Repositioning Guidelines to Reduce Pressure Injuries in the Pediatric Intensive Care Unit

DEPARTMENT OF PEDIATRIC SURGEY, JOHNS HOPKINS CHILDREN'S CENTER, JOHNS HOPKINS UNIVERSITY SCHOOL OF NURSING, DEPARTMENT OF NURSING ADMINISTRATION, JOHNS HOPKINS CHILDREN'S CENTER, DEPARTMENT OF ANESTHESIOLOGY AND CRITICAL CARE MEDICENE, PEDIATRIC, JOHNS HOPKINS CHILDRENS CENTER

Background and Literature

Pediatric pressure injury (PI) is a painful and costly global problem. Compared to PICUs of similar scope and size the local PICU has a need to reduce PI. Most PI in the local PICU occur in sedated hemodynamically unstable patients 0 to 36 months of age with an invasive artificial airway. Repositioning is a basic intervention that off loads pressure to prevent PI (NPIAP, 2019). Adult literature provided the concept of repositioning guidelines for hemodynamically unstable patients (Brindle et al. 2013). As children are physiologically different than adults (Freundlich, 2017), a study from an early mobility program "PICU Up!" provided hemodynamic parameters for the pediatric repositioning guidelines (Wieczorek et al. 2013).

Objective

Reduce the incidence of PI in the PICU 25% by development and implementation of repositioning guidelines for sedated and hemodynamically unstable PICU patients with an invasive artificial airway aged 0 to 36 months with a Braden Q score ≤ 18 .

Methods

- Setting
- 40 bed PICU, Level 1 trauma center in an Eastern based academic tertiary hospital
- Design
- Pre-post QI project (pre n = 116; post n = 100)
- Develop repositioning guidelines by consensus(Delphi process)
- Risk assessment tool: Braden Q Scale(Curley et al., 2003)
- Pre-post comparison of PI development (Fishers exact)
- Establish baseline for adherence to repositioning
- Type of turn (full, partial or unable)
- Per event(event is a two hour window; max 12 per day)
- Pre-post Survey (pre n = 158; post n = 152)
- Assess nurse confidence, knowledge, barriers and facilitators
- Nine questions, 7 point Likert scale (Summary scores)

Results

Aim 1 Developed and implemented consensus repositioning guidelines for critically ill PICU patients 0 to 36 months of age at risk for developing PI.

> **JUIDELINES TO PREVENT HEMODYNAMIC CHANGES IN RESPONSE TO TURNING THE UNSTABLE PEDIATRIC** y conditions listed below occur the turning attempt should cease **1.Development of NEW arrhythmia 2.**Active fluid resuscitation – Unstable blood pressure

3.Active Hemorrhage 4. Change in baseline hemodynamic parameters (BP, HR, Oxygen Saturation, Respiratory Rate) that does not recove within 10 minutes of position change

ATTEMPT TURN AT LEAST EVERY 2 HOURS. IF NOT TOLERATED, ATTEMPT AGAIN IN 2 HOURS •Start SLOW – Secure ALL Lines and Airway

•REQUEST HELP: RNs, Respiratory therapy, ECMO specialist if applicable, to assist with turning and management of airway and equipment

• Round up your BUDDIES!! Turn 15 degrees, monitor vital signs. If tolerated increase by increments of 15 degrees until 30 degrees is achieved alternating sides every 2 hours. Physical Therapy to be present once per day for ROM exercises

•Monitor clinical status closely with each position change for 10 minutes. Has patient returned to their baseline? The following warrant discussion about return to last position:

1. Change in Heart rate, Respiratory Rate, Blood Pressure by 20% from baseline 2.Decreased Sa02 by 15% from baseline

- 3.Increased 02 requirement by 20% from baseline
- 4.Increased ETCO2 by 20% from baseline
- 5.Change in neurological status
- 6.Concern for airway device, vascular access, or drain/tube activity
- 7.Decreased Sv02 by 20% from baseline or Sv02 < 50% in ECMO patients
- 8.Decreased NIRS by 20% from baseline of NIRS
- •Opportunities for Skin Assessment during turn:
- 1.Change linens for moisture management

2. Reposition patients head, arms, legs every 1-2 hours, passive ROM per physical therapy recommendations. Elevate heels off of bed

3.Adjuncts: Z-flo for positioning ensure Mepilex is over any boney prominence

Aim 2 Reduce the rate of hospital acquired PI by 25% in at risk PICU patients 0 to 36 months of age measured over a 20 week timeframe. Patient chai

Male Female Asian Black White Pressure I Yes No ECMO res No VIRS Yes No Diagnosis

Pulmonary Oncology Neurolog Trauma Other

Cardiac

Ancillary

LOS medi LOAA me Braden Q score

Note. LOAA = length of artificial airway; LOS = length of stay. n = sample.

