Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the Intensive Care Unit

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Surgeons Expect Patients to Buy-In to Postoperative Life Support Preoperatively: Results of a National Survey.*
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Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the Intensive Care Unit

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A. Awakening trials
B. Breathing trials
C. Coordination
D. Delirium management
E. Exercise & mobility
What’s Different about this Version of the PAD Guidelines?—Methods

• Professional librarian:
  – Charlie Kishman, MSLS, Univ. of Cincinnati
  – Developed MeSH terms, conducted standardized searches, managed Refworks™ database.

• Electronic Database:
  – Web-based database (Refworks™ software)- >19,000 refs!
  – Accessible on-line to all Task Force members.
What’s Different about this Version of the PAD Guidelines?-Methods (cont.)

• **GRADE Methodology:** (www.gradeworkinggroup.org)
  – More rigorous, transparent process – *minimizes COI.*
  – Strength of recommendations = strength of evidence + relative risks, benefits of interventions – *more practical, applicable.*
  – Expert opinion *not* used as a substitute for making recommendations without evidence – *more robust.*

• **Voting Process:**
  – Anonymous on-line voting (E-survey™) by all Task Force members.
  – Polling managed by SCCM staff.
  – Standardized voting thresholds used to achieve consensus for all statements and recommendations.
Interpreting the PAD Guidelines

Statements and Recommendations

Quality of evidence: statements and recommendations
• High (A)
• Moderate (B)
• Low/Very Low (C)

Strength of recommendations: recommendations only
• Either strong (1), weak (2), or none (0)
• Either in favor of an intervention (+) or against an intervention (-)
<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Quality of Evidence</th>
<th>Type of Evidence</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>High</td>
<td>High quality RCT</td>
<td>Further research is unlikely to change our confidence in the estimate of effect.</td>
</tr>
<tr>
<td>B</td>
<td>Moderate</td>
<td>RCT with significant limitations (downgraded)(^a), or high-quality OS (upgraded)(^c)</td>
<td>Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.</td>
</tr>
<tr>
<td>C</td>
<td>Low</td>
<td>OS</td>
<td>Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.</td>
</tr>
</tbody>
</table>

RCT = randomized controlled trial; OS = observational study.

\(^a\)Adapted from Guyatt et al (40).

\(^b\)RCTs with significant limitations: 1) study design limitations (planning, implementation bias); 2) inconsistency of results; 3) indirectness of evidence; 4) imprecision of results; 5) high likelihood of reporting bias.

\(^c\)High-quality OS: 1) large magnitude of treatment effect; 2) evidence of a dose-response relationship; 3) plausible biases would decrease the magnitude of an apparent treatment effect.
What’s Different About this Version of the PAD Guidelines? – *Scope*

- **Way bigger than the last version!**
  - Total of *53 statements* and recommendations!
  - vs. 28 recommendations in the 2002 SAG Guidelines.
  - vs. 36 statements, recommendations in the 2008 Sepsis Guidelines.

- **Not meant to be comprehensive:**
  - Attempts to answer the most important questions related to pain, agitation, and delirium in ICU patients.
  - Some questions have *no* answers due to a lack of evidence.
  - Identifies area for future research.
2012 Pain, Agitation, and Delirium Clinical Practice Guidelines

Why are they significant?
Early Mobility of ICU Patients
Deep vs. Light Sedation of ICU Patients

Pre-PAD Guidelines

Post-PAD Guidelines
Integrated PAD Management

- Pain Management
- Sedation/Agitation
- Delirium Prevention, Treatment
Integrated PAD Management

- Pain Management
- Sedation/Agitation
- Delirium Prevention, Treatment
- Spontaneous Awakening Trials
- Spontaneous Breathing Trials
- Early Mobility

Trials
PAD Interdisciplinary Team

Integrated Approach to PAD

- MD Champion
- RN Champion
- RT Champion
- Pharmacy Champion
- Physical Therapy Champion
- Hospital Administrators
- Family
- Patient
Expected Benefits of Implementing the PAD Guidelines

- Shortened duration of MV
- Reduced ICU, hospital LOS
- Increased ICU patient throughput, bed availability
- Decreased costs per patient
- Improved long-term cognitive function, mobility
- Increased number of patients discharged to home!
- Lives saved!
INTERUPTION OF SEDATIVE INFUSIONS IN CRITICALLY ILL PATIENTS UNDERGOING MECHANICAL VENTILATION

DAILY INTERRUPTION OF SEDATIVE INFUSIONS IN CRITICALLY ILL PATIENTS UNDERGOING MECHANICAL VENTILATION

JOHN P. KRESS, M.D., ANNE S. POHLMAN, R.N., MICHAEL F. O’CONNOR, M.D., AND JESSE B. HALL, M.D.

ABSTRACT

Background Continuous infusions of sedative drugs in the intensive care unit may prolong the duration of mechanical ventilation, prolong the length of stay in the intensive care unit and the hospital, impede efforts to perform daily neurologic examinations, and increase the need for tests to assess alterations in mental status. Whether regular interruption of such infusions might accelerate recovery is not known.

Methods We conducted a randomized, controlled trial involving 128 adult patients who were receiving mechanical ventilation and continuous infusions of sedative drugs in a medical intensive care unit. In the intervention group, the sedative infusions were interrupted until the patients were awake, on a daily basis; in the control group, the infusions were interrupted only at the discretion of the clinicians in the intensive care unit.

Results The median duration of mechanical ventilation was 4.9 days in the intervention group, as compared with 7.3 days in the control group (P=0.004), and the median length of stay in the intensive care unit was 6.4 days as compared with 9.9 days, respectively (P=0.02). Six of the patients in the intervention group (9 percent) underwent diagnostic testing to assess changes in mental status, as compared with 36 of the patients in the control group (51 percent).

Conclusions Interruption of infusions of continuous sedative drugs in the intensive care unit for critically ill patients, in whom daily neurologic examination was indicated (for example, if the partial pressure of arterial carbon dioxide to reach 50 mm Hg or higher), can cause patients substantial discomfort, necessitating high levels of sedation.

In many intensive care units, sedatives are infused continuously. As compared with intermittent bolus infusion, this approach provides a more constant level of sedation and may increase patients’ comfort. However, administration of sedatives by continuous infusion has been identified as an independent predictor of a longer duration of mechanical ventilation as well as a longer stay in the intensive care unit and in the hospital.

Continuous infusion of sedatives has other disadvantages. Extended sedation may limit clinicians’ ability to interpret physical examinations. It may be difficult to distinguish changes in mental status that are due to the action of a sedative from those that are due to neurologic injury. Therefore, clinicians may be compelled to order diagnostic studies to rule out new neurologic injury when patients do not awaken rapidly after the sedative infusion is discontinued.

The benefit of administering sedatives by continuous infusion must be balanced against these disadvantages. Daily interruption of sedative infusions to allow patients to “wake up” may improve the situation.
Awakening – Daily Interruption of Sedatives

Ventilator time reduced by 2 days

A COMPARISON OF FOUR METHODS OF WEANING PATIENTS FROM MECHANICAL VENTILATION

ANDRÉS ESTEBAN, M.D., PH.D., FERNANDO FRUTOS, M.D., MARTIN J. TOBIN, M.D., INMACULADA ALÍA, M.D., JOSÉ F. SOLSONA, M.D., INMACULADA VALVERDÚ, M.D., RAFAEL FERNÁNDEZ, M.D., MIGUEL A. DE LA CAL, M.D., SALVADOR BENITO, M.D., PH.D., ROSER TOMÁS, M.D., DEMETRIO CARRIEDO, M.D., SANTIAGO MACÍAS, M.D., AND JESÚS BLANCO, M.D., FOR THE SPANISH LUNG FAILURE COLLABORATIVE GROUP*

Abstract  Background. Weaning patients from mechanical ventilation is an important problem in intensive care units. Weaning is usually conducted in an empirical manner, and a standardized approach has not been developed.

