Delirium in the PICU

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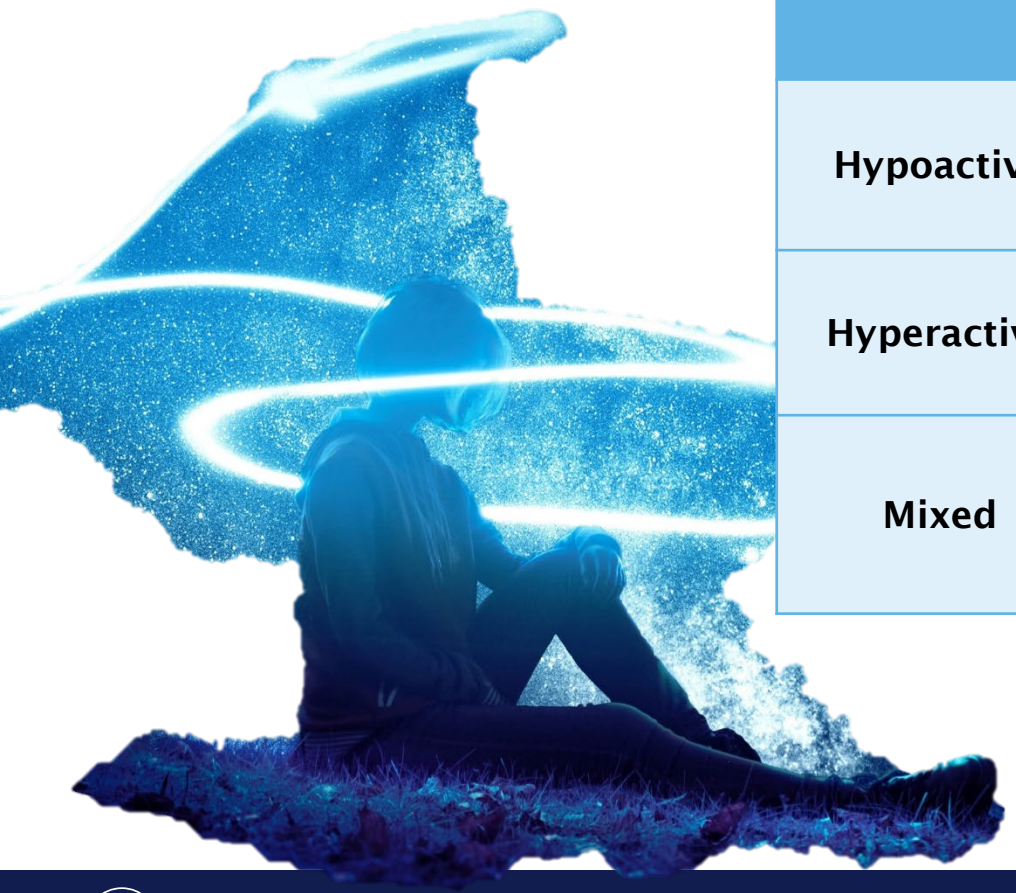
Morning round

Disturbance of awareness

Photo by Илья Мельниченко on Unsplash

Types of delirium



	Clinical Manifestations	Risk for Self-Harm	Immediate Recommendations
Hypoactive	Non-interactive Sleepy Comatose	Low	Identify cause and treat Continue prevention measures
Hyperactive	Agitated Excitable	May be a risk to self	Identify cause and treat Continue prevention measures Consider trial of Pharmacological Therapy
Mixed	A state in which the patient alternates between hypo- and hyperactive delirium.		

Cerebral Insufficiency

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Do children more commonly have delirium than adults?

