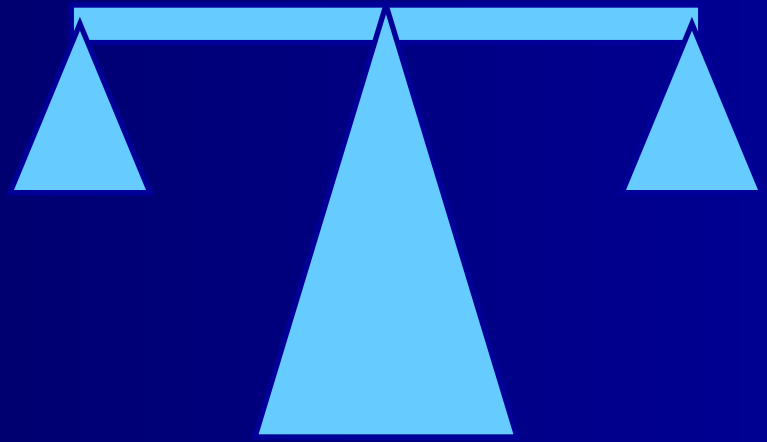
Sedation Management

Achieving Balance for Positive Patient Outcomes



Objectives

- Discuss the evidence and standards that can be used to guide sedation management
- Discuss delirium in the pediatric patient

Sedation Management

Outline:

- Sedation Goals
- Sedation Scales
- U of M Sedation Scale
- PICU Agitation Scale
- Delirium

Sedation

To facilitate mechanical ventilation we use sedation and analgesia medications

We do this, to provide comfort, and minimize pain, suffering ,anxiety and other forms of distress, some of which are a direct result of interventions in the ICU

Sedation

- Management of a patients pain and anxiety requires a delicate balance of analgesia and sedation.
- Administration of sedatives and analgesics can contribute to the development of delirium
- Acute brain dysfunction (delirium) is a significant complication of critical illness

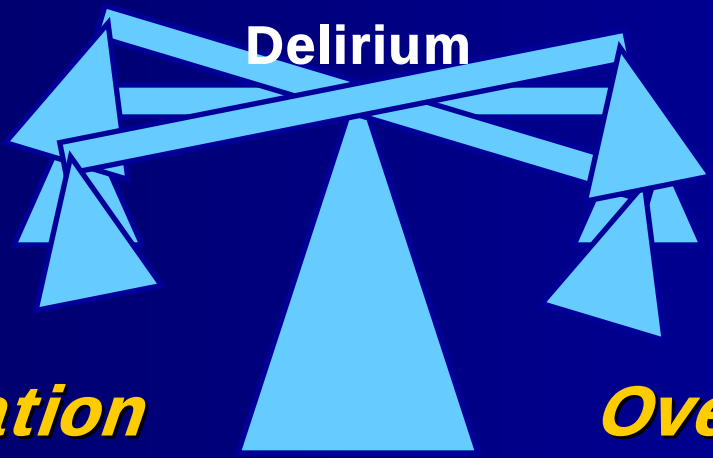
Sedation

Titration

Pain

Sedation

Delirium



- Pain
- Self extubation
- Misery
- Awake
- Aware

Under Sedation

- VAP
- Long-term decrease in cognitive function
- Hemodynamic instability
- Increased length of stay
- PTSD

Over Sedation

Reduced pain

Decreased anxiety

Managed delerium

Amnesia

Recovery

After San Diego Patient Safety Council 2009

Pain/sedation/Agitation poorly managed

- Escalating dosages and increased exposures to drugs resulting in complications and side effects
- Prolonged ventilation and longer PICU stay
- Unplanned extubation (self-extubation)
- Drug withdrawal
- Conflict and confusion among staff
- Patient discomfort
- Patient/family dissatisfaction

Standardization, communication, goals, protocols

- Pain and sedation should be routinely assessed
- Team work and good communication improve pt outcomes
- Standardization helps to develop protocols
- Sedation goals and protocols decrease unplanned extubations
- Planned drug tapers decrease withdrawal

Sedation Management

- To improve communication, collaboration and develop a common language
- Developed Daily Sedation Goals (Goal directed care)
- Implemented Assessment Tools for pain/sedation/agitation and drug withdrawal (close monitoring)
- Developed algorithms. (medication titration protocols)

Sedation Goals

A – Awake: interactive with environment

B – Light: arouses to light stimulation, consistently breathes above ventilator

C – Moderate: arouses to loud noise and pain, very little movement, breathes above ventilator

D – Deep and Apneic: no respiratory effort, no spontaneous movement

E – Deep and Blocked: asleep with neuromuscular blockade

Sedation Scales

Why?