Methods. We carried out a prospective, randomized, multicenter study involving 546 patients who had received mechanical ventilation for a mean (±SD) of 7.5±6.1 days and who were considered by their physicians to be ready for weaning. One hundred thirty patients had respiratory distress during a two-hour trial of spontaneous breathing. These patients were randomly assigned to undergo one of four weaning techniques: intermittent mandatory ventilation, in which the ventilator rate was initially set at a mean (±SD) of 10.0±2.2 breaths per minute and then decreased, if possible, at least twice a day, usually by 2 to 4 breaths per minute (29 patients); pressure-support ventilation, in which pressure support was initially set at

Standardized protocols were followed for each technique.  Results. The median duration of weaning was 5 days for intermittent mandatory ventilation (first quartile, 3 days; third quartile, 11 days), 4 days for pressure-support ventilation (2 and 12 days, respectively), 3 days for intermittent (multiple) trials of spontaneous breathing (2 and 6 days, respectively), and 3 days for a once-daily trial of spontaneous breathing (1 and 6 days, respectively). After adjustment for other covariates, the rate of successful weaning was higher with a once-daily trial of spontaneous breathing than with intermittent mandatory ventilation (rate ratio, 2.83; 95 percent confidence interval, 1.36 to 5.89; P<0.006) or pressure-support ventilation (rate ratio, 2.05; 95 percent confidence interval, 1.04 to 4.04; P<0.04). There was no significant difference in the rate of success between once-daily trials and multiple trials of spontaneous breathing.

Conclusions. A once-daily trial of spontaneous breath-
Breathing – Spontaneous Breathing Trials

Weaning Time (Days)

Patients Liberated from Mechanical Ventilation (%)

- Intermittent SBTs (n=33)
- Daily SBTs (n=31)
- Pressure support vent (n=37)
- Intermittent mandatory vent (n=29)

EFFECT ON THE DURATION OF MECHANICAL VENTILATION OF IDENTIFYING PATIENTS CAPABLE OF BREATHING SPONTANEOUSLY

E. Wesley Ely, M.D., M.P.H., Albert M. Baker, M.D., Donnie P. Dunagan, M.D., Henry L. Burke, M.D., Allen C. Smith, M.D., Patrick T. Kelly, M.D., Margaret M. Johnson, M.D., Rick W. Browder, M.D., David L. Bowton, M.D., and Edward F. Haponik, M.D.

ABSTRACT

Background Prompt recognition of the reversal of respiratory failure may permit earlier discontinuation of mechanical ventilation, without harm to the patient.

Methods We conducted a randomized, controlled trial in 300 adult patients receiving mechanical ventilation in medical and coronary intensive care units. In the intervention group, patients underwent daily screening of respiratory function by physicians, respiratory therapists, and nurses to identify those possibly capable of breathing spontaneously. Successful tests were followed by two-hour trials of spontaneous breathing. The control subjects had daily screening but no other interventions. In both groups, all clinical decisions, including the decision to discontinue mechanical ventilation, were made by the attending physicians.

Results Although the 148 patients randomly assigned to the intervention group had more severe disease, they received mechanical ventilation for a median of 4.5 days, compared with 6 days in the 151 patients in the control group (P = 0.003). The median interval between the time a patient met the criteria and the test was completed was 14 days. The rate of successful trials was 29% in the intervention group and 12% in the control group (P = 0.003)...

FOR over two decades, physicians have attempted to define the best methods of discontinuing mechanical ventilation in patients recovering from respiratory failure. An early study of weaning noted that the clinical decision to discontinue mechanical ventilation is often arbitrary, based on "judgment and experience." With increasing recognition of the risks and economic consequences of prolonged ventilation, identifying strategies that reduce the duration of mechanical ventilation remains a high priority. However, no single approach has been established as the best one. Many measures have been proposed to identify patients ready for extubation, ranging from simple maneuvers, such as counting and measuring breaths, to more complicated methods requiring the insertion of gastrointestinal devices or the use of computerized decision-support models. Some investigators have advocated the use of a ventilatory management team, although randomized, controlled trials of this strategy are lacking.

Despite these efforts, there is evidence to suggest that physicians do not discontinue mechanical ventilation expeditiously. Using clinical judgment alone...
Breathing – SBT Protocols

Ventilator time reduced by 2 days

Days before Weaning Begins

- Days before Weaning Begins
- Days after Intubation
- Intubation
- Sedation
- SBTs begin (Esteban 1995)
- SBTs begin (Ely 1996)
SAT reduced ventilator time by = 2 days

Control (n=60) vs. Protocol (n=68)

Adjusted $p < 0.001$

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

Duration of Mechanical Ventilation

Ventilator time reduced by 3 days

SAT+SBT (n=167)
Control (n=168)

ICU Length of Stay

SAT+SBT (n=167)

Control (n=168)

$p=.01$

Hospital Length of Stay

SAT+SBT (n=167)

Control (n=168)

$p=.04$

One-Year Survival

NNT = 7

p = .01

Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial

William D Schweickert, Mark C Pohlman, Anne S Pohlman, Celerina Nigos, Amy J Pawlik, Cheryl L Esbrook, Linda Spears, Megan Miller, Mietka Franczyk, Deanna Deprizio, Gregory A Schmidt, Amy Bowman, Rhonda Barr, Kathryn E McCallister, Jesse B Hall, John P Kress

Summary

Background Long-term complications of critical illness include intensive care unit (ICU)-acquired weakness and neuropsychiatric disease. Immobilisation secondary to sedation might potentiate these problems. We assessed the efficacy of combining daily interruption of sedation with physical and occupational therapy on functional outcomes in patients receiving mechanical ventilation in intensive care.

Methods Sedated adults (≥18 years of age) in the ICU who had been on mechanical ventilation for less than 72 h, were expected to continue for at least 24 h, and who met criteria for baseline functional independence were eligible for enrolment in this randomised controlled trial at two university hospitals. We randomly assigned 104 patients by
Return to Functional Independence

Patients with Functional Independence (%)

Hospital Days

Early PT/OT (n=49)

Control (n=55)

\[ p = .05 \]

# ICU PAD Care Bundle

## PAIN

- **Assess pain** ≥ 4x/shift & prn
- **Preferred pain assessment tools:**
  - Patient able to self-report → NRS (0-10)
  - Unable to self-report → BPS (3-12) or CPOT (0-8)
- Patient is in significant pain if NRS ≥ 4, BPS ≥ 6, or CPOT ≥ 3

- **Treat pain within 30” then reassess:**
  - Non-pharmacologic treatment – relaxation therapy
  - Pharmacologic treatment:
    - Non-neuropathic pain → IV opioids +/- non-opioid analgesics
    - Neuropathic pain → gabapentin or carbamazepine, + IV opioids
    - S/p AAA repair, rib fractures → thoracic epidural

## AGITATION

- **Assess agitation, sedation** ≥ 4x/shift & prn
- **Preferred sedation assessment tools:**
  - RASS (-5 to +4) or SAS (1 to 7)
  - NMB → suggest using brain function monitoring
  - Depth of agitation, sedation defined as:
    - Agitated if RASS = +1 to +4, or SAS = 5 to 7
    - Awake and calm if RASS = 0, or SAS = 4
    - Lightly sedated if RASS = -1 to -2, or SAS = 3
    - Deeply sedated if RASS = -3 to -5, or SAS = 1 to 2

## DELIRIUM

- **Assess delirium Q shift & prn**
- **Preferred delirium assessment tools:**
  - CAM-ICU (+ or -)
  - ICDSC (0 to 8)
- Delirium present if:
  - CAM-ICU is positive
  - ICDSC ≥ 4

- **Targeted sedation or DSI** (Goal: patient purposely follows commands without agitation):
  - RASS = -2 to 0, SAS = 3 to 4
  - If under sedated (RASS >0, SAS >4) assess/treat pain → treat w/sedatives prn (non-benzodiazepines preferred, unless ETOH or benzodiazepine withdrawal suspected)
  - If over sedated (RASS <2, SAS <3) hold sedatives until @ target, then restart @ 50% of previous dose

- **Consider daily SBT, early mobility and exercise** when patients are at goal sedation level, unless contraindicated
- EEG monitoring if:
  - at risk for seizures
  - Burst suppression therapy is indicated for ↑ICP

- **Identify delirium risk factors:** dementia, HTN, ETOH abuse, high severity of illness, coma, benzodiazepine administration
- **Avoid benzodiazepine use in those at ↑ risk for delirium**
- **Mobilize and exercise patients early**
- **Promote sleep** (control light, noise; cluster patient care activities; decrease nocturnal stimuli)
- **Restart baseline psychiatric meds, if indicated**
Implementing the ICU PAD Care Bundle

**PAIN**

Assess pain ≥ 4x/shift & prn
- Preferred pain assessment tools:
  - Patient able to self-report → NRS (0-10)
  - Unable to self-report → BPS (3-12) or CPOT (0-8)
- Patient is in significant pain if NRS ≥ 4, BPS ≥ 6, or CPOT ≥ 3

**TREAT**

Treat pain within 30” then reassess:
- Non-pharmacologic treatment—relaxation therapy
- Pharmacologic treatment:
  - Non-neuropathic pain → IV opioids +/- non-opioid analgesics
  - Neuropathic pain → gabapentin or carbamazepine, + IV opioids
  - S/p AAA repair, rib fractures → thoracic epidural

