Delirium in the ICU

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Outline
I. Define delirium
II. Assessment
III. Management

So many terms...
- Acute confusional state
- Confusion
- Acute brain syndrome
- Altered mental status
- Toxic or metabolic encephalopathy
- Sundowning
- Delirium
Delirium Key Features (DSM-IV)

1. Disturbance of consciousness with reduced ability to focus, sustain, or shift attention.

2. A change in cognition or the development of a perceptual disturbance that is not better accounted for by pre-existing, established, or evolving dementia.

3. Develops over a short period of time and tends to fluctuate over the course of the day.

4. There is evidence from the H&P and/or labs that the disturbance is caused by a medical condition, substance intoxication, or medication side effect.

Delirium Subtypes

- Hyperactive Delirium
- Mixed Delirium
- Hypoactive Delirium
- Alert & Calm
- Combative
- Agitated
- Restless
- Lethargic
- Sedated
- Stupor

Scope of the problem

- 30% of Older adults experience delirium at some point during hospitalization.
- 10-50% of older surgical pts.
- 60-80% ICU pts.
- 10% Emergency Department pts.
- 42% Hospice pts.
- 16% Pts in Post Acute Care settings.
Impact - Acute Care Setting

- Prolonged Hospitalization
  - Prolonged ICU stay
  - Prolonged Ward Stay
  - Prolonged time on mechanical ventilation
- Delirious on Discharge
- Increased Mortality
- Increased Cost

- Important Point: Often dose dependent. The more delirium, the worse the outcome.

Impact - Post Acute Care

- Increased Institutionalization
- Increased Mortality
- Possibly Long Term Cognitive Impairment
  - Acquired Brain Dysfunction?
  - Hastens Alzheimer's Dementia?
  - Mild Cognitive Impairment
  - Is it rehab-able?
Worse long-term cognitive performance

- Duration of delirium was an independent predictor of cognitive impairment
  - An increase from 1 day of delirium to 5 days was associated with nearly a 5-point decline in cognitive battery scores
- Patient testimony
  “One quite literally loses one’s grip on what is true and what is false because the true and the false are mixed together in a mess of experience.”


...seems like I was in a huge, empty gray space, sort of like a monstrous underground parking garage with no cars, only me, floating or seeming to float, on something...

-SB
Marie’s Story

Delirium Pathophysiology

Delirium Assessment Tools

- Confusion Assessment Method (CAM)
- Delirium Rating Scale (DRS)
- Cognitive Test for Delirium (CTD)
- NEECHAM

ICU Specific Scales
- Confusion Assessment Method for the ICU (CAM-ICU)
- Intensive Care Delirium Screening Checklist (ICDSC)
How to choose?

• Elements to look for
  – Accurate
  – Reliable
  – Easy to perform & Fast
  – Easy to document
  – Easy to communicate

We Need to Use a Tool

Intensive Care Delirium Screening Checklist (ICDSC)

1. Altered level of consciousness
2. Inattention
3. Disorientation
4. Hallucinations
5. Psychomotor agitation or retardation
6. Inappropriate speech
7. Sleep/wake cycle disturbances
8. Symptom fluctuation

Score 1 point for each component present during shift

• Score of 1-3 = Subsyndromal Delirium
• Score of 4 = Delirium

Confusion Assessment Method (CAM & CAM-ICU)

Feature 1: Acute change or fluctuating course of mental status

And

Feature 2: Inattention

And

Feature 3: Altered level of consciousness

Or

Feature 4: Disorganized thinking

Ely, et. al. CCM 2001; 29:1370-1379
Ely, et. al. JAMA 2001;286:2703-2710
Pediatric CAM-ICU

Perceptions/Misconceptions about delirium monitoring

Barriers stated for not monitoring delirium in the ICU

- Not confident: 13%
- Tools too difficult: 7%
- Sedatives prevent delirium assessment: 10%
- Takes too much time: 33%
- Cannot assess if intubated: 13%
- Only nurses can do tools: 24%

Devlin J, Ann Pharmacother 2011;45:1217-29

Implementation of delirium assessment

- Introduce the definition
- If we don’t look we will miss it!
- Pair with arousal assessment
- Most components already part of neuro assessment
- Involve medical & pharmacy staff
- Have a plan for management

Specific implementation strategies

- Case-based scenarios
  - Before-and-after case studies
  - This strategy increased usage of the ICDSC by 70% and accuracy of assessment by 54%
  - [http://www.biomedcentral.com/content/supplementary/cc679_3-52.doc](http://www.biomedcentral.com/content/supplementary/cc679_3-52.doc)
- Spot-checking
  - Systematically uses expert raters
  - Identifies areas for fine tuning education
- Get it into the water
  - Incorporate delirium into hospital nursing orientation

Once assessed, what do you do?

