Delirium and ICU Liberation: Impact on Survival and Survivorship

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Disclosures: ICU Physician Vanderbilt
- Abbott, Hospira, Orion, AVID
- NIH and VA U.S. Federal Funding
- Author of PAD Guidelines of SCCM 2013 and PI of the SCCM ICU Liberation collaborative
SAG Guidelines for sustained use of sedatives and analgesics in the critically ill adult

Jacobi, CCM 2002
Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the Intensive Care Unit

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Barr J et al, CCM 2013;41:263-306
50-70% Cognitively Impaired

Wolters Intensive Care Med 2013; 39: 376
Jackson AJRCCM 2010; 182: 183
Girard Crit Care Med 2010; 38: 1513
60-80% Functionally Impaired
After 5 months I felt better and returned to work but was fired 10 weeks later... it didn't surprise me because I was struggling terribly. I couldn't organize my work; committed many errors in documentation; frequently lost things; forgot meetings, and did not manage my time well.

http://www.icudelirium.org/testimonials.html
When I returned to work, the work I did before seemed foreign and unfamiliar. I became isolated and excluded from everyone. No one wanted to be around me. My wife of more than 36 years told me that I was just “feeling sorry” for myself, and I just needed to get on with my life. I nearly ended my life a few times. Then after five years of this hell, Oct 2 2013 CBS News ran a report about people just like me. From that report I found your website. I cried for long time; it has changed my wife’s opinion about me. For the first time in the past five years, I think believe I have a future.

http://www.icudelirium.org/testimonials.html
Cognitive Impairment: Sepsis

Iwashyna T, JAMA 2010;304:1787-1794

Before Sepsis

After Sepsis

% survivors cognitively impaired

Mild Cognitive Impairment
Moderate/Severe Cog Impairment

p<0.001

Iwashyna T, JAMA 2010;304:1787-1794
Delirium as a Predictor of Mortality in Mechanically Ventilated Patients in the Intensive Care Unit
Delirium Duration & Mortality

Shehabi Y, et al. CCM 2010; 38:2311–2318
Bringing to light Risk factors And Incidence of Neuropsychological dysfunction in ICU survivors
Long-Term Cognitive Impairment after Critical Illness


ABSTRACT

BACKGROUND
Survivors of critical illness often have a prolonged and disabling form of cognitive impairment that remains inadequately characterized.

NEJM 2013;369:1306-16
Editorial by M. Herridge
The Picture of Dementia Following ICU Care

A

<table>
<thead>
<tr>
<th>RBANS Global Cognitive Score</th>
<th>&lt;65 Years</th>
<th>&gt;=65 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>MCI</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>TBI</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>AD</td>
<td>70</td>
<td>70</td>
</tr>
</tbody>
</table>

N=244  12 Months

N=227  12 Months

N=130  12 Months

N=98  12 Months
Global Cognitive Scores by Age

NEJM 2013;369:1306-16
Global Cognitive Scores by Age and Comorbidity

NEJM 2013;369:1306-16
Delirium and Executive Function

![Graph showing the relationship between adjusted Trails B T-score and duration of delirium.](NEJM 2013;369:1306-16)
Delirium and Brain Atrophy

(A) 46 year old, no delirium
(B) 42 year old, 12 days of delirium

Gunther M et al. CCM 2012;40:2022-32
Confirmed: Delirium Risk Factor for Long-Term Cognitive Problems after ICU Stay

- 1,101 survivors of critical illness, 37% with delirium
- Studied only survivors and used self report
- Multivariable analysis with adjustment for gender, admission dx, severity of illness (both APACHE IV and cumulative SOFA)
- Delirium independent predictor of mild (O.R. 2.41, C.I. 1.57-3.69) and severe (3.1, 1.1-8.74) LTCI 1 year

Wolters AE, Crit Care 2014;18:R125
# ICU DELIRIUM (S)

Mnemonic for risk factors and causes of ICU DELIRIUM (S).

