Non-Pharmacologic Management of Delirium: An ABCDEF Approach

Michele C. Balas PhD, RN, APRN-NP, CCRN-K, FCCM
Center of Excellence in Critical and Complex Care
The Ohio State University College of Nursing
Columbus, Ohio, USA

Disclosures:
Dr. Balas has received research funding from the Alzheimer’s Association, the Robert Wood Johnson Foundation, the UNMC College of Nursing and the John A. Hartford Foundation. She has no industry related conflicts of interest regarding the content of this presentation.

Objectives

- Identify potentially modifiable risk factors for delirium
- Explore the evidence-based ABCDEF bundle & other non-pharmacologic interventions aimed at reducing delirium & improving outcomes for patients and families experiencing an acute illness
Critically ill with sepsis
Critically ill non-sepsis
Mortality from Critical Illness is Decreasing

Adjusted Odds Ratio

Year of ICU Admission

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012

Iwashyna J Am Geriatric Soc 2012;60:1070-77

Long-term Survivors from Severe Sepsis

Number of New Survivors

Year in which patient reached survivorship

3-Year Survivors
5-Year Survivors

Wunsch JAMA 2010; 303: 849-856
Society of Critical Care Medicine, Critical Care Statistics in the United States, 2012

Annually
3.5 Million
Adults Survive a Critical Illness
40-70% Cognitively Impaired

60-80% Physically Impaired

10-30% Mental Health Impairments
Post-Intensive Care Syndrome (PICS)

- Cognitive Impairments
- Physical Impairments
- Mental Health Impairment

Family Post-Intensive Care Syndrome (PICS-F)

- Psychological Symptoms
- Quality of Life (Death)
- Managing Emotions (Grief)
- Financial Implications

Not Just the Critically Ill
Similarities to Cancer Literature

**Acute survivorship**
Time when a person is being diagnosed &/or in treatment for cancer

**Extended survivorship**
Time immediately after treatment is completed, usually measured in months

**Permanent survivorship**
A longer period of time, often meaning that the passage of time since treatment is measured in years

Low mobility is common in the hospital

ICU-Acquired Weakness & Mortality

1. Delirium = inattention
2. Develops over a short period of time, represents an acute change from baseline & fluctuates in severity
3. Additional cognitive domain involved
4. Not occurring during coma

American Psychological Association Diagnostic and Statistical Manual of Mental Disorders, 2013, 5th Ed.
Delirium is the Strongest Independent Predictor of Cognitive Impairment

Pandharipande, et al. NEJM 2013;269:1306-1316

Delirium, Why We Should Care

- Increased ICU & hospital LOS
- ↑ restraints & sedative medications
- Poor functional recovery
- New institutionalization
- Multiple complications
- Total $143 billion to $152 billion nationally
- ↑ 1-year health-care costs
Predisposing Risk Factors

- Advanced age
- Dementia or other forms of cognitive impairment
- Functional impairments
- Medical & Psychiatric comorbidities
- Drug or ETOH withdrawal
- Male
- Sensory impairment
- APO E4 polymorphism
Precipitating Risk Factors

- Acute cardiac, neurologic, pulmonary or infectious event
- Surgery
- Severity of illness
- Fluid & electrolyte imbalances
- Immobility/bed rest/restraints
- Mechanical ventilation
- Indwelling tubes/catheters
- Sleep deprivation
- Uncontrolled pain
- Medications
  - Anticholinergic agents, benzodiazepines, opioids, more than 3 medications added

Meta-analysis of Delirium Incidence and Falls

Eleven studies measured delirium incidence. Three randomized or matched trials and 5 non–randomized or matched trials demonstrated significant reductions in delirium incidence. P < .001, and heterogeneity was low at I² = 18%. Weighting was assigned according to the inverse of the variance. Odds ratios less than 1 indicate decreased delirium incidence.

Four studies examined the number of falls per patient-days. Individually, only Stenvall et al (a randomized or matched trial) demonstrated significant reduction in the number of falls. P < .001, and heterogeneity was low at I² = 0%. Weighting was assigned according to the inverse of the variance. Odds ratios less than 1 indicate decreased rate of falls.

NNT indicates the number needed to treat.

