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

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## Research Abstract Title

**Submitting/Presenting Author (must be a trainee): Amjad Taha MD, FAAP**  
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- Medical Student  
 Resident/Psychology Intern ( $\leq 1$  month of dedicated research time)  
 Resident/Ph.D/post graduate ( $> 1$  month of dedicated research time)  
 Fellow

**Primary Mentor (one name only): Winston Manimtim MD**  
**Other authors/contributors involved in project: Gangaram Akangire MD, Janelle R. Noel-MacDonnell PhD, Tiffany Willis PsyD.**

**IRB Number: MOD00004180**

**Describe role of Submitting/Presenting Trainee in this project (limit 150 words):**  
**Amjad Taha MD is the first author for this research project who has made the most contribution in this research in terms of designing the study, collecting and analyzing data and writing the abstract under supervision and guidance of the primary mentor, Winston Manimtim MD.**

### **Background, Objectives/Goal, Methods/Design, Results, Conclusions limited to 500 words**

**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)  $\leq 121$  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, 3<sup>rd</sup> 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.