100 60

> Reduction of PI was significant at the 99% confidence interval (Fisher's exact test; p = .0003). Aim 2 exceeded the goal of reducing PI 25% by achieving a reduction of 90.4%.

Margaret Birdsong, MSN, CPNP, CWOCN, Bryan Hansen, PhD, RN, APRN-CNS, ACNS-BC, Judy Ascenzi, RN, DNP, Sapna Kudchadkar, MD, PhD

racteristics	

	Pre- Group		Post group		Total	
	NT	07	NT	07	ΝT	0./
	IN 11(%0	1N 100	%	1N 21.(%0 100.00/
	116		100		216	100.0%
	(5	56.00/	(2	(2,00/	100	50.20/
	05 51	50.0%	03	03.0% 27.00/	128	59.5% 44.00/
	51	44.0%	37	37.0%0	95	44.0%
	2	24 50/	2	2 00/	6	2 00/
	3	34.3 %	3 20	3.0%	70	2.0%
	40	20.0% 62.0%	50 67	<i>3</i> 0.0%	/0	<i>52.4%</i>
	13	02.9%	07	07.0%	140	04.0%
jury	10	16 40/	2	2 00/-	21	0 70/
	19	10.470 83.60/			۲ 105	9.770
	97	03.070	90	90.0%	195	90.370
	10	10 30/-	1	1 00/-	16	7 40/-
	104	10.570 20.70/	4	4.070	200	02.60/2
	104	09.//0	90	90.070	200	92.070
	23	19.8%	28	28 0%	51	23.6%
	03	19.070	72	72.0%	165	$76 4^{0/2}$
))	10.270		72.070	105	70.770
	41	35.3%	32	32.0%	72	33.3%
	60	36.2%	42	42.0%	102	47.2%
	3	3.4%	4	4.0%	7	3.2%
;	9	2.6%	3	3.0%	12	5.6%
	3	9.5%	11	11.0%	14	6.5%
	0	0.0%	8	8.0%	8	3.7%

atient data before and after intervention					
	<i>n</i> = 116	<i>n</i> = 100			
	Pre-intervention	Post-intervention			
n days	7	5			
lian days	5	2			
nedian	18	17			

Pre and Post Incidence of PI Development



adherence to the guideline (Delphi Diary).



	Nonadheren	Unable	Partial	Full	Sum	
Event 1 0000 - 0159	4	38	218	297	557	
Event 2 0200 - 0359	7	37	221	301	566	
Event 3 0400 - 0559	6	35	218	311	570	
Event 4 0600 - 0759	13	30	224	316	583	
Event 5 0800 - 0959	10	34	203	349	596	
Event 6 1000 - 1159	12	33	211	347	603	
Event 7 1200 - 1359	12	37	197	349	595	
Event 8 1400 - 1559	11	37	192	351	591	
Event 9 1600 - 1759	6	36	193	344	579	
Event 10 1800 – 1959	5	30	203	330	568	
Event 11 2000 – 2159	3	28	214	311	556	
Event 12 2200 – 2359	1	23	214	304	542	
Count by TOR	90	360	2508	3910	6868	
Rate by TOR	1.31%	5.24%	36.52%	56.93%	100.00 %	
Note. Unable = unable to reposition, $Partial = partial turn at 15 degrees, Full$						

= full turn at 30 degrees, TOR = type of repositioning. All time was formatted in military time.

Established a baseline for adherence. Rate of nonadherence was 1.31%. New method of attempting to reposition offered nurses two additional options for adhering to the guidelines; partial turn or listing (15 degrees) or unable to reposition due to hemodynamic instability. The guidelines facilitated the intervention of repositioning.