ABCDEF Bundle

- A: Assess, prevent, & manage pain
- B: Both SAT & SBT
- C: Choice of analgesia & sedation
- D: Delirium: Assess, prevent, & manage delirium
- E: Early Mobility & Exercise
- F: Family Engagement & Empowerment
ABCDEF Team Approach

A • Why
  - Incidence
  - Outcomes
• How
  - NRS, BPS, CPOT
  - Pharmacologic interventions
  - Nonpharmacologic interventions
  - Proxy responders

A Assess, prevent, & manage pain

A protocol of “No Sedation”
113 randomized

55 to intervention
Morphine PRN
Haloperidol PRN
6 hr propofol
Cont. propofol

58 to control
Morphine PRN
Cont. propofol
Ramsay 3-4
Daily interruption

Analgosedation: ICU Length of Stay

![Graph showing reduction in ICU stay with analgosedation intervention.](image)

ICU stay reduced by **9.7 days**


**Why**
- Incidence
- Outcomes

**How**
- Daily safety screen & success/failure criteria
- Importance of RT & RN coordination
- Opt out method

Both SATs & SBTs


ABC—study design

336 randomized

- 168 to intervention
- Daily SAT
- Daily SBT
- 1 year follow-up

- 168 to control
- Daily SBT
- 1 year follow-up

Coordinated SAT+SBT approach is associated with a 14% reduction in mortality at 1 year.

Patients Alive (%)

NNT to save 1 life: 7

• Why
  – Incidence
  – Outcomes

• How
  – Rounding
  – Target sedation score
  – Pharmacist driven

Choice of analgesia & sedation

Every deep sedation increases the risk of death at 6 months

Patients Alive (%)
Targeted Level of Consciousness

Choose Target Level of Consciousness
Assess Actual Level of Consciousness
Modify Treatment so Actual = Target

• Why
  – Incidence
  – Outcomes
• How
  – CAM ICU, ICDSC
  – Nonpharmacologic interventions
  – Pharmacologic interventions

Delirium is missed in 3 out of 4 cases if a screening tool is not used.

Clinical Subtypes of Delirium

- Hyperactive: 2%
- Mixed: 54%
- Hypoactive: 43%


Step 1: **Routinely administer** valid & reliable delirium screening instruments

- CAM, CAM-ICU, ICDSC, etc.
- Frequency of assessments
- Teaching strategies
- Common errors

Screening: Implementation Strategies

- UTA drama
- Case-based scenarios
  - Before and after case studies
    - Strategy increased usage of the ICDSC by 70% and accuracy of assessment by 54%
- Spot-checking
  - Systematic comparison of users with expert raters
    - Identifies areas for fine tuning education
- Get it into the water
  - Incorporate delirium into hospital nursing orientation

Step 2- Consider differential diagnosis & recognize potential for coexistence

- Pain, anxiety, dementia, depression

Step 3- Perform history & physical exam

- History-Baseline status
- Medication review
  - OTC & ETOH
- Physical exam
  - VAS, O2 sat, neuro exam, I & O
- Laboratory other diagnostic tests
  - CBC, electrolytes, renal function test, UA, LFTs, serum drug levels, ABGs, chest X-ray, EKG, cultures
  - EEG & CSF rarely helpful

Step 4- Discontinue unnecessary drugs

- Anticholinergics
- Anticonvulsants
- Antidepressants (anticholinergic only)
- Antihistamines (anticholinergic only)
- Antiparkinsonian agents
- Antipsychotics
- Barbiturates
- Benzodiazepines
- Chlora hydrate
- H2 blocking agents
- Opioid analgesics (esp. meperidine)
Step 5- Use non-pharmacologic interventions

• Recognize, remove, or reverse of the underlying cause of delirium
• Prevent/correct
  – Electrolyte disturbances  
  – Hypoxia  
  – Infections  
  – Hemodynamic instability
• Implement fall, aspiration, & safety precautions

Step 5- Use non-pharmacologic interventions

• Call bell, close proximity
• DC unnecessary
  lines/tubes/equipment
• Distraction/activity belts
• Adequate lighting/reduced noise
• Clocks/calendars/pictures
• Avoid physical restraint use
  – Restraints are indicated only if other nonrestrictive measures have failed & if behavior puts self or others at risk for harm
• Provide 1:1 care/supervision

