IMPRS Award Recipient

Using Late Supplemental Oxygen to Prevent Retinopathy of Prematurity Progression In Premature Infants: a Retrospective Study

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Background/Objective: Retinopathy of Prematurity (ROP) is a leading cause of childhood blindness. It affects 15,000 surviving US preterm infants annually, with 1,400 infants developing severe ROP and 500 infants developing legal blindness. The pathogenesis of ROP involves 2 phases. During phase 1, the immature retinal vascularization is obliterated due to hyperoxia. During phase 2 (>4 weeks postnatally), abnormal neovascularization occurs due to hypoxia, sometimes requiring surgical intervention. We retrospectively evaluated the impact of late supplemental oxygen (>4 weeks postnatally) on ROP progression in infants born <28 weeks.

Methods: Preterm infants <28 weeks with >stage 2 ROP admitted to the Riley Hospital for Children Neonatal Intensive Care Unit (NICU) from 7/2017- 12/2019 were included. Nine patients treated with supplemental oxygen therapy were compared to a control cohort managed by a standard protocol after the diagnosis of stage 2 ROP. The primary outcome was the need for surgical intervention with either laser or bevacizumab treatment. Continuous data was analyzed using unpaired t-test, and categorical data was analyzed using fishers exact test.

Results: There was no statistical difference in regard to clinical variables contributing to risk of severe ROP (sex, race, birthweight necrotizing enterocolitis, bronchopulmonary dysplasia or length of stay) between the two study cohorts. There was a statistically significant decrease in need for treatments (laser or bevacizumab) in patients receiving supplemental oxygen (control: 35/83 patients treated, late O2: 0/9 patients treated, p=0.012).

Conclusion and Implications: Supplemental oxygen therapy seems to have a protective effect on the development of treatable ROP (type I). Limiting surgical intervention (laser or bevacizumab) would directly benefit the babies by decreasing the need for sedation and any inherent risks of surgery. This initial data suggests the need for future studies with a higher sample size to validate the efficacy of late supplemental O2 in ROP.

Robert Minturn is a third year medical student currently undecided on specialty choice. "This project provided me the benefit of exposing me to several pediatric fields including neonatology and pediatric ophthalmology. I am grateful that through this project I gained a solid base of knowledge and mentors to reach out to in the future, however, the true impact this research could have for future premature babies was what I enjoyed the most. I look forward to continuing this research and seeing where the data takes us."