**PREVENT**

- Administer pre-procedural analgesia and/or non-pharmacologic interventions (eg, relaxation therapy)
- Treat pain first, then sedate

**AGITATION**

Assess agitation, sedation ≥ 4x/shift & prn
- Preferred sedation assessment tools:
  - RASS (-5 to +4) or SAS (1 to 7)
  - NMB → suggest using brain function monitoring
- Depth of agitation, sedation defined as:
  - Agitated if RASS = +1 to +4, or SAS = 5 to 7
  - Awake and calm if RASS = 0, or SAS = 4
  - Lightly sedated if RASS = -1 to -2, or SAS = 3
  - Deeply sedated if RASS = -3 to -5, or SAS = 1 to 2

**TREAT**

Targeted sedation or DSI (Goal: patient purposely follows commands without agitation): RASS = -2 – 0, SAS = 3 – 4
- If under sedated (RASS >0, SAS >4) assess/treat pain → treat w/sedatives prn (non-benzodiazepines preferred, unless ETOH or benzodiazepine withdrawal suspected)
- If over sedated (RASS < -2, SAS <3) hold sedatives until @ target, then restart @ 50% of previous dose

**PREVENT**

- Consider daily SBT, early mobility and exercise when patients are at goal sedation level, unless contraindicated
- EEG monitoring if:
  - at risk for seizures
  - Burst suppression therapy is indicated for ↑ICP

**DELIRIUM**

Assess delirium Q shift & prn
- Preferred delirium assessment tools:
  - CAM-ICU (+ or -)
  - ICDSC (0 to 8)
- Delirium present if:
  - CAM-ICU is positive
  - ICDSC ≥ 4

**TREAT**

- Treat pain as needed
- Reorient patients; familiarize surroundings; use patient’s eyeglasses, hearing aids if needed
- Pharmacologic treatment of delirium:
  - Avoid benzodiazepines unless ETOH or benzodiazepine withdrawal suspected
  - Avoid rivastigmine
  - Avoid antipsychotics if ↑ risk of Torsades de pointes

**PREVENT**

- Identify delirium risk factors: dementia, HTN, ETOH abuse, high severity of illness, coma, benzodiazepine administration
- Avoid benzodiazepine use in those at ↑ risk for delirium
- Mobilize and exercise patients early
- Promote sleep (control light, noise; cluster patient care activities; decrease nocturnal stimuli)
- Restart baseline psychiatric meds, if indicated
Step 1: Implement Pain, Agitation, and Delirium Monitoring Tools in the ICU
Pain Assessment
Numerical Rating Scale* (NRS)

*NRS ≥ 4 is significant
Pain Assessment

Behavioral Pain Scale* (BPS)

* BPS Range = 3-12, BPS > 6 is significant

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td>Relaxed</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Partially tightened (e.g., brow lowering)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fully tightened (e.g., eyelid closing)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Grimacing</td>
<td>4</td>
</tr>
<tr>
<td>Upper limbs</td>
<td>No movement</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Partially bent</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fully bent with finger flexion</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Permanently retracted</td>
<td>4</td>
</tr>
<tr>
<td>Compliance with ventilation</td>
<td>Tolerating movement</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Coughing but tolerating ventilation for most of the time</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fighting ventilator</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Unable to control ventilation</td>
<td>4</td>
</tr>
</tbody>
</table>
# Pain Assessment

## Critical Care Pain Observation Tool* (CPOT)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facial expression</strong></td>
<td>No muscular tension observed</td>
<td>Relaxed, neutral</td>
</tr>
<tr>
<td></td>
<td>Presence of frowning, brow lowering, orbit tightening, and levator contraction</td>
<td>Tense</td>
</tr>
<tr>
<td></td>
<td>All of the above facial movements plus eyelid tightly closed</td>
<td>Grimacing</td>
</tr>
<tr>
<td><strong>Body movements</strong></td>
<td>Does not move at all (does not necessarily mean absence of pain)</td>
<td>Absence of movements</td>
</tr>
<tr>
<td></td>
<td>Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements</td>
<td>Protection</td>
</tr>
<tr>
<td></td>
<td>Pulling tube, attempting to sit up, moving limbs/thrashing, not following commands, striking at staff, trying to climb out of bed</td>
<td>Restlessness</td>
</tr>
<tr>
<td><strong>Muscle tension</strong></td>
<td>No resistance to passive movements</td>
<td>Relaxed</td>
</tr>
<tr>
<td>Evaluation by passive flexion and extension of upper extremities</td>
<td>Resistance to passive movements</td>
<td>Tense, rigid</td>
</tr>
<tr>
<td></td>
<td>Strong resistance to passive movements, inability to complete them</td>
<td>Very tense or rigid</td>
</tr>
<tr>
<td><strong>Compliance with the ventilator (intubated patients)</strong></td>
<td>Alarms not activated, easy ventilation</td>
<td>Tolerating ventilator or movement</td>
</tr>
<tr>
<td></td>
<td>Alarms stop spontaneously</td>
<td>Coughing but tolerating ventilator</td>
</tr>
<tr>
<td></td>
<td>Asynchrony: blocking ventilation, alarms frequently activated</td>
<td>Fighting ventilator</td>
</tr>
<tr>
<td><strong>OR</strong></td>
<td><strong>Vocalization (extubated patients)</strong></td>
<td>Talking in normal tone or no sound</td>
</tr>
<tr>
<td></td>
<td>Talking in normal tone or no sound</td>
<td>Sighing, moaning</td>
</tr>
<tr>
<td></td>
<td>Crying out, sobbing</td>
<td>Crying out, sobbing</td>
</tr>
</tbody>
</table>

*CPOT range = 0 – 8, CPOT > 3 is significant*
### Sedation Assessment

**Richmond Agitation Sedation Scale** (*RASS*)

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Combative</td>
<td>Overtly combative, violent, immediate danger to staff</td>
</tr>
<tr>
<td>3</td>
<td>Very agitated</td>
<td>Pulls or removes tube(s) or catheter(s); aggressive</td>
</tr>
<tr>
<td>2</td>
<td>Agitated</td>
<td>Frequent non-purposeful movement, fights ventilator</td>
</tr>
<tr>
<td>1</td>
<td>Restless</td>
<td>Anxious but movements not aggressive vigorous</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
<td>Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice (&gt;10 seconds)</td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
<td>Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice (&lt;10 seconds)</td>
</tr>
<tr>
<td>-2</td>
<td>Light sedation</td>
<td>Briefly awakens with eye contact to voice (&lt;10 seconds)</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
<td>Movement or eye opening to voice (but no eye contact)</td>
</tr>
<tr>
<td>-4</td>
<td>Deep sedation</td>
<td>No response to voice, but movement or eye opening to physical stimulation</td>
</tr>
<tr>
<td>-5</td>
<td>Unarousable</td>
<td>No response to voice or physical stimulation</td>
</tr>
</tbody>
</table>

#### Procedure for RASS Assessment

1. Observe patient
   a. Patient is alert, restless, or agitated. (score 0 to +4)
2. If not alert, state patient’s name and say to open eyes and look at speaker.
   b. Patient awakens with sustained eye opening and eye contact. (score -1)
   c. Patient awakens with eye opening and eye contact, but not sustained. (score -2)
   d. Patient has any movement in response to voice but no eye contact. (score -3)
3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum.
   e. Patient has any movement to physical stimulation. (score -4)
   f. Patient has no response to any stimulation. (score -5)

*RASS range = -5 to +4, target RASS = 0 to -2*
Sedation Assessment

Sedation Agitation Scale* (SAS)

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Dangerous Agitation</td>
<td>Pulling at ET tube, trying to remove catheters, climbing over bedrail, striking at staff, thrashing side-to-side</td>
</tr>
<tr>
<td>6</td>
<td>Very Agitated</td>
<td>Requiring restraint and frequent verbal reminding of limits, biting ETT</td>
</tr>
<tr>
<td>5</td>
<td>Agitated</td>
<td>Anxious or physically agitated, calms to verbal instructions</td>
</tr>
<tr>
<td>4</td>
<td>Calm and Cooperative</td>
<td>Calm, easily arousable, follows commands</td>
</tr>
<tr>
<td>3</td>
<td>Sedated</td>
<td>Difficult to arouse but awakens to verbal stimuli or gentle shaking, follows simple commands but drifts off again</td>
</tr>
<tr>
<td>2</td>
<td>Very Sedated</td>
<td>Arouses to physical stimuli but does not communicate or follow commands, may move spontaneously</td>
</tr>
<tr>
<td>1</td>
<td>Unarousable</td>
<td>Minimal or no response to noxious stimuli, does not communicate or follow commands</td>
</tr>
</tbody>
</table>

Guidelines for SAS Assessment

1. Agitated patients are scored by their most severe degree of agitation as described.
2. If patient is awake or awakens easily to voice (“awaken” means responds with voice or head shaking to a question or follows commands), that’s a SAS 4 (same as calm and appropriate – might even be napping).
3. If more stimuli such as shaking is required but patient eventually does awaken, that’s SAS 3.
4. If patient arouses to stronger physical stimuli (may be noxious) but never awakens to the point of responding yes/no or following commands, that’s a SAS 2.
5. Little or no response to noxious physical stimuli represents a SAS 1.

