

PICU Delirium Pathway

Delirium Definition: Delirium is a disturbance of both consciousness and cognition with the cardinal features of acute change in mental status and inattention.

Clinical Application: Delirium is a diagnosis that is caused by an underlying pathophysiological abnormality leading to an imbalance in neurotransmitters in the brain. The underlying cause must be addressed before the delirium will resolve.

ALL PICU Patients:
- Initiate preventative measures upon admission (1)

Screen twice daily for delirium using Cornell Assessment of Pediatric Delirium (CAPD) scale (2)

POSITIVE screen (CAPD > or = 9)
RN to notify ICU provider

NEGATIVE screen (CAPD < 9)
Continue routine screening with CAPD twice daily & continue preventative measures

PICU clinical team to assess patient within 2-4 hours of positive screen.

Evaluate patient using **BRAIN MAPS (3)** and nursing should chart a baseline WAT score

Delirium NOT diagnosed:

"If CAPD > or = 9" provider determines to the best of their ability the patient does not have delirium or has modifiable risk factors (e.g. agitation related to untreated pain):

- Continue CAPD screening twice daily
- BRAIN MAPS can help determine other factors to modify
- Continue to trend scores over time. If increasing or not improving, reconsider diagnosis

If Delirium is diagnosed: Begin 3 prong treatment approach

Use **BRAIN MAPS** to guide:

- Address Underlying Disease
- Minimize Iatrogenic Factors
- Optimize Environment

Medical evaluation (REQUIRED before starting medication)

- * EKG before starting first dose of medication
- * Family/patient history of long QT, SIDS, unexplained seizures, ICDs, syncope
- * Provider to review other QTc prolonging medications

CONSIDER before medications:

- Chem 8
- TSH
- Triglycerides
- Potassium
- Urine tox screen
- Ionized calcium
- CBC
- CK
- LFT's
- EEG, CT/MRI
- Magnesium
- Psych Consult

Consider trial of *pharmacological therapy* for: (4)
- Patients at risk for self harm/device dislodgement
- Those whose CAPD scores do not improve with preventative measures

- Assess for resolution and continue preventative measures
- Continue CAPD screening twice daily while in PICU
- If pharmacological therapy initiated, evaluate ability to discontinue within 5-7 days

1) Preventive Measures

Many of the contributing factors to delirium can be managed or improved by prevention and treatment strategies. These strategies are often nursing driven and may include:

- Establish daily routines and schedules
 - Cluster care at night (consider “hands off” time or “every other off monitor” when appropriate)
 - Curtains open/lights on during daylight hours
 - Sleep hygiene- uninterrupted 5-6 hours of night time sleep + age appropriate daytime nap
 - Lights, TV and music should be off while asleep
 - Control light and noise in the patient room
- Re-orient patient to time and place
- Promote a familiar environment (toys, blankets, photos)
 - Identify consistent caregivers — promote parental involvement
 - Use adaptive equipment and/or communication aids (e.g. glasses/hearing aids)
- Minimize/avoid use of restraints
- Daily review of need for tubes/lines
- Encourage early mobilization as appropriate
- Consult child life, PT/OT/Speech therapy
- Encourage holding by family when appropriate (includes intubated patients)
- Minimize benzodiazepine use

2) Screen Twice Daily with Cornell Assessment of Pediatric Delirium (CAPD) Scale

This pathway should guide the care of ALL PICU patients.

**Initiate delirium preventive measures for all PICU patients regardless of screening result.*

Screening: The CAPD Scale

- Patients should then be **screened twice daily** at 0600 and 1800 with the CAPD scale. SBS, pain scores, and RASS scores should be documented concurrently.
- Exceptions to screening: patients under neuromuscular blockade and patients with a documented SBS score of -3 or with a RASS score of -4 or -5.

This is an observational tool.

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:						
	Never	Rarely	Sometimes	Often	Always	Score
	4	3	2	1	0	
1. Does the child make eye contact with the caregiver?						
2. Are the child's actions purposeful?						
3. Is the child aware of his/her surroundings?						
4. Does the child communicate needs and wants?						
	Never	Rarely	Sometimes	Often	Always	
	0	1	2	3	4	
5. Is the child restless?						
6. Is the child inconsolable?						
7. Is the child underactive – very little movement while awake?						
8. Does it take the child a long time to respond to interactions?						
TOTAL						

