

Effects of SBS and CAPD scores on Sedation and Delirium in the PICU

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Sedation & Delirium

Sedation

- Depression of a patient's awareness to the environment and responsiveness to external stimuli

Delirium

- Sudden severe confusion and rapid changes in brain function occurring with physical or mental illness

Background

Mechanical ventilation correlates with deeper levels of sedation

Prolonged sedation is associated with delirium

High risk of delirium in critically ill patients in the pediatric intensive care unit (PICU)

Minimizing sedation in adult ICU reduced delirium & length of mechanical ventilation

Many validated assessments, lacking pediatric evidence

Scoring Systems

Sedation Assessment

- COMFORT Score
- State Behavioral Scale (SBS)

Delirium Assessment

- Cornell Assessment of Pediatric Delirium (CAPD)

COMFORT Scale

- Previously used in Mercy PICU
- Scored 1-5 for:
 - Alertness
 - Calmness/Agitation
 - Respiratory Response
 - Crying
 - Physical Movement
 - Muscle Tone
 - Facial Tension
 - Deviation from baseline blood pressure and heart rate

State Behavioral Scale (SBS)

- Implemented September 2019
- Describes sedation and agitation levels in young patients on mechanical ventilation

Score	Description
-3	Unresponsive
-2	Responsive to noxious stimuli
-1	Responsive to gentle touch or voice
0	Awake and able to calm
+1	Restless and difficult to calm
+2	Agitated

Cornell Assessment of Pediatric Delirium (CAPD)

- Implemented September 2019
- Observational tool allowing real-time delirium screening
- Measures continuum of hypoactivity to hyperactivity
- Total score ≥ 9 = Delirium present

CAPD

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

Scoring Comparison

COMFORT

- Longer to complete

SBS

- More specific to sedation-agitation continuum
- Simpler and faster to complete

CAPD

- Easy for nursing to conduct
- More effective delirium assessment

RESTORE Trial

- Effects of a sedation protocol on duration of mechanical ventilation in critically ill children
- Utilized SBS for sedation assessment and goal
- Implementation of sedation protocol did not reduce duration of mechanical ventilation
- Sedation goals for a more awake state
 - Decreased sedation exposure
 - Accelerated weaning from primary sedative

JAMA. 2015;313(4):379-389.

Methods

Purpose

- To evaluate the effect of implementation of SBS & CAPD scoring on clinical control of sedation and delirium in the PICU

Primary Outcome

- Days free from sedation in patients assessed with COMFORT scoring system compared to patients assessed with SBS and CAPD scoring systems

Secondary Outcomes

- Subgroup analysis of primary outcome based on PRISM score
- Duration of mechanical ventilation
- PICU and hospital length of stay
- Delirium treatment with antipsychotics
- Discharge Rx for withdrawal

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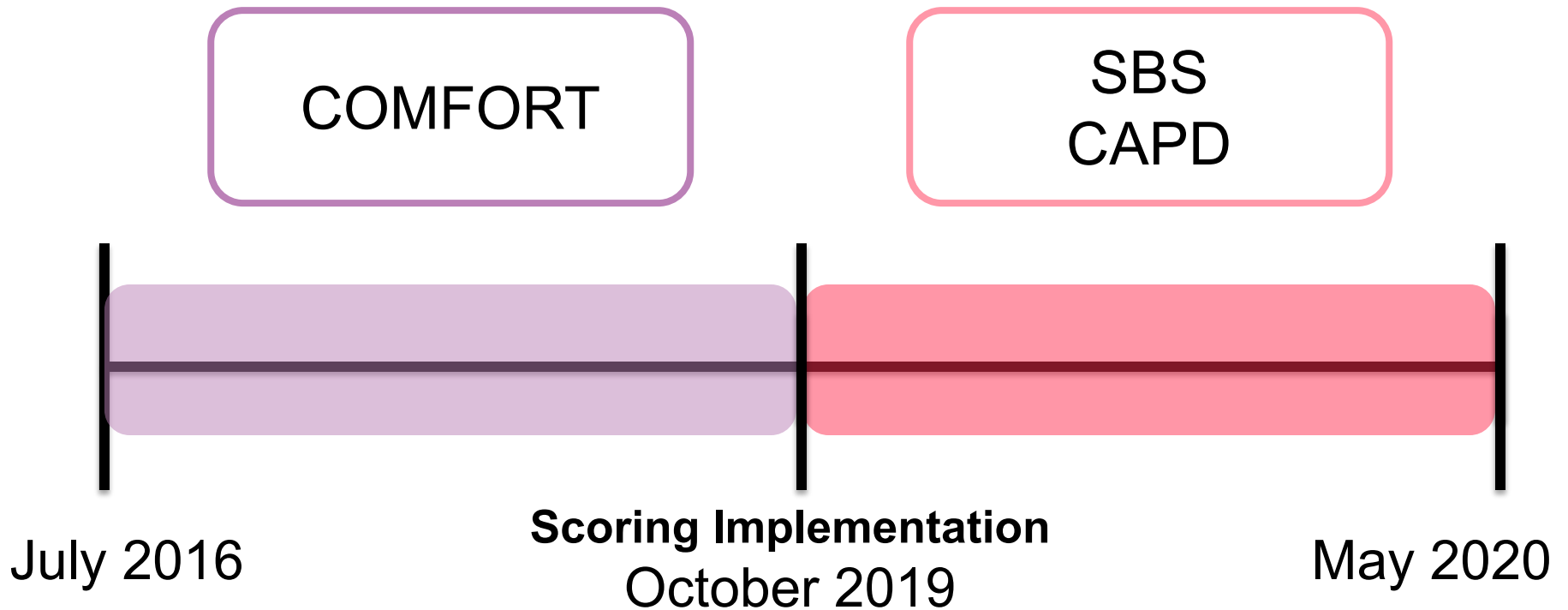
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- Delirium treatment with antipsychotics
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PRISM:
Pediatric Risk
of Mortality