This helps separate sedated patients into those you can eventually wake up (SAS 3), those you can’t awaken but can arouse (SAS 2), and those you can’t arouse (SAS 1).

*SAS range = 1 to 7, target SAS = 3 to 4
Delirium Assessment
CAM-ICU

Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet

1. Acute Change or Fluctuating Course of Mental Status:
   - Is there an acute change from mental status baseline? OR
   - Has the patient’s mental status fluctuated during the past 24 hours?

   YES -> NO DElIRiUM

   NO -> CAM-ICU negative

2. Inattention:
   - “Squeeze my hand when I say the letter ‘A’.”
     Read the following sequence of letters: S A V E A H A A R T
     ERRORS: No squeeze with ‘A’ & Squeeze on letter other than ‘A’
   - If unable to complete Letters -> Pictures

   > 2 Errors

   0 - 2 Errors

   CAM-ICU negative
   NO DElIRiUM

3. Altered Level of Consciousness
   Current RASS level

   RASS = zero

4. Disorganized Thinking:
   1. Will a stone float on water?
   2. Are there fish in the sea?
   3. Does one pound weigh more than two?
   4. Can you use a hammer to pound a nail?

   Command: “Hold up this many fingers” (Hold up 2 fingers)
   OR “Now do the same thing with the other hand” (Do not demonstrate)
   OR “Add one more finger” (If patient unable to move both arms)

   > 1 Error

   0 - 1 Error

   CAM-ICU negative
   NO DElIRiUM

   CAM-ICU positive
   DElIRiUM Present

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ICUdelirium.org
# Delirium Assessment

**Intensive Care Delirium Screening Checklist** (ICDSC)

<table>
<thead>
<tr>
<th>Level of consciousness*</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: no response</td>
<td>none</td>
</tr>
<tr>
<td>B: response to intense and repeated stimulation (loud voice and pain)</td>
<td>none</td>
</tr>
<tr>
<td>C: response to mild or moderate stimulation</td>
<td>1</td>
</tr>
<tr>
<td>D: normal wakefulness</td>
<td>0</td>
</tr>
<tr>
<td>E: exaggerated response to normal stimulation</td>
<td>1</td>
</tr>
</tbody>
</table>

**SCORING SYSTEM:**

The scale is completed based on information collected from each entire 8-hour shift or from the previous 24 hours. Obvious manifestation of an item = 1 point. No manifestation of an item or no assessment possible = 0 point. The score of each item is entered in the corresponding empty box and is 0 or 1.

1. **Altered level of consciousness:**
   - A) No response or B) the need for vigorous stimulation in order to obtain any response signified a severe alteration in the level of consciousness precluding evaluation. If there is coma (A) or stupor (B) most of the time period then a dash (-) is entered and there is no further evaluation during that period.
   - C) Drowsiness or requirement of a mild to moderate stimulation for a response implies an altered level of consciousness and scores 1 point.
   - D) Wakefulness or sleeping state that could easily be aroused is considered normal and scores no point.
   - E) Hypervigilance is rated as an abnormal level of consciousness and scores 1 point.

2. **Irritability:** Difficulty in following a conversation or instructions. Easily distracted by external stimuli. Difficulty in shifting focuses. Any of these scores 1 point.

3. **Disorientation:** Any obvious mistake in time, place or person scores 1 point.

4. **Hallucination, delusion or psychosis:** The unequivocal clinical manifestation of hallucination or of behaviour probably due to hallucination (e.g. trying to catch a non-existent object) or delusion. Gross impairment in reality testing. Any of these scores 1 point.

5. **Psychomotor agitation or retardation:** Hyperactivity requiring the use of additional sedative drugs or restraints in order to control potential dangerousness (e.g. pulling out IV lines, hitting staff). Hypeactivity or clinically noticeable psychomotor slowing. Any of these scores 1 point.

6. **Inappropriate speech or mood:** Inappropriate, disorganised or incoherent speech. Inappropriate display of emotion related to events or situation. Any of these scores 1 point.

7. **Sleep/wake cycle disturbance:** Sleeping less than 4 hours or waking frequently at night (do not consider wakefulness initiated by medical staff or loud environment). Sleeping during most of the day. Any of these scores 1 point.

8. **Symptom fluctuation:** Fluctuation of the manifestation of any item or symptom over 24 hours (e.g. from one shift to another) scores 1 point.

*Delirium present if ICDSC > 4*
Step 2: Incorporate PAD Assessments into Daily ICU Care Plan

• What is the patient’s pain score and their current analgesia regimen?

• What is the patient’s current and target sedation scores, and their current sedation regimen?

• What is the patient’s delirium score and what are their delirium risk factors?
Step 3: Apply ICU Specific Pain, Agitation, and Delirium Management Protocols

- **Pain:**
  - Assess and treat pain first, then sedate (analgo-sedation)
  - Treat significant pain: NRS ≥ 4, BPS ≥ 6, or CPOT ≥ 3
  - Use appropriate pain management strategies (patient specific)
  - Administer pre-procedural analgesia

- **Agitation/Sedation:**
  - Minimize sedative use, avoid over-sedation (DSI or TSS→SAT)
  - Sedation goals: patient is responsive, aware, and able to purposely follow commands* (RASS = 0 to -2 or SAS = 3 to 4)
  - Choose sedatives that minimize side effects (patient-specific)

- **Delirium:**
  - Optimize pain management
  - Reorient patient
  - D/C deliriogenic drugs
  - Treat with anti-psychotics (patient-specific)

*Performs 3 out of 5 commands: opens eyes, maintains eye contact, squeezes hand, sticks out tongue, wiggles toes.
Benzodiazepines

Odds of delirium

Benzodiazepines in previous 24 hours (midazolam equivalents)

Opiates

Odds of delirium

Opiates in previous 24 hours (fentanyl equivalents)

Pandharipande et al., J Burn Research 2010
Step 4: Link to Other Strategies to Reduce the Need for Medications, Improve Outcomes

- Link spontaneous awakening trials (SAT) to spontaneous breathing trials (SBT) - *facilitate weaning from MV.*

- Link SAT to early mobility and exercise (EM) protocols - *reduce delirium, improve strength.*

- Implement environmental controls to protect patients’ sleep-wake cycles - *reduce delirium, improve sleep.*
PAD Interdisciplinary Team

- MD Champion
- RN Champion
- RT Champion
- Pharmacy Champion
- Physical Therapy Champion
- Hospital Administrators
- Family
- Patient

Integrated Approach to PAD
STATEMENTS AND RECOMMENDATIONS
Pain and Analgesia
Incidence of Pain

i. Adult medical, surgical, and trauma ICU patients routinely experience pain, both at rest and with routine ICU care (B)

ii. Pain in adult cardiac surgery patients is common and poorly treated; women experience more pain than men after cardiac surgery (B)

iii. Procedural pain is common in adult ICU patients (B)
Pain Assessment

I. We recommend that pain be routinely monitored in all adult ICU patients (+1B)

II. The Behavioral Pain Scale (BPS) and the Critical-Care Pain Observation Tool (CPOT) are the most valid and reliable behavioral pain scales for monitoring pain in medical, postoperative, or trauma (except for brain injury) adult ICU patients who are unable to self-report and in whom motor function is intact and behaviors are observable. Using these scales in other ICU patient populations and translating them into foreign languages other than French or English require further validation testing (B)
Pain assessment

III. We do not suggest that vital signs (or observational pain scales that include vital signs) be used alone for pain assessment in adult ICU patients (−2C)

IV. We suggest that vital signs may be used as a cue to begin further assessment of pain in these patients, however (+2C)
Pain Assessment
Numerical Rating Scale* (NRS)

*NRS ≥ 4 is significant
Pain Assessment

Behavioral Pain Scale* (BPS)

