



SEDATION PROTOCOL FOR VENTILATED PATIENTS IN ICU

Goals

1. Reduce length of time patient requires mechanical ventilation.
2. Reduce ICU length of stay.
3. Target Riker Sedation Agitation Scale (SAS) goal of 3 - 4.
4. Allow for daily wake-up periods.

Background

1. Appropriate use of sedatives and analgesics can greatly facilitate the care of patients in the ICU by improving rest and relieving suffering.
2. Overdosing of these agents or selection of an inappropriate agent can result in prolongation of mechanical ventilation and or the ICU stay which in turn can result in increased hospital and patient expenses.

Recommendations

1. Patient must be mechanically ventilated.
 2. Allow for adequate analgesia, due to non-opioid sedatives lack analgesic properties.
 3. Determine the anticipated length of mechanical ventilation and reassess daily.
 - < 24 hours
- Versed® or Diprivan®
- Versed® (Midazolam)
- General properties
 - i) rapid onset of action (usually 2 - 5 minutes)
 - ii) relatively short half life (< 2 hours), however in critically ill patients, it can accumulate and result in sedation for many hours or even days after discontinuation
 - iii) no analgesic properties
 - Side effects
 - i) respiratory depression
 - ii) no difference between Lorazepam and Midazolam in terms of time to awakening after prolonged continuous infusion because Midazolam accumulates in fat
 - Usual dose: 0.03 mg./Kg. to initiate sedation, continue 0.03 mg./Kg./hr and titrate to effect
Usual maintenance dose: 1 - 5 mg./hr. Doses greater than 5 mg./hr must be evaluated.
- Diprivan® (Propofol)
- General properties
 - i) very rapid onset of action (1 - 2 minutes)
 - ii) very short half life (10 - 15 minutes)
 - iii) no analgesic properties
 - iv) contains 0.1 gm fat per 1 ml
 - Side effects
 - i) very lipophilic
 - ii) respiratory depression
 - iii) bradycardia
 - iv) pain at infusion site (central lines preferred)
 - v) in high doses, can result in clinically significant hypertriglyceridemia due to the emulsifying lipids (care must be taken to avoid accidental contamination of the lipid by infectious organisms; change the bottle and tubing q 12 hours)
 - vi) may cause a 20 - 30% fall in systolic blood pressure in some patients
 - vii) use cautiously in patients with increased intracranial pressure
 - viii) can cause a chemical pancreatitis
 - Usual dose: Initiate 5 mcg./Kg./min. IV. Increase by 5 - 10 mcg./Kg./min. IV every 5 - 10 minutes, titrating to clinical response. Usual maintenance dose is 5 mcg./Kg./min. – 50 mcg./Kg./min.
 - Monitoring Parameters
 - i) Allergies to soybean oil, lecithin and glycerol
 - ii) Cholesterol and triglyceride levels
 - iii) Amylase and lipase levels
 - iv) Zinc levels
 - v) Monitor closely for respiratory depression, hypotension and bradycardia

SEDATION PROTOCOL FOR VENTILATED PATIENTS IN ICU cont.

- > 24 hours, < 2 weeks
Agent of choice is Diprivan (Propofol)
- > 2 weeks
Agent of choice is Ativan® (Lorazepam)
 - General properties
 - i) slow onset of action (10 - 20 minutes)
 - ii) intermediate half life (6 hours)
 - iii) less lipophilic than Diazepam and therefore does not accumulate in the tissues as much as Diazepam and is less likely to exhibit prolonged sedation
 - iv) no active metabolites
 - v) elimination not affected by renal or hepatic failure
 - Side effects
 - i) respiratory depression
 - Usual starting dose 1 - 2 mg. hr, can increase to 10 mg./hr
Because Lorazepam has a slightly delayed onset of action, a single dose of Midazolam 0.03 mg./Kg. may be utilized to initiate sedative therapy when rapid sedation is required.
- 4. Use non-pharmacological measures whenever possible
 - Establish regular q 12 hour wake-up cycles to assess weanability and neurological status
 - Minimize stimulation during sleep
 - Reassure patient and provide general comfort
 - Use opiates as needed for pain; sedatives are a poor substitute for analgesics when pain is the primary problem facing the patient

Riker Sedation Agitation Scale (SAS)

1. Unarousable – Minimal or no response to noxious stimuli, does not communicate or follow commands
2. Very Sedated – Arouses to physical stimuli but does not communicate or follow commands, may move spontaneously
3. Sedated – Difficult to arouse, awakens to verbal stimuli or gently shaking, but drifts off again, follow simple commands
4. Calm and Cooperative – Calm, awakens easily, follows commands
5. Agitated – Anxious or mildly agitated, attempting to sit up, calms down to verbal stimuli
6. Very Agitated – Does not calm despite frequent verbal reminding of limits, biting ET
7. Dangerous Agitation – Pulling ET, trying to remove catheters, climbing over bedrails, striking at staff, thrashing side to side

References

1. Society of Critical Care Medicine: "Practice Parameters for Systemic Intravenous Analgesia and Sedation for Adult Patients in the Intensive Care Unit", September, 1995
2. ACCM Practice Parameters: http://www.sccm.org/accm/guidelines/guide_body_p02.html
3. Kress JP, Pohlman AS, O'Connor MF, et. al. "Daily Interruption of Sedative Infusions in Critically Ill Patients Undergoing Mechanical Ventilation" *N Engl J Med* 2000;342:147 1 - 7.
4. Prospective evaluation of the sedation-agitation scale in adult ICU patients. *Crit Care Med* 1999; 27:1325-1329.
5. Assessing sedation in ventilated ICU patients with the bispectral index and the sedation-agitation scale. *Crit Care Med* 1999; 27:1499-1504
6. Confirming the reliability of the Sedation-Agitation-Scale in ICU nurses without prior experience in its use. *Pharmacotherapy* 2001; 21:431-436.
7. Validating the Sedation-Agitation Scale with the bispectral index and visual analog scale in adult ICU patients after cardiac surgery. *Intensive Care Med* 2001; 27:853-858.