Step 5- Use non-pharmacologic interventions

• Provide glasses, hearing aids, &/or other assistive devices
• Favor mobilization/avoid immobilization
  – Limit the use of tubes & catheters, IVs, & other devices that “tether” patient
• Assist with ADLS
• Encourage activities that limit anxiety
• Reorient
Reorienting ICU Patients
• Before-after observations in 214 ICU patients
• Interventions:
  – Night environment, music therapy, visual cues (clock)
  – Reorientation with 5 W's and 1 H
  • Who? Who are you? Who is the nurse/physician?
  • What? What happened?
  • Where? Where are you/we?
  • Why? Why did it happen?
  • How? How did it happen? And what is the illness progression?
• Result: Delirium incidence reduction
  – Pre 35% vs. post 22%

Step 5- Use non-pharmacologic interventions

Communication-Patient
• Provide a way of communicating needs
• Use reality orientation, repeat information as necessary, explain the situation, environment, & equipment
• ALL BEHAVIOR HAS MEANING!
  • Listen to & observe behavior
  • Acknowledge feelings & fears

Communication-Staff
• Walking rounds & mental status exam with off-going care provider
• Delirium screenings at least once a shift
• Conduct multidisciplinary rounds
• Provide for continuity in care
• Rapid response for challenging situations
Step 5 - Use non-pharmacologic interventions

**Communication - Family**
- Interview caregivers & family to determine patients' baseline behavior & methods to relieve anxiety & depression
- Involve & inform SO of patients change in mental status (provide emotional support)
- Encourage visits by family/friends (may be helpful to call in family 24/7)

**Nonpharmacologic sleep promotion**

**Sleep Abnormalities**
- More time in light sleep
- Less time in deep sleep
- More sleep fragmentation


There is little evidence that sedatives in the ICU restore normal sleep.
Boosting Sleep Quality

- Optimize environmental strategies
  - Day/night variation, reduce night interruptions, noise reduction
- Avoid benzodiazepines (↓ SWS & REM)
- Consider dexmedetomidine (↑ SWS)
- GABA receptor agonists (eg, zolpidem)
- Sedating antidepressants (eg, trazodone) or antipsychotics
- Melatonin
  - May improve sleep quality of ICU COPD patients

Effect of Common Sedatives & Analgesics on Sleep

There is little evidence that administration of sedatives in the ICU achieves the restorative function of normal sleep

- Benzodiazepines
  - ↑ Stage 2 NREM
  - ↓ Slow wave sleep (SWS) and REM
- Propofol
  - ↑ Total sleep time without enhancing REM
  - ↓ SWS
- Analgesics
  - Abnormal sleep architecture
- Dexmedetomidine
  - ↑ SWS

Contribution of Sedative-Hypnotic Agents to Delirium Via Modulation of the Sleep Pathway

- Differences in BOLD activities/NREM sleep (MRI)
**Why**
- Incidence
- Outcomes

**How**
- Daily safety screen & success/failure criteria
- Importance of team coordination
- PT/OT driven

---

More patients who received early PT+OT were functionally independent at hospital discharge

Schweickert, Lancet 2009; 373: 1874-82

---

**Why**
- Patient & family-centered care
- Safety

**How**
- Flexible visiting hours
- Family presence during codes
- Rounding
- Unit design

---

### ABCDEs: Processes of Care

<table>
<thead>
<tr>
<th>ABCDE</th>
<th>Process Measures</th>
<th>Pre – ABCDE</th>
<th>Post – ABCDE</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SAT performed</td>
<td>53% (Ntot = 146) 71% (Nnent = 93)</td>
<td>71% (Ntot = 150) 84% (Nnent = 94)</td>
<td>0.04</td>
</tr>
<tr>
<td>B</td>
<td>SBT performed</td>
<td>71% (Ntot = 146) 84% (Nnent = 93)</td>
<td>84% (Ntot = 150) 94% (Nnent = 94)</td>
<td>0.03</td>
</tr>
<tr>
<td>C</td>
<td>Used Benzodiazepines</td>
<td>62% (Ntot = 146) 51% (Nnent = 93)</td>
<td>51% (Ntot = 150) 68% (Nnent = 94)</td>
<td>0.06</td>
</tr>
<tr>
<td>D</td>
<td>% time CAM-ICU documented every 8 hours</td>
<td>NA (Ntot = 146) 50% (Nnent = 93)</td>
<td>50% (Ntot = 150) 68% (Nnent = 94)</td>
<td>NA</td>
</tr>
<tr>
<td>E</td>
<td>Out of bed anytime</td>
<td>48% (Ntot = 146) 68% (Nnent = 93)</td>
<td>68% (Ntot = 150) 88% (Nnent = 94)</td>
<td>0.002</td>
</tr>
</tbody>
</table>