- Consistently document a patients status
- Improve communication among ICU caregivers
- Guidance for titration of sedatives

Sedation Scales

- There are many validated scales to quantify and describe patient behavior in relation to sedation
- Only validated in adult settings.
- Underlying assumption:

  increased agitation = increased need for sedatives.

Sedation Scales

Adult Scale examples:

- Ramsay Sedation scale (30 years ago)
- Sedation Agitation Scale (SAS)
- Motor Activity Assessment Scale
- Vancouver Interactive and Calmness Scale (VICS)
- Richmond Agitation Sedation Scale (RASS)
- Adaptation to the Intensive Care Environment (ATICE)

Sedation Scales

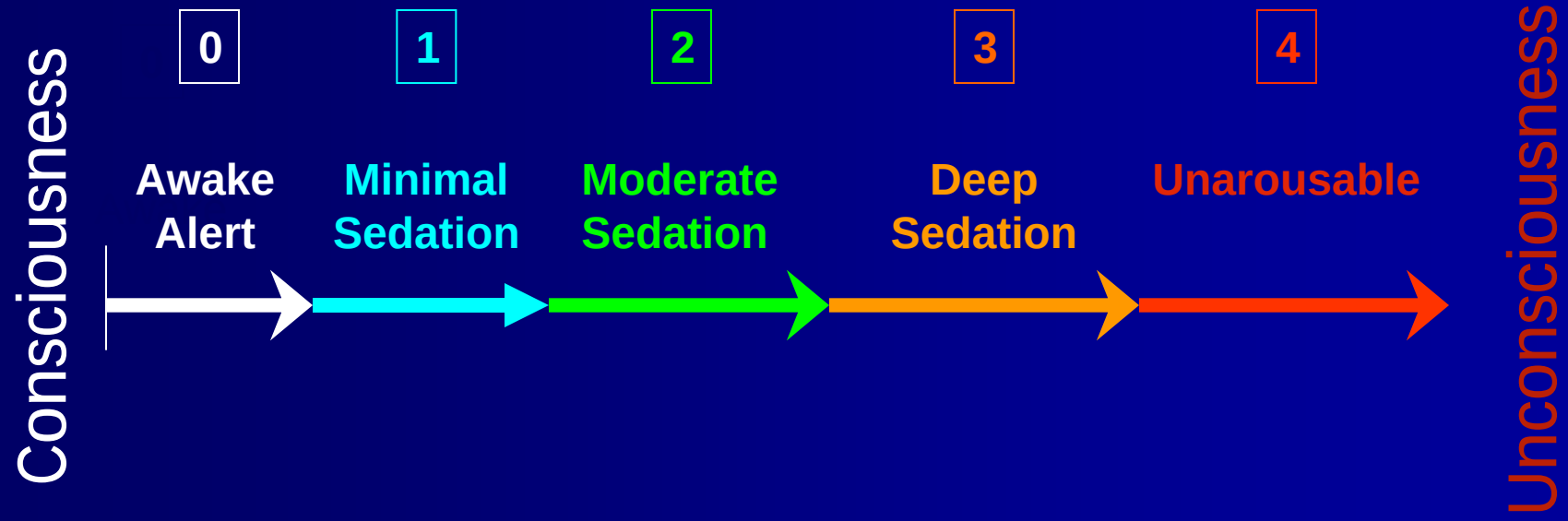
- State Behavior Scale (SBS)Validated in critically ill intubated children
- Comfort scale
- Identifies 6 behaviors and 2 physiological scores
- Assessment includes pain and sedation
- Determines comfort vs discomfort
- Does not differentiate cause
- Limited value guiding interventions

University of Michigan Sedation Scale

Pros:

- Practical
- Reliable
- Validated for pediatric patients
- Simple to administer
- Easy to document

Sedation is a continuum



Patient who has received a PRN dose of Lorazepam can score a 0

University of Michigan Sedation Scale

Cons:

- Assesses degree of arousal
- Does not assess content
- Does not address agitated behavior

Sedation Medication Protocols

- Development of Sedation Protocols helps guide practitioner medication choices
- Ensures understanding of sedation medication activity and dosing
- Ensures consistent approach to how we go up or down on sedation drips
- Most commonly used are midazolam lorazepam and valium (benzodiazepines)
- Also use ketamine and dexmedetomidine