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iatrogenic exposure</td>
<td>Consider any diagnostic procedure or therapeutic intervention or any harmful occurrence that was not a natural consequence of the patient’s illness</td>
</tr>
<tr>
<td>Cognitive impairment</td>
<td>Preexisting dementia, or MCI or depression</td>
</tr>
<tr>
<td>Use of restraints and catheters</td>
<td>Reevaluate the use of restraints and bladder catheters daily</td>
</tr>
<tr>
<td>Drugs</td>
<td>Evaluate the use of sedatives (e.g. benzodiazepines or opiates) and medications with anticholinergic activity. Consider the abrupt cessation of smoking or alcohol. Consider withdrawal from chronically used sedatives.</td>
</tr>
<tr>
<td>Elderly</td>
<td>Evaluate patients older than 65 years with greater attention</td>
</tr>
<tr>
<td>Laboratory abnormalities</td>
<td>Especially hyponatremia, azotemia, hyperbilirubinemia, hypocalcemia and metabolic acidosis</td>
</tr>
<tr>
<td>Infection</td>
<td>Sepsis and severe sepsis. Especially urinary, respiratory tract infections.</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Consider respiratory failure (PCO2 greater than 45 mmHg or PO2 less than 55 mmHg or oxygen saturation less than 88%). Consider causes such as COPD, ARDS, PE*</td>
</tr>
<tr>
<td>Intracranial perfusion</td>
<td>Consider presence of hypertension or hypotension. Consider hemorrhage, stroke, tumor</td>
</tr>
<tr>
<td>Urinary/faecal retention</td>
<td>Consider urinary retention or faecal impaction, especially in elderly and in postoperative patients</td>
</tr>
<tr>
<td>Myocardial</td>
<td>Consider myocardial causes: myocardial infarction, acute heart failure, arrhythmia</td>
</tr>
<tr>
<td>Sleep and Sensory deprivation</td>
<td>Consider the alterations of the sleep cycle and sleep deprivation. Consider the non availability of glasses (poor vision). Consider the non availability of hearings devices (poor hearing).</td>
</tr>
</tbody>
</table>
If delirium is not screened for using a validated delirium screening tool it is missed ~75% of time.

2013 PAD Guidelines:

“We recommend routine monitoring for delirium in adult ICU patients”

Grade 1B Recommendation

Crit Care Med. 2013;41:263-308
ICU PAD Guidelines
ABCDEF Bundle Checklist*

• A – Assess, Prevent and Manage Pain
• B – Both SATs and SBTs
• C – Choice of Sedation
• D – Delirium: Assess, Prevent and Manage
• E – Early Mobility and Exercise
• F – Family Engagement and Empowerment

*www.icudelirium.org
*www.iculiberation.org
Improving Hospital Survival and Reducing Brain Dysfunction at Seven California Community Hospitals: Implementing PAD Guidelines Via the ABCDEF Bundle in 6,064 Patients*

Mary Ann Barnes-Daly, MS, RN, CCRN, DC¹; Gary Phillips, MAS²; E. Wesley Ely, MD, MPH, FCCM³⁴

The ABCDEF Bundle: Science and Philosophy of How ICU Liberation Serves Patients and Families

E. Wesley Ely, MD, MPH, FCCM

Barnes-Daly MA, CCM Feb 2017;45:171-78
Ely EW, CCM Feb 2017;45:321-30
Survival and Brain Dysfunction Improved after Implementing PAD Guidelines via ABCDEF Bundle in >6,000 patients

NOTE: Adjusted for age, APACHE III, and mechanical ventilation
7 California Hospitals, Interprofessional QI Implementation project
Barnes-Daly MA, CCM Feb 2017;45:171-78
SCCM’s ICU Liberation Collaborative 2015-2017
Liberated...?
Liberated...
Liberated...texting while on vent
Liberated...
ventilated patient and nurse “talking”
**for Medical Professionals**

**Delirium Prevention and Safety:**

Starting with the ABCDEF's

It is essential to consider delirium management in the broader picture of ICU patient care as a major piece of the current guidelines for Pain, Agitation, and Delirium (PAD) of the Society of Critical Care Medicine (SCCM). Advancements in research and technology are resulting in higher acuity and increased complexity of care, which is resulting in drastic increases in workload and demands on staff. More than ever, there is a great need to develop simpler ways of implementing safer and better care into practice for our sickest patients.