*BPS Range = 3-12, BPS > 6 is significant

Table 1. Behavioral pain scale

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td>Relaxed</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Partially tightened (e.g., brow lowering)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fully tightened (e.g., eyelid closing)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Grimacing</td>
<td>4</td>
</tr>
<tr>
<td>Upper limbs</td>
<td>No movement</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Partially bent</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fully bent with finger flexion</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Permanently retracted</td>
<td>4</td>
</tr>
<tr>
<td>Compliance with ventilation</td>
<td>Tolerating movement</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Coughing but tolerating ventilation for most of the time</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fighting ventilator</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Unable to control ventilation</td>
<td>4</td>
</tr>
</tbody>
</table>
# Pain Assessment

## Critical Care Pain Observation Tool* (CPOT)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td>No muscular tension observed</td>
<td>Relaxed, neutral 0</td>
</tr>
<tr>
<td></td>
<td>Presence of frowning, brow lowering, orbit tightening, and levator contraction</td>
<td>Tense 1</td>
</tr>
<tr>
<td></td>
<td>All of the above facial movements plus eyelid tightly closed</td>
<td>Grimacing 2</td>
</tr>
<tr>
<td>Body movements</td>
<td>Does not move at all (does not necessarily mean absence of pain)</td>
<td>Absence of movements 0</td>
</tr>
<tr>
<td></td>
<td>Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements</td>
<td>Protection 1</td>
</tr>
<tr>
<td></td>
<td>Pulling tube, attempting to sit up, moving limbs/thrashing, not following commands, striking at staff, trying to climb out of bed</td>
<td>Restlessness 2</td>
</tr>
<tr>
<td>Muscle tension</td>
<td>No resistance to passive movements</td>
<td>Relaxed 0</td>
</tr>
<tr>
<td>Evaluation by passive flexion and extension of upper extremities</td>
<td>Resistance to passive movements</td>
<td>Tense, rigid 1</td>
</tr>
<tr>
<td></td>
<td>Strong resistance to passive movements, inability to complete them</td>
<td>Very tense or rigid 2</td>
</tr>
<tr>
<td>Compliance with the ventilator (intubated patients)</td>
<td>Alarms not activated, easy ventilation</td>
<td>Tolerating ventilator or movement 0</td>
</tr>
<tr>
<td>OR</td>
<td>Alarms stop spontaneously</td>
<td>Coughing but tolerating 1</td>
</tr>
<tr>
<td>Vocalization (extubated patients)</td>
<td>Asynchrony: blocking ventilation, alarms frequently activated</td>
<td>Fighting ventilator 2</td>
</tr>
<tr>
<td></td>
<td>Talking in normal tone or no sound</td>
<td>Talking in normal tone or no sound 0</td>
</tr>
<tr>
<td></td>
<td>Sighing, moaning</td>
<td>Sighing, moaning 1</td>
</tr>
<tr>
<td></td>
<td>Crying out, sobbing</td>
<td>Crying out, sobbing 2</td>
</tr>
</tbody>
</table>

*CPOT range = 0 – 8, CPOT ≥ 3 is significant*
Treatment of pain

i. We recommend that preemptive analgesia and/or nonpharmacologic interventions (e.g., relaxation) be administered to alleviate pain in adult ICU patients prior to chest tube removal (+1C)
Treatment of pain

ii. We suggest that for other types of invasive and potentially painful procedures in adult ICU patients, preemptive analgesic therapy and/or nonpharmacologic interventions may also be administered to alleviate pain (+2C).

iii. We recommend that intravenous (IV) opioids be considered as the first-line drug class of choice to treat non-neuropathic pain in critically ill patients (+1C).
Treatment of pain

iv. All available IV opioids, when titrated to similar pain intensity endpoints, are equally effective (C)

v. We suggest that nonopioid analgesics be considered to decrease the amount of opioids administered (or to eliminate the need for IV opioids altogether) and to decrease opioid-related side effects (+2C)

vi. We recommend that either enterally administered gabapentin or carbamazepine, in addition to IV opioids, be considered for treatment of neuropathic pain (+1A)
vii. We recommend that thoracic epidural anesthesia/analgesia be considered for postoperative analgesia in patients undergoing abdominal aortic aneurysm surgery (+1B)

viii. We provide no recommendation for using a lumbar epidural over parenteral opioids for postoperative analgesia in patients undergoing abdominal aortic aneurysm surgery, due to a lack of benefit of epidural over parenteral opioids in this patient population (0,A)
Treatment of pain

ix. We provide no recommendation for the use of thoracic epidural analgesia in patients undergoing either intrathoracic or nonvascular abdominal surgical procedures, due to insufficient and conflicting evidence for this mode of analgesic delivery in these patients (0,B)

x. We suggest that thoracic epidural analgesia be considered for patients with traumatic rib fractures (+2B)

xi. We provide no recommendation for neuraxial/regional analgesia over systemic analgesia in medical ICU patients, due to lack of evidence in this patient population (0, No Evidence)
<table>
<thead>
<tr>
<th>Opiates</th>
<th>Equi-Analgesic Dose (mg)</th>
<th>Onset (IV)</th>
<th>Elimination Half-Life</th>
<th>Context-Sensitive Half-Life</th>
<th>Metabolic Pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fentanyl</td>
<td>0.1 IV</td>
<td>1–2 min</td>
<td>2–4 hr</td>
<td>200 min (6 hr infusion); 300 min (12 hr infusion)</td>
<td>N-dealkylation CYP3A4/5 substrate</td>
</tr>
<tr>
<td></td>
<td>N/A PO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>1.5 IV</td>
<td>5–15 min</td>
<td>2–3 hr</td>
<td>N/A</td>
<td>Glucuronidation</td>
</tr>
<tr>
<td></td>
<td>75 PO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>10 IV</td>
<td>5–10 min</td>
<td>3–4 hr</td>
<td>N/A</td>
<td>Glucuronidation</td>
</tr>
<tr>
<td></td>
<td>30 PO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methadone</td>
<td>N/A IV</td>
<td>1–3 d</td>
<td>15–60 hr</td>
<td>N/A</td>
<td>N-demethylation CYP3A4/5, 2D6, 2B6, 1A2 substrate</td>
</tr>
<tr>
<td></td>
<td>N/A PO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remifentanil</td>
<td>N/A IV</td>
<td>1–3 min</td>
<td>3–10 min</td>
<td>3–4 min</td>
<td>Hydrolysis by plasma esterases</td>
</tr>
<tr>
<td></td>
<td>N/A PO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opiates</td>
<td>Active Metabolites</td>
<td>Intermittent Dosing</td>
<td>IV Infusion Rates</td>
<td>Side Effects and Other Information</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------</td>
<td>------------------------------</td>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td>None</td>
<td>0.35–0.5 µg/kg IV q0.5–1 hr</td>
<td>0.7–10 µg/kg/hr</td>
<td>Less hypotension than with morphine. Accumulation with hepatic impairment.</td>
<td></td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>None</td>
<td>0.2–0.6 mg IV q1–2 hr</td>
<td>0.5–3 mg/hr</td>
<td>Therapeutic option in patients tolerant to morphine/fentanyl. Accumulation with hepatic/renal impairment.</td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>6- and 3-glucuronide metabolite</td>
<td>2–4 mg IV q1–2 hr</td>
<td>2–30 mg/hr</td>
<td>Accumulation with hepatic/renal impairment. Histamine release.</td>
<td></td>
</tr>
<tr>
<td>Methadone</td>
<td>N-demethylated derivative</td>
<td>IV/PO: 10–40 mg q6–12 hr</td>
<td>Not recommended</td>
<td>May be used to slow the development of tolerance where there is an escalation of opioid dosing requirements. Unpredictable pharmacokinetics; unpredictable pharmacodynamics in opiate naïve patients. Monitor QTc.</td>
<td></td>
</tr>
<tr>
<td>Remifentanil</td>
<td>None</td>
<td>N/A</td>
<td>Loading dose: 1.5 µg/kg IV Maintenance dose: 0.5–15 µg/kg/hr IV</td>
<td>No accumulation in hepatic/renal failure. Use IBW if body weight &gt;130% IBW.</td>
<td></td>
</tr>
<tr>
<td>Nonopiates (Route)</td>
<td>Onset</td>
<td>Elimination Half-Life</td>
<td>Metabolic Pathway</td>
<td>Active Metabolites</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>------------------------------------------------</td>
<td>-------------------------</td>
<td></td>
</tr>
<tr>
<td>Ketamine (IV)</td>
<td>30–40 sec</td>
<td>2–3 hr</td>
<td>N-demethylation</td>
<td>Norketamine</td>
<td></td>
</tr>
<tr>
<td>Acetaminophen (PO)</td>
<td>30–60 min</td>
<td>2–4 hr</td>
<td>Glucuronidation, sulfonation</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Acetaminophen (PR)</td>
<td>variable</td>
<td></td>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Acetaminophen (IV)</td>
<td>5–10 min</td>
<td>2 hr</td>
<td>Glucuronidation, sulfonation</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Ketorolac* (IM/IV)</td>
<td>10 min</td>
<td>2.4–8.6 hr</td>
<td>Hydroxylation, conjugation/renal excretion</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Ibuprofen (IV)</td>
<td>N/A</td>
<td>2.2–2.4 hr</td>
<td>Oxidation</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Ibuprofen (PO)</td>
<td>25 min</td>
<td>1.8–2.5 hr</td>
<td>Oxidation</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Gabapentin (PO)</td>
<td>N/A</td>
<td>5–7 hr</td>
<td>Renal excretion</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Carbamazepine immediate release (PO)</td>
<td>4–5 hr</td>
<td>25–65 hrs initially, then 12–17 hr</td>
<td>Oxidation</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Nonopiates (Route)</td>
<td>Dosing</td>
<td>Side Effects and Other Information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ketamine (IV)</td>
<td>Loading dose 0.1–0.5 mg/kg IV followed by 0.05–0.4 mg/kg/hr</td>
<td>Attenuates the development of acute tolerance to opioids. May cause hallucinations and other psychological disturbances.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetaminophen (PO)</td>
<td>325–1000 mg every 4–6 hr; max dose ≤ 4 g/day)</td>
<td>May be contraindicated in patients with significant hepatic dysfunction.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetaminophen (PR)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetaminophen (IV)</td>
<td>650 mg IV every 4 hrs – 1000 mg IV every 6 hr; max dose ≤ 4 g/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ketorolac* (IM/IV)</td>
<td>30 mg IM/IV, then 15–30 mg IM/IV every 6 hr up to 5 days; max dose = 120 mg/day × 5 days</td>
<td>Avoid nonsteroidal anti-inflammatory drugs in following conditions: renal dysfunction; gastrointestinal bleeding; platelet abnormality; concomitant angiotensin converting enzyme inhibitor therapy, congestive heart failure, cirrhosis, asthma. Contraindicated for the treatment of perioperative pain in coronary artery bypass graft surgery.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibuprofen (IV)</td>
<td>400–800 mg IV every 6 hr infused over &gt; 30 mins; max dose = 3.2 g/day</td>
<td>Avoid nonsteroidal anti-inflammatory drugs in following conditions: renal dysfunction; gastrointestinal bleeding; platelet abnormality; concomitant angiotensin converting enzyme inhibitor therapy, congestive heart failure, cirrhosis, asthma. Contraindicated for the treatment of perioperative pain in coronary artery bypass graft surgery.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibuprofen (PO)</td>
<td>400 mg PO every 4 hrs; max dose = 2.4 g/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gabapentin (PO)</td>
<td>Starting dose = 100 mg PO three times daily; maintenance dose = 900–3600 mg/day in 3 divided doses</td>
<td>Side effects: (common) sedation, confusion, dizziness, ataxia. Adjust dosing in renal failure pts. Abrupt discontinuation associated with drug withdraw syndrome, seizures.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbamazepine immediate release (PO)</td>
<td>Starting dose = 50–100 mg PO bid; maintenance dose = 100–200 mg every 4–6 hr; max dose = 1200 mg/day</td>
<td>Side effects: (common) nystagmus, dizziness, diplopia, lightheadedness, lethargy; (rare) aplastic anemia, and agranulocytosis; Stevens–Johnson syndrome or toxic epidermal necrolysis with HLA-B1502 gene. Multiple drug interactions due to hepatic enzyme induction.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Agitation and Sedation
I. Maintaining light levels of sedation in adult ICU patients is associated with improved clinical outcomes (e.g., shorter duration of mechanical ventilation and a shorter ICU length of stay [LOS]) (B)