### ABCDE Bundle: Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Before ABCDEs (n=146)</th>
<th>After ABCDEs (n=150)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilator-free days (out of 28)</td>
<td>21</td>
<td>24</td>
<td>0.04</td>
</tr>
<tr>
<td>Ever delirious</td>
<td>62%</td>
<td>49%</td>
<td>0.02</td>
</tr>
<tr>
<td>ICU days with delirium</td>
<td>50%</td>
<td>33%</td>
<td>0.003</td>
</tr>
<tr>
<td>Ever comatose</td>
<td>28%</td>
<td>28%</td>
<td>0.91</td>
</tr>
<tr>
<td>ICU days with coma</td>
<td>2</td>
<td>2</td>
<td>0.35</td>
</tr>
<tr>
<td>ICU mortality</td>
<td>16%</td>
<td>9%</td>
<td>0.07</td>
</tr>
<tr>
<td>Hospital mortality (ICU + post-ICU)</td>
<td>20%</td>
<td>11%</td>
<td>0.04</td>
</tr>
</tbody>
</table>


### ABCDEF Team Approach

- Nurse
- Physician
- Respiratory
- Pharmacist
- PT/OT
ABCDEF Road Map
(A framework for bedside rounds)

1. Where is the patient going?
   Target Pain Level
   Target Consciousness Level
   Target Mobility Level

2. Where is the patient now?
   Current Pain & Consciousness Levels
   Current Delirium Status
   Current Mobility Level

3. How did they get there?
   Drugs
   Assistance needed for Mobility

Family Engagement on Rounds

   Improved communication
   Families ↔ Clinicians

   Decreased family anxiety (vs. excluding family)

   How do we do it?
   1) Prepare family
   2) Team rounds as usual
   3) Plain language summary
   4) Q & A

   Does not take longer! (Saves time later?)

Most patients return to their primary care physicians, who frequently don’t know to probe into the nature of their ICU memories. And if no one asks, patients might go years before they admit their experience and seek help — if ever.

“Every day I wake up and I keep thinking this is the day I’m going to go back to my old life.”

Social Worker

Physician

Nurse Practitioners

Pharmacist

Psychologist

Case Manager

Vanderbilt ICU Recovery Center
Aging/Pre-operative studies indicate potential benefits for physical and cognitive function & hospital outcomes:

**Exercise**
- Strength/ Endurance/ Flexibility

**Cognitive**
- Cognitive stimulating activities/ Computer games

**Nutritional**
- Supplemental nutrition in high-risk patients

"Pre"-habilitation?

Selected Additional References

- Ely E. *JAMA*. 2001;286:2703-2710 (CAM-ICU)
- Dubois M. *Intensive Care Med*. 2001;27:1297-1294 (Risk Factors)
- Ely E. *JAMA*. 2004;291:1753-1762 (Delirium Mortality)
- Pikuri K. *Annals of Intensive Care Med*. 2009;180:1092-1097 (Delirium Mortality)
- Shintaku I. *Crit Care Med.*, 2010;38:2111-2118 (Delirium Mortality)
- Needleman D. *Arch Phys Med Rehabil*. 2010;91:536-542 (Delirium Reduction)
- Colombo R. *Minerva Anestesiol*. 2012;78:1026-1033 (Delirium Reduction)
- Bals M. *Crit Care Med*. 2011;42:1024-1036 (Delirium Reduction)
- Kinnerle R. *Crit Care Med*. 2013;41:800-809 (Delirium Reduction)