Developmental Anchor Points For Youngest Patients

	NB	4 weeks	6 weeks	8 weeks	28 weeks	1 year	2 years
1. Does the child make eye contact with the caregiver?	Fixates on face	Holds gaze briefly Follows 90 degrees	Holds gaze	Follows moving object/caregiver past midline, regards examiner's hand holding object, focused attention	Holds gaze. Prefers primary parent. Looks at speaker	Holds gaze. Prefers primary parent. Looks at speaker	Holds gaze. Prefers primary parent. Looks at speaker
2. Are the child's actions purposeful?	Moves head to side, dominated by primitive reflexes	Reaches (with some discoordination)	Reaches	Symmetric movements, will passively grasp handed object	Reaches with coordinated smooth movement	Reaches and manipulates objects, tries to change position, if mobile may try to get up	Reaches and manipulates objects, tries to change position, if mobile may try to get up and walk
3. Is the child aware of his/her surroundings?	Calm awake time	Awake alert time Turns to primary caretaker's voice May turn to smell of primary care taker	Increasing awake alert time Turns to primary caretaker's voice May turn to smell of primary care taker	Facial brightening or smile in response to nodding head, frown to bell, coos	Strongly prefers mother, then other familiars. Differentiates between novel and familiar objects	Prefers primary parent, then other familiars, upset when separated from preferred care takers. Comforted by familiar objects especially favorite blanket or stuffed animal	Prefers primary parent, then other familiars, upset when separated from preferred care takers. Comforted by familiar objects especially favorite blanket or stuffed animal
4. Does the child communicate needs and wants?	Cries when hungry or uncomfortable	Cries when hungry or uncomfortable	Cries when hungry or uncomfortable	Cries when hungry or uncomfortable	Vocalizes /indicates about needs, eg. hunger, discomfort, curiosity in objects, or surroundings	Uses single words, or signs	3-4 word sentences, or signs. May indicate toilet needs, calls self or me
5. Is the child restless?	No sustained awake alert state	No sustained calm state	No sustained calm state	No sustained calm state	No sustained calm state	No sustained calm state	No sustained calm state
6. Is the child inconsolable?	Not soothed by parental rocking, singing, feeding, comforting actions	Not soothed by parental rocking, singing, feeding, comforting actions	Not soothed by parental rocking, singing, feeding, comforting actions	Not soothed by parental rocking, singing, feeding, comforting actions	Not soothed by usual methods eg. singing, holding, talking	Not soothed by usual methods eg. singing, holding, talking, reading	Not soothed by usual methods eg. singing, holding, talking, reading (May tantrum, but can organize)
7. Is the child underactive—very little movement while awake?	Little if any flexed and then relaxed state with primitive reflexes (Child should be sleeping comfortably most of the time)	Little if any reaching, kicking, grasping (still may be somewhat disordinated)	Little if any reaching, kicking, grasping (may begin to be more coordinated)	Little if any purposive grasping, control of head and arm movements, such as pushing things that are noxious away	Little if any reaching, grasping, moving around in bed, pushing things away	Little if any play, efforts to sit up, pull up, and if mobile crawl or walk around	Little if any more elaborate play, efforts to sit up and move around, and if able to stand, walk, or jump
8. Does it take the child a long time to respond to interactions?	Not making sounds or reflexes active as expected (grasp, suck, moro)	Not making sounds or reflexes active as expected (grasp, suck, moro)	Not kicking or crying with noxious stimuli	Not cooing, smiling, or focusing gaze in response to interactions	Not babbling or smiling/laughing in social interactions (or even actively rejecting an interaction)	Not following simple directions. If verbal, not engaging in simple dialogue with words or jargon	Not following 1-2 step simple commands. If verbal, not engaging in more complex dialogue

3) Clinical Team to Bedside to Assess Patient: BRAIN MAPS

Clinical Team Review of Positive Screen

Within 2-4 hours of a positive screen, the provider must assess the potential causes and complete a full history and medical evaluation of the patient at the bedside. All patients under consideration for pharmacological therapy should have a baseline EKG completed, patient/family history of long QT, and consideration of labs.

******Nursing staff is encouraged to look at BRAIN MAPS tool for potential causes of delirium prior to provider arrival at bedside***

Neurological Exam:

- Neuro Diagnostic Evaluation: If indicated by physical and neurologic exam, consider EEG, brain MRI or head CT although brain imaging will likely not be necessary for most patients.