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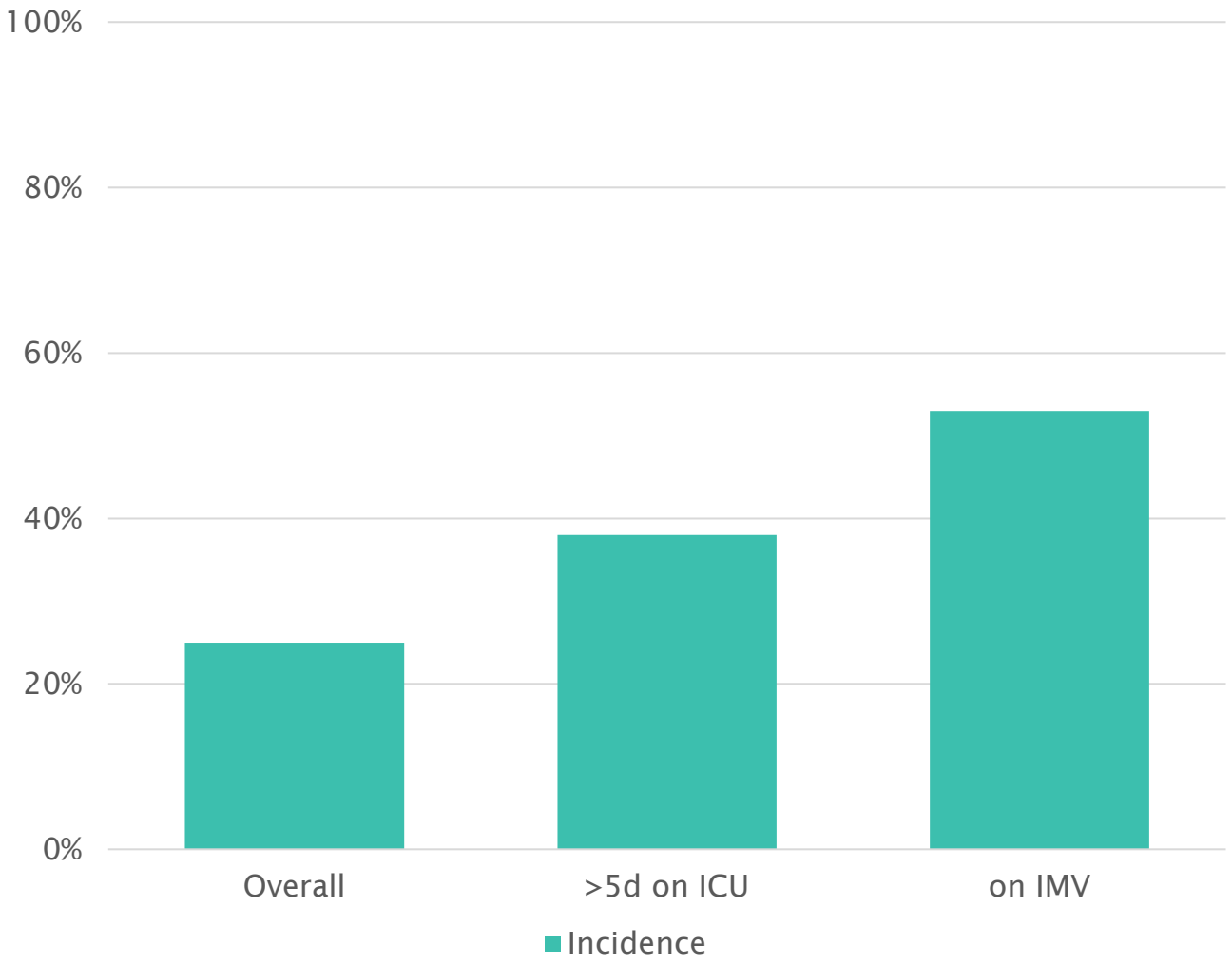
Audience Question 1

- Do children more commonly have delirium than adults?
  - YES / NO / It depends / Don‘t know

Incidence



1 in 4

Cornell Assessment of Pediatric Delirium Scale CAPD

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 4	Rarely 3	Sometimes 2	Often 1	Always 0	Score
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 0	Rarely 1	Sometimes 2	Often 3	Always 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	