Helpful Approach to Delirium Management

• Stop
• THINK
• Lastly Medicate

Do you need to Stop anything?

• Especially consider sedatives
• Is patient on minimal amount necessary?
  – Review medications
  – Doses adjusted for elderly, renal failure, liver failure
• Do sedatives need titrated/changed?
What to **THINK** if positive for delirium

**Toxic Situations**
- CHF, shock, dehydration
- Deliriogenic meds (tight titration)
- New organ failure (liver, kidney, etc)

**Hypoxemia**;

**Infection/sepsis (nosocomial), Immobilization**

**Nonpharmacological interventions**

**K+ or Electrolyte problems**

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**Delirium Pathophysiology**

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**Neuromuscular Dysfunction—Weakness**

- Occurs in 25-100% of ICU survivors
- Predictor of:
  - prolonged weaning from ventilator (up to 20 days!)
  - mortality
- Effects are long-lasting
- Influenced by illness, aggravated by treatment
"Look at the patient lying long in bed.
What a pathetic picture he makes.
The blood clotting in his veins,
The lime draining from his bones,
The sybala stacking up in his colon,
The flesh rotting from his seat,
The urine leaking from his distended bladder,
And the spirit evaporating from his soul."

Dr. Richard Asher, British Medical Journal, 1947

"Teach us to live that we may dread
Unnecessary time in bed.
Get people up and we may save
Our patients from an early grave"

Dr. Richard Asher, British Medical Journal, 1947

**Early Mobility in the ICU**

- Early exercise = progressive mobility
- Study design: paired SAT/SBT protocol with PT/OT from earliest days of mechanical ventilation

**Wake Up, Breathe, and Move**

Early Mobility Trial Design

- 104 sedated patients (daily interruption)
  - Early exercise & mobilization (PT & OT; intervention; n = 49)
  - PT & OT per standard (control; n = 55)
- Primary endpoint: number of patients returning to independent functional status at hospital discharge
  - Ability to perform 6 activities of daily living
  - Ability to walk independently
- Assessors blinded to treatment assignment
- Secondary endpoints
  - Duration of delirium during first 28 days of hospital stay
  - Ventilator-free days during first 28 days of hospital stay


Early Mobility Study Results

Return to independent functional status at d/c
- 59% in intervention group
- 35% in control group (p=0.02)


<table>
<thead>
<tr>
<th>Outcome</th>
<th>Intervention (n=49)</th>
<th>Control (n=50)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functionally independent at discharge</td>
<td>29 (59%)</td>
<td>19 (39%)</td>
<td>0.02</td>
</tr>
<tr>
<td>ICU delirium (days)</td>
<td>2.0 (0.0-6.0)</td>
<td>4.0 (2.0-7.0)</td>
<td>0.03</td>
</tr>
<tr>
<td>Time in ICU with delirium (%)</td>
<td>33 (0-58)</td>
<td>57 (33-68)</td>
<td>0.02</td>
</tr>
<tr>
<td>Hospital delirium (days)</td>
<td>2.0 (0.0-6.0)</td>
<td>4.0 (2.0-8.0)</td>
<td>0.02</td>
</tr>
<tr>
<td>Hospital days with delirium (%)</td>
<td>28 (26)</td>
<td>41 (17)</td>
<td>0.01</td>
</tr>
<tr>
<td>ICU-acquired paresis at discharge</td>
<td>15 (31%)</td>
<td>27 (49%)</td>
<td>0.09</td>
</tr>
<tr>
<td>Ventilator-free days</td>
<td>23.5 (7.4-25.6)</td>
<td>21.1 (0.0-23.8)</td>
<td>0.05</td>
</tr>
<tr>
<td>Length of stay in ICU (days)</td>
<td>5.9 (4.5-13.2)</td>
<td>7.3 (6.1-12.9)</td>
<td>0.08</td>
</tr>
<tr>
<td>Length of stay in hospital (days)</td>
<td>135 (8.0-23.1)</td>
<td>12.9 (9.0-19.8)</td>
<td>0.03</td>
</tr>
<tr>
<td>Hospital mortality</td>
<td>9 (18%)</td>
<td>14 (25%)</td>
<td>0.53</td>
</tr>
</tbody>
</table>

