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Standardizing Spontaneous Awakening and Breathing Trials in Critical Care: A Pilot Project

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Background

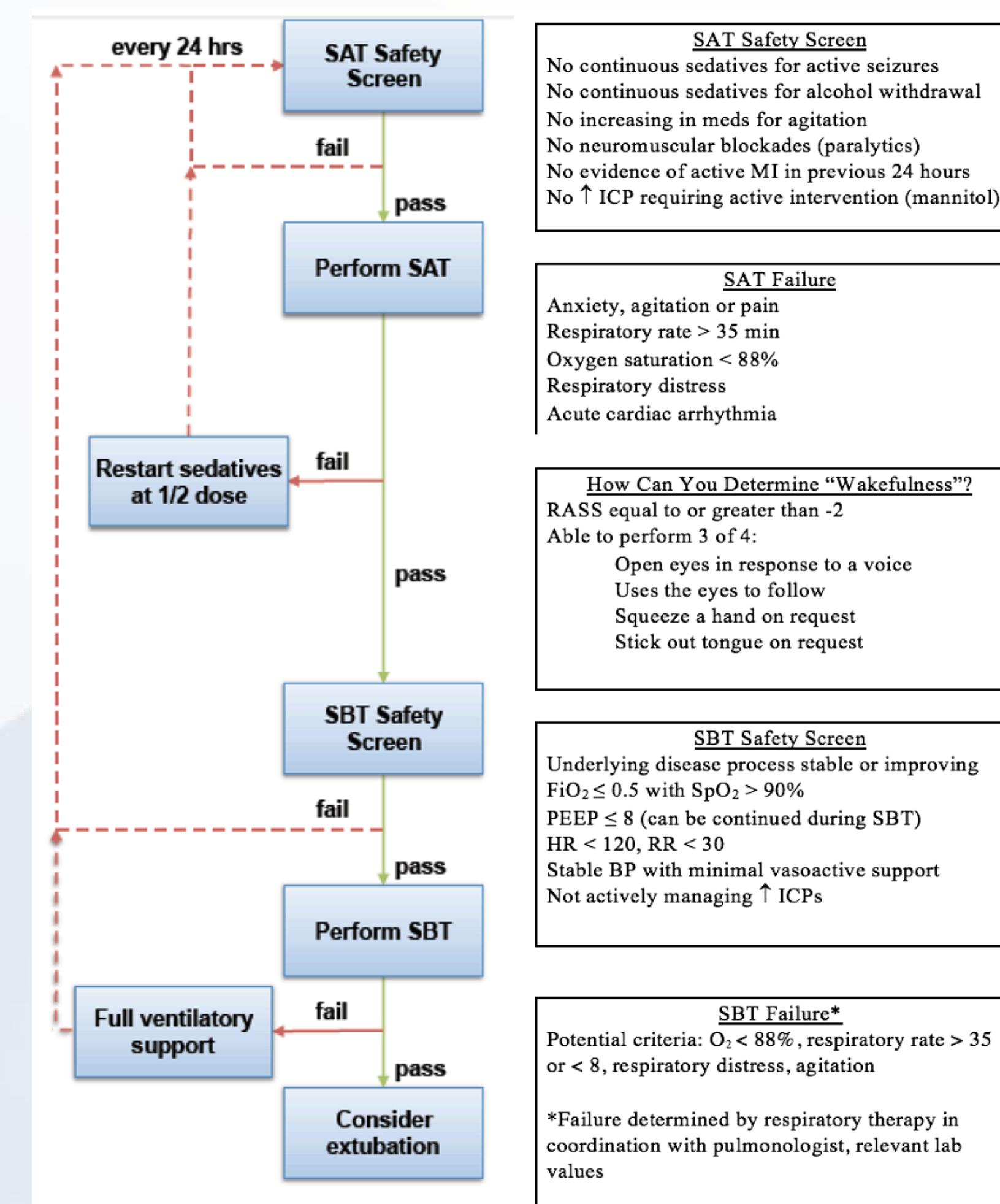
- The ABCDEF Bundle (2017) is an evidence-based guide for clinicians working with critically ill patients to coordinate multidisciplinary care in the intensive care unit.
- The "B" of the ABCDEF Bundle represents both spontaneous awakening trials (SATs) and spontaneous breathing trials (SBTs).
- During an SAT, patients are slowly weaned off sedation to determine if they are capable of tolerating a smaller amount of sedating medications.
- In an SBT, ventilator settings are weaned on qualifying patients to determine readiness to extubate. A pairing of these trials is now the standard of care.
- Other bundle topics include: adequate pain control, properly choosing analgesia and sedation, monitoring and managing delirium, early mobility, and family engagement (Marra, Ely, Pandharipande, et al., 2017).
- Nearly all patients who are mechanically ventilated receive continuous intravenous sedation.
- In one study, researchers demonstrated that daily interruption of sedation shortened the duration of mechanical ventilation by over 2 days and ICU length of stay by 3.5 days (Kress, Pohlman, O'Conner, et al., 2000).
- There is still discussion on the best way to perform paired awakening and breathing trials, both within our unit and the academic community.
- Although our institution has parameters a patient must meet to qualify for a paired SAT/SBT, the spontaneous awakening portion of the trial is at the discretion of the patient's nurse.

Purpose

- The purpose of this pilot project was to investigate if the protocolization and standardization of our spontaneous awakening and breathing trials, as supported by an audit tool, will decrease the number of days a patient spends on mechanical ventilation.

