

# Acute Ventilator Sedation Management Protocol



## Inclusion Criteria:

- PICU patients; ED patients
- Acute respiratory failure requiring mechanical ventilation

## Exclusion Criteria:

- CVICU or NICU patients and/or chronic/ventilator dependent patients
- Neuromuscular respiratory failure

## Assessment

- Monitor and document sedation assessment with the State Behavioral Sedation (SBS) tool a minimum of every 2 hours
- Discuss and identify the patient's trajectory of illness during multidisciplinary rounds every day
  - Acute phase: Goal SBS -1 or -2: Patient critical and/or unstable, interventions escalating
  - Titration phase: Goal SBS -1 or 0: Patient stable, interventions are not escalating
  - Extubation phase: Goal SBS 0: Passed ERT and plan to attempt extubation
- Assess for extubation readiness daily using the Extubation Readiness Test (ERT)
- Perform arousal and modified arousal assessments for patients in titration phase as indicated

## Treatment

- **If length of intubation/ventilation anticipated to be ≤ 2 days, begin: PRN doses of Benzodiazepines + narcotics:**
    - Midazolam 0.05 mg/kg IV Q 2 hours PRN agitation (max start dose 2 mg) **OR**
    - Lorazepam 0.05 mg/kg NGT Q 4 hours PRN agitation (max dose 2mg)
  
    - Fentanyl 1 mCg/kg IV Q 2 hours PRN pain (max start 50mCg) **OR**
    - Morphine 0.1 mg/kg IV Q 2 hours PRN pain (max start 2 mg)
  - AND/OR** Dexmedetomidine Infusion Start 0.2 – 0.5 mCg/kg/hr. Titrate to SBS goal.
  - OR** Consider Propofol Infusion 25mCg/kg/min. Titrate to SBS goal.
  
  - **If length of intubation/ventilation anticipated to be >2 days, start continuous infusions with PRN doses equal to one hour of infusion dose: Dexmedetomidine +/- narcotics:**
    - Dexmedetomidine Infusion Start 0.2 – 0.5 mCg/kg/hr
  
    - Fentanyl 0.5 mCg/kg/hr IV (max start 50mCg) **OR**
    - Morphine 0.05 mg/kg/hr IV (max start 2 mg)
  
  - **If additional sedation required, add Benzodiazepines:**
    - Midazolam 0.05 mg/kg/hr IV (max start dose 2 mg)
- Titrate sedation according to the patient's trajectory/phase of illness to maintain goal SBS.

## Continued Considerations

If extubation is planned within 24 hours and the patient is intolerant of an SBS of -1 or 0 then consider stopping versed and starting propofol 25 mCg/kg/min titrated to achieve desired SBS score, up to maximum of 100 mCg/kg/min. Discontinue propofol and extubate when SBS is 0.

Fentanyl should be used (over morphine) in patients with profound hypotension or unremitting reactive airway disease

In patients receiving neuromuscular blockade (these patients should all be managed in the acute phase) use: Assume Pain Present or Assume Agitation Present assessments

Monitor for delirium utilizing CAP-D screening tool, twice daily. If suspected, consider limiting the use of benzodiazepines (utilize dexmedetomidine as substitute) and/or consider the addition of an atypical antipsychotic

## Discharge Criteria

- Extubated and weaned off sedation

## Acute Phase (SBS -1, or -2)

Goal is to maintain physiologic stability.

If patient's SBS is more positive than prescribed, exclude reversible causes and provide comfort measures. If ineffective, titrate dexmedetomidine. If ineffective, administer a fentanyl/morphine and/or versed PRN dose. If a total of 3 nonprocedural PRN doses are administered in ≤ 8 hours then increase fentanyl/morphine and/or versed infusion by 10-20%. Adjust PRN dose to equal one hour of infusion.

## Titration Phase (SBS -1 or 0)

Goal is minimum yet effective dosing.

If SBS -3, complete an arousal assessment Turn off all sedation until SBS -1 or 0 then reduce sedation doses by 50%, restart and titrate

If SBS -2, complete a modified arousal assess. Reduce sedative doses by 50% then titrate

Every 8 hours adjust sedation. As in the acute phase, if patient's SBS is more positive than prescribed, exclude reversible causes and provide comfort measures. If ineffective, titrate dexmedetomidine. If ineffective, administer a fentanyl/morphine and/or versed PRN dose. If a total of 3 nonprocedural PRN doses are administered in ≤ 8 hours then increase fentanyl/morphine and/or versed infusion by 10-20%. Adjust PRN dose to equal one hour of infusion.