Labs to consider:

- Chem 8, Potassium, LFT's, CBC with diff, TSH, CPK, Magnesium, triglycerides, urine tox screen, and ionized calcium

BRAIN MAPS: Common Causes of Delirium

There are several common causes of delirium. After completing the history and medical assessment, the clinical team should consider the following causes and recommendations using the BRAIN MAPS acronym on the next page:

BRAIN MAPS

Assessment

Evaluation

Recommendations

B -- Bring Oxygen

- Evaluate for:
 - Hypoxemia
 - Low cardiac output
 - Anemia

- Improve oxygenation via:
 - O₂ delivery
 - Resolution of anemia (PRBCs)

R -- Remove/Reduce Drugs

- Evaluate for use of Anticholinergics and sedative medications

- Discontinue if possible

A --- Atmosphere

- Room setup — lights, noise levels
- Restraint use
- Caregiver presence
- Schedule/routine
- Use of adaptive equipment and/or communication aids (e.g. glasses/hearing aids)

- Encourage normal day/night routine
- Encourage consistent and familiar caregiver presence

I --- Infection/Inflammation

- Infectious workup

- Treat infection and fever

N --- New organ dysfunction

- Consider all system: CNS, CV, pulmonary, hepatic, renal, endocrine
- Evaluate with CMP and ABG for:
 - Hypo/hyponatremia
 - Hypo/hyperkalemia
 - Hypocalcemia
 - Alkalosis/acidosis

- Normalize electrolytes
- See information below on Emergence Agitation and NMDA Encephalitis

and

M --- Metabolic disturbance

- No bedtime routine
- Sleep wake cycle disturbance

- Establish day/night cycles
- Consider “hands off” vitals overnight if appropriate

A --- Awake

P --- Pain

- Untreated or undertreated pain
- Over-treated (sedated)

- Adjust analgesia regimen

S --- Sedation

- Evaluate all benzodiazepine use
- Set sedation target
- PICU sedation protocol

- Weaning or D/C benzos
- Consider adding Dexmedetomidine
- Assess for withdrawal

4) Trial of Pharmacological Therapy

Psychotropic medications can be useful to treat symptoms of delirium in select patients. These medications **may treat the symptoms of delirium and improve behaviors but will not resolve the underlying cause (e.g. infection, stroke)**. Symptoms generally resolve as the underlying disease improves.

Trial of Pharmacological Therapy

When indicated, a trial of pharmacological therapy should only be initiated after:

- The patient has been assessed
- Any modifiable risk factors have been addressed

Prior to initiation of antipsychotic medications below, **REQUIRED** to obtain:

- Baseline electrocardiogram (EKG)
 - QTc upper limit for males is 460 and females is 470. Use provider discretion whether medications are safe to initiate based on patients QTc.
- Provider to obtain family/patient history of long QT, SIDS, unexplained seizures, ICDs, syncope
- Provider to review other QTc prolonging medications and discontinue any that are not needed. A list of QT prolonging medications can be found at crediblemeds.org

Consider the following labs before initiating meds: (as well as CT/MRI/EEG/psych consult)

- Chem 8
- LFT's
- CBC
- Magnesium
- EEG
- urine tox screen
- Potassium
- Triglycerides
- TSH
- CK
- ionized calcium

Dosing recommendations:

**Delirium
(able to tolerate
enteral)**

**Delirium with
imminent risk
of harm
(no enteral
access)**

Medication	Route	Initial Dosing	Comments
<u>Quetiapine</u> (Seroquel®)	PO (tablet that can also be given Sublingual)	Children : 12.5-25mg nightly, can titrate to BID OR 1.5mg/kg/day divided q8h (0.5 mg/kg/dose) Neonates: 0.5mg/kg/day in divided doses	* FIRST LINE ORAL MED
<u>Risperidone</u> (Risperdal®)	PO (ODT, oral solution)	<5 yrs: 0.1-0.2mg nightly >5 yrs: 0.2-0.5mg nightly, may titrate up to BID	<u>Preferred for:</u> - Autism spectrum disorder - Patients < 7kg
<u>Haloperidol</u> (Haldol®)	IV IM	Loading dose: 0.15-0.25mg infused slowly over 30-45 min q8h Maintenance dosing: 0.05mg- 0.5mg/kg/day in divided doses 0.05mg-0.5mg/kg *May repeat q1h up to MAX of 5mg/day	***REQUIRES TELEMETRY for 24 hours following final dose * First line - acute agitation (IM if no IV access) Convert to enteral agent as soon as possible due to increased risk of QTc prolongation with this medication

WEANING MEDICATIONS

- Providers should consider weaning medications within 5-7 days of initiation
- When able; consider reducing dose by 50% with 5-7 days in between weaning. Trend CAPD scores following wean as patient may require smaller weans.
- Goal to wean Seroquel to 12.5 mg/day, Risperidone to 1 mg/day, and Haldol to 2 mg/day prior to discontinuation.

References

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Last updated: 11/2/2019