≥ 9

Traube et al. Critical Care Med 2014

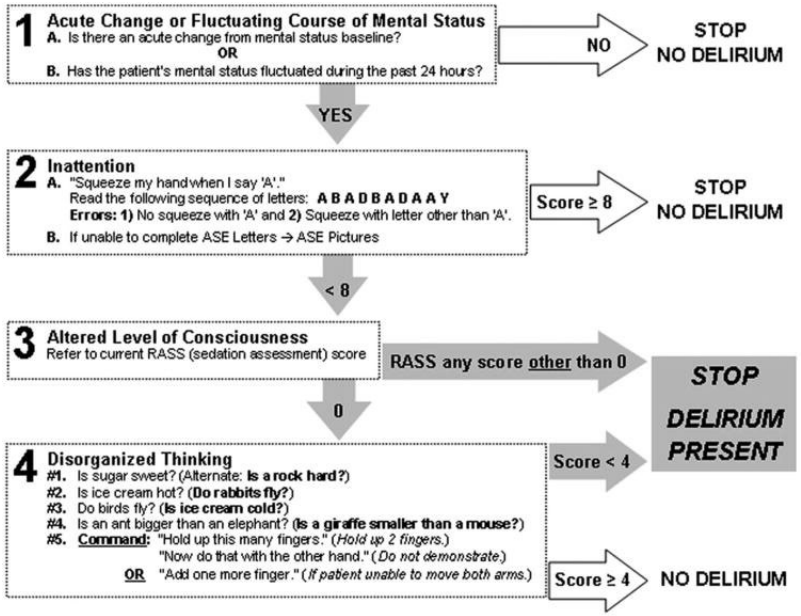
Tricky

- Adding fluctuation of RASS-score may help in developmentally delayed pediatric patients

Savneet et al. PCCM 2020

- psCAM-ICU and pCAM-ICU both provide valuable, objective assessments of delirium in critically ill children

Smith et al. ICM 2016



Anchor points

	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, e.g., hunger, discomfort, curiosity in objects, or surroundings	Uses single words or signs	3 to 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 awake alert 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, comforting actions	Not soothed by usual methods, e.g., singing, holding, talking	Not soothed by usual methods, e.g., singing, holding, talking, reading	Not soothed by usual methods, e.g., 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 discoordinated)	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

Traube et al. Critical Care Med 2014

Anchor points II

Newborn		1 year old
Fixates on face	**Eye contact**	Holds gaze. Prefers primary parent. Looks at speaker
Moves head to side, dominated by primitive reflexes	**Purposeful actions**	Reaches and manipulates objects, tries to change position, if mobile may try to get up
Calm, awake time	**Awareness**	Prefers primary parent, then other familiars, upset when separated from preferred care takers. Comforted by familiar objects (blanket, toys)
Cries when hungry or uncomfortable	**Communicate needs and wants**	Uses single words, or sings
No sustained awake alert state	**Restless**	No sustained calm state
Not soothed by parental rocking singing feeding, comforting actions	**Inconsolable**	Not soothed by usual methods (singing, holding, talking, reading)
Little if any flexed and then relaxed state with primitive reflexes	**Underactive**	Little if any play, efforts to sit up, pull up, and if mobile crawl or walk around
Not making sounds or reflexes active as expected (grasp, suck, Moro)	**Slow to respond**	Not following simple directions. If verbal not engaging in simple dialogue with words or jargon

Traube et al. Critical Care Med 2014

Risk factors in children

Predisposing Factors	Nonmodifiable	Modifiable
Young Age (<2a)	Mechanical Ventilation	Depth of sedation
Developmental delay		Benzodiazepines
Poor nutrition		Restraints
Cyanotic congenital heart disease		RBC transfusion
		PICU environment

Fuhrman & Zimmerman

Why does it matter?

- Delayed extubation
- Increased length of stay (PICU & hospital)
- Excess mortality

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Can we do anything to reduce delirium in children?

ⓘ Start presenting to display the poll results on this slide.

Audience Question 2

- Can we do anything to reduce delirium in children?
  - YES / NO / Don‘t know

What to do about it?

