

Weaning in Ventilator Dependent SCI patients

Daily assessments for weaning should be performed (regardless of presence of tracheostomy)

Assessments include clinical assessment and respiratory/ventilator parameters

Concerns on clinical exam alone are sufficient to NOT attempt weaning

Success of weaning is highly dependent on ASIA classification (ie. complete vs incomplete) and level of injury¹:

C1 → 15%

C2 → 28%

(not necessarily during initial hospitalization)

C3 → 60%

C4 → 85%

Is patient ready to be weaned?

Clinical assessment:

- Wakefulness
 - Eyes open, tracking, interacting with nods / eye blinking / other non-verbal cues
 - Not in active substance withdrawal
 - Not encephalopathic for other reasons
- Secretions
 - Absolute contraindication: suctioning frequency < 2hrs
 - Relative contraindication: suctioning frequency every 2- 4hrs.
 - Non-purulent
- Imaging
 - Atelectasis not present
 - Infiltrates sub-lobar
 - Pulmonary edema not present

Parameters

- Intra-pulmonary
 - Intact gas exchange²
 - P/F ratio ≥ 300
 - PEEP 5 or less
 - Appropriate lung compliance³⁻⁵
 - Static lung compliance (Cstat) = $V_T / (P_{plat} - PEEP)$
 - Normal is > 80-100 ml / cmH₂O
 - Values < 50 predict weaning failure
- Global
 - Rapid shallow breathing index (RSBI)⁶
 - Defined as Tv / RR on PSV 8 or less
 - ≤ 100 predicts successful weaning

- Relative contraindication: 100-120
 - Absolute contraindication: >120
- Negative Inspiratory Force (NIF)⁷
 - Absolute contraindication: <30
 - Relative contraindication: <40
- Forced Vital Capacity (FVC)
 - Absolute contraindication: <10ml/kg
 - Relative contraindication: <15ml/kg

Global considerations

- If VAP present, advise waiting >48hrs from initiation of treatment
- C-collar removal may facilitate weaning (ie. delay weaning until after surgical stabilization if anticipating collar removal)
- If pre-existing lung disease, consider pulmonology consult for optimization prior to weaning
- C-spine injuries above C5 level have low likelihood of successful weaning without tracheostomy⁸

How is the patient weaned?

Weaning procedure⁹

- Optimize breathing
 - Adequately prepare pt psychologically and address potential anxiety issues related to weaning
 - Aspirate respiratory secretions
 - Reposition into supine or Trendelenburg position
 - Administer bronchodilators
 - Measure baseline NIF and VC
- Progressive ventilator-free breathing (PVFB)¹⁰
 - Utilize tracheostomy collar (or T-tube if no tracheostomy)
 - Increase FiO₂ by 10% from baseline during weaning
 - Initial VFB should be 15-30 minutes bid
 - Rest at least 4 hrs between VFB sessions
 - Measure VC q 15min during initial sessions, and place back on ventilator if VC decreases by more than 25%
 - Space VC measurements out to q30 min once pt tolerating more than 1hr of VFB
 - Once pt tolerating more than 2hrs of VFB, interval between sessions can be decreased to 2-3hrs.
 - Once pt tolerating 6hrs of VFB bid, intervals can be combined to a single 10-12hr session
 - Lengthening VFB should not occur unless VC and NIF maintained or increased

- Pace of weaning individualized based on pt fatigue (as assessed by decline in VC during VFB).

References

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