Association of the Early Use of Hydrocortisone with the Prevention of Bronchopulmonary Dysplasia in Preterm Neonates

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INTRODUCTION

Bronchopulmonary Dysplasia (BPD):

- BPD is a common complication in preterm infants
  - BPD causes abnormal lung development and dysplasia in smaller airways and alveoli → infants require oxygen therapy
- The risk of BPD is highest in extremely preterm infants (<28 weeks of gestation)
- BPD is related to systemic inflammation and preterm neonates may have low serum cortisol levels, predisposing them to BPD

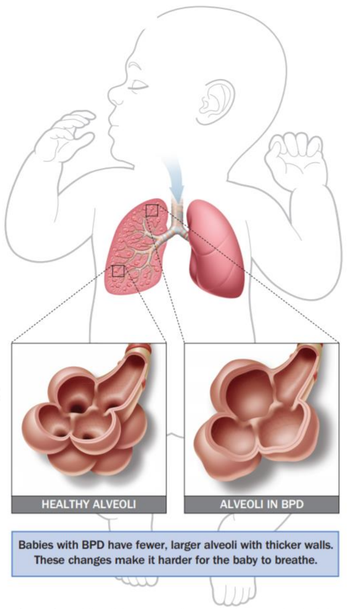


Image from: https://nicuapp.com/bronchopulmonary-dysplasia/

- Long term sequelae of BPD include pulmonary hypertension, neurodevelopmental problems, prolonged hospital stay, recurrent hospital admissions, etc.
- Treatment: steroids have potent anti-inflammatory effects which make them effective in the prevention and treatment of BPD
  - Dexamethasone decreases incidence of BPD and death in infants but also increases the risk of neurodevelopmental impairment

Hydrocortisone:

- Hydrocortisone is a proposed alternative to dexamethasone due to its milder side effects
- Evidence on the use of hydrocortisone for BPD prevention is not conclusive
  - Low doses may be inadequate at suppression of inflammation, which may still lead to BPD development

OBJECTIVES & AIMS

1. Determine whether the administration of stress dose of hydrocortisone to preterm babies at the time of illness is associated with a decreased incidence of BPD at 36 weeks of gestation
2. Examine the association between the early use of stress dose of hydrocortisone and the incidence of neurodevelopmental impairment at 18 months of age, corrected for prematurity

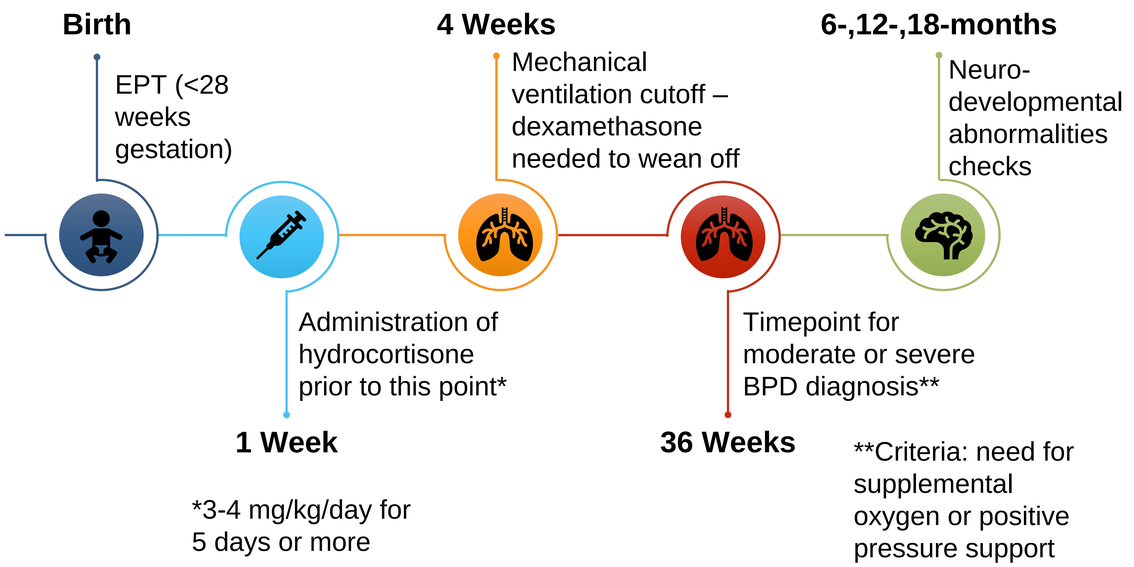
MATERIALS & METHODS

This study was a retrospective cohort study conducted at the NICU (Neonatal Intensive Care Unit) at Vidant Medical Center.

Target Population: Neonates

Inclusion Criteria
- Extremely premature neonates (EPT, <28 weeks gestation)
- Extremely low birth weight neonates
- Infants born at or admitted to the NICU before 24 hours of age between Jan 1, 2017 and Dec 31, 2019

Exclusion Criteria
- Neonates with severe congenital abnormalities
- Neonates with severe chromosomal abnormalities
- Neonates who died before 36 weeks of gestation



Control Group: For primary analysis, control group was neonates who did not receive a stress dose of hydrocortisone in the first week of life. For secondary analysis, neonates in the primary analysis control group that were treated with hydrocortisone after their first week of life were excluded.

DATA ANALYSIS & NEXT STEPS

Study Outcomes Being Measured:

1. Moderate or severe BPD using the NICHD (National Institute of Child Health and Human Development) criteria of the need for supplemental oxygen or any positive pressure support at 36 weeks of age

2. Neurodevelopmental abnormalities at 18 months of age, corrected for prematurity
   - Developmental assessments were conducted at 6-, 12-, and 18-months of age, corrected for prematurity

Data Analysis:

- Data will be analyzed using Chi-square tests, Fisher's exact tests, or rank-sum tests as appropriate
- Multivariable logistic regression analysis will be used to compare odds of BPD and neurodevelopmental impairment
- $P \leq 0.05$ will be considered statistically significant

Next Steps:

- Continued demographic data collection
- Data collection based on exposure variables
- Data analysis as described above

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ACKNOWLEDGEMENTS

Funding provided by the Summer Scholars Research Program at the Brody School of Medicine. A special thanks to Dr. Kori Brewer for her guidance and Sherry Moseley for generating a patient list from the Vermont Oxford Network database.