PHYSICIAN'S ORDER SHEET
STANDING ORDERS FOR:
ICU ONLY

Page 1 of 2 Check here if STAT medications ordered

ANOTHER BRAND OF GENERALLY EQUIVALENT PRODUCT, APPROVED BY THE PHARMACY AND THERAPEUTICS COMMITTEE, MAY BE ADMINISTERED UNLESS (SPECIFIC) IS WRITTEN AFTER THE MEDICATION ORDER.

SEDATION AND ANALGESIA ORDER FOR MECHANICALLY VENTILATED PATIENTS IN ICU

Patient Weight _____ lbs. _____ Kg. Allergies _____

Choose sedation goal: Riker Sedation Agitation Scale (SAS) goal of 3 - 4 recommended

7	Dangerous Agitation	Pulling ET, trying to remove catheters, climbing over bedrails, striking at staff, thrashing side to side
6	Very Agitated	Does not calm despite frequent verbal reminding of limits, biting ET
5	Agitated	Anxious or mildly agitated, attempting to sit up, calms down to verbal stimuli
4	Calm & Cooperative	Calm, awakens easily, follows commands
3	Sedated	Difficult to arouse, awakens to verbal stimuli or gently shaking, but drifts off again, follows simple commands
2	Very Sedated	Arouses to physical stimuli but does not communicate or follow commands, may move spontaneously
1	Unarousable	Minimal or no response to noxious stimuli, does not communicate or follow commands

For patients that are mechanically ventilated for three days or less, short acting agents should be used such as Propofol (Diprivan) or Midazolam (Versed). For longer periods of mechanical ventilation, longer acting agents such as Lorazepam (Ativan) should be used. Patients that have been ventilated for long periods using the long acting agent Lorazepam (Ativan) may need to be switched to a shorter acting agent such as Propofol (Diprivan) for optimal weaning purposes. Indicate the following agent to be used.

SEDATIVES

PROPOFOL (Diprivan)

Administer 5 mcg./Kg./min. IV _____ mcg./min.
 Increase by 5 - 10 mcg./Kg./min. IV every 5 - 10 minutes titrating to clinical response. Watch vital signs.

 Maintenance dose 5 mcg./Kg./min. - 50 mcg./Kg./min.

Doses exceeding 50 mcg./Kg./min. should be evaluated by physician.

**Shake well before administration.
 Change the bottle and tubing every 12 hours.
 Have the next dose on hand due to ultra fast emergence of sedation.
 Propofol (Diprivan) does not change pupil size on neuro exam.**

For patients receiving Propofol (Diprivan), Triglycerides must be monitored at baseline and every 7 days.

MIDAZOLAM (Versed)

Administer 0.5 - 1 mg. IV initially, may repeat.
 Increase in 1 mg. increments, (0.5 mg. for sensitive patients), titrating to clinical response.
 Watch vital signs and sedative effect.

 Maintenance dose 1 - 5 mg./hr.

Doses greater than 5 mg./hr should be evaluated by physician.

LORAZEPAM (Ativan)

Initiate sedation with 1 - 2 mg./ hr IV and increase up to a dose of 5 mg./hr.

 A single dose of Midazolam 0.5 - 1 mg. may be used to initiate sedation if rapid sedation is required.

Doses exceeding 5 mg./hr should be evaluated by physician.

Sedation Vacation

For patients receiving continuous infusions, lighten/discontinue sedation daily (or more often as indicated by physician) until the patient is awake, can follow commands, or until they become uncomfortable or agitated in order to evaluate mental status and readiness to wean from ventilator.

Resume sedation infusion at 1/2 the previous rate and retitrate to the SAS goal. Document on the nursing flow sheet.



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PHYSICIAN'S ORDER SHEET
STANDING ORDERS FOR:
PHYSICIAN'S NAME HERE

Check here if STAT
 medications ordered

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SEDATION AND ANALGESIA ORDER FOR MECHANICALLY VENTILATED PATIENTS IN ICU

PAIN NEEDS TO BE MONITORED AS SEDATIVES DO NOT HAVE ANALGESIC PROPERTIES!

PAIN EVALUATION PER PAIN SOP

ANALGESICS



HYDROMORPHONE (Dilaudid)

(Recommended for patients with renal dysfunction or hemodynamic instability)

(Morphine recommended for other patients)

_____ 0.25 - 2 mg. IV every hour prn

_____ mg. IV every _____ scheduled and/or

_____ mg. IV every _____ prn

MORPHINE SULFATE

(Use caution in patients with renal insufficiency)

_____ 1 - 10 mg. IV every hour prn

_____ mg. IV scheduled every _____ hour and

_____ mg. IV every _____ hour prn

FENTANYL (Sublimaze)

**(Recommended for morphine allergy)
 (Caution: Discontinue if chest wall rigidity occurs)**

_____ 10 - 100 mcg. IV every hour prn

_____ mcg. IV scheduled every _____ hour and

_____ mcg. IV every _____ hour prn

FOR AGITATION UNRESPONSIVE TO SEDATIVES AND ANALGESICS, CONSIDER TREATMENT OF DELIRIUM. REFER TO THE DELIRIUM PROTOCOL.

Bowel Prophylaxis: Sennosides 8.8 mg./5 ml liquid and docusate 100 mg./5 ml liquid, 5 ml per OG or NG tube twice daily.

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 PHYSICIAN'S SIGNATURE

 DATE/TIME