Aim 3 Analyze diary that records patient position and time of turn to determine PICU

Nonadherence Unable to turn



Aim 4 Assess RN knowledge, confidence, facilitators and perceived barriers for repositioning of PICU patients 0 to 36 months of age by survey pre and post implementation of guidelines.

Question

(Q1) - I am confident in identifying be safely repositioned due to the rist hemodynamic status.

(Q2) - I am confident it is possible t the ICU without the risk of potenti status

(Q3) - I am knowledgeable about he following primary systems: respira

(Q4) - It is possible to turn almost a without the risk of potential signifi

(Q5) - I always inform the physician reposition my patient every 2 hours

(Q6) - I am confident with identific parameters that would define instal arterial pressure, systolic blood pres saturation, heart rate, respiratory rat

Q7) - I feel it is safer not to attem patient (B).

(Q8) - I am confident to attempt reunstable patient.

(Q9) - Repositioning the hemodyr

Sum of scores

A directional increase in knowledge, facilitators and confidence was not significant. A validated survey needs to be developed. Green = positive direction. Red = negative direction.

Conclusion

Repositioning hemodynamically unstable PICU patients is a complex intervention. A 90.4% reduction in PI was better than expected. The position of base nurse was critical for recording repositioning data and cueing PICU nurses to reposition. A change in unit culture was achieved by the guidelines as they facilitated repositioning hemodynamically unstable PICU patients. Hemodynamic instability is a serious concern when repositioning. It is not an overarching patient status that prevents all repositioning of unstable PICU patients.

Dissemination & Sustainability

Dissemination was continuous within the PICU. Outside dissemination includes: the hospitals newsletter, professional nursing organizations, a conference presentation and intended publication in a related journal. Essential to sustainability is placement of the guidelines within the hospitals electronic health record system, EPIC. Meetings with the hospitals EPIC team are underway and the CWOCN is informed of all PI that occur within the pediatric hospital. The guidelines will be paired with 'PICU Up!" in place across the USA at 32 hospitals.

References

Brindle, T., Malhorta, R., O' Rourke, S., Currie, L., Chadwik, L., Falls, P., ... Creehan, S. (2013). Turning and repositioning critically ill patients with hemodynamic instability. Journal Wound, Ostomy, Continence Nursing 40(3), 254-267. Curley, M., Razmus, I., Roberts, K., & Wypi, D. (2003). Predicting pressure ulcer risk in pediatric patients. The Braden Q Scale. Nursing Research 52(1), 22-29. Freundlich, K. (2017). Pressure injuries in medically complex children: A review, Children, 4(25), 1-7. National Pressure Injury Advisory Panel updated guideline. (2019). Prevention and treatment of pressure ulcers/injuries: Clinical *Practice Guideline*: retrieved November, 2019nfrom https://npiap.com/page/Guidelines Wieczorek, B., Ascenzi, J., Kim, Y., Lenker, H., Potter, C., Shata, N., ... Kudchadkar S. (2016). Improvement intervention to promote early mobilization in critically ill children. *Pediatric Critical Care Medicine* 17(12), 559-566.



	n = 68 Pre Score	n = 41 Post Score	Change	Area
situations where some patients may not k of potentially fatal changes to	1.76 <u>-</u>	1.51	0.25	Confidence
to turn almost all critically ill patients in ally fatal changes to hemodynamic	2.57	2.27	0.30	Facilitator
emodynamic instability changes in the ory, cardiovascular and neurological.	1.75	1.44	0.31	Knowledgce
Il critically ill patients in the PICU cant changes in hemodynamic status.	2.76	2.51	0.25	Barrier
or nurse practitioner if I am unable to	2.84	2.44	0.40	Facilitator
ation of specific hemodynamic ility for all patients: such as mean sure, diastolic blood pressure, oxygen re and end title.	1.71	1.37	0.34	Confidence
t to turn a hemodynamically unstable	4.04	4.15	-0.11	Barrier
position of the hemodynamically	2.90	2.88	0.02	Confidence
mically unstable patient is time	2.54	3.07	-0.53	Barrier
	22.87	21.64	1.23	
	• ~ •	1 • 1 1	٦	1