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
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Objectsives

• 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
Mortality from Critical Illness is Decreasing

Adjusted Odds Ratio

Critically ill non-sepsis

Critically ill with sepsis

Kaukonen JAMA 2014;311:1308-16
Annually 3.5 Million Adults Survive a Critical Illness

Wunsch JAMA 2010; 303: 849-856
Society of Critical Care Medicine, Critical Care Statistics in the United States, 2012
40-70% Cognitively Impaired

Jackson AJRCCM 2010; 182: 183
Girard Crit Care Med 2010; 38: 1513
Wolters Intensive Care Med 2013; 39: 376
Pandharipande, et al. NEJM 2013;269:1306-1316
60-80% Physically Impaired
10-30% Mental Health Impairments

Davydow DS *Intensive Care Med* 2009;35:796-809
Davydow DS *Psychosom Med* 2008;70:512-9
Wunch H *JAMA* 2014;311:1133-42
Post-Intensive Care Syndrome (PICS)

Cognitive Impairments

Physical Impairments

Mental Health Impairment

Needham Crit Care Med 2012; 40: 502-09
Elliott Crit Care Med 2014;42:2518-2526
Family Post-Intensive Care Syndrome (PICS-F)

Psychological Symptoms

Quality of Life (Death)

Managing Emotions (Grief)

Financial Implications

Needham *Crit Care Med* 2012; 40: 502-09
Elliott *Crit Care Med* 2014;42:2518-2526
Not Just the Critically Ill

Hazards of Hospitalization of the Elderly
Morton C. Creditor, MD

For many older persons, hospitalization results in functional decline despite cure or repair of the condition for which they were admitted. Hospitalization can result in complications unrelated to the problem that caused admission or to its specific treatment for a patient. Some of the decline can be attributed to particular complications of the disease itself or to its management. Adverse drug reactions are an example of the latter.

Post-Hospital Syndrome — An Acquired, Transient Condition of Generalized Risk
Harlan M. Krumholz, M.D.

To promote successful recovery after a hospitalization, healthcare professionals often focus on issues related to the acute illness that precipitated the hospitalization. Their disproportionate attention to the hospitalization’s cause, however, may be misdirected. Patients who were recently experienced in the hospital as they do from the lingering effects of the original acute illness. At the time of discharge, physiological systems are impaired, reserves are depleted, and the body cannot effectively defend against health threats. Nearly one fifth of Medicare (COPD), the cause of readmission is the same as that of the index admission for only 37%, 29%, and 36%, respectively. The causes of readmission, regardless of the original admitting diagnosis, commonly include heart failure, pneumonia, COPD, infection, gastrointestinal conditions, mental...
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

Mean Percent of Time

- Lying
- Sitting
- Standing/Walking

N=45

ICU-Acquired Weakness & Mortality

In-hospital Mortality (%)

<table>
<thead>
<tr>
<th>Quartiles of MRC Score</th>
<th>Weakest</th>
<th>2</th>
<th>3</th>
<th>Strongest</th>
</tr>
</thead>
<tbody>
<tr>
<td>P=0.001 N=136</td>
<td>29.4%</td>
<td>9.1%</td>
<td>4.2%</td>
<td>6.2%</td>
</tr>
</tbody>
</table>

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

P = 0.004 for 0 vs. 5 days of delirium

N = 382

RBANS Global Cognitive Score

Days of ICU Delirium

Delirium & Mortality

Survival Probability

HR, 1.10; 95% CI, 1.03–1.18; p < .001

Time to Death (Days)
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 \( I^2 = 18\% \). 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 \( I^2 = 0\% \). 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  Nurse
B  Physician
C  Respiratory
D  Pharmacist
E  PT/OT
F
• Why
  – Incidence
  – Outcomes
• How
  – NRS, BPS, CPOT
  – Pharmacologic interventions
  – Nonpharmacologic interventions
  – Proxy responders

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

Intervention (n=55)
Control (n=58)

Patients Remaining in ICU (%)

ICU stay reduced by 9.7 days


p=.03
• Why
  – Incidence
  – Outcomes

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

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.


[Graph showing survival rates and 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.

Light Sedated (RASS -2 to +1)

Deep Sedated (RASS -3 to -5)

p = 0.048
N = 251

Shehabi Y, et al. AJRCCM 2012;186:724-731
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**¹
  – Before-and-after case studies
  – Strategy increased usage of the ICDSC by 70% and accuracy of assessment by 54%

• **Spot-checking**²,³
  – 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
  – VSS, 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
- Chloral 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
Step 5- Use non-pharmacologic interventions

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)
Step 5- Use non-pharmacologic interventions

- 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
  - Pilot: 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 (fMRI)

• 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.

Proportion of patients with functional independence at hospital discharge (%)

- Usual Care (n=49)
- Early PT+OT (n=55)

Hospital Days

• 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 (N&lt;sub&gt;tot&lt;/sub&gt; = 146)</th>
<th>Post – ABCDE (N&lt;sub&gt;tot&lt;/sub&gt; = 150)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SAT performed</td>
<td>53%</td>
<td>71%</td>
<td>0.04</td>
</tr>
<tr>
<td>B</td>
<td>SBT performed</td>
<td>71%</td>
<td>84%</td>
<td>0.03</td>
</tr>
<tr>
<td>C</td>
<td>Used Benzodiazepines</td>
<td>62%</td>
<td>51%</td>
<td>0.06</td>
</tr>
<tr>
<td>D</td>
<td>% time CAM-ICU documented every 8 hours</td>
<td>NA</td>
<td>50%</td>
<td>NA</td>
</tr>
<tr>
<td>E</td>
<td>Out of bed anytime</td>
<td>48%</td>
<td>66%</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Balas MC *Crit Care Med* 2014;42:1024-36
## 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>

Balas MC *Crit Care Med* 2014;42:1024-36
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."

"Their life is terrible, and they often end up back in the hospital...We need to restructure critical care to handle the needs of ICU survivors."
“Pre”-habilitation?

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

Exercise

Strength/ Endurance/ Flexibility

O’Doherty Br J Anes 2013;110:697-84
Barnes JAMA Inter Med 2013;173:797-804

Cognitive

Cognitive stimulating activities/ Computer games

Barnes JAMA Inter Med 2013;173:797-804

Nutritional

Supplemental nutrition in high-risk patients

Gupta Anes Clinics 2016; 34; 2641-50
Undone in the ICU
Understanding the scope of the problem

READ THE ARTICLE

Illustration by Yuri Lobo
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