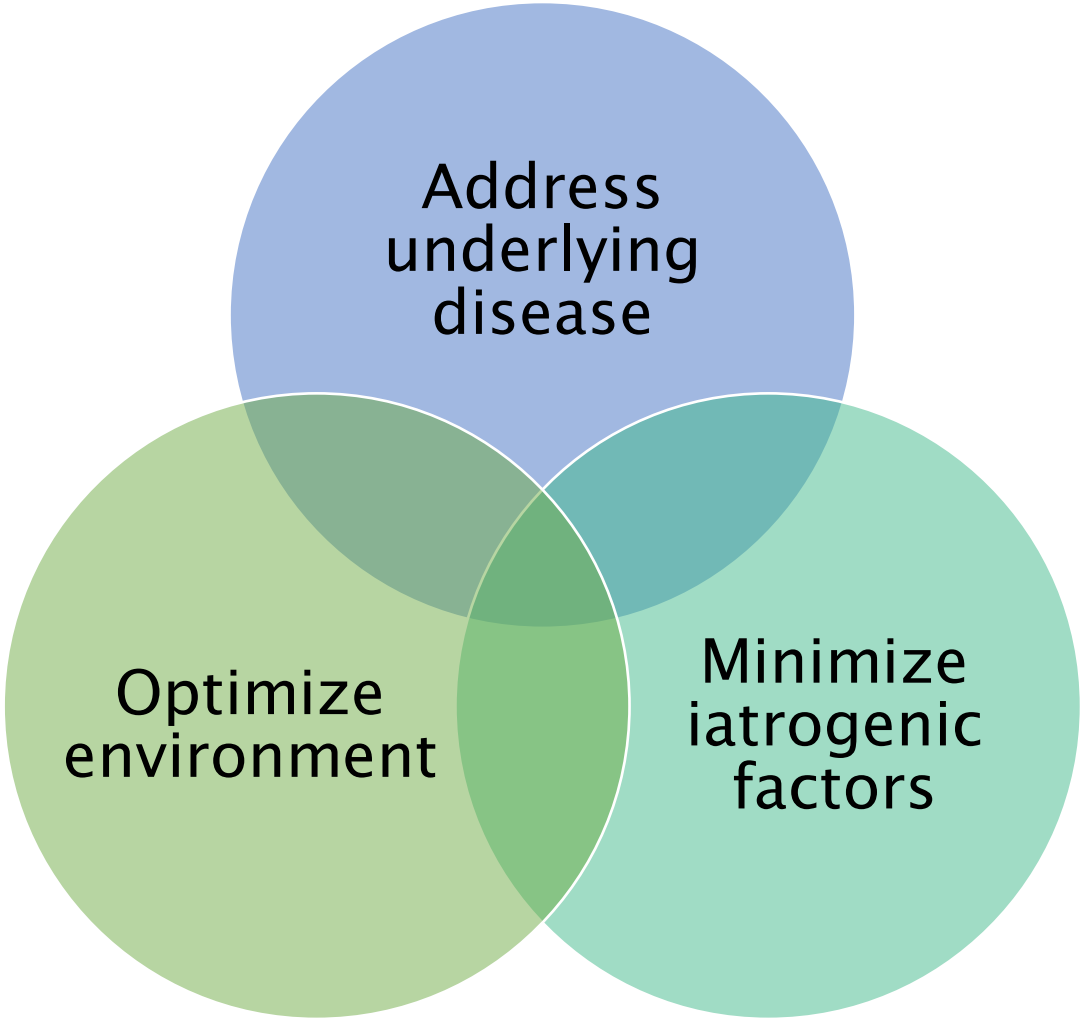
Preventive Measures

- Establish daily routines and schedules
- Re-orient patient to time and place
- Promote a familiar environment
- Minimize/avoid use of restraints
- Daily review of need for tubes/lines
- Encourage early mobilization as appropriate
- Consult PT/OT

Smith HA et al. Pediatric Delirium - Monitoring and Management in the Pediatric Intensive Care Unit. *Pediatr Clin North Am.* 2013; 60(3): 741-760.

