Assessment and Management of Delirium in Pediatric Patients

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**ASSESSMENT AND INTERVENTIONS**

### PRESENTATION

- Patient admitted to the Pediatric Intensive Care unit (PICU) or Stem Cell Transplant (SCT) service
  - RN to screen for delirium twice daily\(^1\) with Cornell Assessment of Pediatric Delirium (CAPD) Scale (see Appendix A)

- Patient admitted to the Pediatric Inpatient unit
  - RN to screen for delirium daily\(^1\) with Cornell Assessment of Pediatric Delirium (CAPD) Scale (see Appendix A)

### INTERVENTION AND FOLLOW-UP

#### Yes

- Continue routine screening
- Continue preventive measures (see Appendix B)

#### No

- Patient exhibits harm to self, behavior impeding care or extreme distress?
  - Yes
    - Obtain baseline EKG and assess QTc
    - Consider Psychiatry consult and/or Pediatric Supportive Care consult
  - No
    - Consider trial of pharmacologic therapy (see Appendix C)
      - If starting atypical antipsychotics, obtain baseline total cholesterol, triglycerides, and non-HDL
      - Consider transfer to higher level of care
      - Implement BRAIN MAPS recommendations as indicated (see Appendix B)

- Positive delirium screen (CAPD score ≥ 9)?
  - Yes
    - RN to notify PICU and primary teams and continue routine screening\(^1\)
    - PICU team to assess patient within 4 hours using BRAIN MAPS (see Appendix B)
  - No
    - RN to notify primary team and increase screening to twice daily\(^1\)
    - Primary team to assess patient within 4 hours using BRAIN MAPS (see Appendix B)

### All other pediatric inpatients

- RN to notify PICU and primary teams and continue routine screening\(^1\)
- PICU team to assess patient within 4 hours using BRAIN MAPS (see Appendix B)

- If CAPD score trending upwards from baseline and patient has received IEC therapy, consider more frequent CAPD screening (see IEC Therapy Toxicity Assessment and Management (also known as CARTOX) - Pediatric algorithm)

- RN to notify primary team and increase screening to twice daily\(^1\)

\(^1\) Perform assessment throughout the nursing shift and document results at the end of the shift

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Approved by the Executive Committee of the Medical Staff on 07/18/2023
APPENDIX A: Cornell Assessment of Pediatric Delirium (CAPD) Scale

<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>
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<td>2. Are the child’s actions purposeful?</td>
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<tr>
<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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<td>5. Is the child restless?</td>
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<td>6. Is the child inconsolable?</td>
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<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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</tbody>
</table>

**TOTAL SCORE**

Note: The CAPD scale should not be used in patients with a Richmond Agitation-Sedation Scale (RASS) ≤ -4 (see Appendix E). To assist with completing the scale in patients age ≤ 2 years, refer to the Developmental Anchor Points for Youngest Patients as found in the electronic health record.
# APPENDIX B: BRAIN MAPS — Common Causes of Delirium and Recommendations for Management

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Evaluation</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B</strong> Bring Oxygen</td>
<td>Evaluate for hypoxemia, low cardiac output, anemia</td>
<td>Improve oxygenation via O\textsubscript{2} delivery; transfuse packed red blood cells (PRBCs) for anemia</td>
</tr>
<tr>
<td><strong>R</strong> Remove/Reduce Drugs</td>
<td>Evaluate the continued need for anticholinergics and sedative medications (especially benzodiazepines)</td>
<td>Discontinue if possible</td>
</tr>
</tbody>
</table>
| **A** Atmosphere | ● Room setup  
● Restraint use  
● Caregiver presence  
● Schedule/routine  
● Use of adaptive equipment and/or communication aids (e.g., glasses and hearing aids) | ● Promote a familiar environment (toys, plants, photos)  
● Control light and noise in the patient’s room  
   ○ Lights on with window shades up during the day  
   ○ Doors and window shades closed with lights, TV and music off while asleep  
   ○ Offer noise-reducing devices such as ear plugs or headphones  
● Minimize/avoid restraint use  
● Encourage consistent and familiar caregiver presence; promote parenteral involvement  
● Encourage normal day/night routine  
● Re-orient patient to time and place |
| **I** Infection/Mobilization/Inflammation | Infectious workup | ● Treat infection and fever  
● Encourage early mobilization as appropriate  
● Consult Child Life, Physical Therapy/Occupational Therapy |
| **N** New Organ Dysfunction and Metabolic Disturbance | ● Central nervous system (CNS), cardiovascular, pulmonary, hepatic, renal, endocrine systems  
● Evaluate for hypo/hypernatremia, hypo/hyperkalemia, hypocalcemia, alkalosis/acidosis | ● Normalize electrolytes  
● See Appendix D for emergence agitation and anti-NMDA receptor encephalitis |
| **M** Awake | ● No bedtime routine  
● Sleep wake cycle disturbance | ● Establish day/night cycles  
   ○ Cluster care at night  
   ○ Sleep hygiene – schedule uninterrupted 5-6 hours of night time sleep and age appropriate daytime nap; consider use of ear plugs/muffs and eye mask as appropriate |
| **P** Pain | ● Untreated or undertreated pain  
● Over-treated (sedated) | ● Adjust analgesia regimen if appropriate  
● Daily review of need for tubes/lines |
| **S** Sedation | ● Critically evaluate all benzodiazepine use  
● Set sedation target | ● Consider weaning or discontinuing benzodiazepines  
● Consider adding dexmedetomidine in patients with appropriate hemodynamics |

*“Clinical Team to Bedside to Assess Patient: BRAIN MAPS,” by The Children’s Hospital of Philadelphia’s CICU/PCU/PICU Delirium Clinical Pathway, n.d. Copyright 2019 by Children’s Hospital of Philadelphia*
## APPENDIX C: Pharmacologic Therapies

