

Early Hydrocortisone Administration for Bronchopulmonary Dysplasia Prevention

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Background

- BPD (Bronchopulmonary Dysplasia)**
 - Chronic lung disease of neonates
 - Caused by the disruption of normal pulmonary development and injury from exposure to mechanical ventilation, oxygen toxicity, infection, and inflammation in preterm infants
 - Leading cause of morbidity and mortality in preterm infants
 - Risk factor for poor neurodevelopmental outcomes in extremely premature infants
 - Definition: FiO2 requirement during hospitalization
- Hydrocortisone**
 - Effective in improving survival and decreased BPD
 - Safe without evidence of moderate to severe neurodevelopmental impairment (in contrast to dexamethasone treatment)
- Early Hydrocortisone Administration**
 - Adopted as standard of care in the NICU at the UNMH in 2018
 - All infants <29 weeks' gestation within the first 48 hours of life
 - 7 days of hydrocortisone at 0.5 mg/kg per day every twelve hours; 3 days of 0.5 mg/kg given once per day

Objective

- To assess the impact prophylactic hydrocortisone use has had on the incidence of BPD in extremely preterm infants at UNMH
- Hypothesis: Since the implementation of routine use of hydrocortisone in 2018, there has been a 10% decrease in the diagnosis of BPD defined as any oxygen use at 36 weeks corrected gestational age

Methods

- Primary objective:**
 - Historic incidence of BPD: Review charts of extremely preterm infants (born <29 week gestation) from January 1, 2017 to July 31, 2018
 - Current time epoch: from December 1, 2018 to June 30, 2020, in which all <29 weeks' gestational infants were routinely treated with prophylactic hydrocortisone
- Secondary objective:** Assess for possible complications that can occur with treatment of steroids
 - Review charts for the presence of spontaneous gastrointestinal perforation, late onset sepsis, significant hyperglycemia after administration of HCTZ, and significant hypertension
- Inferential statistics obtained:**
 - Association between BPD level and the 2 epochs, using a chi-square test and two multiple logistic regressions, with one regression controlling for only infant characteristics, and the other controlling for both infant and mother characteristics
 - Association between Epoch and complications, using chi-square or Fisher's exact tests

BPD Definitions	
Mild	Breathing room air at 36 weeks PMA (Post menstrual age)
Moderate	Need for <30% oxygen at 36 weeks PMA
Severe	Need for ≥30% oxygen and/or positive pressure (PPV or CPAP) at 36 weeks