II. *Maintaining light levels of sedation increases the physiologic stress response, but is not associated with an increased incidence of myocardial ischemia* (B)

III. The association between depth of sedation and psychological stress in these patients remains unclear (C)

IV. We recommend that sedative medications be titrated to maintain a light rather than a deep level of sedation in adult ICU patients, unless clinically contraindicated (+1B)
Monitoring depth of sedation and brain function

I. The Richmond Agitation-Sedation Scale (RASS) and Sedation-Agitation Scale (SAS) are the most valid and reliable sedation assessment tools for measuring quality and depth of sedation in adult ICU patients (B)

II. We do not recommend that objective measures of brain function (e.g., auditory evoked potentials [AEPs], Bispectral Index [BIS], Narcotrend Index [NI], Patient State Index [PSI], state entropy [SE]) be used as the primary monitor depth of sedation in noncomatose, nonparalyzed critically ill adult patients, as these monitors are inadequate substitutes for subjective sedation scoring systems (−1B)
Monitoring depth of sedation and brain function

I. We suggest that objective measures of brain function (e.g., AEPs, BIS, NI, PSI, or SE) be used as an adjunct to subjective sedation assessments in adult ICU patients who are receiving neuromuscular blocking agents, as subjective sedation assessments may be unobtainable in these patients (+2B)

II. We recommend that EEG monitoring be used to monitor nonconvulsive seizure activity in adult ICU patients with either known or suspected seizures, or to titrate electrosuppressive medication to achieve burst suppression in adult ICU patients with elevated intracranial pressure (+1A)
Sedation Assessment
Richmond Agitation Sedation Scale* (RASS)

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
<td>Overtly combative, violent, immediate danger to staff</td>
</tr>
<tr>
<td>+3</td>
<td>Very agitated</td>
<td>Pulls or removes tube(s) or catheter(s); aggressive</td>
</tr>
<tr>
<td>+2</td>
<td>Agitated</td>
<td>Frequent non-purposeful movement, fights ventilator</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
<td>Anxious but movements not aggressive vigorous</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
<td>Not fully alert, but has sustained awakening</td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
<td>(eye-opening/eye contact) to voice (&gt;10 seconds)</td>
</tr>
<tr>
<td>-2</td>
<td>Light sedation</td>
<td>Briefly awakens with eye contact to voice (&lt;10 seconds)</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
<td>Movement or eye opening to voice (but no eye contact)</td>
</tr>
<tr>
<td>-4</td>
<td>Deep sedation</td>
<td>No response to voice, but movement or eye opening to physical stimulation</td>
</tr>
<tr>
<td>-5</td>
<td>Unarousable</td>
<td>No response to voice or physical stimulation</td>
</tr>
</tbody>
</table>

**Procedure for RASS Assessment**

1. Observe patient
   a. Patient is alert, restless, or agitated. (score 0 to +4)
2. If not alert, state patient’s name and say to open eyes and look at speaker.
   b. Patient awakens with sustained eye opening and eye contact. (score -1)
   c. Patient awakens with eye opening and eye contact, but not sustained. (score -2)
   d. Patient has any movement in response to voice but no eye contact. (score -3)
3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum.
   e. Patient has any movement to physical stimulation. (score -4)
   f. Patient has no response to any stimulation. (score -5)

*RASS range = -5 to +4, target RASS = 0 to -2
Sedation Assessment
Sedation Agitation Scale* (SAS)

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Dangerous Agitation</td>
<td>Pulling at ET tube, trying to remove catheters, climbing over bedrail, striking at staff, thrashing side-to-side</td>
</tr>
<tr>
<td>6</td>
<td>Very Agitated</td>
<td>Requiring restraint and frequent verbal reminding of limits, biting ETT</td>
</tr>
<tr>
<td>5</td>
<td>Agitated</td>
<td>Anxious or physically agitated, calms to verbal instructions</td>
</tr>
<tr>
<td>4</td>
<td>Calm and Cooperative</td>
<td>Calm, easily arousable, follows commands</td>
</tr>
<tr>
<td>3</td>
<td>Sedated</td>
<td>Difficult to arouse but awakens to verbal stimuli or gentle shaking, follows simple commands but drifts off again</td>
</tr>
<tr>
<td>2</td>
<td>Very Sedated</td>
<td>Arouses to physical stimuli but does not communicate or follow commands, may move spontaneously</td>
</tr>
<tr>
<td>1</td>
<td>Unarousable</td>
<td>Minimal or no response to noxious stimuli, does not communicate or follow commands</td>
</tr>
</tbody>
</table>

Guidelines for SAS Assessment
1. Agitated patients are scored by their most severe degree of agitation as described.
2. If patient is awake or awakens easily to voice ("awaken" means responds with voice or head shaking to a question or follows commands), that’s a SAS 4 (same as calm and appropriate – might even be napping).
3. If more stimuli such as shaking is required but patient eventually does awaken, that’s SAS 3.
4. If patient arouses to stronger physical stimuli (may be noxious) but never awakens to the point of responding yes/no or following commands, that’s a SAS 2.
5. Little or no response to noxious physical stimuli represents a SAS 1.