<table>
<thead>
<tr>
<th>Medication</th>
<th>Starting Dosing</th>
<th>Maximum Daily Dose</th>
<th>Adverse Effects</th>
<th>Monitoring</th>
</tr>
</thead>
</table>
| Haloperidol | Loading dose: 0.15 to 0.25 mg IV slowly over 30 to 45 minutes  
Maintenance dose: 0.015 to 0.025 mg/kg/dose IV every 6 hours | 0.45 mg/kg/day | • Altered cardiac conduction  
• Anticholinergic effects (dry mouth, blurred vision, constipation, urinary retention)  
• Blood dyscrasias  
• Extrapyramidal symptoms  
• Neuroleptic malignant syndrome  
• Central nervous system (CNS) depression  
• Orthostatic hypotension  
• Falls | • EKG at baseline and then periodically  
• CBC with differential  
• Vital signs  
• Mental status  
• Involuntary movements and extrapyramidal symptoms |
| Olanzapine | Age < 3 years: 0.625 mg PO daily at bedtime  
Age ≥ 3 years: 1.25 mg to 5 mg PO daily at bedtime | 10 mg/day | • Altered cardiac conduction  
• Blood dyscrasias  
• Extrapyramidal symptoms  
• Neuroleptic malignant syndrome  
• CNS depression  
• Orthostatic hypotension  
• Falls | |
| Quetiapine | 0.5 mg/kg/dose (maximum 25 mg/dose) PO every 8 hours | 500 mg/day | • Altered cardiac conduction  
• Blood dyscrasias  
• Extrapyramidal symptoms  
• Neuroleptic malignant syndrome  
• CNS depression  
• Orthostatic hypotension  
• Falls | |
| Risperidone | Age < 5 years old:  
0.1 to 0.2 mg PO daily at bedtime  
Age ≥ 5 years old:  
0.2 to 0.5 mg PO daily at bedtime | Weight ≤ 20 kg: 1 mg/day  
Weight 20 to 45 kg: 2.5 mg/day  
Weight > 45 kg: 3 mg/day | • Altered cardiac conduction  
• Blood dyscrasias  
• Extrapyramidal symptoms  
• Neuroleptic malignant syndrome  
• CNS depression  
• Orthostatic hypotension  
• Falls | |
| Aripiprazole | Weight < 25 kg: 1 mg PO daily  
Weight ≥ 25 kg: 2 mg PO daily | 15 mg/day | • Altered cardiac conduction  
• Blood dyscrasias  
• Extrapyramidal symptoms  
• Neuroleptic malignant syndrome  
• CNS depression  
• Orthostatic hypotension  
• Falls | |

1 Consider consulting Psychiatry and/or Pediatric Supportive Care when prescribing these medications  
2 Gradual tapering of antipsychotics, if indicated, is recommended to prevent withdrawal symptoms and minimize the risk for relapse

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APPENDIX D: Additional Differential Diagnostic Considerations

<table>
<thead>
<tr>
<th>The diagnosis of delirium may require additional considerations including:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emergence Agitation</strong></td>
</tr>
<tr>
<td>This is a phenomenon noted in patients who are recovering from anesthesia. This impacts many children after surgery and also occurs in children recovering from anesthesia for non-painful procedures (e.g., MRI). Emergence agitation generally resolves once the anesthetic wears off.</td>
</tr>
<tr>
<td><strong>Anti-NMDA Receptor Encephalitis Associated Delirium</strong></td>
</tr>
<tr>
<td>Anti-NMDA receptor encephalitis is a rare cause of delirium and acute agitation in pediatrics. Diagnosis is made in conjunction with Neurology, Psychiatry and Oncology subspecialists based off of CSF studies. Delirium associated with anti-NMDA receptor encephalitis is treated best in consultation with Psychiatry. Treatment of underlying disorder is required; treatment of delirium has been described utilizing benzodiazepines, clonidine and olanzapine (limited evidence from case report).</td>
</tr>
<tr>
<td><strong>Non-delirious Disorganized Behavior</strong></td>
</tr>
<tr>
<td>Disorganized behavior may manifest in some patients (especially young) in which the diagnosis of delirium is difficult to make. These patients may be delirious. If patient safety and/or dislodgement of high-risk medical devices is of concern, these patients may be treated with a trial of pharmacological therapy after the risks and benefits of these treatments have been discussed with parents/caregivers. Consult Psychiatry and/or Pediatric Supportive Care</td>
</tr>
</tbody>
</table>


APPENDIX E: Richmond Agitation Sedation Scale (RASS)

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
</tr>
<tr>
<td>+3</td>
<td>Very agitated</td>
</tr>
<tr>
<td>+2</td>
<td>Agitated</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
</tr>
<tr>
<td>-2</td>
<td>Light sedation</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
</tr>
<tr>
<td>-4</td>
<td>Deep sedation</td>
</tr>
<tr>
<td>-5</td>
<td>Unarousable</td>
</tr>
</tbody>
</table>

+4: Overly combative, violent, immediate danger to staff
+3: Pulls or removes tube(s) or catheter(s); aggressive
+2: Frequent, non-purposeful movement, fights ventilator
+1: Anxious, but movements not aggressive or vigorous
0: Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice (greater than or equal to 10 seconds)
-1: Briefly awakens with eye contact to voice (less than 10 seconds)
-2: Movement or eye openings to voice (but no eye contact)
-3: No response to voice, but movement or eye opening to physical stimulation
-5: Unarousable
SUGGESTED READINGS


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This practice consensus statement is based on majority opinion of the Pediatric Delirium workgroup at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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