Agitation

- Most sedation scales are based on a continuum of behaviors from deeply sedated to extremely agitated
- Observations of agitation infer that more sedation is required
- Most sedation scales guide caregivers to this conclusion
- Agitation is not captured in U of M sedation scale

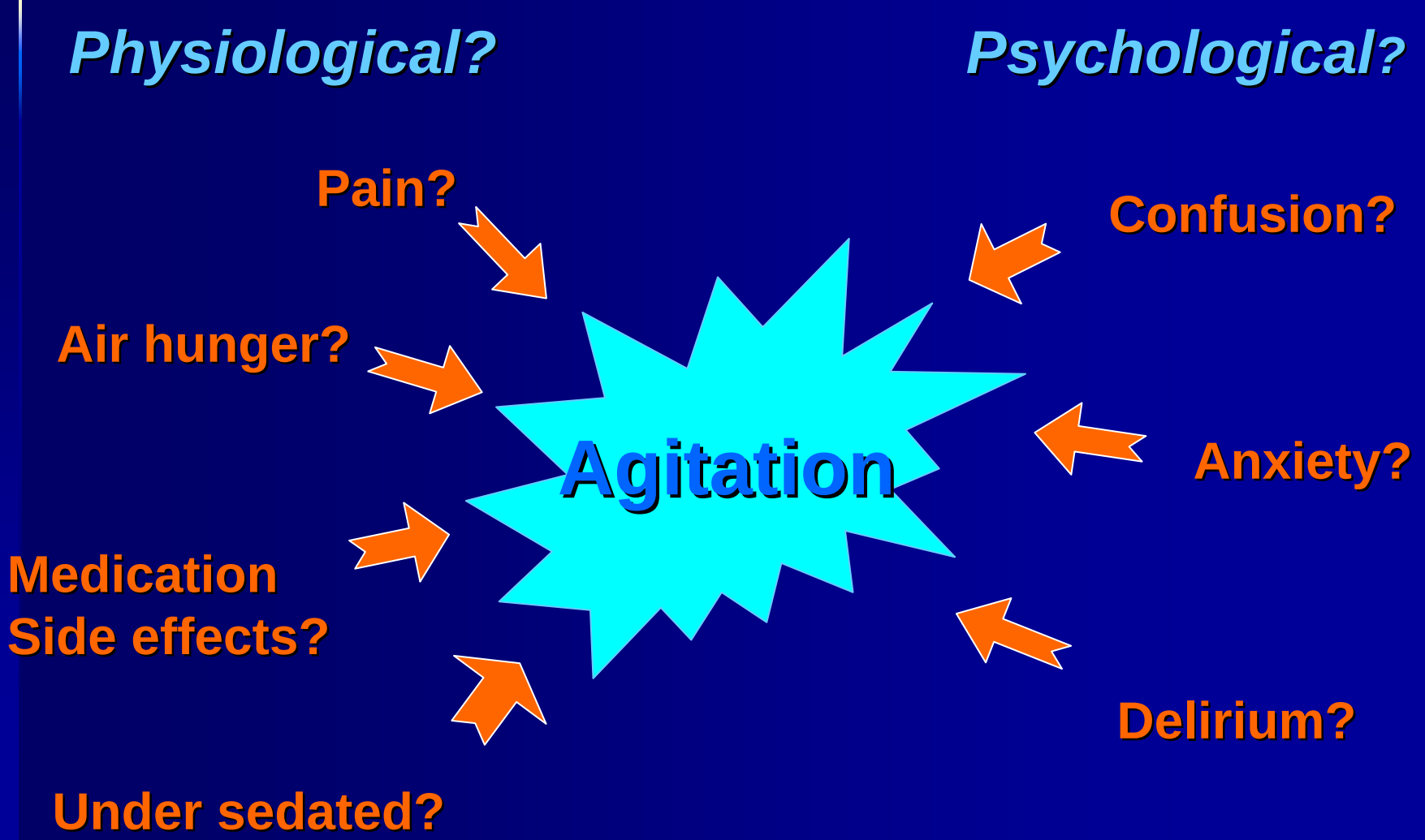
Agitation Defined

- Is a behavioral response to a physical or emotional distress
- Behaviors include, excessive motor activity, which is non purposeful and involves pulling at tubes
- The patient can be kicking and biting, and difficult to redirect or get to follow instructions.