The ABCDEF bundle is one way to align and coordinate care, which includes specific focus on delirium as a component of the overall care patients receive including sedation and pain medications, breathing machines, and mobilization.

**What are the components of the ABCDEF bundle?**
When Delirium strikes, don’t forget about Dr. DRE

**Disease remediation**
Sepsis, COPD, CHF

**Drug Removal**
SATs and stopping benzodiazepines/narcotics

**Environment**
Immobilization, sleep and day/night, hearing aids, glasses, noise
THINK

What to THINK about when delirium is present

T  Toxic Situations
    CHF, shock, dehydration
    Deliriogenic meds (Tight Titration)
    New organ failure, e.g., liver, kidney

H  Hypoxemia

I  Infection/sepsis (nosocomial), Immobilization

N  Nonpharmacological interventions
    Hearing aids, glasses, reorient, sleep protocols, music, noise
    control, ambulation

K  K+ or Electrolyte problems

* Adapted with permission from: Marta Render, MD – Veteran Affairs In-patient
   Evaluation Center (IPEC)
**I WATCH DEATH**

Differential Diagnosis of Delirium.

<table>
<thead>
<tr>
<th>Category</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection</td>
<td>HIV, sepsis, Pneumonia</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>Alcohol, barbiturate, sedative-hypnotic</td>
</tr>
<tr>
<td>Acute metabolic</td>
<td>Acidosis, alkalosis, electrolyte disturbance, hepatic failure, renal failure</td>
</tr>
<tr>
<td>Trauma</td>
<td>Closed-head injury, heat stroke, postoperative, severe burns</td>
</tr>
<tr>
<td>CNS pathology</td>
<td>Abscess, hemorrhage, hydrocephalus, subdural hematoma, Infection, seizures, stroke, tumors, metastases, vasculitis, Encephalitis, meningitis, syphilis</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>Anemia, carbon monoxide poisoning, hypotension, Pulmonary or cardiac failure</td>
</tr>
<tr>
<td>Deficiencies</td>
<td>Vitamin B12, folate, niacin, thiamine</td>
</tr>
<tr>
<td>Endocrinopathies</td>
<td>Hyper/hypoadrenocorticism, hyper/hypoglycemia, Myxedema, hyperparathyroidism</td>
</tr>
<tr>
<td>Acute vascular</td>
<td>Hypertensive encephalopathy, stroke, arrhythmia, shock</td>
</tr>
<tr>
<td>Toxins or drugs</td>
<td>Prescription drugs, illicit drugs, pesticides, solvents</td>
</tr>
<tr>
<td>Heavy Metals</td>
<td>Lead, manganese, mercury</td>
</tr>
</tbody>
</table>

Reference: http://pda.rnao.ca/content/causes-delirium
MIND-USA
Modifying the Impact of ICU-Associated Neurological Dysfunction
F = FAMILY

- Family rounding
- Family visitation
- Family importance to reducing delirium
- Good EOL planning
- Good transitions of care, IMPACT project
Excellence

Aristotle: “We are what we repeatedly do. Excellence is not an act, but a habit”

Jiro Dreams of Sushi - Tokyo
ICU Delirium & Cognitive Impairment Study Group: local members

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Jin Han  Christin Rowan  Sandra Simmons
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Chris Hughes  Brenda Pun  Cathy Fuchs
Tim Girard  Aimee Hoskins  Heidi Smith
Wes Ely  Amy Kiehl  Jennifer Thompson
Lorraine Ware  Rob Gould  Rameela Chandrasekhar
Gordon Bernard  Carrie Jones  Angie Williams
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Ted Speroff  Mayur Patel  Maddie Morrell
Mike Stein  Mariu Carlo  Kwame Frimpong
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Bill Pojedinec  Melinda Buntin  John Graves
Brennan McNeil