Background

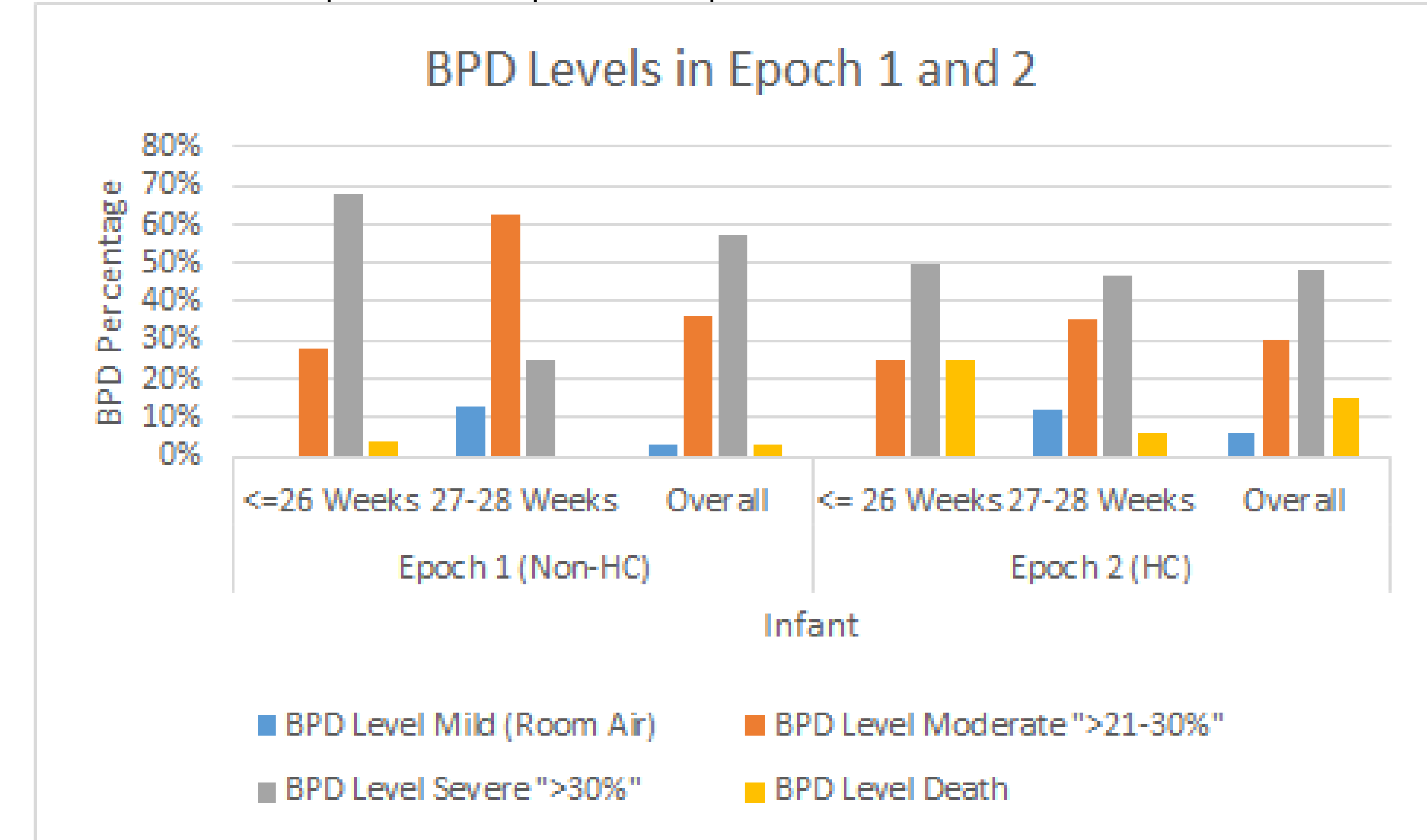
Table 1. BPD Levels in Epoch 1. Number of infants with the varying BPD levels, mild, moderate, and severe. Infants classified by <26 weeks and 27-28 weeks gestational age.

		Epoch 1 (Non-HC)					
		<=26 Weeks (n=25)		27-28 weeks (n=8)		Overall (n=33)	
		n	Col %	n	Col %	n	Col %
Infant							
BPD Level	Moderate	7	28.00%	5	62.50%	12	36.36%
	Severe	17	68.00%	2	25.00%	19	57.58%
	Room Air	0	0.00%	1	12.50%	1	3.03%
	Death	1	4.00%	0	0.00%	1	3.03%

Table 2. BPD Levels in Epoch 2. Number of infants with the varying BPD levels, mild, moderate, and severe. Infants classified by <26 weeks and 27-28 weeks gestational age.

		Epoch 2 (HC)					
		<=26 Weeks (n=16)		27-28 weeks (n=17)		Overall (n=33)	
		n	Col %	n	Col %	n	Col %
Infant							
BPD Level	Moderate	4	25.00%	6	35.29%	10	30.30%
	Severe	8	50.00%	8	47.06%	16	48.49%
	Room Air	0	0.00%	2	11.76%	2	6.06%
	Death	4	25.00%	1	5.88%	5	15.15%

Graph 1. Comparison of BPD Levels in Epoch 1 and 2. There is an overall decrease in BPD incidence in Epoch 2 in comparison to Epoch 1.



Conclusion

- Mild BPD levels increased from 3 to 6% from Epoch 1 to 2 with only 1 infant in epoch 1 and 2 infants in epoch 2
- Both moderate and severe BPD levels decreased from Epoch 1 to 2 (36% to 30% and 58% to 48%, respectively)
- Death rates increased from 1 to 5 infants from Epoch 1 to 2
- No increase in complications from Epoch 1 to 2
- Results are not significantly significant, most likely due to limited sample size

Next Steps

- Increase the sample size with hopes to achieve statistical significance

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