Agitation Assessment

- No validated tools exist to measure agitation in children
- Variable assessment and interpretation of agitated behavior leads to inconsistent treatment choices.

Agitation Assessment



Agitation Behavior

- Need to communicate the observed agitation in a standard way (common language)
- Developed a tool to measure agitation in the pediatric pt.
- Called the ACAT scale

ACAT Scale

- Four Categories of Assessment:
  - Activity: calm to excessive/pulling at tubes
  - Consolability: control to not consoled
  - Alertness: follow instruction to confused
  - Threat to Safety: calm, tolerates ventilation to high risk of self-extubation

University of Michigan PICU ACAT Scale

Scoring

	0	1	2	3
Activity Restlessness/ squirming	Calm	Intermittent- squirming	Persistent attempts to move – restless and squirming	Excessive movement and pulling at tubes
Consolability Ability to console	No intervention needed	Easy to console with voice or touch	Difficult to console (short period < 5 min)	Inconsolable
Alertness Ability to follow instructions*	Yes – without reinforcement	Yes – with reinforcement	Inconsistent – requiring frequent reinforcement	Does not follow instructions - confused
Threat to safety Risk for harm or self-extubation	Calm and tolerates ventilation	Distressed at times, calms when stimulus removed. Unsafe at times. Tolerates ventilation most of the time.	Intermittently unsafe to be left alone. Recovers after ET suctioning	High threat of safety and risk of self-harm, high risk of self-extubation, fighting ventilation

ACAT Scale

- If your patient continues to score 2-3 despite interventions, consider delirium.

Delirium

- Acute brain dysfunction, is a common and significant complication of critical illness
- Observed in 60-80% of ventilated adult ICU patients
- There are well validated/reliable tools for diagnosis in adult populations

Delirium

- More failed and self extubations
- Prolonged mechanical ventilation
- Inadvertent removal of catheters
- Prolonged hospital stay
- Higher health care costs
- Increased mortality

Delirium

- Survivors can develop post traumatic stress disorder (PTSD)
- Survivors can develop long-term cognitive impairment (LTCI)
- The common risk factor for the development of PTSD, and LTCI is delirium

Delirium Defined

- A disturbance of consciousness and cognition that develops acutely with a fluctuating course of inattention and impaired ability to receive, process, store or recall information

Delirium Types

- Hyperactive- hyper vigilance, restlessness, anger, irritability and uncooperativeness. Associated with better outcomes
- Hypoactive- lack of awareness, decreased alertness, sparse or slow speech, lethargy, decreased motor activity and apathy. More common and deleterious.
- Mixed- a bit of both at different times, in adults can occur in up to 54% of patients

Delirium Risk Factors

- Iatrogenic:

- Sleep deprivation
- Administration of sedatives and analgesics

- ICU patients sleep on average 2 hours/day

Delirium-Risk Factors

Risk factors for delirium		
	Preciptating Factors	
Predisposing Factors Host	Factors of Critical Illness	Iatrogenic Factors
Age	Acidosis	Few social interactions
Apolipoprotein E4 polymorphism	Anemia	Frequent nursing care
Cognitive impairment	Electrolyte disturbances	Immobilization
Depression	Endocrine derangement	Medications
Epilepsy	Fever	Oversedation
Stroke history	Hepatic failure	Poorly controlled pain
Vision/hearing impairment	High severity of illness	Sleep disturbances
	Hypoperfusion	Vascular access lines
	Hypotension	
	Hypoxia/anoxia	
	Intercranial hemorrhage	
	Infection/sepsis	
	Malnutrition	
	Metabolic disturbances	
	Myocardial failure	
	Poisoning	
	Respiratory failure	
	Trauma	

Delirium Treatment

- Prevention through controlling precipitating risk factors
- Management of delirium symptoms
- Treatment through resolution of the underlying cause or modulation of the neurochemical cascade.

Non-Pharmacological Delirium treatment

- Promote effective sleep/awake cycles
- Remove lines, restraints as early as possible
- Minimize noise/stimulation at night
- Minimize benzodiazepines for sedation
- Early mobilization
- Continually reorient the pt to surroundings

Delirium Treatment

- After minimizing risk factors
- After taking care of complications from the disease (hypoxemia etc)
- Then pharmacological therapy can be considered.

Delirium Treatment

- Neurotransmitters are involved in cognitive function
- Haldol, and resperidone are antipsychotic used to help restore neurotransmitter equilibrium
- All antipsychotics have potentially serious side effects that need to be monitored for.