Protocol for early mobility therapy

Lasty Medicate

When to Medicate? Survey

- Delirium should always be managed with a medication? Y=85%
- Use ≥ 2 medications to treat delirium? Y=68%

Characteristics of Haloperidol Use (always or frequently)
- Oral: 23%; IV/93%
- As needed: 93%; Scheduled: 61%; Infusion: 0%
- ≤ 4 mg/d: 47%; 5-10 mg/d: 56%; 11-20 mg/d: 18%; ≥ 21 mg/d: 3%
**The MIND Study**

- Modifying the INcidence of Delirium (MIND)
- Randomized and double blind
- Multi-site - 6 centers
- 103 MV patients
- PO/IM delivery of study drug
- Doses: haloperidol = 5-20 mg; ziprasidone 40-160 mg

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**Study Results**

<table>
<thead>
<tr>
<th>Outcome*</th>
<th>Haloperidol (n=35)</th>
<th>Ziprasidone (n=32)</th>
<th>Placebo (n=36)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium/coma-free days</td>
<td>14 [6-18]</td>
<td>15 [9-18]</td>
<td>13 [2-17]</td>
<td>0.65</td>
</tr>
<tr>
<td>Ventilator-free days</td>
<td>8 [0-15]</td>
<td>12 [0-19]</td>
<td>12 [0-23]</td>
<td>0.33</td>
</tr>
<tr>
<td>Length of stay</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU</td>
<td>12 [5-16]</td>
<td>10 [4-15]</td>
<td>8 [5-13]</td>
<td>0.70</td>
</tr>
<tr>
<td>Hospital</td>
<td>14 [10-NA*]</td>
<td>14 [10-NA*]</td>
<td>16 [9-NA*]</td>
<td>0.67</td>
</tr>
<tr>
<td>Mortality, %</td>
<td>11</td>
<td>12</td>
<td>17</td>
<td>0.80</td>
</tr>
<tr>
<td>Extrapyramidal side effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily EPS score</td>
<td>0 [0-0.2]</td>
<td>0 [0-0]</td>
<td>0 [0-0]</td>
<td>0.56</td>
</tr>
<tr>
<td>Cognition at discharge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Median [interquartile range] except as noted

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**Quetiapine vs. Placebo**

- Randomized, double blind, placebo controlled
- Multi-site - 3 centers
- 36 ICU patients
- Quetiapine dose: 50-200 mg q12h
- PO delivery of study drug

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**First Resolution of Delirium**

Day During Study Drug Administration

Quetiapine added to as-needed haloperidol results in faster delirium resolution, less agitation, and a greater rate of transfer to home or rehabilitation.


**Rivastigmine: Greater mortality**

Mortality during rivastigmine administration: 22% vs 8%, p=0.07

Van Eijk, MMJ et al. Lancet 2010; 376: 1829

**Putting it Together**
The ABCDE Bundle

- **A**: Awakening and Breathing Coordination
- **B**: Choice of Sedative
- **C**: Delirium Identification and Management
- **D**: Early Mobility

We Need Coordinated Care

- Many tasks and demands on critical care staff
- Great need to align and supporting the people, processes, and technology already existing in ICUs
- ABCDE protocol is multiple components, interdependent, and designed to:
  - Improve collaboration among clinical team members
  - Standardize care processes
  - Break the cycle of oversedation and prolonged ventilation

Providing your team with a script
Brain Road Map

1. Where is the patient going? (Target RASS, SAS, etc)
2. Where is the patient now? (Current RASS/SAS + CAM-ICU/ICDSC)
3. How did they get there? Drug exposures

Brain Road Map for Rounds
(Script for Interdisciplinary Communication)

Skipping any of these steps could leave the clinical team wanting more information!

<table>
<thead>
<tr>
<th>Investigate (Ask these questions)</th>
<th>Report (only takes 10 seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where is the patient going?</td>
<td>Target level of consciousness (RASS, SAS)</td>
</tr>
<tr>
<td>Where is the patient now?</td>
<td>Actual level of consciousness (RASS, SAS)</td>
</tr>
<tr>
<td>How did they get there?</td>
<td>Delirium assessment (CAM-ICU, ICDSC)</td>
</tr>
<tr>
<td></td>
<td>Drug exposures</td>
</tr>
</tbody>
</table>

Summary

I. Define delirium
II. Assessment
III. Management