This helps separate sedated patients into those you can eventually wake up (SAS 3), those you can’t awaken but can arouse (SAS 2), and those you can’t arouse (SAS 1).

*SAS range = 1 to 7, target SAS = 3 to 4
c. Choice of sedative

I. We suggest that sedation strategies using nonbenzodiazepine sedatives (either propofol or dexmedetomidine) may be preferred over sedation with benzodiazepines (either midazolam or lorazepam) to improve clinical outcomes in mechanically ventilated adult ICU patients (+2B)
<table>
<thead>
<tr>
<th>Agent</th>
<th>Onset After IV Loading Dose</th>
<th>Elimination Half-Life</th>
<th>Active Metabolites</th>
<th>Loading Dose (IV)</th>
<th>Maintenance Dosing (IV)</th>
<th>Adverse Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midazolam</td>
<td>2–5 min</td>
<td>3–11 hr</td>
<td>Yes*</td>
<td>0.01–0.05 mg/kg over several minutes</td>
<td>0.02–0.1 mg/kg/hr</td>
<td>Respiratory depression, hypotension</td>
</tr>
<tr>
<td>Lorazepam</td>
<td>15–20 min</td>
<td>8–15 hr</td>
<td>None</td>
<td>0.02–0.04 mg/kg (≤ 2 mg)</td>
<td>0.02–0.06 mg/kg q2–6 hr prn or 0.01–0.1 mg/kg/hr (≤ 10 mg/hr)</td>
<td>Respiratory depression, hypotension; propylene glycol-related acidosis, nephrotoxicity</td>
</tr>
<tr>
<td>Diazepam</td>
<td>2–5 min</td>
<td>20–120 hr</td>
<td>Yes*</td>
<td>5–10 mg</td>
<td>0.03–0.1 mg/kg q0.5–6 hr prn</td>
<td>Respiratory depression, hypotension, phlebitis*</td>
</tr>
<tr>
<td>Propofol</td>
<td>1–2 min (Short-term use = 3–12 hr; Long-term use = 50 ± 18.6 hr)</td>
<td></td>
<td>None</td>
<td>5 µg/kg/min over 5 min*</td>
<td>5–50 µg/kg/min</td>
<td>Pain on injection*, hypotension, respiratory depression, hypertriglyceridemia, pancreatitis, allergic reactions, propofol-related infusion syndrome; deep sedation with propofol is associated with significantly longer emergence times than with light sedation</td>
</tr>
<tr>
<td>Dexametomidine</td>
<td>5–10 min</td>
<td>1.8–3.1 hr</td>
<td>None</td>
<td>1 µg/kg over 10 min*</td>
<td>0.2–0.7 µg/kg/hr*</td>
<td>Bradycardia, hypotension; hypertension with loading dose; loss of airway reflexes</td>
</tr>
</tbody>
</table>
Consciousness

Cognition
Thanks for joining us today!

WWW.mecriticalcare.net
mgjamil@hotmail.com
“a disturbance of consciousness that is accompanied by a change in cognition that cannot be better accounted for by a preexisting or evolving dementia”

– American Psychiatric Association
Actual Prevalence of Delirium

**Medical ICUs (40%-80%)**
- Riker, '09
- Girard, '08
- Pisani, '07
- Thomason, '05
- Micek, '05
- McNicoll, '05
- Ely, '04
- McNicoll, '03
- Ely, '01

**Mixed ICUs (10%-40%)**
- Guenther, '09
- Lat, '09
- Plaschke, '07
- Pandharipande, '07
- Ouimet, '07
- Skrobik, '04
- Bergeron, '01
Recognition of Delirium in the ICU

MDs recognized 28%  RNs recognized 35%

Delirium Subtypes in the ICU

Question

What outcomes are associated with delirium in adult ICU patients? (descriptive)
Delirium as a Predictor of Mortality in Mechanically Ventilated Patients in the Intensive Care Unit
Risk of Death Rises 10% per Day

1. After adjusting for covariates, each day spent in delirium was associated with **10% increased risk of death** at 6 mo (HR, 1.10; 95% CI, 1.0-1.3).

2. After adjusting for covariates, each day spent in delirium was associated with **10% increased risk of death** at 1 yr (HR, 1.10; 95% CI, 1.0-1.2).

2. Pisani M, AJRCCM 2009;180:1092-7
Relative Hazard of Death vs. Days of Delirium

$p < .001$

Shehabi Y, et al. CCM 2010; 38:2311–2318
Answer:

• Delirium is associated with:
  1. Increased mortality (A)
  2. Prolonged ICU and hospital LOS (A)
  3. Development of post-ICU cognitive impairment in adult ICU patients (B)
Detecting and Monitoring Delirium
Should ICU patients be monitored routinely for delirium with an objective bedside delirium instrument? (actionable)
We recommend routine monitoring for delirium in adult ICU patients (+1B)
Question:

Which instruments available for delirium monitoring have the strongest evidence for validity and reliability in ventilated and non-ventilated medical and surgical ICU patients? (descriptive)
Answer:

The Confusion Assessment Method for the ICU (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC) are the most valid and reliable delirium monitoring tools in adult ICU patients (A)
Delirium Assessment
CAM-ICU

Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet

1. Acute Change or Fluctuating Course of Mental Status:
   - Is there an acute change from mental status baseline? **OR**
   - Has the patient's mental status fluctuated during the past 24 hours?

   **YES**

   **NO**
   CAM-ICU negative
   NO DELIRIUM

2. Inattention:
   - "Squeeze my hand when I say the letter ‘A’."
   - Read the following sequence of letters: S A V E A H A A R T
   - ERRORS: No squeeze with ‘A’ & Squeeze on letter other than ‘A’
   - If unable to complete Letters → Pictures

   **> 2 Errors**

   **0 - 2 Errors**
   CAM-ICU negative
   NO DELIRIUM

3. Altered Level of Consciousness
   Current RASS level

   **RASS = zero**

   CAM-ICU positive
   DELIRIUM Present

4. Disorganized Thinking:
   1. Will a stone float on water?
   2. Are there fish in the sea?
   3. Does one pound weigh more than two?
   4. Can you use a hammer to pound a nail?

   Command: “Hold up this many fingers” (Hold up 2 fingers)
   “Now do the same thing with the other hand” (Do not demonstrate)
   **OR** “Add one more finger” (If patient unable to move both arms)

   **> 1 Error**

   **0 - 1 Error**
   CAM-ICU negative
   NO DELIRIUM
Delirium Assessment

Intensive Care Delirium Screening Checklist* (ICDSC)

<table>
<thead>
<tr>
<th>Level of consciousness*</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: no response</td>
<td>none</td>
</tr>
<tr>
<td>B: response to intense and repeated stimulation (loud voice and pain)</td>
<td>none</td>
</tr>
<tr>
<td>C: response to mild or moderate stimulation</td>
<td>1</td>
</tr>
<tr>
<td>D: normal wakefulness</td>
<td>0</td>
</tr>
<tr>
<td>E: exaggerated response to normal stimulation</td>
<td>1</td>
</tr>
</tbody>
</table>

**SCORING SYSTEM:**
The scale is completed based on information collected from each entire 8-hour shift or from the previous 24 hours. Obvious manifestation of an item = 1 point. No manifestation of an item or no assessment possible = 0 point. The score of each item is entered in the corresponding empty box and is 0 or 1.

1. Altered level of consciousness:
   A) No response or B) the need for vigorous stimulation in order to obtain any response signified a severe alteration in the level of consciousness precluding evaluation. If there is coma (A) or stupor (B) most of the time period then a dash (-) is entered and there is no further evaluation during that period.
   C) Drowsiness or requirement of a mild to moderate stimulation for a response implies an altered level of consciousness and scores 1 point.
   D) Wakefulness or sleeping state that could easily be aroused is considered normal and scores no point.
   E) Hypervigilance is rated as an abnormal level of consciousness and scores 1 point.

2. Inattention: Difficulty in following a conversation or instructions. Easily distracted by external stimuli. Difficulty in shifting focuses. Any of these scores 1 point.

3. Disorientation: Any obvious mistake in time, place or person scores 1 point.

4. Hallucination, delusion or psychosis: The unequivocal clinical manifestation of hallucination or of behaviour probably due to hallucination (e.g. trying to catch a non-existent object) or delusion. Gross impairment in reality testing. Any of these scores 1 point.