Study Design



Methods

Patient Selection Process	
Inclusion Criteria	<ul style="list-style-type: none">■ Children ≤ 17 years of age■ Mechanical ventilation for ≥ 1 day■ Patients on BiPAP with continuous sedation
Exclusion Criteria	<ul style="list-style-type: none">■ Patients on neuromuscular blocking agents

- Retrospective cohort design
- Identify mechanically-ventilated patients via Epic EMR

Data Analysis

Student's t-test

- Days free from sedation, days free from mechanical ventilation, length of PICU and hospital stay

Fisher's Exact

- Instances of discharge Rx for withdrawal, instances of delirium treated with antipsychotic medication or diagnosed within medical record

Baseline Characteristics

	COMFORT (n = 15)	SBS/CAPD (n = 7)
	n (%)	n (%)
Gender		
Female	6 (40)	2 (28.6)
Male	9 (60)	5 (71.4)
Past Medical History		
Chromosomal abnormality	2 (13.3)	1 (14.3)
Neurological disorder	1 (6.7)	1 (14.3)
Asthma	1 (6.7)	0 (0)
None	12 (80)	5 (71.4)
Sedation/Ventilation Complications		
Edema	4 (26.7)	2 (28.6)
Ileus	2 (13.3)	0 (0)
None	11 (73.3)	5 (71.4)

*There were no significant differences in baseline characteristics between the two groups.

Baseline Characteristics

	COMFORT (n = 15)	SBS/CAPD (n = 7)
	n (%)	n (%)
Sedation/Ventilation Complications		
Edema	4 (26.7)	2 (28.6)
Ileus	2 (13.3)	0 (0)
None	11 (73.3)	5 (71.4)
Ventilator-Associated Pneumonia	1 (6.7)	0 (0)
Received TPN	3 (20)	1 (14.3)
Delirium	1 (6.7)	0 (0)
Antipsychotic tx ordered	1 (6.7)	0 (0)
Delirium mentioned in note	1 (6.7)	0 (0)
Discharge Rx – Iatrogenic Withdrawal	0 (0)	0 (0)

Outcomes

	COMFORT group	SBS/CAPD group	P value	95% CI
Days free from sedation	2.53	2.29	0.503	-3.05 to 1.55
PRISM < 14	2.67	2.80	0.922	-2.98 to 2.71
PRISM ≥ 14	2.00	1.00	0.597	-4.39 to 6.39
Days free from mechanical ventilation	2.53	2.14	0.724	-1.88 to 2.67
PICU length of stay	4.26	5.43	0.649	-3.83 to 2.44
Hospital length of stay	6.60	6.57	0.988	-3.80 to 3.86

Analysis

Strengths

- Baseline metrics to direct protocol development
- Improved assessment tools
- Introduction of delirium assessment to Mercy PICU nurses

Limitations

- Chart review
 - Subjective or missing information
- Small sample size

Conclusions

- Compared to using COMFORT, utilizing SBS and CAPD scoring systems did not result in significant improvement in days free from sedation in critically ill children
- No statistically significant differences observed in secondary outcomes

Future Direction

Provide insight to PICU providers concerning sedation protocol development

Future research with larger trials assessing a greater number of patients

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