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

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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

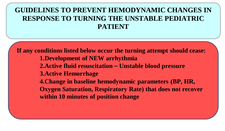
Reduce the incidence of PI in the PICU 25% by development and implementation of repositioning guidelines for sedated and hemodynamically unstable PICU patients with an invasive artificial airway aged 0 to 36 months with a Braden Q score ≤ 18.

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.



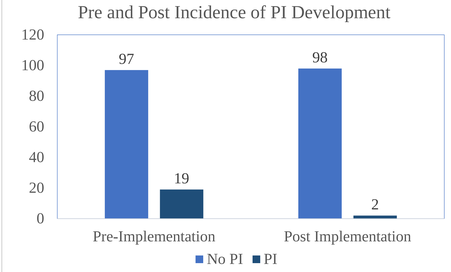
Aim 2 Reduce the rate of hospital acquired PI by 25% in at risk PICU patients 0 to 36 months of age measured over a 20 week timeframe.

Patient characteristics

	Pre- Group		Post group		Total	
	N	%	*N*	%	*N*	%
***N* =**	116		100		216	100.0%
Sex						
Male	65	56.0%	63	63.0%	128	59.3%
Female	51	44.0%	37	37.0%	95	44.0%
Race						
Asian	3	34.5%	3	3.0%	6	2.8%
Black	40	26.0%	30	30.0%	70	32.4%
White	73	62.9%	67	67.0%	140	64.8%
Pressure Injury						
Yes	19	16.4%	2	2.0%	21	9.7%
No	97	83.6%	98	98.0%	195	90.3%
ECMO						
Yes	12	10.3%	4	4.0%	16	7.4%
No	104	89.7%	96	96.0%	200	92.6%
NIRS						
Yes	23	19.8%	28	28.0%	51	23.6%
No	93	18.2%	72	72.0%	165	76.4%
Diagnosis						
Cardiac	41	35.3%	32	32.0%	72	33.3%
Pulmonary	60	36.2%	42	42.0%	102	47.2%
Oncology	3	3.4%	4	4.0%	7	3.2%
Neurologic	9	2.6%	3	3.0%	12	5.6%
Trauma	3	9.5%	11	11.0%	14	6.5%
Other	0	0.0%	8	8.0%	8	3.7%

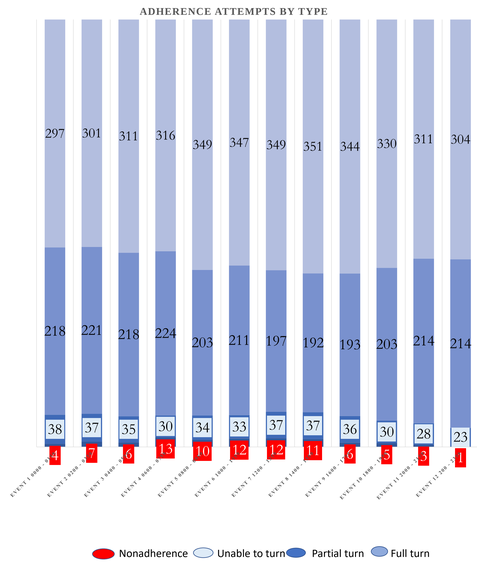
Ancillary patient data before and after intervention		
	n = 116	*n* = 100
	Pre-intervention	Post-intervention
LOS median days	7	5
LOAA median days	5	2
Braden Q median score	18	17

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



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%.

Aim 3 Analyze diary that records patient position and time of turn to determine PICU adherence to the guideline (Delphi Diary).



	Nonadherence	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 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	*n* = 68 Pre Score	*n* = 41 Post Score	Change	Area
(Q1) - I am confident in identifying situations where some patients may not be safely repositioned due to the risk of potentially fatal changes to hemodynamic status.	1.76	1.51	0.25	Confidence
(Q2) - I am confident it is possible to turn almost all critically ill patients in the ICU without the risk of potentially fatal changes to hemodynamic status.	2.57	2.27	0.30	Facilitator
(Q3) - I am knowledgeable about hemodynamic instability changes in the following primary systems: respiratory, cardiovascular and neurological.	1.75	1.44	0.31	Knowledge
(Q4) - It is possible to turn almost all critically ill patients in the PICU without the risk of potential significant changes in hemodynamic status.	2.76	2.51	0.25	Barrier
(Q5) - I always inform the physician or nurse practitioner if I am unable to reposition my patient every 2 hours.	2.84	2.44	0.40	Facilitator
(Q6) - I am confident with identification of specific hemodynamic parameters that would define instability for all patients: such as mean arterial pressure, systolic blood pressure, diastolic blood pressure, oxygen saturation, heart rate, respiratory rate and end title.	1.71	1.37	0.34	Confidence
(Q7) - I feel it is safer not to attempt to turn a hemodynamically unstable patient (B).	4.04	4.15	-0.11	Barrier
(Q8) - I am confident to attempt reposition of the hemodynamically unstable patient.	2.90	2.88	0.02	Confidence
(Q9) - Repositioning the hemodynamically unstable patient is time consuming.	2.54	3.07	-0.53	Barrier
Sum of scores	22.87	21.64	1.23	

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

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