**The Impact of Early Tracheostomy on Neurodevelopmental Outcome of Infants with Severe Bronchopulmonary Dysplasia Exposed to Postnatal Steroids**

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Background: BPD is associated with long-term neurodevelopmental impairment. Tracheostomy is performed in 5-12% of severe BPD for prolonged ventilation. There is evidence that chronic ventilation with tracheostomy in severe BPD may facilitate neurodevelopment and lead to improved outcome. However, there is no consensus on the optimal timing of tracheostomy. A large multicenter study of infants with tracheostomy performed at <120 days of life had better neurodevelopmental outcomes at 18-22 months of age. Use of steroids postnatally to ameliorate the severity of BPD had been controversial due to its negative effect on neurodevelopment. To date, no data has specifically evaluated the impact of early tracheostomy on neurodevelopmental outcome of infants with severe BPD who are exposed to postnatal steroids.

Objectives/Goal: To compare the cognitive, language and motor scores among 3 groups of severe BPD infants who received early vs late vs no tracheostomy. Secondly, evaluate if postnatal steroids had an additive negative effect on neurodevelopmental outcomes.
Methods/Design: IRB approved retrospective cohort of infants with severe BPD in a level IV NICU and followed in neonatal follow up clinic, 2010 – 2017, grouped into early (ET) ≤121 days), late (LT) > 121 days) and no tracheostomy (NT). Primary outcomes: cognitive, language and motor developmental scores at 2-3 years of age, by Bayley Scales of Infant and Toddler Development, 3rd edition. Secondary outcome compared cumulative steroid exposure among 3 groups.

Results: N=68. 41 (60%) had tracheostomy and 27 (40%) with no tracheostomy (NT). Median age at tracheostomy: 121 days, 22 (54%) had ET, 19 (46%) had LT. Demographics shown in Table 1. Kruskal Wallis test (nonparametric ANOVA) showed significant difference in Motor composite scores in ET vs LT (median score 85 vs 73, p 0.028). A trend for better cognitive scores in ET vs LT vs NT but not significant. No difference in language scores among the 3 groups. Overall, LT group had the lowest scores in all three domains (Figure 1). LT group had the most steroid exposure while the NT had the least (Median steroid cumulative exposure calculated as hydrocortisone equivalent in mg: 595.05 (67.50, 1213.60); 347.20 (132.95, 677.00); 97.90 (35.60, 237.50); p=0.012) respectively.

Conclusions: Early tracheostomy may improve neurodevelopmental outcome in severe BPD particularly in motor domain. Delaying tracheostomy in severe BPD may predispose to more postnatal steroids exposure and possible worst neurodevelopmental impairment.