Photo by kids&me Germany on Unsplash

Treatment


Address underlying disease
Optimize environment
Minimize iatrogenic factors

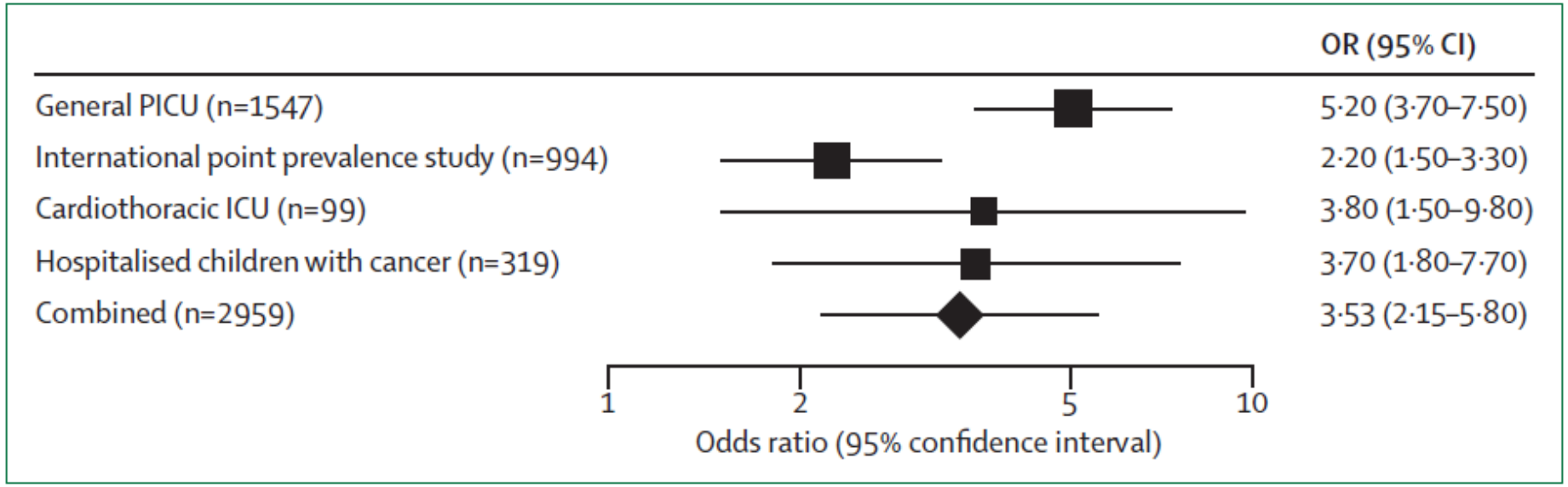
BRAIN MAPS

	Assessment	Evaluation
B	**Bring Oxygen**	Evaluate for hypoxemia, low cardiac output, anemia
R	**Remove/Reduce Drugs**	Evaluate for use of Anticholinergics and sedative medications
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)
I	**Infection/Mobilization/ Inflammation**	Infectious workup
N M	**New organ dysfunction** and **Metabolic disturbance**	❖ Consider all system: CNS, CV, pulmonary, hepatic, renal, endocrine ❖ Evaluate for: Hypo/hypernatremia, Hypo/hyperkalemia, Hypocalcemia, Alkalosis/acidosis
A	**Awake**	❖ No bedtime routine ❖ Sleep wake cycle disturbance
P	**Pain**	❖ Untreated or undertreated pain ❖ Over-treated (sedated)
S	**Sedation**	❖ Critically evaluate all benzodiazepine use ❖ Set sedation target

BRAIN MAPS

	Assessment	Evaluation	Recommendations
B	**Bring Oxygen**	Evaluate for hypoxemia, low cardiac output, anemia	❖ Improve oxygenation via: O_2 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/Mobilization/ Inflammation**	Infectious workup	❖ Treat infection and fever
N **M**	**New organ dysfunction** and **Metabolic disturbance**	❖ Consider all system: CNS, CV, pulmonary, hepatic, renal, endocrine ❖ Evaluate for: Hypo/hypernatremia, Hypo/hyperkalemia, Hypocalcemia, Alkalosis/acidosis	❖ Normalize electrolytes ❖ See information below on Emergence Agitation and NMDA Encephalitis
A	**Awake**	❖ No bedtime routine ❖ Sleep wake cycle disturbance	❖ Establish day/night cycles
P	**Pain**	❖ Untreated or undertreated pain ❖ Over-treated (sedated)	❖ Adjust analgesia regimen if appropriate
S	**Sedation**	❖ Critically evaluate all benzodiazepine use ❖ Set sedation target	❖ Consider discontinuing benzodiazepines ❖ Consider Dexmedetomidine