5. Psychomotor agitation or retardation: Hyperactivity requiring the use of additional sedative drugs or restraints in order to control potential dangerousness (e.g. pulling out iv lines, hitting staff). Hypeactivity or clinically noticeable psychomotor slowing. Any of these scores 1 point.

6. Inappropriate speech or mood: Inappropriate, disorganised or incoherent speech. Inappropriate display of emotion related to events or situation. Any of these scores 1 point.

7. Sleep/wake cycle disturbance: Sleeping less than 4 hours or waking frequently at night (do not consider wakefulness initiated by medical staff or loud environment). Sleeping during most of the day. Any of these scores 1 point.

8. Symptom fluctuation: Fluctuation of the manifestation of any item or symptom over 24 hours (e.g. from one shift to another) scores 1 point.

*Delirium present if ICDSC > 4
## Nursing Delirium Screening Scale (NuDESC)

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Rating (0, 1, or 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disorientation</td>
<td></td>
</tr>
<tr>
<td>Inappropriate behavior</td>
<td></td>
</tr>
<tr>
<td>Inappropriate communication</td>
<td></td>
</tr>
<tr>
<td>Illusions/hallucinations</td>
<td></td>
</tr>
<tr>
<td>Psychomotor retardation</td>
<td></td>
</tr>
<tr>
<td><strong>Total score</strong></td>
<td>≥2 = delirium</td>
</tr>
</tbody>
</table>

Gaudreau JD, et al. J Pain Symptom Manage;29:368-75
Question

Is implementation of routine delirium monitoring feasible in clinical practice? (descriptive)
Routine monitoring of delirium in adult ICU patients is feasible in clinical practice (B)
Delirium Risk Factors
Question

What baseline risk factors are associated with the development of delirium in the ICU? (descriptive)
Answer

• Four baseline risk factors are positively and significantly associated with the development of delirium in the ICU:
  I. preexisting dementia
  II. History of hypertension and/or alcoholism
  III. High severity of illness at admission

(B)
Question

Is coma a risk factor for the development of delirium in the ICU? (descriptive)
Answer

- Coma is an independent risk factor for the development of delirium in ICU patients. Establishing a definitive relationship between various subtypes of coma (i.e., medication-related, structural, neurological, medical) and delirium in ICU patients will require further study.
Question

Which ICU treatment-related (acquired) risk factors (i.e., opioids, benzodiazepines, propofol, and dexmedetomidine) are associated with the development of delirium in adult ICU patients? (descriptive)
Answer

- **Conflicting** data surround the relationship between opioid use and the development of delirium in adult ICU patients (B)

- Benzodiazepine use may be a risk factor for the development of delirium in adult ICU patients (B)
Benzodiazepines and Delirium

Probability of Delirium (%)

Lorazepam Dose (mg)

No Drug  0-1  1-2  2-3  3-4  4+  Log scale
0-2.7  2.7-7.4  7.4-20  20-55  55+  Original scale

Answer

- There are insufficient data to determine the relationship between propofol use and the development of delirium in adult ICU patients (C)

- In mechanically ventilated adult ICU patients at risk for developing delirium, dexmedetomidine infusions administered for sedation may be associated with a lower prevalence of delirium compared to benzodiazepine infusions administered (B)
Dexmedetomidine  Midazolam

Delirious Patients (%)

Enroll... 1 2 3 4 5 6

Study Day

Riker, et al. JAMA 2009;301:489-499

p<0.001
Dexmedetomidine vs Lorazepam

Delirious Patients (%)

Study Day

1 2 3 4 5 6


p=0.02
Dexmedetomidine vs. haloperidol in delirious, agitated, intubated patients: a randomised open-label trial
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Abstract

Introduction Agitated delirium is common in patients undergoing mechanical ventilation, and is often treated with haloperidol despite concerns about safety and efficacy. Use of conventional sedatives to control agitation can preclude extubation. Dexmedetomidine, a novel sedative and anxiolytic agent, may have particular utility in these patients. We sought to compare the efficacy of haloperidol and dexmedetomidine in facilitating extubation.

Methods We conducted a randomised, open-label, parallel-groups pilot trial in the medical and surgical intensive care unit of a university hospital. Twenty patients undergoing mechanical ventilation in whom extubation was not possible solely because of agitated delirium were randomised to receive an infusion of either haloperidol 0.5 to 2 mg/hour or dexmedetomidine 0.2 to 0.7 μg/kg/hr, with or without loading doses of 2.5 mg haloperidol or 1 μg/kg dexmedetomidine, according to clinician preference.

Results Dexmedetomidine significantly shortened median time to extubation from 42.5 (IQR 23.2 to 117.8) to 19.9 (IQR 7.3 to 24) hours ($P = 0.016$). Dexmedetomidine significantly decreased ICU length of stay, from 6.5 (IQR 4 to 9) to 1.5 (IQR 1 to 3) days ($P = 0.004$) after study drug commencement. Of patients who required ongoing propofol sedation, the proportion of time propofol was required was halved in those who received dexmedetomidine (79.5% (95% CI 61.8 to 97.2%) vs. 41.2% (95% CI 0 to 88.1%) of the time intubated; $P = 0.05$). No patients were reintubated; three receiving haloperidol could not be successfully extubated and underwent tracheostomy. One patient prematurely discontinued haloperidol due to QTc interval prolongation.

Conclusions In this preliminary pilot study, we found dexmedetomidine a promising agent for the treatment of ICU-associated delirious agitation, and we suggest this warrants further testing in a definitive double-blind multi-centre trial.

Trial registration Clinicaltrials.gov NCT00503804
Dexmedetomidine in Agitated Patients

Patients Intubated (%)

Dexmedetomidine

Haloperidol

$p = .001$

Hours

Prevention of Delirium
Question

Should a nonpharmacologic delirium protocol be used in the ICU to reduce the incidence or duration of delirium? (actionable)
Answer

We recommend performing early mobilization of adult ICU patients whenever feasible to reduce the incidence and duration of delirium (+1B)
Question

Should a pharmacologic delirium prevention protocol be used in the ICU to reduce the incidence or duration of delirium? (actionable)
Answer

We provide no recommendation for using a pharmacologic delirium prevention protocol in adult ICU patients, as no compelling data demonstrate that this reduces the incidence or duration of delirium in these patients (0, C)
Question

Should a combined nonpharmacologic and pharmacologic delirium prevention protocol be used in the ICU to reduce the incidence or duration of delirium? (actionable)
We provide no recommendation for the use of a combined nonpharmacologic and pharmacologic delirium prevention protocol in adult ICU patients, as this has not been shown to reduce the incidence of delirium in these patients (0, C)
Question

Should haloperidol or atypical antipsychotics be used prophylactically to prevent delirium in ICU patients? (actionable)
Answer

We do not suggest that either haloperidol or atypical antipsychotics be administered to prevent delirium in adult ICU patients (–2C)
Question

Should dexmedetomidine be used prophylactically to prevent delirium in ICU patients? (actionable)
Answer

We provide no recommendation for the use of dexmedetomidine to prevent delirium in adult ICU patients, as there is no evidence regarding its effectiveness in these patients (0, C)
Treatment of Delirium
Question

Does treatment with haloperidol reduce the duration of delirium in adult ICU patients? (descriptive)
Answer

There is no published evidence that treatment with haloperidol reduces the duration of delirium in adult ICU patients

(No Evidence)
Question

Does treatment with atypical antipsychotics reduce the duration of delirium in adult ICU patients? (descriptive)
Atypical antipsychotics may reduce the duration of delirium in adult ICU patients (C)
Question

Should treatment with cholinesterase inhibitors (rivastigmine) be used to reduce the duration of delirium in ICU patients? (actionable)
Answer

We do not recommend administering rivastigmine to reduce the duration of delirium in ICU patients (−1B)
Question

Should haloperidol and atypical antipsychotics be withheld in patients at high risk for torsades de pointes? (actionable)
We do not suggest using antipsychotics in patients at significant risk for torsades de pointes (i.e., patients with baseline prolongation of QT interval, patients receiving concomitant medications known to prolong the QT interval, or patients with a history of this arrhythmia) (−2C)
Question

For mechanically ventilated, adult ICU patients with delirium who require continuous IV infusions of sedative medications, is dexmedetomidine preferred over benzodiazepines to reduce the duration of delirium? (actionable)
We suggest that in adult ICU patients with delirium unrelated to alcohol or benzodiazepine withdrawal, continuous IV infusions of dexmedetomidine rather than benzodiazepine infusions be administered for sedation in order to reduce the duration of delirium in these patients (+2B)
Thanks for joining us today!

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