix B: Weaning Process

[4] Acceptable pulmonary mechanics include: vital capacity ≥ 10 mL/kg, negative inspiratory force > -20 cm H_2O and rapid shallow breathing index (RSBI) < 105. RSBI = ratio of respiratory frequency (f) to tidal volume (TV) (f/VT)

[5] If extubation orders are received from a non-critical care provider (*i.e.*, primary physician), the RT should notify the patient's critical care physician prior to the tube removal

[6] See Respiratory Therapy Departmental Protocol (#ATT3291)

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Department of Clinical Effectiveness V3
Approved by the Executive Committee of the Medical Staff on 01/19/2021

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APPENDIX A: SBT Criteria

Spontaneous Breathing Readiness Assessment shall be completed by RT and RN by 8:30 am (unless otherwise ordered)

(All must be met in order to proceed with protocol)

- Stable hemodynamics (MAP > 60 mmHg, HR < 120 bpm)
- No significant dysrhythmias (unless chronic). If patient has a dysrhythmia, contact ICU provider prior to proceeding with SBT.
- If patient is receiving vasopressor therapy, contact ICU provider prior to proceeding
- The most recent ABG values are as follows: pH > 7.28, PCO_2 < 60 mmHg (unless chronic), and PO_2 > 60 mmHg. If ABG not available, $SpO_2 \geq 92\%$.
- Temperature < 38.9°C
- Ventilator rate is set ≤ 20 bpm and spontaneous respiratory rate < 35 bpm
- Capability to breathe spontaneously
- $FiO_2 \leq 0.50$
- PEEP ≤ 10 cm H_2O
- Capable of lifting head off pillow
- RASS score +1 to -2 (see Appendix C). If RASS score < -2, discuss with ICU provider. RT to discuss with the RN, if sedation holiday is appropriate and if it has been performed.

MAP = mean arterial pressure
ABG = arterial blood gas
PCO_2 = partial pressure of carbon dioxide
PO_2 = partial pressure of oxygen
SpO_2 = arterial oxygen saturation
FiO_2 = fraction of inspired oxygen
PEEP = positive end-expiratory pressure
RASS = Richmond Agitation-Sedation Scale

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APPENDIX B: Weaning Process

- Change ventilator settings to PS mode or ventilation of 6 cm H_2O and titrate PS to deliver tidal volume of 6-7 mL/kg of ideal body weight
- Monitor patient's respiratory status as appropriate

Note: If there are signs of intolerance[1], terminate weaning process and return to appropriate ventilator mode/settings, adjust alarms as appropriate and document

- Once the weaning process has reached acceptable level (*i.e.*, PSV of 6 and acceptable spontaneous pulmonary mechanics[2]) consult the physician for extubation orders

Note: If extubation orders are received from a non-critical care provider (*i.e.*, primary physician), the RT should notify the patient's critical care physician prior to the tube removal

PS = pressure support PSV = pressure support ventilation

[1] Signs of intolerance include:

- Signs of dyspnea or fatigue
- SpO_2 < 90%
- Asynchronous or discordant respiratory pattern
- Use of accessory muscles
- Noted diaphoresis
- New onset of dysrhythmias
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[2] Acceptable pulmonary mechanics include: **v**ital capacity ≥ 10 mL/kg, negative inspiratory force > -20 cm H_2O and rapid shallow breathing index (RSBI) < 105. RSBI = ratio of respiratory frequency (f) to tidal volume (TV) (f/VT)

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APPENDIX C: Richmond Agitation Sedation Scale (RASS)

+4	Combative	Overly combative, violent, immediate danger to staff
+3	Very agitated	Pulls or removes tube(s) or catheter(s); aggressive
+2	Agitated	Frequent, non-purposeful movement, fights ventilator
+1	Restless	Anxious, but movements not aggressive or vigorous
0	Alert and calm	-
-1	Drowsy	Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice (greater than or equal to 10 seconds)
-2	Light sedation	Briefly awakens with eye contact to voice (less than 10 seconds)
-3	Moderate sedation	Movement or eye openings to voice (but no eye contact)
-4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation
-5	Unarousable	Unarousable

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SUGGESTED READINGS

Departmental Protocol for Assessing Liberation from Mechanical Ventilation (#ATT3296)

Ely, E. W., Meade, M. O., Haponik, E. F., Kollef, M. H., Cook, D. J., Guyatt, G. H., & Stoller, J. K. (2001). Mechanical ventilator weaning protocols driven by nonphysician health-care professionals: Evidence-based clinical practice guidelines. *Chest Journal, 120*(6_suppl), 454S-463S. doi:10.1378/chest.120.6_suppl.454S

MacIntyre, N. R., Cook, D. J., Ely, E. W., Epstein, S. K., Fink, J. B., … Heffner, J. E. (2001). Evidence-based guidelines for weaning and discontinuing ventilatory support: A collective task force facilitated by the American College of Chest Physicians; the American Association for Respiratory Care; and the American College of Critical Care Medicine. *Chest Journal, 120*(6_suppl), 375S-396S. doi:10.1378/chest.120.6_suppl.375s

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DEVELOPMENT CREDITS

This practice consensus statement is based on majority expert opinion of the SBT and Mechanical Ventilation Weaning workgroup at the University of Texas MD Anderson Cancer Center for the population. These experts included:

Emi Evans, RRT-ACCS (Respiratory Care)
Olga N. Fleckenstein♦
Merline George, BSRC, RRT-ACCS (Respiratory Care)
Dolores Mejia-Garcia, RRT, BS (Respiratory Care)
Nisha Rathi, MD (Critical Care & Respiratory Care)Ŧ
Gautam Sachdev, MS, MBA (Respiratory Care)
Mary Lou Warren, DNP, APRN, CNS-CC♦

Ŧ Core Development Lead
♦ Clinical Effectiveness Development Team

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