The Clinician’s Perspective on BPD

Roger F. Soll MD

25 Years of VON Data and Collaboration: The Challenge of BPD

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Disclosure

Dr. Soll is President of The Vermont Oxford Network and Coordinating Editor of the Cochrane Neonatal Review Group

Improved survival with the introduction of mechanical ventilation in the 1970’s

Bronchopulmonary Dysplasia

Bronchopulmonary Dysplasia: proposed pathogenesis, contributing factors and potential treatments

Proposed Pathogenesis

Factors Involved

Potential Therapies

Sustainable Host

Premature Birth
Genetic Predisposition
Fetal Anoxia
Fetal Infection

Prenatal Care
Antenatal Care
Vitamin A Care

Acute Lung Injury

Surfactant Deficiency
Infection
Inflammation

Surfactant Replacement
Antibiotics

Secondary Lung Injury

Oxidants
Proteolytic Enzymes

Antioxidants
Antiproteases

Abnormal Healing

Interstitial Fibrosis
Vitamin A Deficiency
Arachinoid Fibrosis

Monitoring Oxygen
Aldosterone
Anti-inflammatory and Anti-fibrotic Agents

Supportive Care

Definition

Bronchopulmonary Dysplasia at 28 days of age

Original definition:

- On assisted ventilation at some time during first 3 days of life
- Requiring supplemental oxygen at day 28 to 30
- Radiographic features consistent with bronchopulmonary dysplasia
Bronchopulmonary Dysplasia
Supplemental Oxygen at 28 days of age

FROM VERMONT OXFORD NETWORK ANNUAL REPORT 2013

Chronic Lung Disease
Supplemental oxygen at 36 weeks adjusted age

FROM VERMONT OXFORD NETWORK ANNUAL REPORT 2013

New Definitions:
Bronchopulmonary Dysplasia
Supplemental Oxygen at 36 weeks postmenstrual age

Accuracy of predicting outcome at 36 weeks PMA
[Accuracy = True positive + true negative / total number]

Shennan 1988, Davis 2002

Poor pulmonary outcome 84% 63%
Poor neurosensory outcome N/A 63%

Davis J. Pediatrics 2002

Evolving definitions: Why 36 weeks postmenstrual age?

50% abnormal pulmonary follow-up

20 days oxygen

FROM VERMONT OXFORD NETWORK ANNUAL REPORT 2013

Jobe Pediatric Research 1999

The “New” BPD

Clinical vs. Physiological Definition of Chronic Lung Disease

Walsh 2003

Clinical
Physiological

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Definitions of CLD

9575 infants 22 to 29 weeks or 401 to 1500 grams
NICHD Neonatal Research Network Pediatrics 2010;126:443-356

Bronchopulmonary Dysplasia

Impact on Pulmonary Outcomes

- In the first 2 years of life
  - Re-hospitalization for respiratory illness
- After 4 to 5 years of life
  - Asthma
  - Chronic respiratory symptoms
- In adolescence
  - Abnormal pulmonary function

Impact of Bronchopulmonary Dysplasia on Death or Severe Neurodevelopmental Delay

SCHMIDT AND COWORKERS 2003

Death or Severe Neurodevelopmental Delay at 18 months

- Death or severe developmental delay
- Bronchopulmonary Dysplasia
- Brain injury
- Severe ROP

Schmidt et al. Impact of Bronchopulmonary Dysplasia, Brain Injury and Severe Retinopathy of Prematurity on Outcome of Extremely Low Birth Weight Infants at 18 Months. Jama 2003

Chronic Lung Disease and Length of Stay

VON VLBW Database 2013

EVIDENCE BASED?

Our Challenge

To dramatically reduce if not entirely eliminate the major morbidities for VLBW infants
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CLD for Infants <33 Weeks Gestation

Postnatal Steroids

Morbidity for Infants and Families

Avoidable Morbidity for Infants and Families

60,000 VLBW Infants at 917 NICUs

25 Years of VON Data and Collaboration:

The Challenge of BPD

The Case for the New COFN Respiratory Management Guidelines Kristi L. Watterberg

Evidence-Based Prevention of BPD Kathleen A. Kennedy MD, MPH

Can Quality Improvement Decrease Your Rate of BPD? Michele C. Walsh MQ, MS

Risk adjusted estimates based on 917 NICUs in 2013