Delirium in the Pediatric Intensive Care Unit

Recognition, Prevention and Treatment

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Objectives

• Understand how delirium negatively impacts patients
• Use a validated score to diagnose delirium in the pediatric population
• Implement strategies to prevent and treat delirium
Delirium Defined

- A disturbance of attention or awareness
- Changes in cognition (not explained by other conditions)
- Develops within hours or days
- Often fluctuates during the day and is worse at night
- Probably the result of a medical condition or its treatment
In adult ICU patients...

Is *independently* predicted by:
- Age
- Dementia
- Emergency surgery or trauma
- Severity of illness
- Metabolic acidosis
- Benzodiazepines
- Coma
- Mechanical ventilation 60-80%

*Independently* predicts:
- Prolonged mechanical ventilation
- ↑ length of hospitalization
- ↑ 6-month mortality
- Long-term cognitive impairment
- ↑ medical costs
In pediatric ICU patients...

**Independently predicted by:**
- Age ≤ 2 years
- Developmental delay
- Severity of illness
  - Infectious and inflammatory disorders
- Coma status
- Mechanical ventilation
- Use of physical restraints
- Medications
  - Benzodiazepines
  - Anticholinergics
  - Vasopressors
  - Antiepileptics

**Independently predicts:**
- ↑ PICU LOS
- ↑ Hospital LOS
- ↑ duration of mechanical ventilation
- ↑ mortality
- Posttraumatic stress symptoms
- Delusional memories or disturbing hallucinations 33%
Delirium in Pediatric ICU Patients

- Overall 17-25%
  - Median duration 2 days
  - 78% develop delirium within first 3 PICU days
    - 20% in first 5 PICU days
    - 38% after day 5
  - Mechanical ventilation 53%

- 3 types
  - Hypoactive 46%
  - Mixed 45%
  - Hyperactive 8%
Screening for Delirium

The Cornell Assessment of Pediatric Delirium (CAPD)

• Done at least one time per shift
  o At end of shift
  o Takes less than 2 minutes
• CAPD score ≥ 9 is a positive screen
• Sensitivity 94%, specificity 79%
  o Without developmental delay, 92% and 87%
  o With delay, 96% and 51%

RASS Score ____ (If -4 or -5 do not proceed)

Please answer the following questions based on your interactions with the patient over the course of your shift:

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does the child make eye contact with the caregiver?</td>
<td></td>
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<td>2. Are the child’s actions purposeful?</td>
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<td>3. Is the child aware of his/her surroundings?</td>
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<tr>
<td>4. Does the child communicate needs and wants?</td>
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<tr>
<td>5. Is the child restless?</td>
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<tr>
<td>6. Is the child inconsolable?</td>
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<tr>
<td>7. Is the child underactive—very little movement while awake?</td>
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<tr>
<td>8. Does it take the child a long time to respond to interactions?</td>
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TOTAL
<table>
<thead>
<tr>
<th>Cornell Assessment of Pediatric Delirium Item</th>
<th>Diagnostic and Statistical Manual Delirium Domains</th>
<th>Selected Normal Developmental Anchor Points*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does the child make eye contact with the caregiver?</td>
<td>Consciousness</td>
<td>Age (8 wk)</td>
</tr>
<tr>
<td>2. Are the child’s actions purposeful?</td>
<td>Cognition</td>
<td>Follows moving object past midline, regards hand holding object, focused attention</td>
</tr>
<tr>
<td>3. Is the child aware of his/her surroundings?</td>
<td>Consciousness, Orientation</td>
<td>Symmetric movements, will passively grasp handed object</td>
</tr>
<tr>
<td>4. Does the child communicate needs and wants?</td>
<td>Consciousness, Psychomotor activity</td>
<td>Facial brightening or smile in response to nodding head, frown to bell, coos.</td>
</tr>
<tr>
<td>5. Is the child restless?</td>
<td>Cognition, Psychomotor activity</td>
<td>Cries when hungry or uncomfortable</td>
</tr>
<tr>
<td>6. Is the child inconsolable?</td>
<td>Orientation, Cognition, Affect/distress</td>
<td>No sustained awake alert state</td>
</tr>
<tr>
<td>7. Is the child underactive—very little movement while awake?</td>
<td>Orientation, Affect/distress</td>
<td>Not soothed by usual comforting actions, for example, rocking and singing</td>
</tr>
<tr>
<td>8. Does it take the child a long time to respond to</td>
<td>Consciousness, Psychomotor activity</td>
<td>Little if any purposive grasping, control of head and arm movements, such as pushing things that are noxious away</td>
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<td></td>
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<td>Not cooing, smiling, or focusing gaze in response to interactions</td>
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</tbody>
</table>
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AN OUNCE OF PREVENTION is Worth a Pound of Cure!

PHILIP MORRIS
are scientifically proved far less irritating to the smoker's nose and throat.

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Preventing Delirium

• Reduce medication exposure
  o Sedate as lightly as possible
    • Measure sedation levels
  o Analgesia first sedation
  o Avoid benzodiazepines and anticholinergics
  o Intermittent rather than continuous
  o Spontaneous awake trials

• Protect sleep
  o Cluster cares!
  o Minimizing overhead pages
  o Turn off TV’s, soothing music
  o Dim hallway lights and darken room
  o Earplugs and eye masks
  o Noise reduction
  o Avoid caffeine
  o Melatonin or Ambien
Treating Delirium

• Investigate for underlying illness
• Investigate for iatrogenic causes
  o Iatrogenic Withdrawal Syndrome
• Investigate for abnormal environment
• Pharmacological treatment
  o Quetiapine (Seroquel)
  o Risperidone
  o Haloperidol
Summary

• Delirium is an acute alteration in awareness, attention and cognition.
• Pediatric delirium is associated with increased morbidity and mortality.
• Pediatric delirium occurs in as many as 25% of critically ill children and in as many as 50% of mechanically ventilated children.
• The CAPD score effectively screens for delirium at any age in pediatric patients with or without developmental delay and should be performed one time per shift.
• Preventing delirium includes reducing exposure to medications, particularly benzodiazepines, and maintaining normal circadian rhythms.
• When delirium is diagnosed, caregivers should investigate for underlying illness, iatrogenic causes and environmental causes.
• Certain antipsychotic medications have been used safely to treat pediatric delirium.
References