Methods

- The Institutional Review Board (IRB) waived approval for this evidence based project as no changes to the standard of care were implemented.
- All patients were sourced from the Providence Portland Intensive Care Unit between July and August of 2020.
- Prior to the implementation phase, staff nurses in the ICU were educated on proper use of spontaneous awakening and breathing trials.
- Education included information on the signs and symptoms that indicate a "fail" or a "pass" on the trials (Girard, Kress, Fuchs, et al., 2008). The flowchart below was edited based on the recommendations of pulmonologists in the PPMC critical care unit.
- Patients who qualified for a stand-alone SAT or combined SAT/SBT were identified by the pulmonologist on service during medical rounds.
- Eligible individuals included mechanically ventilated patients ages 18 and over, exclusive of tracheostomy patients.
- Nurses with a qualifying mechanically ventilated patient completed an audit form in order to ensure protocol adherence.
- It was assumed patients did not have an SBT, SAT, NMB, sedation, or were prone if an audit sheet was not collected demonstrating this.
- Study groups were compared using the two-sample t-test assuming unequal variances.



Spontaneous Awakening and Breathing Trial Flowchart (image on left from Girard, Kress, Fuchs, et al., 2008)

	No (%)	Yes (%)
Awakening Trial	15 (41.66)	21 (58.33)
Neuromuscular Blockade (NMB)	34 (94.44)	2 (5.56)
Prone	33 (91.67)	3 (8.33)
Breathing Trial	14 (40)	21 (60)
Sedation	7 (19.44)	29 (80.56)

Table 1. Number and percentages of patients in collected categories

Results

- 163 audit sheets were turned during the data collection phase. 15 of these sheets were unusable because they lacked patient labels.
- The remaining 149 audit sheets represented 36 discrete patients.
- Analysis of the data demonstrated that patients with less ventilator hours are less likely to:
 - Need a neuromuscular blockade (NMB)
 - Be prone
 - Need an SBT
 - Or need an SAT, $t(35) = 4.35, p < .05$.
- Additionally, there was a significant relationship between age and length of stay.

Audit Form for Ventilated Patients
ABCDEF ICU Liberation Bundle

This audit form is intended to aid you in providing successful outcomes for our ventilated patients, as well as providing baseline data for an evidence-based project surrounding our unit's protocol for SAT/SBTs (the B part of the bundle). Please provide accurate information and EPIC documentation. Refer to the back of the page for reference. We appreciate you!

Date/Shift: _____ Nurse: _____ Charge: _____

Ventilator start date: _____ # of Reintubations: _____ Hospital LOS: _____

A	Assess, Prevent, & Manage Pain	Assess using the CPOT.
B	Both SAT Sedation Awakening Trial & SBT Spontaneous Breathing Trial	Does the patient meet the safety requirements for an SAT? Y N - If no, Why? _____ Did you titrate the analgesia off for SAT? Y N Did they: open eyes, use eyes to follow, and stick out tongue? Y N During the SAT, the RASS was: _____. They passed / failed. Did you restart sedatives at 1/2 dose and titrate accordingly? Y N Was the SAT titration charted in the MAR? Y N Did the patient qualify for an SBT? Y N - If no, Why? _____ Were both the SAT & SBT charted in Flowsheets under VAP? Y N
C	Choice of analgesia & sedation	Analgesia DRIP? Y N Sedation used: Precedex Propofol Other: _____
D	Delirium: assess, prevent, & manage	Assess using the CAM-ICU. Were they CAM positive? Y N
E	Early mobility & exercise	Has the patient mobilized this shift in any of the following ways? None PROM AROM Edge of the bed Up to chair
F	Family engagement & empowerment	Was the family present? Y N Did you update them? Y N

Audit form provided to staff nurses with qualifying patients

	Range	Mean	Median
Age	38 to 90	64.33	63.50
Total Vent Hours	3 to 312	118.92	62.00
Number of Reintubations	0 to 2	0.25	0.00
Hospital LOS	1 to 48	3.00	6.94

Table 2. Descriptive analysis of patient data

Discussion/Conclusions

- This data appears to represent the population of patients who are mechanically ventilated in our ICU.
- A major limitation of this pilot project is that audit sheets demonstrating an SBT, SAT, prone, NMB, or use of sedation may not have been turned in.
- Furthermore, the number of audit sheets did not match the number of shifts each of these patients was ventilated.
- Audit sheets demonstrated a great variability in knowledge surrounding spontaneous awakening and breathing trials in our unit.
- Education on this topic, as well as updates in Epic, would be helpful in addressing issues with the audit forms.
- In the future, we plan to simplify the audit form and collect data only related to the project at hand. This may eliminate the number of incomplete audit forms we receive.
- Future iterations of this project could involve a control and test group to evaluate whether changes to our SAT/SBT protocol decreases ventilator time.

References

- Girard, T.D., Kress, J.P., Fuchs, B.D., Thomason, J.W.W., et al. (2008). Efficacy and safety of a paired sedation and ventilator weaning protocol for mechanically ventilated patients in intensive care (awakening and breathing controlled trial): a randomised controlled trial. *Lancet*, 371(9607), 126-134. doi: 10.1016/S0140-6736(08)60105-1
- Kress, J.P., Pohlman, A.S., O'Conner, M.F., & Hall, J.B. (2000). Daily interruption of sedative infusions in critically ill patients undergoing mechanical ventilation. *The New England Journal of Medicine*, 342(2), 1471-1477. doi: 10.1056/NEJM20005183422002
- Marra, A., Ely, E.W., Pandharipande, P.P., & Patel, M.B. (2017). The ABCDEF bundle in critical care. *Critical Care Clinics*, 33(2), 225-243. doi: 10.1016/j.ccc.2016.12.005

