STRONG CHILDREN'S RESEARCH CENTER

Summer 2012 Research Scholar

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ABSTRACT

Title: ***Assessment of Respiratory Function in Preterm Infants Using Tidal Breathing Analysis***

Background: Respiratory complications, such as wheezing and bronchiolitis, are common in preterm infants. While clinical features, such as a history of bronchopulmonary dysplasia (BPD) are associated with a greater risk for respiratory morbidity after hospital discharge, infants without these features also experience respiratory complications. The Premature and Respiratory Outcomes Program (PROP) is a study designed to identify biologic, physiologic, and clinical markers that will better predict respiratory disease risk in preterm infants. One marked that PROP will utilize is respiratory inductance plethysmography (RIP), a non-invasive method of assessing respiratory function in infants prior to discharge from the hospital. Previous studies have shown that RIP measures are abnormal in preterm infants with and without BPD, but their relationship to gestational age (GA) and airway reactivity is not well understood.

Objective: Describe baseline and post-bronchodilator (BD) RIP measures in preterm infants and their relationship to clinical characteristics.

Results: We analyzed data from 34 preterm infants whose GA at birth ranged from 24-35 weeks. Phase angle (PA) was 50±36° and the ratio of time to peak expiratory flow over total expiratory time (Tpef/Te) was 0.48±0.02 (mean±SD). After treatment with inhaled albuterol, 5 (18.5%) infants demonstrated a decrease in PA of ≥40°, while 5 (18.5%) demonstrated an increase of ≥40°. No correlation was seen between PA and respiratory rate or oxyhemoglobin saturation. There were no difference in PA or Tpef/Te between infants with and without BPD or GA ≤ 29 weeks and GA = 30-35 weeks.

Conclusion: Preterm infants demonstrate asynchronous tidal breathing as evidenced by an increased mean PA. This may be due to decreased lung compliance and airway obstruction. Heterogeneity in PA response post-BD may reflect subpopulations of preterm infants with airway reactivity or bronchomalacia. The lack of correlation between RIP measures and clinical features suggests that the latter may not fully reflect underlying parenchymal lung disease. We speculate that data obtained from RIP prior to discharge from the hospital may enhance prediction of respiratory disease risk in preterm infants.