If the patient's SBS is more negative or as prescribed and if < 3 total nonprocedural PRN doses are given in an 8 hour period then decrease fentanyl/morphine and/or versed by 10-20%. Adjust PRN dose to equal one hour of infusion.

## Extubation Phase (SBS 0)

Goal is to D/C sedation and extubate.

If patient on sedation for < 5 days then discontinue medications

### OR

If on sedation for ≥ 5 days identify target Withdrawal Assessment Tool (WAT-1) and begin methadone/ativan wean

### Methadone

0.1mg/kg IV q6h

5 mg IV q6h, Dosing Guidelines: > 50 kg;

0.1 mg/kg NGT q6h

5 mg NGT q6h, Dosing Guidelines: > 50 kg;

Wean by 20% of initial dose Q other day, alternate w/ lorazepam wean day

**Morphine** 0.1 mg/kg IV Q 4 hours, PRN WAT-1 > identified target

**Lorazepam** starting dose = (total daily midazolam dose)/10 daily divided every 6 hours

Wean by 20% of initial dose Q other day, alternate w/methadone wean day

## Patient Education

- Review pain and sedation assessment and trajectory of illness with parents/care givers
- Discuss both nonpharmacologic and pharmacologic comfort measures to address pain and agitation

# Daily Extubation Readiness Test (ERT)

Every morning (before rounds) assess for:

- Spontaneous breathing and
- OI or OSI  $\leq 6$

If No, then continue with current plan

If Yes, and no surgical procedure or MRI is anticipated within the next 12-24 hours, then proceed to ERT

## Extubation Readiness Test (ERT)\*\*

- Temporarily stop enteral feedings
- If FiO<sub>2</sub> > 0.5, decrease to 0.5
- If PEEP > 5 cmH<sub>2</sub>O, set PEEP to 5 cmH<sub>2</sub>O
- Evaluate SpO<sub>2</sub> after the above changes:
  - a) If SpO<sub>2</sub> at least 95% change mode to straight PS of 8 cmH<sub>2</sub>O
  - b) Monitor SpO<sub>2</sub>, exhaled Vt and RR

\*\*For NAVA patients, refer to POI Respiratory Services Policy on Neurally Adjusted Ventilatory Assist (NAVA) for weaning procedure

## Passed- Ready for Extubation

(from a pulmonary perspective) if all 3 are present for  $\geq 2$  hours:

- SpO<sub>2</sub>  $\geq 95\%$
- Exhaled Vt  $\geq 5$  mL/kg (ideal weight)
- RR within goal of age:
 

<6mo 20-40	2-5yrs 15-40
6mo-2yrs 15-45	>5yrs 10-35

If passed, then keep on the existing settings & notify the care team that the patient is ready for extubation from a pulmonary perspective.

If not passed from a pulmonary perspective, then return to pre-test ventilator settings, restart feedings and re-evaluate the next day

If not passed because of sedation-related hypoventilation, conduct a modified arousal assessment then retest later in the day. If the patient is still not passing, then return to pre-test ventilator setting, restart feedings and re-evaluate the next day

# State Behavioral Scale (SBS) for Sedation Assessment

-3	Comatose and unresponsive
-2	Responsive to noxious stimulus
-1	Responsive to gentle touch or voice
0	Awake and able to calm
+1	Restless and difficult to calm
+2	Extremely agitated

## WITHDRAWAL ASSESSMENT TOOL VERSION 1 (WAT – 1)

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<i>Patient Identifier</i>											
	Date:										
	Time:										
<i>Information from patient record, previous 12 hours</i>											
Any loose /watery stools	No = 0 Yes = 1										
Any vomiting/wretching/gagging	No = 0 Yes = 1										
Temperature > 37.8°C	No = 0 Yes = 1										
<i>2 minute pre-stimulus observation</i>											
State	SBS <sup>1</sup> ≤ 0 or asleep/awake/calm = 0 SBS <sup>1</sup> ≥ +1 or awake/distressed = 1										
Tremor	None/mild = 0 Moderate/severe = 1										
Any sweating	No = 0 Yes = 1										
Uncoordinated/repetitive movement	None/mild = 0 Moderate/severe = 1										
Yawning or sneezing	None or 1 = 0 >2 = 1										
<i>1 minute stimulus observation</i>											
Startle to touch	None/mild = 0 Moderate/severe = 1										
Muscle tone	Normal = 0 Increased = 1										
<i>Post-stimulus recovery</i>											
Time to gain calm state (SBS <sup>1</sup> ≤ 0)	< 2min = 0 2 - 5min = 1 > 5 min = 2										
<b>Total Score (0-12)</b>											

## References

### Acute Ventilator Sedation Management Care Guideline

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