Delirium Treatment

- Benzodiazepines is recognized as a significant risk factor for the development of delirium.
- Dexmedetomidine has not been shown to be associated with the development of delirium
- Dexmedetomidine would be the better choice for sedation

Delirium Pediatrics

- In its infancy regarding diagnosis, treatment and associations of risk
- Prevalence unknown, likely underestimated as it was initially in adult literature
- We literally don’t look for it, don’t diagnose it and don’t treat it.

Delirium

- In adults there are several delirium-screening tools
- The Delirium Rating Scale
- Confusion Assessment Method for the ICU (CAM-ICU)
- Intensive Care Delirium Screening Checklist (ICDSC)

Delirium

- Of these the CAM-ICU and the IDSC can be used by non psychiatrically trained medical professionals.
- The CAM-ICU is the most commonly used, and is also validated for mechanically ventilated patients

Pediatric Delirium Tool

- Vanderbilt Pediatric Delirium Group took the CAM-ICU and modified it for pediatric patients
- They adapted the tool using age appropriate cognitive assessment methods
- The resulting tool is appropriate for 5 years of age and up.

Pediatric Delirium Tool

- The tool uses the RASS to assess sedation level or arousal
- The pCAM-ICU is used to assess content or the delirium assessment
- The validity and reliability of this tool is being tested now

Pediatric Delirium

- The Pediatric Anesthesia Emergence Delirium(PAED) scale
- Can be used on children as young as 2 years
- Used for emergence delirium post anesthesia

Pediatric Anesthesia Emergence Delirium Scale

Item A: The child makes eye contact with the caregiver.

Item B: The child's actions are purposeful.

Item C: The child is aware of his/her surroundings.

Item D: The child is restless.

Item E: The child is inconsolable.

Items A, B, and C are scored as follows: **4**, not at all; **3**, just a little; **2**, quite a bit; **1**, very much; **0**, extremely. Items D and E are scored as follows: **0**, not at all; **1**, just a little; **2**, quite a bit; **3**, very much; **4**, extremely. The scores of all items are summed to obtain a total PAED scale score. The degree of ED increases directly with the total score.

Adapted from Sikich N., Lerman J. Development and psychometric evaluation of the pediatric anesthesia emergence delirium scale. Anesthesiology 2004; 100(5):1138-45.

PAED

- Has limitations
- It really only looks at hyperactive delirium
- Is not validated to diagnose delirium
- Subjective in nature

Delirium Treatment

- There is very little data on use of haldol and resperidone for delirium treatment in children
- Schieveld et al. Intensive Care Med 2007;33:1033-40
- Study reporting the use of these meds for delirium treatment.

Delirium- Summary

- Described as a disturbance of consciousness and cognition that cannot be accounted for by a preexisting condition.
- Delirium is frequently seen in critically ill adults and is associated with poor outcomes
- Agitation can be a symptom of delirium
- Data suggest that it can be present in children and contributes to increased mortality
- The treatment for delirium is not more sedation, but possibly less, with the addition of antipsychotic drugs like haldol and resperidone.

Delirium- Summary

- Valid and reliable tools are in the works for pediatric patients
- For a detailed description of the pCAM-ICU visit www.icudelirium.org
- Tool development in <5years yet to be addressed

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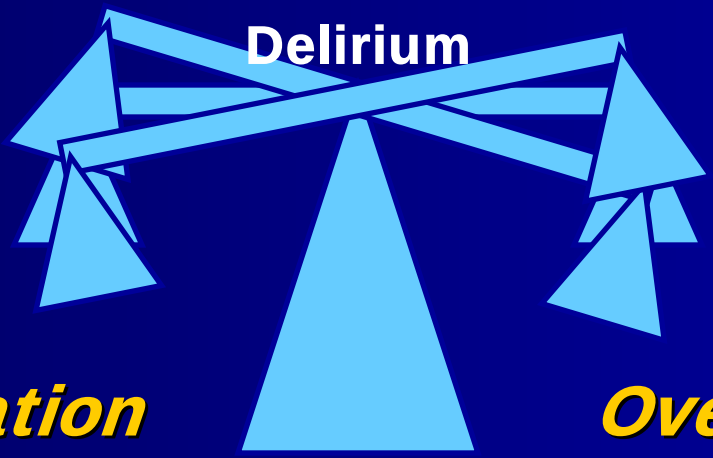

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Sedation

Questions?

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