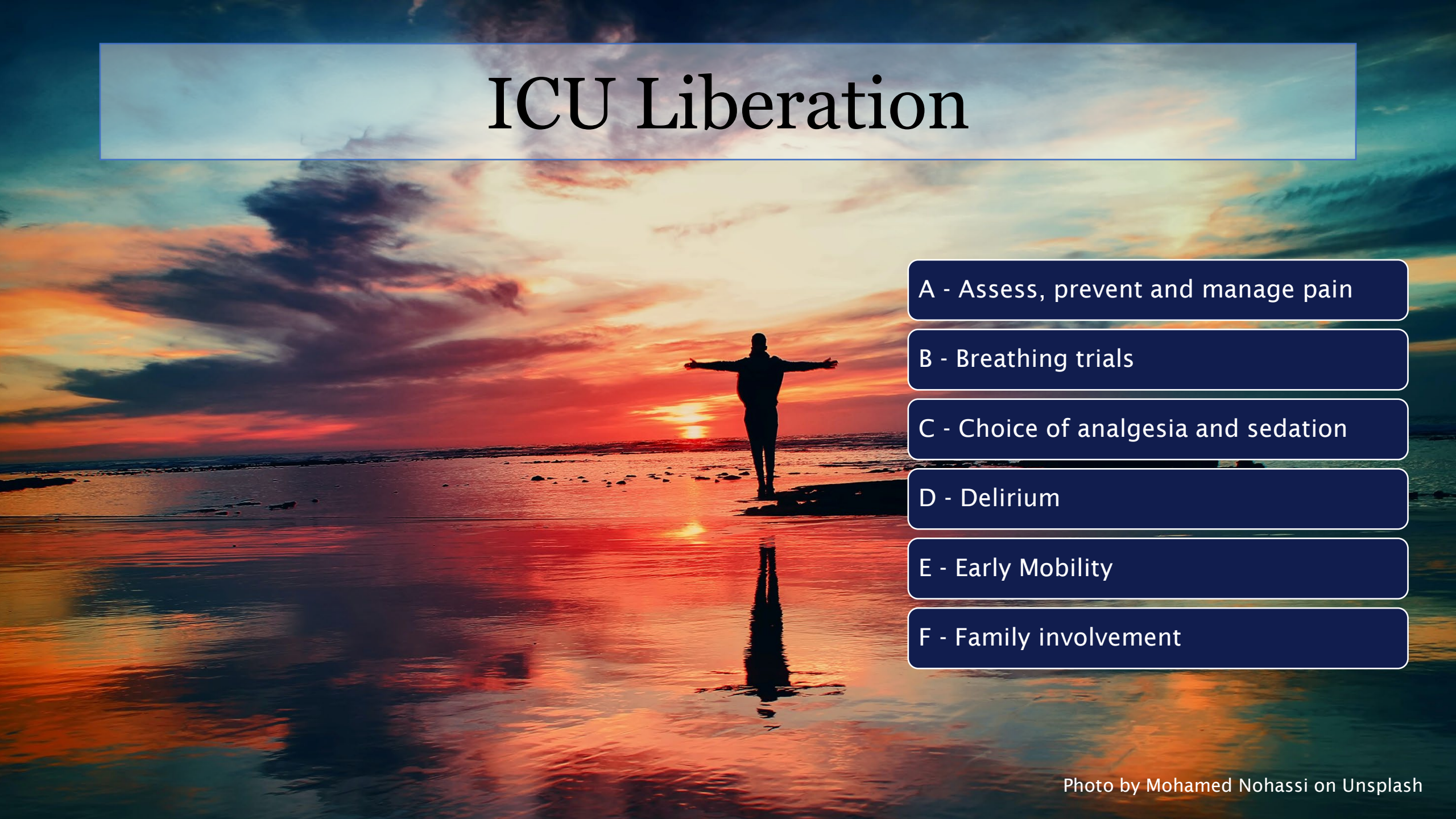
Benzodiazepines are associated with delirium



UVP
Unrestricted visitation policies

https://penfieldbuildingblocks.org/positive-parenting-es/rooming-in-with-your-baby/

ICU Liberation



- A - Assess, prevent and manage pain
- B - Breathing trials
- C - Choice of analgesia and sedation
- D - Delirium
- E - Early Mobility
- F - Family involvement

Photo by Mohamed Nohassi on Unsplash


If you don't take a temperature,
you can't find a fever.

Literature

Thank you. Děkuji.

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- https://docs.google.com/document/d/13vh9GBtxUh_1eYhsOTgFQCF2h7eLxTwgfOXswUzcn4g/edit#